

# QUADERNI



Università degli Studi di Siena  
**DIPARTIMENTO DI ECONOMIA POLITICA**

Antonella Stirati

INFLATION, UNEMPLOYMENT AND "HYSTERESIS"  
A CLASSICAL APPROACH

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# **Inflation, Unemployment And 'Hysteresis'- A Classical Approach**

Antonella Stirati, University of Siena

## **1. Alternative approaches to the inflation/unemployment relation and aim of the paper**

### *The Phelps-Friedman approach to unemployment and inflation*

Main-stream discussions of the 'Phillips curve' have centred, since the contributions by Phelps et al. (1970) and Friedman (1968) around the concept of the natural rate of unemployment. The latter is the equilibrium rate of unemployment associated with a constant inflation. In this approach equilibrium is characterized by some unemployment because of frictions and market imperfections. In the 70s, the emphasis was on the fact that imperfect and costly information renders it rational for workers to spend time in search activities aimed at getting a good enough pay within the existing distribution for any particular kind of job.<sup>1</sup> Search (according to the approach) is best carried out while unemployed. The level of the natural unemployment rate is thus determined by 'structural' factors such as the efficiency of the institutions conveying the relevant information; the costs of search activity (the focus has been on the role of unemployment benefits in lowering such costs, thus increasing voluntary unemployment); the intensity of the continuously occurring changes that, by altering equilibrium prices, continuously prevent the system from fully converging towards the frictionless long period equilibrium.

This framework of analysis implies that attempts to keep the economy at an unemployment rate lower (higher) than the natural rate imply keeping it at output and employment levels above (below) equilibrium. This can be sustained only by accelerating inflation (deflation) and continuous unpredicted expansion (contraction) of money

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<sup>1</sup>As information is gathered the distribution of wages offered for any particular occupation would tend to converge to the unique equilibrium wage for each occupation, but such tendency is never realized, due to continuously occurring structural changes.

supply. Without it, the system would soon spontaneously converge towards the equilibrium natural unemployment rate.

Now if one thinks of the experience of industrial countries in the last two decades or so some problems (though certainly not the only ones) become apparent. In the second half of the 70s increasing unemployment rates were associated with accelerating inflation;<sup>2</sup> later, inflation was substantially reduced but unemployment rates remain, particularly in Europe) very high, and do not show any tendency to return to a - supposedly lower - natural rate. Attempts to explain the current persistent high rate in terms of an increase of the natural unemployment rate do not appear promising, since during the 80s and 90s the underlying determinants of natural unemployment (such as the costs and incentives to search, the intensity of structural change, or obstacles to free competition in the labour market) have, if anything, changed in a direction that should be favourable to its reduction.<sup>3</sup> Recently, there has been a shift in emphasis from information costs to obstacles to free competition (particularly unions) and asymmetric information (efficiency wages) as the main determinants of the equilibrium unemployment rate or of the NAIRU (non accelerating inflation rate of unemployment). These analyses too predict accelerating inflation (deflation) for unemployment rates different from the NAIRU, and a tendency of the economy to return to it, thus encountering difficulties in the explanation of observed trends similar to those of the earlier natural rate concept. Of course this problem is widely acknowledged also by main-stream economists, who are attempting to provide explanations of why adjustment to 'equilibrium' can be very slow, or why equilibrium unemployment itself can change as a consequence of changes in the actual rate - both

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<sup>2</sup> This was explained with the 'supply shocks' of the 1970s increasing the intensity of structural change, and/or shifting the aggregate supply function, thereby increasing the natural unemployment rate. Yet unemployment persisted in the 1980s despite the fact that structural change was less intense than in the 1960s and 1970s and the 'supply shocks' from the prices of commodities had the opposite sign.

<sup>3</sup> In a prestigious study by OECD it is affirmed: "despite considerable effort, it has been hard to identify changes in the basic determinants of the natural unemployment rate that are large enough to account for the observed trend increase in actual unemployment during the 1980s" (OECD, 1994, p. 67). See also Carlin and Soskice, 1990, pp. 442-44.

topics coming under the now familiar heading of hysteresis. The present work may be regarded as an attempt to provide an explanation of these phenomena, which have appeared as 'puzzling', by taking a route that departs radically from the traditional neoclassical approach.

*Aim of the paper and comparison with 'conflict' theories of inflation*

Aim of this paper is to suggest a framework for the analysis of inflation, and of its relation to unemployment, which is consistent with the surplus or classical approach to economic theory. The ideas I shall present build upon old and recent contributions to the theory of income distribution within the classical approach. These ideas may be developed to improve our understanding of inflation.

Inflation is regarded as the result of incompatible influences and claims over income distribution, and in this sense the approach taken here has much in common with cost-push or conflict interpretations of inflation developed in the Kaleckian tradition. In this tradition when workers pursue increases in the real wage higher than the increases in productivity there will tend to develop an accelerating inflation, as firms form their prices by charging a given, desired 'mark-up', in percentage terms, over money wage costs (Rowthorn, 1977). Indeed this analysis of inflation has been integrated in models in which the equilibrium employment (corresponding to the NAIRU) is determined by means of a wage-setting function relating the real wage and unemployment: if the real wage aimed at by unions depends on the unemployment rate, there will be only one particular unemployment rate associated with a real wage claimed by unions which is compatible with the given 'mark-up' (see Blanchard, 1986, Layard and Nickell, 1986, Carlin e Soskice, 1990). The contributions that follow this approach, however, do not appear to provide sound explanations of the 'mark up' and hence of the profit rate or of the 'target' profit rate. In Kaleckian literature the mark-up at firm and industry level is explained as resulting from factors such as barriers to entry, elasticity of demand, ecc.

that can be summarized under the heading of 'market structure'.<sup>4</sup> Costs however are taken as given, thus neglecting all input-output transactions that render 'costs' in one industry (or firm) dependent on its own and other industries (firms) mark-up and prices. Such limitation of the approach becomes extremely serious when this is used at the aggregate level, as it has been shown that there is no sensible and economically meaningful way to determine the 'average' mark up for the economy, used in aggregate models, as an average of the mark-ups at firm and industry level (Steedman, 1992).<sup>5</sup> In addition it might seem to be implied in these models that there would be no return on invested capital in free competition (or in conditions very close to it). This would appear as an unacceptable paradox. On the other hand, if that proposition is rejected this must imply that the 'market structure' may allow the earning of an additional profit above a 'minimum' or 'normal' rate that would be earned if free competition prevailed. But it appears unclear, as it is not discussed in this literature, what would determine this 'normal' profit rate (see also Pivetti, 1992, pp. 108ff).

Indeed, it is sometimes suggested that the bargaining position of the parties in the conflict over income distribution is the ultimate determinant of the actual mark-up (Tarling and Wilkinson, 1985). But in such case why not suppose that, in general, the bargaining between workers and employers can determine not only money wages but also real wages? When workers manage to obtain increases in money wages capitalists might simply have to accept a reduction in profits with no changes in the general price level.

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<sup>4</sup>Another explanation of the mark-up at firm level is also found in post-keynesian literature. According to it, the mark-up is established by firms in such a way as to raise internal funds to finance productive investments up to the point where the (increasing) costs of raising funds by that means (lost sales caused by price increases) - which may be represented as an 'interest'  $R$  on internal funds - will be equal to the (decreasing) expected returns from an additional investment (Eichner, 1973; Harcourt and Kenyon, 1976; Wood, 1975). Even apart from a number of questions concerning the soundness of this explanation (on which see Pivetti, 1992, pp. 117ff), it would encounter the same problems of the other when attempting to explain the mark-up at the economy-wide level (see text).

<sup>5</sup> In order to construct an average, the industry mark-ups must be weighted according to the share of the industry in gross output, but such shares, being measured in value terms, are not independent of the mark-ups (Steedman, 1992, p. 131)

After all, this may well have been the case in some historical phases, and is close to the views of the old classical economists and Marx. They believed that the bargaining between the parties would determine the real wage and hence the rate of profit. The full-cost pricing generally assumed in Kaleckian contributions is evidently not per se an explanation of prices but a description of how firms determine their prices, which is open to different explanations of the normal profit rate (Pivetti, 1995, p. 21; 1992, pp. 122ff). Hence this description may in principle be compatible also with an explanation of the normal profit rate as determined by the real wage rate, as in the old classical tradition (Schefold, 1983, p. 246). Yet, it appears to be true that at least in some historical period the price level changes in response to changes in the money wage level. For example, a wage-price spiral definitely appears to have contributed to the high inflation of the 1970s. The question of what determines the profit rate underlying the pricing decisions of firms, can find an answer in the ideas, developed within the surplus approach, as to the influence of the rate of interest on the profit rate.<sup>6</sup> These ideas can contribute to provide an account of inflation as the result of conflicting influences on the profit rate and the real wage rate causing inconsistent claims over income distribution. Taking this approach not only appears to provide a sounder explanation of the profit rate (hence, of the mark-up) than those found in Kaleckian literature, but also leads to different views concerning the circumstances giving rise to accelerating rather than constant inflation.

