

2 The origins and fall of the natural rate hypothesis

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The idea of the natural rate of unemployment, the long-run path of the unemployment rate, challenged the Keynesian thought: that doctrine held that the unemployment rate was determined by effective demand, and demand management was the best policy. In the new Keynesian model, the unemployment rate is governed by neoclassical considerations. The natural rate is the point on the unemployment rate curve where the inflation rate is zero.

Modelling of the natural rate idea led to a conclusion from the model sketched in (1) and (2). Management of monetary demand to keep the unemployment rate other than the natural rate would generate a continuing disequilibrium, leading to mounting deflation - then collapse.¹ If the inflation rate is below the natural level, for example, the actual inflation rate will rise above the expected rate; but each such rise would leave the disequilibrium undiminished.

The other proposition was implied by the model. A similar thesis was forcefully argued by Milton Friedman in his paper (Friedman, 1968). Monetary policy should be based only on nominal variables: a policy to keep the inflation rate constant will generate a constant unemployment rate relative to the path of the natural rate. In particular, the actual unemployment rate, in response to shocks, is constantly homing in on the natural rate - makes this the stronger proposition - makes this the stronger proposition.

Some of these terms need defining, particularly 'equilibrium' and 'natural rate'. 'Equilibrium' here means, as the term is used in physics, that expectations of wages, etc. are borne out.

unforeseen shock; 'disequilibrium' means a gap between expectations and outcomes. Under the maintained assumptions, each equilibrium path of the unemployment rate (indexed by its starting point) converges to the path of the natural rate - conceived as a path independent of monetary policy, at least approximately. The current natural rate may be defined as the current stationary rate: the level of the unemployment rate such that it would be unchanging for the moment as least.² For analytical convenience the natural rate was taken to be a constant, hence equal to the equilibrium stationary state level.³ The first proposition assumes that in the stated circumstances there is a tendency for expectations to narrow the disequilibrium unless policymakers keep people off balance. The second proposition assumes that the tendency to equilibrium is general. Then the actual unemployment rate converges to one of the equilibrium 'glide paths', all of which converge to the natural rate path. Strikingly, this message that economists took away from the natural rate discussions of the late 1960s - the neutrality of money and inflation and the homing in - was less a theory of employment determination than a set of *axioms* that we might require of such a model independently of what substantive building blocks the model is made from.⁴ Indeed, the concept of the natural rate, as I have on occasion acknowledged, had existed for decades prior to the arrival on the scene of Milton Friedman and myself. The postulate that inflation was neutral for the equilibrium path of output, employment and some other 'real' variables was introduced by Abba Lerner in the 1940s and by William Fellner (a great teacher of mine) in the 1950s.⁵ Perhaps my 1967 paper and Friedman's were more emphatic and explicit about homing in to the natural rate (on which I was more cautious in my 1968 paper).

There was a tendency among quite a few scholars, myself included, to forget that my 1968 paper on equilibrium unemployment sketched a *substantive model* of the determination of the *size* of the natural unemployment rate and the course of the equilibrium unemployment rate path which leads to it. The 1968 paper by Friedman also had a substantive side, though it sketched departures of the labour force (to which employment was equal) from its equilibrium path: unemployment does not appear.

The present commentary on the natural rate begins by looking back: to what my model of equilibrium unemployment was, and how that model arose. The second section argues that the full implications of this model and kindred sequels all featuring what I prefer to call 'incentive wages'- have not, until very recently at any rate, been grasped. The discussions of 1968 hit upon one implication of central consequence for Keynesian thought, the scope of monetary policy. But, I will maintain, there are other ramifications of this kind of model of equilibrium unemployment - implications for fiscal

policy and other non-monetary impulses plausible, no less devastating for Keynesian

Background to the original model

It might be thought that the late 1960s model was a byproduct, the natural rate grew out of general equilibrium. In fact, the Keynes-Phillips orthodoxy was the object of much congratulation, rather like the fateful iceberg. In the present context the axiom of Lerner and Fellner. What made the neutrality inevitable was that sooner or later to provide one or more micro-macro models of the development the difficulty of maintaining the position which the Keynes-Phillips position implied.

