

Market Forces, Trade Union Action, and the Phillips Curve in Italy*

This study is an extension of two of our previous studies. In the first [VI, 2°], we proposed and tested a generalization of the Phillips curve for a developing country. In the second [VI, 3°], we attempted to introduce the percentage of workers involved in contract renewal at any given moment of time into the previous model, a percentage which we interpreted as a measure of trade union action on wages. The purpose of this study is to extend our model of trade union action on contract renewals. For this purpose, we make a distinction between the percentage of workers at any given moment of time whose new contracts take effect on or before the expiration date of their previous contract, and the percentage of workers in a weaker position, whose new contracts take effect after the expiration date of their previous contract. This extension of our previous model is then subjected to econometric tests; the data, which refer to the Italian industrial sector, are the same data employed in our previous studies. The central conclusion of this study is that, beginning with the wave of strikes initiated by the contract renewals of Fall 1969, the so-called "hot autumn", the Phillips curve has shifted to the right and upwards, and that its slope for any given level of unemployment is nearly doubled with respect to the slope prevailing in the previous twenty years. These results and those obtained in our first study of the Phillips curve suggest an interpretation of the wage

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dynamics in Italy from the "easy" years of the economic miracle to the "difficult" years of the subsequent depression and to the wage rounds begun during the "hot autumn". There will follow some implications, which concern the present conditions of dynamic instability of the inflationary process in Italy, and the necessity for modifying the present system of the escalator clause for wages as soon as possible, diminishing its indexation with respect to consumer prices for the higher income brackets.

1. The basic paradigm

The paradigm of the wage equation on which the studies of the Italian system have been based up to now can be expressed by the following "modified" Phillips curve:

$$[1] \quad \dot{w} = \Phi(u') + A + c \dot{p}_c$$

where \dot{w} , u' , A and \dot{p}_c represent, respectively, the rate of change of money wages, a measure of the rate of unemployment in terms of "efficiency units", trade union action, and the rate of change of consumer prices.

The first modification of the traditional Phillips curve pertains to the measure used for the rate of unemployment, u' . As we have previously shown [VI, 2°], in a developing country which undergoes a substantial reduction in the rate of structural unemployment (as in Italy from the early 1950's to the boom of 1963), u' can be measured by the rate of unemployment in terms of efficiency units:

$$[2] \quad u' = \frac{u - \gamma' - b(u_m - \gamma')}{1 - b(u_m - \gamma')}$$

where u is the measured rate of unemployment, u_m the minimum rate of unemployment previously reached by the system, b the coefficient of transformation of workers without previous professional experience and without adaptation on the job in terms of equivalent labor force, and γ' the minimum frictional rate of unemployment.

The central implication of [2] is that the rate of unemployment in terms of efficiency units, u' , is a decreasing function of the rate of "structural" unemployment net of the frictional component, $(u_m - \gamma')$, for any given level of the rate of unemployment, u . It follows that, in a developing economy, in the presence of a diminishing rate of

structural unemployment and for given values of the other variables, the Phillips curve shifts to the left and downwards, that is, towards the origin. In particular, while an expansion of effective demand and employment beyond their previous maximum levels creates inflationary pressures on the labor market in the short run, at the same time it brings about a reduction in the rate of structural unemployment and an "on the job training effect" on the labor force previously excluded from the productive process. The permanent improvement in the degree of specialization and competitiveness of the labor force, which is a result of the individual worker's insertion in and adaptation to the job, reduces the inflationary pressures associated with any given level of employment for the future.¹

As regards the second modifying variable of the traditional Phillips curve, that is, trade union action, A , and with reference to the Italian experience, the studies conducted up to now have proposed the following three measures:

(1) dummy variable, in periods of particular overheating of the system at the industrial relations level (e.g. the "hot autumn"). This variable, though in common use, is useful for the econometrician, but not for the economist, in that it only refers the problem to an "external" analysis, that is, to the industrial relations system;

(2) number of hours lost for strikes, proposed by P. Sylos Labini [VIII], which is an attempt to furnish a measure of the level of conflict of the industrial relations system. But the sign of this variable in a wage equation is *a priori* uncertain. In fact, a large number of hours lost for strikes is an indication not only of great contractual strength (resistance) of the trade union, but also of a great contractual resistance (strength) of the firm. In addition, this variable

¹ As regards the rate of change of money wages, the relevance of the proportion of the labor force which is not only either "employed" or "unemployed" (the conventional rate of unemployment) but is divided into the employed and the reserve army (structural rate of unemployment), would seem, according to our first study, to derive from this passage in Marx "Taking them as a whole, the general movements of wages are exclusively regulated by the expansion and contraction of the industrial reserve army, and these again correspond to the periodic changes of the industrial cycle. They are, therefore, not determined by the variations of the absolute number of the working population, but by the varying proportions in which the working-class is divided into active and reserve army, by the increase or diminution in the relative amount of the surplus-population, by the extent to which it is now absorbed, now set free" (*Capital*, F. Engels ed. International Publishers, New York 1968, p. 637).

For a discussion, cf. also [IX], p. 235 ff.

has given rather unreliable results at the empirical level because of the existence of a statistical collinearity with the rate of unemployment, u , in [2]; therefore, in order to estimate this equation at the econometric level, Sylos Labini has been forced to use residuals of a preceding equation between "hours lost" and u . It can be easily shown² that this method presents substantial gaps on an econometric level and can give rise to biased coefficients. In the presence of a changing level of employment, and, as is the case in the Italian industrial system, of a sharply rising trend of employment, the number of hours lost for strikes should, in any case, be divided by the number of the employed [V] in order to take account of the variations in the scale of the phenomenon under consideration. And lastly, as regards its capacity for econometric forecasting, this measure in any case gives rise to a paradox: it is even more difficult to estimate the future evolution of the hours lost for strikes, that is, of the explanatory variable of the equation which is by its very nature highly volatile, than to forecast the future evolution of the dependent variable. Therefore, the independent variable is utilizable only after the fact, i.e. *ex post*;

(3) alternatively, as we proposed in [VI, 3^o], the average rate of change of wages can be conceived of as a weighted average of three principal components:

(a) the fraction of the labor force subject to collective bargaining whose contract is renewed at any given moment of time;

(b) the fraction of workers who, while subject to collective bargaining, do not renew their contracts in the period under examination;

(c) and lastly, that fraction of the labor force which is not subject to collective bargaining.

The hypothesis on which this subdivision of the labor market into three distinct segments rests is the following: the dynamic of the money wage is different for each group, even though each group has its corresponding Phillips curve. This difference is caused by the existence of systematic differences in the parameters of each group. Consequently, the rate of change of the money wage for the market

² Cf., E. TARANTELLI, "Costo del lavoro e margini di profitto industriale nel 1970", in *Contributi alla ricerca economica*, n. 1, Servizio Studi, Bank of Italy, 1971 (in particular, note 9, pp. 257 ff.).

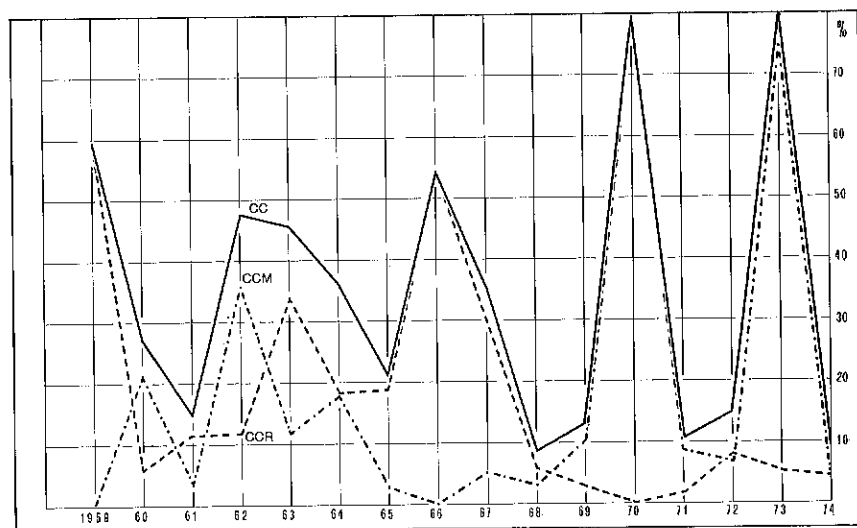
as a whole can be conceived of as a weighted average of the rates of change of wages of the three segments, where the weights are made up of the fraction of workers belonging to each of the segments under consideration. In particular, this hypothesis implies that the greater is the fraction of the employed who renew their contract at any given moment of time, the greater is the wage increase.

