Metroeconomica 59:3 (2008) 479–510
doi: 10.1111/j.1467-999X.2008.00314.x

IS THE NAIRU THEORY A MONETARIST, NEW KEYNESIAN, POST KEYNESIAN OR A MARXIST THEORY?

Engelbert Stockhammer*
Wirtschaftsuniversität Wien, Austria

(May 2007; revised July 2007)

ABSTRACT

The NAIRU (non-accelerating inflation rate of unemployment) theory has become the mainstream theory in explaining unemployment in Europe and is often used to justify demands for a cutback of the welfare state, such as reducing unemployment benefits. Close inspection reveals that it, perhaps surprisingly, shares some arguments with Post Keynesian and even Marxist theory. The paper proposes an underdetermined, encompassing NAIRU model, which is consistent with several theoretical traditions. Depending on the closure with respect to demand formation and determination of the NAIRU itself, the model allows for New Keynesian, Post Keynesian and Marxist results.

1. INTRODUCTION

The question this paper poses in its title may sound odd at first. Isn't it clear what sort of theory the NAIRU (non-accelerating inflation rate of unemployment) is? No lesser authorities than L. Ball and G. Mankiw assure us that 'the NAIRU is approximately a synonym for the natural rate of unemployment' (Ball and Mankiw, 2002, p. 115). However, de Brunhoff, a senior Marxist monetary theoretician, argues that 'The NAIRU model was developed by Post Keynesian economists' (de Brunhoff, 2005, p. 216) and implicates P. Davidson in the crime scene. Davidson himself however seeks to 'provide a Post Keynesian explanation of persistent high unemployment

* This paper was written as part of FWF project P18419-G05. Earlier versions of the paper have been presented at the Hetecon Conference, July 2005, London, the Working Group Keynesian Theory and Berlin, October 2005, the Conference New Developments in Economic Theory and Policy, July 2006, Bilbao, and the Workshop of Analytical Political Economy, May 2007, London. The author is indebted to the participants of the discussions there, in particular to Robert Blecker, Eckhard Hein, Özlem Onaran, Mark Setterfield, Alfonso Palacio-Vera and two anonymous referees for helpful comments. All remaining errors, however, are the authors'.

rates experienced by OECD nations since 1973 (. . .) so that the reader can comprehend why this explanation differs from that of NAIRU proponents' (Davidson, 1998, p. 818), which certainly suggests that the NAIRU is at odds with the Post Keynesian theory. Moreover, de Brunhoff rejects the NAIRU as the 'NAIRU would appear to be a statistics-dominated instrument of wage supervision, to be used by those who fear that low unemployment might undermine wage moderation' (de Brunhoff, 2005, p. 216); whereas R. Pollin argues that 'Marx and Kalecki (. . .) share a common conclusion with natural rate proponents, in that they would all agree that positive unemployment rates are the outgrowth of class struggle over distribution of income and political power' (Pollin *et al*., 1998, p. 5f). Overall, it is certainly fair to say that there is need for a clarification of the theoretical foundation of the NAIRU.

In the simplest definition the NAIRU theory claims that at any point in time there is a rate of unemployment at which inflation is constant—which is the NAIRU. However there is also a stronger definition that adds that the NAIRU theory is based on wage bargaining and allows for involuntary unemployment (Carlin and Soskice, 1990, p. 157; Snowdon *et al*., 1994, p. 323). We follow this stronger definition. The paper will distinguish between the *existence* of a NAIRU, the *stability* of the NAIRU as a point of equilibrium and the issue of its *exogeneity*. The NAIRU can only serve as a strong attractor for actual unemployment, if it is determined exogenously itself and if it gives rise to a stable equilibrium. While many, if not most, economists would nowadays agree with the basic assertion that there is some unemployment at which inflation is stable (at least in the short run), there is substantial disagreement over the theoretical interpretation of this relation, its theoretical foundation and its policy implications. This paper aims at a clarification of these differences.

This paper will argue that the NAIRU theory is an interesting theoretical hybrid and that it can be given Marxian, Post Keynesian and New Keynesian interpretations. However, the Monetarist natural rate of unemployment should not be confused with the NAIRU, as the former is a theory of voluntary unemployment. The task of this paper is to identify the differences in interpretation. To do so, a core NAIRU model will be proposed and alternative closures for the respective theories will be suggested. The aim is to clarify key differences, among which two areas are identified. First, the demand function; here the questions are what the effect of inflation on output is and what the effect of a change in the wage share on output is. Second, the determination of the NAIRU; here the question is how the NAIRU is determined, in particular whether it is exogenous or not. Overall the question is whether NAIRU is a strong attractor for actual unemployment.

A few clarifications regarding the scope of the paper are in place. By design we will try to keep things simple and comparable. This implies that several sophistications that are important and idiosyncratic to each theory will have to be brushed aside. Among these, three issues stand out. First, empirical research in the New Keynesian tradition has recently highlighted the role of interactions between demand shocks, supply shocks and labor market institutions (e.g. Blanchard and Wolfers, 2000). While potentially empirically important, a treatment of various interaction effects for all the theories discussed here is well beyond the scope of the paper. Second, several Keynesian authors have argued that there are non-linearities in the relation between unemployment and prices.[1] We will assume standard linear relations throughout the paper. Introducing non-linearities will not invalidate the different mechanisms highlighted in this paper. Third this paper will be based on an equilibrium framework. Many Post Keynesians and most Marxists would feel that this framework is inappropriate to capture their respective arguments. And rightly so. Arguably neither Marx nor Keynes conceptualized the economic processes as moving smoothly from one well-defined equilibrium to another. However, the use of a standard comparative statics framework will help highlight the different mechanisms in the four theories discussed. In doing so, necessarily, other important differences, such as dynamics, are ignored.

