Inflation, Unemployment and Hysteresis: an alternative view

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This paper integrates ideas concerning the influence of the interest rate on the rate of profits with an analysis of inflation and its relation with unemployment. Inflation is regarded, as in Kaleckian contributions, as resulting from inconsistent claims on income, but the approach taken leads to different conclusions concerning the effects of inflation (or deflation) on income distribution, and the circumstances giving rise to acceleration of inflation. The approach followed in the paper also provides explanations of phenomena that have appeared 'puzzling', particularly the association of different unemployment rates with stable *inflation, and the persistence of high rates of unemployment.*

1. Alternative Approaches to the Inflation–Unemployment Relation

1.1. The Phelps–Friedman Approach to Unemployment and Inflation

Since the contributions of Friedman (1968) and Phelps *et al.* (1970), mainstream discussions of the Phillips curve have centered around the concept of the natural rate of unemployment. According to this framework of analysis, attempts to keep the economy at an unemployment rate lower than the natural rate mean keeping it at output and employment levels above equilibrium. This can be sustained only by accelerating inflation and continuous unpredicted expansion of the money supply (or vice versa if unemployment is above the natural rate). Without the unpredicted expansion of the money supply, the system would soon spontaneously converge towards the equilibrium natural unemployment rate. 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, i.e. of the Non-Accelerating Inflation Rate of Unemployment, or NAIRU. These analyses

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too predict accelerating inflation (or deflation) for unemployment rates different from the NAIRU, and a tendency of the economy to return to it.

If one considers the experience of industrial countries in the last quarter of a century, some problems become apparent. In the second half of the 1970s, rising unemployment rates were associated with accelerating inflation. Later, inflation was substantially reduced, but unemployment rates remain very high, particularly in Europe, and do not show any tendency to return to a lower natural rate. On the other hand, attempts to explain the current persistent high unemployment rate in terms of an *increase* of the natural unemployment rate do not appear promising since, during the 1980s and 1990s, the underlying determinants of natural unemployment (such as the incentives to job search, 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* (see OECD, 1994; Carlin & Soskice, 1990, pp. 442–444). Of course, this problem is also widely acknowledged by mainstream economists, who have sought to explain 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 topics coming under the now familiar heading of 'hysteresis'. The present work is an attempt to provide an explanation of these 'puzzling' phenomena by taking a route that departs radically from the traditional neoclassical approach.

1.2. Conflict Theories of Inflation

In what follows, inflation is seen as resulting from incompatible influences and claims over income distribution; in this respect, the approach 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 increases in labour productivity, inflation tends to accelerate as firms set their prices by charging a given, desired percentage mark-up over money wage costs (Rowthorn, 1977). Indeed, this analysis of inflation has been integrated into models in which equilibrium employment (corresponding to the NAIRU) is determined by the interaction of a labour demand curve with a wage-setting function relating the real wage and unemployment: if the real wage demanded by unions depends on the unemployment rate, there will be only one particular unemployment rate at which union claims will be compatible with the given mark-up, and inflation will be stable (see Blanchard, 1986; Layard & Nickell, 1986; Carlin & Soskice, 1990). The contributions that follow this approach, however, do not provide a persuasive explanation of the mark-up and hence of the profit rate or of the 'target' profit rate.

In the Kaleckian literature, the mark-up at firm and industry levels is explained as resulting from factors such as barriers to entry, elasticity of demand, etc, that can be summarized under the heading of 'market structure'. 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-ups and prices. This limitation of the approach becomes extremely serious in aggregate models, since there is no 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 levels (Steedman, 1992).[1] In addition, these models seem to imply that there would be no return on invested capital in free competition, an unacceptable proposition. On the other hand, if one rejects the idea that there would be no return on capital in free competition, then one must allow that market power can explain only the extra profit above the normal rate. However, it appears unclear, as it is not discussed in this literature, what would determine this normal profit rate (see also Pivetti, 1992, p. 108–116).

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 & Wilkinson, 1985). But then why not suppose that, in general, 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. This may well have been the case in some historical phases, and is close to the views of the old classical economists and Marx, who believed that the bargaining between the parties would determine the real wage and hence the rate of profit. The full-cost pricing rule generally assumed in the Kaleckian literature is not *per se* an *explanation* of prices but a *description* of how firms set their prices, and the approach is consistent with more than one explanation of the normal profit rate (Pivetti, 1992, pp. 122–127). Hence, full-cost pricing 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. Yet, in at least some historical periods, the price level changes in response to changes in the money wage level; for example, a wage–price spiral surely 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, we shall see, in the influence of the rate of interest on the profit rate, as suggested by Sraffa (1960, p. 33).[2] This approach not only provides a sounder explanation of the profit rate (and, hence, of the mark-up) than that found in the Kaleckian literature, but also leads to different views concerning the circumstances giving rise to accelerating inflation.

The aims of this paper are (i) to provide a taxonomy of conditions that may

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[1] Another explanation of the mark-up at firm level is found in the Post Keynesian literature. Here firms set their mark-ups with a view to generating the internal funds needed to finance productive investments. They raise the mark-up to the point where the (increasing) costs of raising funds by that means (lost sales caused by price increases)—which may be considered an 'interest' cost on internal funds—is equal to the (decreasing) expected returns from additional investment (Eichner, 1973; Harcourt & Kenyon, 1976; Wood, 1975). This explanation presupposes that the owners of productive capital would accept, even in the long run, a lower rate of return on capital than that earned by owners of financial capital (Pivetti, 1992, pp. 117–119). Even apart from the questions raised by this assumption, the above explanation of the mark-up would encounter the same problems as the one discussed in the text when attempting to explain the mark-up at the economy-wide level.

[2] This suggestion by Sraffa has been developed in Pivetti (1992), to which I shall refer in what follows; other contributions on this subject include Panico (1988), Vianello (1988), Pivetti (1990) and Bonifati (1991). Outside the surplus approach, the role of high interest rates in affecting income distribution and the price level has been pointed out by De Cecco (1979, pp. 96–98), Taylor (1983, p. 7) and Fitoussi (1995, pp. 93–94) among others.

lead to different (i.e. constant or accelerating) inflationary and deflationary processes; (ii) to analyze the effect of inflation or deflation on income distribution under different assumptions; and (iii) to suggest a framework for the analysis of the relation between unemployment and inflation. Although a distinctive feature of the approach I develop here is that it takes into account the influence of the interest rate on the rate of profit and on money prices, 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 an important area for further research. In what follows, as in all cost–push explanations of inflation, the 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 the money supply dependent on the 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 the argument in Pivetti (1992).