When the conflicting influences on income distribution are such as to cause an acceleration of inflation (or deflation), the process evidently cannot go on for ever, and eventually there will have to be changes in the policies, institutions and social processes in general that lay behind such influences. These changes too will be influenced by the strength of the conflicting parties. These aspects however will not be dealt with here, and

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<sup>6</sup> I shall here mostly refer to Pivetti, 1992; other contributions include Panico 1988, Pivetti, 1990, Vianello 1988, Bonifati 1991. See also Aspromourgos, 1991; Ciccone, 1990a; Ginzburg, 1992; Serrano, 1993, Vianello and Bonifati, 1997. Outside the surplus approach the role of high interest rates in affecting income distribution and the price level has recently been emphasized by Fitoussi, 1995, pp.93-94; De Cecco, 1979, pp. 96-98 also suggested that interest rates should be regarded as costs for the firms and hence as positively associated to the rate of inflation.

cannot be analyzed at the same level of abstraction. My only attempt will be to propose a sort of 'taxonomy' of conditions that may lead to different (i.e. constant or accelerating) inflationary (and deflationary) processes, and suggest a framework for the analysis of the (changing) relation between unemployment and inflation.

Although a distinctive feature of the approach I shall attempt to develop is to take into account the influence of the interest rate on the 'target' rate of profit and hence on prices and inflation, my focus will be on the influence of labour market conditions on inflation, given alternative policies followed by the Central Bank concerning the interest rate. I shall not therefore discuss the many factors that may influence and constrain the Central Bank's policy with respect to the interest rate. This, however, suggests itself as a very important area for research.

#### *Main features of the approach*

It may be useful to recall some of the features of the 'surplus approach' within which the following analysis will be carried out.

Employment and the output level are determined independently (as a first approximation) of the real wage rate. The level of output is determined by effective demand, and employment simply is determined by output level and the given average labour productivity. There is no systematic inverse relation between the real wage and labour demand based on direct or indirect factor substitution. The theoretical foundations for this lay in the demonstration, in contributions to the so-called capital controversy, that the notion of decreasing demand curves for 'production factors' including labour is fundamentally flawed (Sraffa, 1960, pp. 38, 81; Garegnani, 1966, 1970; Pasinetti, 1969; see also Roncaglia, 1988). As distribution changes so do all prices and consequently it is not granted that, for example, techniques using (directly and indirectly) a higher proportion of labour per unit of output will be more profitable in consequence of a fall of the wage rate. But without 'well behaved' substitutability, the marginalist approach

ceases to be a theory, i.e. to provide an explanation of distribution, prices and output levels.<sup>7</sup>

Techniques are (provisionally) assumed constant when distribution changes. Of course there may be effects of changes in distribution on the chosen techniques and on the introduction of innovations. But these are better studied at a separate stage of analysis, and there is no foundation for expecting a particular direction of change in the demand for 'factors'. The wage rate may affect employment also via its influence on effective demand, arising from changes in the propensity to consume (on which increases in the wage rate tend to have a positive effect) or in the ability to export and import penetration (on which they may have a negative and positive effect respectively). The relevance and intensity of such influences are contingent upon specific conditions, and will be neglected here.

In this approach unemployment may well be a persistent phenomenon, and is not regarded as leading to an indefinite fall of the wage rate, but rather as one of the factors that may affect the real wage level.

In main-stream literature, the relationship between changes in unemployment and inflation is generally discussed in the context of the economic cycle; that is as a short run phenomenon, related to deviations of the economy from its equilibrium position. This obviously depends on the theoretical framework, which implies a spontaneous tendency of the economy towards the unique 'equilibrium' or natural unemployment rate and to the associated stable inflation rate. This is not the case in the approach taken here. Unemployment and changes in its level can be lasting phenomena (there are no spontaneous tendency of the system to full employment or 'maximum employment') and so is its influence on wages and, by this route, on inflation. Actually, it is persistent changes in the (average) unemployment rate, that are believed to affect the latter; while

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<sup>7</sup> It should be noted that once the flaws in its analytical foundations are recognized, the downward sloping demand for labour cannot turn for support to striking empirical evidence (see Anyadike-Danes and Godley, 1989; Zenezini, 1993; Hamermesh, 1993, pp. 339-42; see also, for the short period, the empirical results on the movements of real wages over the cycle (Michie, 1988; Brandolini, 1995).



short term fluctuations might not have significant or systematic effects (consistently with the empirical evidence according to which real wages in the business cycles tend to vary procyclically, but not significantly and consistently so in different periods and countries). In what follows, as in all 'cost-push' explanations of inflation, money supply is not regarded as the main determinant of the price level and its changes. One can think of the Central Bank as carrying out 'accommodating' monetary policies so as to stabilize the interest rate around the desired level, thus rendering money supply dependent on price and activity levels.

## **2. Interest rate, profit rate and money prices.**

Let us look at the relation between the profit rate and the (given) interest rate (in this section I follow closely Pivetti, 1992).

Suppose that the price level and money wage rate are constant and the money interest rate is  $i$ .<sup>8</sup> Competition implies that any sum invested at the beginning of the year should have at the end of the year a return equal at least to  $i$ . The latter represents the opportunity cost of any capital - be it borrowed or not<sup>9</sup> - invested in production, and prices will accordingly tend to be such as to cover this cost along with the others, that is, will be such as to yield a rate of profit equal at least to the rate of interest.<sup>10</sup>

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<sup>8</sup> The interest rate that appears to be relevant here is the interest rate on long-term, safe financial assets.

<sup>9</sup> It may be thought that firms relying on own funds for their (gross) investments could attempt to undersell competing firms that need to rely on borrowed funds. Even if they do, this cannot be a very long lasting phenomenon, as the capital invested in these firms would be yielding less than it would if invested elsewhere. The owners of this capital would be making a loss, and would not accept such a state of things for an indefinite period of time.

<sup>10</sup> It has generally been understood by economists that interest rate and profit rate move together. In the neoclassical tradition the profit rate is determined by the full employment marginal product of capital, and the rate of interest must adjust to this level. If it is different, a process of inflation (if the interest rate is too low) or deflation will be set in motion, which will eventually induce the monetary authorities to change the interest rate (Wicksell, 1935; see also Garegnani, 1978, pp. 42-7; Bonifati, 1991). In the old classical tradition the rate of profit was determined by the real wage (given output and technology), and the interest rate would tend to follow - a divergence between the two giving rise to changes in demand for loanable funds relatively to their supply, which would tend to bring the interest rate to the level of the

In general the profit rate must be higher than the interest rate, as it must compensate for the 'risk and trouble' associated with productive investment. The perceived 'risk and trouble' will generally differ across industries. In addition, the profit rate may be higher than the interest rate and differ between firms and across industries because of market power and barriers to entry. The rate of interest therefore represents a minimum common component for the rates of profit. Thus we shall have:

$$P = PA(1+i) + PA + IW$$

where

$P$  = the (row) vector of money prices

$i$  = the given nominal interest rate

= the (column) vector of industry profit margins in addition to the interest rate<sup>11</sup>

$A$  = the matrix of input coefficients per unit of output

$W$  = the given money wage (supposed unique, i.e. a scalar, for simplicity)

$I$  = the (row) vector of labour inputs per unit of output

Given the money wage and nominal interest rate the system above determines the  $n$  money prices. Money is here 'fiat' money and not a produced commodity. Once the money wage and the money prices are determined, the real wage can be determined and is equal to the money wage over the appropriate price index.<sup>12</sup>

profit rate (see Panico, 1988). By contrast, in contemporary contributions to the surplus approach it is maintained that it is the rate of profit that must adjust to autonomous changes in the rate of interest (see the references in footnote 6 above).

<sup>11</sup> The compensation for risk and the possible 'extraprofits' associated to barriers to competition are here conceived as a given proportion of the capital invested. It would not have any consequence for the themes discussed in this paper to treat them instead as a given proportion of interest (as used to be done, for example, by Ricardo), so that the profit rate in each sector would be:  $r_j = i + \beta_j i$  (see Pivetti, 1992, p. 64).

<sup>12</sup> This is determined by the price vector times a vector of weights which reflects the average consumption basket of the wage earners:

$$w = W/P_w$$

$$P_w = P_b$$

The matrix of coefficients  $A$  will be assumed unchanging. This is not a necessary assumption but a simplifying one, which is justified by our focus on sources of changes in the price level other than technical change, economies of scale and relative price changes.

As the  $w$  vector can be regarded as constant - that is as independent from changes in the interest rate or level of employment, normal profit rate and interest rate will move in step, and we can safely neglect, for simplicity, the term indicating profits above the interest rate.

