

Real wages in the business cycle and the theory of income distribution: an unresolved conflict between theory and facts in mainstream macroeconomics

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The focus of this article is the recurring tension between mainstream macroeconomics and observed facts in connection with the difficult task of providing explanations of the business cycle consistent both with the traditional theory of income distribution and with the empirical evidence concerning the co-movements of real wages and employment over the cycle. The attempts to reconcile facts and theory have led to the continuous introduction of specific and arguably *ad hoc* hypotheses, in contrast with the search for greater theoretical rigour claimed by the various streams of macroeconomic modelling subsequent to the neo-classical synthesis. In addition, the specific assumptions introduced in the models, or their implications, are in turn often contradicted or, at best, not confirmed by subsequent empirical research. It is suggested in the conclusions that the difficulty of keeping together in a simple and consistent framework theory and facts reflects the flawed theoretical foundations of mainstream theory.

Key words: Real wages in the business cycle, Macroeconomic models

JEL classifications: E24, E32, E12

1. Introduction: the nature of the problem

The focus of this article is the recurring tension between mainstream macroeconomics and observed facts in relation to the difficult task of providing explanations of the business cycle that are consistent with the traditional theory of income distribution and with the empirical evidence concerning the co-movements of real wages and employment over the cycle.¹ Tensions of a similar nature can be found in other fields of macroeconomic analysis (which to some extent will emerge in what follows) but will not be considered in this article.

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¹ A comprehensive discussion of analytical problems and applied results on this subject was developed in [Michie \(1987\)](#). For a retrospective on the debate, see [Dunlop \(1998\)](#).

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The attempts to reconcile facts and theory have led to the continuous introduction of specific and arguably *ad hoc* hypotheses, in contrast with the search for greater theoretical rigour claimed by the various streams of macroeconomic modelling subsequent to the neoclassical synthesis. In addition, the specific assumptions introduced in the models, or their implications, are in turn often contradicted or, at best, not confirmed by subsequent empirical research. It is suggested in the conclusion that the difficulty of keeping theory and facts together in a simple and consistent framework reflects the flawed theoretical foundations of mainstream theory.

The nature of the ‘facts’ is generally largely controversial in economic analyses; very few are accepted as such by all—or even most—economists. Yet some of the ‘facts’ to which I refer belong to this limited set; namely, the observation that in the business cycle, relatively large fluctuations of output and employment are not systematically associated with real wage movements in the opposite direction appears to be confirmed by a large number of empirical studies (based on aggregate or individual data) and is no longer controversial. Empirical results in other fields will be reported, even though they may be regarded by some economists as non-conclusive. Due to the reputation of their authors or journals in which such results have been published, or because of the number of the studies giving similar results, they may be regarded as sufficiently influential in the profession to have contributed to a drive towards the construction of new (classes of) mainstream macroeconomic models capable of consistency with those empirical results.

The meaning of ‘mainstream’ also requires some clarification. I take it to mean all those approaches to macroeconomics that predict a tendency of the economic system towards full employment equilibria (net of frictional unemployment) or towards the potential output, which may be lower than full employment but is the maximum that can be achieved given existing rigidities and imperfections.² In turn, such a tendency relies on the existence of decreasing demand curves for labour and capital (and, accordingly, aggregate investment) derived from the principle of factor substitutability, under the assumption that such a substitution will give rise to ‘well-behaved’ factor demand functions.

Given these premises, the nature of the problem that will be the focus of the following critical assessment can thus be outlined. In the 1970s, the rise of monetarism, in both the adaptive and rational expectations versions, involved a return to the traditional theoretical approach—as had been the case to a large extent, from a theoretical point of view, already with the neoclassical synthesis)³—combined with the rejection of the assumptions of nominal rigidity that had characterised the neoclassical synthesis. The monetarist ‘revolution’ thus bore with it a claim to analytical rigour, understood as consistency between micro-foundations (that is, the traditional marginalist theory of prices and income distribution) and macroeconomic analysis, and the rejection of any *ad hoc* assumptions inconsistent with those theoretical foundations.

Hence, monetarist models share the traditional view that the economy spontaneously tends towards full employment (natural unemployment rate) equilibrium and also emphasise that it does so rapidly. The business cycle is interpreted as a transitory deviation from equilibrium in which, however, all the ‘agents’ behave rationally—on the basis

² What is significant here is the concept of potential output, whilst its empirical measurement is very problematic, and ultimately consists of the average value of actual output (Palumbo, 2013).

³ See Roncaglia and Tonveronachi (1985).

of available information—and maximise utility and profits under the assumption of well-behaved neoclassical production functions. Therefore, workers and firms move along their supply and demand functions for labour, respectively. That is, in an expansion (generated by a ‘surprise’ in economic policy) firms will be moving along a decreasing labour demand function, whilst the workers will be moving along an increasing labour supply function. This obviously gives rise to a very thorny problem—albeit seldom openly recognised in these terms⁴—since it requires that market signals are interpreted in opposite ways by workers and firms. In addition to this already substantial difficulty, the empirical studies concerning the behaviour of real wages over the business cycle pose a further problem, since they indicate that the data are generally not consistent with the assumption that the economic system is moving along either of those curves.

In the following, I intend to assess the ways in which various mainstream macroeconomic models have attempted to overcome these analytical and empirical difficulties. First, I discuss monetarist analyses (Section 2), followed by real business cycle models (Section 3) and conclude with new Keynesian models (Section 4). All these approaches, which are discussed here in their foundational and distinctive aspects, also contribute (sometimes in an eclectic manner) to the construction of stochastic general equilibrium macro-models, currently widely used for macroeconomic forecasts and policy prescriptions. The conclusion offers a critical assessment and outlines an alternative approach.

2. Labour supply and demand in the business cycle in monetarist models with aggregate demand shocks

2.1 *Labour supply and the role of search theory in the explanation of the business cycle*

On the basis of what has just been explained, monetarist macro-models must assume that the increase in employment following an aggregate demand shock reflects an increase in aggregate labour supply (usually supposed to be a positive function of the real wage); yet under neoclassical assumptions, firms will be hiring more workers only if the real wage is falling. Since in the traditional neoclassical approach the individual choice concerning the supply of labour services is not constrained by the possibility of finding a job, changes in labour supply will have to reflect changes in relative prices and, particularly, in the real wage. The solution suggested in monetarist models involves the existence of information problems that lead the workers to interpret the change in nominal wages as a change (increase, in the present example) of the real wage, although the price level is increasing (because of rising marginal costs) more than nominal wages, thus allowing firms to expand output and employment along their decreasing labour demand curves. This allows this first difficulty to be worked around, although not too satisfactorily, since the same objection of being an *ad hoc* assumption as had been levied against nominal rigidity (and to adaptive expectations in first-generation monetarist models) can easily be extended to imperfect information on the price level.⁵ Another difficulty arises, however: it is generally recognised that employment

⁴ See, however, Ackley (1983, p. 10) and Michie (1987, p. 18).

⁵ A common criticism of imperfect information concerning price changes is that it appears inconsistent with the parallel assumption of rational expectations (that is, expectations formed on the basis of all available information) since statistics regarding price levels and money aggregates are public and frequently disseminated (monthly and quarterly bulletins published by central banks and national statistical offices), whilst the real effects of aggregate demand shocks tend to be protracted (Romer, 2012, p. 300).

varies significantly over the cycle, and this must be reconciled with an aggregate labour supply curve which, both in principle and empirically, does not exhibit a high positive elasticity to changes in the real wage. The combination of income effects and substitution effects when the real wage increases is such that it cannot be excluded that individual supply curves are backwards-bending and leads to the conclusion that even if the aggregate supply curve is a positive function of the real wage, its elasticity is likely to be low. But with a low-elasticity labour supply curve, the observed changes in employment would require a substantial increase in the ratio of the nominal wage to the price level perceived by workers. This is not likely, particularly if we consider that according to the model, firms increase prices by more than nominal wages. This further problem has been tackled by means of two theoretical constructions, which may be complementary, as in the seminal contribution by Phelps *et al.* (1970): search theory and intertemporal labour supply. Here I look at how the first construction can be used to cope with the just described difficulty, whereas the second will be discussed in connection with real business cycle models, in which it plays a fundamental role.