The paper is structured as follows. Section 2 presents the core model and distinguishes between the NAIRU theory and the NAIRU story of European unemployment. Section 3 explores whether the Monetarist natural rate of unemployment is indeed similar to the NAIRU. Section 4 presents the New Keynesian NAIRU theory and highlights the ambiguous role of hysteresis in this theory. In section 5 a Post Keynesian approach based on the so-called conflict inflation is presented as well as the more genuine role for hysteresis. Section 6 discusses Marxian theory and its ambivalent position with respect to the NAIRU. Section 7 concludes.

2. A NAIRU REFERENCE MODEL

Table 1 summarizes a NAIRU reference model for a closed economy. Nominal wages are set in a bargaining process. Thus the reference model is a NAIRU model in the strong sense. Workers' bargaining position and thus wage claims (equation (1)) depend on various exogenous factors and

[1] The numerous examples include Robinson (1937), Akerlof *et al.* (2000), Kriesler and Lavoie (2004) and Hein (2006).

Table 1. A NAIRU reference model

Wage claims	$(1-\pi)^{W} = w_0 - w_1 u(y)$	(1)
Profit claims	$\pi^{R} = \pi_0$	(2)
Realized wage share	$(1-\pi) = w_0 - w_1 u(y) - w_2 p^{U}$	(3)
Realized profit share	$\pi = \pi_0 - \pi_2 p^{U}$	(4)
National income (standardized to 1)	$1 = \pi_0 + w_0 - w_1 u(y) - (\pi_2 + w_2) p^{U}$	(5)
Adaptive expectations	$p_t^{E} = p_{t-1}$, thus $p^{U} = \Delta p$	(6)
Unemployment	$u = n - y$	(7)
Demand	$y = y_0 + y_2 p + y_3 \pi$	(8)
NAIRU	$\hat{u}_N = \gamma(u - u_N)$, where $u_N = (\pi_0 + w_0 - 1)/w_1$	(9)

Notes: π, u, p, y and n are the profit share, the rate of unemployment, the rate of inflation, log level of output and the (logarithm of the) labor force. Superscript W and R stand for the targets of workers and capitalists, respectively. Superscripts E and U stands for expected and unexpected, respectively.

negatively on the rate of unemployment. This is also often called the wage setting curve. The precise interpretation of this relation as well as the determinants of exogenous factors influencing wage claims will differ according to theory.

Firms have the ability to influence prices and set prices by charging a mark-up on production costs. The (intended) mark-up is determined exogenously (equation (2)). It is assumed that capitalists as well as workers are imperfectly able to protect themselves against unexpected inflation. Actual wage and profit shares (equations (3) and (4)) thus depend on unanticipated inflation. At first it may appear counterintuitive to have the actual profit share being affected by unanticipated inflation; after all in the NAIRU theories to be discussed, it is assumed that firms do have market power and thus *set* prices. However, firms set the prices on their output, but may experience price changes of their inputs and a large body of theoretical and empirical work suggests that prices are sticky. By implication this means that in many cases cost increases will not be fully passed on to prices. Indeed, the model presented here is a simplified version of a fully fledged model, which would distinguish between wage inflation and price inflation (e.g. Asada *et al*., 2006; Franke *et al*., 2006). We avoid this complication because this would contribute little to the understanding of the difference of the theories to be discussed. The distributional effects of inflation depend on the speed and frequency with which wages and prices are adjusted.

Following standard practice we assume that people form adaptive expectations about price inflation (equation (6)) throughout the paper. The assumption is made for convenience. The difference between the theories

discussed does not lie in different assumptions about the formation of expectations. A second convenient auxiliary assumption is an employment function according to which unemployment depends on output (7). This is an Okun's Law-type relation that is written in levels rather than differences.

From (5) and (6) we can derive the familiar expectations-augmented Phillips curve:

$$\Delta p = (\pi_0 + w_0 - 1)/(\pi_2 + w_2) - w_1 u/(\pi_2 + w_2) \tag{10}$$

In combination with equation (7) we can solve for the short-run Phillips curve that will be used for graphic analysis later:

$$p_t = p_{t-1} + (\pi_0 + w_0 - 1)/(\pi_2 + w_2) - w_1 n/(\pi_2 + w_2) + w_1 y/(\pi_2 + w_2) \tag{11}$$

Alternatively we can solve for unemployment:

$$u(y) = u_N - (\pi_2 + w_2)\Delta p/w_1 \tag{12}$$

where $u_N = (\pi_0 + w_0 - 1)/w_1$.

The empirical interpretation of the NAIRU model can focus either on the explanation of inflation or on the explanation of unemployment. It seems that in the USA the NAIRU model is implicitly interpreted as a theory of inflation. Most authors criticize or defend the NAIRU model based on its ability to explain the development of inflation (Gordon, 1997; Staiger *et al.*, 1997). In Europe, on the other hand, the NAIRU is understood as a theory that ought to be able to explain unemployment *ex ante*, i.e. exogenous variables that supposedly determine the NAIRU also ought to explain actual unemployment (Blanchard and Katz, 1997; Nickell, 1997). In other words, in the USA the NAIRU is mostly interpreted from the point of view of a Central Banker, but in Europe from the view point of a labor market reformer.

The model is not closed yet, as nothing has been said about demand formation and about the evolution of the NAIRU over time. This paper will propose two equations, the demand closure (equation (8)) and the NAIRU closure (9). It will be argued that substantial differences in interpretation and terminology exist between the Monetarist, New Keynesians, Post Keynesian and Marxist theories, but different specifications of these two equations go a long way in illustrating these differences, while leaving equations (1) to (7) unchanged.