If we suppose changes in the price level from one period to another, caused by changes in costs other than the interest rate, the condition indicated above that the normal profit rate and the interest rate will tend to equality must be qualified. Competition requires that any sum invested in period  $t-1$  will yield the same return in the subsequent period  $t$ . This means that a return equal at least to the nominal interest rate must be earned on the historical cost of capital (as opposed to the replacement cost):

$$P_t = P_{t-1}A(1+i) + IW$$

hence, if  $P_tQ > P_{t-1}Q$ , the profit rate on the replacement cost of capital (i.e. the profit rate as it is normally understood) will actually be lower than the money interest rate and equal to the real interest rate:

$$(1+r) = (1+i) (P_{t-1}Q/P_tQ)$$

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where

$w$  = real wage rate

$P_w$  = the price index for wage earning households

$b$  = vector of  $b_j = P_jQ_j / P_jQ_j$  with  $j = 1...n$ ;  $Q_j$  = the quantity of the  $j$ th good consumed by the wage earners;  $P_j$  its price.

In what follows I shall neglect the effects of changes in the relative prices of wage goods with respect to other commodities as a factor that can have a role in the dynamics of inflationary processes. The theme however is very relevant, as shown by the attention received in 'structuralist' analyses of inflation, and can find an appropriate setting in the framework of analysis outlined in the present paper.

However, if the increase in money prices is once-for-all, as the historic cost of capital inputs converges towards its replacement cost, the rate of profit converges towards the rate of interest.

We shall now use these ideas concerning the relation between the interest rate and the profit rate to analyze the consequences on money prices of changes in money wages, interest rate and terms of trade, neglecting, for the moment, changes in productivity.

### 3. Sources of inflation.

#### *Changes in money wages*

Suppose we have a once-for-all increase in money wages. Initially this will bring about a fall in the profit rate and a rise in the real wage level. Money prices after the change ( $P_t$ ) will be:

$$P_t = P_{t-1}A(1+i) + IW(1+h)$$

where

$h$  = rate of increase of money wages

The money prices before the wage change can be written as:

$$P_{t-1} = P_{t-1}A(1+i) + IW = \{1 [I-(1+i)A]^{-1}W\}Q$$

The change in the price level between the two periods depends on the respective weights of labour and non-labour costs and is measured by:

$$P_tQ / P_{t-1}Q = \alpha + (1-\alpha)(1+h)$$

where

$$\alpha = P_{t-1}A(1+i)Q / \{1 [I-(1+i)A]^{-1}W\}Q$$

is the share of the value of capital inputs and profits on the value of total output<sup>13</sup> at prices  $P_{t-1}$  and quantities  $Q$ , and

$$(1-\alpha) = IQW / \{1 [I-(1+i)A]^{-1}W\}Q$$

is the share of direct labour costs on the value of total output in period  $t-1$ .

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<sup>13</sup> The denominator in the expression is the sum of the value at wage  $W$  of total direct and indirect labour requirements for the production of the output vector  $Q$  (for the economic meaning of the inverse see Pasinetti, 1981, pp. 84-86 )

The profit rate is lower and the real wage in period  $t$ ,  $w_t$ , is:

$$w_t = w_{t-1}(1+h) (P_{t-1}Q / P_tQ) = w_{t-1}(1+h) \{1 / [1 + (1- ) (1+h)]\}$$

From the above, we see that:  $1 < (w_t/w_{t-1}) < (1+h)$ . The real wage rate has increased, but at a rate lower than  $h$ , the rate of increase in money wages.

However, this is true only in the 'transition'. As the price of produced inputs rises, the money price level will tend to converge to:

$$P' = P'A(1+i) + IW(1+h)$$

Hence, the change in the money price level will exactly match the change in money wages ( $P'Q/P_{t-1}Q = 1+h$ ), the real wage will be unchanged and the profit rate equal to the interest rate.

However, if the money wage rises again, for example if it rises at the rate  $h$  in every period, then the profit rate is constantly lower than the nominal interest rate and equal to the real interest rate. In the (regularly repeated) 'transition' in which the nominal interest rate is charged over a historic cost of capital lower (because of the inflation) than its replacement cost, the money price level increases less than  $h$ , and hence the real wage remains at the higher level.

Hence, a continuous increase in money wages at a 'yearly' rate  $h$  determines, other things given, a constant rate of inflation, an increase in the level of the real wage, smaller than  $h$ , and a fall in the profit rate.<sup>14</sup> This also implies that, should the nominal interest rate rise, workers may resist the consequent fall in real wages by setting in motion a constant inflation of wages and prices.

Delays or graduality in the adjustment of prices to changed costs of production have been neglected here. Quite obviously they will generally occur, and affect the actual course of inflation and distribution. Here however I meant to isolate the effects that depend on the forces determining normal prices, rather than the adjustment towards these prices.

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<sup>14</sup> In principle, with a given nominal interest rate, inflation might reduce real interest to zero, or extremely low level. In such circumstances however a persistently constant nominal interest rate would be highly implausible.

### *Changes in the interest rate*

Let us now suppose that the Central Bank's objectives are defined also in terms of real interest rates. This will be the case if it wants to protect the value of and returns on savings and wealth held in assets denominated in national currency by 'agents' planning to spend or re-invest them in the country. Note however that the Central Bank may be concerned with nominal interest rate more than real interest rate in certain circumstances: if its policy is dominated by external objectives (exchange rate, balance of payment) what matters is the nominal interest rate.<sup>15</sup> Thus assume that the nominal interest rate is fixed by the Bank in such a way as to ensure a particular value of the real interest rate, given the expectations concerning price changes:

$$(1+i) = (1+i^*)(P^eQ/PQ)$$

where

$i^*$  = the Bank's target real interest rate

$P^eQ$  = the money price level expected to prevail in next period

$PQ$  = the money price level in the current period

Substituting this expression in the money price equation we obtain

$$P = PA(1+i^*)(P^eQ/PQ) + IW$$

This, if expectations are correct, and if the adjustment is immediate, amounts to eliminating what we have described as the 'transition' in which the money interest rate is applied to a historic cost of capital lower than its replacement cost. To see this let us assume that expectations are correct, that is they are that the rate of inflation will equal the rate of increase of

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<sup>15</sup>International capital flows depend upon differences in nominal interest rates and the expectations concerning the risk of depreciation of the currency. The latter certainly depend on the rate of inflation of the country compared to that prevailing in major trading partners, as a positive differential will lead to a deterioration of the current account of the balance of payment that, sooner or later, is likely to cause a devaluation of the currency. But this deterioration may take a rather long time, or devaluation of the currency may be postponed for the sake of nominal exchange rate stability while the higher nominal will continue to attract capital flows.

money wages  $(1+h)$ .<sup>16</sup> In this case too the growth of money wages at the  $h$  rate will bring about a constant rate of inflation, but there will not be any increase in the real wage, as the price level immediately increases at the same rate as money wages (see also Pivetti, 1992, p. 56):

$$P_t = P_{t-1}A(1+i^*)(1+h) + IW(1+h)$$

and

$$(P_tQ/P_{t-1}Q) = (1+h)\{P_{t-1}A(1+i^*)+ IW\}Q/\{P_{t-1}A(1+i^*) + IW\}Q = 1+h$$

### *Real targets and expectations*

Now if the Central Bank has real targets and so - as it is most plausible (see below) - do workers, and if these targets give rise to inconsistent claims over income, an accelerating inflation (or deflation) will result.

Let us assume that the expectations of the Central Bank and workers (or unions) are the same, and that the latter aim at an increase in real wages by  $h$ . Money prices at time  $t$ ,  $P_t$ , will be:

$$P_t = P_{t-1}A(1+i^*)(P^eQ/PQ) + IW(1+h)(P^eQ/PQ);$$

where  $h$  is the desired increase in the real wage level.

The change in money prices will be:

$$(P_tQ/P_{t-1}Q) = (P^eQ/PQ) \{ [P_{t-1}A(1+i^*) + IW(1+h)]Q / [P_{t-1}A(1+i^*) + IW]Q \}$$

Which shows that the rate of change in money prices in any period must be greater than expected:  $(P_tQ/P_{t-1}Q) > (P^eQ/PQ)$ . This evidently implies that, as the expectations concerning the rate of change of money prices are revised in the light of experience (as must reasonably be supposed), actual inflation will be higher from period to period, and an accelerating inflationary process will be set in motion. Its speed, and the actual distribution of income between the parties - whether inflation erodes more the target real wage or real interest rate (and hence the profit rate - will depend on the speed of adjustment of the money interest rate and money wages, in turn evidently affected by institutional arrangements (indexation, timing of wage contracts etc), and how expectations are formed (which, in turn, may be regarded as the result of previous experiences of inflation). If for example inflation has been accelerating for a while,

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<sup>16</sup> This expectation is correct if the interest rate is adjusted for inflation.

there will form a tendency to expect the increase in prices in next period to be higher than in the past, and therefore expectations of rising inflation will tend to be incorporated in the bargained money wage<sup>17</sup> and, possibly, in the Central Bank's revisions of the money interest rate. Expectations will also depend on opinions/perceptions concerning the probable behaviour of the parties involved, their ability to continue in the pursuit of their objectives given the constraints arising for example from macroeconomic policies, foreign trade and balance of payment, exchange rates.