In a Walrasian world, with perfect information in any given homogeneous labour market, we should observe a uniform wage and no unemployed workers or job vacancies. In monetarist macro-models, the reasons this is not observed lay in the existence of incomplete information on the part of workers concerning all the vacancies and associated wages and on the part of firms concerning available workers and the wages offered by other firms. This implies that in each labour market, wages are not uniform but are normally distributed around an average. In stationary conditions, as firms and workers acquire more information, wages would converge towards the equilibrium value and unemployment and vacancies would disappear. However, since continuous disturbances affect the economy, such as changes in tastes and technology, which lead to changes in the equilibrium wage, the convergence is never fully realised. In such conditions, it is rational for workers to ‘invest’ a period of time—during which they remain unemployed—in a search activity aimed at collecting information and placing themselves in a good position with regard to the existing distribution of wages. On the basis of acquired knowledge, they will determine the reservation wage, that is, the minimum wage at which they will be prepared to accept a job (Figure 1). The reservation wage will be such that the costs of continuing the search activity will be equal to the benefits in terms of expected higher incomes. Thus, ‘search’ unemployment is voluntary, and its extent essentially depends on the intensity of the shocks to the economy and on the costs of acquiring information through search, largely influenced by unemployment benefits.

In this class of models, if an expansionary policy increases aggregate demand (shifts the AD curve upwards in an AD-AS model), firms will have a larger number of vacancies and will increase their search activity. Since the latter is costly, they will find it appropriate to increase the nominal wage they offer to attract workers. With imperfect information workers (i) interpret increased money wages as increased real wages and (ii) do not perceive the shift of the entire distribution of wages offered by firms, hence do not change their reservation wage, which leads to a higher acceptance of job offers (Figure 1) and to a reduction of ‘frictional’ unemployment. Unemployment, however, decreases only as a consequence of misperceptions: as soon as these are corrected, it will return to its natural rate.

Of particular interest to the discussion here is that the working of the model as described is such that employment can also be increased in the cycle by means of the

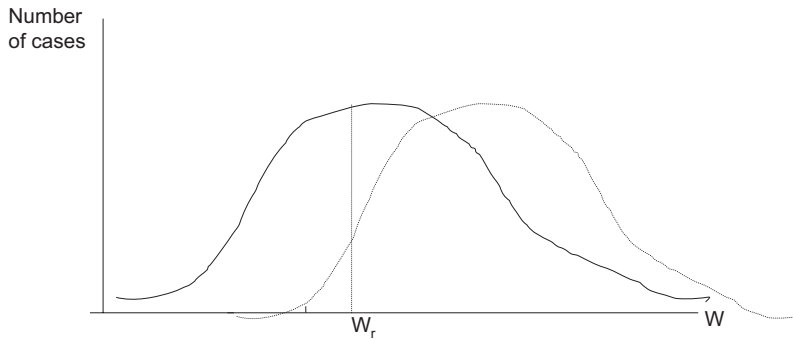


Fig. 1. *Shift of the distribution of wages offered by firms, with a given reservation wage*

contraction of the pool of the voluntarily unemployed—and hence to a greater extent than would be allowed by the movement along an aggregate labour supply curve in response to the perceived increase in real wage.

2.2 Empirical difficulties of search theory

A fundamental assumption in search models is that job search can be carried out more effectively by unemployed than by employed people. Otherwise, workers would accept the first job offered and then continue their search for a better position. It would appear crucial, therefore, to test this assumption, as suggested from the outset by [Tobin \(1972\)](#), who was critical of monetarist positions. The empirical studies aimed at assessing this important assumption have come up with results that do not fully support the model. [Layard *et al.* \(1991\)](#), surveying a number of studies on US and UK data, conclude that ‘off-the-job search is not typically more productive than on-the-job search’ (pp. 235ff.).⁶ [Kahn and Low \(1982\)](#) find some weak evidence that an unemployed search yields higher offers than an employed search, whilst [Holzer \(1987\)](#) finds that employment status has a negligible effect on the probability of receiving an offer after controlling for personal and labour market characteristics, the number of search methods and the time spent on each method. Conceivably, search intensity depends on employment status, but in this regard, [Devine and Kiefer \(1991\)](#) report in their survey of an impressive collection of empirical studies that there is no direct evidence owing to lack of data (p. 302), whilst on the other hand there is evidence that search intensity on the part of individuals depends inversely on the unemployment rate in the relevant labour market (p. 224). A less direct way to check whether the status of unemployed is important in rendering search activity more effective is to assess the intensity of the search activities of the unemployed. Several investigations of the behaviour of the unemployed have shown that in general, the actions undertaken are limited in number and such that they could be undertaken also by an employed person ([Layard *et al.*, 1991](#), pp. 235ff). Finally, particularly adverse to search models is the conclusion reached by a number of empirical studies that the probability that an unemployed person will accept a job offer is close to 1 and, accordingly, the duration of unemployment actually depends on the probability of receiving a job offer ([Devine and Kiefer, 1991](#), p. 302; [Layard *et al.*, 1991](#), p. 242), which in turn has been found

⁶ The only exception being highly qualified workers who have accepted low-skilled jobs.

to be highly correlated with demand conditions in the labour market relevant for the unemployed (Osberg *et al.*, 1986).

Much of the empirical research based on search theory has been aimed at estimating the influence of supply-side factors, particularly unemployment benefits, on individual unemployment duration.⁷ The results obtained concerning the relation between individual duration of unemployment and the access to unemployment benefits are weak and consistent with the finding in other studies that the probability of the refusal of a job opportunity is very low. Devine and Kiefer conclude on this point that ‘the effect of unemployment benefits . . . appears to be positive, but with uncertain magnitude . . . estimates vary across samples . . . also vary with the estimation techniques, and this sensitivity of results suggests specification error in modelling the effects of benefits’ (1991, p. 304; see also Layard *et al.*, 1991, p. 249).

2.3 *Employment fluctuations, the labour demand function and real wage changes over the cycle*

In macroeconomic models with neoclassical micro-foundations and cycles generated by aggregate demand shocks, real wages must move in the opposite direction with respect to output, otherwise, with decreasing labour marginal product, profit-maximising firms would not increase employment. Neither is it possible in the case of firms to advocate mis-perception of actual changes in real wages based on imperfect information, since each firm must know the ratio between its current product price and wages. This condition must be satisfied even in analyses that admit involuntary unemployment, and hence do not face the problem discussed in the previous section of explaining labour supply increases in a cyclical expansion in terms of changes in labour supply in response to wage changes, but accept the traditional labour demand curve. Accordingly, the problem involves also Keynes’s *General Theory*, where increases in the employment level are determined solely by changes in effective demand, yet require an increase in the price level with respect to the nominal wage. In the 1930s Tarshis (1938) and Dunlop (1938) had already provided empirical evidence that real wages do not vary in an opposite direction with respect to output and employment. In commenting on those results Keynes (1939, pp. 39–40) argued that the results obtained by Tarshis and Dunlop would be more favourable to his own conclusions than the opposite, traditional view, but he was reluctant to abandon the latter solely on the basis of their results, which

⁷ Concerning the effects of unemployment benefits on an individual’s attitude to accepting job offers, a caution may be in order. Even in the event of it being an accurate description of reality that the workers who have access to unemployment benefits persist in their job search longer than workers who do not have access to such benefits, this would not necessarily imply that at a macroeconomic level, the extent of unemployment would be much affected by the existence of unemployment benefits. If one adopts a theoretical standpoint different from the monetarist one, with aggregate employment solely determined by effective demand, then it would be $U = N - (mA/q)$ where U is the number of unemployed, N is the labour supply, m is the Keynesian multiplier, A is autonomous demand and q is output per worker. If we now want to take into account the existence, at any time, of labour turnover and vacancies, it is useful to distinguish two components of unemployment: $U' = N - mA/q - V$ where V is the number of vacancies, and a frictional component: $U_f = V$ with, then, $U = U' + U_f$. From this perspective, a change in workers’ behaviour concerning job acceptance determined by reduction of unemployment benefits would only affect the frictional component of unemployment (for the sake of simplicity, disregarding here the likely adverse effects on demand and employment of a cut in unemployment benefits). Even on the extreme assumption that vacancies could be reduced to zero, this would only eliminate the U_f component. But often, this represents only a small fraction of the number of unemployed. Just to give an order of magnitude V/U in Italy, according to Istat data has recently varied between 15% in an expansion year to 3% in the current recession.

he did not regard as conclusive. More recently, a large number of empirical studies on both aggregate and individual data, carried out on the basis of greater data availability and more sophisticated methods than in the 1930s, have substantially confirmed those initial findings, and there is now widespread agreement on the fact that real wages are not counter-cyclical. On the contrary, they are found to be either acyclical or, more often, moderately pro-cyclical (see the surveys by [Abraham and Haltiwanger, 1995](#); [Brandolini, 1995](#)). In addition, the relation between real wages and cyclical fluctuations appears to vary over time and across countries (a result emphasised in [Michie, 1987](#)). Although there have been attempts to argue that these results would not be inconsistent with traditional micro-foundations ([Lucas, 1970](#)), it appears that they have, in fact, contributed to undermine monetarist explanations of the cycle and drive macroeconomic modelling in new directions: on the one hand, towards real business cycle models where fluctuations are caused by technological shocks, and where real wages are expected to vary pro-cyclically, leading to significant increases in labour supply along a short period labour supply function; on the other hand, towards new Keynesian models featuring micro-founded nominal and real rigidities.