2.1 The NAIRU theory *and the NAIRU* story

The NAIRU theory is, in Europe, associated with a particular explanation of unemployment. Before we proceed with the theoretical discussion a

digression on policy implications is necessary. We will distinguish between the NAIRU *model* and the NAIRU *story* regarding European unemployment (Stockhammer, 2004a). The NAIRU *model*, outlined above, is understood as a general model of output, employment and inflation that allows for inflation resulting from conflicting income claims. Such models imply that at any point in time there will exist an inflation barrier, the NAIRU, such that if demand took unemployment below that barrier then inflation would tend to rise. The NAIRU *story* is understood as a specific interpretation of the model. It involves two claims. First that the NAIRU is determined exogenously by labor market institutions, which are mostly subject to policy. Second that changes in the NAIRU in a strong sense of the word cause changes in actual unemployment (rather than vice versa or a third variable affecting both). Consequently the NAIRU serves as a strong attractor for actual unemployment. The NAIRU story thus claims that the rise of unemployment in Europe is due to labor market inflexibility: changes in the NAIRU over the past decades have been due to wage-push factors conveniently summarized as overgenerous welfare states.

3. THE NATURAL RATE OF UNEMPLOYMENT—A MONETARIST NAIRU?

Friedman (1968) and Phelps (1968) laid the cornerstone for the later discussions of the NAIRU by proposing the long-run vertical Phillips curve. Friedman famously baptized the unemployment rate at which inflation would be constant the 'natural rate of unemployment' (NRU). Some, mostly American, economists do maintain that 'the NAIRU is approximately a synonym for the natural rate of unemployment' (Ball and Mankiw, 2002, p. 115). It will be argued that this is at best misleading.

Friedman's (1968) famous paper does not offer a rigorous analysis. Rather he asserts that, given certain frictions, the Walrasian system will ground out an equilibrium rate of unemployment, labeled the natural rate of unemployment in analogy to Wicksell's natural rate of interest. Friedman's definition of the natural rate as well as his description of the forces that will push actual unemployment towards its natural level are cryptic.

> At any moment in time there is some level of unemployment which has the property that it is consistent with equilibrium in the structure of real wages . . . The 'natural rate of unemployment' . . . is the level that would be ground out by the Walrasian system of general equilibrium equations, provided that there is embedded in them the actual structural characteristics of the labor and commodity markets, including

> market imperfections, stochastic variability in demands and supplies, the costs of gathering information about job vacancies, and labor availabilities, the costs of mobility and so on. (Friedman, 1968, p. 8)

Asserting that the economy does gravitate to the NRU, Friedman goes on to explain that attempts to influence unemployment will result only in higher inflation. People's inflationary expectations will be based on past inflation rates. Unexpected inflation can thus increase the labor supply in the short run and therefore output, but once people realize that inflation is higher than expected, real variables, including the rate of unemployment, will return to their equilibrium level and prices will increase.

In his Nobel Lecture Friedman (1977) elaborates further. A nominal demand shock that is not properly understood by firms and workers may be misinterpreted due to rising sectoral prices. Thus workers may offer more labor as they believe that real wages have increased, whereas in fact only nominal wages have. Firms may hire more workers because they think the real product wage (i.e. deflated by sectoral prices) has fallen. Unemployment increases because workers quit and search for new, better-paying jobs. Unemployment in Friedman's theory is search unemployment. Overall, the changes in employment happen because of misperceptions of workers and firms.

Thus instead of (12) the relation between unemployment and inflation should rather be written as

$$u = u_{\mathrm{N}} - \Delta p(y)(\pi_2 + w_2)/w_1 \tag{12′}$$

Here inflation, rather than employment, is a function of the demand shock. Employment will only react because of price misperceptions. In the Monetarist argument prices change before or simultaneously with quantities and employment. Note that if prices were slow in adjusting, there would be no reason for workers or firms to adjust their employment decisions. Notably, this is not how modern Central Banks think that monetary policy is operating. Ehrbar *et al*. (2003) in a summary of the European Central Bank's Euro-area study on monetary policy argue that changes in monetary policy are quick in affecting output, but slow in affecting prices.

The demand closure of Monetarists is a standard Pigou or Keynes effect: inflation will negatively affect demand ($\partial y/\partial p < 0$), given a certain supply of money. The effect of income distribution on demand is neglected ($y_3 = 0$). The Monetarist demand closure thus becomes

$$y = y_0 + y_2(m - p) \tag{13.Mo}$$

where m is the growth rate of the money supply (set by the Central Bank).

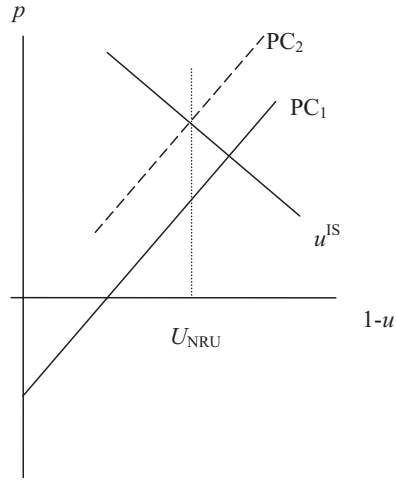

Figure 1. Monetarism.
Notes: PC is the short-run Phillips curve. u^{IS} is the level of unemployment as determined by the goods market equilibrium.

As to the NAIRU closure Friedman agues that the NRU is given exogenously. Friedman (1977) mentions two factors that will empirically be important in determining the NRU: demographics and unemployment benefits. The demographic structure matters because different age groups have different rates of mobility (and mobility by assumption implies spells of unemployment). Unemployment benefits matter because they encourage workers to search for jobs longer. More generally he argues that the NRU depends on real as opposed to monetary factors (Friedman, 1977, p. 458). There is no indication that the NRU would depend on actual unemployment (thus $\gamma = 0$ in equation (9)); indeed demand shocks for Friedman are monetary shocks. Equation (9) therefore vanishes and NRU is determined exogenously. Thus the second Monetarist closure is

$$u_N = f(d, \Lambda) \tag{14.Mo}$$

where d denotes the demographic structure and Λ various relevant labor market institutions.

