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WAGE DETERMINATION IN ITALY WITH AND WITHOUT INDEXATION.

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ABSTRACT: It is commonly believed that the 1992 and 1993 Wage Agreements have been crucially important in the disinflation enacted in Italy at the beginning of the 1990s. Perhaps because of this wide agreement, not much scientific literature has been devoted to these agreements and to their effects. In the present study we take up this topic, concentrating on the relationships between these agreements and macroeconomic performance. We tackle these issues within a macroeconomic model throughout the 1970-2002 period in order to have a wide enough perspective on the structural changes that might have affected our equations. Our emphasis is a on the Central Bank reaction function and on wage equations specified and estimated on 2-digit industry data. A distinctive feature of our work is that we construct and utilise industry-level estimates for the degree of indexation. we find (similarly to Fabiani et al., 1998) that the target rate of inflation had some impact on expectation formation. On the other hand, the Agreements have some the impact on the relationships between wages and other main labour market variables. Generally speaking, and to some extent contrary to expectations, the demise of the *scala mobile* and the Agreements make wages *less* reactive to labour market slack. Also the impact of labour productivity is actually lower after the Agreements, in spite of the move to decentralised bargaining (all this is well in agreement with the arguments in Casadio, 2002).

1) Introduction

It is commonly believed that the 1992 and 1993 Wage Agreements have been crucially important in the disinflation enacted in Italy at the beginning of the 1990s. Perhaps because of this common belief, not much formalised analysis has been devoted to these agreements and to their effects (a notable exception is Fabiani *et al*., 1998; highly interesting descriptive accounts of the Agreements and of their workings are contained in ISTAT, 2002 and in Casadio, 2002). In the present study we take up this topic, which has considerable interest, because it provides a rather rare example of incomes policy in an advanced economy in recent years. Providing an analytically sound assessment of the impact of the Agreements on the macroeconomic performance of Italy in the 1990s can then be an important element in the analysis of the control of inflation under the current institutional set-up.

The 1992 and 1993 Wage Agreements have been characterised (i) by the demise of the system of wage indexation (the well known *scala mobile*) which had characterised to a large extent wage determination in Italy throughout the post-war period; (ii) by a reform of the institutional set-up of wage bargaining: basically, the length of nation-wide collective contracts was reduced to two years (from the previous three-four years), nation-wide wage bargaining was centred on the respect of the target rate of inflation set by government, while the link between labour productivity and wages was mainly shifted to decentralised wage bargaining. The macroeconomic outcome of these reforms is perhaps not as clear as it may seem. It is true that the rate of inflation has been curbed and brought to the levels required by the Maastricht Treaty, despite the occurrence of two negative rate-of-exchange shocks (in 1992 and 1994-5). Yet, the rate of unemployment also underwent through a largely unfavourable evolution. After a considerable increase at the beginning of the 1990s (over 3 percentage points above the already high mean rate of the 1980s), unemployment has levelled off and then decreased. Yet, the rate of unemployment in 2002 was still no lower than it used to be in the 1980s. All this leaves ground for believing that the reduction of inflation could have been primarily the outcome of a restrictive monetary policy, feeding into the labour market through the increase in unemployment and the moderating influence of the latter on wage determination.

The aim of the present paper is twofold. First of all we want to assess the extent to which the Agreements, putting an end to the *scala mobile* system, did indeed have an impact in helping disinflationary demand management. In this sense it is important to assess whether the Agreements succeeded in moving away from the backward-looking character of wage bargaining in Italy, and in realigning inflationary expectations to the target level chosen by government. Secondly, we want to assess the impact of the Agreements on the evolution of the main labour market variables. Did the emphasis on decentralised wage bargaining succeed in achieving a closer relationship between labour productivity and wages? Was the *scala mobile* imposing some kind of constraint on wage bargaining? Have wage setters experienced problems in keeping up with inflation in the absence of indexing clauses?

It may be thought that the demise of the *scala mobile* had some role in determining the significant decline of the labour share of value added which took place in the last decade in Italy. There are obviously other explanations for this phenomenon: technological change, decline of unions' bargaining power, changes in the industrial composition of GDP, changes in the international division of labour. Yet, the contribution to this phenomenon of the new institutional set-up of wage bargaining has never been examined with the due attention and constitutes an important focus of attention for our work. In the light of the changes in the functional distribution of income, it is possible to gauge the impact of the Agreements on the evolution of output and employment. In particular, aggregate employment has shown in the last decade an almost unprecedented growth (over one and a half million additional units in the last seven years). It is important, in our view, to measure the extent to which wage moderation (and more particularly the Agreements) have contributed to this outcome. Here too, of course there are other explanations to be duly taken into account: changes in the industrial composition of employment, the advent of part-time and fixed-term labour contracts.

In principle these issues should be tackled within a full-fledged macroeconomic model. For instance within the New Keynesian approach we would have a supply side determining wages, prices and labour demand, and demand side comprising an expectations-augmented IS function and a Central Bank reaction function. The latter is crucial in order to allow for the changes in the preferences of policy-makers that are

likely to have occurred in Italy at the beginning of the 1990s. In this sense the present analysis can be considered only as a preliminary step to this fuller analytical set-up. Indeed here we concentrate only on two building blocks of the model: the Central Bank reaction function and the equations describing wage determination. The reaction function of the Bank of Italy, whose understanding is crucial in gaining insights on the stance of monetary policy and its evolution, is analysed mainly through an historical account of the relationships between rates of interest, inflation and output. As for the equations describing wage determination, they are obviously needed to address the question posited above on the relationships between the Agreements and macroeconomic performance. In order to lend higher power to tests of the role of the *scala mobile* on wage formation, our wage equations are specified and estimated on 2-digit industry data over the 1970-2002 period. Indeed, a distinctive feature of our work is that 2-digit industry-level estimates for the degree of wage indexation are constructed and utilised. In our view, the 2-digit industry set-up also allows a better understanding of the determination of equilibrium in the labour market. As will be shown below, wage comparisons turns out to be very important in the process of wage determination. This set-up also makes it straightforward to allow for the potential role played by changes in industrial composition in explaining the evolution of labour share and employment.

The rest of the paper has the following structure. In Section 2 we provide an historical account of the relationships between rates of interest, inflation and output throughout the 1980s and the 1990s, and assess the occurrence of changes in the reaction function of the Bank of Italy. In Section 3 we survey previous analyses of the 1992 and 1993 wage agreements and derive empirical specifications of the wage equation that can provide further evidence on this matter. Section 4 presents the data and the empirical results. Finally some concluding remarks are given in Section 5.

2) Monetary Policy in Italy throughout the 1980 and the 1990s

Monetary Policy in the EMS Period

At the end of the 1970s the Italian economy was facing two main problems: a very high rate of inflation (between 1972 and 1977 this rate had gone from 5.6 to 18.1 %)

and an ever increasing public sector borrowing requirement. Monetary policy had to adjust in order to face these problems. However, the decision taken in 1979 to adhere to the European Monetary System marked a radical turn in monetary strategy, which concretely began in that moment to aim to price stability. The adhesion to the rate of exchange control mechanism was expedient in imposing self-discipline to the Bank of Italy and in controlling inflationary pressures. By the same token this choice strongly contributed to restrain inflationary expectations and heightened the incentives for firms to exert a more careful control upon cost increases.

Hence the real intermediate target of monetary policy in those years was the rate of exchange. Still, the control of monetary targets also contributed, although to a reduced extent, to the pursuit of price stability. In 1984 the M2 aggregate was considered alongside with the CTI (total domestic credit) intermediate target, and even came to supplant the latter in the last years of the Ciampi governorship. Yet, even if the M2 targets were publicly announced, they could not (yet) be properly defined as intermediate targets. The expediency of monitoring M2 was of an essentially informative kind: econometric analyses from the Bank of Italy showed that M2 alone could predict the 43% of the variability of nominal GDP (the informative content of CTI was by comparison very small). M2 velocity remained indeed rather stable throughout the second half of the 1980s. Establishing a target M2 growth also implicitly constrained the monetisation of public debt.