3. Real business cycle models and the co-movements of wages and employment

3.1 *Intertemporal labour supply*

In the basic version of real business cycle models, cyclical fluctuations are entirely due to exogenous shocks in technology which shift the production function and, hence, the labour demand schedule. Empirical evidence often offered in support of this view consists of the pro-cyclical variations of productivity—an uncontroversial empirical regularity, whatever the measure chosen: Solow's residual, output per worker or output per hour. The notion that they are related to technology shocks, however, has been challenged by the finding that pro-cyclical variations of productivity may also be observed when fluctuations in output are clearly caused by changes in aggregate demand, as in the great depression of 1929–30, or in fluctuations associated with changes in military expenditure ([Hall, 1988](#); [Bernanke and Pankinson, 1991](#); [Basu, 1996](#)). The cyclical changes in productivity are thus attributed to increasing returns ([Hall, 1988](#));⁸ a greater intensity in the use of fixed capital and labour, associated with a constant proportion between intermediate inputs and output ([Basu, 1996](#)) or to the existence of fixed labour costs and labour hoarding ([Bernanke and Pankinson, 1991](#))—all of these explanations being consistent with Okun's law.⁹

Although the literature has cast doubt on the plausibility that shocks in technology or tastes cause the cyclical alternation between expansions and slow-downs, real business cycle models might at first sight appear to have some advantage concerning consistency with the evidence on pro-cyclical changes in real wages. This is to such an

⁸ The term 'increasing returns' is used in this literature to mean that the firm produces on the decreasing section of its average cost curve. The 'returns' are not therefore returns to scale, since some of the inputs are fixed.

⁹ [Okun \(1962\)](#) established a short-run empirical relation between changes in output, productivity and unemployment, with the assumed causality clearly of a Keynesian type, running from a change in aggregate demand to changes in the same direction of output, productivity, hours worked by the employed, employment and participation rate, with a final effect on the change in unemployment in an opposite direction with respect to output, but affected also by the parallel changes induced in the variables listed above.

extent that it might be thought that the search for such consistency played a role in the development and acceptance of these models. Indeed, since technology (or taste) shocks cause a shift in the labour demand function, counter-cyclical wage movements are not required by the model, whilst the elasticity of intertemporal labour supply plays an essential role in the propagation of technology shocks, and movements in the same direction of real wages and employment are therefore predicted by the model. However, even in this area the models encounter problems of consistency with the empirical evidence.

As argued, the standard aggregate labour supply curve has, in principle and empirically, a low (if any) positive elasticity with respect to the real wage and is difficult to reconcile with the assumption that workers are normally on their supply curve, on the one hand, and, on the other, with the relatively wide fluctuations in employment observed in the cycle. However, intertemporal labour supply introduces a distinction between the long-run and short-run responses of labour supply to changes in the expected (normal) wage or to transitory wage fluctuations, respectively. The latter will be much more elastic than the former: this is so because it must be supposed that workers maximise their utility intertemporally. Accordingly, given the expected level of wages, it will be convenient for the workers to increase their working activity when the real wage is high, and enjoy more leisure when it is low with respect to the expected value. The unemployed are thus workers that choose to enjoy more leisure time, and a conceptual distinction no longer exists between unemployed and inactive workers. When exogenous technological shocks occur, the variation in the wage level which is perceived as transitory will have, according to the intertemporal model, a significant effect on labour supply.

3.2 *Intertemporal labour supply: empirical problems*

The short-run labour supply based on intertemporal substitution and originally proposed by Lucas and Rapping (1969) has not, however, encountered much empirical support. Altonji (1982) finds that the estimated parameters concerning the relationship between labour supply measured in hours and real wage have a sign opposite to that expected on the basis of the model and argues that this is probably due to the omission of variables that are important in explaining labour supply, such as demand-side constraints to workers' choices concerning hours of work. Clark and Summers (1982) find that individual decisions concerning labour force participation tend to be persistent, rather than transitory. Individuals who enter the labour market during an expansion tend to remain active in subsequent periods, whilst those who leave the labour market in a depression tend not to re-enter. A similar conclusion was reached, using Italian data, by Leoni (1987). Ball (1990) concludes, in his study of individual supply of hours of work, that the sign of the parameter is that expected but only for individuals who declare that they are not constrained in their choice about how many hours they work and who are well-off (which means that they do not need to become indebted when they choose to work fewer hours or not to work). However, even within this group, adult men are found to have a labour supply elasticity that is close to 0 and statistically non-significant (see also Altonji, 1986, for similar conclusions). It is now widely accepted that the intertemporal labour supply theory is not supported by empirical analyses. Even though some studies have found that individual real wages tend to be rather sensitive to the economic cycle, the pro-cyclical changes observed in

wages are not sufficiently large to explain the observed cyclical changes in employment as resulting from an increase in labour supply, given the generally rather low values of the estimated elasticity of the latter (Romer, 2012, pp. 228, 254–55).

Because of these empirical difficulties, even economists working within the real business cycle framework have been seeking other routes (see Ham and Reilly, 2002, 2012, for a brief overview). Amongst these, the most popular is the introduction into real business cycle models of efficient implicit contracts, which (it is claimed) allows parameters to be obtained concerning the elasticity of labour supply consistent with observed data on changes in hours of work and real wages over the cycle. Efficient implicit contracts are (unwritten) contracts that can enhance workers' utility (with respect to a Walrasian labour market) without impairing profits. This is possible since they insure the workers—who are risk-averse—against fluctuations in income and consumption. The literature has shown that optimal contracts must ensure continuous full employment, but can explain fluctuations in hours if the worker can obtain an income (albeit reduced) during lay-offs. The insurance implicit in these contracts smoothes wages in the face of the fluctuations in labour marginal product by allowing workers to obtain more than their marginal product in depressions, whilst they obtain less than the marginal product in expansions. On the other hand, it is convenient for the workers, in order to raise their expected income, to agree to work a greater number of hours when the marginal product of labour is high and fewer hours when it is low (Rosen, 1985). In each period/state of the world t , if workers' utility is maximised by the implicit contract subject to the constraint that expected profits cannot be less than in a Walrasian outcome, the following condition must hold:

$$M_{ht} = V'(H)_t / U'(C)_t$$

where M_{ht} is the marginal product of labour, measured in hours, in a state of the world t , $V'(H)$ is the marginal disutility of H working hours and $U'(C)$ is the marginal utility of consumption (under the assumption that in each state of the world t it is: $C_t = w_t H_t$, with w the real wage).

Since implicit contracts stabilise the marginal utility of consumption, maximisation requires that, when the marginal product changes, hours of work change in the same direction. At the same time, since under implicit contracts real wages vary less than the marginal product, the changes in the former cannot be taken as a measure of the latter. This would explain the fact that observed cyclical changes in wages are small compared with the fluctuations in employment. Yet once again, this variant of real business cycle models encounters empirical problems.

One of these is that since it is assumed that consumption in each period equals the period income $w_t H_t$, consumption smoothing should imply that when hours increase, wages should be lower (and vice versa); that is, consumption smoothing requires counter-cyclical wages, in contrast to their observed pro-cyclical behaviour (Romer, 2012, p. 482). Another major problem is that marginal product is not directly observable. Thus, empirical testing of the models (that is, of labour supply elasticity to changes in marginal product) requires that some proxy can be found. The strategies actually followed in testing the model may appear questionable; for example, Ham and Reilly (2002, 2012) choose as indicators of the cycle—and, hence, proxies of the marginal product of labour—the unemployment rates and employment growth in various occupations.

They find a high elasticity of individual labour supply measured in hours to these cyclical indicators and accordingly claim the model is successful. Yet quite evidently, their result may have a different and more direct ‘Keynesian’ interpretation, that is, that individuals are constrained in their labour supply choices by demand conditions and hence labour supply responds to changes in demand (as suggested by other empirical studies mentioned earlier).