Figure 1 summarizes the Monetarist argument. In the $(p, 1 - u)$ space the Phillips curve (PC) has a positive slope and the demand function (u^{IS}) a negative slope. Actual unemployment will only deviate from the NRU, if there is unexpected inflation. In figure 1 this is the case at PC_1. Once people incorporate the increased price level into their expectations, the Phillips curve

will shift upwards the next period (to PC_2) such that actual unemployment will approach the NRU. The ensuing equilibrium is thus stable and, as the NRU was assumed to be exogenous, the NRU serves as an attractor for actual unemployment.

Monetarism and the NRU have had a major impact on economic theory and economic policy. In terms of the latter it shifted the policy focus from full employment to price stability. Unemployment was perceived as a structural phenomenon that fiscal and monetary policy could do nothing about. Monetarism was thus criticized by Balogh as 'the incomes policy of Karl Marx' by 'deliberately setting out to base the viability of the capitalist system on the maintenance of a large "industrial reserve army" ' (Balogh, 1982, pp. 177–178). Theoretically Monetarism crucially contributed to the decline of Keynesian economics as mainstream economics. It constituted the first wave of New Classical Economics that led to the Rational Expectations school and the Real Business Cycle theory, neither of which developed the theory of the natural rate further.

How similar is the NRU to the NAIRU? While the NRU concept does lead to similar policy conclusions as (some versions of) the NAIRU theory and, indeed, the two are often conflated, as witnessed by Ball and Mankiw (2002), there are important differences in the theoretical foundation. NRU is founded on a Walrasian analysis of atomistically competitive markets. Snowdon, Vane and Wynarczyk point out:

> The crucial difference between these concepts relates to their micro foundations. Friedman's natural rate is a market-clearing concept, whereas the NAIRU is the rate of unemployment which generates consistency between the target real wage of workers and the feasible real wage determined by labour productivity and the size of a firm's mark up. Since the NAIRU is determined by the balance of power between workers and firms, the micro foundations of the NAIRU relate theories of imperfect competition in the labour and production markets. (Snowdon *et al*., 1994, p. 323)

On the labor market a competitive labor demand function intersects with a labor supply curve that can be derived from individual income leisure trade-off. The NAIRU model, on the other hand, is founded on bargaining models, i.e. there is an intrinsic conflict of interest between workers and firms that is mediated not by the market but by a bargaining process.[2] The key difference conceptually is that Friedman's NRU is a theory of *voluntary* unemployment. The NAIRU model, as understood in this paper, is a theory of

[2] Carlin and Soskice (1990, pp. 157–159) make a similar point.

involuntary unemployment.[3] Therefore we conclude that, despite similarities in policy conclusions, the Monetarist NRU should be considered a distinct theory and not a variant of the NAIRU theory. While the NRU certainly is a rate of unemployment at which inflation is stable, the behavioral assumptions of the Monetarist model as well as its properties are rather different from the NAIRU theory (in the strong sense).[4]

4. THE NEW KEYNESIAN NAIRU

New Keynesian theory maintains the perfectly competitive labor market as a reference system, but situates the actual analysis in an imperfect competition framework. New Keynesians pride themselves in being able to provide microfoundations for their models. What is labeled 'wage claims function' here is usually called the 'wage-setting function', and is interpreted as the outcome of the bargaining process between labor and capital. Our profit claims function is called price-setting function and is interpreted as the price-setting behavior by a firm with market power. Consequently, the target profit claims, in this interpretation, depend solely on the market power of the firm (as measured by the demand elasticity faced by the firm, as the latter is assumed to be profit maximizing). Moreover, in empirical research it is usually assumed constant (e.g. Nickell, 1997, 1998).

Equations (1)–(7) would be acceptable to New Keynesians without substantial modifications. Indeed this set of equations has been inspired by Nickell (1998). Thus we only need to investigate the demand closure and the NAIRU closure.

There are two versions of the New Keynesian demand closure. The first is a reproduction of the Monetarist price effect. Layard *et al.* (1991) and Nickell (1998) are prominent examples that follow this path. However, few economists, certainly few Central Bankers, these days believe that the money supply is given exogenously or can be controlled by the Central Bank. The second, more genuine New Keynesian closure does not rely on real balance effects of various sorts, but on Central Bank behavior.[5] Typically Central

[3] This is another important difference in the interpretation of the NAIRU on the two sides of the Atlantic. While hardly any economist in Europe would associate the NAIRU with voluntary unemployment, many in the USA do.

[4] In the NRU model prices change *before* employment (and output). Indeed employment changes because price changes (which must already have taken place) are misinterpreted. In the NAIRU model, prices change because (hence after) output and employment have changed.

[5] Palacio-Vera (2005) points out that in addition there is an implicit assumption that agents have perfect foresight in the case of a positive supply shock.

Banks are assumed to follow some form of a Taylor rule. For simplicity, it is assumed here that the Central Bank is inflation targeting, i.e. that it increases interest rates if inflation exceeds its target inflation (equation (15)).[6] The Central Bank's reaction function is

$$i^{CB} - p = i_0 + i_2(p - t) \tag{15}$$

where i^{CB} is the rate of interest set by the Central Bank and t the Central Bank's target inflation rate.