My efforts at a theoretical understanding of the natural rate began earnest over the summer of 1966 in the Department of Cambridge, and my first few months at the Institute in the autumn. In the preceding winter I had been studying inflation/unemployment control, public policy, and expectations-augmented quasi-Phillips curves.

$$p - p_{-1} = \phi(u) + p^e - p_{-1},$$

equivalently

$$p = \phi(u) + p^e,$$

where p is the money price level being set, u is the unemployment rate. But there was a puzzle about the function ϕ . Furthermore, the model was the passive partner of the price level rather than the active and most practitioners supposed. A misperception of the relation between inflation and unemployment.

With the benefit of hindsight the puzzle was reduced to a few basic problems: how could the natural rate of unemployment, particularly in conditions of high inflation, sense? How could the unemployment rate be above the natural level? In such a infra-natural state, how do nominal wages go on spiralling upward? In the original model the Lerner-Fellner acceleration hypothesis, say, kept the unemployment rate below

increase of the average wage would steadily increase? I had only a foggy notion at best of the answers to any of these questions. However, I did have the sense that the way to the answers was somehow to lay out a model - not a complete system of differential equations but nonetheless a serviceable description of a highly stylised hypothetical economy.

There were bits of labour economics that I started from with each new attempt at a model. I had read a little of Dunlop and Slichter, the Harvard labour economists, Paish, the LSE economist, and Wallich, my colleague over several years at Yale. From them I took away the impression that when the economy is pressured, at least for a time, into operation at a level in excess of its equilibrium steady state level, the low unemployment rate poses various inconveniences for firms, which try in turn to cope by setting higher wage rates. I also had a more recent memory of the dynamics of employment arising from employee turnover behaviour as it was modelled by Richard Lipsey in an otherwise econometric paper of his on wage inflation and employment (1960). Yet these insights, however necessary, were missing something fundamental, it seemed to me. They did not put us into the mind of the firm, or its personnel manager. Man is a thinking, expectant being! What was needed was a model of a sequence: the firm's expectations, its subsequent actions and those of the others, the discovery of the others' actions, the formation of new expectations, and so forth.

I had also read the (1964) paper on wages and employment, replete with econometric estimates, by Sargan of LSE. This paper postulated a required nominal wage level that is an increasing function of the employment rate (hence decreasing in the unemployment rate), given expectations of the price level. I took from this paper the rather important point that the rate of increase of nominal wages is a function not just of the *level* of unemployment but also the *change* of employment. It also encouraged my impression that when firms plan to increase employment they offer an increased wage simultaneously; the wage is not completely described as a feedback response to discovery of changes in the market wage and the total unemployment rate. On the other hand, at the embryonic stage of my thinking then, this paper was a distraction and an unnecessary complication. For weeks, I focused exclusively upon expectations of the price level by the personnel manager and his employees rather than their expectations of what the general money wage level was going to be.

By the time I was settled into the University of Pennsylvania I had a 'story' about labour market equilibrium and wage dynamics - to use the phrase I finally used as a title. The unemployment rate might move to so low a level that, to moderate the associated quit rate, every firm wants to offer its employees a better *real* wage as an inducement not to quit with such readiness; but as all firms pass along the implied money wage increase, the

price level increases in proportion (beyond an increase that is unexpected; to keep the real wage constant) must be a succession of such wage increases. In the event of unexpected inflation - greater than what was expected in the scenario, the unemployment rate was below the equilibrium level. The new equilibrium must be one with a larger rate of unemployment.

One day, though, it struck me that so much of the story was wrong. Suppose that each wage increase is due to an increase of productivity, so that the price level and the real wage is increased. Then it would be expected that the reduced unemployment rate was consistent with the advance of the real wage and productivity. The unemployment would be reduced again to the equilibrium level. Furthermore, as I went on to suppose that the increased wage scale on the expected real wage would induce a reduction of the quit rate. Employees would not quit to a higher money wage if they could get a higher real wage rates at all the other firms.

The model was then reconstructed: the real wage and the firm's relative wage. For simplicity, the real wage and unemployment rate determine the quit rate. In this version, if the unemployment rate is driven below the equilibrium level, a firm raises its wage in the expectation of a higher real wage in order to induce a moderation of the quit rate. If one outpays one another the result can only be a higher real wage in which expectations of the money wage level are kept low. Equilibrium in the labour market is reached when the quit rate is large enough to dissuade the representative firm from an unrepresentative outcome. The resulting equilibrium is a steady state.

$$w - w_{-1} = \phi(u) + w^e - w_{-1},$$

where w denotes the money wage level, w_{-1} the money wage level in the previous period, u the unemployment rate, which makes $\phi(\cdot)$ a function of the unemployment rate. If monetary policy keeps on yanking up the price level, the real wage to induce firms to go on employing beyond the equilibrium level. The money wages will continue to go up, regardless of what firms expect them to go up by.