The speed of adjustment of actual to normal prices, which affects actual distribution and inflation, will depend on economic circumstances which may influence the pricing behaviour of firms, such as foreign competition and exchange rate policy.

#### *Comparison with 'Kaleckian' models*

The previous analysis leads to the conclusion that, given productivity, workers may be able to realize an increase in real wages by causing a constant wage and price inflation, provided that the money interest rate remains constant. This contrasts with the view that attempts to obtain real wage increases greater than productivity increases are bound to failure and, if repeated, lead to accelerating inflation - a view often found in Kaleckian models, which rests on the view that the mark-up, hence the profit rate, is given and cannot be reduced by increases in money wages. These models usually do not directly address the question whether the constant mark up is calculated on historic or replacement costs of inputs. An exception to this is a paper by Tarling and Wilkinson (1985) which takes up the issue, and concludes that whether firms charge the mark-up on historic or replacement costs ultimately depends on the bargaining

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<sup>17</sup> Hence it is not to be taken for granted that in an inflationary context wage indexation will tend to favour inflation more than a non indexed periodic re-contracting of wages. Actually the opposite may well be true: with indexation, however frequent the adjustment of wages, the money wage changes must follow price changes. With no indexation and high inflation the workers will attempt to obtain a money wage that anticipates future price changes. However, automatic indexation will continue to guarantee some protection of the real wage even when the bargaining position of the workers is not strong enough to bring about such a result via re-contracting of the money wage. Thus, the elimination of indexation may be a necessary step in a process leading to a change in income distribution unfavourable to the workers.



position of firms and unions.<sup>18</sup> By contrast, here is competition that, if the money interest is constant, will tend to impose price increases which entail a reduction in the profit rate.

In some discussion of cost-push inflation it is indeed maintained that increases in the money wage above what allowed by productivity increases may result in a constant inflation and redistribution of income if there are (constant) lags in the adjustment of actual prices to desired prices, i.e. to the prices formed by charging the target profit rate or mark-up over costs (see Modigliani and Padoa Schioppa, 1977; Meade, 1982, appendix A). In other words, if there are lags in the adjustment of prices to costs (and of money wages to prices), then inflation itself will be the means by which a compromise is reached between the incompatible objectives of the parties. In a sense we reach here a similar conclusion, but the analysis above shows that, given the nominal interest rate, redistribution of income will result, even independently of adjustment lags, from the trend in normal prices themselves.

#### *Changes in the terms of trade*

Let us now suppose a negative change in the terms of trade. To analyse its effects it is convenient to distinguish between domestically produced inputs and imported inputs. With a given interest rate and money wage the price equation can be written as:

$$P = PA(1+i) + F(1+i)(1+m) + IW$$

where

F = the vector of the values in national currency of the imported inputs per unit of output:  $F_j$  is the value of imported inputs necessary to produce a unit of commodity j.

m = the rate of increase in the value, in national currency, of imported inputs.

The increase in the value of imported inputs may be due either to a devaluation of national currency or to a rise in international prices of imported goods and raw materials.<sup>19</sup> To fix our

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<sup>18</sup> In the model presented in their paper labour is the only input (wages are advanced) so that there will be a mark-up on wage costs. The question whether this is charged on historical or replacement costs hence coincides with the question of the time-lag with which prices are adjusted to changes in costs. Of course the role of such lags in affecting the distributive effects of inflation has been widely recognized in the literature (see for example the works cited in the text).

ideas on the possible outcomes, in terms of inflation, of such a rise, it is useful to distinguish five cases.

i) If the increase in the cost of imported inputs is a once-for-all event, with given money wage and interest rate we shall have a rate of inflation which will gradually subside. This because the worsening of the terms of trade is gradually eroded by the rise in internal prices. At the end of the process, the increase in the price level converges to a value lower than  $m$  (which is lower the larger is the share of labour costs on total costs in the initial period), so that part of the initial worsening of the terms of trade will persist; the profit rate will equal again nominal (and real) interest rate and the real wage will have been reduced as a result of the rise in the price level.<sup>20</sup>

ii) If we assume that money wages and money interest rate are constant as before, but the worsening in the terms of trade is persistent, that is, as domestic prices rise, the exchange rate (or prices of commodities) will adjust for the inflation, still the inflation will gradually smooth down, albeit more slowly than before. The rate of increase in prices is less than  $m$  (the rate of increase in import costs) in the first period, and is smaller in every subsequent period. This is so because, with a constant money wage, as the level of prices increases from period to period the real wage falls, thus allowing the economy to adjust to the worsened terms of trade.<sup>21</sup> In

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<sup>19</sup> In this second case it is most likely that not all prices would rise at the same rate - and  $m$  should be reinterpreted as a vector. For simplicity I shall regard it as a scalar.

<sup>20</sup> The price level converges to  $P'Q = P'A(1+i) + F(1+i)(1+m) + lw = [F(1+i)(1+m) + lw] [I-(1+i)A]^{-1}$  which, dividing by the price index in the period before the change in import costs becomes  $P'Q/P_{t-1}Q = [ (1+m) + ] / (1- ) < 1+m$  - where , , are respectively the weights of domestically produced capital and interest, imported capital and interest, and labor costs on the value of production in period  $t-1$ . The disequation above can be rewritten as:  $+ + m < + + m + m$ , which shows that the difference between the two terms depends on the size of  $m$ .

<sup>21</sup> The increase in money prices in the first period is:

$$(P_t Q / P_{t-1} Q) = [P_{t-1} A(1+i) + F(1+i)(1+m) + lW]Q / [P_{t-1} A(1+i) + F(1+i) + lW]Q$$

The expression above can be re-written as:

$$+ (1+m) + = 1+ m$$

where , , are the shares of domestically produced capital and interest, imported capital and interest and labour costs on the value of output at  $t-1$

in the subsequent period we have:

other words, the workers bear (part of) the burden of this adjustment by accepting a fall in the real wage *via* an increase in the price level. The real interest rate also falls, although less and less so as the rate of inflation smooths down.

iii) Let's suppose now that the worsening in the terms of trade is persistent, the nominal wage is given, but the nominal interest rate is adjusted to the rate of price change experienced by the economy, so as to preserve the real interest rate. In this case as before the rate of increase in the price level in the first period is  $\pi$  (where  $\pi$  is the share of the value of imported inputs and interest on the value of output in the first period,  $m$  is the increase in the cost of imported inputs due to the change in the terms of trade), and may be rising for a while, but as in each period the real wage and hence the cost of labour inputs falls as a consequence of the increase in the price level, inflation will at some point start smoothing down, and will disappear when the fall in labour costs is such as to fully compensate for the increase in production costs caused by the change in the terms of trade.<sup>22</sup>

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$$\begin{aligned} (P_{t+1}Q/P_tQ) &= \\ &= [P_{t-1}(1+\pi)A(1+i) + F(1+i)(1+m)(1+\pi) + IW]Q / [P_{t-1}A(1+i) + F(1+i)(1+m) + IW]Q = \\ &= 1 + \pi + (1+m)\pi + [\pi^2 / (1+\pi)] < (1+\pi) \end{aligned}$$

<sup>22</sup> In the first period  $P_tQ/P_{t-1}Q = 1 + \pi$ . In the following period  $t+1$  we have:

$$P_{t+1}Q/P_tQ = \{[P_t(1+\pi)A(1+i) + F(1+i)(1+m)(1+\pi)^2 + IW]Q\} / P_tQ$$

remembering that  $P_tQ = P_{t-1}(1+\pi)Q$  the above expression can be rewritten as:

$$P_{t+1}Q/P_tQ = (1+\pi) + (1+m)\pi + [\pi^2 / (1+\pi)]$$

The above expression can be larger or smaller than  $(1+\pi)$  according to the value of the parameters; it will certainly be greater if  $\pi > 0.5$ . In every subsequent period however the first two terms of the right hand side will be given by the sum of  $\pi$  and  $(1+m)\pi$  each multiplied by one plus the inflation rate in the previous period, while the third term of the right hand side will fall, as real labour costs decrease as a consequence of the progressive rise of the price level (the denominator of the third term is the product of all the terms given by one plus the rate of change in prices for all previous periods), so that inflation will at some point start smoothing down and will completely cease when the denominator of the third term is equal to  $\pi / (\pi - m)$ , and the third term thus becomes equal to  $(\pi - m)$ . This outcome of course is possible

Evidently, the larger the increase in prices, the less plausible it is that the money wage will remain unchanged after the worsening of the terms of trade. If there is - as we should expect (see below) - what is called in contemporary economic literature 'real wage resistance', we must expect the money wage to rise in response of the rising cost of living due both to the direct increase of the price of imported goods consumed by the workers and to the increase in the production costs of domestically produced goods.

iv) With a persistent worsening of the terms of trade, if money wages increase to preserve their purchasing power, with a constant nominal interest, inflation will tend to converge to a constant rate and the burden of the (negative impact) of the terms of trade will be born by profit (and interest) earners *via* the inflation.<sup>23</sup>

v) If the workers aim at preserving their real wage level and the Central Bank pursues a policy of preserving the real rate of interest, this would set in motion a process of accelerating inflation, as the 'target' real wage and rate of profit are inconsistent, given the persistent change in the terms of trade.