Effects of income distribution on demand are ignored ($y_3 = 0$ in equation (8)). The New Keynesian demand closure thus is

$$y^{IS-CB} = y_0 + y_2(i^{CB} - p) \quad \text{with } y_2 < 0 \tag{13.NK}$$

The IS curve including Central Bank behavior then becomes

$$y^{IS-CB} = y_0 + y_2 i_0 - y_2 i_2 t + y_2 i_2 p \tag{16}$$

The NAIRU in the New Keynesian interpretation depends on labor market institutions that determine wage claims (the so-called wage push factors) and on the market power of firms. In empirical research, however, the latter is routinely ignored. For practical purposes thus the target wage share and consequently the NAIRU are thought of as depending on exogenous labor market institutions, in particular welfare state characteristics, such as the level of minimum wages, the level and duration of unemployment benefits, etc. In combination with a given market power of firms, the NAIRU is thus assumed to be determined exogenously. As with Monetarists $\gamma = 0$ and (9) vanishes. Instead we get

$$u_N = f(\Lambda) \tag{9.NK}$$

While (9.NK) may look similar to (9.Mo), its interpretation is quite different. Whereas in the Monetarist version higher unemployment benefits increase the duration of unemployment of the people searching for jobs, in the New Keynesian version the unemployment benefits increase the bargaining power of the workers who have a job and pushes up their wage demands. Therefore involuntary unemployment will arise because of wages being 'too high'.

We are now in a position to discuss the properties of the New Keynesian NAIRU model. *In the short run*, effective demand determines actual

[6] Taylor rules also include a term for the output gap. This complication is ignored here. And indeed with the assumed employment function (7) this would not be very interesting. These second type of New Keynesian NAIRU models have also become known as New Consensus models (Romer, 2000) and recently been subject to critique by Post Keynesians (Arestis and Sawyer, 2002; Kriesler and Lavoie, 2004).

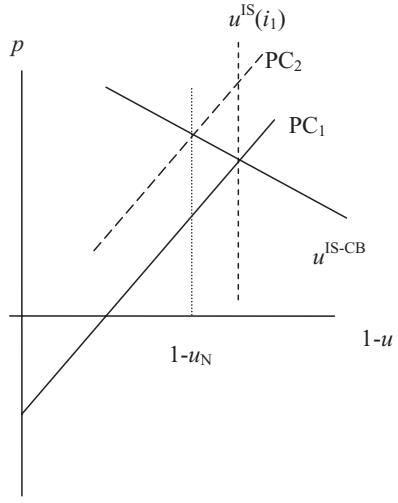

Figure 2. New Keynesian NAIRU.
Notes: PC is the short-run Phillips curve. u^{IS} is the level of unemployment as determined by the goods market equilibrium (for a given interest rate). $u^{IS\text{-}CB}$ is the rate of unemployment as determined by the goods market equilibrium and the Central Bank's response function.

unemployment and as a consequence unanticipated inflation. Unemployment then is a function of all kinds of demand shocks, including fiscal (y_0) and monetary policy. The deviation of demand-determined, actual unemployment from equilibrium unemployment then determines changes in the inflation rate (as summarized in equation (10)). In the short run, the system therefore has Keynesian features, but only because of the difference between expected and actual prices.

As their expectations have been frustrated in the short run, people will alter their behavior and adjust expectations to the higher inflation rate. For equilibrium *in the long run*, expectations have to be fulfilled ($\Delta p = 0$), and income claims are thus equilibrated through the rate of unemployment. There will be only one level of unemployment that renders income claims of workers (w_0) and capitalists (π_0) consistent. Any attempt by fiscal or monetary policy to move unemployment away from this equilibrium level is doomed to fail. In the long run the NAIRU depends on wage push factors and the mark-up, but not on autonomous demand. In the long run the model thus has neoclassical features, but a non-clearing labor market.

This is summarized in figure 2. Compared with figure 1 there are two demand curves: u^{IS} (based on (13.NK)), which is the level of employment for a given interest rate, and $u^{IS\text{-}CB}$ (based on (16)), which incorporates the CB reaction function and has a negative slope. In figure 2 the initial short-run

Phillips curve (PC_1) gives rise to a low level of unemployment (u_1) that is below u_N. Therefore there will be an increase in inflation and in the next period the Phillips curve will thus shift upwards (to PC_2). Actual unemployment will be pushed towards the NAIRU (u_N). With a given Central Bank reaction function the system is stable and the NAIRU serves as an attractor for actual unemployment.

4.1 From the New Keynesian NAIRU model to the NAIRU story

The New Keynesian interpretation of the NAIRU therefore replicates on important feature of the Neoclassical Synthesis: the short run (Keynesian)–long run (Classical) dichotomy. Finally, we turn to the policy conclusions and see how the New Keynesian model turns into the NAIRU story. The standard NAIRU *story* of European unemployment is that wage push factors, i.e. overgenerous welfare states, caused unemployment. Wage inflexibility is due to labor market rigidities that empowered insiders and has caused a rise in the NAIRU (Siebert, 1997). Some versions of the NAIRU story also highlight technological change and globalization as interacting factors (Krugman, 1994). Among the most frequently cited empirical causes for unemployment are long and durable unemployment benefits, job protection measures, high social security contributions (or more generally: the tax wedge) and strong unions. This explanation, i.e. a change in w_0 within the NAIRU model, leads to an increase in the rate of unemployment, with the mark-up being constant. The policy recommendations of this explanation are straightforward: as rigid labor markets and overgenerous welfare states have caused the problem, labor markets have to be deregulated and welfare states curbed. The OECD does therefore recommend in a series of publications (OECD, 1997) the easing of employment protection, reducing the level and duration of unemployment benefits, and decentralizing wage bargaining.