Italian Monetary Policy from September 1992 to December 1997

In 1992 Italy went out of the EMS because of the increasing pressures towards devaluation of the lira. The persistent imbalances in public finance helped in fostering a climate of scepticism concerning the chances that Italy had to fulfil the requirements of the Maastricht Treaty. A massive sale of Italian bond from foreign investors followed urging the Bank of Italy to raise interest rates in order to defend the lira rate of exchange. This strategy was not however sustainable in the long run. Furthermore Italian firms were losing competitiveness within the EMS. Rising costs were often attributed to aggressive wage bargaining in the industries protected from foreign competition (services and public administration). In 1988, for instance, a session of very buoyant nation-wide wage contracts took place.

These structural factors, plus some conjunctural elements, brought about the exit of the lira from the EMS. Hence the Bank of Italy could no longer count on the intermediate target of the rate of exchange in order to control inflation. The objective of price stability had to rely on strategies of a different kind, whose crucial aim was to establish the anti-inflationary credibility of the Bank itself.

In Italy the most serious obstacle to the acquisition of a solid anti-inflationary credibility of monetary policy has been represented by the size of public debt. Virtually any restrictive monetary policy determines, at least initially, a rise in the rates of interest which feeds back unfavourably on public debt. Hence the public, faced with the announcement of a monetary squeeze may not revise downwards its inflationary expectations, believing that the Bank will not pursue a too restrictive policy that would worsen public finance imbalances. Albeit the conditions for gaining credibility were far from good, the Bank of Italy adopted a very restrictive monetary stance after the exit from EMS, in order to acquire quickly a good anti-inflationary reputation. This new strategy determined the introduction of four important innovations in the *modus operandi* of monetary policy:

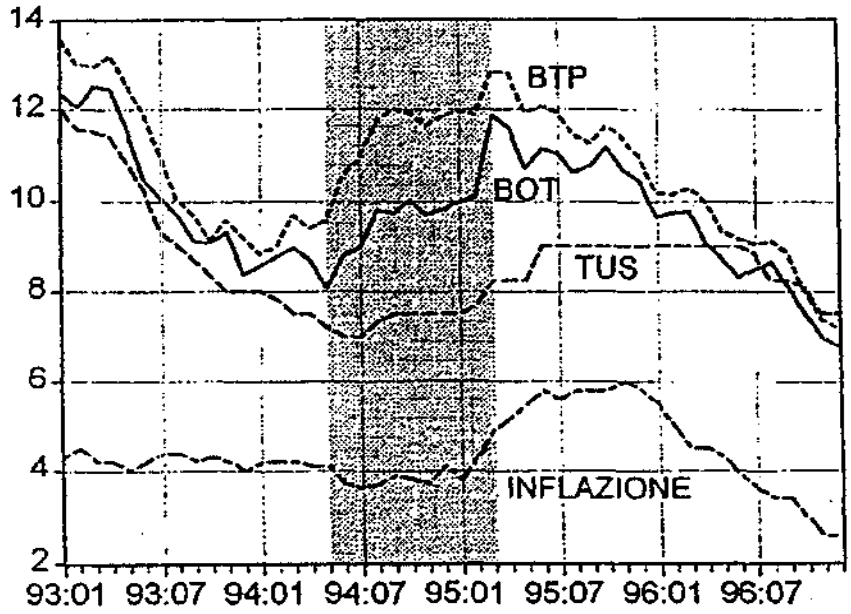
1. relinquishing anti-cyclical policies: monetary policy is restrictive also in the presence of a slump, and the rate of exchange is no longer utilised to foster competitiveness;

2. a relatively high level of the official rate of interest (TUS). The TUS can be lowered only when inflation credibly approaches the targeted level;

3. a careful control of short-term interest rates. Until when inflation credibly approaches the targeted level the structure of short-term rates must be decreasing;

4. a greater attention paid to the information embodied in long-term interest rates, which in an efficient market are strongly linked to the expectations of future inflation.

Investment in anti-inflationary reputation has been rigorous since 1995, while in 1993 and in 1994 the strategy followed by the Bank of Italy has been more ambiguous. A telling example is provided by the behaviour of the Bank in August 1994. The Bank of Italy decided to lower the TUS although the (long-term) BTP rates were growing (see Fig. 1).



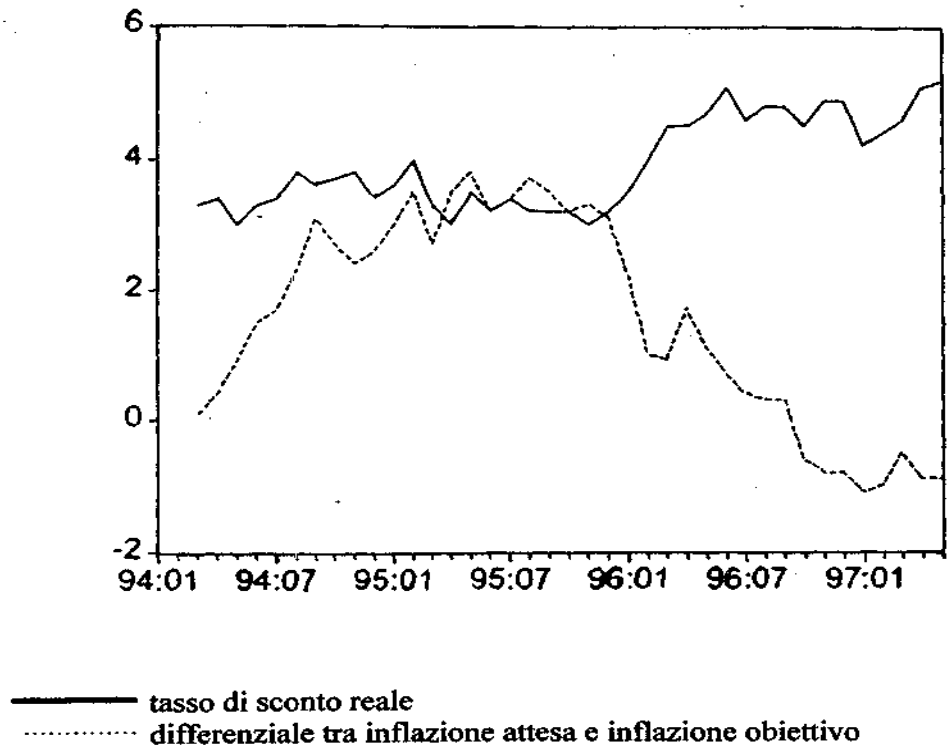
Fonte: Osservatorio monetario 1/1997

Fig. 1 - TUS, BOT rate, BTP rate and inflation rate between 1993 and 1997

An expansionary monetary policy was thus adopted in the face of growing inflationary expectations. Probably the Bank wanted to avoid an increase in the loan rates or further increases in the long-term bond rates. In any case, the extremely bad consequences of this kind of conduct for the anti-inflationary reputation of the Bank of Italy urged the Bank to follow a much stricter policy from 1995 onwards. In April 1995, for instance, the Bank of Italy raised the TUS even if the market interest rates were decreasing. There were inflationary pressures from the depreciation of the lira, rises in indirect taxes and lagged effects of the relatively buoyant economy. Only when inflationary expectations decreased after mid-1996 the TUS was lowered. In 1997 a similar strategy was followed and the TUS was lowered well after the reduction of market rates.