Finally, these models can only deal with fluctuations in hours worked by workers who remain tied to their occupation (as in the case of lay-offs) and continue to receive some income, but fail to explain the cyclical changes in labour supply of non-contractualised workers.¹⁰

4. New Keynesian models

4.1 *The objectives of new Keynesian economics and the role of imperfect competition*

The declared purpose of new Keynesian models is to overcome the criticism originally addressed to the neoclassical synthesis of making *ad hoc* assumptions. They therefore seek to provide consistent micro-foundations to two main propositions: (i) it is possible to have equilibrium positions with involuntary unemployment and (ii) macroeconomic policy has real effects in the short run. The development of new Keynesian models, however, can also to some extent be interpreted as an attempt to construct models that are consistent with empirical observations, including the co-movements of real wages and employment.

The new Keynesian approach is often defined as the ‘imperfect competition’ approach. However, imperfect competition in product markets does not entail major consequences concerning the system’s tendency towards full employment or the real effects of aggregate demand. With imperfect competition, the price level is determined as $P = C_{mg}(1 + m^*)$, where m^* is the mark-up determined by the elasticity of product demand for the ‘representative firm’, and C_{mg} is its marginal cost.¹¹ If labour is the only variable factor, then $C_{mg} = W/M_h$ (where W is the money wage and M_h is the labour marginal product). Therefore, it will be $W/P = M_h/(1 + m^*)$. As represented in Figure 2, although the employment level in imperfect competition is lower than in perfect competition (unless labour supply is vertical), in equilibrium the workers will still be on their labour supply function, and aggregate demand can affect employment only if certain assumptions are made (money illusion, incomplete information, incorrect expectations) that in the model can determine, at the same time, a fall in real wages and an increase in labour supply. The only role of imperfect competition in product markets is to allow firms to be treated as price makers, rather than price takers, thus introducing the possibility of analysing the price fixing behaviour of firms. To support the two main propositions, some rigidity of real wages and price stickiness is needed and, as will presently be illustrated, the explanations of the two are interconnected. In the following, I focus on those aspects of this literature that may be regarded as part of an attempt to reconcile the models with the observed movements of real wages and employment over the cycle.

¹⁰ Mankiw (1991) also notes that implicit contract models imply greater real wage cyclical volatility in less contractualised sectors, which is not evident.

¹¹ Here and in what follows, I do not discuss the problems connected with deriving the aggregate mark-up from the mark-up in individual firms. On this, see Steedman (1992).

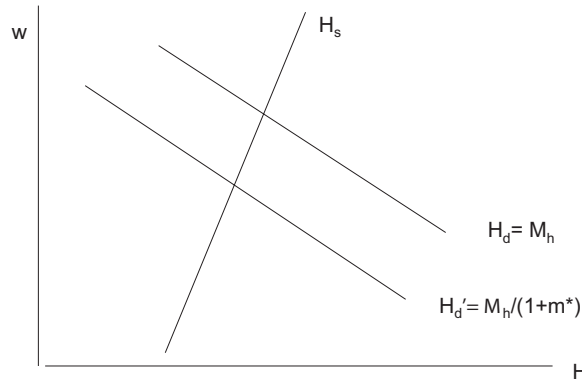


Fig. 2. Labour demand curve with perfect and imperfect competition

4.2 Real rigidities and labour supply in new Keynesian models

The models that provide micro-foundations for real wage rigidity are aimed at supporting the possibility of macroeconomic equilibria with involuntary unemployment. At the same time, as we shall see, they provide support for nominal rigidities and the (short-run) relevance of aggregate demand. The great variety of efficiency wage or bargained wage models proposed as micro-foundations for real rigidities all lead to the construction of a ‘wage curve’ which lies above the traditional labour supply curve, and is a decreasing function of the unemployment rate and an increasing function of labour market institutions such as employment protection or unemployment benefits. A fall in the degree of employment protection or in unemployment benefits would shift the curve (Figure 3) downwards, allowing lower equilibrium unemployment.

According to the proponents of these models, this equilibrium is characterised by involuntary unemployment, since the unemployed workers would be available to work at the current or even a somewhat lower wage. In addition, if the intersection with the demand curve is in the flatter section of the wage curve, as is usually supposed, an increase in employment might take place with only a very moderate increase in real wages. It is also worth noting that in contrast to what happens with the labour supply curve, such an increase here is not required to stimulate additional labour supply, but is something that tends to take place as a consequence of lower unemployment because of the latter’s effect on bargaining or on the firm’s incentive systems. Thus, the models with real rigidity remove the constraint on the expansion of employment represented by the traditional labour supply curve and do so in a way that appears more plausible than the short-run intertemporal labour substitution hypothesis. However, in other respects the equilibrium has the same features as the traditional labour market equilibrium: wage flexibility¹² when the economy is out of equilibrium would be able to return the economy to the equilibrium unemployment rate, and changes in aggregate demand would not be able to alter the unemployment rate for any length of time. For aggregate demand to affect the unemployment rate, it is necessary to provide foundations for some nominal rigidity.

¹² When the money wage falls, prices fall, too, but less than proportionally, since the marginal product of labour falls (marginal cost increases) when employment rises. Thus, some decline in real wage is also needed.

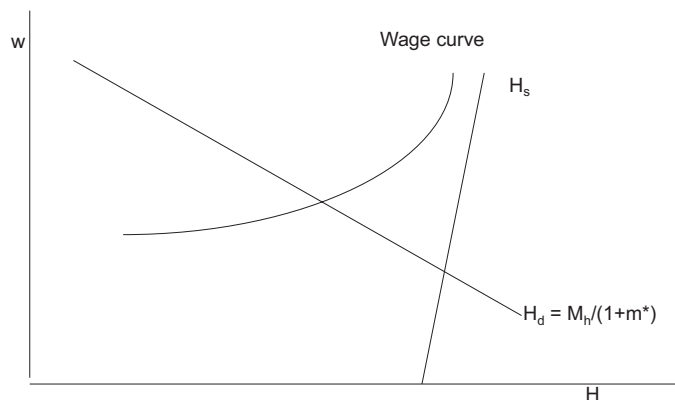


Fig. 3. *The labour market with the wage curve, imperfect competition and constant mark-up*

4.3 Nominal rigidities, real rigidities and counter-cyclical mark-up in NK models

Even with imperfect competition and real wage rigidity, a foreseen aggregate demand change would only lead to a parallel increase in wages and prices; to have real effects—at least, in the short run—it is required that prices do not adjust immediately to the increase in costs. There are many (perhaps too many) explanations of price stickiness. Here, I consider that based on the existence of ‘menu costs’ (that is, of costs related to price adjustment), which appears to be the prevailing explanation in new Keynesian literature.

The argument runs as follows: first, the losses made by the firm if it does not adjust the price but only the quantity produced are identified; second, it is claimed that if these losses are small, and smaller than the costs associated with changing the price, then it will be rational for the firm to keep the price unchanged. Figure 4 shows for a given ‘representative firm’ the product demand and marginal revenue curves for two different states of aggregate demand (D_0 and D_1), together with the marginal cost curve. The loss of profit incurred if the price is not changed when demand falls from D_0 to D_1 is represented by the triangle *bac* between the marginal cost and marginal revenue curves (Romer, 1993, 2012). This loss is small, if the change in costs associated with the change in quantity produced is small—that is, if the marginal cost function is ‘flat’ (for given wages) and if the cost curve is not shifted downwards by a fall in wages. Note, however, that if the change in demand depends on an aggregate demand shock, and all firms change the quantity produced (and not the price), there will be an aggregate change in the demand for labour, which, unless some real wage rigidity is assumed, would lower wages and shift the cost curve. Also, if the change in aggregate demand persists, the profit losses from not adjusting the price accumulate over time.

Once the profit losses have been identified, the second step in the reasoning is to show that these losses may be small relative to the costs of changing prices. If this can be demonstrated, then price inertia, at least in the short run, is a rational behaviour for firms, which provides a micro-foundation for nominal rigidity and the real effects of macroeconomic policy.

The costs of changing prices are represented by the costs associated with the need to change catalogues and inform the clients, computational costs of determining the new price and the costs of renegotiating with clients. In addition, there is the risk for the

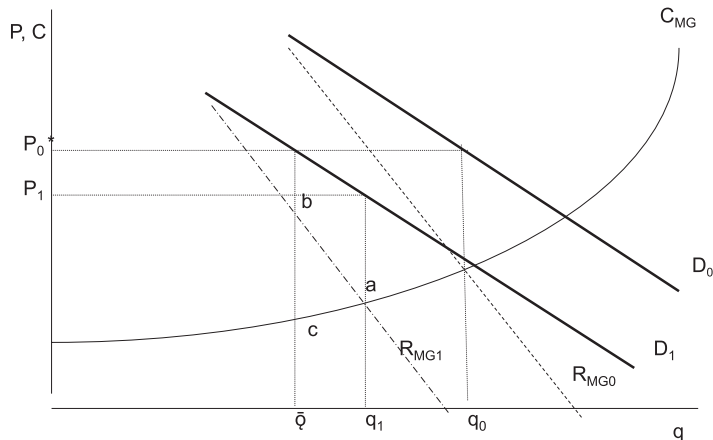


Fig. 4. Loss deriving from non adjusting the price when demand changes

individual firm that it may lose its clients if it raises its price when a number of other firms are not doing so.