Suppose that money wages are constant and the nominal interest rate is i.[3] 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) invested in production, and prices will accordingly tend to be such as to cover this cost along with the others, that is, they will be such as to yield a rate of profit equal *at least* to the rate of interest.[4] In general, however, 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 may differ across industries.

The analysis developed here is relevant not only in situations where free competition tends to establish a uniform rate of profit (net of risk premiums), but also in situations where the existence, for example, of product differentiation or barriers to entry may allow firms in particular industries to earn an additional premium above the normal profit rate. In both situations, one might observe firms setting their prices by charging a given mark-up over normal costs of

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[3] The interest rate that is relevant here is the rate on long-term, riskless financial assets.
[4] Economists have generally understood that the interest rate and the 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). 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 rate of interest and the rate of profit would give rise to changes in demand for loanable funds relative to their supply, which would tend to bring the interest rate to the level of the profit rate. By contrast, a number of contemporary contributions to the surplus approach maintain that it is the rate of profit that must adjust to autonomous changes in the rate of interest (see the references in footnote 2 above).

production; but in one case market forces would lead firms to charge a mark-up entailing the earning of the normal rate of profit on capital, in the other, market forces will allow some firms to charge a mark-up comprising, besides the normal rate of profit, an additional return on capital.

To sum up, the rate of interest represents a minimum common component for the rate of profit across industries, to which must be added an industry-specific risk premium and any additional return deriving from market power.

Thus we have:

$$\mathbf{P} = \mathbf{PA}(1 + i) + \mathbf{PA}\rho + \mathbf{l}W$$

where

$\mathbf{P}$ = the (row) vector of money prices;
i = the given nominal interest rate;
ρ = the diagonal matrix of industry premiums derived from market power and risk compensation;
$\mathbf{A}$ = the matrix of input coefficients per unit of output;
W = the given money wage (supposed unique, i.e. a scalar, for simplicity); and
$\mathbf{l}$ = the (row) vector of labour inputs per unit of output.

Given the money wage, the nominal interest rate and the industry premiums, this system determines the n money prices.[5] Once the money wage and the money prices are determined, the real wage can be determined and is equal to the money wage divided by the appropriate price index.

The coefficient matrix $\mathbf{A}$ is assumed to be unchanging. This is not a necessary assumption but a simplifying one, which is justified by our focus on sources of change in the price level other than technical change, economies of scale and relative price changes.[6] The ρ matrix is assumed, in what follows, to be constant;[7] hence the normal profit rate and the interest rate will move in step, and we can safely neglect, for simplicity, the term indicating profits above the interest rate. Throughout what follows money is fiat money and not a produced commodity.

If we now suppose that prices can change from one period to another, owing to changes in costs other than interest rate variations, 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 at time $t-1$ will yield the same return after one period, regardless of where it is invested. 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).

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[5] It is here implicitly assumed that the nominal interest rate is lower than the maximum rate of profit (the rate associated with zero real wages) that the economic system can yield, given technology. For an analysis of the inflationary consequences of the opposite case, see Podkaminer (1998).

[6] The matrix $\mathbf{A}$ and the vector $\mathbf{l}$ are assumed, as a first approximation, to be independent of changes in distribution. That is, we assume for simplicity that there is only one technique available for each sector, so that changes in distribution do not induce changes in the methods of production.

[7] The premiums that enter normal prices depend on persistent factors determining risk and elements of monopoly in each industry, and are independent of changes in activity levels, since normal prices reflect the normal degree of capacity utilization.

Hence, if the price level rises, 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:

$$(1 + r) = (1 + i) \ (\mathbf{P}_{t-1}\mathbf{Q}/\mathbf{P}_t\mathbf{Q})$$

where the column vector $\mathbf{Q}$ gives the outputs in the base year.[8] 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 (see below).

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

3. Sources of Inflation

3.1. Changes in Money Wages

Suppose we have a once-for-all increase in money wages from W_0 at time $t-1$ to $W_t = W_0(1 + h)$, where h is the rate of increase of money wages.[9] Initially, this will bring about a fall in the profit rate and a rise in the real wage. Money prices after the change will be:

$$\mathbf{P}_t = \mathbf{P}_{t-1}\mathbf{A}(1 + i_0) + \mathbf{l}W_0(1 + h)$$

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

$$\mathbf{P}_{t-1} = \mathbf{P}_{t-1}\mathbf{A}(1 + i_0) + \mathbf{l}W_0 = \mathbf{l} \ [\mathbf{I} - \ (1 + i_0)\mathbf{A}]^{-1}W_0$$

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:

$$\mathbf{P}_t\mathbf{Q}/\mathbf{P}_{t-1}\mathbf{Q} = \alpha + (1 - \alpha)(1 + h) = 1 + h - \alpha h$$

where $\alpha = \mathbf{P}_{t-1}\mathbf{A}(1 + i_0)\mathbf{Q}/\{\mathbf{l}[\mathbf{I} - (1 + i_0)\mathbf{A}]^{-1}W_0\}\mathbf{Q}$ is the share of the value of capital inputs and profits in the value of total output at prices $\mathbf{P}_{t-1}$ and quantities $\mathbf{Q}$ (that is, before the change in wages); and $(1 - \alpha) = \mathbf{l}\mathbf{Q}W_0/ \{\mathbf{l}[\mathbf{I} - (1 + i_0)\mathbf{A}]^{-1}W_0\}\mathbf{Q}$ is the share of direct labour costs in the value of total output at time $t-1$.

    At time t the profit rate is lower and the real wage, w_t, is:

$$w_t = w_0(1 + h)(\mathbf{P}_{t-1}\mathbf{Q}/\mathbf{P}_t\mathbf{Q}) = w_0(1 + h)[1/(1 + h - \alpha h)]$$

Since $(1 + h) > (1 + h - \alpha h) > 1$, the real wage rate has increased, but at a rate

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[8] The expression in the text is equivalent to the more common $r = (i - \pi)/(1 + \pi)$, where $\pi = (\mathbf{P}_t\mathbf{Q}-\mathbf{P}_{t-1}\mathbf{Q})/\mathbf{P}_{t-1}\mathbf{Q}$. Here, and in what follows, we shall measure price changes by the ratio $\mathbf{P}_t\mathbf{Q}/\mathbf{P}_{t-1}\mathbf{Q} = 1 + \pi$, or its inverse, because that ratio can be more immediately derived from the price index equations.