A number of features of this model are striking. The invariance of labour market equilibrium to changes in the price level was an expected aspect. This was a sensational aspect. This

substantive interest on the part of economists in whether a steady inflation of, say, 6% per year, might make for tighter labour markets than 5%. As I suggested at the start of this chapter, the fascination lay in the implication that Keynesian aggregate demand management - through monetary policy, at least - could not achieve an arbitrarily chosen unemployment rate within some admissible and reasonable range. Keynesian forces could only make transient departures from the gravitational pull of the natural rate.

A second feature was that the unemployment existing at the natural rate, and indeed virtually everywhere on any equilibrium path, was involuntary not just in Keynes' sense of the term but in the everyday sense that the unemployed could not get a job by offering their labour for less than the going wage. As far as I can recall, this point was not well understood by me at the time of writing, nor for some time after.⁶ But eventually it became clear to me why the model implied that an unemployed worker could not obtain a job that way: if the firm were to accept such a worker at a lower wage though that worker did not apparently differ from employed workers with regard to the likelihood of quitting, the firm would have to assume that the worker's quit rate would be higher as a result; but that trade-off would be sub-optimal for the firm to accept since it had already calculated the optimum on the wage-quitting opportunity locus.

Another feature - an 'optional extra' - of the model was the property that, starting from unemployment in excess of the natural level, the equilibrium path would approach the natural rate only gradually. The argument was simply that firms will not jump their employment rolls to the natural level since they face rising marginal cost of imparting firm-specific training, or induction programmes, to new recruits. Whether a specified unemployment rate today will generate unexpected inflation thus depends on the rate yesterday. The augmented Phillips curve became

$$w - w_{-1} = \phi(u, u_{-1}) + w^e - w_{-1}. \quad (2')$$

Hence there was an equilibrium path of the unemployment - a path along which the expected wage is always matched by the actual wage, hence a path given by $\phi(u, u_{-1}) = 0$ - that approaches the natural rate only asymptotically. This was the notion of 'persistence'. In contrast, the idea of 'hysteresis', as used in my 1972 book, at any rate, referred to the effect of unemployment history on the natural rate, either a permanent effect or a long-lasting one.

In another respect, however, the spirit of the model was uncomfortably remote from the behaviour of aggregate data: the setting evoked by the paper suggested that firms would raise their wages - up or down immediately in response to a shock, then learn what the general wage was

doing once the data for that week or month had been collected, measured, and released. But in reality, though the price of labour was not set by their wages by discrete amounts, instantaneous price changes in the weekly time series of the average wage rate were not continuous - without large increases no one would have perceived the shock. This modelling provided a useful but apparently artificial device of imposing a discrete response of its wage; implicitly there was a continuous response to the daily or weekly wage. In the last section of the paper I gave a verbal discussion of the importance of modelling the response of the model that would allow for overlapping generations in a non-synchronous and regular manner, as in the paper of the altered version of that paper prepared for the 1970 conference volume which the (1970) conference volume was intended to have effects to make it closer to the companies' data. I had sketched the algebra of the wage rate learning process in a special case in which unemployment is kept at the natural level. The work remained for the 1970s in New Keynesian economics. (Guillermo Calvo and myself).⁷

As a result of synchronous wage-setting in a market for goods, or an auction market for goods, the model was not rational, instead of adaptive as I had supposed. The model would generate what could be regarded as a distribution of forecast errors by the firms about the up-coming price level. As it took for the wage data (or other price data) to be collected, were in, wage rates would jump the remainder of the way to the economy again on an equilibrium track. The (1972) model, based on my parable of inflation, was not rational. Fortunately, by the early 1970s, Friedman's model of the problem arrived to give one sort of reply to the question of a fixed natural rate, the central bank went to the market and set always the same probability of ending with a given level of employment will be above natural as long as the central bank wage-setters will not have treated its core inflation target. It will drop below its natural level in the future, but it will be regaining the natural level gradually. So the model was just weekly vibrations. The other reply, given by the model, independently and collaboratively by Robert Lucas and I in the 1980s was the argument that expectations are formed in a world in which the correct model (or the true model) is of continuing disagreement. Then your response to a shock is a forecast, unless we are fellow travellers

same model's road. Then the economy can take a non-equilibrium path for a long time, even indefinitely. (Even in the 1968 paper, I might add, a certain ambiguity arises over whether the economy assuredly approaches the natural rate path - hence the distinction between the concept of the natural rate and the natural rate hypothesis.⁸)