Empirical research on pricing behaviour tends to confirm price stickiness, but at the same time shows that price adjustment is less frequent than the reprinting of catalogues; thus, to some extent, questioning the motivation for price stickiness provided by ‘menu costs’ (Blinder, 1998; Cecchetti, 1986, amongst others). Logical objections to these models have also been addressed on the grounds that automatic pricing rules, such as indexation to the aggregate consumer price index, might significantly reduce the costs of price adjustment.

After reviewing the critical arguments, Romer maintains:

if prices are posted and wages are paid in dollars and not continuously adjusted, individuals may come to attach significance to dollar prices and wages—and unchanged nominal price and wage may come to be viewed as the norm. The end result is likely to be that costs which in a frictionless world would be associated with changes in real prices—costs of collecting and processing information and reaching a decision, negotiation costs, costs of offending customers and employees who prefer stable prices and wages, and so on – become attached, in part, to changes in nominal prices. (Romer, 1993, p. 18)

This is a line of argument very reminiscent of ‘money illusion’.

However, since price adjustment involves one-off costs, whilst profit losses from non-adjusting prices persist, it has been shown that nominal rigidities are plausible only if changes in costs are really small (Ball and Romer, 1990; Romer, 1993, 2012, pp. 276–8). In turn, this would not be compatible with aggregate demand shocks in which labour supply increases along a standard labour supply curve, since this would require significant changes in wage costs (causing a shift of the individual cost curves for firms). It may thus be perceived that real rigidities, which bring about the existence of involuntary unemployment in equilibrium, are also a logical necessity to provide support to ‘micro-founded’ nominal rigidities

Finally, it has to be remarked that nominal price rigidity also means that firms are not moving along their labour demand curve, since $P_i \neq (W_i/M_h)(1 + m^*)$ entails $(W_i/P_i) \neq (M_h/1 + m^*)$. Hence, price rigidity and the associated counter-cyclical mark-ups also allow the ‘constraint’ represented by the labour demand curve when analysing the cyclical

co-movements of employment and real wages to be removed (Rotemberg and Woodford, 1991).

4.4 Cyclical behaviour of the mark-up on marginal costs: empirical evidence

In new Keynesian models, the mark-up on marginal costs must be counter-cyclical, as a result of the combination of sticky prices and increasing marginal costs (that is, decreasing labour marginal product).

Counter-cyclical mark-ups may be regarded as simply the outcome of price stickiness in the face of changing marginal costs and, in this sense, endogenously determined by the factors that determine nominal rigidity, so that over the cycle the actual mark-up will be different from m^* , the mark-up determined by the elasticity of product demand curves. If, for instance, with given nominal wages, prices remain fixed over the cycle, mark-up variations would exactly compensate the change in marginal costs and, as a result, the labour demand curve would be horizontal, even though labour marginal product is decreasing.

Alternatively, it has also been argued that the elasticity of product demand curves is pro-cyclical—amongst other things, because the entry of new firms would become easier in expansions, or because of the change in the composition of output in favour of industries (particularly the investment goods sector) with higher elasticity of demand during expansions (and vice versa). If this is the case, it is the mark-up m^* determined by the elasticity of demand in product markets that changes over the cycle, thus determining shifts in the imperfect-competition labour demand curve (Rotemberg and Woodford, 1991, 1999).

But is there any empirical evidence that mark-ups are, indeed, counter-cyclical? If so, is it possible to distinguish between changes determined by nominal rigidity, or by variations of the elasticity of product demand curves?

Concerning the first question, the problem that immediately arises is that, as discussed, average labour productivity is pro-cyclical, and hence, for a given wage rate, total average labour costs diminish when output and employment expand. It is therefore necessary to show that marginal labour costs are, nevertheless, increasing and the mark-up falls in expansions.

The starting point for empirical investigation of the mark-up is:

$$1 + m = \eta_h S_h^{-1}$$

where η_h is output elasticity to changes in labour input, and S_h^{-1} is the inverse of the wage share in national income. The right-hand side actually represents the ratio of labour marginal product to the real wage:

$$\eta_h S_h^{-1} = (\delta Y / \delta H)(H / Y)(YP / WH) = (\delta Y / \delta H)(P / W)$$

where Y is the national income, H is the amount of labour measured in hours, P is the price level and W is the money wage. Supposing for the moment that η_h is constant, then the changes in the inverse of the labour share measure the changes in the mark-up, and the latter is counter-cyclical to the extent that the wage share is pro-cyclical. However, the wage share is not pro-cyclical but counter-cyclical, as is generally recognised and as is shown by the data in Rotemberg and Woodford (1999, p. 110), who

have made the major contributions in support of the counter-cyclical behaviour of the mark-up. This behaviour of the wage share is the natural consequence of the cyclical changes in productivity, if not accompanied by more than compensatory changes in the real wage. In the US economy between 1950 and 1990 (the period examined by Rotemberg and Woodford, 1999), the wage share tends to peak in the declining phase of the cycle (just before the trough) and to reach a minimum in the upwards phase of the cycle before the peak in output. Accordingly, the correlations reported in Rotemberg and Woodford (1999, table 1, p. 114) show a negative correlation (the opposite of that desired) between the wage share and various indicators of the cycle amongst which are detrended GDP and detrended worked hours. Only after a lag of three quarters does the correlation become positive, and it reaches its maximum positive value only after a lag of six quarters.¹³ However, Rotemberg and Woodford point out a number of reasons the mark-up over marginal costs may in fact be more counter-cyclical than would appear by looking at the wage share. They observe that the elasticity of output to labour input η_h is likely not to be constant in the short run but, rather, counter-cyclical (that is, falling when output increases) because the capital stock is fixed in the short run. They then add that the existence of fixed labour costs would cause a reduction in average labour costs and, hence, in the observed wage share in an expansion (and vice versa), thus providing a distorted measure of marginal costs. Indeed, if there are fixed labour costs, it becomes:

$$\begin{aligned}\eta_h S_h^{-1} &= (\delta Y / \delta H_v)(H_v / Y) (WH_t) / (PY) \\ &= (\delta Y / \delta H_v)(P / W)(H_v / H_t) \\ &= (1 + m) (H_v / H_t)\end{aligned}$$

where H_v is variable labour used in production, whilst total employment $H_t = H_v + \hat{H}$ is the sum of variable and fixed labour. Accordingly, when there are fixed labour costs the appropriate measure of the mark-up over marginal costs is:

$$(1 + m) = \eta_h S_h^{-1} \left\{ 1 / \left[1 - (\hat{H} / H_t) \right] \right\}$$

where the term between curly brackets on the right-hand side clearly drops when total employment increases and is thus counter-cyclical. Simple calculations show that a proportion of overhead labour of 30% would cause (with constant elasticity η_h and given the wage) a change in the observed wage share of 4% for each 1% increase in output and hours worked, which is the parameter used by Rotemberg and Woodford to correct the changes in $\eta_h S_h^{-1}$. However, the parameter is not calculated on the basis

¹³ Note that the duration of the cycle in terms of distance between peak and trough in the USA in the period considered by Rotemberg and Woodford and measured with one of the cycle indicators they use (Hodrick and Prescott filtered GDP) has generally been of two or three quarters (Romer 2012, p. 190). It is therefore uncertain what one is really measuring when the lag structure described in the text is introduced. The duration of the cycle is specific to the particular theoretical perspective and associated method of estimation. In a survey of empirical evidence concerning business cycles in the USA after World War II, Zarnowitz (1985, p. 3) wrote that ‘they are persistent—lasting as a rule several years, i.e., long enough to permit the development of cumulative movements in the downward as well as upward direction’. According to Zarnowitz, the average duration of GDP contractions had been one year, and four years the overall duration of the cycle.

of a direct measure of overhead labour. Rather, it is deduced from the estimated steady state value of the mark-up, on the basis of the reasoning that the latter is an index of the proportion between average and marginal costs. This, in turn, allows a measure of fixed costs (Rotemberg and Woodford, 1999, pp. 16–17) to be obtained—a way of proceeding that pre-supposes a good deal of confidence in the fact that the model is an accurate description of reality.