[9] I shall use W_0, i_0 to indicate variables that, by assumption, either do not change during the process considered, or change at a known rate (h in this case) which is expressed separately.

lower than h, the rate of increase in money wages. However, this is true only in the 'transition'. As the prices of produced inputs rise, the money price vector will tend to converge to:

$$\mathbf{P}' = \mathbf{P}'\mathbf{A}(1 + i_0) + \mathbf{l}W_0(1 + h).$$

Hence, the change in the money price level will exactly match the change in money wages ($\mathbf{P}'\mathbf{Q}/\mathbf{P}_{t-1}\mathbf{Q} = 1 + h$), the real wage will be unchanged and the profit rate equal to the interest rate.[10]

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 that is nominally 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, *ceteris paribus,* a continuous increase in money wages at an annual rate h generates a *constant* rate of inflation, a smaller than h increase in the level of the real wage, and a fall in the profit rate. 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 in the adjustment of prices to changed costs of production have been neglected here. They can be expected to occur, and to affect the actual course of inflation and distribution. The preceding discussion is intended to isolate the effects that depend on the forces determining normal prices; what happens in the course of the adjustment towards these prices is not considered.

3.2. Changes in the Interest Rate

Let us now suppose that the Central Bank's objectives are defined in terms of real interest rates. This will be the case if its main objective is 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. Thus, assume that the nominal interest rate at $t - 1$ 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:

$$1 + i_{t-1} = (1 + i^*)(\mathbf{P}_i^e\mathbf{Q}/\mathbf{P}_{t-1}\mathbf{Q})$$

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[10] At any time t after the increase in the money wage, the difference between the price levels at time t and $t-1$ will be given by:

$$\mathbf{P}_t\mathbf{Q} - \mathbf{P}_{t-1}\mathbf{Q} = h(1 - \alpha)\alpha^{t-1}$$

Since $\alpha < 1$, The expression on the right will tend to zero for t tending to infinity; that is, the price level will stabilize. The ratio of the price level at any time t after the change in money wages to the initial price level is:

$$\mathbf{P}_t\mathbf{Q}/\mathbf{P}_0\mathbf{Q} = 1 + \Sigma_t h \ (1 - \alpha)\alpha^{t-1}$$

The limit for t tending to infinity of the second term of the right hand side in the above expression is: $h(1 - \alpha)/(1 - \alpha) = h$.

where

i^* = the Bank's target *real* interest rate;
P_t^e = the money price level expected to prevail at time t, after one period; and
$P_{t-1}Q$ = the money price level in time $t-1$, at the beginning of the period.

Substituting this expression in the money price equation we obtain

$$P_t = P_{t-1}A(1 + i^*)(P_t^e Q/P_{t-1}Q) + lW_0.$$

If expectations are correct, and if the adjustment is immediate, this 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, the monetary authorities expect the rate of inflation to equal the rate of increase of money wages $(1 + h)$.[11] In this case too, the growth of money wages at the rate h 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):

$$P_t = P_{t-1}A(1 + i^*)(1 + h) + lW_0(1 + h)$$

and

$$(P_t Q/P_{t-1}Q) = (1 + h)\{P_{t-1}A(1 + i^*) + lW_0\}Q/\{P_{t-1}A(1 + i^*) + lW_0\}Q = 1 + h$$

3.3. Real Targets and Expectations

Now, if the Central Bank has real targets and—as is most plausible (see below)—so do workers, and if these targets give rise to inconsistent claims over income, 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:

$$P_t = P_{t-1}A(1 + i^*)(P_t^e Q/P_{t-1}Q) + lW_0(1 + h)(P_t^e Q/P_{t-1}Q)$$

where h is the desired increase in the real wage level. The change in money prices will be:

$$P_t Q/P_{t-1}Q = (P_t^e Q/P_{t-1}Q)\{[P_{t-1}A(1 + i^*) + lW_0(1 + h)]Q/[P_{t-1}A(1 + i^*) + lW_0]Q\}$$

Hence, the rate of change in money prices in any period must be greater than expected: $P_t Q/P_{t-1}Q > P_t^e Q/P_{t-1}Q$.[12] This implies that, as expectations concerning the rate of change of money prices are revised in the light of experience (as must reasonably be supposed), actual inflation will increase from

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[11] This expectation is correct if the interest rate is adjusted for inflation.
[12] That it must be so can be intuitively understood by considering that the real targets of the parties are inconsistent; that is, if they were both realized, the sum of the labour and capital shares in real income would be greater than one. This inconsistency must be resolved by an increase in the price level greater than that in the money wage and the nominal interest rate.

period to period, and an *accelerating* inflationary process will be set in motion. The rate of acceleration, and the actual distribution of income between the parties—whether inflation causes greater erosion of the real wage or of the real interest rate (and hence the profit rate)—will depend on the adjustment speeds of the nominal interest rate and money wages, which in turn depend upon institutional arrangements (indexation, timing of wage contracts, etc), and on how expectations are formed. If, for example, inflation has been accelerating for a while, agents will tend to expect the increase in prices in the next period to be higher than in the past, and therefore expectations of rising inflation will tend to be incorporated in the money wage bargain and, possibly, in the Central Bank's revisions of the interest rate.[13] Thus, it is not to be taken for granted that, in an inflationary context, wage indexation would favour inflation more than a non-indexed periodic recontracting of wages. 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 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 recontracting of the money wage. Thus, the elimination of indexation may be a necessary step in a policy program intended to reduce inflation by means of a change in income distribution unfavourable to workers.)

3.4. Comparison with Kaleckian and NAIRU 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 nominal interest rate remains constant (or does not adjust completely to the inflation rate). This possibility is not to be ruled out, as some of the Central Bank's objectives may be pursued by means of nominal rather than real interest rate management: the Central Bank may be concerned with nominal interest rates more than real interest rates if its policy is dominated by external objectives. International capital flows depend upon differences in nominal interest rates and the expectations concerning the risk of depreciation of the currency. The latter certainly depends on the rate of inflation of the country, compared with that prevailing in major trading partners; a positive differential will cause a deterioration of the current account of the balance of payments that, sooner or later, is likely to lead to a devaluation of the currency. This deterioration, however, may take rather a long time, or the devaluation of the currency may be prevented as far as possible by the Central Bank for the sake of nominal exchange rate stability, while the nominal interest rate will continue to regulate capital flows.