There was another missing feature - trade unions. In the economics of those days, the fashion had been to suppose that the necessity for so high an unemployment rate in order to contain inflation was ultimately a consequence of the presence of labour unions, which grew aggressive whenever the labour market became tight. I took a different view, and in a paper where so little had been eliminated in the interest of simplicity and tractability, I felt it was necessary to draw the line somewhere. Labour unions were banished. Since then, there has been a considerable amount of modelling of unions. It has become clear what unions can add to the story. But a rough idea of the quantitative importance of that addition is not yet in hand.

One last comment. The above account glosses over the confusions and ambiguities that were present in my mind over the months of writing the paper and for months afterwards. The worst of these was the unfortunate remark early in the exposition that it would be necessary to think of the labour force as heterogeneous in order to make sense of positive unemployment as an equilibrium phenomenon. In fact, though, heterogeneity of workers plays no role in the defensive upward push of the product wage in response to the turnover problem that is the driving force behind the creation of unemployment in the model; it is the heterogeneity of firms in the minds of workers that underlies labour turnover. Worker heterogeneity merely plays a supporting role as one of the contributors to the marginal cost of hiring; it is needed to underpin firms' concern about the quit rate only if marginal hiring costs do not include any firm-specific on-the-job training costs, which ultimately I came to depend on more. The next-worst confusion was created by the property of rising marginal hiring costs on which the existence of continuous equilibrium paths depended; it led to a variable vacancy rate, which played a role alongside the unemployment rate as a determinant of the rate of wage inflation. Some readers mistook the resulting model as generalization of an excess demand model of wage dynamics (in which excess demand was measured by the excess of vacancies over unemployment).

If I have gone on rather lengthily about this now rather old piece of work, it is because it will be useful to have a good idea of what that model of the natural rate was for grasping the simple propositions of the next section on the determinants of the natural rate and hence the possible causes of its long-term swings and shifts.

Further developments

Natural rate models, to repeat, are so constructed that, in terms of the variables at all, the equilibrium path from any initial conditions converges to 'money' and to the purely monetary variables. The natural rate, in the presence of non-synchronous wage- (and price-) variables, is a function of these variables into equilibrium near-term behaviour. The natural rate model's main propositions: that keeping the unemployment rate constant on the natural rate path must ultimately result in a problematic level, and that a small change in the natural rate produces a transient difference for the path of the unemployment rate. This doctrine warrants comment. There is, however, with at least as urgent a claim as the natural rate model.

The question arises: what *are* the key variables? The natural rate - money not being one, by construction, is a pull? My 1968 paper observed that faster growth would produce a higher natural rate through higher inflation. There was also the suggestion that faster growth would raise the average rate of layoff in the economy, and hence the natural rate. But there was little more than that. In the succeeding papers in the next month, the natural rate's 'comparative statics' of the natural rate model was elevated to the status of a normal variable, a constant, as if a force of nature, a magic wand. This constancy, which served only to complicate the understanding of the natural rate, may be one of the reasons the natural rate doctrine has come to be regarded as a dead end a dozen or so years. Natural rate models of the natural rate, in any suitably general view, has been a failure. The evolution of real conditions while on the natural rate path to treat it as a parameter rather than a variable.

There has been a crying need, then, for a new model of the natural rate - defined now in the general sense of a stationary rate, given the *current* capital stock. (It is the unemployment rate that, if it were constant, would make the current rate of change of the unemployment rate path equal to zero.) The natural rate path from a given initial condition is a constant, but the latter is a *variable* of the system. The natural rate path constantly pursues

If we view the natural rate path as endogenous, pushed like other economic variables by non-monetary forces, and take on board the rest of natural rate doctrine - actual unemployment tending soon to equilibrium, and all equilibrium paths approaching the natural path - we arrive at a new paradigm: *a non-monetary equilibrium theory of unemployment movements* - an endogenously moving-natural rate theory of movements in the *actual* rate of unemployment.