As in the case of fixed costs, the existence of labour hoarding (here represented as the possibility to shift workers between maintenance and production according to the cycle) implies that the observed changes in $\eta_h S_h^{-1}$ represent a distorted measure of the mark-up on marginal costs, which needs therefore to be corrected.¹⁴

Further corrections are required in consideration of labour adjustment costs, increasing marginal wage costs for overtime work and increasing wage costs of effort per hours of work—according to the authors, this cost element might not be captured by the data when there are implicit contracts that smooth wage incomes over time (see Section 3.2)

Empirical estimations of the cyclical changes in the mark-up are carried out only after the introduction of at least some parameters that allow the ‘corrections’ described to be made, and the values of which are often derived from indirect procedures, rather than from direct observation and measurement. As the authors remark: ‘not surprisingly, mark-ups are now much more countercyclical’ (Rotemberg and Woodford, 1999, p. 15). Yet the maximum negative value of the correlation of the mark-up with a constructed indicator of the cycle still takes place with a time lag of two quarters (p. 111).

It should be noted that average productivity (output per worker and per hour) is pro-cyclical and average labour costs are decreasing in an expansion, whilst it is suggested that marginal costs are increasing. This means that if average and marginal cost curves have the usual U shape, firms must be producing an output such that they are, at the same time, on the downwards-sloping part of the average cost curve and on the upwards-sloping part of the marginal cost curve. Actually, Rotemberg and Woodford argue that the marginal cost curve is not U-shaped and, on logical grounds, criticise the decreasing part of the curve. The argument itself is sound and not new,¹⁵ but the consequence drawn by the authors that the marginal cost curve will be continuously rising—under the assumption that machinery of different efficiency exists and will be used in succession (Rotemberg and Woodford, 1999, p. 91n17)—appears controversial. It is often maintained that the marginal cost curve may be horizontal, at least over a certain output range: this might be the case, for example, if, as is most plausible, the fluctuations in output are associated with changes in the number of hours of plant utilisation. Thus, the notion that marginal costs are increasing seems, rather, to be rooted in the view that the economy is always, in the aggregate, close to full employment of all productive

¹⁴ When labour hoarding is taken into account, the correct measure of the mark-up is: $(1 + m) = \eta_h S_h^{-1} [(H_v + H_m)/H_v]$ where H_v and H_m are labour employed in production and in maintenance, respectively, and where the square bracketed term on the right-hand side is clearly counter-cyclical.

¹⁵ Sraffa (1925 [1998]), in re-examining the foundations of Marshallian cost functions, argues amongst other things that the increasing part of the marginal product curve (hence the decreasing section of the marginal cost function) holds only if there are indivisibilities or there are costs associated with the non-utilisation of the super-abundant factor. If this is not so, it will be cost-minimising for the firm always to use the factors in the proportion which allows the costs per unit of output to be minimised. This proportion—and hence the marginal product—will remain constant until the level of production is such that one of the factors is fully utilised. Only after this point is reached will the marginal product curve of the other, variable factor decrease (and marginal cost increase).

factors, which must then give rise to decreasing marginal product and increasing wage costs when output increases. However, [Blinder \(1998\)](#), in his interview-based investigation, finds that amongst the prevailing motivations expressed by firms concerning why price changes are infrequent is the fact that firms do not want to antagonise their clients and generally feel ‘competitive pressures’, and also that ‘our costs do not change more often’ (p. 127). The latter motivation seems to suggest that either marginal costs do not vary all that much or, alternatively, that the costs that are relevant to price fixing are normal, average costs, which are independent of short-run fluctuations in output, as is maintained in the full cost pricing literature ([Coutts *et al.*, 1978](#)).

Thus, to sum up the cyclical behaviour of mark-ups on marginal costs: the methods used in empirical analyses tend to introduce parameters that contribute to counter-cyclical outcomes and that are not, in many instances, based on direct estimation, whilst the cyclical behaviour of marginal costs is not analysed directly. (However, [Hall \[1988\]](#), who attempts an estimate of marginal costs in a neoclassical framework, concludes that they are not increasing.) Notwithstanding, as yet the econometric studies have not produced any conclusive results. Whilst [Rotemberg and Woodford \(1991, 1999\)](#), amongst others, find that mark-ups are counter-cyclical, there are also a number of studies that come to different conclusions. The differences in results appear to be independent of whether the mark-up is calculated on marginal direct labour costs only or if intermediate input costs are also taken into account. [Domowitz *et al.* \(1988\)](#), using US data, find that mark-ups have different cyclical behaviours according to the sector but are, in most instances, pro-cyclical. [Macallan *et al.* \(2008\)](#) use the same estimation procedures as in [Rotemberg and Woodford \(1999\)](#), with UK data, but find that mark-ups are pro-cyclical. With a different estimation procedure, also using UK data, [Haskel *et al.* \(1995\)](#) also find pro-cyclical mark-ups. [Neckarda and Ramey \(2010\)](#), using US data, find that the mark-up is acyclical, and [Marchetti \(1999\)](#), using Italian data, finds that there is diversity amongst sectors, with a significant number of industries where the mark-up is acyclical. Thus, counter-cyclical behaviour of the mark-ups does not appear to be an outstanding empirical regularity of economic cycles.

Now let us move briefly on to the question of whether it is possible to distinguish empirically between ‘endogenous’ changes in the mark-up that simply result from price stickiness and changes that are due instead to changes in the elasticity of product demand curves over the cycle, which cause shifts of the demand curve and may therefore be regarded as propagating aggregate shocks. The attempt made by [Rotemberg and Woodford \(1999\)](#) to discriminate between these two phenomena produces results so paradoxical that the authors conclude there must be ‘large errors’ in the statistics concerning wages and the wage share (choosing, therefore, to use constructed indicators in place of statistical data, p. 61). The findings are nevertheless extremely sensitive to the specification of the model, according to which autonomous variations of the mark-up either have no role in cyclical fluctuations, or can instead explain about 90% of output changes (pp. 63 and 67).

5. Conclusion

The starting point of this discussion was the difficulty in reconciling the observed movements over the cycle of employment and real wages (which are moderately pro-cyclical or acyclical) with the conventional labour demand and supply curves.

On the supply side, the way out proposed by monetarist and real business cycle models is based on search theory and short-run intertemporal labour supply. Both, however, face much adverse empirical evidence. A further attempt is represented by the combination of intertemporal labour supply and efficient implicit contracts, which has also encountered analytical and empirical problems. On the other hand, new Keynesian models suggest the existence of involuntary unemployment in equilibrium, so that the conventional labour supply curve does not represent a constraint on employment changes.

On the demand side, monetarist models do not offer a solution, which may have contributed to the development of real business cycle and new Keynesian models. The former class of models suggest cyclical shifts in the labour demand curve caused by exogenous technical ‘shocks’,¹⁶ which would cause changes in full employment equilibrium along an elastic short-run labour supply (not confirmed, however, by empirical research). New Keynesian models predict counter-cyclical changes in the mark-up over marginal costs; this entails either irrelevance or shifts of the imperfect competition labour demand curve in the short run. But empirical research has not provided consistent results in this respect. Thus, all mainstream models face similar difficulties, the roots of which can be found in the fact that they retain the conventional functions, particularly the decreasing labour demand curve.

Economists willing to emphasise the positive contribution of mainstream macroeconomics might argue that the discipline proceeds in a truly scientific manner, since empirical tests and findings lead to some of the models being abandoned and new ones developed in search of greater consistency with empirical observation, thus enhancing our knowledge.

The developments that have been assessed in this article, however, perhaps suggest a different, less favourable evaluation, namely, that contemporary macroeconomics has become entangled in an unresolved conflict between the attempt to be consistent with its marginalist (neoclassical) analytical foundations and ‘realism’—understood as consistency with the findings of applied research.

As Lindbeck observed: ‘Indeed the development of macroeconomic theory in recent decades may to a considerable extent be seen as a long and cumbersome attempt to escape the “tyranny” of the downward sloping labour-demand curve and hence also to overcome the classical dichotomy’ (1998, p. 171). The attempts to reconcile the facts with traditional theory have led to the continuous introduction of specific—and arguably *ad hoc*—hypotheses, in sharp contrast with the search for greater theoretical rigour that had been claimed to be the inspiration for the development of all the various streams of macroeconomic modelling subsequent to the neoclassical synthesis. Thus, in this respect the judgement expressed by Romer about the new Keynesian models—that is, ‘they are so flexible that they are extremely difficult to refute’ (2006, p. 338)—appears well suited to all streams in macroeconomic modelling. The exceptions to this are those versions that we could define as the base models, which closely reflect the neoclassical foundations without (many) additional assumptions, such as the monetarist and real business cycle models. These, however, as we have seen, are unable to come to terms with the observed co-movements of employment and real wages over the cycle (which does not exclude that other problems may be encountered in other

¹⁶ The exogeneity of cyclical changes in productivity with respect to changes in aggregate demand has, however, been questioned by empirical research.

areas). In turn, the specific assumptions introduced in the models to render them more consistent with empirical observation, or their implications, are in most cases contradicted by subsequent empirical research, or at best not confirmed by results that turn out to be contradictory and inconclusive.