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[13] It is clear from the algebra in the text that, however expectations are formed, the actual increase in prices will have to be higher than expected. Rational expectations in this context would appear to imply the ability of the parties to foresee the actual distributive outcome of the inflationary process and to establish accordingly their real wage and real interest rate targets. In this case, inflation would not need to materialize. It would seem that this kind of situation might be better approximated by an institutional set-up that involves centralized bargaining.

The above conclusion concerning the inflation and distribution effects of wage inflation contrasts with the view that any attempt to obtain real wage increases greater than productivity increases is bound to fail and, if repeated, leads to accelerating inflation—a view common to NAIRU models and many Kaleckian contributions, which rests on the supposition that the mark-up, and hence the profit rate, is given and cannot be reduced by increases in money wages (see Carlin & Soskice, 1990, pp. 159–160 for a textbook exposition). These models usually do not directly address the question of whether the constant mark-up is calculated on historic or replacement costs of inputs. Tarling & Wilkinson (1985) do take up the issue, and conclude that whether firms charge the mark-up on historic or replacement costs ultimately depends on the bargaining position of firms and unions.

In some discussions of cost-push inflation, it is indeed maintained that increases in the money wage above what is allowed by productivity increases may result in a constant inflation rate and in a 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 & 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 have come to a similar conclusion here, but the above analysis shows that, given the nominal interest rate, the redistribution of income will result from the limit competition imposes on price changes.

These differences extend to the case in which inflation originates in changes in the terms of trade, as the effects on income distribution and the emergence of accelerating inflation will depend on the behaviour of the nominal interest rate.

3.5. Changes in the Terms of Trade

In order to analyze the effects of changes in the terms of trade we need to distinguish in the price equation between domestically produced inputs and imported inputs and write:

$$\mathbf{P} = \mathbf{P}\mathbf{A}(1 + i) + \mathbf{F}(1 + i) + \mathbf{l}W$$

where $\mathbf{F}$ is the vector of the values in national currency of the imported inputs per unit of output. Now suppose a deterioration in the terms of trade such that the cost in terms of the national currency of imported inputs at time $t-1$ is increased by m; prices will be:

$$\mathbf{P}_t = \mathbf{P}_{t-1}\mathbf{A}(1 + i_0) + \mathbf{F}_0(1 + i_0)(1 + m) + \mathbf{l}W_0$$

The increase in the value of imported inputs may be due either to a devaluation of the national currency or to an increase in international prices of imported

goods and raw materials.[14] To fix our ideas on the possible outcomes 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 that will gradually subside, because the worsening of the terms of trade will gradually be eroded by the increase in internal prices. At the end of the process, the overall increase in the price level converges to a value lower than *m*, so that part of the initial worsening of the terms of trade will persist; the profit rate will again equal the nominal (and real) interest rate and the real wage will have been reduced as a result of the increase in the price level.[15]

(ii) If we assume that *money wages and the nominal interest rate are constant*, as before, but the *worsening in the terms of trade is persistent*—that is, that as domestic prices rise, the exchange rate (or commodity prices) will adjust for the inflation—then the inflation will still gradually subside, 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. In 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 as the rate of inflation declines. Inflation will become zero when the fall in the real wage is large enough to compensate fully for the deterioration in the terms of trade.[16]

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[14] In this second case prices would not all rise at the same rate; *m* should then be reinterpreted as a vector. For simplicity I shall regard it as a scalar.

[15] The price level before the change in the terms of trade is $P_0Q = \alpha + \beta + \gamma = 1$, where α, β and γ are, respectively, the weight of the value of domestically produced inputs and interest, the weight of imported inputs and interest and the weight of labor cost on the value of output in the initial period. After the deterioration in the terms of trade by the rate *m*, the ratio of the price level to the initial price level converges to:

$$P'Q/P_0Q = 1 + [\beta m/(1 - \alpha)]$$

where $[\beta m/(1 - \alpha)] < m$.

Demonstration: The difference between price levels at any time *t* after the change in the terms of trade is given by:

$$P_tQ - P_{t-1}Q = \alpha^{t-1}\beta m$$

Since $\alpha < 1$ the term on the right hand side tends to zero for *t* tending to infinity. The overall increase in the price level at any time *t* is given by:

$$P_tQ/P_0Q = 1 + \Sigma_t\alpha^{t-1}\beta m$$

The limit for *t* tending to infinity of the second term on the right hand side is $\beta m/(1 - \alpha)$.

[16] Assume that the exchange rate (or the prices of commodities) adjusts immediately to changes in domestic prices, so that imported inputs enter next period prices at time *t* already adjusted for the change in the price level between *t*–1 and *t*. As before, the price level before the deterioration in the terms of trade is $P_0Q = \alpha + \beta + \gamma = 1$. At any time *t* after the change in the terms of trade, the difference between price levels is:

$$P_tQ - P_{t-1}Q = \beta m (\alpha + \beta + \beta m)^{t-1}$$

(iii) Let us suppose now that *the deterioration in the terms of trade is persistent* and *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 βm (where β is the share of the value of imported inputs and interest in the value of output before the change in the terms of trade); subsequently, the rate of inflation will decline if certain conditions concerning the values of the parameters (particularly the share of labour costs) hold. If they do, in this case too the fall in real wages is what allows the inflation rate to decline.[17]

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 what the contemporary economic literature calls 'real wage resistance', we must expect the money wage to rise in response to the rising cost of living due both to the direct increase of the prices 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*, there will be a constant rate of inflation and the burden of the deterioration in the of terms of trade will be born by profit and interest earners via the inflation.[18]

Footnoe 16 continued

which converges to zero for t tending to infinity if $(\alpha + \beta + \beta m) < 1$, that is, if $\beta m < \gamma$. If that inequality holds, the ratio of the price level at any time t to the initial price level is:

$$\mathbf{P}_t\mathbf{Q}/\mathbf{P}_0\mathbf{Q} = 1 + \Sigma_t \beta m \, (\alpha + \beta + \beta m)^{t-1}$$

and the limit for t tending to infinity of the second term on the right hand side is:

$$\beta m/(1 - \alpha - \beta - \beta m) = \beta/(\gamma - \beta m)$$

The inequality $\beta m < \gamma$ is most likely to hold for $m < 1$; its economic meaning is that inflation will disappear only if the initial increase in production costs determined by the deterioration in the terms of trade (βm) can eventually be entirely compensated by the fall in labour costs, with given money wages.

