

# **HYSTERESIS AND INSIDER-OUTSIDER THEORY: A LITERATURE REVIEW**

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## **ABSTRACT**

In recent years a large theoretical and empirical literature has emerged on hysteresis in unemployment. This paper reviews the theoretical part of this literature, including the various insider-outsider models that have been advanced to explain hysteresis. The review finds that while the assumptions required to generate full hysteresis are somewhat extreme, a less severe form of hysteresis, called persistence, emerges quite readily from models with reasonable assumptions. The paper however questions the extent to which the recent experience of unemployment can be explained by this approach.

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## **1: Introduction**

In recent years a large literature has developed which explores the idea that persistence in unemployment might be explained by the tendency for actual unemployment to cause an upward movement in equilibrium unemployment. This tendency has been called hysteresis and is explained by the insider-outsider theory. This paper provides a critical review of this voluminous theoretical literature. The paper has the following structure. In the next section hysteresis is defined and its macroeconomic implications spelt out. Section 3 reviews the insider-outsider literature that attempts to explain the origin of hysteresis. Section 4 contains some concluding comments.<sup>1</sup>

## **2: Hysteresis: Definition and Macroeconomic Implications**

### **2.1: Hysteresis and the NAIRU**

The term hysteresis comes from the Greek verb meaning ‘that which comes after’, and refers to effects which persist after the initial impulse which gave rise to those effects is removed. The first person to apply the word to scientific matters was the Scottish physicist James Ewing, in 1881. As there are a number of good accounts of the origin and application of the concept in the natural sciences, as well as its more recent application in the social sciences, that work will not be replicated here.<sup>2</sup>

When applied to unemployment, hysteresis is used to denote a situation in which the equilibrium unemployment rate is determined, at least in part, by the path of the actual unemployment rate. This idea is also frequently represented in the literature as follows. A hysteretic system is one in which the long-run equilibrium of the system is path dependent. The long-run equilibrium of such a system depends not only on the long-run equilibrium values of its exogenous variables, but also on the initial values of each endogenous variable.

In contrast, in a non-hysteretic system, the equilibrium of the system is fully determined by the equilibrium values of the system’s exogenous variables and any exogenously given parameters. Non-hysteretic systems are path independent in the sense that the equilibrium of the system is defined independently of the path taken to equilibrium. This is illustrated with the simple case of a one dimensional discrete time linear system in which the unemployment rate (denoted  $U$ ) is subject to the following process:<sup>3</sup>

$$(1) \quad U_t = aU_{t-1} + bZ_t$$

<sup>1</sup> This paper expands upon and updates a similar review published by Dobbie (1997).

<sup>2</sup> Cross and Allen (in Cross, 1988) present a very readable account of the origin of the concept of hysteresis as applied in the physical sciences and later to debates in economic methodology. These ‘equilibrium debates’ occurred in the 1930s and involved such luminaries as Samuelson, Kaldor and Frisch. Franz (1990) also has a straightforward account of the origin of the notion and its various applications in economics. For more challenging accounts see Cross (1993a) and Elster (1976). Cross (1993a) includes a simplified description of the work of the Russian mathematician Krasnosel’skii, who has lead a research team for the past two decades investigating the mathematical properties of non-linear hysteretic systems.

<sup>3</sup> The following presentation of the discrete time linear case is based on a number of publications. Franz (1990), Setterfield (1993) and Wyplosz (1987) are just a few. Giavazzi and Wyplosz (1985) deal with linear continuous time systems. Franz also deals with a multi-dimensional case (Franz, 1990, pp110-112).

$Z$  is some exogenous demand disturbance, and an  $*$  denotes a long run equilibrium value of a variable. If  $0 < \mathbf{a} < 1$  then the long run equilibrium value of  $U$  is:<sup>4</sup>

$$U^* = \mathbf{b}Z^* / (1 - \mathbf{a}) \quad (2)$$

$U^*$  could be called a long-run NAIRU. It is clear from (2) that  $U^*$  is path independent. However the speed with which the system reaches this long-run NAIRU is inversely related to the size of  $\mathbf{a}$ . Hysteresis on the other hand is a feature of path dependent systems and results when the characteristic equation of the system has a unit root<sup>5</sup>; i.e.  $\mathbf{a} = 1$ . In this case it is only possible to define from (1), the following system of equations.

$$U_{t-1} = U_{t-2} + \mathbf{b}Z_{t-1} \quad (2a)$$

Substituting (2a) into (1) gives,

$$U_t = (U_{t-2} + \mathbf{b}Z_{t-1}) + \mathbf{b}Z_t \quad (2b)$$

$$U_{t-2} = U_{t-3} + \mathbf{b}Z_{t-2} \quad (2c)$$

Substitute (2c) into (2b),

$$U_t = (U_{t-3} + \mathbf{b}Z_{t-2}) + \mathbf{b}Z_{t-1} + \mathbf{b}Z_t \quad (2d)$$

In general,

$$U_t = U_0 + \mathbf{b} \sum_{i=1}^{t-1} Z_i \quad (3)$$

Note that the  $Z_i$  represent time dependent values of  $Z$ . What (3) implies is that all that can be defined in any time period  $t$  is some contemporaneous value of the variable  $U$  which depends on its own past history. Equation (3) effectively defines a moving equilibrium, which is dependent on the equilibrium value of  $Z$  and the initial value of  $U$ . These points imply that a long-run equilibrium unemployment rate does not exist.

It is for these reasons that hysteretic systems have been variously described as ‘historical systems’, and as systems in which ‘Where you get to is determined by how you get there’ (Buiter, 1987, p24). Equation (1) employs only one lag on the unemployment rate. The result can be made more general by modelling the unemployment rate as an  $n$ th order process. In this case hysteresis emerges if the coefficients on the lagged unemployment rate sum to unity.<sup>6</sup>

<sup>4</sup> The case in which  $-1 < \mathbf{a} < 0$  is ignored since it has no sensible economic meaning.

<sup>5</sup> Hysteresis emerges in the continuous time case if the characteristic equation contains a zero root. See Giavazzi and Wyplosz (1985).

<sup>6</sup> This discussion of hysteretic versus non-hysteretic systems is related to the general discussion about the nature of macroeconomic time series that has emerged since the work of Nelson and Plosser (1982). The natural

rate hypothesis corresponds to trend stationary processes, while the hysteresis hypothesis corresponds to difference stationary processes (Mitchell, 1993).

## 2.2: Hysteresis and the ‘Inflation Unemployment Tradeoff’

The specific theoretical and policy challenge which hysteresis effects pose for the natural rate framework can be seen in the following discussion.<sup>7</sup> Equation (4) captures the idea of path dependence by including the lagged unemployment rate, as well as  $X$ , in the determination of NAIRU ( $U_t^n$ ).  $X$  represents traditional exogenous microeconomic determinants of NAIRU.

$$U_t^n = aU_{t-1} + bX_t \quad (4)$$

Equation (5) is a standard expectations augmented Phillips curve in which, for simplicity, assumes the coefficient on expected inflation ( $P_{t-1}$ ) to be unity.

$$P_t = P_{t-1} - d(U_t - U_t^n) \quad (5)$$

Substituting (4) into (5) and re-arranging yields,

$$P_t = P_{t-1} - d(1-a)U_t - da(U_t - U_{t-1}) + dbX_t \quad (6)$$

If  $a = 1$  the system displays full hysteresis and it is the **change in unemployment** not the **level of unemployment** which matters for **changes** in the rate of inflation. Gordon notes that this finding constitutes an effective abandonment of the natural rate hypothesis. Moreover this abandonment:

‘...casts stabilisation policy adrift from its previous mooring, the task of steering the economy towards a fixed NAIRU, and open to the central policy implication of hysteresis that any rate of unemployment, no matter how low or high, is consistent with steady inflation at a rate that depends on the history of both inflation and unemployment’ (Gordon, 1989, p220).

The natural rate hypothesis carries the implication that there exists no long-run trade off between inflation and unemployment. Under full hysteresis the somewhat more optimistic conclusion emerges that there exists a trade off between the change in inflation and the change in the unemployment rate.

If demand management were to hold the unemployment rate below the natural rate, inflation would accelerate. The acceleration is finite, under full hysteresis, since eventually the lower actual unemployment rate becomes the new natural rate and the inflation rate stabilises. This implies that, rather being an exogenous constant vis a vis demand management policy, the natural rate is to some extent ‘chosen’ by that policy. Hargreaves Heap (1980) warns that under hysteresis, policy makers should be less worried about what happens when they fail to steer the economy towards the ‘given’ natural rate, and more concerned with the possibility of decelerating growth if the wrong ‘natural rate’ is chosen.