On the other hand, this model does not pass the difficult test which begins with the "hot autumn", even though it significantly improves the fit of the equation for the two decades preceding the wage explosion of the 70's. In the following pages, we propose to modify and extend our previous model on the basis of a measure of industrial conflict, discussed elsewhere [X] in more detail, which distinguishes within the fraction of workers who renew their contracts at any given moment of time, that fraction whose contract takes effect on or before the expiration date of the previous contract, and, therefore, "without delay", from that fraction whose contract renewals are delayed.³ In fact, it seems reasonable to hypothesize that the percentage of workers subject to contract renewal whose contracts take effect on or before the expiration date of the previous contract is an increasing measure of the contractual strength of the trade union (and that the percentage of workers whose contracts take effect after the expiration date of the previous contract is a measure of a weaker trade union). The money wage is rigid downwards. The renewal may increase it (or, in extreme cases, maintain it constant) but not diminish it. It follows that only the firm can be interested in postponing the date on which the new contract takes effect beyond the expiration date of the previous contract, in order to postpone wage increases. For the same reasons, a strong trade union will be able to negotiate new contracts which take effect on or before the expiration date of the previous contract. It should also be noted that the eventual retroactivity of the contract can reflect not only the capacity of the union "to gain more", but also to "lose less", as in periods of strong increases in the cost of living (even if the latter is caused by external agents: imported raw materials, for 1973).

³ The possibility of a distinction in this direction was discussed initially with V. Seppi, from whose contribution the authors greatly benefited. He had previously proposed it in a study with L. Di Vezza (*Contrattazione e dinamica dei salari nell'industria italiana*, CERES ed., Rome, 1970, particularly p. 44, and with regard to worker employment, table 28, p. 49, Vol. II). This study also contains an interesting discussion of the evolution of collective bargaining in our industrial system (cf. Vol. I, parte prima).

The annual index calculated on this basis for the industrial sector (cf. Appendix) in terms of percentage of employment involved in contract renewal (cf. Graph 1) beginning from 1959 gives the expected results. It shows "non delays" (renewals taking effect on or before the expiration date of the previous contract) for the contracts of 1962 and 1969, and substantial delays for the first

GRAPH 1



Ratio between the number of industrial workers subject to contract renewals whose new contract takes effect without delay (CCM) and with delay (CCR) relative to total (CC=CCM+CCR) divided by total industrial employment (annual data).

contract negotiated after the depression of 1958 (and delayed by the structurally depressed conditions of the labor market in those years) and for the contract renewals of 1966, in the midst of a substantial crisis of trade union strength because of the extremely depressed conditions of the labor market. And lastly, it shows anticipations in 1973 as the effect of the above mentioned tendency to retrodate the effects of the contract in the presence of strong accelerations of the cost of living. These attempts to defend the money wage from the erosion of the cost of living constitute, as is well known, the first concrete signs of the process which in the next

year lead to the unification of the escalator clause "al punto di contingenza superiore".⁴

In particular, as we can see from Graph I, if we exclude the contract renewal of 1959, a contract renewal which shows the weakness of the trade union movement which was emerging from the long structural crisis of the 50's and from the slump of 1958, 1966 is the only year of our series in which the fraction of workers subject to contract renewal without delay is nil. This, in turn, implies that the fraction corresponding to delayed contract renewals, CCR, which in our model measures the weakness of trade union action, coincides with the total percentage of workers subject to contract renewal, CC. It should also be noted that the contract renewal of 1962 in particularly favorable conditions of the labor market, represents, as one would expect, the first peak relative to non-delayed contract renewals of our series in the post-war period, while, completely unexpectedly, the succeeding one, relative to the contracts of 1963, the year of the maximum expansion of our economic system, is dominated by the delay (of approximately three months) of the metalworkers in private industry, (the metalworkers in public industry had renewed their contract in November, 1962) in the first quarter (expiration October, 1962 — effective from February, 1963). The annual data of 1963 seem to reflect, on the one hand, the well-known wage rules from which the metalworkers benefited in that year, relating, in particular, to the switch from bargaining at the level of the central trade union to bargaining by sector (*settorializzazione*)⁵ and at plant level. On the other hand, they reflect the minor emphasis which the metalworkers' union presumably accorded the moment at which the collective contract took effect (in a situation in which the conquest of plant level re-bargaining (*contrattazione articolata*) would

⁴ According to this modification of the system of the escalator clause, by February 1977, money wages in industry and commerce will rise by roughly 3,500 lire for every one percent increase in the cost of living irrespective of the income bracket of the wage earner. This will imply a one-to-one indexation of the average money wage with respect to the increase in the cost of living, and a more and less than full indexation for the income brackets, respectively, lower and higher than the average wage. This system will be extended to public employment and transportation in the years following 1977. The indexation is at present more than one to one in both agriculture (because of the low average wage prevailing in the sector) and in some privileged areas of public and quasi-public employment (wages in Parliament, the Senate, *Cassa del Mezzogiorno*, some public owned firms, the banking system, etc.).

⁵ Cf., in particular, the "Preface" to the national contract for the employees of the private sector of the metalwork industry in February 1963. We wish to thank L. Di Vezza for a conversation on this subject.

have in any case allowed for a substantial wage drift at the firm level, in the presence of a particularly low level of the rate of unemployment). It is only beginning from the "hot autumn" that the system registers a strong increase in the concentration of contract renewals and a drastic change of regime of the industrial relations system, a change which is preceded by the spontaneous conflicts at plant level and culminates in the formal establishment of the unified trade union (*sindacato unico*). As can be seen from the preceding graph, 1970 and 1973 represent the first two contract renewals of the post-war period in which CCM effectively coincides with CC, and CCR is, respectively, nil or near zero.

2. An extension of the previous model

Let the employed labor force be divided into subgroups and let w_i be the average wage and N_i the number of the employed of group i . The average wage for the entire employed labor force can then be expressed by

$$w = \sum_i w_i \frac{N_i}{\hat{N}} = \sum_i w_i n_i$$

where $n_i = N_i/\hat{N}$ is the fraction of total employment, \hat{N} , belonging to group i . Similarly, provided that n_i does not change appreciably in the course of one period, the rate of change of the average wage

$$\dot{w} = \frac{w - w(-1)}{w(-1)}$$

can be expressed as a weighted average of the rates of change of wages in each single group, w_i

$$[3] \quad \dot{w} = \sum_i \left[w_i \frac{n_i}{n_i(-1)} - w_i(-1) \right] \frac{n_i(-1)}{w(-1)} = \sum_i \dot{w}_i p_i$$

$$p_i = \frac{w_i(-1) n_i(-1)}{w(-1)}; \quad \sum p_i = 1$$

The weight p_i represents the fraction of total employment relative to the i^{th} group multiplied by the ratio between its average initial wage and the average initial wage of the entire labor force.

According to the above, the total labor force can be divided into four groups. The first is composed of those workers who are not covered by collective bargaining. We denote with w_n their wage and with N their "weight", as expressed in [3]. The second includes those workers covered by collective bargaining whose contract does not expire in the period under consideration. We denote with w_{cn} and CN , respectively, their wage and their weight. The third includes those workers covered by collective bargaining whose contract renewal is non-delayed. We denote with w_{ccm} and CCM , respectively, their wage and weight. Lastly, the fourth comprehends the remaining group of workers covered by collective bargaining whose contract renewal is delayed with respect to the expiration of the preceding contract. Let w_{ccr} and CCR be, respectively, their wage and weight. Therefore, we can rewrite [3] as follows:

$$[3'] \quad \dot{w} = \dot{w}_N N + \dot{w}_{CN} CN + \dot{w}_{CCM} CCM + \dot{w}_{CCR} CCR;$$

$$N + CN + CCM + CCR = 1$$

In the following pages, we make the assumption, acceptable for the Italian system at least for the period under consideration, that the fraction N can be considered constant. Let $CCM + CCR = CC$, which in turn implies that $CC + CN = C = 1 - N$ is also a constant. On the other hand, the proportion of workers covered by collective bargaining whose contract is renegotiated in any given period whether delayed or not, can and does vary substantially through time, as can be seen in the preceding graph. This implies corresponding variations in the three components of CN , CCM and CCR and, therefore, also in the sum of these last two variables, CC .

We further hypothesize that the rate of change of wages of each group can be explained by the basic model discussed in our first study, but we allow for the existence of systematic differences in the parameters of the single work group, as is specified by the following:

$$[4] \quad \dot{w}_i = a_i + b_i \frac{1}{u'} + d \dot{p}_e; \quad i = N, CN, CCM, CCR$$

It is further assumed that the coefficient d , in [4], is the same for all groups since in the Italian economic system, the role of \dot{p}_e largely reflects the mechanism of the escalator clause whose effects can be considered at a first approximation uniform for the different labor groups.

Substituting [4] into [3'], and remembering that $CN = C - CC$ and that $CC = CCM + CCR$, we can rewrite [3'] in the following form:

$$[5] \quad \dot{w} = \alpha + \gamma \frac{1}{u'} + \rho CCR + \eta CCM + \nu \frac{1}{u'} CCR + \lambda \frac{1}{u'} CCM + \delta \dot{p}_c$$

where:

$$\alpha = (a_N N + a_{CN} C); \quad \gamma = (b_N N + b_{CN} C); \quad \rho = (a_{CCR} - a_{CN});$$

$$\eta = (a_{CCM} - a_{CN}); \quad \nu = (b_{CCR} - b_{CN}); \quad \lambda = (b_{CCM} - b_{CN}) \text{ and } \delta = d$$

On the basis of the previous assumptions, each coefficient from α to δ can be considered constant. Moreover, the model permits us to furnish several indications as regards the signs and the expected magnitude of the coefficients.