[17] We have in the first period, as in the previous cases $\mathbf{P}_t\mathbf{Q}/\mathbf{P}_0\mathbf{Q} = 1 + \beta m$. At the end of the following period, supposing as in the case discussed above an immediate adjustment of the exchange rate and rate of interest to the rate of inflation, we have:

$$\mathbf{P}_{t+1}\mathbf{Q}/\mathbf{P}_t\mathbf{Q} = \{[\mathbf{P}_t\mathbf{A}(1 + i_0)(1 + \beta m) + \mathbf{F}_0(1 + i_0)(1 + m)(1 + \beta m)^2 + l W_0]\mathbf{Q}\}/\mathbf{P}_t\mathbf{Q}$$

Remembering that $\mathbf{P}_t\mathbf{Q} = (1 + \beta m)\mathbf{P}_0\mathbf{Q}$, the above expression can be rewritten as:

$$\mathbf{P}_{t+1}\mathbf{Q}/\mathbf{P}_t\mathbf{Q} = \alpha(1 + \beta m) + \beta(1 + m)(1 + \beta m) + [\gamma/(1 + \beta m)] = (\alpha + \beta + \beta m)(1 + \beta m) + [\gamma/(1 + \beta m)]$$

We can also derive

$$\mathbf{P}_{t+2}\mathbf{Q}/\,\mathbf{P}_{t+1}\mathbf{Q} = (\alpha + \beta + \beta m)[(\alpha + \beta + \beta m)(1 + \beta m)^2 + \gamma] + \gamma/[(\alpha + \beta + \beta m)(1 + \beta m)^2 + \gamma]$$

Comparing those ratios, we see that there are two necessary conditions for the ratios (i.e. the inflation rate) to be decreasing. The first is, as in the case discussed above, that $\gamma < \beta m$; the second is that $(\gamma - \beta m)(1 + \beta m)^2 > \gamma$ that is the difference between γ and βm must be 'large' to allow the inflation rate to subside. The second condition generally holds for values of $\gamma > 0.5$ and values of $m < 1$.

[18] We have in the first period the same rate of increase in prices as in the earlier cases, i.e. βm. In the subsequent period

(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*, a process of accelerating inflation will be set in motion, as the 'target' real wage and rate of profit are now inconsistent, given the deterioration in the terms of trade.

4. Direct Influences on the Real Wage Rate

This section discusses the main factors that exert a direct influence on the real wage. The analysis developed above will then allow us to see the influence of such factors, particularly the unemployment rate, on price inflation, given alternative policies followed by the monetary authorities.[19] Although what the workers receive and bargain over is, in general, the money wage, it is clear that what is aimed at is the real wage. What factors influence the workers' target and, more importantly, their ability to obtain it?

The traditional neoclassical approach sees equilibrium real wages as determined by labour demand and supply functions. Since the 1960s, however, the contributions to the capital controversy have shown that the notion of a systematic relation between distribution and 'factor intensity' of techniques is fundamentally flawed.[20] These results undermine the idea that employment and the real wage are determined by the conventional demand and supply mechanism. Quite aside from this, empirical analyses do not provide striking support for the inverse relation between real wages and employment (see Anyadike-Danes & Godley, 1989; Zenezini, 1992).

There are good reasons therefore to search outside the neoclassical approach for indications concerning the factors directly affecting the real wage rate; in particular, one may turn to the ideas developed within the classical tradition of Smith, Ricardo and Marx, and to empirical analyses, all of which point to the downward stickiness of wages. In the classical tradition, this was regarded as the result of a historically determined floor for real wages in any given period and place. This floor is the minimum consumption level necessary for the workers to take part in social life, to be accepted and respected in the community. Not only does this level represent the minimum acceptable by the

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Footnote 18 continued

$$\mathbf{P}_{t+1}\mathbf{Q}/\mathbf{P}_t\mathbf{Q} = [\mathbf{P}_0(1+\beta m)\mathbf{A}(1+i_0) + \mathbf{F}_0(1+i_0)(1+m)(1+\beta m) + l W_0(1+\beta m)]\mathbf{Q}/[\mathbf{P}_0\mathbf{A}(1+i_0) + \mathbf{F}_0(1+i_0)(1+m) + lW_0]\mathbf{Q} = (1+\beta m)$$

and so in every subsequent period. If wages rose immediately at the beginning of the first period in response to the increase of the prices of imported inputs, still the inflation rate would be constant, but at the rate $(\beta + \gamma)m$.

[19] It is possible that the monetary authorities are themselves influenced and constrained by factors such as the bargaining position of the workers and the ability of money wages to 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 may act as a constraint on price changes because of international competition). In Italy, for example, the combination of a 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.

[20] For an overview of the problems exposed by the criticisms of marginalist capital theory see Garegnani (1990); for a discussion of the labour market in the light of those criticisms see Roncaglia (1988).

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, except under extreme circumstances. Being historically determined, the threshold may change over time, and it is likely to move upwards as the result of ratchet effects led by social imitation of higher living standards that over time become perceived as necessary.[21] Conditions negatively affecting workers' bargaining power may also, although no doubt with more difficulty, gradually erode it.

The emergence of social norms preventing wages from falling below this minimum might be favoured by sedimented historical experience of the dangers for the viability of the economy and society as a whole of unlimited wage competition—a competition that in any case, according to this framework of analysis, would not lead to increases in employment. Such historical experience for example might favour the establishment of a legal minimum wage or the emergence within the working classes of social norms and rules of behaviour condemning wage competition or strike-breaking.

The observation that real wages are sticky downwards is hardly controversial; there is indeed much mainstream economic literature attempting to explain why it should be so. However, contemporary models purporting to explain wage stickiness usually retain the inverse relation between the real wage and employment based on the decreasing marginal product of labour, in contrast with the classical or surplus approach. This has caused some problems in providing convincing microfoundations for the downward stickiness of wages; see for example Solow's (1980) discussion of the low elasticity of labour demand as an empirical foundation for wage rigidity. De Francesco (1993) shows that Solow's (1990) model of the labour market as a social institution, by which Solow attempts to provide an explanation of wage stickiness, relies on some unwarranted *ad hoc* assumptions, and could be generalized by assuming that the demand for labour is not elastic, i.e. that real wage changes do not generally induce significant changes in the employment level.