When considering the 1992–1997 period and comparing the target rates of inflation with the actual rates, 1995 stands out as the turning point of monetary policy. In 1995 the (positive) difference between the actual and target rates of inflation was largest. Following that year actual and target rates began to converge and already in 1997 the actual rate was lower than the target rate.

Since 1995 the Bank of Italy began to announce a target rate of inflation for the following year. This lead many commentators to believe that the Bank was following an "inflation targeting" regime. Actually, the policy of investment in anti-inflationary reputation differs from inflation targeting for at least one fundamental reason. In inflation targeting the Central Bank essentially focuses on short-run inflationary expectations, while for a policy of investment in anti-inflationary reputation the expectations that matter are medium- to long-term. This explains why, in the face of virtually no difference between rate of inflation expected one year after and target rate of inflation, the Bank of Italy did not automatically lower the TUS (see Fig. 2).



Fonte: Osservatorio Monetario 2/1997

Fig. 2 – Real TUS; one-year ahead expected rate of inflation minus target rate of inflation.

It could be asked if, after 1992, the Bank of Italy could have relied on the control of monetary aggregates in order to pursue price stability. Such a strategy would have made sense only if a stable relationship existed between monetary aggregates and nominal GDP. As already said, M2 maintained a rather stable relationship with nominal

GDP until the end of the 1980s. Some studies suggest that, after getting out of the EMS, the Bank of Italy could have safely followed a policy of "monetary targeting" at least until 1996. After 1996, some shifts took place in the composition of the demand for money and financial instruments, and monetary targeting is not likely to have always been a convenient alternative to the policy of investment in anti-inflationary reputation actually followed by the Bank of Italy.

The EMU and Monetary Policy

The year 1998 essentially witnesses a transition from a bank of Italy investing in anti-inflationary reputation to a situation in which the ECB no longer needs to pay a high price in terms of rates of interest in order to be credible. As the Bank of Italy prepares to the entry of Italy in the EMU (which takes place in January 1999), a slight reflationary policy takes place, in order to align (downward) the rates of interest with the other central banks by the end of 1998 (see Fig. 3).

From 1999 onwards the ECB has mostly maintained a rather restrictive stance in the face of a rather high degree of capacity utilisation over most EMU countries. After the beginning of 2001, the ECB somehow relents its stance, but the real interest rates remain almost constant (see again Fig. 3).

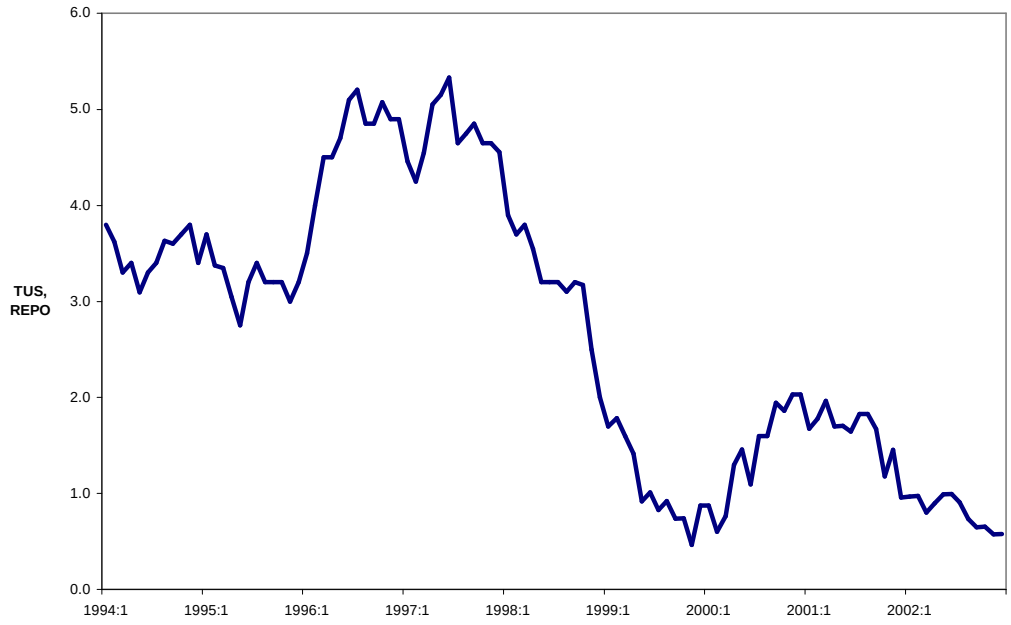


Fig. 3 – Real TUS; real REPO (in terms of the Italian rate of inflation over the previous year).

It is true (not only in Italy, but all over Europe) that since 2000 the actual rates of inflation have been higher than the expected rates. However, this has little to do with a slackening monetary policy. The so-called core rate of inflation has been kept at rather low levels, and the gap between actual and target inflation has been the outcome of cost-push pressures. Among these pressures, the ECB singles out prices above average in private services and in the food industry, as well as surges in energy prices (*Monthly Bulletin*, February 2004, p. 48).

3) The 1992 and 1993 Agreements and Wage Determination. The Wage Equation

Wage determination before and after the Agreements: an institutional account

As is well known, the system of wage bargaining presiding to the determination of wages until 1991 was characterised by three main components: the cost-of-living adjustment clauses (the *scala mobile*), the nation-wide collective contract (set at the industry level typically every three years), the plant-level contract (set at the firm level with a much irregular frequency, in any case typically lower than three years).

Until the mid-1970s the *scala mobile* was differentiated across workers' categories and industries according to the existing wage relativities and assured quarterly cost-of-living adjustment with an elasticity of wage to the cost-of-living index (the so-called degree of indexation) roughly equal on average to 70%. In February 1975 a very important agreement took place between the Confederation of industries and the unions, concerning a thorough reform of the *scala mobile* system. This agreement brought about a substantial rise in the degree of wage indexation, which gradually shot up on average to 100%. Moreover, the 1975 Agreement implied a return to a previous system of flat-rate allowance units to be attributed to all workers. All category-, age-, and sex-based differentials basically disappeared; also this new system could not take into account the contractual growth in real wages. After the 1979 nation-wide contractual rounds the average degree of indexation came back to levels around 70-80%. In December 1985 another important reform of the *scala mobile* took place. The frequency of cost-of-living adjustment became semi-annual and the flat-rate allowance units were abandoned in favour of a mechanism linking the rate of change in a share of

total compensation to the rate of inflation over the two preceding semesters. This reform partially reintroduced a link between the amount of cost of-living adjustments and the contractually negotiated wage levels, stabilising the average degree of indexation around 60%. In December 1991, an Incomes Policy Agreement signed by unions, Confederation of industries and government actually suspended all kinds of index-linked adjustments for the first half of 1992. The government also undertook to keep the rate of growth in the public sector under 4.5 per cent (the target rate of inflation). In July 1992, a new Incomes Policy Agreement deliberated the complete abolition of the wage indexation system.

It is widely believed (see for more detailed analyses Destefanis, 1995; Banca d'Italia, 1986) that, particularly in the years from 1975 to 1979, the *scala mobile* burdened the Italian economy with an amount of real wage resistance higher than what would have otherwise existed. Also, the *scala mobile* worked in the sense of compressing the existing wage relativities, bringing about detrimental allocative effects and an added pressure to upward wage adjustments that could re-establish the previous relativities. Thus the *scala mobile*, as well as the nation-wide industry contracts, may have had a pervasive role upon the wage structure, bestowing a considerable degree of wage rigidity to the Italian economy (Bodo and Sestito, 1991; Visco, 1994; Casavola *et al.*, 1995). The gradual realisation of this state of affairs, plus the intrinsic gravity of the Italian economic situation at the beginning of the 1990s (concerning in particular the public finance imbalances and the apparently scant probability to fulfil the Maastricht Treaty requirements) brought in the early 1990s to two very important episodes of consensual incomes policy.