#### 4. Direct influences on the real wage rate

In this section I intend to discuss the main factors having a direct influence on the real wage. This discussion, integrated with the analysis developed above, will allow a discussion of the influence of such factors, and particularly the unemployment rate, on price inflation, given alternative policies followed by monetary authorities.<sup>24</sup>

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only if  $\mu > m$ , as a negative or zero cost of labour inputs is not admissible, nor is in fact a real wage below some historically determined minimum floor (see sect.4 below).

<sup>23</sup> We have in the first period the same rate of increase in prices as in the earlier cases, i.e.  $\mu$  (see notes above). In the subsequent period

$$P_{t+1}Q/P_tQ = [P_{t-1}(1+\mu)A(1+i) + F(1+i)(1+m)(1+\mu) + IW(1+\mu)]Q / [P_{t-1}A(1+i) + F(1+i)(1+m) + IW]Q = (1+\mu)$$

and so in every subsequent period. If wages rose immediately in the first period still the inflation rate would be constant, but at the rate  $(\mu + m)$ .

<sup>24</sup> It is possible that in turn monetary authorities are themselves influenced and constrained in their choices by factors such as the bargaining position of the workers and the ability of money wages to

Although what the workers get and bargain over is, in general, the money wage, it is clear that what is aimed at is the real wage. What factors influence both the workers' target and, most of all, their ability to pursue it?

In the classical tradition the real wage rate is seen as the 'sum' of two components. The first one is what the old classical economists called 'subsistence', which can be regarded as a 'floor' in any given period and place. The second component is what the workers can obtain in addition to the first, depending on their bargaining position vis a vis their employers.

The first is a minimum consumption threshold that depends on historically determined living standards in any given period. These will define some minimum consumption level that is necessary for the workers to take part in social life, to be accepted and respected in the community. Not only this level represents the minimum acceptable for the workers, but it also tends to be recognized as a floor by the employers, who will generally not try to push wages below that threshold, unless under extreme circumstances.

Being historically determined such threshold may change over time. It is likely to move upwards as the result of 'ratchet effects' lead by social imitation on higher living standards that become with time perceived as necessary.<sup>25</sup> It may also, albeit plausibly with more difficulty, be gradually eroded by conditions negatively affecting workers' bargaining power and/or the productivity (or productivity growth) of the economic system and hence its ability to produce the income to be shared. Such changes in the 'minimum' however must be slow and gradual (especially downwards) so that in any

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respond to price increases (Garegnani, 1978, p. 63), which therefore may have some influence on the interest rate and the exchange rate policy (the latter acting as a constraint on price changes because of international competition). In Italy for example the combination of high interest rate and stricter fixed exchange rate policies has been implemented only after the defeat, in 1980 of a strike in the automobile industry, marking a turning point in industrial relations.

<sup>25</sup> Analyses of consumption patterns in contemporary society that point to such ratchet effects are found in Duesenberry, 1949; for a historical and empirical work on consumption by the waged classes in Great Britain which leads to similar views see Wilkinson (1985). For a discussion of these views in Classical economists, see Stirati, 1994, pp.65-70.

given period there is a given limit to the fall of the real wage level. Because of the 'ratchet effect' just described, such lower limit should not be conceived as very far below the average real wage rate experienced by workers in the recent past.

The emergence of (private or legal) norms preventing wages from falling below this minimum might be favored by sedimented historical experience of the dangers for the viability of the economy and society as a whole of unlimited competition on wages - a competition that would not lead, according to this framework of analysis, to increases in the employment level. Such historical experience for example might favour the emergence within the working classes of social norms and rules of behaviour sanctioning wage competition or 'crumirage', or the establishment of a legal minimum wage.

Today many economists would agree that real wages are 'sticky' downwards - there is indeed much main-stream economic literature attempting to explain why it should be so. This seems to suggest that classical views are not at variance with observed phenomena. But it should be noted that contemporary models purporting to explain wage stickiness usually retain the inverse relation between the real wage and employment based on falling marginal product of labour, in contrast with the classical or surplus approach.<sup>26</sup>

The second component of the normal level of the real wage is subject to influences of a political and institutional nature as well as to economic influences such as constraints from foreign trade, productivity, and of course unemployment - or, perhaps more exactly, the size of what Marx used to call industrial reserve army. As is clear in Marx's analysis, the latter has several components, of which explicit unemployment is only one. Here I shall focus on the unemployment rate and its influences on the real wage, among other things, because this is useful to make the comparison with contemporary discussion in macroeconomics easier. But while unemployment may be a good indicator of labour

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<sup>26</sup> This may cause some problems in providing convincing 'microfoundations' of the downward 'stickiness' of wages - see for example the discussion of elasticity of labour demand in Solow, 1980; see also De Francesco, 1993 who shows that Solow's model of the labour market as a social institution (1990), where Solow attempts to provide an explanation of wage stickiness, relies on some ad hoc assumptions, and could be generalized by assuming that the demand for labour is not 'elastic', i.e. that real wage changes cannot induce significant changes in the employment level.

market conditions, it also has drawbacks and may not be the only useful indicator of the chances that any person willing to get a job has to obtain it (Stirati 1992 pp.50-55). In addition the distribution of unemployment among the working population, and the ways (unemployment benefits, family support etc) unemployed people are provided for - if at all, are also likely to be important for the impact of unemployment on workers' bargaining position.<sup>27</sup>

Besides having a direct influence on the bargaining position of workers, unemployment can have also an indirect one, via its influence on the evolution of the institutional and political framework. For example the strengthening of unions in the 'golden age' decades has probably been permitted by persisting low unemployment rates. Their existence in turn may have reduced and postponed the negative influence of rising unemployment rates, the persistence of which at high levels has however eventually caused their weakening.<sup>28</sup>

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<sup>27</sup> Unemployment benefits have been a major focus of main-stream applied research as they have been regarded as a major source of wage stickiness and hence (in this approach) also of unemployment. But even concerning the 'supply side' behaviour of workers main-stream analyses appear to have overemphasized the role of unemployment benefits in causing unwillingness to accept job offers - a behaviour not confirmed by research on panel (micro) data (see Kiefir and Devine 1991 for an interesting survey)

<sup>28</sup> The reasons why unemployment should have a direct influence on workers' individual and collective bargaining position should include the following. i) Low unemployment renders it easy for workers to change job, and firms may find it necessary to offer relatively good wages and working conditions to retain workers (i.e. firms have to compete to keep their turn-over low). ii) Firms will tend to find difficult to fill vacancies, hence will compete to obtain workers. iii) With low unemployment and short unemployment spells (the two are highly correlated) and vacancies requiring longer time to be filled, the potential costs for individual workers to be dismissed as a consequence of union militancy, or participation in strikes, decrease (as firings are more unlikely and in any case less costly for the individuals involved). iv) With high unemployment new establishments may be able to hire workers at lower wages than those prevailing elsewhere; this, if only as a threat to both employers and employees, will tend to keep wages in check everywhere. v) If low unemployment is associated with running down of stocks of finished goods, the threat of a strike or, in general, of unrest on the part of the workers is more worrying (because it would be more costly) for employers than in opposite conditions, when stocks of finished materials are accumulating beyond the desired level.

It should be noted that in the present framework of analysis the current 'bargaining position' of the workers is a major factor in determining the real wage rate even in a situation in which workers bargain individually and there are no unions. This in contrast with contemporary 'bargaining' explanations of the wage level, that are supposed to hold only if there are monopoly/monopsony elements in the labour market, while in their absence wages would be determined by 'the forces of demand and supply' as they are viewed in neoclassical theory, i.e. would be determined at the intersection of neoclassical demand and supply schedules. Of course, the fact that bargaining power explains the real wage in the surplus approach independently of the market structure does not mean that the latter is irrelevant. Quite the contrary, it gives support to the view that the emergence or strengthening of unions, as it improves workers' bargaining position, can persistently increase the real wage rate.<sup>29</sup> Also, they may render the latter less sensitive, particularly in the short run, to other factors, such as changes in labour market conditions.