One would clearly be led to think that the wages of the labor group covered by collective bargaining whose contract is not renewed in the current period depend on u' less than the wages of the non-unionized group and the group which recontracts without delay. In particular, although b_{CN} should be positive as an effect of the so-called wage drift, one would expect $b_{CCM} > b_{CCR}$, where the first inequality implies $\lambda > 0$. On the other hand, on account of the greater contractual strength of the fraction of the market which recontracts without delay, one would expect $b_{CCM} > b_{CCR}$ and thus $\nu < \lambda$ (nor can one clearly exclude *a priori* a nil or even a negative value for ν). On the contrary, based on the preceding hypothesis, we would expect a positive and relatively high value for η since the "political constant" of non-delayed contracts, a_{CCM} , ought to exceed a_{CN} , which refers to an average of the delayed and non-delayed previous contracts. On the other hand, for symmetrically opposed reasons, we would expect a value of $\rho < 0$, even though relatively modest in absolute value, on account of the downward rigidity of the rate of increase of money wages and as effect of essentially imitative phenomena. With reference to γ , we would expect a positive value given that b_N and b_{CN} ought to be both positive. Further, it would seem reasonable to hypothesize a positive value for a_{CN} since this term ought to reflect largely the lagged effect of wage increases relevant to previous contracts which ought, in turn, to be strongly correlated to the expected rate of growth for labor productivity. Since the latter has been on the order of 4-5 percent for the Italian system, one would expect a non-negligible coefficient for a_{CN} , and,

therefore, in accordance with the hypothesis of downwards rigidity of the money wage of the non-unionized sector ($a_N \geq 0$), a positive α . Summarizing, we would expect:

$$\alpha > 0, \gamma > 0, \rho \leq 0, \eta > 0, \nu < \lambda, \lambda > 0$$

It can be easily demonstrated that the preceding model constitutes a direct extension of our two previous studies. In particular, if we do not distinguish between delayed and non-delayed contracts, we can write:

$$a_{CCR} = a_{CCM} \equiv a_{CC} \text{ and } b_{CCR} = b_{CCM} \equiv b_{CC}$$

which implies

$$\rho = \eta \text{ and } \nu = \lambda$$

in [5]. Under these conditions, the preceding equation reproduces as a particular case the one proposed in our second study [VI, 3^o]:

$$[6] \quad \dot{w} = \alpha + \beta CC + \gamma \frac{1}{u'} + \mu \left(CC \frac{1}{u'} \right) + \delta \dot{p}_c$$

$$\text{where: } \alpha = (a_N N + a_{CN} C), \beta = (a_{CC} - a_{CN}),$$

$$\gamma = (b_N N + b_{CN} C), \mu = (b_{CC} - b_{CN}) \text{ e } \delta = d$$

Lastly, given the hypothesis that the Phillips curves of the various labor markets are not characterized by systematic differences ($a_{CC} = a_{CN} = a_N$ and $b_{CC} = b_{CN} = b_N$), [6] in turn converges to our first model [VI, 2^o], which allowed the variable u' ⁶ as the only modifying element of the Phillips curve

$$[7] \quad \dot{w} = \alpha + \gamma \frac{1}{u'} + \delta \dot{p}_c \text{ con } \gamma > 0 \text{ e } 0 < \delta < 1.$$

3. The empirical verification

The new variables CCM and CCR which appear in [5] and not in our previous studies were approximated with an estimate of the ratio between the number of industrial workers subject to contract

⁶ Finally, it should be noted that this form is compatible with the hypothesis of identical Phillips curves within the unionized sector (even though different from the non-unionized sector, N). According to this less restrictive hypothesis β and μ fall from [6], as occurs in [7]. But in the latter equation α and γ are defined as in [6] and therefore directly embody the characteristics (a_{CN} and b_{CN}) of trade union action as distinct from (and, in the extreme case of a unique Phillips curve, equal to) a_N and b_N .

renewal whose contract is negotiated, respectively, with and without delay, and the total of industrial employment (cf. Appendix).

As is evident from [3], these ratios differ from p_i for factors of proportionality w_{CCM}/w and w_{CCR}/w which can be reasonably considered as constant in the period under examination. The data relative to delayed and non-delayed contract renewals were collected beginning only from 1959 (rather than from 1954, the year which initiates the progressive extension of collective bargaining in industry at the level of industrial sector), because, as is well known, up until the end of the 1950's, only several of the categories of industry in fact renewed their contracts at periodic intervals, while for many, contracts were renewed at very long intervals (up to four years and more) on account of the well-known conditions of the labor market and of the locus and distribution of power in the industrial relations system in Italy. The structure of contracts by industrial sector was consolidated and generalized only from the end of the 1950's, while contracts were renewed with greater regularity.⁷

For these reasons and in order not to lose further degrees of freedom which are already limited in an estimate on an annual basis, the period under consideration for the estimation of the following equations begins in 1952 (the first year for which we have reliable data for the variables of the model), assuming a nil value for the variable relating to contract renewals until 1959.

The other variables are based on the same data used in the two studies mentioned above, and relate to the post-war period of the Italian economy. This will facilitate the comparison between the present results and those already obtained. The money wage per worker in industry was measured by the ratio of total earnings of employees (*lavoro dipendente*) to an estimate of the number of equivalent full-time employees.⁸ For the rate of change of prices, we used the implicit deflator of private consumption.⁹

For the rate of unemployment, u , the conventional measure was

⁷ Notwithstanding this, even at the end of the 1950's and the beginning of the 1960's, there are examples of very deferred contract renewals, whose influence on employment (1-2 percent or less) is so modest as to not prejudice the results reported here [X].

⁸ Sources: ISCO, *Quadri della contabilità nazionale italiana*; ISTAT, *Annali di statistica*.

⁹ Source: ISCO, op. cit.

adopted.¹⁰ Even though all the data are to be taken with the usual qualifications, they have already been extensively and satisfactorily used in several econometric studies of the Italian economy.¹¹

A maximum likelihood estimate for b in [2] was finally estimated by scanning over the *a priori* admissible range, $0 < b < 1$, at intervals of .1, selecting the value which minimizes the standard error of regression.¹² Lastly, as in our two previous studies, a value of 1.5 percent was taken for γ' .

Table 1 which follows gives the results of the tests of two models proposed in our two previous studies up-dated to 1973 [equations *a*) and *c*)]. For future reference, we have also given the version of the latter equation which sets $\mu = 0$ in [6] (equation *b*), following the hypothesis — to which we will return — of a slope of the Phillips curve in the recontracting sector (b_{CC}) substantially similar to that (b_{CN}) of the unionized sector but which doesn't recontract in the period under consideration. We note that this simplification is also suggested by the clear case of collinearity in equation (*c*) of Table 1 between u' and CC/u' and between the latter variable and CC ¹³ which, as we underlined in the previous

¹⁰ Source: SVIMEZ, *L'aumento dell'occupazione in Italia dal 1950 al 1957* and ISTAT, *Annuario di statistiche del lavoro*. Substantially similar results were obtained with the use of a measure of the rate of unemployment in terms of permanent units elaborated by Dr. Paolo Gnes of the Servizio Studi of the Bank of Italy.

¹¹ Cf., for example, "Prices, Distribution and Investment in Italy, 1951-66: An Interpretation", in this *Review*, December 1967; Bank of Italy, *Un modello economico dell'economia italiana (M.I., B.I.)*, Centro Stampa of the Bank of Italy.

¹² Within this interval we verified the existence of a unique and identical maximum in each of the estimates of b reported below.

¹³ In our second study, we tried to reduce these problems of collinearity by means of the hypothesis (symmetrically opposed to the one suggested here) of a constant of the Phillips curve in the recontracting sector (a_{CC}) similar to that (a_{CN}) of the unionized sector but which doesn't recontract in the period under consideration, assuming $\beta = 0$ in [6]. The equation, estimated for the period 1952-73, is the following

$$\dot{w} = 2.68 + 0.0065 \frac{1}{u'} + 0.12 \frac{CC}{u'} +$$

(2.59) (0.29) (2.93)

$$+ 1.15 \dot{p}_c \quad \text{S.E.} = 2.01; R^2 = 0.840; \text{D.W.} = 1.11; b = 0.2$$

(5.25)

where the sign of u' is now the expected one but still insignificant. It is evident that, while the latter variable and the variable relative to the contract renewals taken together give a relevant contribution to the explanation of the wage dynamics, the estimates of single coefficients are not very reliable. In order to avoid this collinearity, it would be tempting to exclude the "insignificant" variable $1/u'$, whose t of Student is close to zero, from equation *c*) of Table I. On the other hand, as we observed in the previous study [VI, 3^o], this form would lead to the unreasonable implication that, in a year in which CC is equal to zero, the rate of change of wages would not depend on the condition of the labor market.