The July 1992 Agreement signed by unions, Confederation of industries and government, beside deliberating the complete abolition of the wage indexation system, also ruled out rises in wages for the remainder of 1992, decreeing a flat-rate monthly rise of 20 000 lire from January 1993. This agreement could not prevent the exit of the lira from the EMS, which took place in September 1992. However, the consensual basis of the Agreement proved strong enough to resist the 15% depreciation of the lira and to bring about in July 1993 a new incomes policy agreement. The "Protocollo sulla politica dei redditi e dell'occupazione, sugli assetti contrattuali, sulle politiche del lavoro e sul sostegno al sistema produttivo" has defined a new system of wage determination.

The new system is centred upon two contractual levels, similar in principle to those already in existence. The nation-wide industry contracts rule now wage determination over a two-year time horizon (while dictating other normative aspects of the labour contract over four years). Wage rises implied by this contractual level should be consistent with the target rate of inflation annually decided by the government. The eventual discrepancy between actual and target rate of inflation is one of the elements taken into account when nation-wide industry contracts are renegotiated after a two-year period. This discrepancy must be evaluated in the light of total (not only contractual) wage growth and of the evolution of the terms of trade. The second contractual layer relates to plant-level bargaining, and should now emphasises the nexus between wages and firm productivity and profitability. Finally, an indexation scheme of sorts still exists as a guarantee to workers if nation-wide industry contracts are not renegotiated within the prescribed two years. The nation-wide contractual wage rates increase by 30% of the *target* rate of inflation after three months of delay in renegotiation and by 50% after six months.

Wage determination before and after the Agreements: some analyses

Some very interesting accounts of the 1992 and 1993 Agreements and of their workings are provided in Fabiani *et al*. (1998), in ISTAT (2002) and in Casadio (2002). The analysis provided by Fabiani *et al*. (1998) is based on the econometric model of the Bank of Italy (METBI). They provide counterfactual simulations according to which in the absence of the Agreements inflation in 1996 would have 2-3 percentage points higher. Also, achieving the historical rates of inflation through monetary policy only would have put in jeopardy the process of fiscal consolidation. Less clear is the impact of the Agreements on the determinants of the NAIRU. The key element of the analysis is the wage equation of the METBI. Fabiani *et al*. (1998) not only consider the structural stability of this equation throughout the early 1990s, but also attempt to model the modifications implied by the Agreements for the process of wage determination.

The wage equation of the METBI is essentially a Phillips curve and its key features are represented by the following function:

$$\Delta w_t = f\,[\ \alpha\,\Delta p_{t-1} + (1-\alpha)\,\Delta p^{e}_{t}\ ;\ \mathrm{pos}\,(\Delta p_{t-2} - \Delta p^{e}_{t-2})\ ;\ -U\ ;\ -\Delta(U^{CN}/U^{S})\ ;\ CU\ ;\ \Delta HS\ ;\ \Delta RR\ ] \qquad (3.1)$$

The quarterly rate of change in (non-agricultural, non-energy) private sector wages, Δw_t, is a linear homogenous function of past and expected inflation rates (Δp_{t-1} , Δp^e_t); it also depends on an asymmetric catch-up term of past forecasting errors in the rate of inflation (only positive errors matter); on the rate of unemployment, U, and on the change in the ratio between the Northern and the Southern unemployment rates; on the degree of capacity utilisation, CU; on the change in number of hours lost in strikes; on the change in a measure of the replacement ratio (allowing for unemployment benefit plus CIG expenditure). Note that time subscripts are skipped in (3.1) when not absolutely necessary. Quite clearly, the price-wage nexus in the above equation is rather ad hoc and does not explicitly allow for the workings of cost-of-living clauses. Also, relying on a classic Phillips curve format rather than on a real wage equation may make it more difficult to ascertain changes in the NAIRU through estimates of this equation (see on this Bean, 1994; Sestito, 1994).

Fabiani *et al*. (1998) test the structural stability of this equation from 1972 to 1996. Application of the stability test proposed in Hansen (1994) does not reveal any significant break in the wage equation. Yet, when the equation is estimated up to 1991:4 it generally overpredicts wage changes over the following quarters, providing *prima facie* evidence that the Agreements were indeed episodes of wage moderation. Further evidence is provided by recursive OLS estimates: the evolution of the coefficient on unemployment and of the constant term suggest a reduction in the NAIRU following the agreements. However, these changes are not statistically significant. There is more decisive evidence in favour of a modification of the coefficients linking wage changes to past and expected inflation rates. The weight of the latter increases over time in line with the demise of the *scala mobile* system.

Fabiani *et al*. (1998) then proceed to a more precise attempt of estimating a wage equation incorporating the institutional changes brought about by the Agreements. This is made maintaining the specification of the (3.1), but jointly allowing for the possibility that the coefficients linking wage changes to past and expected inflation rates (including the catch-up term of past forecasting errors) change after 1993:1 and that expected inflation is geared to the target rate of inflation set by government. The results point out that after 1993:1 the weight of expected inflation (or rather of the target rate of

inflation) on wage bargaining decisively increases. They also point out, however, that the catch-up coefficient shoots up after 1993:1, providing an overcompensation of past forecasting errors in inflation. The authors find this evolution qualitatively credible but too pronounced in quantitative terms.

The account in ISTAT (2002) is of a more descriptive nature. It clearly points to the existence of three phases in the evolution of wages after the Agreements. In the first phase (1993-1994) there is a strong reduction in wage growth. Among the determining factors of this evolution, some emphasis is put on the 1992-1993 wage freeze. In the second phase (1995-1997), wage bargaining is rather intense, especially in 1995 and 1996. The economic upturn also brings about a positive wage drift, especially as far as manufacturing is concerned. Finally, from 1998 onwards, wage growth slows down again. A particularly important feature of this slowdown is the loss in wage-earners purchasing power. While the actual rate of inflation is often above the target rate, there is prima facie evidence that wages are still anchored to the latter. As far as the wage-productivity nexus is concerned, there is some evidence that the weight of decentralised bargaining increased over the period in question, although this phenomenon was not very strong outside manufacturing.

According to Casadio (2002), the 1992-1993 Agreements were crucial in dampening the price-wage spiral at the aggregate level, driving inflationary expectations down to their target level and co-ordinating, at least to some extent, wage dynamics. However, the diffusion of firm-level flexible wage-premia remained confined to the medium-large firms. Productivity gains were only partly distributed to wages and probably yet insufficient elements of flexibility and differentiation were introduced in wage bargaining.

Going beyond the existing evidence

It may be safely maintained that the demise of the *scala mobile* has modified the backward-looking character of wage bargaining in Italy. Yet there are two different questions in this ambit that should be dealt with separately: did wage setting become more forward-looking? Was the target rate of inflation duly taken into account in wage bargaining after the 1993 Agreement? Both questions are dealt with jointly, rather than separately, by Fabiani *et al*. (1998), and we believe that new evidence on this matter can

be of some interest. In the light of the discussion in Section 2, it is important to test whether the realignment of inflationary expectations to the target rate has been affected by the consistent investment in anti-inflationary credibility carried out by the Bank of Italy since 1995, or, in another sense, by the prolonged discrepancy in recent years between actual and target inflation. Also of interest is to ascertain whether wage setters experienced problems in keeping up with inflation in the absence of indexing clauses. A second set of questions relates to the impact of the Agreements on the evolution of the main labour market variables. Did the emphasis on decentralised wage bargaining succeed in achieving a closer relationship between labour productivity and wages? Was the *scala mobile* imposing some kind of constraint on wage bargaining (see on this Destefanis, 1995) that was relaxed after its demise?