Indeed, one could argue that contemporary macroeconomics is like Ptolemaic astronomy before its abandonment, seeking to reconcile the geocentric view with an increasing number of ‘anomalous’ observed facts. The difficulty in keeping theory and facts together in a simple and consistent framework may be linked, in contemporary mainstream macroeconomics as in the old Ptolemaic astronomy, to the erroneous theoretical premises; that is, in the case of macroeconomics, to the logical difficulties of the notion of decreasing factor demand curves. These difficulties emerged during the controversy over marginalist capital theory (Sraffa, 1960; Pasinetti 1966, Garegnani, 1970, 2012), which brought to light that cost-minimising choice of technique does not necessarily imply a decreasing relation between a factor rate of return and its demand. On the other hand, the difficulties that have been the focus of this article concern the analysis of economic fluctuations and, hence, particularly short-period factor demand curves. Even apart from the criticisms to marginal capital theory, the notion of decreasing factor demand curves in the short run—which appears so difficult to reconcile with observed facts—is analytically very fragile, as acknowledged even by the founders of the marginalist approach. A thorough discussion of this lays outside the scope of the present work and would need a separate treatment,¹⁷ but it may be worth considering the view originally held on the subject by Hicks:

a rise in the marginal productivity of labour with constant wages . . . does not necessarily lead employers to expand their demand for labour at once. Similarly, the fact that the employment of certain men has become less advantageous does not always lead to an immediate contraction in the demand for labour . . . The principal reason for this ‘lag’ is to be found in the fact that one of the cooperating factors—capital—is, at any particular moment, largely incorporated in goods of a certain degree of durability . . . if the capital is at present invested in durable goods, the change in conduct which follows from the change in relative profitability cannot immediately be realized . . . only a small portion of the total supply of capital is ‘free’—available for investment in new forms—and that in itself may make very little difference to the demand for labour. . . . Since the whole conception of marginal productivity depends upon the variability of industrial methods, little advantage seems to be gained from the attempt which is sometimes made to define a ‘short period marginal product’ . . . It is very doubtful that this conception can be given any precise meaning which is capable of useful application. (Hicks, 1932, pp. 19–21)

From this perspective, then, the problem should not be seen in terms of the existence in economics as a discipline of a tension between ‘rigour’ and ‘relevance’, as has sometimes been suggested (Blaug, 2009), but in terms of flawed foundations of the dominant economic theory, that quite naturally are reflected in the difficulty it encounters in explaining observed phenomena.

Non-mainstream developments in economic theory may offer an alternative approach that appears quite consistent with many of the stylised facts concerning the economic cycle that have been discussed so far and can fill the void left by abandoning the flawed foundations of mainstream theory. The main pillars of such an alternative, which can be recalled here only in its most general lines, are the theory of output (both in the short run and in the long run) based on the principle of effective demand,

¹⁷ For critical discussion of short-run labour demand curves, see Petri (2004, pp. 29–30, 295–304).

combined with the revival of the theory of value and distribution of the classical surplus approach.¹⁸

From this perspective, increases in the employment level would not require a fall in real wages and would essentially depend on effective demand. On the other hand, with regards to labour supply, since there is no endogenous tendency of the system towards full employment, there is also no reason to wonder why increases in effective demand can easily be met by increased production and employment, since there will normally be labour ‘reserves’ in the economy represented by explicit and disguised unemployment and underemployment. This will not necessarily require increases in wages, although the latter may result as a consequence of increased employment.

Concerning this last point, it is important to emphasise that the abandonment of the theory of output and distribution based on factor demand curves entails a separation between the determination of output and employment, on the one hand, and the determination of distribution, on the other. Income distribution can be regarded as the result of acquired living standards and the bargaining position of the parties, in turn affected both by labour market conditions and the institutional set-up—as also increasingly recognised in mainstream literature.¹⁹ From this perspective, it is likely that a fall in the unemployment rate—either in the cycle, or on average over longer periods of time—will have a positive effect on nominal and real wages, due to the improvement in the bargaining position of the workers (see, for example, [Levrero and Stirati, 2006](#); [Stirati, 2011A](#)). Also, the existence and strength of this effect will largely depend on the specific social and institutional condition of the period and country under consideration (as pointed out in [Michie, 1987](#)). If the increase in wages relative to productivity brings about a change in income distribution, the effect on employment will depend on its consequences for effective demand. From this point of view, a change in income distribution favourable to labour may generally be expected to have positive effects on output, since it tends to determine an increase in the propensity to consume.

Thus, the puzzle of the co-movements of wages and employment over the cycle appears to be such only from a mainstream perspective, whilst the observed empirical regularities fit quite naturally into an analysis of the cycle and the general working of the economic system centred around the principle of effective demand and the explanation of income distribution based on the bargaining strength of the parties and the role of institutions.

References

- Abraham, K. G. and Haltiwanger, J. C. 1995. Real wages and the business cycle, *Journal of Economic Literature*, vol. 33, no. 3, 1215–64
- Ackley, G. 1983. Commodities and capital: prices and quantities, *American Economic Review*, vol. 73, no. 1, 1–16

¹⁸ See [Eatwell and Milgate \(1983\)](#) and [Garegnani \(1992\)](#) for seminal contributions along these lines, and [Petri \(2004, pp. 309–23\)](#) for a summary of the main arguments.

¹⁹ From the non-orthodox perspective, however, institutions (such as legal minimum wages, trade union agreements, unemployment benefits or social norms) setting limits to wage competition do not represent a ‘distortion’ or an interference with market forces understood as labour demand and supply functions but, on the contrary, represent the necessary way of functioning of the market, when decreasing demand functions for production factors and the consequent tendency of the economic system to full employment (or to potential output) are not assumed. This is so because unlimited competition over wages, being unable to bring about increased employment, would turn out to be economically and socially destabilising and destructive ([Garegnani, 2007](#); [Levrero, 2011](#); [Stirati, 1992, 2011B](#)).