## 2.3: Persistence, partial and short-run hysteresis

These conclusions are too strong for many researchers. In fact some of the most prominent names in the field explicitly reject the relevance of full hysteresis. Lindbeck for instance insists that ‘...realistic theories of unemployment have to include mechanisms that sooner or later bring the economy back towards normal rates of unemployment’ (Lindbeck 1991, p90). Layard and Bean (1989) point to

<sup>7</sup> These equations are drawn from the work of Hargreaves Heap (1980), Gordon (1989) and Franz (1987, p94-95).

the fact that in most countries the unemployment rate is untrended when looked at over very long time periods. From this they conclude that ‘...there is a long-run “natural” rate of unemployment to which the system tends to eventually return’ (Layard and Bean 1989, p371).<sup>8</sup>

Viewed from within the context of equations (1) through (3), these researchers consider full hysteresis to be a special case. They consider the more general situation to be one in which  $0 < \mathbf{a} < 1$ . While the terminology is not always used consistently, the  $0 < \mathbf{a} < 1$  case is referred to as ‘persistence’, ‘short run’ or ‘partial hysteresis’, in order to delineate it from the hysteresis (unit root) case.<sup>9</sup> Referring to equation (1) again, when  $0 < \mathbf{a} < 1$ , the long-run natural rate is unique and path independent. However, the speed of adjustment to this long-run is inversely related to the size of  $\mathbf{a}$ . If  $\mathbf{a}$  is close to one then any deviation from the natural rate may persist for a considerable time.

Layard et al formalise the idea of short-run hysteresis by deriving a short-run NAIRU. In their approach unemployment acts to reconcile competing claims over the functional distribution of income in the current period (Layard et al, 1991, p378-382, see also Layard and Bean, 1989, p373-380). Their short-run NAIRU can be thought of as comprising two components. The first component is the lagged actual rate of unemployment. The second component is comprised of the factors that determine the long-run NAIRU. The closer  $\mathbf{a}$  is to unity, the closer is the short-run NAIRU to the past actual unemployment rate. Conversely, the closer  $\mathbf{a}$  is to zero, the closer the short-run NAIRU is to the long-run NAIRU.

The intuition behind the short-run NAIRU is as follows. Assume the economy is operating at its current short-run NAIRU, and that this happens to also equal the long-run NAIRU. Assume next that actual unemployment rate is shocked upward. Under the natural rate hypothesis this will generate downward pressure on inflation. In the presence of hysteresis effects however, the rise in the unemployment rate will tend to generate some upward pressure on wage and price inflation. In the short-run the ‘level of unemployment’ and the ‘hysteresis’ influences on the inflation rate may offset each other. The result is that the inflation rate might be stable, despite the fact that the economy is operating at a rate of unemployment above its long-run natural rate. Layard et al (1991) would define this unemployment rate as a short-run NAIRU. In the long run however the ‘level of unemployment’ effect dominates and the economy converges to the long-run NAIRU. Layard and Bean note that:

‘This may well have been the case in many European countries after the two oil shocks, which helps explain why it took so much unemployment to get inflation down’ (Layard and Bean, 1989, p380).

## **2.4: Other important developments**

Roed (1999) notes that in the unit root case, the permanent fraction of a shock on the equilibrium unemployment rate is equal to unity. In the  $0 < \mathbf{a} < 1$  case the permanent fraction of a shock, on the equilibrium unemployment rate, is zero. In other words hysteresis is treated as a discrete phenomenon. Roed (1999) presents a more general linear model in which the permanent aspect of a

<sup>8</sup> Cross (1993b, p121) offers several reasons why he considers this evidence to be unconvincing.

<sup>9</sup> The terminology can be confusing. Blanchard and Summers (1986) in one of the first and most influential papers on the subject state, ‘Thus, we should say that unemployment exhibits hysteresis when current unemployment depends on past values with the coefficients summing to 1. We shall instead use “hysteresis” more loosely to refer to the case where the degree of dependence on the past is very high, where the sum of coefficients is close but not necessarily equal to 1’ (Blanchard and Summers, 1986, p17). Clearly they are referring to what is referred to as “persistence” in this paper.

shock is modeled as continuous rather than discrete. His model presents an intermediate case in which a transitory real shock, or a permanent monetary shock, can increase the equilibrium rate of unemployment 'to some extent' (Roed, 1999, p256). This model enables hysteresis to be treated as the general case, even in the absence of a unit root.

Thus far the discussion of hysteresis has been within the context of linear difference equations. Another avenue of research has been to explore hysteresis within a non-linear framework within which multiple stable equilibria are possible. Within such a framework some transitory shocks have transitory effects on the equilibrium unemployment rate, i.e. the long-run NAIRU is independent of the history of actual unemployment. This is so if the transitory shock is not large enough to shift the economy from one equilibrium to another. However, if a shock is large enough, it may have a permanent effect by shifting the economy to a new locally stable equilibrium.

This approach is attractive in that it '...sounds more plausible than the implicit assumption embedded in linear unit root models, that all shocks have the same permanent component no matter how large they are' (Roed, 1997, p396).<sup>10</sup> An unattractive feature of this approach however is that the models tend to predict a limited number of stable equilibria. This may not faithfully capture the idea of a NAIRU tracking the actual rate of unemployment (Roed, 1997, p396).

This problem is addressed by including asymmetric adjustment costs and 'threshold effects' in hysteretic models. These models can give rise to a large number of potential equilibria. Cross (1995) illustrates these ideas with respect to the hiring and firing decision of a firm. For each firm there will exist particular levels of aggregate demand at which the decision to hire or fire is triggered, *ceteris paribus*. Non-linearity at the level of each firm is introduced by acknowledging the possibility that the switching values are asymmetric with respect to upwards and downwards movements in aggregate demand. This asymmetry may result from hiring and firing costs. If the switching values are not equal across firms then aggregation across many firms produces a model that can display 'selective history dependence'.

In other words it is not the whole of past history, as in the linear unit root case, that matters for the current equilibrium of the system. Rather it is only the dominant extrema of past history that count. Thus mild recessions may not trigger the kinds of adjustments responsible for hysteresis like effects. However, more severe recessions could trigger responses that ensure that the current actual rate of unemployment has a persistent or even permanent effect on the equilibrium unemployment rate. For more on this see papers by Cross (1993a), Setterfield (1993, 1998) and Smyth and Easaw (2001).

### **3: The Theoretical Literature**

There are two main approaches to explaining the basis of these hysteresis effects. Both are based on a distinction between those with and those without power in wage determination. Insiders are those in relatively secure employment who play a dominant role in wage setting. Their relative security enables them to, either fully or largely, ignore conditions in the external labour market

<sup>10</sup> Cross (1993a) and Setterfield (1993) contain discussions of non-linear hysteretic models. Setterfield also argues that the idea of multiple equilibria does not capture the essence of hysteresis.

when wages are set. The outsiders are usually, but not always, the unemployed.<sup>11</sup> The first approach is referred to as the insider-outsider theory and is most closely associated with Blanchard and Summers (1986, 1987) and Lindbeck and Snower (1988b). The second approach is referred to as the outsider ineffectiveness hypothesis and is associated with Layard and Nickell (1987). The outsiders in this latter approach are the long-term unemployed.

In the Blanchard and Summers model, the ability of insiders to ignore the unemployed in wage setting is simply assumed. The focus of interest is on the implications of this insider power when combined with various rules for defining insider status in the presence of shocks that alter the size of the insider group. Lindbeck and Snower also explore the implications of the self-interested exercise of insider power for unemployment hysteresis/persistence. However, they extend the analysis of Blanchard and Summers, and others who simply assume insider power, by examining the source of that power. They argue that insider power comes from a range of turnover costs that make it costly for firms to replace incumbent employees with outsiders. These turnover costs include hiring and firing costs, morale effects of excessive turnover, and the ability of insiders to exercise some discretion over the level of cooperation they afford new employees in the process of training and working with them.

The outsider ineffectiveness hypothesis offers another explanation for how insiders are insulated from the competition of the external labour market. In this case the external market is postulated to consist, at least in part, of the long-term unemployed who do not represent viable substitutes for incumbent employees. Several sources of outsider ineffectiveness are postulated and will be discussed in detail below. For now it is noted that, under this approach, the long-term unemployed pose little threat to insiders and this is reflected in wage setting.

### **3.1: The Insider-Outsider Theory**

This section begins by outlining a simple macroeconomic model that generates hysteresis. This model is due to Blanchard (1991), and captures the main features of the Blanchard and Summers (1986, 1987) approach. This model is outlined in order to illustrate the role of membership rules in a simple context, and to provide a reference point for subsequent discussion. The model uses a ‘monopoly union’ framework. In this framework it is assumed workers set wages unilaterally. Firms then select the profit maximising employment level from the labour demand curve. It is also assumed that any layoffs are by random draw, also called the ‘hiring hall’ assumption.