Note that what we call the NAIRU story is really a specific interpretation of the New Keynesian NAIRU model. The NAIRU story does not follow automatically from the New Keynesian interpretation of the NAIRU, as the former involves the empirical claim that labor market institutions have in fact changed in the alleged direction and strong enough so as to raise the NAIRU substantially. There are numerous problems with this claim. First, the argument implies that wage push factors that increase the NAIRU also increase real wages. This is squarely at odds with the stylized facts of European unemployment, where over past 25 years the rate of unemployment *and* the profit share have risen (Blanchard, 1997; Stockhammer, 2004c, 2008, ch. 1). Second, several studies concluded that the changes in labor market

institutions are unable to explain the actual behavior of unemployment over time (Madsen, 1998; Ball, 1999; Stockhammer, 2004a; Baker *et al.*, 2005)

4.2 Unemployment hysteresis

Many New Keynesian models take into account unemployment persistence. This is a delicate task as unemployment hysteresis has the potential to undermine key policy conclusions of the NAIRU story. If today's unemployment depends on past unemployment then the effectiveness of economic policy in fighting unemployment increases. The NAIRU itself may become an endogenous variable and follow where actual unemployment takes it (Blanchard and Summers, 1988), in our notation $\gamma > 0$ in equation (9). Indeed, within the New Keynesian camp there is disagreement on the question how fundamental the effect of hysteresis is. Whereas Layard *et al.* (1991) regard it as a minor modification to the model, Ball (1999) argues that differences in monetary policy explain most of the differences in unemployment rates across countries.

In the New Keynesian version unemployment persistence is usually (Layard *et al.*, 1991) modeled in the following way. Wage demand depends on a weighted average of current and past unemployment rather than on current unemployment alone. Thus,

$$(1-\pi)^{W} = w_0 - w_1(u_t - hu_{t-1}) \tag{1'}$$

where $0 \leq h \leq 1$ is a measure of how differently wages react to present and to past unemployment and, as will be shown, corresponds to unemployment persistence. The mechanism through which unemployment persistence becomes effective is that current and past unemployment affect wage bargaining differently. The justifications for this vary. Frequently cited causes are insider bargaining (insiders care more about the employed than about the unemployed) and deskilling (the unemployed loose skills while unemployed and thus cannot compete with the employed).

In the extreme case of full hysteresis ($h = 1$) the change in inflation will be related to the *change* in unemployment. Instead of (12) we get

$$\Delta u = [u_N - (\pi_2 + w_2)\Delta p]/w_1 \tag{12'}$$

Inflation can then be stable at *any* rate of unemployment. Accelerations of inflation will come with a lasting decrease in unemployment. In other words, the wage setting curve shifts with any change in actual unemployment and

consequently the NAIRU will be dragged along with actual unemployment and ceases to play an independent role.

However the above requires that the long-term unemployed exercise no downward pressure on wages whatsoever, an assumption that few economists are willing to make. Thus usually partial unemployment persistence ($0 < h < 1$) is thought to be more realistic. In the short run unemployment will then not only depend on the NAIRU and unexpected inflation, but also on past unemployment. Equation (12) becomes

$$u_t = u_N - (\pi_2 + w_2)\Delta p / w_1 + h u_{t-1} \qquad (12'')$$

u_N can now not be interpreted as the NAIRU any more. In the long run $\Delta p = 0$ and $u_t = u_{t-1}$ will hold. The expression for the NAIRU then changes somewhat:

$$u_N^{LR} = u_N / (1-h) = (\pi_0 + w_0 - 1)/w_1(1-h)$$

where u_N^{LR} stands for the long-run NAIRU in system with unemployment persistence. Again unemployment will then only depend on the exogenous factors.

Thus unemployment persistence in the case of less than full hysteresis is merely a case of low wage flexibility (with respect to unemployment) and will increase unemployment in the long run. It does not affect the qualitative long-run properties of the New Keynesian NAIRU model (except for the case of full hysteresis). However, for New Keynesian economists with a genuine interest in short-run development it can provide a reason to argue for government demand management.

5. A POST KEYNESIAN NAIRU

The New Keynesian NAIRU theory lends itself to policy recommendations that are in line with standard neoclassical prescriptions. Labor market reforms, not demand policy, is what is needed to combat unemployment. The NAIRU story, correspondingly, argues that it has been wrong-headed labor market reforms that led to labor market inflexibility and thus caused the rise in European unemployment. Post Keynesian reactions to this explanation, i.e. the NAIRU *story*, have been consistently critical. But reactions to the NAIRU *theory* have been far less unified, ranging from outright rejection of the NAIRU to attempts of formulating a genuinely Post Keynesian version of the NAIRU.

The basis for this diversity in Post Keynesian reactions to the NAIRU model is that some of its arguments are also part of the Post Keynesian

repertoire. Indeed the earliest definition of the NAIRU, though not of the term itself, is arguably found in Joan Robinson's (1937) *Essays in the Theory of Employment*, where she writes: 'in any given conditions of the labor market there is a certain more of less definite level of employment at which money wages will rise' (Robinson, 1937, p. 4).[7] Not only has the NAIRU been defined, but key determinants of nominal and real wages in the NAIRU theory are set out clearly: 'there is a certain level of employment, determined by the general strategical position of the Trade Unions, at which money wages rise, and at that level of employment there is a certain level of real wages, determined by the technical conditions of production and the degree of monopoly' (Robinson, 1937, p. 5). Later Robinson (1956) uses a similar concept with her 'inflation barrier'. Robinson's theory has later been elaborated as the theory of conflict inflation. The diversity in Post Keynesian reactions to the NAIRU theory is, in our view, at least in part related to a conflation of the NAIRU theory and the NAIRU story. We will first look at the variety of Post Keynesian reactions.