Over the past several years I have managed to develop to a rudimentary, working stage a general equilibrium theory of this kind in the form of a family of intertemporal micro-macro models. Each one revolves around a distinct kind of asset acquired by the firm that is of importance for its hiring decisions: the trained employee, the customer and fixed capital equipment. Collectively these models provide a 'structuralist story' of how the equilibrium unemployment path is determined and thus disturbed by changing parameters and conditions. The evidence so far encourages me to believe that this theory does rather well at explaining the *shifts* and *long swings* of the unemployment rate in the postwar experience of the Western industrial countries. A detailed exposition of this approach, with a statistical and historical investigation of its explanatory power, is presented in my recent monograph (Phelps, 1994). It is possible, though, to give a glimpse of what the approach has to offer by taking up two themes regarding the closed economy.

One of these themes concerns the effect of shocks to the technology. Consider a one-time shock to the level of labour augmentation appearing in all production functions. In the admirable rendering of the natural rate by Steven Salop (1979), the implication in this regard went unnoticed. Such a productivity shock had no effect on the natural rate path and, accordingly, on the equilibrium path from the initially given unemployment rate; the shock was followed instantly by a neutralising increase of the real wage at each firm, hence no change in the quit rate, and no reason for firms to speed or slow their hiring of labour, the wage having offset the increased productivity of employees. This was a comforting result from one point of view since it meant that secular progress did not have the counterfactual implication of an ever-decreasing unemployment rate; but it likewise implied that there was no near-term disturbance to the employment rate either. This result was a consequence of the wage-wage view of labour turnover behaviour of my 1968 paper on which Salop built. In the later, utility-theoretic formulation by Carl Shapiro and Joseph Stiglitz (1984), the contrast was complete. Such a labour-augmenting shock, in driving up the economy-wide real wage, decreased the propensity to quit, causing the supply wage to shift up less than the demand wage

in the employment-wage plane, with increased and the wage rises proportionally. Finding was a consequence of the utility setting.

The models I have developed take a different view of income from wealth in the quitting or saving model. Nevertheless, a one-time productivity shock, not the natural rate, nor on the equilibrium path. In the two models where there is no slow-growth, one model, the stock of employed workers increases. In the model where there *is* such a state variable as fixed capital, however, there is an effect on the stock could increase in proportion to productivity, gradually as saving and investment jump. A higher wage rate at the firm, in the economy a higher non-wage income would all increase in the demand wage and the supply wage shift up equally, putting the unemployment rate on the equilibrium path. If capital stock cannot increase, there is a contractionary effect through an important channel. A higher real wage relative to the new-found level of labour productivity, a higher real rate of interest and lower the real price of capital effect in turn operates to move the capital accumulation curve and, since that is the labour-intensive model, the wage relative to the new level of labour productivity.

The effect of an unanticipated productivity shock, labour-augmenting progress expected or unexpected, is another story. It might be thought that a productivity shock, economy, precipitating new doses of investment, new levels of real income in the future, while not providing the technical means to increase income present, with the result that the real price of capital with real interest rates accordingly put on the capital drop in the capital goods output supply curve contracted. Thus it may happen that a productivity shock, enemy of its employment rate.

The emerging general equilibrium theory, as supply shocks the great movers and shakers on the equilibrium path. In the version constructed here, the supply and demand thrift as prime sources of disturbances.

domestic assets and of wealth operate to amplify or ultimately to tend to correct the early effect on unemployment.

Here the theory is an echo of pre-Keynesian doctrine in sounding the theme of slump through 'undersaving': public debt and other fiscal stimulus to consumer spending are seen as contractionary. Yet the results have in common with Keynesian doctrine the theme of slump through 'underinvestment': in particular, government armaments purchases (and in all but special cases manpower buildups too), as occur in wartime, and more generally any government spending on goods produced by the capital goods sector of the economy are implied to be expansionary - without any reference to the liquidity of a money economy, which is crucial to the Keynesian analysis.