The real wage, denoted  $w$ , is set prior to the realisation of a random shock. This shock is denoted  $e$ , and represents any unexpected shock to labour demand. In the model outlined below these shocks are real shocks. In a model with nominal wage setting these shocks could also include price surprises (for a model in which nominal wages are set by insiders see Blanchard and Summers (1987)). In what follows lowercase letters denote natural logarithms unless otherwise stated (the random shock to labour demand can be positive or negative; therefore  $e$  is not a logarithm). For simplicity unimportant constants are omitted. Given all the above, Blanchard (1991, p279) presents the following simple specification of static labour demand:<sup>12</sup>

<sup>11</sup> While most research on insiders and outsiders has focused on wages, non-wage aspects of employment are presumably also of interest to insiders and are subject to negotiation between the firm and its insiders. A recent indication of how the insider-outsider model could be extended is Wolter (2001). He develops a model in which insider power is used to limit ‘normal working time’ to the detriment of outsider employment. This prediction received support when tested using Swiss survey data.

<sup>12</sup> Static labour demand means that the firm ignores the effect of current employment decisions on future membership and hence future wages/profits. Blanchard and Summers (1986, p41) and Blanchard (1991, p283)

speculate that to take such effects into account would not alter the qualitative conclusions of the model. Drazen and Gottfries (1994, 1990) provide some formal confirmation of this.

$$n_t = -w_t + e_t \quad (7)$$

where,

$n_t$  = employment in the firm at time  $t$ ,

Insiders set the wage to achieve expected full employment of all insiders. This results in the following:

$$n_t = n_t^* + e_t \quad (8)$$

where,

$n_t^*$  is the firm's current insider group,

Equation (8) says that employment will equal insider membership plus any unanticipated disturbances. How is membership of the insider group determined? The most restrictive membership rule emerges if only those workers who are employed at the time wages are set are insiders, i.e.  $n_t^* = n_{t-1}$ .<sup>13</sup> Substituting this into (8) yields:

$$n_t = n_{t-1} + e_t \quad (9)$$

This equation says that, given the assumptions being made, employment follows a random walk with innovations due to unanticipated shocks. Assuming a given labour force, the NAIRU in this simple model, will be equal last period's actual rate of unemployment. There is no tendency, in this model, to return to a unique non-hysteretic long-run NAIRU. A central prediction of this simple model is that there is an inverse relationship between wages and lagged employment.

Relaxing the membership rule by assuming that it takes several periods to acquire and lose insider status means that it would take a series of unexpected shocks of the same sign to produce a change in membership and hence a permanent change in the NAIRU.<sup>14</sup> Reducing NAIRU would then require a series of shocks in the opposite direction. Another variation employed in the literature is to use an 'asymmetric membership' rule. For instance, insider status may be lost more rapidly than it is acquired. The result is that a series of positive and negative shocks of the same magnitude tend to shrink the insider group and hence to contract equilibrium employment over time (Lindbeck and Snower, 1987).

The main assumptions and implications of this model are now explored in detail, including an examination of what happens to the predictions made by the model if key assumptions are varied. The assumptions of interest are as follows: (1) the nature of the insider objective function, (2) layoff by random draw, implying the absence of seniority provisions, (3) the bargaining framework, (4) the membership rules and (5) the role of outsiders. These assumptions are now explored in turn.

<sup>13</sup> Blanchard and Summers (1986) suggest that the fact that voting usually takes place on the job provides a potential rationale for this assumption.

<sup>14</sup> Burda notes that the typical European union retains unemployed members on their books for some time after they are dismissed. This could provide a rationale for this more relaxed membership rule (Burda 1990b, p459 and p464).

### *The Insider Objective Function*

The insider objective function is not explicitly stated in the model just outlined. The implied objective function is one where insiders attempt to maximise the wage, subject to their employment being maintained. Minimisation of a one period quadratic loss function,  $s$ , defined in terms of deviations of  $n$  from  $n^*$ , captures this idea as follows:

$$s = (n_t - n_t^*)^2 \quad (10)$$

Equation (10) implies insiders will accept any real wage in order to maintain insider status. Criticisms of this objective function include the following. Insiders must have employment opportunities outside the firm with which they are currently employed. This will put a lower limit to the wage insiders will accept (Sanfey, 1995, p259). The insiders could be expected to have real wage as well as employment aspirations (Alougoskoufis and Manning, 1988, p431). An objective function such as (10) leads to the prediction of more short-run real wage flexibility than is observed in reality (McDonald, 1989, p513). Finally, it is clear that the insiders (and the firm for that matter) need some kind of dynamic intertemporal objective since the wages they set today will determine employment today and hence membership tomorrow.

These points are taken up first by noting that in the trade union literature (see Faber 1986, and Oswald 1985 for surveys) it is usual to model union indifference curves as sloping down in real wage/employment space. Once employment equals membership the curves become horizontal; further gains to employment add nothing to union utility. The wage at which the indifference curves become horizontal is the union's reservation wage. The downward sloping section of the indifference curve captures the idea that union members are willing to risk unemployment for higher wages, something the Blanchard and Summers insiders will not do.

While the union literature assumes membership is fixed, the insider-outsider theory contributes the idea that membership varies in some manner with employment. If for instance  $n^* = n_{t-1}$  the insider indifference curves have a 'travelling kink' at the current level of employment. This type of objective function can deliver hysteresis. Once  $n^* = n_{t-1}$ , any improvement in labour demand is likely to be taken in the form of wage increases rather than employment growth. If insider status takes several periods to acquire or lose, it will require a series of similarly signed shocks to shift the kink, but once again hysteresis can emerge at the kink. Papers employing this kind of objective function include Carruth and Oswald (1987), Gottfries and Horn (1987), Blanchflower, Oswald and Garret (1990), McDonald (1989, 1991), Nickell and Wadhvani (1990), Nickell and Kong (1992) and Huizinga and Schiantarelli (1992).

Alogoskoufis and Manning (1988) argue that allowing insiders to have both real wage and employment targets eliminates full hysteresis, even if the extreme membership rule,  $n^* = n_{t-1}$ , is employed. On the other hand, such an objective function is quite consistent with persistent effects from temporary shocks. Denote real wage aspirations at time  $t$ , as  $wa_t$ . Assume these aspirations are a weighted average of past real wages, which for simplicity equal last period's real wages, and the real wage consistent with full employment. Denote the real wage consistent with full employment by  $wf$ :

$$wa_t = ew_{t-1} + (1 - e)wf_t \quad (11)$$

$(1 - e)$  therefore represents the speed of adjustment of real wage aspirations. Alogoskoufis and Manning would modify the insider objective function represented by equation (10), by including **both** deviations in real wages **and** employment from their respective targets (Alogoskoufis and Manning 1988, pp 464-465):

$$s = (n_t - n_t^*)^2 + f(w_t - wa_t)^2 \quad (12)$$

$f$  is a measure of the marginal cost of deviations of real wages from target relative to employment. Clearly (10) is a special case of (12) where  $f = 0$ .

An implication of this model is that the presence of a tendency for real wage aspirations to adjust to the level consistent with full employment means that after any shock, even in the presence of the  $n^* = n_{t-1}$  membership rule, unemployment eventually converges to a unique long-run NAIRU. The speed of the return will depend on the severity of the membership rule and the strength of the preference insiders have over wages versus employment security, that is, on the size of  $f$ .

This modification to the insider objective function eliminates full hysteresis, even in the presence of an extreme membership rule of the kind employed by Blanchard and Summers. A model employing an objective function of this kind predicts persistence, due in part to the less than instantaneous adjustment of wage aspirations to those required for full employment. This is less than satisfactory for the following reason. Those researchers who prefer ‘persistence’ to ‘full hysteresis’ base this preference, in part, on the absence of a long-run trend to unemployment. This they say implies, that in the long-run, real wages adjust to the level consistent with the long-run NAIRU. The view taken in this paper is that it is implausible that the unemployment experience of the past two decades can be explained in terms of a failure of wage aspirations to adjust to those required for full employment.

Blanchard and Summers (1986) present a multi-period version of the model described in equations (7) to (9). This is a more sophisticated model, and includes both an untrended long-run unemployment rate, and wage aspirations on the part of insiders. In this model insiders maximise an objective function given by a linear combination of the wage and the probability of employment. In addition a distinction is made between anticipated and unanticipated movements in the labour demand curve arising from shocks to productivity. The model predicts that anticipated movements in demand are absorbed by wage increases; the stochastic equivalent of inelastic labour supply. This model still generates full hysteresis since unanticipated shocks will alter the size of the insider group and produce a permanent change in employment.

However, setting wages to take any anticipated increases in demand for labour in the form of wage gains is a high-risk strategy in a labour market in which insider status is in some way tied to being employed. In the Blanchard and Summers (1986) model insiders allow for this by setting wages to guarantee that the firm is, on average, a net hirer of labour. This implies that while employment follows a random walk, it also has a positive drift. After any shock unemployment therefore drifts down over time. The more severe the membership rules the more rational it is for insiders to place a large weight on the probability of employment in the utility function. However this will speed up the downward drift in unemployment. So while this model does yield persistent effects from temporary

shocks, the downward drift in unemployment is not a satisfactory result for a model which is trying to explain how unemployment can get stuck at high levels for long periods of time.