TABLE 1 (*)
(1952-73)

eq.	Estimated parameters															
	Con- stant	1/u'	b	p _c	CC	CC/u'	b	CCM	CCM/u'	b	CCR	CCR/u'	b	S.E.	R ²	D.W.
a)	1.55 (1.44)	0.043 (2.92)	0.3	1.45 (6.3)										2.37	0.776	1.53
b)	0.84 (0.82)	0.040 (3.0)	0.3	1.27 (5.60)	5.01 (2.27)									2.15	0.817	1.27
c)	3.41 (1.86)	-0.0046 (-0.12)	0.1	1.11 (4.89)	-2.67 (-0.57)	0.18 (1.82)	0.1							2.05	0.833	1.08

(*) The values in parenthesis are the *t* of Student of the estimated coefficients which are given together with the multiple correlation coefficient corrected for the degrees of freedom, r^2 , the standard error of regression, S.E., and the Durbin-Watson statistic, D.W. In this as in the following tables, the variables w , u , and u_m are measured as percentages and CCM and CCR as ratios. Because of the unit of measurement adopted for u' , the comparison between the estimated coefficients for this variable (and for CC/u') and the corresponding estimates of the previous studies cited in the text can be obtained by multiplying by 100 the estimates reported in this and the following tables.

study, impedes accurate and reliable point estimates of the relevant parameters.

On the whole, these equations confirm the qualitative results given in our two previous studies for the shorter period 1954-69. At the same time, the inclusion of the "difficult years" 1970-73 in the period under observation drastically increases the standard error of the regression from values inferior to 1.5 percent in both of our previous studies, to values which now exceed 2 percent; this is caused by the difficulty in explaining the wage increases following the "hot autumn" in a reliable way. Moreover, as opposed to our previous studies, the coefficient relative to the cost of living is now substantially > 1 in all the regressions estimated and is still highly significant, which implies the hypothesis of an unstable Phillips curve in the long run, an hypothesis which it is difficult to accept.

In the attempt to overcome these difficulties, the following Table 2 gives the results of the empirical tests of [5] in which the variable relative to the contract renewals is divided, along the lines mentioned above, into the two components relative to contracts which take effect on or before the expiration date of the previous contract and to those which take effect after this date. A direct test of [5] is unfortunately impossible because of the limited number of available degrees of freedom in an estimate on annual data (22 observations) with respect to the parameters under estimation (6 plus the constant and the parameter to be scanned, b). In addition, taking into account the above mentioned problems of collinearity between $1/u'$ and the ratio between this variable and the percentage of contract renewals (which, as we shall see, is not diminished by the substitution of CC with CCM and CCR), it is necessary to proceed by successive approximations. A partial estimate of our basic model which avoids the above mentioned problems of collinearity along lines analogous to the previous ones, suggests the substitution of CC — equation b), Table 1 — with an estimate of the more relevant new variable of the contractual strength of trade unions, CCM. This shortcut is valid to a first approximation under the hypothesis of a substantially equal Phillips curve within the unionized sector, with the exception of the constant of the Phillips curve for the sector whose new contract takes effect on or before the expiration date of the previous contract. Due to the greater contractual strength of the trade union and to the "political unionism" rather than "enterprise unionism" characteristic of the Italian

industrial relations system (which in large measure frees it from the cyclical conditions of the labor market), the latter should be superior to the constant of the sector which doesn't renew its labor contract at any given moment of time, which refers to an average of delayed and non-delayed previous contracts.

Following this hypothesis, we can thus write:

$$a_{CCR} = a_{CN}, \quad b_{CCR} = b_{CN}, \quad b_{CCM} = b_{CN}$$

and, therefore,

$$\rho = \nu = \lambda = 0$$

It follows that [5] can be specified in the simplified form:

$$[5'] \quad \dot{w} = \alpha + \gamma \frac{1}{u'} + \eta CCM + \delta \dot{p}_c$$

The estimate of this equation is given in Table 2 (equation *a*). As can be seen, the substitution of CC — Table 1, equation *b*) — with the new variable of trade union action drastically reduces the standard error of the regression for the first time to less than 2 percent. The coefficients relative to the modified rate of unemployment, u' , and to the cost of living are both substantially reduced, even though the latter still implies an unstable long-run Phillips curve. In particular, these results demonstrate the superiority of our new index of trade union activity compared to the rougher aggregation, used in our previous study¹⁴ which did not distinguish between delayed and non-delayed contract renewals. In addition, the estimated value of b , in Table 2, equal to .6, is among the highest estimated up to now (values which were smaller than the estimate of around .5 found in our previous studies) and is, in effect, for the first time at the maximum level acceptable *a priori*¹⁵ for the rate of unemployment in terms of efficiency units. The addition of the variable CCM/ u' not only does not resolve this difficulty but it reconfirms the fears

¹⁴ It should be noted that the basic hypothesis of equation *b*) Table 1 is substantially identical to that of equation *a*), Table 2, with the difference that the greater disaggregation of the latter equation suggests the hypothesis of a constant of the Phillips curve in the sector which renews with delay similar to that of the unionized sector, but which does not recontract ($a_{CCR} \cong a_{CN}$).

¹⁵ In this estimate, as in those which follow, we chose the value of b which minimizes the standard error of regression in the narrower *a priori* acceptable interval $0 < b < .6$ (rather than $0 < b < 1$), in that for values of b superior to this latter extreme, u' , for several years takes by construction negative values which as such do not fall within the *a priori* acceptable interval for the rate of unemployment in terms of efficiency units.

TABLE 2
(1952-73)

eq.	Estimated parameters									
	Constant	1/ u'	b	\dot{p}_c	CCM	CCM/ u'	b	S.E.	R^2	D.W.
a)	3.46 (4.86)	0.0077 (3.99)	0.6	1.0 (5.03)	9.93 (4.75)			1.68	0.883	1.65
b)	2.69 (2.83)	0.035 (2.32)	0.2	1.02 (4.71)		0.127 (3.52)	0.2	1.88	0.860	1.95

of a high degree of collinearity between CCM and CCM/ u' which prevents the estimation of the relative magnitude of η and λ in [5] in a reliable way and, with it, the difference in the constant and in the slope of the Phillips curves of the single segments.¹⁶ The elimination of the variable CCM — equation *b*), Table 2 — does not substantially modify the results reported in the previous note, but raises both the estimated coefficient of CCM/ u' and that of u' , on account of the high degree of collinearity existing between this variable and CCM ($R^2 = .8$). On the other hand, this specification substantially raises the standard error of the regression carrying it to values near to two percent.

The comparison of this latter equation with the results of equation *a*) of Table 2 would seem to suggest a trade union action largely independent of labor market conditions on account of the greater significance of the variable CCM with respect to CCM/ u' , in addition to the better fit of equation *a*) with respect to equation *b*) of Table 2. The insertion of the two variables relative to delayed contract renewals, CCR and CCR/ u' in [5] into the previous equations does not modify these results in any substantial way. In particular, the

¹⁶ The equation estimated is:

$$\dot{w} = 3.30 + 0.014 \frac{1}{u'} + 14.9 CCM - 0.046 CCM \frac{1}{u'} + 0.92 \dot{p}_c$$

(4.83) (3.43) (4.27) (-1.73) (4.74)

S.E. = 1.59; $R^2 = 0.899$; D.W. = 1.5; $b = 0.6$

where the problem of the collinearity between CCM/ u' and $1/u'$ is aggravated by the collinearity between CCM/ u' and CCM, whose estimated coefficient is now much greater than that of equation *a*) of Table 2, while the coefficient of CCM/ u' "corrects" for this overestimation with a sign which, though insignificant, is now even negative, which implies the unrealistic hypothesis that $b_{CN} = b_{CCM}$ in [3].

addition of CCR to equation *a*) of Table 2 leaves the result of the estimation substantially unchanged, giving rise to a completely insignificant coefficient of CCR, which implies the reasonably plausible hypothesis according to which $a_{CCR} = a_{CN}$ in [5].¹⁷ On the other hand, the addition of the variable CCR/u' to this equation (an addition which furnishes the nearest approximation of a direct estimation of our basic model [5], taking account of the available degrees of freedom in addition to the above mentioned problems of collinearity between u' and CCM/u' , results in a statistically significant coefficient, whose point estimate, however, is not reliable.¹⁸

In conclusion, the previous estimates underline the importance of trade union action in the function of wage negotiations together with the operation of market forces in our "modified" Phillips curve at the aggregate level. At the same time, the high degree of collinearity between the variables involved in the model and the limited number of available observations impede the distinction of the point estimates of the relevant parameters in the single Phillips curves of the four segments of the market under consideration, N, CN, CCM, and CCR. It is to be hoped that these difficulties can be eliminated at least in part with the use of quarterly data (by means of which, in a study in preparation, we propose to extend this first phase of the research with the objective of verifying the complete model [5]).

On the other hand, because they refer to averages of the entire period under observation, 1952-73, the previous estimates do not in any case permit us to answer the question which has recently

¹⁷ The equation estimated is the following:

$$\dot{w} = 4.28 + 0.0074 \frac{1}{u'} + 10 \text{ CCM} + 1.25 \text{ CCR} + 1.01 \dot{p}_c$$

(4.12) (3.56) (4.68) (0.55) (4.96)

S.E. = 1.71; $R^2 = 0.884$; D.W. = 1.55; $b = 0.6$

This result suggests an "imitation effect" which, with reference to the "weak" fraction of workers who renew their contracts, would imply a minimum wage demanded (represented by the constant a_{CCR}) not far from the average minimum established by the preceding contracts (a_{CN}).