The pre-Keynesian part follows from a very simple mechanism. An increase of consumer demand, whether the response to a spontaneous increase of the rate of pure time preference or the artefact of a recent increase of public debt, creates an excess of consumption demand over consumption supply, with the result that real asset prices have to drop and real interest rates rise in order to eliminate that excess demand. The repercussion of these changes in financial prices is an induced decrease in the amount of investment of the various types that firms are willing to undertake. The effect in turn is a decline in the equilibrium path of the employment rate.

The Keynesian part arises from the property that an increased demand by the government for the capital good serves to pull up the relative price of the good whose production is the more labour-intensive and thus to pull up the demand wage in the aggregate employment-wage plane. As an empirical matter, however, it is not clear that this effect is generally strong; it may be confined to a small sub-set of capital goods.

Introducing the interactions of open economies adds further twists to the story. It is found to be theoretically possible that a consumption-demand stimulus in an open economy, if it small enough, will have an expansionary effect at home - a result more Keynesian than that obtained by some Keynesian models - while having a contractionary effect abroad (in proportion to its size). This is the same 'Locomotive' in reverse, or 'crowding out' at a distance, previously found in the part-monetary models of Fitoussi and Phelps (1988). The argument is that the fiscal largesse of the country on its own citizenry drives up the domestic real interest rate and thus the world real interest rate, which entails a real exchange rate depreciation abroad, the effect of which is to push up the natural unemployment rate abroad.

The empirical sections of the monograph suggest that this theory of equilibrium unemployment succeeds to an important degree in shedding light on the contrasts between the long period of extraordinarily high

economic activity from the early postwar the two nearly global slumps in the 1970s. What it offers is not far from the mark either. It is a theory of slumps and booms. It is based on the same equilibrium approach as the insider-outsider models (especially their embryonic models based on modern firms and households. So it is not suggested that the natural rate that I have developed are an alternative approach to slumps and booms.

Some reservations

The thrust of these reflections is clear. The natural rate is a powerful concept for macroeconomic analysis. It is a natural rate in the work of Salop, Stiglitz, and others. It is a natural rate of a less micro founded sort by Kouri, Eicher, and Newell and Symonds, to mention others. It is a natural rate that does a great deal more work than it was credited with.

Yet it would be remiss of me not to offer some reservations. How much of the edifice that has been going up. How much of it can be captured by a theory that emphasises the role of monetary factors and channels and downplays the role of incentives and that bases the natural rate on incentives to shirk, and adverse selection?

The claim that money and inflation are important is more than it usually receives. The monetary approach is more than the sort of linearity that we imply in our models. A 1% increase or decrease of the money supply, a change of 15 or 25 per cent, however, in the neighbourhood of such a disturbed range of supply may make a large difference. It is a point that early Irving Fisher got a hold of this point and it is taken up by Keynes and most Keynesians.

Fisher's point may be important for understanding what is behind the high unemployment of recent years. The high unemployment of the 1990s is not altogether a holdover from the 1980s but is, rather, *in part* to be explained by the high unemployment over the 1980s, which has left households with larger levels of real indebtedness than in previous years. By the end of the 1980s much of this debt in previous years. By

be that some of the 1980s' slump - particularly the high unemployment rates still lingering toward the end of the decade - is also to be explained by this phenomenon of 'debt deflation', in Fisher's term. Very likely the bulging levels of real debt overhang had a sobering effect on households and firms contemplating their customary accumulations of real assets and financing them by the customary mix of debt and equity. If hypothesis is true and quantitatively important, it means, as I see it, that the natural rate hypothesis is not as good an approximation of reality as it first seemed to us in the 1960s. However, no purpose would be served by conceding this small but valuable piece of territory to the resurgent monetary forces until the econometric scouts have confirmed that the insurgents have solid control of it. At the time of writing, the relevant econometric tests have not yet been performed. Scraps of circumstantial evidence and supporting observations are useful but not conclusive.

The reliability of convergence to the natural rate path is, in my view, no less serious an issue. It is one thing to suggest a broad tendency toward equilibration (not in any exact way, of course) over a range of circumstances and histories, and quite another to close the door to the intuition, ventured by Keynes and a few others, that there are apt to be episodes in which the economy lingers away from equilibrium or moves back and forth past the correct expectations to have. Research by Roman Frydman and myself, some of it collaborative, has sought to identify some conditions that may block convergence to equilibrium. On the other hand, if my recent econometric work implementing the variable natural rate theory (mentioned on p.26 above) is basically right, there is - on average, at any rate - a tendency for the unemployment rate to approach the natural rate path. A question very much left open, however, is whether, following a shock, there is a systematic tendency for a stampede, culminating in overshooting - a phenomenon perhaps traceable to expectational errors or perhaps to a desire of each enterprise manager not to be seen having taken fewer precautions than other managers even if the situation of the enterprise does not call for them.