Other multi-period models that attempt to explore the dynamic intertemporal problem faced by insiders include Gottfries and Horn (1987), Burda (1990b), McDonald (1989) and Drazen and Gottfries (1990, 1994). The situations being analysed become extremely complicated and the models invariably employ strong assumptions to render the problem tractable. Gottfries and Horn (1987) for instance limit their analysis to a two period time horizon.

The results from this type of research suggest that the basic insights derived from more simple models hold in dynamic contexts. Optimisation over multiple time periods tends to produce more short-run responsiveness of wages to demand than would be observed in a one period model. Putting the same point differently: wages are set with a greater emphasis on stabilising employment when insiders are concerned with future and not only current utility. However, what drives the result that temporary shocks can have permanent or long lasting effects are the assumptions made about membership and the extent to which the unemployed can influence wage outcomes, not the temporal structure of the model. The next sections continue to explore these assumptions.

### ***Insider Heterogeneity***

Ball (1990) has speculated that one way to eliminate the problematic downward drift in unemployment from the Blanchard and Summers (1986) model is to introduce seniority rules. This is so since more senior insiders would have a buffer of less senior insiders between themselves and unemployment. While this sounds plausible, in fact the uncertainty facing the hiring hall insider is simply transferred, under majority voting with last in first out provisions, to the median insider, and the nature of his or her problem is unchanged. Myopic behavior by the median voter would lead to the setting of a wage which makes him or her the marginal incumbent in the next period and the new median voter would then do the same. The myopic median voter would soon be an outsider.<sup>15</sup> Burda (1990a, 1990b) confirms within a Blanchard and Summers type model that seniority provisions are compatible with a random walk in employment, provided the median insider is concerned to maintain his or her median position. Wage setting to create a positive employment drift can emerge if the median voter wants additional insurance. Other papers to address this issue include Layard (1990), Gottfries (1992) and Blanchflower (1991).

Bean also takes up the point made by Ball regarding seniority. Bean notes that from a practical viewpoint seniority may not insulate senior insiders. This is so since in reality last in first out provisions often operate at the individual plant level. This enables management to keep incumbents guessing as to just which plant will be closed in the event that layoffs are necessary (Bean, 1991, pp62-63).

### ***Bargaining Structure***

In the monopoly union framework there is no bargaining over the wage. Wage bargaining has been introduced into the insider-outsider literature by adopting either the 'right to manage' or 'efficient bargain' framework. Under the former, bargaining takes place over the wage but the firm retains the right to determine the employment level. In the latter, bargaining takes place over both wages and employment. The introduction of genuine bargaining allows the external labour market to impact on

<sup>15</sup> In the trade union literature this is called the 'Cheshire cat problem'; myopic behaviour would lead to the unions eventual extinction.

wage outcomes and employment dynamics by influencing the relative bargaining power of firms and their employees.<sup>16</sup>

Formal bargaining solutions are usually derived via a Nash solution. Using the same notation as above, the payoff to insiders is the difference between their threat point pay,  $wr$ , and the bargained wage. Call  $wr$  the insider reservation wage, the lowest wage the firm could pay. This could also be interpreted as the wage available outside the firm in the external labour market. Utility is denoted by  $u(0)$ . Taking the firm's threat point to be zero profit, its payoff is simply profits,  $r(n) - wn$ . The following problem presents itself:

$$[n\{u(w) - u(wr)\}]^I [r(n) - wn]^{1-I} \quad 1 \geq I \geq 0 \quad (13)$$

where  $I$  represents the bargaining power of the insiders vis a vis the firm. With  $I = 1$  all power lies with the insiders and the Nash solution is the same as the monopoly union solution.

The salient features of the solution to (13) are as follows. The bargained wage is positively related to  $I$  and the outside wage. It is negatively related to the elasticity of employment and profits to wages. In principle the external labour market could influence wage outcomes via  $I$  or the outside wage. The usual practice is to assume some constant bargaining power parameter and to allow unemployment to impact on wage outcomes via its influence on the outside wage,  $wr$ . It is taken that  $wr$  varies with the state of the external labour market, either through changes in  $wr$  itself or through changes in the probability of getting a job paying  $wr$ .

Blanchard (1991) shows that the simplest way to incorporate this into the Blanchard and Summers model is to allow unemployment to impact on wage outcomes. Let  $w^*$  be the wage that employs, in expected terms, the  $n_t^* = n_{t-1}$  insiders. Let  $nr$  be the employment level that would exist if the wage equaled  $wr$ . For simplicity call  $(nr - n)$  the unemployment rate. The expectations operator is denoted by  $E$ . Thus the bargained wage would be (Blanchard, 1991, p284):

$$w_t = I w_t^* + (1 - I) w_{r_t} - j (nr_t - E n_t) \quad j \geq 0 \quad (14)$$

Blanchard (1991, p284) replaces the wage in the original labour demand relation and on rearranging obtains:

$$(nr_t - n_t) = \frac{I}{1 + j} (nr_t - n_{t-1}) - e_t \quad (15)$$

Unemployment follows a first order autoregressive process with innovations equal to the negative of labour demand innovations. Full hysteresis only emerges if  $j = 0$  and  $I = 1$ . As this is unlikely, the model generates unemployment persistence. The degree of persistence is positively related to  $I$ , and negatively related to  $j$ .

<sup>16</sup> Most of the work in the area has employed either the monopoly union or right to manage framework. For brevity the efficient bargain models are not examined in this paper. The essential implication is as in the right to manage framework. See Carruth and Oswald (1987) and Solow (1985) for discussions of efficient bargain insider-outsider models.

## ***Wage Bargaining in the Presence of Seniority and Different Membership Rules***

Layard (1990) incorporated median voter dominance within a right to manage model. He established that, when bargaining in the vicinity of equilibrium, the median insider can afford to ignore employment and in fact maximise a utility function in which only the wage appears - the opposite of (10). While as shown above this would be irrational for the median insider in a monopoly union framework, this is not an issue in the presence of bargaining over wages. This is the case since the desire of the firm to maximise profits prevents, in the vicinity of equilibrium, the wage from skyrocketing to cause major job losses.

McDonald (1991) develops a similar argument with a rather strong conclusion. He accepts the idea that wages are set by a group of relatively secure insiders. However he rejects any membership rule which ties insider status too closely to employment status. The  $n^* = n_{t-1}$  rule in particular is, to McDonald, both unrealistic and responsible for what he considers to be the counterfactual prediction that it is wages and not employment that adjust to labour demand shocks.

To demonstrate the role played by the extreme membership rule for obtaining a unit root, McDonald assumes that employment exceeds the number of 'dominant' insiders in whose interests wages are set. As they have zero risk of unemployment their objective becomes one of maximising the wage; again the opposite of (10). The actual wage outcome then depends on the upward and downward pressure exerted by the parties to the wage bargain. In what McDonald calls the benchmark case, shifts in the labour demand curve do not influence the bargained wage. McDonald's model places us in a world of rigid wages in which employment does all the adjusting to shocks. In such a world temporary shocks have temporary effects on employment; there is neither full hysteresis nor persistence.

But why does the dominant insider group allow upward movements in the labour demand curve to expand employment rather than wages? As in Layard (1990), bargaining in the vicinity of the Nash solution implies an approximate balance of upward and downward pressure on wages.<sup>17</sup> Allowing for variation in relative bargaining strength as the demand for labour varies does not alter the conclusion that there is neither full hysteresis nor persistence; once a shock has been reversed the system reverts to the pre-shock level of employment and unemployment *ceteris paribus*. This is so because the model rules out by assumption any change in the size of the dominant insider group.

McDonald's (1991) model highlights the role of the extreme membership rule for obtaining a unit root. Nevertheless, zero probability of unemployment is also a rather strong assumption. McDonald's model restates what has already been established in the trade union literature. This is that under union bargaining the equilibrium rate of unemployment can be higher than in a competitive labour market. In terms of explaining the past two decades however this type of model runs into the obvious problem that, as union power has declined over that period, so should the importance of this type of explanation.

### ***Outsider 'starting wages' and underbidding***

<sup>17</sup> In Carruth and Oswald (1987) insiders allow employment to expand in a boom since rising output prices enable benefits of expansion for both the firm and employees. In McDonald (1989, 1991) economies of scale perform a similar role.

The introduction of bargaining brings the interests of outsiders to bear on wage setting in an indirect manner. The work of Lindbeck and Snower analyses the source of insider power, and in so doing provides some explanation for why outsiders cannot directly underbid insiders. In what follows the three main versions of the theory are examined briefly. These are firstly, a version based on hiring and firing costs. Secondly, a version based on cooperation and harassment. Thirdly, a version based on the adverse effects of labour turnover on the morale and productivity of employees.<sup>18</sup>

The analysis begins with the hiring-firing cost model. In what follows the symbols  $R$ ,  $H$  and  $F$  are used to denote the outsider reservation wage ( $R$ ), the marginal hiring/training cost ( $H$ ) and the marginal firing costs ( $F$ ) respectively. The most obvious examples of these costs include recruitment and training costs, as well as the usual range of termination expenses. The latter could also include potential legal expenses in the event that the termination is challenged.