The classical view of competition and the determinants of the real wage imply that the level (and direction of change) of the unemployment rate will influence the level of the real wage. A significant rise in unemployment will tend to cause a reduction in the real wage, not its indefinite fall; and if unemployment decreases significantly, this will cause an improvement in real wages. Actually, it may be thought that a very persistent low level of unemployment (as well as a persistent very high level) might with time have reiterated effects. This may be conceptualized as the result of the new consumption habits becoming gradually incorporated into what is customarily regarded as 'necessary' consumption, thus moving upwards (or, but with greater difficulty downwards) the threshold. Once the gains in real wages and consumption have thus been 'assimilated', then a continuing low

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These considerations, it should be emphasized, are not in contrast with the idea that there is a minimum threshold for the real wage, as this does not imply an absence of competition, but simply that competition operates within (historically determined) boundaries.

<sup>29</sup> This in contrast with the view that in the long run unions cannot alter the income distribution resulting by underlying economic forces, which can be found for example in the writings of Friedman (1951) and Phelps Brown (1968); for a critique of Phelps Brown views based on a detailed discussion of the factors affecting real wages in various countries in the period 1890-1913 see Levrero (forthcoming).



(high) level of unemployment may permit a further movement in the same direction. This however suggests a gradual, stepwise process of change in real wages rather than the continuous one imagined by neoclassical theory for an economy (labour market) which is not in equilibrium.

Again, the classical idea that real wage levels are influenced by the rate of unemployment has re-emerged in much of contemporary literature, with the construction of a wage-fixing function which establishes a relation between the unemployment rate and the real wage rate, and which is based on 'efficiency wage' models or 'bargained wage' models. Such function however plays the role of a 'surrogate supply function', and once these models are completed with a labour demand function, they do not imply the possibility of a variety of unemployment/real wage equilibria, characterized by an inverse relation between unemployment and the real wage. These can be obtained only under assumptions which rule out the inverse relation between labour demand and the real wage (see for example Nickell, 1985). By contrast, in the approach followed here, the absence of any necessary relation between the real wage and the employment level implies that different normal values of the real wage may be associated to varying unemployment rates, a relation that appears consistent with empirical findings.<sup>30</sup>

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<sup>30</sup> Blanchflower and Oswald, 1994, find a systematic negative relation between unemployment rate and individual real earnings (for individuals with similar characteristics) across regions and industries of the same country, in several industrial countries. The relation between unemployment rate and real wage in time series data is explored also in econometric analyses interpreting the Phillips curve as a 'real wage equation', with the real wage determined by 'bargaining' (see Newell and Symons, 1986).

## **5. Main determinants of unemployment.**

What can be said about the possible causes of unemployment, once we reject the marginalist view that the economy spontaneously tends towards full employment, or the maximum employment consistent with existing frictions and imperfections?

For given levels of average labour productivity and labour supply<sup>31</sup> unemployment will result from an insufficient level of aggregate income.<sup>32</sup> Attention therefore should be focussed on the determinants of the latter. Once the marginalist theory is abandoned, the Keynesian principle of effective demand naturally suggests itself as an alternative explanation of output levels. Moreover, if one recognizes the influence of the degree of capacity utilization on investment, the Keynesian principle can be extended to provide an explanation of output (and employment) trends over time (Garegnani, 1978; 1983).

The determination of output according to the principle of effective demand is usually regarded as valid (if valid at all) only in the 'short-period'. This is so because it is generally accepted that in the long period output is determined - given the technology, tastes, resources and their allocation - at the full employment (or, if there are 'imperfections', at the 'maximum employment') equilibrium level. In the surplus approach however we do not find the mechanisms (the inverse relation between interest rate and investments and wage level and employment) ensuring such tendency of the long period output level to the level corresponding to full (or maximum) employment of resources. Hence persistent changes in the autonomous components of demand will determine persistent changes in the output level. Existing productive capacity does not

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<sup>31</sup> Indeed the present analytical framework suggests that labour supply is positively related to the employment level both in the short and, particularly, in the long run (Stirati, 1992); the real wage rate also may have some influence on individual labour supply, which may go in either direction. However I shall neglect these influences the analysis of which is outside the scope of the present paper.

<sup>32</sup> I entirely neglect here labour hoarding and changes in hours worked (very likely to occur over the cycle), so that the level of employment (in heads) is uniquely related to the output level. The extent to which changes in output can be accompanied by changes in working hours is of great relevance for the empirical analysis of changes in employment, but at the level of abstraction of the present discussion it does not appear harmful to neglect them.

pose a stringent limit to output expansion. The existence of some spare capacity, and, most importantly, spare labour, may be regarded as the norm: a) because there are no economic forces ensuring their full utilization in any given period, and b) because firms will tend to build up a capacity that allows them to face the peaks of demand in order not to lose their customers (Ciccone 1990b); hence even when the economy is operating at the desired degree of capacity utilization it will be possible to increase to some extent production of both consumption and investment goods.<sup>33</sup> At the same time, increased use of capacity above the desired degree due to changes in demand perceived as persistent will tend to stimulate an increase in investment and hence installed capacity.<sup>34</sup> Changes in demand - due for example to macroeconomic policies - will thus have persistent effects in two senses. First, as long as the fall in, say, public spending persists, so will the fall in output and employment. That is, there are no endogenous economic forces determining a tendency for the economy to move towards a full employment (or 'natural unemployment') equilibrium (such tendency, in main-stream analyses, relies upon the existence of downward sloping demand curves for labour and investment). Second, a persistent fall in demand will have long term negative effects on investment and the building up of productive capacity. Accordingly, there is no reason to expect that, in general, the existing capacity is such (in size as well as embodied technology) that it may

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<sup>33</sup> Even if the economy was already near to full employment, labour supply might still be able to adjust, *via* increases in hours worked, changes in participation rates, migration. Another important source of adjustment in labour supply in an expanding economy are shifts in employment between sectors - from agriculture to industry, or from self employment to wage employment for example - albeit this would not show in aggregate data on labour supply as conventionally defined.

<sup>34</sup> Garegnani 1962, 1992; Kurz, 1990 Trezzini, 1994, Serrano, 1994, Bortis, 1996. Outside the 'surplus approach' the idea that investments depend on aggregate demand was admitted in mainstream literature with the accelerating principle, the role of which however was limited to the cycle. The idea is also present, albeit not theoretically developed, in some of Kaldor's writings (see Kaldor 1978) and in many 'Kaldorian' economists, who extend it to the explanation of accumulation, and it is now again attracting interest as an explanation of 'persistence' of unemployment (see for example Rowthorn, 1995).

allow, if fully utilized, the full employment of labour.<sup>35</sup> Evidently, all this points to macroeconomic policy as a major determinant of output and employment.

## **6. Unemployment and inflation**

We can now draw threads together and suggest some conclusions concerning the relationship between unemployment and inflationary (or deflationary) processes.

A persistent fall in the average unemployment rate will set in motion a tendency towards an increase in the real wage. Given the nominal interest rate, it is possible to arrive at a particular rate of increase in money wages and prices such that the real interest rate and the profit rate are low enough to accommodate (to be consistent with) the increased real wage level desired by the workers. Hence, everything else constant, an increase in the real wage and a constant rate of inflation may follow a reduction in the average rate of unemployment. There is a difference here with the conclusions drawn in some contributions to the conflict explanation of inflation according to which an increase in money wages not accompanied by a proportional increase in productivity would lead to accelerating inflation (Rowthorn, 1977; Carlin and Soskice, 1990). This difference depends on the assumption, in those contributions, that the percentage 'mark up' (hence, the profit rate) remains constant. By contrast, in the analysis presented here capitalists are constrained in their pricing decisions by competition tending to establish a rate of profit equal to the real interest rate. Thus, whether accelerating inflation will tend to be set in motion ultimately depends on the changes in the money interest rate. While it can hardly be supposed that this will remain unchanged in the face of a high rate of inflation, the

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<sup>35</sup> The opposite way of reasoning, based on the neoclassical theory, according to which capacity tends to adjust to labour supply in the long run is often supported by the argument that over long periods of time, labour supply and labour demand have grown in step rather than showing persistently divergent paths (see for example Jackman, Layard and Nickell, 1991, p. 9). However this may be due to causality and adjustment running in the opposite direction: i.e. from opportunities to work to labour supply. The actual mechanisms depend on historical circumstances, and particularly on the degree of development and income level, and include changes in: population size (migrations, changes in fertility rates and mortality rates); participation rates; the number of the self-employed.

adjustment to inflation may not be immediate and complete, particularly as some of the Central Bank's objectives may be pursued by means of nominal rather than real interest rate management (see above).