Finally, is the labour market really a matter of incentive pay and nothing else? Of course not. Students should understand that seeing N papers in a row without a mention of the word 'union', say, or 'insiders' end 'outsiders', should not be taken to indicate that the author doubts the importance of those considerations. The more convenient model is always preferred, and as between equally convenient models, the one in which the writer has a vested interest is selected.

The insider-outsider theory greatly enriches the dynamics of employment, and it has interesting implications for the real wage response to shocks. Some models by Andrew Oswald and by Assar Lindbeck and

Dennis Snower (1989, for example) are a part of the natural rate theory in the 1980s. It does not seem that these models are a natural extension of the natural rate concept. There is a tendency for the unemployment rate gravitates back to the natural rate. Indeed, there are elements of the natural rate hypothesis, such as the marginal costs of hiring, that have fed into the natural rate concept. A careful recognition of such costs tends to support the natural rate hypothesis of a point, since the employment level tends to converge to the level to which it will increase its work force when starting with an excess of workers. ¹⁰ One could go further with the idea that these models offer another dimension to the natural rate hypothesis: incentive pay: wages are set high enough to induce workers to produce, refuse to work with new recruits.

Lastly, trade unions. To Europeans and Americans, trade unions have left them out. As I commented earlier, trade unions were in the preceding years and, as a reaction to the natural rate hypothesis, inessential for explaining why equilibrium is not reached. Since then, of course, a number of models of the natural rate hypothesis with unions have appeared. Models of the natural rate hypothesis with unions have already been mentioned. William Layard and his colleagues has come up with a model of the natural rate hypothesis based on bargaining between competitive firms - a sort of Nash-Zeuthen model. Yet these union models do not incorporate the natural rate hypothesis just as incentive models do not have unions.

We are stuck with the fact that every model is a simplification of reality. I feel fortunate to have seized upon the natural rate hypothesis has gone on yielding rich insights into the

Notes

¹ The process of rising inflation would cause sellers of money would find no takers, money would have no role. The process of rising deflation would cause such that sellers of real wealth claims would have to come to dominate all non-monetary assets.

² This definition of the natural rate seems to be a bit narrow. In a purely theoretical paper it might be more

to define the natural rate as the equilibrium steady state path.

- 3 Clearly the thrust of the doctrine would survive if the natural rate became a *path* instead of a constant, even an endogenous path provided it is invariant to monetary policy.

Dahrendorf would say that the proposition belongs to critical rather than to theoretical economics; see Dahrendorf (1993).

- 5 These papers were widely known. Lerner's, in the *Review of Economics and Statistics* (1949), was the stimulus to Friedman's famous complaint that, contrary to what Lerner had implied, inflation had *some* real allocative maleffects, namely the time-consuming efforts of people to economise on cash balances.

Among those who zeroed in on this aspect of the model were Dale Mortenson and some of his colleagues at Northwestern, Donald Gordon, then at UBC, and Arthur Okun at Brookings.

- 7 The first wave of new Keynesian models, developed at Columbia in the latter half of the 1970s. is discussed in Phelps (1991).
- 8 I could not be certain that the distinction was really there were it not that I remember some readers having called attention to it, William Nordhaus for one.
- 9 Another effect works the other way, as the deficiency of capital relative to the long run means that non-wage income is decreased relative to the wage, which tends to decrease the propensity to shirk in the model and thus to reduce the supply wage (or incentive wage). As a consequence of this contrary tendency, there is no theoretically unambiguous result regarding the unemployment effect of a permanent shock to the level of labour augmentation and of a change in the initial capital stock.
- 10 Appendix A to the 1970 version of my paper has some equations bearing on the dynamics of employment under the explicit presence of rising marginal hiring cost. Without doubt that discussion is somewhat confused, having been written in late 1966, well before the significance and real meaning of the model I was working on had become more or less fully clear to me.

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