Lindbeck and Snower identify three categories of worker, defined in terms of the  $H$  and  $F$  costs. Insiders are those on whom the firm has expended hiring and training costs and on whom firing costs would need to be expended upon termination of employment. The entrants are employees of the firm who have yet to complete some probation period, and can be dismissed without cost. Entrants have however had hiring costs  $H$  expended upon them. Outsiders are the unemployed.

Let  $WI$  and  $WE$  represent the wages of insiders and entrants. Both  $R$  and  $WE$  are taken to be exogenous by Lindbeck and Snower.  $WI$  can exceed  $WE$  by some positive amount not greater than  $F$  since this is the cost to the firm of replacing an insider with an outsider:

$$WE < WI \leq (WE + F) \quad (16)$$

The intuition here is clear. The cost of firing an insider, to replace him or her with an entrant, makes the firm indifferent between the two when the wage differential between  $WE$  and  $WI$  equals  $F$ .

Likewise,  $WE$  can exceed  $R$  by an amount not greater than  $H$ :

$$R \leq WE \leq (R + H) \quad (17)$$

This is the case since  $H$  is the amount already spent by the firm on an incumbent entrant. This would have to be spent again, if the firm wished to replace an incumbent entrant with an outsider.

Lindbeck and Snower argue that  $H$  costs are genuine costs of production, whereas  $F$  costs have no intrinsic role in production and simply result from insider rent seeking. Outsiders are considered involuntarily unemployed if they are prepared to work for a wage sufficiently below  $WI$  to compensate the firm for hiring and training costs,  $(R + H) < WI$ , but nevertheless cannot find employment. Lindbeck and Snower consider the outsiders to be involuntarily unemployed, since insider rent seeking restricts the outsider opportunity set by forcing the firm to factor the cost of firing insiders into the decision to replace them with outsiders. Unemployment persists as long as  $(R + H + F) > WI$ . Under these circumstances the firm will have no incentive to replace insiders with outsiders, *ceteris paribus*.

<sup>18</sup> Lindbeck and Snower (1988b) Chapter 4 contains a good overview of the various turnover cost models.

Cooperation and harassment behaviour represents another source of turnover cost. According to Lindbeck and Snower this can be used to explain not only the absence of underbidding by outsiders, but also the inability of insiders to avoid being laid off by underbidding those insiders not threatened with layoff, in the event that layoffs are required. In this model insiders are assumed to have some discretion over just how much cooperation they show co-workers. Refusing to cooperate with entrants for instance affects the productivity of those entrants to the firm. Moreover ‘harassment’ of entrants could raise their reservation wage by increasing the disutility of labour. These kinds of costs are likely to be particularly high when work is performed in teams. Moreover this particular type of turnover costs does not require the presence of unions or job protection legislation. As such they may help form the basis of insider power in countries such as the United States where unions and job protection legislation are weak (Lindbeck and Snower, 2001, p167). Output related contracts are unlikely to be able to circumvent these problems since firms and insiders may find them incentive incompatible, too risky and too costly to monitor (Lindbeck and Snower, 1988a, pp184-185).

To capture the effect of cooperation, Lindbeck and Snower assume that wages are the outcome of an individualistic bargaining process, as above. They also assume that while insiders have the ability to offer variable levels of cooperation, entrants do not. Entrants therefore have no bargaining power and receive a wage,  $WE = R$ . Assume each entrant provides  $ae$  efficiency units of labour, given the level of cooperation between insiders and entrants. Assume each insider provides  $ai$  efficiency units of labour, given the level of cooperation between the insiders. The insider wage,  $WI$  can therefore exceed  $R$  by some positive amount not greater than the differential in the efficiency units of labour supplied:

$$R < WI < R \frac{ai}{ae} \quad (18)$$

Once again the intuition is clear. If the firm replaces an insider with an entrant it will lose the productivity differential generated by the different levels of cooperation supplied by the marginal insider and entrant. Thus provided the difference between  $R$  and  $WI$  is less than this productivity differential the firm will not wish to replace an insider with an entrant. Assuming that cooperative activity has no direct utility effects on the insiders then their objective will be to make the cooperation based productivity differential as large as possible. They will do this by affording maximum cooperation to each other and refusing to cooperate with entrants.

In such an economy, if insiders set a wage above the market clearing level then the outsiders who are unemployed as a result, may be considered involuntarily unemployed if the differential between  $R$  and  $WI$  exceeds the ability related marginal product differential between insiders and entrants. This latter differential is calculated on the assumption that insiders and entrants receive the same level of cooperation. Wage bargaining may well result in a wage differential which exceeds this ability differential. Entrants may be unable to underbid insiders precisely because the entrants are not afforded the same level of cooperation. Similarly, insiders threatened with lay off may be unable to retain their jobs by underbidding insiders not threatened with lay off if the latter make a credible threat to withdraw cooperation from under-bidders. Harassment can achieve a similar result by altering the disutility of labour, and hence the reservation wage of entrants.

There are two points to make about the cooperation and harassment model. First it is not clear that the threat of harassment and non-cooperation is credible. As it is likely to cost insiders something to carry out this threat, once the firm has hired outsiders the threat may not actually be implemented (Fehr, 1990). This objection can be overcome if the analysis is placed in a multi-period repeated

game context. In this case it may be optimal for insiders to take a short-term loss and carry out the threat in order to establish the required credibility (Elster, 1989).

The second point emerges from a statement by Ball. He expresses the view that the neo-classical foundations of the cooperation and harassment model are a weakness and not a strength; ‘...the idea that workers harass each other for the same reasons they shop at discount stores does not ring true’ (Ball, 1990, p462). This reservation about explaining the absence of underbidding in terms of purely economic arguments is supported by recent work on the role of social norms, as well as notions such as fairness and attachment for a range of labour market observations; including the absence of underbidding by the unemployed. While much of this work is based on methodological individualism, some is not. The seminal work of Akerlof (1982) on the ‘partial gift exchange’ is a case in point. The interested reader is referred to Costabile (1995) for an excellent discussion and dissection of this literature along methodological lines. For now it will suffice to note Solow’s remark that the absence of observed underbidding may be due to ‘...social conventions, or principles of appropriate behavior, whose source is not entirely individualistic’ (Solow 1980, p3).

In a recent survey Lindbeck and Snower argue that their theory provides an economic explanation for the absence of underbidding, and as such does not need to rely on a social norm against such behaviour. Nevertheless they argue that ‘...the model becomes richer and more powerful if combined with such a social norm’ (Lindbeck and Snower, 2001, p179).<sup>19</sup> These issues are almost entirely neglected in the insider-outsider literature to date. Pursuing these lines of research could prove valuable since, from a policy standpoint, it may be necessary to know what motivates behaviour in order to get the policy right. These issues will provide fertile ground for both theoretical and empirical research in the future.

The final source of insider power explored by Lindbeck and Snower, relates to presumed adverse productivity effects of labour turnover<sup>20</sup>. If labour turnover adversely affects the morale and productivity of employees, then it may not be in the interest of a firm to accept underbidding by entrants if the adverse productivity effects outweigh the savings from replacing an insider with an entrant. If it is assumed that firms are unable to monitor work effort perfectly they are unable to make wages dependent on it. Insiders could use this to raise their wages above the wage at which outsiders/entrants would be willing to work. The outsiders can be considered involuntarily unemployed due to their less fortunate competitive position. They would be willing to work for less than the firm’s incumbent insiders, but cannot gain employment since, through no fault of their own, they can only gain employment by adversely affecting the productivity of the remaining insiders.

Bertola (1990) argues that these results from simple static models do not hold in a more dynamic framework.<sup>21</sup> To show this he outlines a model in which workers bargain individually with their firm. He takes each worker’s payoff to be given by the infinite horizon discounted labour income achieved by being an entrant in the first period and an insider forever after:

<sup>19</sup> Lindbeck and Snower (2001) do not actually elaborate in any detail on how this richness and power is added to the model. It could be viewed as self-evident. The interested reader is referred to pages 179-80 of Lindbeck and Snower (2001) for some points in support of this statement.

<sup>20</sup> An identical idea underpins one version of efficiency wage theory. For a detailed analysis of the relationship between efficiency wage theory and the insider-outsider theory see Lindbeck and Snower 1988b, Chapter 3.

<sup>21</sup> While directed at the Lindbeck and Snower model, this criticism could also be seen as relevant to any insider-outsider model such as the one due to Blanchard and Summers.

$$Y_I = WE + \sum_{i=1}^{\infty} \left( \frac{1}{1+r} \right)^i (WE + H + F) = WE \frac{1+r}{r} + \frac{H+F}{r} \quad (19)$$

or if unemployed and therefore only able to earn the opportunity wage forever after by:

$$Y_o = \sum_{i=1}^{\infty} \left( \frac{1}{1+r} \right)^i W = W \frac{1+r}{r} \quad (20)$$

where  $r$  is the interest rate. In the static Lindbeck and Snower hiring firing cost model the entrant wage  $WE$  is exogenously given. But if  $Y_o < Y_I$ , then forward looking outsiders/entrants should bid down  $Y_I$  by lowering  $WE$ . This result could also be brought about if firms extract future insider rents before agreeing to take the outsider on through, for example, some kind of apprenticeship scheme. Once  $Y_o = Y_I$  involuntary unemployment ceases to exist (Bertola, 1990, p870).