¹⁸ The equation estimated is the following:

$$\dot{w} = 4.89 - 0.0032 \frac{1}{u'} + 12.5 \text{ CCM} - 2.80 \text{ CCR} + 0.041 \text{ CCR}/u' + 0.76 \dot{p}_c$$

(5.05) (-0.67) (5.81) (-1.07) (2.42) (3.62)

S.E. = 1.51; $R^2 = 0.909$; D.W. = 1.5; $b = 0.6$

where the point estimate of the parameters is in this case rendered even more uncertain by the collinearity existing between u'/CCR and $1/u'$, whose coefficient is now insignificant and with a sign which is even opposite to that which would be expected *a priori*.

interested the students of the inflationary process in Italy: has the Phillips curve been "dead" since the "hot autumn"? In an attempt to answer this question and to avoid the problems of collinearity which the previous results underlined, we have resorted to the previous equation [5'], which does not attempt to distinguish the point estimates of the parameters of the disaggregated Phillips curve within the unionized sector, with the exception of the "political constant" of collective bargaining. At the same time, the more limited number of parameters to be estimated for this equation allows us to verify the existence of eventual structural modifications of the constant and in the slope of the aggregate Phillips curve beginning with the "hot autumn" as an effect, in particular, of the well-known political changes of our industrial relations system (which lead to the unification of the trade union movement — the *sindacato unico*) and of the climate of conflict which preceded and accompanied it. In order to accomplish this, [5'] can be respecified in the more general form.

$$[5''] \quad \dot{w} = \alpha + \gamma_1 A \frac{1}{u'} + \gamma_2 B \frac{1}{u'} + \eta_1 \text{ACCM} + \eta_2 \text{BCCM} + \delta \dot{p}_c$$

where A is a unit vector from 1952 to 1969 and nil for the remaining period and β is, on the contrary, a nil vector for the first period and a unit vector from 1970 to 1973. The estimate of [5''] reflects the presence of structural modifications in γ and η in [5'] by means, respectively, of the estimated parameters of γ_1 , γ_2 and η_1 , η_2 in the two subperiods under consideration. The estimates of these equations are given in Table 3.

Equation *a*), in particular, verifies the hypothesis of structural modifications in the only parameter relative to the rate of unemployment in the two subperiods for a constant trade union action on wages. The results are interesting. Not only is the standard error of the regression reduced to below 1.5 percent, but the estimated coefficient of u' is highly significant in both subperiods and suggests a substantially more sloped Phillips curve in the second period with respect to the first.¹⁹ At the same time, the relative size of the two coefficients of u' — that relative to the more recent period (.049) being five times that of the preceding period (.0095) —

¹⁹ It should be noted that this result explains the upward bias which is evident from the comparisons of the coefficient of $1/u'$ in the simpler equation *a*) of Table 1, estimated for the period 1952-73, with that obtained in our first study for the shorter period 1952-68 (.043 as against .028; cf. the note for Table 1).

TABLE 3
(1952-73)

eq.	Estimated parameters													
	Constant	1/u'	b	p̄	A/u'	b	B/u'	b	CCM	ACCM	BCCM	S.E.	R ²	D.W.
a)	3.56 (5.67)			0.86 (4.71)	0.0095 (5.15)	0.6	0.049 (2.97)	0.6	6.98 (3.20)			1.47	0.914	1.70
b)	3.11 (4.72)	0.027 (5.04)	0.5	0.88 (4.88)						-0.63 (-0.14)	10.58 (5.57)	1.49	0.912	1.60
c)	3.09 (4.90)			0.81 (4.51)	0.027 (5.34)	0.5	0.057 (2.91)	0.5		0.68 (0.15)	8.18 (3.47)	1.42	0.919	1.65

suggests the possibility of an upward bias of the coefficient of Bu' , as the effect of the missing consideration of structural modifications beginning with the "hot autumn" in the incidence of the exogenous trade union action on wages, represented by CCM. For this reason, we subjected the symmetrically opposed hypotheses to preliminary empirical tests, that is, the hypothesis of structural variations in the only parameter relative to CCM in the two subperiods, for an average constant slope of the aggregate Phillips curve. The results given in equation *b*) suggest a drastic change in the industrial relations system beginning with the "hot autumn", a change which was an effect of the substantial growth in exogenous trade union action on wages. Not only does the estimated coefficient of CCM for the more recent period result substantially higher and highly significant, but the coefficient relative to the same variable for the period preceding the "hot autumn" is practically nil and completely insignificant.

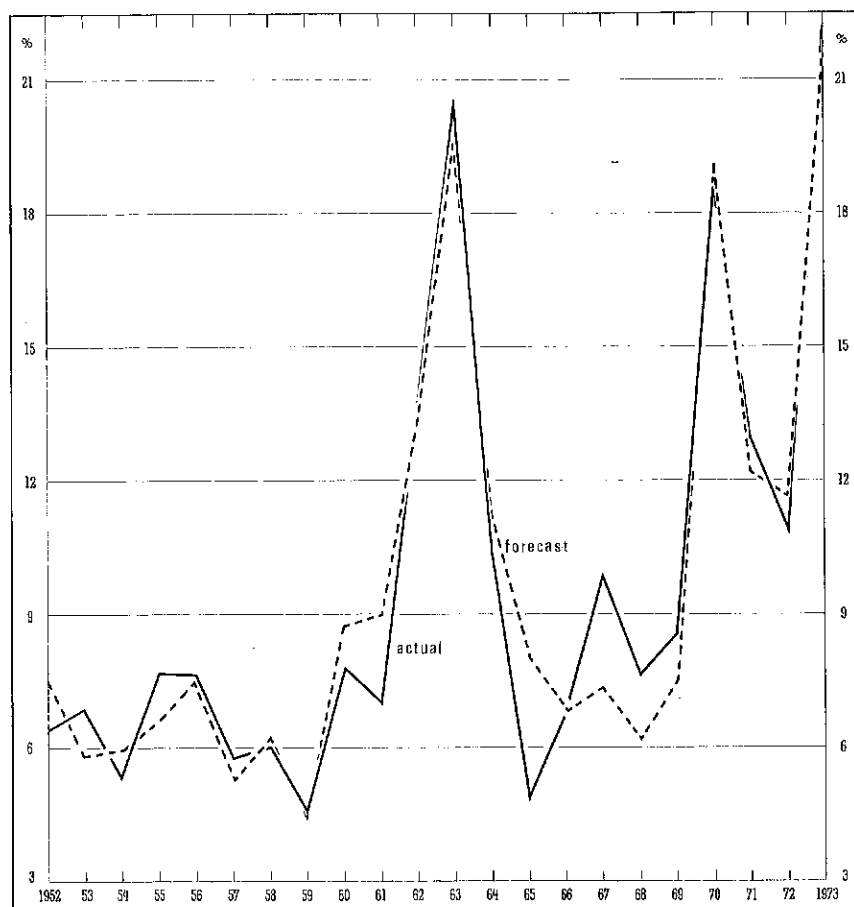
But as one would expect, we obtained the best results from a test of the compound hypothesis suggested by the two equations just given, subjecting [5''] in its complete form, Table 3, equation *c*) directly to empirical tests. In this case, the standard error of regression reaches a minimum with respect to all the equations previously estimated. The coefficient for the rate of unemployment is, as one would expect, practically identical to that obtained in our first study [VI, 2°] for the first subperiod and more than double — but not five times greater, as implied in the rougher equation *a*) — beginning with the "hot autumn". This indicates a strong increase in the slope of the Phillips curve for the more recent period. Analogously, the variable directly relevant to trade union action is practically nil in the first subperiod and very high in the second, implying for the latter a strong upward shift of the Phillips curve in the presence of non-delayed contract renewals and, therefore, in periods of greater bargaining strength of the union.

It should be underlined that in both the first and second subperiods, the constant of regression, equal to 3.1, is identical to that estimated in our first work.²⁰

In any case, the estimated coefficients are highly significant and that relative to the cost of living is now substantially less than one

²⁰ According to us, this value, equal to 50-60 percent of the long-term trend of industrial productivity, reflects both market effects and trade union action, which tends to establish a lower limit for the rate of increase of money wages commensurate with the growth in productivity even in the presence of a high rate of unemployment (in particular, for all the 1960's).

GRAPH 2
ACTUAL AND FORECAST VALUES FOR EQUATION c), TABLE 3
(1952-73)



implying a stable long-run Phillips curve, even though it is nearly five times²¹ more sloped than the short-run curve.