Similarly, inconsistent influences on the real wage rate and profit rate may give rise to deflationary processes. Suppose to start from a situation in which the inflation rate is zero (that is in which the influences on distribution are mutually consistent). Suppose then that a substantial increase in unemployment diminishes the real wage workers are able to obtain - i.e. their money wage, given a certain price level. Capitalist employers may see this as an opportunity to increase their profits, but eventually be led by competition (with a given nominal interest rate) to lower their prices. If further reductions in money wages can be obtained, a deflationary process will thus be set in motion and - symmetrically with the case discussed above - there will be (everything else constant) a constant rate of deflation of money wages and prices such that the rate of deflation renders the given nominal interest rate, thanks to an increase in the real interest rate and rate of profit, consistent with the lower real wage rate associated with the higher unemployment. However, the fall in the real wage would encounter a limit in the historically determined minimum floor; so that even increasing unemployment rates may not further increase the rate at which prices fall, or they may, but only very gradually.

If changes in the unemployment level occur in a situation where there is already a positive inflation rate, the above analysis suggests that a fall in the unemployment level, other things given, will tend to bring about an increase in the constant rate of inflation, while an increase in the unemployment rate will tend to cause its reduction by a certain amount, but only provided that the real wage is not already at the level at which it becomes extremely 'sticky' downwards.

#### *Changes in productivity.*

Until now changes in productivity have been neglected, but evidently capitalist economies are characterized by a continuous increase in productivity, albeit at varying speed.

How is the above analysis of inflation and income distribution altered if we take into account productivity increases?

Evidently, the inflation rate associated with a given annual rate of increase of the money wage will be lower than what it would have been without increases in productivity by  $1/(1+g)$ , where  $g$  is the annual rate of decrease in the required labour and material inputs (I have here assumed that increases in productivity affect in the same proportion labour and non-labour inputs in all sectors). Accordingly, the rate of increase of real wages in a given period is higher than would otherwise have been for a given increase in money wages.<sup>36</sup> These increases in the real wage accumulate in time, because even as the historic costs of capital tend to adjust to the replacement costs and the real interest rate tends to converge towards the nominal interest rate, real wages increase as a consequence of the productivity increase, as prices (with a given nominal rate of interest) would decline with respect to money wages. Thus, considering only the effects of productivity growth, with a given nominal rate of interest, the real wage in time  $t$  compared to the real wage in an initial period  $0$  will be:

$$w_t = w_0 (1+g)^t$$

With a given money wage the profit rate too will be increased by productivity growth, on account of the price deflation caused by it. This would occur, given our assumptions concerning the effects of productivity increases on the required non-labour inputs, even if money wages rose in time at the rate of productivity growth  $g$ , as prices would still fall, albeit at a slower pace than with constant money wages.

If, as maintained above, workers are concerned with real income, and pursue a certain level of the real wage, the effect of a continuous rise in productivity will be that of

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<sup>36</sup> While it is generally true that the introduction of technologies giving a higher per capita productivity will allow increases in the real wage given the the profit rate (or vice versa) it is also true that new techniques may be introduced which allow higher real wage given the profit rate but give rise to lower per capita output - this is due to the fact that the value of the capital inputs associated to the new technique is lower. I thank prof. Garegnani for drawing my attention to this point.

gradually accommodating inflationary conflicting influences on distribution, thereby determining a gradual reduction of the inflation rate where we would have had, without productivity growth, a constant rate of inflation. Naturally the importance and rapidity of this effect will depend on the rate of increase in productivity compared to the increase in the real wage pursued by the workers (or the increase in the interest rate sought by the Central Bank; or the deterioration in the terms of trade). The existence of a continuous increase in productivity also makes it possible for the economy to adjust to a higher rate of interest and profit rate without actually lowering the real wage rate but simply by stagnation or slow growth in the latter compared to productivity growth.<sup>37</sup>

On the other hand, the continuous gains in productivity would, in principle, appear to make deflationary processes likely. Yet general price deflation which has characterized some phases of accumulation in industrial countries, has not been observed, until now, in the post WWII period. This seems to indicate that increases in money wages and the 'target' real wage are not, particularly in this period (but to some extent also before it) entirely independent from the changes in productivity. Indeed, there seems to be a fairly large consensus on the fact that in the post-WWII period industrial relations in advanced countries were such that money wages would tend to rise in step with productivity (Boyer, 1978; Marglin and Schor, 1990). Such industrial relations however began to break up after a period of high unemployment - with differences in timing and intensity in different countries.

Given that in the first decades of the post-WWII era unions would tend to aim at increases in real wages at least equal to the gains in productivity, and workers accordingly to expect a constant improvement in living standards, it may be appropriate to regard changes in unemployment at least in these decades as affecting not so much the real wage level but the deviations of its rate of change from the rate of increase in productivity. Thus, while the previous discussion of how increases in productivity would alter the inflationary

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<sup>37</sup> This is what appears to have happened in industrial countries during the 80s, as real hourly earnings have increased less, over the period, than the increases in productivity both in manufacturing and services (OECD, historical statistics).

effects of inconsistent influences on income distribution has been based on the (provisional) assumption that real wages are independent of changes in productivity, such complete independence cannot in fact be supposed. In the classical framework, increases in productivity may be regarded as a favourable condition for increases in the real wage, as this becomes possible without reductions in the rate of profit; in addition, they may stimulate workers' claims to benefit from the productivity gains, of which they are likely to be aware at firm and industry level.<sup>38</sup> But whether, and to what extent, workers will be able to benefit from increases in productivity will still depend on their bargaining position.<sup>39</sup> The latter may also have a role in determining whether the workers benefit from productivity increases *via* increases in money wages or (to a lower extent) *via* falling prices.

#### *A 'Phillips curve'?*

The ideas discussed may be summarized in *figure 1*, representing the relation between unemployment and inflation that one would expect to observe, *given*: the money interest rate; the terms of trade; productivity and the institutional framework. Changes in any of these would determine shifts of the curve; in addition, the institutional setting is likely to be important also for the shape of the curve, for example, as the literature on 'neo-

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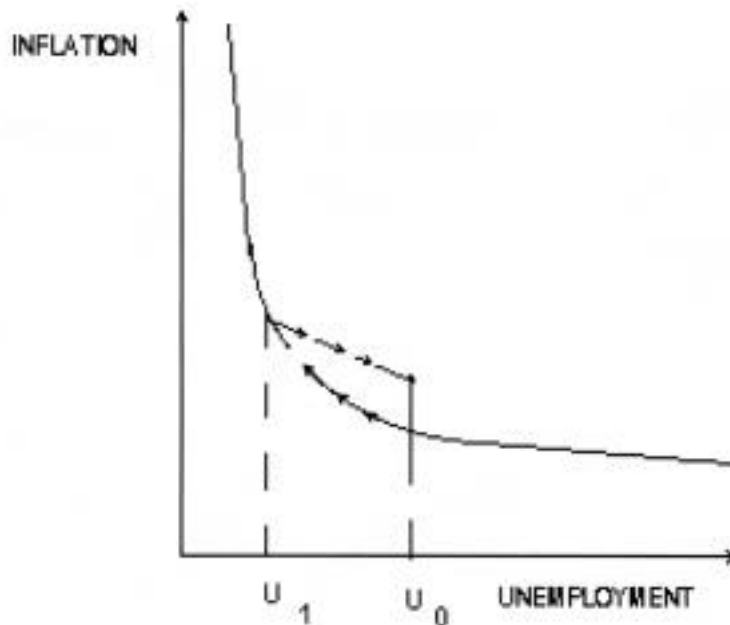
<sup>38</sup> If the the increase in productivity goes along with an increase of the value of capital per worker (which is not necessarily the case), this may by itself increase the bargaining position of the workers: a) because it increases the cost, for the employer, of conflict (in the form of strike or sabotage) b): because it diminishes the incidence of wage concessions on total production costs

<sup>39</sup> In the classical approach the realrelationship between wages and productivity is not as strong and necessary as it is in the neoclassical approach, and one would expect that wage increases may diverge from productivity increases also for relatively long periods of time (for empirical and historical investigation confirming this possibility see Levrero, forthcoming). By contrast in neoclassical theory wages tend to the value of the full employment marginal product of labour. This is positively affected by gains in the average productivity of labour, and technical progress, even when labour saving, will tend to increase the full employment marginal product of labour. Only "very labour saving" technical progress, in Hicks terminology, is associated to a fall in the equilibrium real wage.



corporatism' has pointed out, a centralized bargaining system might be able to prevent the emergence of inflation even at extremely low unemployment rates.