In the classical tradition, wages are regarded as affected, above the minimum, by various factors influencing the bargaining position of the workers; these may be of a political and institutional nature, or they may be economic influences such as foreign trade constraints, productivity and, of course, unemployment. 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 had probably been favoured by the persistent low unemployment rates of that period. Unions, in turn, may have reduced and postponed the negative influence of rising unemployment rates, whose persistence at high levels in the subsequent period led to the weakening of union power.

The classical view of competition and the determinants of the real wage implies that a significant increase in unemployment may cause a reduction in the real wage, but not its indefinite fall; and that if unemployment decreases

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[21] Analyses of consumption patterns that point to such ratchet effects are found in Duesenberry (1949) and Wilkinson (1988). For a discussion of these views in classical economists see Stirati (1994, pp. 65–70).

significantly, real wages are apt to rise. Persistent low or high levels of unemployment might, with time, have amplified 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, with greater difficulty, downwards the threshold. Once the gains in real wages and consumption have been 'assimilated', a continuing low or high level of unemployment may permit a further movement in the same direction.

The classical idea that real wage levels are influenced by the rate of unemployment has re-emerged in the contemporary 'efficiency wage' and 'wage bargain' literature, in the form of a wage-fixing function that establishes a relation between the unemployment rate and the real wage rate. Such a function, however, plays the role of a 'surrogate supply function', and once these models are completed with a traditional downward-sloping labour demand function, they determine a *unique* unemployment and real wage equilibrium, and do *not* admit the possibility of a variety of unemployment/real wage outcomes, in which higher levels of the real wage are associated with lower levels of unemployment. These can be obtained only under assumptions that rule out the inverse relation between labour demand and the real wage (see for example Nickell, 1987, p. 60). 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 with varying unemployment rates, a relation that is consistent with empirical findings.[22]

The criticism of neoclassical factor demand curves also implies another major difference with respect to the current mainstream literature. In the framework of the analysis presented here, the 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. In contrast, the contemporary 'bargaining' explanations of the wage level are supposed to apply only if there are monopoly elements in the labour market, while in the absence of monopoly elements wages would be determined by demand and supply curves in the conventional fashion. 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, by improving workers' bargaining position, can permanently raise the real wage.[23] Unions may also render the real wage less sensitive to other factors, such as changes in unemployment.

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

[23] This is in contrast to the view that, in the long run, unions cannot alter the income distribution resulting from underlying economic forces (i.e. demand and supply functions), as found for example in the writings of Friedman (1951) and Phelps Brown (1968). For a critique of Phelps Brown see Levrero (1999).

5. The 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, unemployment will result from an insufficient level of aggregate output. Attention therefore should be focused 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 (Garegnani, 1978). 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.

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, given the technology, tastes and resource endowments, output tends in the long period towards its full-employment equilibrium level (or, in New Keynesian models, towards the maximum employment consistent with the existing market imperfections). The results that emerged in the capital controversy, however, rule out the mechanisms (the inverse relations between the interest rate and investment and between the wage level and employment) that ensure such a tendency.[24] Hence, persistent changes in the autonomous components of demand will determine persistent changes in aggregate output. Existing productive capacity does not impose a severe constraint on 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 tend to build up enough capacity to meet the peaks of demand in order not to lose customers (Ciccone, 1990). Thus, even when firms are operating at the planned degree of capacity utilization it will be possible to increase production of both consumption and investment goods to some extent. At the same time, increased use of capacity above the desired degree due to changes in demand perceived as persistent will stimulate an increase in investment and hence installed capacity.[25]

Changes in demand (due, for example, to fiscal policies) will thus have

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[24] In contemporary macroeconomics the two mechanisms that are presumed to lead to full employment when money wages are flexible are the so-called Keynes and Pigou effects. The first requires the traditional inverse relation between investment and interest rate, which is challenged by the criticisms of marginalist capital theory and which has also proven empirically weak (Chirinko, 1993). On the other hand, the Pigou effect by itself is not capable of restoring full employment (Patinkin, 1987).

[25] See Garegnani (1962, 1992), Kurz (1990), Trezzini (1995), Serrano (1995) and Bortis (1996). The idea is also present, albeit not theoretically developed, in some of Kaldor's writings (see Kaldor, 1978) and in the work of many Kaldorian economists; it is now again attracting interest as an explanation of the persistence of unemployment (Rowthorn, 1995). That investment depends on aggregate demand is also recognized in mainstream literature in the form of the acceleration principle, whose role however is confined to the cycle.

persistent effects in two senses. First, as long as, say, public spending remains at a decreased level, output and employment will remain at a lower equilibrium level, as there are no endogenous forces determining a tendency for the economy to move towards a full employment (or NAIRU) equilibrium. 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, if fully utilized, will allow the full employment of labour.[26] All this points to macroeconomic policy as a major determinant of output and employment.

6. Unemployment and Inflation

6.1. *The Relationship between Unemployment and Inflation*

We can now draw the threads of our argument 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 identify 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 the increased real wage level desired by the workers. Hence, with 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. Whether accelerating inflation will be set in motion ultimately depends on the subsequent changes in the nominal interest rate. While it can hardly be supposed that this will remain unchanged in the face of a high rate of inflation, the adjustment to inflation may not be immediate and complete, depending on the objectives of the monetary authorities.

Similarly, inconsistent influences on the real wage rate and the profit rate may give rise to deflationary processes. Suppose that starting from a situation in which the inflation rate is zero a substantial increase in unemployment causes a fall in money and real wages. 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 that, by raising the real interest and profit rates, renders the given nominal interest rate consistent with

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[26] Orthodox theory argues that, in the long run, capacity adjusts not to aggregate demand but to labour supply. This reasoning 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 Layard *et al*., 1991, p. 5). But this may well 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 and mortality rates), participation rates, and the number of the self-employed.

the lower real wage rate associated with the higher unemployment. However, the fall in the real wage may encounter a limit in the historically determined minimum; and in this case even increasing unemployment rates may not increase the rate of deflation, or they may do so 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 produce a lower inflation rate, provided that the real wage is not already at the level at which it becomes extremely sticky downwards.