In order to deal with these questions and get new evidence on the impact of the 1992 and 1993 Agreements, we specify and estimate a set of wage equation using 2-digit industry level data. In this sense, our analysis can be seen as an extension of the estimation exercise proposed in Fabiani *et al*. (1998). With respect to that contribution, we also have the advantage of six more years of (quarterly) observations. The availability of these data is likely to provide more information on the workings of the post-1993 wage bargaining set-up in the presence of a prolonged discrepancy between actual and target inflation. Eventually, some hypothesis about the effects of non-standard labour contracts on wage determination can also be surmised.

When commenting upon the evidence in Fabiani et al. (1998), we have evinced the need for a more explicit modelling of the dynamic structure of wage adjustment: this includes the use of direct measures for cost-of-living adjustments as well as the specification and testing of a more articulated price-wage nexus. In particular, we shall put to test the forward-looking mechanisms proposed in Moghadam and Wren-Lewis (1994) and in Roberts (1995). Also, we consider it appropriate to introduce an error correction term, developing upon the contribution of Lee and Pesaran (1993). The main aim of this extension is to allow a much better modelling of wage-wage interactions, as well as a direct test of the eventually stronger nexus between wages and labour productivity after 1993.[1]

[1] It may also be thought that a real wage equation is likely to yield a more straightforward estimation of the evolution of the NAIRU. See however on this Bean (1994), Sestito (1994).

Finally, we could also explore the possibility that the change in bargaining institutions is to be modelled as a change in wage norms (akin to incomes policy norms) and estimated along the lines suggested in Wren-Lewis (1985).

4) The 1992 and 1993 Agreements and Wage Determination. Some New Evidence

The Econometric Specification

As a starting point, it is convenient to expound some issues about the econometric specification of the wage equation under three headers: the nominal adjustment mechanism; the Phillips curve term; the set of shift variables.

(a) the nominal adjustment mechanism: in an expectations-augmented Phillips curve set-up, wage changes clearly depend upon expected changes in prices. Usually, when modelling this relationship, lagged wage and price changes are also taken into account because of various reasons (informational lags, wage inertia, …). The equation estimated by Fabiani *et al*. (1998) is no exception to this, as it includes the lagged rate of inflation, as well as a catch-up term for past forecasting errors in inflation. In the past there have also been successful attempts at including lagged rates of change of wages for a period akin to that considered here. However, almost invariably, the expected rate of inflation has been considered in a rather ad hoc fashion: often the variable included in the equation measured expected inflation for the current quarter, which does not make much sense in terms of most theoretical models of wage adjustment.[2]

In our view, a better approach, followed for instance in Moghadam and Wren-Lewis (1994) and in Roberts (1995, 1997), is to start from a theoretically based forward-looking mechanisms that links price expectations to wages and to derive from it the econometric equation.[3] If, for simplicity, it is assumed that wage contracts are made annually and last for one year, contracts struck at t (c_t) could embody expectations of variables in quarters t+1, t+2, t+3. If it is further assumed that regardless of the date of

[2] We hasten to add that a few studies (including Fabiani *et al*., 1998) partially overcome this critique by relying on a direct measure of inflation expectations. These measures however typically relate to the one- or two-quarter ahead rate of inflation, arguably a still too short time horizon.

[3] A first attempt on Italian data along these lines has already been made with some success in Destefanis (1997).

stipulation all groups of wage setters form the same expectations for a given quarter, the following formula can be written:

$$c_t = 1/4 \left[p^e_{t+3} + p^e_{t+2} + p^e_{t+1} + p^e_t \right] \quad (4.1)$$

But recorded wages in quarter t reflect not only contracts struck at t, but also contracts struck at t-1, t-2, t-3. If contracts last one year for everybody and every quarter the same share of wage setters renew their contracts, then we can write:

$$w_t = 1/4 \left[c_t + c_{t-1} + c_{t-2} + c_{t-3} \right] \quad (4.2)$$
$$= 1/4 \left[1/4\, p^e_{t+3} + 2/4\, p^e_{t+2} + 3/4\, p^e_{t+1} + 4/4\, p^e_t + 3/4\, p^e_{t-1} + 2/4\, p^e_{t-2} + 1/4\, p^e_{t-3} \right]$$

In terms of rates of change, one can straightforwardly obtain:

$$\Delta w_t = 1/4\, \Delta \left[1/4\, p^e_{t+3} + 2/4\, p^e_{t+2} + 3/4\, p^e_{t+1} + 4/4\, p^e_t + 3/4\, p^e_{t-1} + 2/4\, p^e_{t-2} + 1/4\, p^e_{t-3} \right] \quad (4.2')$$

This leads to the issue of linear homogeneity of wages in expected prices. It can only hold if the discount factor on future variables is equal to one, which is usually assumed for high-frequency data. However the analyses in Karanassou *et al*. (2003; forthcoming) provide some elements of doubt in this respect.

There is a further important issue concerning nominal adjustment. In Italy, the existence for a long period of cost-of-living adjustment clauses means that the price-wage nexus working through this channel should be explicitly specified and measured. Since Banca d'Italia (1986), this kind of relationship is usually modelled as:

$$\Delta w_t = \gamma_t \Delta cv_t + (1-\gamma_t)\, 1/4\, \Delta [\ldots] \quad (4.3)$$

where γ_t is the (possibly time-varying) degree of indexation, cv_t is (the natural log of) the price index used in the calculation of the cost-of-living allowance and […] is the term in square brackets defined in (4.2'). The analyses in Visco (1984), Banca d'Italia (1986) have also led many researchers to believe that wage setters may try to make up

for past forecasting errors in inflation. In the presence of cost-of-living adjustment clauses, this catch-up term is likely to take one of the following forms:

$$(1-\gamma_{t-1}) \{ \Delta p_{t-1} - 1/4 \, \Delta [\dots] \} \quad (4.4a)$$

$$\Delta p_{t-1} - \gamma_{t-1} \Delta cv_{t-1} - (1-\gamma_{t-1}) \, 1/4 \, \Delta [\dots] \} \quad (4.4b)$$

Both specifications were tested in empirical analysis. As will be recalled, Fabiani *et al*. (1998) suggest that this catch-up term should be asymmetric (only positive forecast errors mattering); this suggestion was also put to test.

(b) the Phillips curve term: by this term we mean the variable (or set of variables) standing for the impact of wage market pressures on wage determination. It is well known that various measures of the rate of unemployment may be chosen to represent labour market slack. However, it is also worth pointing out that the dynamic specification of this term too may be the object of a priori considerations. Following Moghadam and Wren-Lewis (1994) or Destefanis (1997) it may be thought that forward-looking behaviour from wage setters may be relevant for the rate of unemployment too. In this case one would obtain the following formulation:

$$w_t = 1/4 [1/4 \, p^e_{t+3} + 2/4 \, p^e_{t+2} + 3/4 \, p^e_{t+1} + 4/4 \, p^e_t + 3/4 \, p^e_{t-1} + 2/4 \, p^e_{t-2} + 1/4 \, p^e_{t-3}] +$$
$$+ 1/4 [1/4 \, \omega^e_{t+3} + 2/4 \, \omega^e_{t+2} + 3/4 \, \omega^e_{t+1} + 4/4 \, \omega^e_t + 3/4 \, \omega^e_{t-1} + 2/4 \, \omega^e_{t-2} + 1/4 \, \omega^e_{t-3}] \quad (4.5)$$

where ω is a function of the rate of unemployment. A perhaps more customary specification can be obtained along the lines of Roberts (1997), who adopts an overlapping-contract model à la Taylor and finds that a moving average of current and past rates of unemployment should enter the wage equation.