Unemployment caused by insider power can only re-emerge if something prevents  $WE$  from falling low enough to make  $Y_o = Y_I$ . Reasonable candidates for this role include the following. Firstly, minimum wage laws may prevent the entrant wage from falling far enough. If the insider-outsider model had to rely on this to underpin the veracity of its findings then the theory could be said to be neither novel nor profound. Secondly, capital market imperfections may impose liquidity constraints on potential insiders' ability to 'purchase' insider jobs.<sup>22</sup> Thirdly, incentive incompatibility; potential insiders may fear that the firm will sack them after they have completed the period in which future rents are extracted.<sup>23</sup> Bertola concludes that hiring firing costs are therefore a necessary, but not sufficient condition, for unemployment caused by insider power to emerge.

Snower argues that Bertola's approach '...bypasses all the interesting issues in this area' (Snower, 1990, p883).<sup>24</sup> Snower argues that actual labour markets fail to deliver equalised average discounted returns from employment and unemployment, with the former far exceeding the latter. There must be some reason for this. Lindbeck and Snower prevent, by assumption, the outsider behaviour that Bertola shows can eliminate involuntary unemployment. They do so since they want to '...capture the notion of inequality of opportunity over a period starting at a particular time, when some workers are insiders while others are entrants or outsiders' (Lindbeck and Snower, 1988b, p8).

Bertola's method is more traditional, but actually assumes away all the interesting issues. It allows agents to make their optimal intertemporal decisions '...at the beginning of their respective working lifetimes' (Lindbeck and Snower, 1988b, p8). Thus while Bertola's model of intertemporal wage determination is, in that sense, 'dynamic', it is not an appropriate way to approach the problem posed by insider-outsider labour markets. Nevertheless Bertola's criticism does highlight the fact that given the nature of the insider-outsider labour market the behaviour of agents need to be forward looking. Vetter and Andersen (1994) also develop a dynamic model in which forward looking behaviour results in employment never being less than the competitive level. Indeed they show that it

<sup>22</sup> Bertolila and Bertola (1990) deal with these issues using a more sophisticated model and empirical analysis; producing essentially the same results as Bertola (1990). Lazear (1990) presents a simple model in which job security provisions are circumvented by forward looking agents 'buying' jobs. It is implicitly assumed there are no capital market imperfections.

<sup>23</sup> Lindbeck and Snower (2001, p169) provide a more detailed explanation of this scenario.

<sup>24</sup> Snower (1990) acknowledges that Bertola's paper yields an insight that does not emerge from the static models. This is that current hiring and firing decisions depend not only wages and current hiring/firing costs, but also on future expected hiring/firing costs (Snower, 1990, p882).

could result in higher employment than in the case where all workers are wage takers. Lindbeck and Snower argue that the results of this model are due to assumptions that are too special, or unrealistic with respect to insider-outsider labour markets (Lindbeck and Snower, 2001, p171).

In the Blanchard and Summers model, the starting wage paid to outsiders who manage to find employment is equal to the wage paid to insiders. Thus an increase in the insider wage will reduce the hiring of outsiders. The same applies with the Lindbeck and Snower model, except that the latter adjusts the starting wage of outsiders (what they call the entrant wage) for the costs of hiring and training. Nevertheless, in both approaches, the insider wage, and the starting wage paid to outsiders, are **linked** in a manner that Gottfries and Sjostrom (2000) find to be somewhat arbitrary.

They ask why rational insiders prevent the employment of outsiders, when that employment could generate a surplus that could be appropriated, at least in part, by the insiders. This surplus would arise if the marginal product of an outsider, net of hiring and training costs, exceeded their alternative wage. The only problem this could create is that if the starting wage paid to outsiders is too low, firms have an incentive to replace insiders with outsiders. Gottfries and Sjostrom (2000) show that a labour contract could be struck which specifies that the firm pays insiders a fee to terminate them. This would be a more efficient response to the problem and should allow the insider and outsider wages to be uncoupled, while protecting insiders from being replaced. Gottfries and Sjostrom (2000) show that, under such a contractual arrangement, an increase in insider power is consistent with either an increase or a decrease in employment. Which situation eventuates depends on the values of some key model parameters and the length of time the labour contract is struck for. They conclude that the most common situation is one in which an inverse relationship between insider power and employment emerges (Gottfries and Sjostrom, 2000, p672).

### **3.2: Outsider Ineffectiveness**

There are several strands to the outsider ineffectiveness hypothesis. The first strand postulates that unemployment, particularly long-term, leads to skill atrophy that reduces the stock of human capital available to the economy. The second strand proposes that individuals can be demoralised by the experience of unemployment. This in turn impacts adversely on job search intensity. Bean (1991) notes that both skill atrophy and reduced search intensity have two consequences for unemployment persistence. First, a given level of vacancies could be expected to bring forth fewer job matches, resulting in a rightward shift in the Unemployment and Vacancies Relationship. Secondly, contraction of the effective labour force creates more favourable wage bargaining conditions for the employed and may result in wage outcomes that exacerbate or perpetuate the original negative employment impulse (Bean, 1991, pp68-69).

Early contributions to the skill atrophy approach include Phelps (1972) and Hargreaves Heap (1980), although neither of these authors presented a formal model. Price (1988, 1992) has explored this idea more formally within search/matching models with workers who live for many periods. The results depend critically on whether or not workers are assumed to be finitely or infinitely lived. In the latter case knife edge instability tends to emerge, while with finite lived workers multiple equilibria, including low employment equilibria, result.<sup>25</sup> Other papers that

<sup>25</sup> The outsider ineffectiveness hypothesis is amenable to a search theoretic treatment. Moreover, many of the models in this literature generate multiple equilibria while not being concerned with the dynamics of movement from one equilibrium to another. Nevertheless multiple equilibria are consistent with the basic hysteresis story in that temporary shocks can move the system from one equilibrium to another without any tendency to return once the original shock has dissipated (Jones 1995, p27). Price (1992, p211) on the other hand highlights the

emphasise skill loss as a source of unemployment persistence include Moller (1990) and Pissarides (1992).

One criticism of the skill atrophy approach is that it is the unskilled that tend to suffer most from unemployment. As such the extent of atrophy cannot be that great and should be easily reversed. Pissarides (1992) also notes that while the skill atrophy argument is intuitively appealing, it can only account for persistent unemployment while those who were unemployed at the outset of an adverse shock remain unemployed. As the average duration of unemployment is short relative to the length of the business cycle it is unlikely that, on its own, skill decay can explain the observed persistence of unemployment. Pissarides (1992) offers a model that attempts to address this. In his model a temporary shock which lowers the average skill level of the labour force leads firms to offer fewer vacancies than if the original shock had not occurred. This generates a 'thin market externality' which causes a further reduction in skill and a subsequent perpetuation of the externality.

Layard and Bean (1989) develop a model in which reduced job search intensity generates unemployment persistence. However as Bean notes the model provides no answer to the issue of whether the reduction of search intensity constitutes an irreversible change in tastes and behaviour or merely a rational response to difficult labour market conditions which will be reversed in the face of economic upturn. If the latter is the case then this cannot be the source of unemployment persistence (Bean, 1991, p70).

Both these strands of the literature are open to the more general criticism that they do not provide an unambiguous explanation for how unemployment per se can beget more unemployment. In the presence of genuine skill atrophy for instance, there is nothing new in the idea that the market will bypass the long-term unemployed if their reservation wage does not adjust to reflect their lower productivity.

The third source of outsider ineffectiveness results from employer attitudes towards the unemployed. Firms face a heterogeneous labour supply about whose individual productivity they have less than perfect knowledge. Firms may use length of unemployment as a screening device to gauge the productivity of potential employees. Even if the unemployed are not suffering any actual skill or attitudinal deterioration, this kind of ranking procedure has the effect of creating more favourable wage bargaining conditions for the employed. This is the case since insiders realise that if they happen to be laid off, their chances of re-employment are better than that of the average unemployed worker.

Lockwood (1991), Blanchard and Diamond (1994) and Totsch (1988) have built formal models to describe this kind of idea. These models confirm that this type of ranking can produce negative duration dependence and higher equilibrium wage outcomes than would result if firms hired at random from the ranks of the unemployed. In Totsch's model it is assumed that firms face a distribution of workers with heterogeneous productivities, but that each individual worker's productivity is not adversely affected by the duration of an unemployment spell. A two-sector economy is assumed. In one sector firms can costlessly and accurately determine individual worker productivity before hiring. Firms in this sector set a wage and job termination structure that induces self-selection in that sector, and which also causes the job acquisition rate to vary positively with

difference between an account of the rise of UK unemployment based on the Blanchard and Summers (1986, 1987) approach and one involving multiple equilibria.

worker productivity. Thus the average productivity of an unemployment cohort will deteriorate with its duration of unemployment.