6.2. Changes in Productivity

Until now, we have neglected changes in productivity. How is the above analysis of inflation and income distribution altered if we take into account productivity increases?

Clearly, the inflation rate associated with any given annual rate of increase of the money wage will be lower, and real wages will be higher, than they would have been without productivity growth of $1/(1 + g)$, where g is the annual rate of decrease in the required labour and material inputs.[27]

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

If workers are concerned with real income, and pursue a target level of the real wage, a continuous rise in productivity will gradually accommodate conflicting inflationary influences on distribution, thereby bringing about a gradual reduction of the inflation rate. A continuous increase in productivity also makes it possible for the rates of interest and profit to increase without a corresponding reduction in the real wage rate; stagnation or slow growth in the real wage will enable the economy to accommodate the higher profit and interest rates.[28]

On the other hand, continuous gains in productivity would, in principle, appear to make deflationary processes more likely. Yet general price deflation, which had characterized some earlier phases of accumulation in industrial countries, has not been observed in the post World War II period, until recently. This seems to indicate that increases in money wages and the target real wage are not entirely independent of the changes in productivity, particularly in the postwar period. Indeed, there seems to be a widespread consensus that industrial

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[27] I am assuming for simplicity that all labour and material inputs are reduced by productivity gains at the same annual rate g.

[28] This is what appears to have happened in industrial countries during the 1980s, as real hourly earnings increased less over the period than the increases in productivity in manufacturing and services (OECD, 1997).

relations in advanced countries in the postwar period permitted money wages to rise in step with productivity (Boyer, 1979; Marglin & Schor, 1990). This situation began to break down, however, when these countries experienced episodes of exceptionally high and persistent unemployment—with differences in timing and intensity in different countries.

If in the first decades of the postwar era, unions aimed at increases in real wages at least equal to gains in productivity, and workers accordingly expected a steady improvement in living standards: changes in unemployment, at least in these decades, may have affected not the level of real wages, but the deviations of its rate of change from the rate of increase in productivity. Our discussion of how increases in productivity would alter the inflationary effects of inconsistent claims on income distribution has so far been based on the provisional assumption that real wages are independent of changes in productivity, but such complete independence cannot, in fact, be supposed. Outside the marginalist framework of analysis, however, the relation between real wage increases and productivity growth is not necessary and cannot be determined *a priori*. Increasing productivity may be a favourable condition for increases in real wages, as these then become possible without reductions in the rate of profit. In addition, rising productivity may stimulate workers' claims that they should benefit from the productivity gains, of which they are likely to be aware.[29] But whether, and to what extent, workers will be able to benefit from increases in productivity will still depend on their bargaining position. The latter may also have a role in determining whether the workers benefit from productivity increases via increases in money wages or via falling prices.

6.3. A Phillips Curve?

The ideas discussed here may be summarized in Fig. 1, which represents the empirical 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 cause the curve to shift position. In addition, the institutional setting is also likely to be important for the shape of the curve; for example, as some contributions to the literature on neo-corporatism have pointed out, a centralized bargaining system, coupled with social consensus over income distribution, might prevent the emergence of inflation even at low unemployment rates (McCallum, 1983).

Unlike most recent discussions of the Phillips Curve (but in line with Phillips' original 1958 article), the curve represents a long-period relation between the average level of unemployment and the 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 rate is zero, given the existence of a floor to the real wage (hence the horizontal tail of the curve in the figure).

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[29] If the increase in productivity is accompanied by an increase of the value of capital per worker (which need *not* be the case), this may by itself improve the bargaining position of the workers, first because it increases the cost, for the employer, of conflict (in the form of strike or sabotage), and also because it diminishes the impact of wage concessions on total production costs.
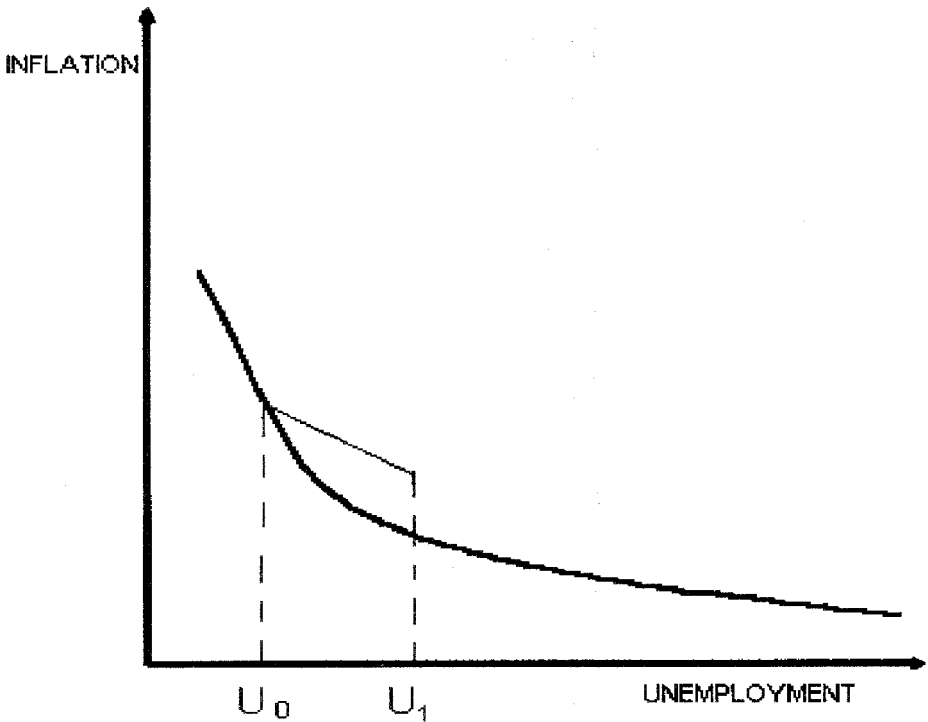
Fig. 1. The likely empirical relation between unemployment and inflation, other things being constant.

In addition, there may be ratchet effects from actual real wages to the minimum acceptable level of real wages; thus, if unemployment (and the associated real wage) remain at U_0 in the figure for a sufficiently long period, an increase in unemployment to U_1 may not reduce inflation to the same level experienced, in combination with U_1, at an earlier period.