A related issue is whether a function of employment should enter the wage equation. The 2-digit industry set-up of the present analysis lends itself very well to this kind of test, because sectoral employment is not very likely to be correlated with the aggregate rate of unemployment. In the empirical analysis we will try the following specification proposed in Lee and Pesaran (1993): $n_{jt} - n_j^*$, where n_{jt} is the (natural log

of) number of employees in sector j at time t, and n_j^* is the lowest level of dependent employment in sector j tolerable to wage setters. In empirical analysis, n_j^* was proxied by the one-year lagged average number of employees in sector j.

(c) the set of shift variables: these variables usually include some function of real wages, labour productivity and fiscal terms (tax wedge, replacement ratio, …). Here we follow the suggestion from Lee and Pesaran (1993), and include among the shift variables

$w_{jt-i} - p_{t-i}$, the lagged real consumer wage;

$w^A_{t-i} - p_{t-i}$, the lagged real alternative consumer wage (this can be conveniently measured by the real consumer wage of sectors other than j, in the empirical analysis we adopt a fixed-weight mean);

x_{jt-i}, a (lagged) measure of output per head corrected for sectoral terms of trade. We should also include measures of the tax wedge and replacement ratio, but they were unfortunately unavailable for 2-digit industry quarterly data.

A final point concerning the general specification of the wage equation is whether the dependent variable (as customary, the rate of change in wages) should be modelled as a quarterly rate (Δw_t) or as an annual rate ($\Delta_4 w_t$; this specification also implies a straightforward reformulation of some regressors). While the bulk of the Italian empirical literature point in the latter direction, Fabiani *et al*. (1998) make the opposite choice. The two alternative formulations can be quite easily compared from the empirical standpoint. When we did so, there was a marked (although by no means overwhelming) support for the $\Delta_4 w_t$ specification, which shall then be the baseline specification in analysing the impact of the 1992 and 1993 Agreements.

Testing the impact of the 1992 and 1993 Agreements

Drawing from the discussion in Sections 2 and 3, let us examine again the main points relating to the analysis of the impact of the 1992 and 1993 Agreements on wage determination.

The first points are crucially linked to the treatment of expectations, inflation expectations in particular.

(a) did wage setting become more forward-looking after the demise of the *scala mobile*? In principle this can be tested along the lines of Fabiani *et al*. (1998). However, if a specification like the (4.4) is adopted, testing for parameter changes may not even be necessary;

(b) was the target rate of inflation duly taken into account in wage bargaining after the 1993 Agreement? This point may be better understood in the light of our approach to price expectations.

In order to build price (or unemployment rate) expectations, a fourth-order autoregressive function was estimated over a window of 24 quarterly observations shifted throughout the 1964:1-1996:4 period. The chain rule of expectations has then be applied to the autoregressive structures found in this manner, so as to obtain expectations of future values for the required time horizons. In this manner there was no need to assume that regardless of the date of stipulation all groups of wage setters form the same expectations for a given quarter, and in each quarter wage setters were endowed with an information set to which they actually might have had access.

If the target rate of rate of inflation was taken seriously after the 1993 Agreement, then expectations built upon this rate should have superseded the above described mechanism of expectation formation.

Other points concerning the impact of the 1992 and 1993 Agreements on wage determination relate to the relationships between wages and other main labour market variables.

(a) did the emphasis on decentralised wage bargaining succeed in achieving a closer relationship between labour productivity and wages? This possibility can be straightforwardly tested as a parameter change if the relationship between labour productivity and wages is explicitly included in the estimates. In our case, the test should apply to the error correction mechanism comprising real wage, alternative real wages and output per head;

(b) was the *scala mobile* imposing some kind of constraint on wage bargaining that was relaxed after its demise? Following the suggestion made in Destefanis (1995), this possibility can be assessed by testing changes in the Phillips curve parameter. If cost-of-living wage adjustments were detrimental to wage flexibility, it is expected that the Phillips curve parameter increases in absolute value after 1991:4.

Finally, the change in bargaining institutions, particularly insofar as the pivotal role of the target rate of inflation is concerned, could be interpreted as the imposition from government of a wage growth norm. This possibility can be tested along the lines suggested in Wren-Lewis (1985). A nonlinear specification superimposing the new wage growth norm (akin to an incomes policy norm) can be estimated and the stringency of the norm straightforwardly tested.

The Data

A distinctive feature of our work is that 2-digit industry-level direct measures for the degree of wage indexation and cost-of-living adjustment clauses are constructed and utilised. Details about construction of these variables are given in the Appendix.

It is important for our purposes to consider the 1970-2002 period in order to have a wide enough perspective on the structural changes that might have affected our equations. We take data from ISTAT National Quarterly Accounting and splice together two different series. Unfortunately, General government services and other market and non-market (personal and communal) could not be split in market and non-market services because the treatment of these industries considerably changed with the new SEC95 national accounting (see for instance Collesi, 2000).

Data on unemployment are taken from ISTAT Quarterly Labour Force statistics. Some important changes in definitions and computation methods occurring throughout the period under scrutiny are duly taken into account (see Destefanis, 1999, for details).

The Results

We adopted the following strategy in the empirical analysis. First, we estimated over the 1970:1-1991:4 period various specifications of the wage equation for 15 2-digit industries (see Table 1 in the appendix). We compared the performance of various hypotheses about nominal adjustment, the Phillips curve terms and the shift terms, and assessed the general statistical performance of the equations. Then we proceeded to test the hypotheses about the impact of the 1992 and 1993 Agreements that have been singled out above.

The specification search carried out for the 1970:1-1991:4 sample yielded the following preferred equation:

$$\Delta_4 w_t = \beta_0 + \beta_1 \Delta_4 w_{t-1} + \beta_2 \gamma_t \Delta_4 cv_t + \beta_3 (1-\gamma_t)\, 1/4\, \Delta [\ \dots\ ] + \beta_4 (1-\gamma_{t-3}) \{ \Delta_4 p_{t-1} - 1/4\, \Delta [\ \dots\ ] \} +$$
$$- \beta_5 U_t + \beta_6 (n_{jt} - n_j^*) + \beta_7 (w_{jt-4} - p_{t-4}) + \beta_8 (w^A_{t-4} - p_{t-4}) + \beta_9 x_{jt-1} + \beta_{10} t + \beta_{11} t^2 \quad (4.6)$$

Coefficient values and t-ratios are presented in Table 2. It is appropriate to make the following remarks about this specification. The lagged dependent variable was included after it turned out to be consistently significant across various specification. Its inclusion can be easily rationalised in many different ways, and does not impair in any sense the significance and interpretation of other regressors. The cost-of-living allowance was almost always significant (its lack of significance in Credit and in Government can be explained among other things by the lower quality of data for these sectors) and took very reasonable values. The other nominal adjustment terms are not often significant but take reasonable values (Agriculture is an exception, but the equation for this sector generally has some specification problems). In any case it is important to point out that:

(a) the forward-looking specification for inflation expectations proposed in (4.2') consistently gave a better fit than the alternative specifications (current or lagged annual rates of change in consumer prices);

(b) the catch-up term (4.4a) gave better results than (4.4b). The asymmetric formulation suggested by Fabiani *et al*. (1998) did not meet with any success: it gave rise to lower fits and its coefficient were often negative;

What about linear homogeneity??

As far as the Phillips curve coefficients are concerned, their sign and significance generally make sense (sectoral comments ????). As they enter the preferred specification with their current values, Wu-Hausman exogeneity test were duly carried out, and very little evidence of endogeneity bias was found in these coefficients. Consider the rate-of-unemployment term more in detail, it must be pointed that the current rate of unemployment was preferred not only to its lagged values, but also to the moving average formulation suggested in Roberts (1997) and to the forward-looking

specification suggested in Destefanis (1997). The traditional rate of unemployment was preferred to a rate excluding first-job seekers and other secondary-labour force workers (see Destefanis, 1999, for more details). No experimentation was carried out with territorial rates of unemployment, due to problems of data availability. Adjusting the rate of unemployment for the number of CIG workers did not bring about any significant improvement.