Firms in sector two cannot ascertain a worker's productivity until he or she has been hired. Firms in this sector use unemployment duration to predict the expected profit to accrue from hiring a worker. Employment shocks, which lengthen the average duration of unemployment, will also create a larger group of unemployed workers who are perceived as not worth hiring. It can be argued that some of this persistence results from a failure of the wage structure to reflect worker productivity. The point Totsch is making however, is that this type of sorting process could see many high productivity workers, unlucky enough not to find a job quickly, end up chronically unemployed, i.e. the victims of genuine duration dependence.

Blanchard (1991) attempted to capture these ideas within his simple model as follows. In general these ideas about the impact of unemployment duration mean that the wage will depend on the whole distribution of unemployment durations. This distribution will in turn depend on the whole past history of unemployment. Blanchard (1991, p287-88) modifies equation (14) (the wage equation) as follows in order to capture the idea that sustained high unemployment will have a diminishing impact on wages. To the previous notation add,  $ur_t = nr_t - n_t$  to denote the unemployment rate. The wage equation is now written as:

$$w_t = Iw_t^* + (1-I)wr_t - j[Eur_t - c\{L\}ur_{t-1}] \quad 0 \leq c(1) \leq 1 \quad (21)$$

Let  $c(L)$  = a lag polynomial of order  $n$  with positive coefficients. For  $0 < c(1) < 1$  the effect of any given level of unemployment on wages diminishes slowly with time, but remains negative. Blanchard uses equation (21) to replace the wage in the original labour demand equation. Upon some re-arranging the behaviour of unemployment becomes:

$$ur_t = \left( \frac{I}{1+j} \right) ur_{t-1} + \left( \frac{j c(L)}{1+j} \right) ur_{t-1} - e_t \quad (22)$$

Equation (22) suggests that duration induced full hysteresis is unlikely as this would require that  $I = 1$  and  $c(1) = 1$ . From (22) it can also be seen that if  $c(1) > 0$  the system displays persistence; since the sum of the weights on lagged unemployment is higher than if duration effects are ignored. This can be seen by comparing equation (22) with equation (15); its counterpart in the absence of duration effects. This implies that unemployment is more persistent in the presence of duration effects.

#### **4: Concluding Remarks**

This paper has outlined the idea of hysteresis and its application to the explanation of persistent unemployment. A fundamental division exists between those researchers who begin from the position that a long-run path independent natural rate of unemployment exists and those who do not. The former group views unemployment persistence in terms of sluggish adjustment to shocks. The latter group rejects the idea that it is meaningful to talk about a long-run natural rate.

This paper has also presented a major review of the rather extensive theoretical literature that has emerged to provide microeconomic foundations for hysteresis and persistence. Full hysteresis seems

to emerge in models as a result of assumptions that may be considered unreasonable. Unemployment persistence on the other hand emerges readily out of models employing quite reasonable assumptions. Two examples of the latter include the idea that insiders face some risk of layoff, and that wages are the result of bargaining rather than being set by a monopoly union.

The problem that is posed by accepting persistence, rather than full hysteresis, is that it is not immediately clear that the past twenty years unemployment experience in many countries can be explained in terms of sluggish adjustment back to equilibrium. Blanchard (1991) has suggested that a combination of persistence, induced by membership effects on wage formation, and outsider ineffectiveness may provide an acceptable solution to this problem. Once unemployment emerges for some reason, it is likely to persist in markets with insider power. This may then result in the build up of a pool of long-term unemployed that then further compromises the speed of the recovery back to equilibrium.

Lindbeck and Snower (2001, p175) use a similar example as the one offered by Blanchard to show how complementary lagged adjustment processes could explain the persistence of unemployment over very long time periods. Their work goes further than Blanchard (1991) on this point. Karanassou and Snower (1998) for instance have explored the ability of these complementarities to explain persistent unemployment in a formal economic model. Moreover they provide some empirical estimates of the importance of complementary lagged adjustment effects in explaining UK unemployment over the years 1964-95. Lindbeck and Snower argue that:

‘When adjustment processes are complementary along such lines, **their joint influence is greater than the sum of the individual processes**, and thus it may take unemployment a long time to approach its long-run equilibrium in the aftermath of a shock’ (Lindbeck and Snower, 2001, p175, emphasis added).

So convinced are Lindbeck and Snower that this approach, based on lagged complementary adjustment processes, can explain unemployment persistence they have called it the chain reaction theory of unemployment (Karanassou and Snower, 1998, p833). Exploring these lagged complementary adjustment processes may prove to be a fruitful line of research in the future.

## **Bibliography**

- Akerlof, G. (1982). "Labor Contracts as Partial Gift Exchange", *Quarterly Journal of Economics*, 87, pp543-69.
- Alogoskoufis, G. and Manning, A. (1988). "On the Persistence of Unemployment", *Economic Policy*, 7, pp428-69.
- Ball, L. (1990). "Insiders and Outsiders: A Review Essay", *Journal of Monetary Economics*, 26, pp 459-469.
- Bean, C. (1991). "European Unemployment: A Survey", *Centre for Economic Performance Discussion Papers*, 71, pp1-116.
- Bentolila, S. and Bertola, G. (1990). "Firing Costs and Labour Demand: How Bad is Eurosclerosis?" , *Review of Economic Studies*, 57(3), pp381-402.
- Bertola, G. (1990). "Job Security, Employment and Wages", *European Economic Review*, 34, pp851-886.
- Blanchard, O. (1991). "Wage Bargaining and Unemployment Persistence", *Journal of Money Credit and Banking*, 23(3), pp277-292.
- Blanchard, O. and Diamond, P. (1994). "Ranking, Unemployment Duration, and Wages", *Review of Economic Studies*, 61, pp417-434.
- Blanchard, O. and Summers, L. (1986). "Hysteresis and the European Unemployment Problem", *NBER Macroeconomics Annual*, pp15-78.
- Blanchard, O. and Summers, L. (1987). "Hysteresis in Unemployment", *European Economic Review*, 31, pp288-295.
- Blanchflower, D. (1991). "Fear, Unemployment and Pay Flexibility", *The Economic Journal*, 101, pp483-496.
- Blanchflower, D. Oswald, A. and Garret, M. (1990). "Insider Power in Wage Determination", *Economica*, pp143-170.
- Buiter, W. (1987) "The right combination of demand and supply policies: the case for a two handed approach", NBER working paper No 2333, Cambridge MA.
- Burda, M. (1990a). "Some Evidence on the Membership Hysteresis Hypothesis in Europe", *Empirical Economics*, 15, pp143-161.
- Burda, M. (1990b). "Membership, Seniority and Wage-Setting in Democratic Labour Unions", *Economica*, 57, pp455-466.

Carruth, A. and Oswald, A. (1987). "On Union Preferences and Labour Market Models: Insiders and Outsiders", *Economic Journal*, 97, pp431-445.

### **Bibliography (continued ...)**

Costabile, L. (1995). "Institutions, Social Custom and Efficiency Wage Models: Alternative Approaches", *Cambridge Journal of Economics*, 19, pp605-623.

Cross, R. (Ed), (1988). *Unemployment, Hysteresis and the Natural Rate Hypothesis*, Basil Blackwell, Oxford.

Cross, R. (1993a). "On The Foundations of Hysteresis in Economic Systems", *Economics and Philosophy*, 9, pp53-74.

Cross, R. (1993b). "The NAIRU as a Theory of Equilibrium Unemployment", *Journal of Economic Studies*, 20(1/2), pp116-122.

Cross, R. (1995). "Is the Natural Rate Hypothesis Consistent with Hysteresis?", in Cross, R. (Ed), *The Natural Rate of Unemployment*, Cambridge University Press, Cambridge.

Cross, R. and Allan, A. (1988). "On the History of Hysteresis" in Cross, R. (Ed), *Unemployment, Hysteresis and the Natural Rate Hypothesis*, Basil Blackwell, Oxford, pp26-38.

Dobbie, M. (2003). "*Insiders and Outsiders: Wage Setting Institutions and the Persistence of Unemployment in Australia*", PhD dissertation, Macquarie University.

Dobbie, M. (1997). "Hysteresis and Unemployment", *Macquarie Economics Research Papers*, Number 24/97.

Drazen, A. and Gottfries, A. (1990). "The Persistence of Unemployment in a Dynamic Insider-Outsider Model", in Weiss, Y. and Fishelson, G. (Eds), *Advances in the Theory and Measurement of Unemployment*, MacMillan, London.

Drazen, A. and Gottfries, N. (1994). "Seniority Rules and the Persistence of Unemployment", *Oxford Economic Papers*, 46, pp228-244.