7. Actual Inflation and Unemployment Experiences

7.1. *The Negatively Sloped Phillips Curve in the 1950s and Early 1960s*

The approach described above is consistent with the existence in major industrial countries of a negatively sloped Phillips curve in the 1950s and early 1960s. In a low-inflation context, decreases in the unemployment rate (everything else constant) would lead to increases in the real wage, accompanied by a moderate nominal wage and price inflation. In the postwar period, high rates of productivity growth and low and stable nominal interest rates prevented real wage increases from triggering high or accelerating inflation, and the working of the international monetary system also tended to inhibit the emergence of a wage–

price spiral.[30] In addition, in the then prevailing context of low inflation, there are reasons to believe that money wages and actual prices would adjust only gradually to changes in the price level and production costs respectively (see Rowthorn, 1977, pp. 162–163).

7.2. The 'Vertical Phillips Curve' of the 1970s

The dramatic changes in terms of trade that occurred in the 1970s explain most of the inflation (and its changes) in OECD countries in those years (Beckerman & Jenkinson, 1986). Increases in the prices of imported commodities raised production costs and prices not only directly but also indirectly by raising the money value of a given real wage. Large increases in commodity prices, with a given real wage and a given nominal interest rate, generate high constant inflation rates. If the nominal interest rate changes to keep pace with the rate of inflation then the latter will accelerate. Although nominal interest rates did not rise enough in the aftermath of the first oil shock to prevent the real interest rate from falling sharply, still their upward adjustment helped to accelerate the inflationary process, all this quite independently of the initial rate of unemployment. Deflationary policies involving decreases in aggregate demand growth generated high unemployment rates that may, to some extent, have slowed down the inflationary process, by reducing the real wage or its rate of growth relative to that of productivity. However, continuing large increases in import prices, and the limits to a fall in the real wage, would prevent the policies from reducing 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 did not collapse overnight (particularly in Europe) as a result of increasing unemployment. Hence, the negative influence of higher unemployment on the workers' bargaining power was not immediate, and unions continued for a while to be effective in the pursuit of their objectives. Thus, the combination of traditional deflationary policies (often involving increases in the nominal interest rate) with unfavourable changes in the terms of trade caused the phenomenon known as stagflation—that is, a combination of high unemployment and high (and accelerating) inflation.

7.3. Hysteresis in the 1980s: the Resurrection of the Downward-sloping Phillips Curve

At the start of the 1980s, the OECD economies, and particularly the EEC,

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[30] Biasco (1977) argues that during the period, the working of the international system enabled some countries (Germany and Japan) with no inflationary pressures on the prices of tradables to operate as a check on more inflation-prone countries. Since international competition constrained the ability of firms in the latter countries to raise prices in reaction to wage demands, when these became 'excessive', deflationary macroeconomic policies, perhaps justified by balance of payments problems, would be carried out, which reduced wage demands by creating unemployment. This 'controlling' role of the non-inflationary countries began to collapse in the late 1960s because of exchange rate fluctuations, and this was an enabling factor for the high inflation experienced by industrial countries in the ensuing years. This would explain, according to Biasco, the contemporary emergence of inflation in all the industrial countries.

experienced a significant reduction in inflation rates; inflation then remained stable or rose slightly throughout the 1980s and into the beginning of the 1990s. Average unemployment rates increased dramatically in the whole of the OECD in the 1980s, and have subsequently remained roughly stable at these high levels or have increased in the EEC during the 1990s, while they have decreased in the US. (A different story must be told for non-EEC northern European countries; see below.) The approach outlined above can be used to explain what happened.

Inflation has been dramatically reduced by the favourable changes in the terms of trade experienced by the OECD as a whole, also on account of prolonged recession (Beckerman & Jenkinson, 1986; Ginzburg & Simonazzi, 1997). In the OECD countries in general, and to a greater extent in the US, real wages have increased less than productivity, thus also contributing to a slowing of the inflation process. This behaviour of real wages may be interpreted as the result of prolonged unemployment and of the institutional changes that have taken place in most countries, particularly towards the end of the 1980s, when many countries implemented, in varying degrees, policies aimed at deregulating and increasing flexibility in labour markets. 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) is the other face of the increase in real interest rates, which suppresses the otherwise inflationary pressure of the high nominal interest rates.

Neither the reduction in the inflation rate nor in labour costs, however, necessarily has any favourable impact on employment levels, while more austere fiscal policies, and changes in income distribution unfavourable to lower income groups[31] tend to have an adverse impact on aggregate demand and employment.

The above considerations may be useful in explaining the phenomenon called hysteresis. This is usually understood to entail: (1) that changes in unemployment tend to persist even when there has apparently 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 inflation. Thus, while an increase in unemployment initially reduces the inflation rate, the latter subsequently tends to stabilize, while unemployment persists at the higher level: there isn't just one NAIRU.

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 aggregate demand, there are no self-correcting mechanisms in the economic system tending to restore the previously higher employment level, which could be attained again only by means of increases in the autonomous components of aggregate demand (given the propensity to consume). 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.

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[31] These have also been brought about by the changes in public expenditure away from social programs and towards payment of interest.

7.4. The Experience of Northern European Countries

This approach also explains the success cases of those countries that were able over a very long period (until, roughly, the end of the 1980s) to maintain extremely low unemployment rates simultaneously with inflation rates not significantly higher than the OECD countries average. This achievement can be interpreted as the result of macroeconomic policies aimed at maintaining high employment levels, combined with economic policies and institutional arrangements capable of preventing high or accelerating inflation by establishing a compromise over income distribution. For example, until the 1980s, long-term real interest rates in Sweden were, on average, lower than in the US and Germany (OECD, 1997). The sharp rise in unemployment that these countries have experienced in recent years probably has much to do with the difficulty for small open economies of pursuing full employment policies in isolation, the change in orientation of macroeconomic policies, and the liberalization of financial markets (Korpi, 1996).

The experience of these countries indicates that the relation between low unemployment rates and high inflation is by no means ironclad. The connection depends on institutional arrangements and the nature of industrial relations and on economic policy in general.

8. Conclusions

There are a number of stylized facts that economists agree should be explained but which (most of them also agree) mainstream approaches have difficulties 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 & Soskice, 1990, p. 372)

The approach developed in the present paper provides straightforward explanations of these phenomena.

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