- Altonji, J. 1982. The intertemporal substitution model of labour market fluctuations: an empirical analysis, *Review of Economic Studies*, vol. 49, 783–824
- Altonji, J. 1986. Intertemporal substitution in labour supply: evidence from microdata, *Journal of Political Economy*, vol. 94, S176–S215
- Ball, L. 1990. Intertemporal substitution and constraints on labour supply: evidence from panel data, *Economic Inquiry*, vol. 28, no. 4, 706–24
- Ball, L. and Romer, D. 1990. Real rigidities and the non-neutrality of money, *Review of Economic Studies*, vol. 57, 179–98
- Basu, S. 1996. Procyclical productivity: increasing returns or cyclical utilization?, *Quarterly Journal of Economics*, vol. 111, 719–51
- Bernanke, B. S. and Pankinson M. L. 1991. Pro-cyclical labor productivity and competing theories of the business cycle: some evidence from interwar US manufacturing industry, *Journal of Political Economy*, vol. 99, 439–59
- Blaug, M. 2009. The trade-off between rigor and relevance: Sraffian economics as a case in point, *History of Political Economy*, vol. 41, no. 2, 219–47
- Blinder, A. 1998. On sticky prices: academic theories meet the real world, pp. 117–54 in Mankiw, N. G. (ed.), *Monetary Policy*, Chicago, University of Chicago Press; available at <http://www.nber.org/chapters/c8331> [date last accessed: 22 April 2013]
- Brandolini, A. 1995. In search of a stylised fact: do real wages exhibit a consistent pattern of cyclical variability?, *Journal of Economic Surveys*, vol. 9, no. 2, 103–63
- Cecchetti, S. G. 1986. The frequency of price adjustment: a study of the newsstand prices of magazines. *Journal of Econometrics*, vol. 31, 255–274
- Clark, K. B. and Summers, L. H. 1982. Labour force participation: timing and persistence, *Review of Economic Studies*, vol. 49, no. 5, 825–44
- Coutts, K., Godley, W. and Nordhaus, W. 1978. *Industrial Pricing in the United Kingdom*, Cambridge, Cambridge University Press
- Devine, T. J. and Kiefer, N. M. 1991. *Empirical Labour Economics*, Oxford, Oxford University Press
- Domowitz, I. Hubbard, R. G. and Petersen, B. C. 1988. Market structure and cyclical fluctuations in U.S. manufacturing, *Review of Economics and Statistics*, vol. 70, no. 1, 55–66
- Dunlop, J. G. 1938. The movement of real and money wage rates, *Economic Journal*, vol. 48, no. 191, 413–34
- Dunlop, J. G. 1998. Retrospectives: real and money wage rates, *Journal of Economic Perspectives*, vol. 12, no. 2, 223–34
- Eatwell, J. and Milgate, M. (eds) 1983. *Keynes's Economics and the Theory of Value and Distribution*, Oxford, Duckworth
- Garegnani, P. 1970. Heterogeneous capital, the production function and the theory of distribution, *Review of Economic Studies*, vol. 37, no. 3, 407–36
- Garegnani, P. 1992. Some notes for an analysis of accumulation, in Halevi, J., Laibman D. and Nell, E. (eds), *Beyond the Steady State*, London, Macmillan
- Garegnani, P. 2007. Professor Samuelson on Sraffa and the classical economists, *European Journal of the History of Economic Thought*, vol. 14, no. 2, 181–242
- Garegnani, P. 2012. On the present state of the capital controversy, *Cambridge Journal of Economics*, vol. 36, no. 6, 1417–32
- Hall, R. E. 1988. The relation between price and marginal cost in U.S., *Journal of Political Economy*, vol. 96, no. 5, 921–47
- Ham, J. C. and Reilly, K. T. 2002. Testing intertemporal substitution, implicit contracts, and hours restriction models of the labor market using micro data, *American Economic Review*, vol. 92, no. 4, 905–27
- Ham, J. C. and Reilly, K. T. 2012. ‘Implicit Contracts, Life Cycle Labor Supply and Intertemporal Substitution’, Working paper, available at http://econweb.umd.edu/~ham/Ham_Reilly_revision_oct20_IER.pdf [date last accessed: 30 July 2013]
- Haskel, J., Martin, C. and Small, I. 1995. Price, marginal cost and the business cycle, *Oxford Bulletin of Economics and Statistics*, vol. 57, no. 1, 25–41
- Hicks, J. R. 1932. *The Theory of Wages*, London, Macmillan
- Holzer, H. J. 1987. Job search by employed and unemployed youth, *Industrial and Labour Relations Review*, vol. 40, 446–52

- Kahn, L. M. and Low, S. A. 1982. The relative effects of employed and unemployed job search, *Review of Economics and Statistics*, vol. 64, 34–41
- Keynes, J. M. 1939. Relative movements of real wages and output, *Economic Journal*, vol. 49, 34–5
- Layard, R., Nickell, S. and Jackmann, R. 1991. *Unemployment—Macroeconomic Performance and the Labour Market*, Oxford, Oxford University Press
- Leoni, R. 1987. *Le teorie economiche dell'offerta di lavoro*, Rome, La Nuova Italia Scientifica
- Levrero, E. S. 2011. Some notes on wages and competition in the labour market, in Ciccone, R., Geherke, C. and Mongiovi, G. (eds), *Sraffa and Modern Economics*, Volume 1, London, Routledge
- Levrero, E. S. and Stirati, A. 2006. The influence of unemployment, productivity and institutions on real wage trends: the case of Italy 1970–2000, in Hein, E., Heise, A. and Truger, A. (eds), *Wages, Employment, Distribution and Growth—International Perspectives*, Basingstoke, Palgrave Macmillan
- Lindbeck, A. 1998. New Keynesianism and aggregate economic activity, *Economic Journal*, vol. 108, 167–80
- Lucas, R. E. 1970. Capacity, overtime and empirical production functions, *American Economic Review*, vol. 60, no. 2, 23–7
- Lucas, R. E. and Rapping, L. 1969. Real wages, employment and inflation, *Journal of Political Economy*, vol. 77, no. 5, 721–54
- Macallan, C., Millard, S. and Parker, M. 2008. 'The Cyclicalities of Mark-Ups and Profit Margins for the United Kingdom: Some New Evidence', Bank of England Working Paper no. 351
- Mankiw, N. G. 1991. Comment to Rotemberg and Woodford, in Blanchard, O. J. and Fischer, S. (eds), *NBER Macroeconomics Annual*, Volume 6, Cambridge, MA, MIT Press; available at <http://www.nber.org/chapters/c10982> [date last accessed: 30 November 2013]
- Marchetti, D. J. 1999. 'Mark Up and the Business Cycle: Evidence from Italian Manufacturing Branches', Banca d'Italia Temi di Discussione no. 362
- Michie, J. 1987. *Wages in the Business Cycle—An Empirical and Methodological Analysis*, London, Frances Pinter
- Nekarda, C. J. and Ramey, V. A. 2010. 'Industry Evidence on the Effects of Government Spending', NBER Working Paper No. 15754; available at <http://www.nber.org/papers/w15754> [date last accessed: 24 May 2013]
- Okun M. A. 1962. 'Potential GDP: Its Measurement and Significance', Cowles Foundation Paper no. 190, <http://cowles.econ.yale.edu/P/cp/p01b/p0190.pdf> [date last accessed: 24 May 2013]
- Osberg, L., Apostle, R. and Clairmont, D. 1986. The incidence and duration of individual unemployment: supply side or demand side?, *Cambridge Journal of Economics*, vol. 10, no. 1, 13–33
- Palumbo, A. 2013. Potential output and demand-led growth, in Levrero, E. S., Palumbo, A. and Stirati, A. (eds), *Sraffa and the Reconstruction of Economic Theory*, Volume 2, London, Routledge
- Pasinetti, L. 1966. Changes in the rate of profit and switches of techniques in paradoxes in capital theory: a symposium, *Quarterly Journal of Economics*, vol. 80, 503–17
- Petri, F. 2004. *General Equilibrium, Capital and Macroeconomics*, Cheltenham, Edward Elgar
- Phelps, E. S., Alchian, A. A. and Archibald, G. C. 1970. *Microeconomic Foundations of Employment and Inflation Theory*, New York, Norton
- Romer, D. 1993. The new Keynesian synthesis, *Journal of Economic Perspectives*, vol. 7, no. 1, 5–22
- Romer, D. 2006, 2012. *Advanced Macroeconomics*, various edns, New York, McGraw-Hill
- Roncaglia, A. and Tonveronachi, M. 1985. Pre-Keynesian roots of the neoclassical synthesis, *Cahiers d'economie politique*, nos 10–11, 51–65
- Rosen, S. 1985. 'Implicit Contracts: A Survey', NBER Working Paper no. 1635
- Rotemberg, J. and Woodford, M. 1991. Markups and the business cycle, pp. 63–140 in Blanchard, O. J. and Fischer, S. (eds), *NBER Macroeconomics Annual*, Volume 6, Cambridge, MA, MIT Press; available at <http://www.nber.org/chapters/c10982> [date last accessed: 30 November 2013]
- Rotemberg, J. and Woodford, M. 1999. 'The Cyclical Behaviour of Prices and Costs', NBER Working Paper no. 6909

- Sraffa, P. 1925 [1998]. On the relations between cost and quantity produced, pp. 323–63 in Pasinetti, L. (ed.), *Italian Economic Papers*, vol. III
- Sraffa, P. 1960. *Production of Commodities by Means of Commodities: Prelude to a Critique of Economic Theory*, Cambridge, Cambridge University Press
- Steedman, I. 1992. Questions for Kaleckians, *Review of Political Economy*, vol. 4, no. 2, 125–51
- Stirati, A. 1992. Unemployment, institutions and the living standard in the classical theory of wages, *Contributions to Political Economy*, vol. 11, 41–66
- Stirati, A. 2011A. Changes in functional income distribution in Italy and Europe—service sector prices, labour market conditions and institutional change, in Brancaccio, E. and Fontana, G. (eds), *The Global Economic Crisis: New Perspectives on the Critique of Economic Theory and Policy*, New York: Routledge
- Stirati, A. 2011B. Interpretations of the classics: the theory of wages, in Ciccone, R., Geherke, C. and Mongiovi, G. (eds), *Sraffa and Modern Economics*, Volume 1, London, Routledge
- Tarshis, L. 1938. Real wages in the United States and Great Britain, *Canadian Journal of Economics*, vol. 4, no. 3, 362–76
- Tobin, J. 1972. Inflation and unemployment, *American Economic Review*, vol. 62, no. 1, 1–18.
- Zarnowitz, V. 1985. Recent work on business cycles in historical perspective: a review of theories and evidence, *Journal of Economic Literature*, vol. 23, no. 2, 523–80