5.1 Post Keynesian reactions to the NAIRU

Davidson (1998) offers a Post Keynesian criticism of the NAIRU. Emphasizing the pivotal role of uncertainty in a monetary production economy he insists that no labor demand curve, nor its present incarnation in the form of the price setting curve, can be drawn without an assumption about effective demand, because the notion of the marginal product of labor or the marginal revenue product of labor that underlies the price setting curve does not exist prior to the level of effective demand. The labor demand curve therefore depends on the level of effective demand, which in turn is crucially determined by government expenditure and investment. Wage decreases can therefore not bring about an increase in employment unless they increase effective demand. Davidson fails to distinguish between the NAIRU story and the NAIRU theory. He correctly highlights non-Keynesian features in the demand function in some New Keynesian versions of the NAIRU theory, but seems to miss the difference between a standard labor supply curve and the wage setting curve.[8] Therefore he fails to appreciate how far the New Keynesians have moved away from Monetarists.

[7] Robinson conceptualizes the level of employment consistent with stable money wages as a *range* of employment levels rather than as a unique point of employment, but from the perspective of the approach taken here, this is of secondary importance.

[8] There probably is a deeper reason for this lack of interest in the wage setting curve. Davidson (2003) insists that Post Keynesians should analyze capitalism assuming perfect competition and, indeed, has criticized other Post Keynesians, i.e. the Kaleckian tradition, for taking oligopolistic

Pollin *et al.* (1998) can be regarded as the complement, or opposite, to Davidson in that he discusses the wage setting curve, but remains silent on the price setting curve. Pollin draws attention to the parallels in the NAIRU bargaining model and a Marx–Kalecki theory of income distribution and the reserve army: 'Marx and Kalecki also share a common conclusion with natural rate proponents, in that they would all agree that positive unemployment rates are the outgrowth of class struggle over distribution of income and political power.' And he goes on:

> Of course, Friedman and the New Classicals reach this conclusion via analytic and political perspectives that are diametrically opposite to those of Marx and Kalecki. To put it in a nutshell, mass unemployment results in the Friedmanite/New Classical view when workers demand more than they deserve, while for Marx and Kalecki, capitalists use the weapon of unemployment to prevent workers from getting their just due. (Pollin *et al.*, 1998, p. 5f).

Pollin hardly addresses the issue of effective demand. Davidson and Pollin cover the extreme poles of the reactions of Post Keynesians to the NAIRU theory: harsh criticism of its neglect of demand and approval of its emphasis on distributional conflict. Similar arguments regarding the role of unemployment and distributional conflict in the determination of inflation had been made much earlier by Post Keynesians under the name of conflict inflation.

5.2 Conflict inflation[9]

Davidson underestimates the innovative potential of the NAIRU theory and how far it has moved from the classical model that Keynes had criticized. As a theory of inflation the NAIRU model resembles the conflict inflation theory of Post Keynesian origin. This theory was formally developed in the 1970s and 1980s, and reflects Post Keynesians long-standing conviction that inflation is the outcome of distributional conflict (and not excessive growth in the money supply) and thus has to be combated through incomes policies (Rochon, 1999; King, 2002).

Conflict inflation theory takes as its point of departure income claims of labor and capital, although the model can obviously be extended to include the state and a foreign sector. If the income claims of labor and capital exceed

competition as their starting point. Therefore the oligopolistic conceptualization of the labor market in New Keynesian analysis is not much of an achievement for Davidson.

[9] See Rowthorn (1977), Lavoie (1992) and Palley (1996) as examples.

national income, the income claims are inconsistent and inflation will result such as to reconcile income claims nominally.

The income claims depend on the respective power position, which will depend on various exogenous factors (strength and militancy of labor unions; market power of firms) and demand. For workers a lower level of effective demand results in higher unemployment, and for firms it implies lower capacity utilization. Thus a lower level of demand weakens the bargaining position of either side and thus will lead to lower inflation. Inflation in this theory is thus not a monetary phenomenon in the sense of the quantity theory of money, but a real phenomenon, resulting from the distributional conflict between capital and labor.

Such a model will exhibit a rate of unemployment at which inflation is constant, because at this rate of unemployment workers are weakened sufficiently to accept capitalists' income claims. Thus the model exhibits a NAIRU. However, the similarities between the conflict inflation model and the NAIRU theory are rarely discussed explicitly. Most proponents of the conflict inflation model (e.g. M. Lavoie) regard it as a theory of inflation rather than unemployment.[10]

5.3 A Post Keynesian NAIRU model

While the conflict inflation theory is consistent with the inflation part of the NAIRU model, the Post Keynesian analysis of the labor market part of the NAIRU model differs from the New Keynesian counterpart. The theories of demand and of the determinants of the NAIRU differ. With an appropriate specification of the demand side and endogeneity of the NAIRU itself, equations (1)–(9) would be acceptable.

The effect of inflation on demand is usually (at least for medium levels of inflation) thought of as positive (or nil) rather than negative. In particular Post Keynesians argue that deflation will have a contractionary rather than an expansionary effect. This is sometimes called the Fisher effect and is due to the real value of debt and debt services increasing.[11] Second, income distribution may affect demand. The standard Kaleckian assumption (for a closed economy) is that the consumption propensity out of wage incomes is

[10] Lavoie (2002) and Cassetti (2003) propose Kaleckian growth models with conflict inflation, where a higher price level has no effects on demand. In such a model a NAIRU will exists, although it is not mentioned explicitly by either author, but it affects only inflation, but no real variables.

[11] Empirically moderate levels of inflation, roughly below 20 per cent, seem to be *positively* correlated with growth (Bruno and Easterly, 1998).

higher than that of profit income.[12] Therefore an increase in the wage share will have a positive effect on output. Thus the demand closure in the Post Keynesian NAIRU model (without CB) will be

$$y^{IS} = y_0 + y_2(i - p) + y_3\pi + y_4\left(D - \sum_t p_t\right) \quad \text{with } y_2, y_3, y_4 < 0 \qquad (13.PK)$$

where D is the level of debt. As y_4 is assumed to be negative, $\partial y^{IS}/\partial p$ (which corresponds to y_2 in equation (8)) is positive. Without Central Bank intervention inflation will therefore have an expansionary effect because it alleviates the real debt burden of firms. y_3 is assumed to be negative.