*Figure 1 - The likely empirical relation between unemployment and inflation, other things constant.*



Unlike most recent discussions of the 'Phillips curve' (but similarly to the original work by Phillips) the curve represents a 'long period' relation between the average level of unemployment and rate of change in prices rather than the cyclical fluctuations of these variables. There may or may not be a rate of unemployment at which the inflation is zero, given the existence of a 'floor' to the real wage level (hence the horizontal tract of the curve in the figure). Also, there may be ratchet effects from actual real wages to the minimum acceptable real wages, thus if unemployment (and the associated real wage level) remain in  $U_1$  in the figure for a sufficiently long period, an increase in unemployment to  $U_0$  may not reduce inflation at the same level experienced, in combination with  $U_0$ , at an earlier period.

## **7. Some notes on inflation and unemployment experiences**

### *The negatively sloped Phillips curve.*

The approach described above appears consistent with the existence in major industrial countries of a negatively sloped Phillips curve in the 1950s and early 60s. In a scarcely or non inflationary context, falls in the unemployment rate - everything else constant - would tend to determine increases in the real wage, accompanied by a (moderate) money wage and price inflation. In the post-WWII period the high rates of productivity growth and low and stable money interest rates would tend to prevent a high or accelerating inflationary impact of real wage increases, and the working of the international monetary system also tended to inhibit a wage-price spiralling.<sup>40</sup> In addition, in the then prevailing context of low inflation there are reasons to believe that money wages and actual prices would tend to adjust only gradually to changes in the price level and production costs respectively (see Rowthorn, 1977, pp 162-3).

### *The 'vertical Phillips curve' of the seventies*

The large changes in terms of trade in the seventies explain most of the inflation (and its changes) in Oecd countries in those years (Beckerman and Jenkinson, 1986; Grubb, 1986). Changes in the cost of imported commodities would increase the costs of production and prices both as direct inputs in production, and indirectly, as the cost of a given real wage would be increased. Large increases in commodity prices, with given real wage and a given nominal interest rate, generate high constant inflation rates. If the

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<sup>40</sup> See Biasco, 1977. According to this author, during that period the working of the international system was such that some countries (Germany and Japan) with no inflationary pressures on the prices of tradeables acted, through competition on international markets, with stable exchange rates, as a check for potentially more inflationary countries. As in the latter firms were constrained in their price reactions to wage demands, when these became 'excessive', deflationary macroeconomic policies would be carried out, perhaps justified by balance of payment problems, which would reduce wage demands by creating unemployment. Such 'controlling' role of the non inflationary countries began to collapse in the late 60s because of exchange rate fluctuations, and this was a permissive factor for the high inflation experienced by industrial countries in the ensuing years. This would explain, according to the author, the contemporary emergence of inflation in all the industrial countries.

nominal interest rate changes to keep pace with the rate of inflation then the latter will accelerate. Although nominal interest rates did not rise in the aftermath of the first oil shock enough to prevent the real interest rate from falling sharply, still their upward adjustment contributed to accelerate the inflationary process. All this quite independently of the initial rate of unemployment. De-flationary policies involving falls in aggregate demand generated high unemployment rates that may to some extent have contributed to slowing down the inflationary process, by reducing the real wage or its rate of growth relative to that of productivity. Yet, due to the limits to a fall in the real wage rate, with persisting large increases in import prices, that would hardly be able to cure inflation to a significant degree. In addition, the growth of unionization and union militancy built up during the previous long phase of full employment and sustained growth, would not collapse too rapidly (particularly in Europe) as a result of increasing unemployment. Hence, the negative influence of higher unemployment on the workers' bargaining power was not, particularly in Europe, immediate, and the unions continued for a while to have the ability to organize workers and to be effective in the pursuit of their objectives. Thus, the combination of traditional de-flationary policies (often involving also increases in the nominal interest rate) with unfavorable changes in the terms of trade would cause the phenomenon known as "stagflation", that is a combination of high unemployment and high (and accelerating) inflation.

*The experience of the '80s and hysteresis (or: the re-surrection of the negatively inclined Phillips curve)*

In the 80s Oecd economies, and particularly EEC, can be said to be characterized by an initial significant reduction in inflation rates, then remained stable or slightly rising at a relatively low (compared to the 70s), but positive rates in the last part of the 80s and beginning of the 1990s. Average unemployment rates have increased dramatically in the whole of Oecd, and subsequently remained roughly stable at these high levels or increased in EEC during the 90s, while in they have decreased in the U.S. A different story must be told for non EEC northern European countries (see below).

On the basis of the approach outlined above this could be explained in the following terms.

Inflation has been dramatically reduced by the favorable changes in the terms of trade experienced by Oecd as a whole (also on account of prolonged recession - see Beckerman and Jenkinson, 1986; Ginzburg e Simonazzi, 1997). In Oecd countries in general, and to a greater extent in the US, real wages have increased less than productivity, thus contributing (other things given) to a lowering of the inflation process. This behaviour of real wages may be regarded as the result of prolonged unemployment and the institutional changes that have taken place in most countries, particularly towards the end of the 80s. Many countries have implemented in varying degrees policies aimed at deregulating the labour market, reducing workers' protections by increasing flexibility in the use of manpower, reducing unemployment benefits. Along with these policies the period has been characterized by high nominal and real interest rates. Thus the decline in real wages (or in their growth rates compared to productivity) may be regarded as 'the other face' of the increase in real interest rates, and as preventing the otherwise inflationary pressure of the high nominal interest rates.

Neither the reduction in the inflation rate nor that in labour costs however have any necessary and automatic favorable impact on employment levels. On the contrary, fiscal policies, and the changes in income distribution unfavorable to the workers and to lower income groups in general,<sup>41</sup> all tend to depress income and employment levels (and rates of growth), and favour the persistence of very high rates of unemployment.

The above considerations may be useful in explaining the phenomenon usually called 'hysteresis'. By this it is usually meant: 1) that changes in unemployment tend to persist even when apparently there has been enough time for the economy to adjust to an initial negative shock and 2) that more than one level of unemployment is consistent with stable

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<sup>41</sup> The re-distribution of income may have been reinforced by the changes in public expenditure away from social expenditure and towards payment of interests on bonds whose possession tends to be quantitatively concentrated in high income, high wealth social groups (that have a lower propensity to spend)

inflation; and particularly that while an increase in unemployment initially reduces the inflation rate, the latter subsequently tends to stabilize, while unemployment persists at the higher level. Thus, there isn't just one 'NAIRU' or natural unemployment rate.

Explanations of those phenomena immediately follow from the approach taken in this paper. Concerning point 1) unemployment tends to persist because after, for example, a 'negative shock' caused by a fall in nominal aggregate demand, there are no self-correcting mechanisms in the economic system tending to restore the previously higher employment, unless aggregate demand rises again. In addition, the policies suggested by the main-stream approach to cure unemployment, such as increases in labour market flexibility and real wage reductions do not reduce unemployment and may actually increase it.

Concerning point 2) our approach suggests that given all other relevant circumstances (including interest rate policies), there is not only one unemployment rate at which inflation does not accelerate; inflation will indeed tend to be constant at different unemployment rates, although the inflation rate may vary - consistently with the empirical observations that have led to the 'hysteresis' interpretation.

#### *The experience of Northern European countries*

This approach also provides a basis to explain the success cases of those countries that have been able over a very long period (until, roughly, the end of the 1980s, beginning of the 1990s) to maintain at the same time extremely low unemployment rates and inflation rates not significantly higher than Oecd countries on the average. This can be interpreted as the result of macroeconomic policies aimed at maintaining high employment levels, and of economic policies and institutional arrangements capable of preventing exceedingly high or accelerating inflation by means of seeking a compromise over income distribution - in this respect it may be useful to note that until the 1980s long term real interest rates in Sweden were on average lower than in the US and Germany (OECD, 1995). The sharp rise in unemployment that these countries have experienced in recent years has probably much to do with the difficulty for small open economies of pursuing full employment

policies in isolation, a change in orientation of macroeconomic policies and the liberalization of financial markets (Korpi, 1996).

The experience of these countries is important in so far as it demonstrates that the relation between low unemployment rates and high inflation is by no means a 'necessary' one. It very much depends on institutional arrangements and the nature of industrial relations, the role played by the government and economic policy authorities in general.

## **Conclusion**

There are a number of 'stylized facts' which economists agree should be explained but (most of them also agree) the mainstream approach(es) have difficulties in explaining. According to a well known textbook some of these facts are:

"i) A large proportion of unemployment in the '80s is involuntary and cannot be explained either in terms of mistaken expectations [...] or in terms of search activity;  
ii) changes in nominal aggregate demand produce changes in output and employment in the same direction, and only subsequently changes in prices and wages;  
iii) shifts in unemployment arising from changes in aggregate demand do not roll back to their original level [...] a rise (say) in unemployment above the equilibrium rate of unemployment [...] does not produce permanently falling inflation.[...] Approximately constant inflation is observed at many different rates of unemployment." (Carlin and Soskice, 1990, p. 372).

The approach developed in the present paper appears capable of providing straightforward explanations of these phenomena.

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