Graph 2 gives the actual and forecast values of equation c) of Table 3. It should be underlined that not only does the equation

²¹ As an illustration (under the simplified hypothesis that industrial wages set the pace of growth for all wages), it can be assumed that in the "long run" prices are determined by a constant mark-up on unit labor costs, a hypothesis which seems to fit well both the American and the Italian experience [II], [I]. This hypothesis can be written as follows:

$$\text{Log } p = m + \log w - \log \pi$$

satisfactorily fit the period under estimation (1952-73) represented in the graph, and, in particular, the wage boom of 1963 and that following the "hot autumn", but it comes close to "predicting" the later wage boom (not represented in the graph) of 1974, following the final year of the estimate, predicting a value of 24.3 as against 23.5.²²

Lastly, it is interesting to note that the value of parameter b , which minimizes the standard error of regression, is now identical (.5) to that estimated in both of our previous studies. As will be remembered, this coefficient implies that, relative to the effects on the wage dynamics, a worker without previous professional experience counts, as it were, half of a trained worker inserted in and adapted to his job.

4. Some implications

The previous results and those reached in our first study on the Phillips curve suggest an interpretation of the wage dynamics in Italy from the "easy" years of the economic miracle to the "difficult" years of the following depression and to the wage rounds begun by the "hot autumn".

where m is the logarithm, \log , of the mark-up, assumed to be essentially constant in the period under examination. From [1], we derive

$$[1'] \quad \dot{p} = \dot{w} - \dot{\pi}$$

where $\dot{\pi}$, the rate of growth of productivity can be taken as essentially given and constant for the present purposes. Let the general Phillips curve discussed above be:

$$[2] \quad \dot{w} = \Phi(u') + A + c \dot{p}$$

Solving [1'] and [2] simultaneously, one obtains:

$$[3a] \quad \dot{p} = \frac{\Phi(u') + A - \dot{\pi}}{1 - c}; \quad [3b] \quad \dot{w} = \dot{p} + \dot{\pi} = \frac{\Phi(u') + A - c \dot{\pi}}{1 - c}$$

Equation [3a] can be interpreted as a long run "modified price Phillips curve" and [3b] as the corresponding Phillips curve for wages. It should be noted that the long run curve essentially represents a rotation of the short run curve which, relative to u' , gives rise to a slope in every point steeper by the factor $(1/1-c) > 1$ (for $0 < c < 1$), and therefore, according to our estimate, nearly five times greater ($c \cong .8$, slightly upward biased as the effect of the collinearity between \dot{w} and \dot{p} , Table 3, equation c).

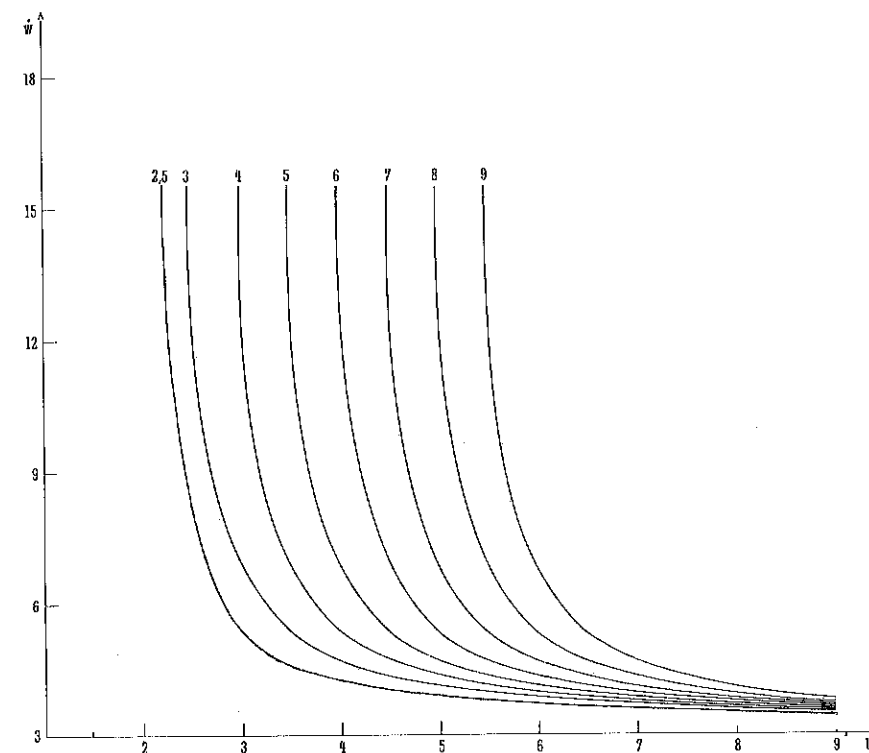
²² This prediction is rendered even more difficult by the well-known change in the national accounting data beginning with 1974 which makes an evaluation of the values of the independent variables of the equation with data compatible with those of the preceding period problematical. On the basis of internal estimates of the Servizio Studi of the Bank of Italy, a value for the level of the rate of unemployment of the order of 3 percent was taken and a rate of change of 19 percent for the implicit price of the cost of living.

In the first period, the Italian economy was characterized by a process of sustained if uneven growth, which gradually transformed the country from an economy of secondary industrial importance, with a great share of the labor force unemployed, underemployed and involved in non-industrial activities, into "the most developed of the underdeveloped countries". In this period, the total measured unemployment was gradually reduced from about 10 percent of the labor force (at the beginning of the 1950's) to 2.5 percent in 1963 according to available estimates. As we showed in our first study [VI, 2°], the share of the untrained labor force not involved in and not adapted to the industrial process diminishes in the gradual but continuous process of reduction of the structural rate of unemployment. As a result of these favorable modifications in the composition of the rate of unemployment, the pressure exercised on wages by a given level of the rate also tends to diminish. It follows that in a developing country with a share of the trained labor force involved in and adapted to the industrial process which gradually increases with respect to the total labor force, we do not find a unique relationship between the rate of increase of wages and the level of unemployment as postulated by the traditional Phillips curve relevant for already developed countries. Rather than a single "Phillips curve", we have an entire "parametric" family of curves. The relevant parameter is constituted by the composition of unemployment which we approximate in [2] with the variable u_m , the minimum previous level of unemployment, as a measure of the structural rate of unemployment.

Graph 3 illustrates the conclusions of our first study on the Phillips curve, giving a sample of the curves in question each drawn for a chosen value of u_m based on the estimates of the parameters of Table 3, equation c and assuming $\dot{p}_c = 0$ and also γ_2 and η_2 equal to zero in [5] (since we refer to the first of the two subperiods considered in the equation). As for η_1 , this parameter was also set equal to zero in Graph 3 since, as can be seen in equation c), its estimated value in the first subperiod is nearly nil and completely insignificant.

The reason for this result is to be looked for in the above-mentioned weakness of the trades unions from the beginning of the 1950's to the drawing of the "hot autumn". In particular, the previous results confirm that not even the sectorial and plant-level bargaining (*contrattazione articolata*) of the beginning of the 1960's succeeded in fundamentally changing the balance of power in the

GRAPH 3



industrial relations system and the bargaining strength of the union on money wages. After three years of sustained growth, the system, beginning from 1964, plunged into the longest economic crisis of the post-war period and the trade union came weak and unprepared to the contract renewal of 1966, which came to be called the "cyclical threat" (*ricatto congiunturale*).

In the period from 1963 to 1969, which followed the terminal moment of the abovementioned process in which the Phillips curve shifted downwards and to the left, our estimates suggest that the economic system moved along the Phillips curve which was reached with the "minimum" rate of unemployment in 1963, with a value of u_m equal to 2.5 percent, along the lowest curve of Graph 3.²³

²³ These are the years of the "long depression" during which, presumably, the Phillips curve tended in a certain measure to retrace its steps towards the position