Elster, J. (1976). "A Note on Hysteresis in the Social Sciences", *Synthese*, 33, pp371-391.

Elster, J. (1989). "Social Norms and Economic Theory", *Journal of Economic Perspectives*, 3(4), pp99-117.

Farber, H. (1986). "The Analysis of Union Behaviour" in Ashenfelter, O. and Layard, R. (Eds) *Handbook of Labor Economics*, 2, North-Holland, Amsterdam, pp1039-89.

Fehr, E. (1990). "Cooperation, Harassment, and Involuntary Unemployment: Comment", *American Economic Review*, 80(3), pp624-629.

Franz, W. (1987). "Hysteresis, Persistence and the NAIRU: An Empirical Analysis for the Federal Republic of Germany", in Layard, R. and Calmfors, L. (Eds), *The Fight Against Unemployment*, MA:MIT Press, Cambridge.

### **Bibliography (continued ...)**

Franz, W. (1990). "Hysteresis in Economic Relationships: An Overview", *Empirical Economics*, 15, pp109-125.

Giavazzi, F. and Wyplosz, C. (1985). "The Zero Root Problem: A Note on the Dynamic Determination of the Stationary Equilibrium in Linear Models", *Review of Economic Studies*, 52, pp353-357.

Gordon, R. (1989). "Hysteresis in History: Was There Ever A Phillips Curve", *American Economic Association: Papers and Proceedings*, 79(2), pp220-225.

Gottfries, N. (1992). "Insiders, Outsiders, and Nominal Wage Contracts", *Journal of Political Economy*, 100(2), pp252-270.

Gottfries, N. and Horn, H. (1987). December, "Wage Formation and the Persistence of Unemployment", *Economic Journal*, 97, pp877-84.

Gottfries, N. and Sjostrom, T. (2000). "Insider Bargaining Power, Starting Wages and Involuntary Unemployment", *Scandinavian Journal of Economics*, 102(4), pp669-88.

Hargreaves Heap, S.P. (1980). "Choosing the Wrong 'Natural' Rate: Accelerating Inflation or Decelerating Employment and Growth?", *Economic Journal*, 90, pp611-620.

Huizinga, F. and Schiantarelli, F. (1992). "Dynamics and Asymmetric Adjustment in Insider-Outsider Models", *The Economic Journal*, 102, pp1451-1466.

Jones, S. (1995). *The Persistence of Unemployment: Hysteresis in Canadian Labour Markets*, McGill-Queen's University Press.

Karanassou, M. and Snower, D. (1998). "How Labour Market Flexibility Affects Unemployment: Long-term Implications of the Chain Reaction Theory", *The Economic Journal*, 108, pp832-849.

Layard, R. (1990). "Lay-Offs By Seniority and Equilibrium Employment", *Economics Letters*, 32, pp295-298.

Layard, R. and Bean, C. (1989). "Why Does Unemployment Persist?", *Scandinavian Journal of Economics*, 91(2), pp371-396.

- Layard, R. and Nickell, S. (1987). "Unemployment in Britain", in Bean, C., Layard, R. and Nickell, S. (Eds) *The Rise in Unemployment*, Basil Blackwell, Oxford, pp121-170.
- Layard, R. Nickell, S. and Jackman, R. (1991). *Unemployment*, Oxford University Press, New York.
- Lazear, E. (1990). "Job Security Provisions and Employment", *The Quarterly Journal of Economics*, Vol. CV, 3, pp699-726.

### **Bibliography (continued ...)**

- Lindbeck, A. (1991). "Unemployment and Labour Market Imperfections", *Issues in Contemporary Economics: Proceedings of the Ninth World Congress of the International Economic Association*, Athens, Greece. Volume 2, pp75-101.
- Lindbeck, A. and Snower, D. (1987). "Union Activity, Unemployment Persistence and Wage-Employment Ratchets", *European Economic Review*, 31(1), pp157-67.
- Lindbeck, A. and Snower, D. (1988a). "Cooperation, Harassment and Involuntary Unemployment: An Insider-Outsider Approach", *American Economic Review*, 78(1), pp167-88.
- Lindbeck, A. and Snower, D. (1988b). *The Insider-Outsider Theory of Employment and Unemployment*, Cambridge, MA:MIT Press.
- Lindbeck, A. and Snower, D. (2001). "Insiders versus Outsiders", *Journal of Economic Perspectives*, 15(1), pp165-188.
- Lockwood, B. (1991). "Informational Externalities in the Labour Market and Their Implications for the Duration of Unemployment", *Review of Economic Studies*, 58(4), pp733-754.
- McDonald, I. (1989). "The Wage Demands of a Selfish, Plant Specific Trade Union", *Oxford Economic Papers*, 41, pp506-527.
- McDonald, I. (1991). "Insiders and Trade Union Wage Bargaining", *The Manchester School*, Vol LIX, No.4, pp395-407.
- Mitchell, W. (1993). "Testing For Unit Roots and Persistence in OECD Unemployment Rates", *Applied Economics*, 52, pp1489-1501.
- Moller, J. (1990). "Unemployment and Deterioration of Human Capital", *Empirical Economics*, 15, pp199-215.
- Nelson, C. and Plosser, C. (1982). "Trends and Random Walks in Macroeconomic Time series: Some Evidence and Implications", *Journal of Monetary Economics*, 10, pp139-62.
- Nickell, S. and Kong, P. (1992). "An Investigation Into the Power of Insiders in Wage Determination", *European Economic Review*, 36, pp1573-1599.
- Nickell, S. and Wadhvani, S. (1990). "Insider Forces and Wage Determination", *Economic Journal*, 100, pp496-509.
- Oswald, A. (1985). "The Economic Theory of Trade Unions; an Introductory Survey", *Scandinavian Journal of Economics*, 87, pp160-93.

### **Bibliography (continued ...)**

- Phelps, E. (1972). *Inflation Policy and Unemployment Theory. The Cost-Benefit Approach to Monetary Planning*, Macmillan.
- Phelps, E. (1993). "A Review of Unemployment: Macroeconomic Performance and the Labour Market", *Journal of Economic Studies*, 20(1/2), pp7-25.
- Piore, M. (1986). "Perspectives on Labor Market Flexibility", *Industrial Relations*, 25(2), pp146-166.
- Pissarides, C. (1992). "Loss of Skill During Unemployment and the Persistence of Unemployment Shocks", *The Quarterly Journal of Economics*, Vol. CVII, 4, pp1371-1391.
- Price, S. (1988). "Unemployment and Worker Quality", in Cross, R. (Ed), *Unemployment, Hysteresis and the Natural Rate Hypothesis*, Basil Blackwell, Oxford.
- Price, S. (1992). "Human Capital, Hysteresis and Unemployment Among Workers With Finite Lives", *Scottish Journal of Political Economy*, 39(2), pp201-212.
- Roed, K. (1997). "Hysteresis in Unemployment", *Journal of Economic Surveys*, 11(4), pp389-418.
- Roed, K. (1999). "A Note on the Macroeconomic Modelling of Unemployment Hysteresis", *Applied Economics Letters*, 6, pp255-258.
- Sanfey, P. (1995). "Insiders and Outsiders in Union Models", *Journal of Economic Surveys*, 9(3), pp255-284.
- Setterfield, M. (1993). "Towards a Long Run Theory of Effective Demand", *Journal of Post Keynesian Economics*, 15(3), pp347-363.
- Setterfield, M. (1998). "Adjustment Asymmetries and Hysteresis in Simple Dynamic Models", *The Manchester School*, 66(3), pp283-301.
- Smyth, D. and Easaw, J. (2001). "Unemployment Hysteresis and the NAIRU: A Ratchet Model", *Applied Economics Letters*, 8, pp359-362.
- Snowder, D. (1990). Comments on G. Bertola: "Job Security, Employment and Wages", *European Economic Review*, 34, pp881-886.
- Solow, R. (1980). "On Theories of Unemployment", *American Economic Review*, 70(1), pp1-11.
- Solow, R. (1985). "Insiders and Outsiders in Wage Determination", *Scandinavian Journal of Economics*, 87, pp411-28.

**Bibliography (continued ...)**

- Totsch, I. (1988). "Screening in Labour Markets with Heterogeneous Workers", in Cross, R. (Ed) *Unemployment, Hysteresis and the Natural Rate Hypothesis*, Basil Blackwell, Oxford, pp180-200.
- Vetter, H. and Andersen, T. (1994). "Do Turnover Costs Protect Insiders?", *The Economic Journal*, 104, pp124-130.
- Wolter, S. (2001). "Opposition of Retail Sales Staff to Shopping Hours Liberalisation. An Application of the Insider-Outsider Theory", *International Journal of Manpower*, 22(5), pp445-456.
- Wyplosz, C. (1987). "Comments" in Layard, R. and Calmfors, L. (Eds), *The Fight Against Unemployment*, Cambridge University Press, MA:MIT, pp123-131.