The error correction terms are very significant, and point to a pervasive influence of wage-wage interactions on wage bargaining. The labour productivity terms re less pervasively significant, but there seems to be a pattern in their influence upon wage determination: they are more significant in relatively more labour-intensive industries. There is no particular reason (save perhaps for informational lags) why alternative real wages should come with a four-quarter lag and labour productivity with a one-quarter lag, but this specification was very consistently favoured by the data. A linear and quadratic trend terms were also found to be consistently significant, and they were left in the preferred specification. They seem to interact with the rate-of-unemployment coefficient only, which suggest their interpretation in terms of shifts in the NAIRU. The diagnostics of the equations are reasonable, although the RESET test is significant in 6 industries (see Table 3).

The insignificant out-of-sample predictive failure tests elicit considerable doubts on the presence of dramatic changes in wage formation after 1991. Yet, Table 4 shows that the target rate of inflation has indeed had an impact on expectation formation. Sargan's likelihood criterion reveals that in 12 industries the target rate of inflation supersedes the autoregressive mechanism of expectation formation that ruled previously. The situation is less clear-cut, if an hybrid mechanism is proposed, where the autoregressive mechanism comes back after 2000 (when the actual rate of inflation began to be consistently higher than the actual one). However, in this case differences are usually pretty small.

In Table 5 we consider the hypothesis according to which the pivotal role of the target rate of inflation is interpreted as the imposition from government of a wage growth norm. This hypothesis is tested along the lines suggested in Wren-Lewis (1985). We estimated a nonlinear specification superimposing the new wage growth norm (akin to an incomes policy norm):

$$\Delta_4 w_t = \theta \, NORM_t + (1 - \theta) \text{ (notional wage equation)} \qquad (4.7)$$

where the notional wage equation is the preferred equation from the 1970:1-1991:4 sample. The stringency of the norm is tested through the t-ratio of the θ coefficient. We consider three different possibilities: NORM1 is simply the 1992-93 wage freeze, NORM2 is the 1992-93 wage freeze plus a wage growth norm equal to the target rate of inflation in following years, and NORM3 is equal to NORM2 plus the eventually positive difference over the last two years between actual and target rate of inflation. In virtually no case we find a significant wage norm. Moreover the sign of the coefficient is almost always negative, contrary to expectations.

In Table 5 and 6, we consider the impact of the 1992 and 1993 Agreements on the relationships between wages and other main labour market variables. We use slope dummies equal to zero before 1992:1 (other periodisations gave similar but less significant results). Along with the slope dummies, we always include dummies for the constant term in order to avoid spurious parameter changes. It turns out that the coefficients most affected by the Agreements are the Phillips curve terms. However, contrary to expectations, the demise of the *scala mobile* and the Agreements make wages *less* reactive to labour market slack. As the intercept dummies are generally negative, it seems that wage setters have bargained lower wage growth for a in exchange of a more secure environment. Similarly, the impact of labour productivity, is actually lower after the Agreements, in spite of the move to decentralised bargaining. It should also be noted that nominal adjustment coefficients are not very much affected by the Agreements. However, both the inflation expectations and the catch-up coefficients generally *decrease* after 1991.

5) Concluding Remarks

In this paper we put to test the impact of the 1992 and 1993 Wage Agreements on wage determination. We start from an examination of the main policy changes occurring in the period under scrutiny, and proceed to various empirical tests on 2-digit

industry data. A distinctive feature of our study is that we construct and use direct measures for cost-of-living allowances.

The main results can be summed up as follows. We find reasonably well behaved wage equations. There is some evidence in favour of a forward-looking behaviour of wage-setters. As far as the impact of Wage Agreements is concerned, we find (similarly to Fabiani et al., 1998) that the target rate of inflation had some impact on expectation formation. Even if an hybrid mechanism is proposed, giving no weight to the target rate after 2000 (when the actual rate of inflation began to be consistently higher than the actual one), it still appears that target inflation matters.

No evidence is found in favour of the hypothesis according to which the target rate of inflation is interpreted as a wage growth norm. This hypothesis was tested along the lines suggested in Wren-Lewis (1985). On the other hand, the Agreements have some the impact on the relationships between wages and other main labour market variables. Generally speaking, and to some extent contrary to expectations, the demise of the *scala mobile* and the Agreements make wages *less* reactive to labour market slack. Also the impact of labour productivity is actually lower after the Agreements, in spite of the move to decentralised bargaining (all this is well in agreement with the arguments in Casadio, 2002).

It is only fair to point out that our wage equations may be better specified (in particular an effort should be done to model the evolution of the NAIRU more articulately). Any precise quantitative (as opposed to qualitative) assessment of the Agrrements should then be postponed to future work.

APPENDIX

Deriving a measure for cost-of-living adjustments and the degree of indexation

The main series utilised in empirical work not coming from National Accounting is the degree of wage indexation, whose measure was obtained in the following manner. First, the definition of the degree of wage indexation was written as:

$$\alpha = \frac{\frac{\Delta C_t}{W_t}}{\frac{\Delta CV_t}{CV_t}} = \frac{\frac{COLA_t \, \Delta CV_t}{W_t}}{\frac{\Delta CV_t}{CV_t}}$$

where ΔC_t is the (absolute) change in wages due to cost-of-living adjustments, $COLA_t$ is the cost-of-living adjustment, CV_t is the price index used in the calculation of the cost-of-living allowance and W_t are the previously defined wages. The above formula can be reformulated as:

$$\alpha = \frac{\frac{COLA_t \, CV_t}{W_t}}{\frac{\Delta CV_t}{\Delta CV_t}} = \frac{COLA_t \, CV_t}{W_t}$$

meaning that in order to calculate α, one only needs measures of W_t, $COLA_t$ and CV_t. The latter, the price index used in the calculation of the cost-of-living allowance, can be easily retrieved from the tables relating to the *numeri indici del costo della vita valevoli ai fini dell'applicazione della scala mobile delle retribuzioni nei settori dell'industria, commercio, agricoltura e credito*, ISTAT, *Bollettino Mensile di Statistica*, various years. Note that the monthly index numbers presented in the tables have been temporally aggregated according to the distribution in time of the variations in the cost-of-living allowance, November-January, February-April, May-July, August-October.

As for $COLA_t$, it was readily available in the period when there was a unified cost-of-living allowance (1977-85). In the previous period (1951-76), $COLA_t$ has been calculated following the procedure suggested in Robotti (1973), that is weighting the cost-of-living allowances corresponding to a given set of wage relativities (disaggregated by contractual category, sex and area) by the relevant employment shares. However, the employment shares to be utilised as weights were taken from

Table 41, *5º Censimento Generale dell'Industria e del Commercio*, Vol. III, ISTAT (1976), unlike in Robotti (1973) where 1961 Census data were utilised. With respect to the indexation system ruling in the 1986-92 period, the provisions of the act n. 38, 26/2/1986 have been applied to the quarterly data available for average wages from National Accounting.

Note that the above formula can also be easily adapted to the case in which the elasticity of wages to other notions of consumer prices (such as PC_t) ought to be considered. Take the following expressions:

$$\alpha = \frac{\frac{\Delta C_t}{W_t}}{\frac{\Delta PC_t}{PC_t}} = \frac{\frac{COLA_t \, \Delta CV_t}{W_t}}{\frac{\Delta PC_t}{PC_t}} = \frac{\frac{COLA_t \, CV_t}{W_t}}{\frac{\Delta CV_t}{\Delta PC_t}}$$

As long as it is posited that $\Delta CV_t = \Delta PC_t$ (an equality which can be surmised to hold, at least in terms of *ex ante* expected values mattering for wage negotiations), one obtains as before $\alpha = \frac{COLA_t \, CV_t}{W_t}$.