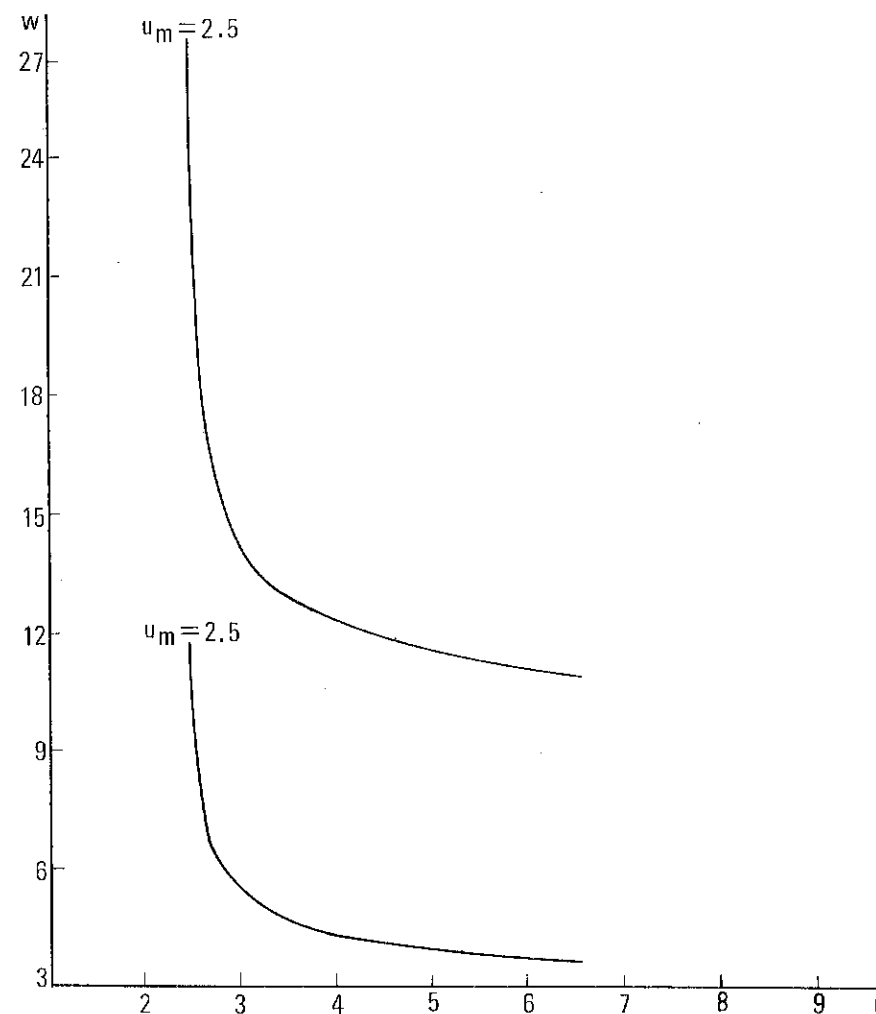
On the other hand, beginning with the contract renewals of the "hot autumn", the change of regime in our industrial relations system and the climate of conflict which accompanied it caused a strong upward shift in the Phillips curve and an increase in its slope. In our estimates both these changes are shown by the slope of the Phillips curve in the second subperiod, γ_2 , in [5''], which is more than doubled with respect to the slope of the same curve in the first subperiod, γ_1 , and by the high value and significance of the coefficient of the variable CCM in the second period, η_2 , which up to 1969 is practically nil and entirely insignificant [Table 3, equation *c*]]. This result, which is relevant to the second subperiod, is represented by the highest curve in Graph 4 which is drawn assuming $\dot{p}_c = 0$ and CCM equal to the value relevant to the "hot autumn" (.8 which in fact coincides with that relevant to the wage round of 1973, about .75). The lowest curve of the same graph reproduces the relevant curve for the period 1963-69 (which coincides with the lowest curve of Graph 3).

This result highlights the fact that, contrary to the widely held opinion that the Phillips curve "disappeared" starting with the "hot autumn", the Phillips curve is not "dead". At the same time, as an effect of the change of regime in our industrial relations system and of the climate of conflict which accompanied it, the Phillips curve relevant to our industrial relations system today has substantially shifted upwards, relative to the previously relevant curve, with a slope which is more than double for any level of the unemployment rate.

The Phillips curve relevant today, represented in Graph 4,

reached at the beginning of the 1960's ($u_m \cong 3.0 - 3.5$), as the effect of the persistence (for six consecutive years) of a higher average rate of measured unemployment (about 3.5 percent, as against the minimum registered in 1963 of 2.5 percent), which might have raised the rate of the relevant (minimum previous) structural unemployment (the system's memory of the on-the-job training process can not survive the "death" — including the technical obsolescence — of the trained workers¹). This effect was, in its turn, probably reinforced by other modifications (different from the increase of u_m relevant, in [2]) in the labor force (for example, the increase of youths in search of their first employment, the unemployment of those with high school and college degrees, etc.) in accordance with tendencies exposed by VALCAMONICI [XI] for the Italian industrial system and formalized by PERRY [VII] for the United States in a model similar to our first study. Notwithstanding this, the analysis of the residuals of our equation *c*) Table 3, does not show any autocorrelation of residuals during the 1960's, as might be expected from the effect of these potential sources of bias. An extension of our basic model in this direction can only be attempted by means of the use of quarterly data because of the scarcity of the degrees of freedom available in an estimate such as ours on annual data.

GRAPH 4



shows that in the presence of both "offensive" trade union action (like that of the "hot autumn") and "defensive" action against the increase in the cost of living (as in 1973) the annual rate of increase of money wages is largely higher than that relative to the average rate of growth of labor productivity. In particular, our estimates imply that in the presence of trade union action on money wages of the order of magnitude registered in 1970 and 1973, the

"average annual constant" during the period covered by the contract is equal to $(3.1 + 1/3 \cdot 8.2 \times .8) = 5.3$ percentage points,²⁴ greater, that is, than the rate of growth of productivity of the second sub-period (3.5 and 4, respectively, in the total of the industrial and the private sectors in the period 1970-74). An implication of this result is that a 'natural' rate of unemployment does not today exist in the Italian industrial system.²⁵ As is well-known, this is the rate of unemployment which corresponds to the point where the short-run Phillips curve crosses the line of the average rate of growth of productivity. This also implies that the Italian industrial system does not permit a policy of constant prices even in the presence of a strong deflationary monetary and fiscal policy.

In a long-run perspective, the estimate of the coefficient of the cost of living, equal to .8 in equation c) Table 3, implies, as we mentioned above, a Phillips curve five times more sloped than that of the short-run curve represented by Graph 4, in both the sub-periods under consideration.

The two highest curves in Graph 5 represent, respectively, the long and short-run curve relevant to the second subperiod under estimation (1970-73), assuming a rate of growth of productivity of 4 percent²⁶ and a (union) average constant equal to 15.3 percent according to the previous estimates which refer to contract renewals from the "hot autumn" onwards.

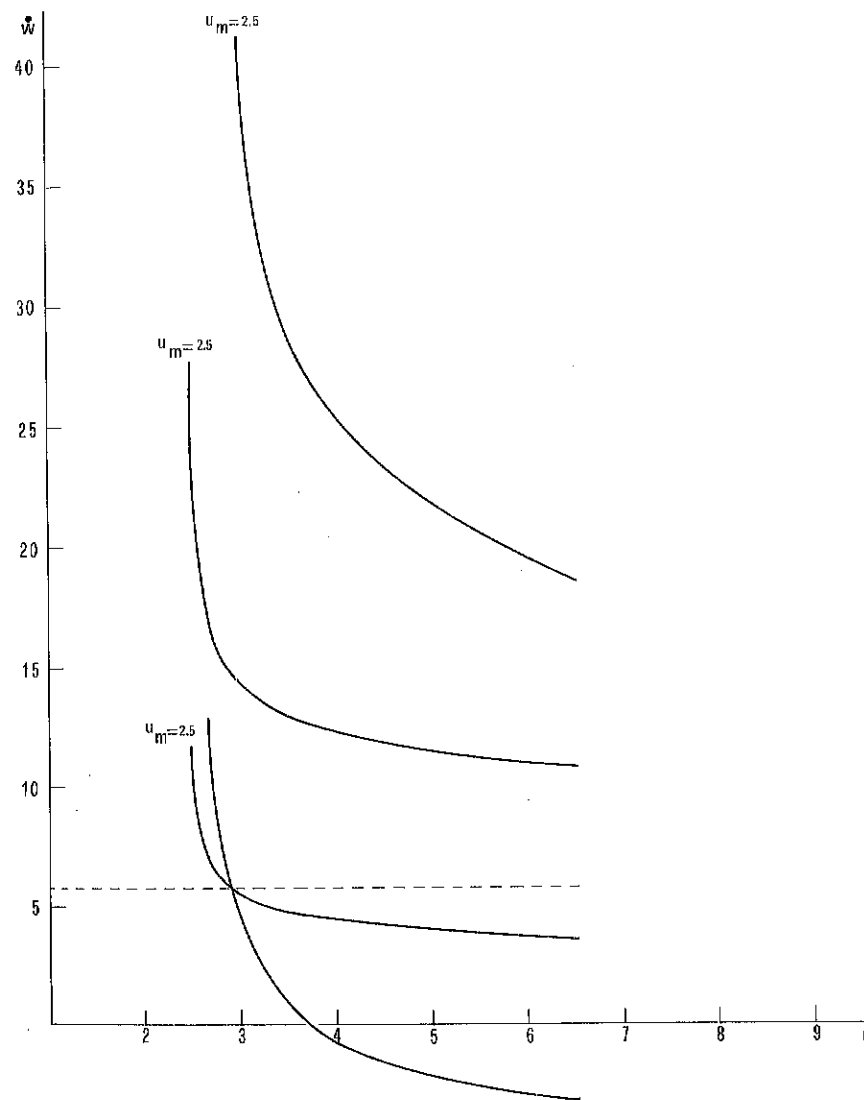
The two lowest curves in the previous graph represent the long and short-run Phillips curves estimated in the first subperiod (1952-69), for $u_m = 2.5$ (and, therefore, for the period 1964-69) and

²⁴ This estimate is based on a three year contract renewal period such as that holding for the Italian system and grows out of the ("least inflationary") hypothesis according to which the variable of contract renewal is nil for the entire period (two years) covered by the contract which follows the year in which the contract takes effect.

²⁵ It should be noted that the reasons which underlie this result are opposite to those which underlie the "natural" rate of unemployment of FRIEDMANN [IV], in that they do not grow out of conditions of long term equilibrium but from conditions of social conflict.