TABLE 1 – The 2-Digit Industries Considered in the Analysis

1- Agricultural, forestry and fishery products
2- Fuel and power products
3- Food, beverages and tobacco
4- Textiles and clothing, leather and footwear
5- Timber and furniture, Paper and printing products, Rubber and plastic products, Other manufactured products
6- Chemical products
7- Non-metallic minerals and mineral products
8- Ferrous and non-ferrous ores and metals
9- Metal products, machinery and electric goods
10- Transport equipment
11- Building and construction
12- Wholesale and retail trade services, Lodging and catering services
13- Transport and communication services
14- Services of credit and insurance institutions
15- General government services, other market and non-market services

TABLE 2 – Coefficient Values and T-Ratios, 1973:2-1991:4

	β_1	β_2	β_3	β_4	β_5	β_6	β_7	β_8	β_9
1	.52	.29	.01	-.74	-.22	.04	-.37	.42	.06
2	.11	.52	.31	.46	-2.13	.13	-.97	-.29	.01
3	.27	.37	-.17	.55	-.26	.36	-1.04	1.05	.07
4	.23	.40	.27	.84	-2.51	.44	-1.18	.29	.17
5	.25	.48	.32	-.26	-.62	.25	-.95	.63	.03
6	.14	.95	-.03	-.06	-2.16	.24	-1.00	.74	.07
7	.21	.61	.10	.87	-2.31	.06	-1.12	.68	.16
8	.05	.95	.46	.79	-1.05	-.06	-1.28	.19	.26
9	.04	1.08	.71	.14	-.26	.30	-1.02	.29	.19
10	.12	1.21	-.30	.59	-2.12	.39	-1.07	.39	.08
11	.30	.50	.13	1.02	0.04	-.03	-.90	.90	.21
12	.29	.76	.31	.64	-.76	.06	-.43	-.19	.04
13	.48	.47	.31	-.12	-.38	.01	-.40	.40	.20
14	.32	.40	.56	1.28	-.20	.11	-.67	.40	.08
15	.64	.50	.44	.29	-.37	.13	-.54	.26	.12

TABLE 3 – Diagnostic p-values, 1973:2-1991:4

	Within-sample PF Test 73:2-91:4		RESET Test 73:2-91:4		Out-of-sample PF Test 92:1-02:4
1	0.02		0.00		0.83
2	0.75		0.30		0.24
3	0.05		0.00		0.99
4	0.99		0.03		0.73
5	0.17		0.50		0.99
6	0.95		0.00		0.99
7	0.99		0.72		0.99
8	0.99		0.24		0.99
9	0.99		0.07		0.99
10	0.99		0.01		0.99
11	0.95		0.22		0.47
12	0.45		0.00		0.99
13	0.97		0.91		0.99
14	0.76		0.55		0.89
15	0.62		0.37		0.99

TABLE 4 – Expectation Formation and the Target Rate of Inflation; Sargan's Likelihood Criterion

		Target Exp.'s vs. Autoregressive Exp.'s		Mixed Exp.'s vs. Target Exp.'s
1		-127.92		85.02
2		-11.70		71.76
3		-23.40		42.90
4		41.34		3.12
5		38.22		3.90
6		49.14		-10.14
7		198.90		-89.7
8		14.04		-0.78
9		68.64		-44.46
10		0.78		18.72
11		31.2		-25.74
12		173.16		-50.7
13		50.7		-30.42
14		8.58		0.78
15		191.88		-106.08

TABLE 5 – The Target Rate of Inflation as a Wage Norm

The table presents the t-ratio of the θ's in the equations:

$\Delta_4 w_t = \theta\ NORM_t + (1 - \theta)$ (notional wage equation)

		Norm 1		Norm 2		Norm 3
1		-0.39		0.57		0.63
2		-1.32		-1.40		-1.24
3		0.48		0.82		0.91
4		-0.25		-0.24		-0.25
5		-1.40		-1.07		-1.05
6		-1.13		-1.34		-1.77
7		-1.27		-0.81		-0.91
8		0.56		-0.19		-0.20
9		-1.31		-1.60		-1.74
10		1.27		1.88		1.54
11		-1.95		-1.08		-1.22
12		-1.33		-0.57		-0.61
13		-1.45		-1.43		-1.43
14		-0.62		-0.40		0.09
15		-0.60		-1.37		-1.01

TABLE 5 – Most Notable Parameter Changes over 1992:1-2002:4, T-Ratios

		β_5		β_6		β_7	β_8	β_9
1		1.76		-1.41		1.51	-1.59	-1.24
2		0.78		-0.80		-1.83	-0.00	0.56
3		0.95		-2.89		0.14	-1.95	0.22
4		3.09		-3.11		1.18	-2.90	-3.92
5		1.37		-0.90		0.82	-0.76	-1.68
6		2.32		0.61		-0.21	-2.75	-0.92
7		5.13		1.73		2.41	-4.01	-2.85
8		-0.18		-2.99		0.49	-0.48	-3.60
9		-0.73		-2.29		-1.88	1.34	-1.43
10		-0.49		-3.12		-1.96	0.47	-2.56
11		-1.22		0.95		0.76	-0.85	1.12
12		1.79		-0.02		-2.23	1.15	-0.81
13		0.52		0.74		-2.34	0.69	-1.52
14		1.45		-3.52		-1.96	0.73	2.02
15		-0.65		-1.10		0.51	-0.11	-0.48

TABLE 6 – Coefficient Values and T-Ratios, 1973:2-2002:4

	β_1	β_2	β_3	β_4	β_5	β'_5	β_6	β'_6	β_7	β_8	β_9
1	0.48	0.26	-0.02	-0.43	-0.06	0.69	0.09	-0.08	-0.57	0.55	0.05
2	0.04	0.60	0.27	0.45	-2.60	0.62	0.25	-0.39	-1.13	0.06	0.03
3	0.23	0.41	-0.02	0.28	-0.26	0.56	0.41	-0.46	-1.04	1.00	0.08
4	0.23	0.30	0.26	0.61	-1.79	2.32	0.52	-0.64	-1.20	0.27	0.08
5	0.26	0.42	0.29	-0.12	-0.33	0.84	0.22	-0.24	-0.88	0.51	0.03
6	0.13	0.79	-0.01	0.06	-2.35	2.24	0.25	-0.26	-1.05	0.63	0.05
7	0.22	0.60	0.16	0.58	-1.91	2.19	0.06	-0.09	-1.10	0.66	0.16
8	0.08	0.82	0.48	0.64	-0.44	0.87	-0.03	-0.53	-1.25	0.25	0.22
9	0.06	0.95	0.63	0.19	0.00	0.17	0.31	-0.58	-1.03	0.34	0.14
10	0.11	1.14	-0.23	0.44	-1.80	1.16	0.48	-0.71	-1.07	0.46	-0.01
11	0.32	0.51	0.10	0.70	-0.03	-0.33	-0.07	0.05	-0.87	0.98	0.22
12	0.25	0.69	0.26	0.60	-0.78	0.65	-0.00	0.08	-0.58	0.06	-0.00
13	0.42	0.50	0.28	-0.06	-0.64	0.24	0.00	0.11	-0.43	0.46	0.19
14	0.26	0.52	0.58	0.67	-0.28	0.45	0.10	-0.34	-0.78	0.46	0.08
15	0.59	0.55	0.46	0.22	-0.52	-0.30	0.13	-0.43	-0.55	0.29	0.14

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