²⁶ As we noted above, this value represents the average rate of growth of productivity for the entire private sector which, in the simplified hypothesis in which industrial wages set the pace of growth for all wages, seems to be more relevant than industrial productivity for relating the rate of variation of the cost of living with that of wages. Naturally, our qualitative conclusions would be valid *a fortiori*, considering the average rate of growth of industrial productivity in the same subperiod equal, as mentioned, to 3.5 percent, even if, in this case as in the former case, a precise quantitative analysis of the relationship between (total) industrial wages and consumer prices can be obtained only by incorporating this equation in the econometric model of the Bank of Italy, for which it was estimated.

GRAPH 5



a rate of growth of productivity of 6 percent.²⁷ Notwithstanding the indicative value of our calculations, both the short and long-run

²⁷ This is the average rate of growth of productivity for the entire private sector in the period to which these curves refer. The rate of growth two points lower chosen

implications of the change of regime in the Italian industrial relations system are evident. In particular, with reference to the long-run Phillips curve, the difficulties in maneuvering the Italian economic system, in the presence of politically unacceptable rates of unemployment, emerge clearly, starting in the 1970's.

Even though a quantitative evaluation of our estimates must necessarily wait for equations on a quarterly basis (which are in the process of elaboration), it is still possible to furnish some orders of magnitude implied by our previous results, even if only tentatively. In the first place, our estimates imply that, as an effect of the greater slope of the Phillips curve, a rate of unemployment, like that of 1963, on the order of 2.5 percent, is presently unreachable with a rate of inflation lower than 20 percent, even if the union's "exogenous" contractual action, represented by the variable CCM ($CCM=0$) is excluded. This result is probably attributable not only to a greater sensitivity to favorable conditions of the labor market for plant bargaining but also, presumably, as noted above, to structural modifications in the composition of the unemployment of the 1960's (cf. note 23). In the second place, a rate of unemployment slightly higher than 3 percent is compatible with rates of variation of wages slightly higher than 10 percent in the long run, in the absence of the exogenous trade union action, represented by the variable CCM, that is, in the presence of a return to a "pre-hot autumn" climate (a return whose advisability the authors do not intend to discuss here). The degree to which the rate of unemployment should result higher than 3 percent depends on the rate of growth of labor productivity (cf. note 27). In the third place, in the presence of the continuation in the long run of trade union action of the order of magnitude registered in 1970 and in 1973, and even in the presence of a higher rate of growth of industrial productivity (and/or of the private sector, which, in any case, ought not to exceed 5 or 6 percent), to which the preceding estimates refer, the rate of unemployment consistent

for the higher curve in the graph, relative to the period under estimation 1970-73, reflects the well-known reduction of the rate of growth of productivity in the latter period (cf. note 26). Given the hypothesis of a rate of growth of productivity equal to 5 percent in both periods, the rate of long-run wage variation in the second subperiod would be about 4 points lower for any given level of the rate of unemployment and 8 points in the presence of a rate of growth equal to 6 percent: the up-dating of technology through investment pays, also in the long-run Phillips curve.

with a rate of change of wages between 10 and 20 percent is of the order of 4 rather than 3 percent, or even greater.

It should be underlined that the definition of the long-run used here extrapolates, as a working hypothesis, the persistence of the present situation of conflict. Our estimates are not therefore able to answer the most urgent question: what would be the effect on wages of a change in our system of industrial relations in a regime of communists participating in government (*compromesso storico*). Nor can they answer the question: in the conditions of the "historical compromise", might plant bargaining (which in our model substantially depends on the slope of the Phillips curve and on the structural conditions of the labor market) take that "exogenous" role of modification of the constant which the union has in our model? For these reasons, there is nothing to guarantee the future stability of the coefficient of our "historical dummy", CCM, or of the rate of unemployment in terms of efficiency units, u' , given a change of regime of the industrial relations system. On the contrary, our results suggest that these coefficients are not at all maintainable in the long-run, in that they are incompatible with the conditions of dynamic stability of the system. Unfortunately, because of the above-mentioned problems of collinearity and of the limited number of degrees of freedom relative to the parameters to be estimated, these results emerge from the estimate of the simplified form [5'] rather than from the more general basic model [5]. The cost of this simplification consists in the impossibility of distinguishing the parameters of the functions of wage bargaining for the four segments of the market explicitly considered in our model in a reliable way, and thus of referring to an "aggregate" Phillips curve. It is to be hoped that the reproduction (in progress) of these estimates at a quarterly level can to some degree diminish these difficulties permitting a direct estimate of our previous model, even though the abovementioned problems of collinearity will presumably tend, at least in some degree, to persist.

Lastly, we would like to underline the fact that, as opposed to what was the case for the more predictable measure of trade union strength, CC, used in the previous study, the measure of trade union strength proposed in this study, CCM, does not in any case free us from the necessity of referring to an analysis of the industrial relations system at the forecasting level. In fact, only an analysis of bargaining conditions and demands (including those of the rank and file)

can allow us to advance a working hypothesis on the forecasted measures of CCM, aside from the trivial case of a contract signed before its expiration (as can occur in estimates on a quarterly basis), in which CCM becomes a predetermined variable.

The above mentioned conditions of dynamic instability of the system are, finally, worsened by the recent unification of the escalator clause "al punto di contingenza superiore" (see note 4), which, beginning from 1977, will lead to an average value of 2,389 lire for every rate of increase in the cost of living of one percent, at 1974 prices, for all industrial categories (and not only for the most highly paid categories). Given the fact that the average monthly wage of industrial workers in 1974 was 228,000 lire, it follows that in 1977 the coefficient of compensation of wages over prices will again be equal to one in this sector, given also its diminution up to that date, as an effect of the increase in real wages, which should not in any case exceed an average of 5 percent per year. But a unit value of this coefficient implies a wage-price spiral which continues without limits and at an accelerated pace (as can be verified by setting $c=1$ in (3a) and (3b), cf. note 21), unless we hypothesize further and massive — and unrealistic — reductions in profit margins. The extension of the same agreement to commerce (in agriculture, the coefficient of compensation is already greater than one), and, in the years following, to transportation and public service, clearly shows the risks that the existing escalator clause agreement will involve for the conditions of dynamic stability of the inflationary process,²⁸ unless it is modified at the earliest possible moment.²⁹

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²⁸ For an updating to February 1977 and a confirmation of the previous estimates on the percentage of wage compensation of the escalator clause on prices, cf. Bank of Italy, *Annual Report for 1975*, pp. 131-32. We might remember that under Friedman's hypothesis, according to which this coefficient tends to unity in the long-run [IV] (which in the Italian system will tend to be verified, although based on very different reasoning from Friedman's, cf. note 25), the absence noted above of a "natural" rate of unemployment in the Italian system would imply an explosive inflationary spiral (in that the denominator of [3a] and [3b] is nil, cf. note 21) for any level of the rate of unemployment. This absence is shown in Graph 5 by the lack of a point of intersection between the two highest short and long-run curves of Graph 5 which refer to the post-hot autumn period, as opposed to what occurred to the two lowest curves, short and long-run curves which refer to the preceding period, 1964-69.

APPENDIX

In order to calculate CCM, CCR, and CC, we gathered the data relative to contract renewals of the collective national labor contracts of 51 industrial categories for the years 1959-74.³⁰ The categories actually considered in the calculating procedure are those whose employment composition is given in Di Vezza - Seppi [III] (vol. I, p. 186) with the exception of the "rope and string" sector, for which data was not obtainable for computation purposes.³¹ The data refer to total industry (in that they include the construction, electricity, mining, gas and water sectors). The elaboration of the basic data used in the estimates concerned the percentage of total industrial employment according to the 1961 census involved in contract renewals which renew without delay, CCM, with delay, CCR, and which renew *tout court*, CC.³² The series relative to these three indices used in the regressions, set at the actual date at which the contract takes effect, are given in Graph I. For a more detailed analysis of the procedure of elaboration of the indices and for their disaggregation and comparison with different measures of industrial conflict, cf. [X].

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²⁹ Cf. F. MODIGLIANI, *Corriere della Sera*, Feb. 3, 1975 and Mar. 9, 1975 and E. TARANTELLI, *Paese Sera*, April 9, 1975 for a discussion and a proposal for the modification of the escalator clause by income brackets, which safeguards the lower income brackets.

³⁰ A complete collection of these data can be found at the Associazione Industriale Lombarda of Milan.

³¹ In the calculation procedure, the employment data of two sectors: 1) the spinning of synthetic fibers; 2) dyeing and printing of synthetic fibers have been respectively included in the sectors: 1) spinning of silk, rayon and related products; 2) dyeing and printing of silk; since distinct contractual data for silks and fabrics were not available. The "oils, fats, soap, and related products" sector, moreover, began bargaining separately from 1970, dividing itself into two sectors: "soap" and "oleomargarine". From this year, therefore, employment data have been adapted to the new situation calculating the percentage of the new sector on the total oils sector, as results from the census of 1971 and applying these percentages to the available data.

³² This measure is directly comparable to previous data used by MODIGLIANI-TARANTELLI [VI, 3°] who slightly underestimate it for the reasons mentioned above (cf. [X]).

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