If the Central Bank is inflation targeting (like equation (15)) the extended IS curve becomes

$$y^{IS\text{–}CB} = y_0 + y_3\pi - y_2(i^{CB} - p) + y_4(D - p)$$

If the Central Bank reacts sufficiently strongly to an increase in inflation, the total derivative $\partial y^{IS\text{–}CB}/\partial p$ will be negative (as long as inflation is positive).[13] This is assumed in the following.

As will be shown below, the Post Keynesian NAIRU model is unstable without policy intervention. Post Keynesians have long emphasized the role of effective demand in determining the level of output and employment. The labor market is usually thought of as adjusting passively to the level of effective demand, which is why Sawyer (1996) speaks of the labor sector rather then the labor market in Post Keynesian economics. Moreover, Post Keynesians argue that the NAIRU itself is endogenous. One reason why the NAIRU should be endogenous was already discussed above: hysteresis in wage formation. Employment, being dragged along with demand, will respond slowly, because insiders may not consider the long-term unemployed as competitors. However, the Post Keynesian case for the endogeneity of the NAIRU is much broader. Indeed, there are several arguments.

First, the level of employment will depend on the capital stock (in combination with imperfect substitution between capital and labor; Rowthorn, 1999; Sawyer, 2002; Arestis and Sawyer, 2005), an issue that has been

[12] This probably is the Post Keynesian majority view. Bhaduri and Marglin (1990) proposed a simple model where investment also reacts to the profit share. Demand can then be either wage-led or profit-led. The wage-led regime is considered the standard Post Keynesian assumption, whereas the profit-led regime is considered the Marxian assumption. We consider this type of model a synthesis of Keynesian and Marxian arguments.

[13] The ability of the Central Bank to stabilize the system is severely limited once inflation turns into deflation because nominal interest rates have to be positive. Hein (2006) presents a skeptical view on the ability of Central Banks to stabilize the economy by using a Taylor rule.

established empirically by several studies.[14] Thus the NAIRU in the Post Keynesian model will depend, next to labor market institutions, on the capital stock:

$$1 = \pi_0(y, K) - \pi_2 \Delta p + w_0 - w_1 u(y) - w_2 \Delta p, \quad \text{where } K = \sum_t f(y_t)$$

with $\partial \pi_0 / \partial K < 0$ as additional capacity (given a certain level of demand) decreases the price-setting ability of firms.

Second, it has been argued that profit claims would be affected by the interest rate (Hein, 2006). An increase in the interest rate would consequently affect not only actual unemployment, but also the NAIRU.

$$\pi_0 = f(i - p) \quad \text{thus } \partial u_N / \partial i = f / w_1$$

Third, Post Keynesians reject the neoclassical theory of income distribution based on technology and preferences. Rather wage and profit aspirations are based on conventional behavior. Therefore, wage claims themselves will depend on the past experience.[15] A simple way to formalize this argument that gives rise to an endogenous NAIRU is the following: assume that autonomous wage claims increase if the actual wage share is higher than wage claims. In other words, workers get used to their higher income share. The same conventionalist argument would hold for profit claims.[16]

$$\hat{w}_0 = \alpha \left| (1 - \pi) - (1 - \pi)^W \right|$$

$$\hat{\pi}_0 = \beta \left| \pi - \pi^R \right|$$

As the NAIRU is determined by autonomous income claims, it would also become endogenous:

$$\begin{aligned} &\text{As } (1 - \pi) - (1 - \pi)^W > 0 \text{ and } \pi - \pi^R > 0 \text{ if } u > u_N: \\ &\hat{u}_N = \gamma (u - u_N) \\ &\text{if } u \neq u_N, \text{ because } u_N = (\pi_0 + w_0 - 1)/w_1 \text{ and thus } \hat{u}_N = \hat{\pi}_0 + \hat{w}_0 \end{aligned} \tag{9.PK}$$

The NAIRU would thus follow the path of actual unemployment.

[14] References include Sarantis (1993), Rowthorn (1995), Arestis and Biefang-Frisancho Maricsal (1998), Alexiou and Pitelis (2003) and Stockhammer (2004a).

[15] The argument is similar to that of Skott (2005). In Setterfield (2005) wage aspirations refer to the growth of wages rather than the wage share. Thus if productivity growth increases, wages may lag behind and still be in line with aspirations. This is not assumed here.

[16] The analogy will only hold in a closed economy. In an open economy with capital mobility, profit claims will not readily adjust to past experiences at home but strongly depend on profitability abroad. Thus we would expect that in the real world, α be greater than β.

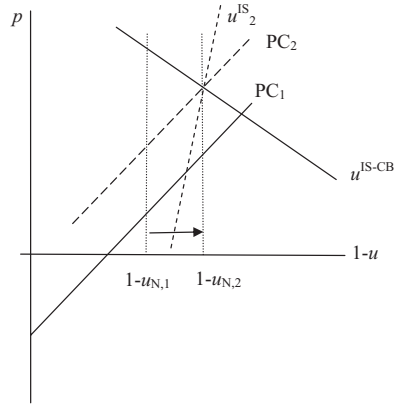

Figure 3. Post Keynesian NAIRU.
Notes: PC is the short-run Phillips curve, u^{IS} is the level of unemployment as determined by the goods market equilibrium (for a given interest rate). $u^{IS\text{-}CB}$ is the rate of unemployment as determined by the goods market equilibrium and the Central Bank's response function.

There are several other arguments that have been put forward by Post Keynesians, but in the framework presented here, they are not crucial, although they would reinforce the argument presented here. As Lavoie (2004) points out the key point is that the natural rate of growth is endogenous.

To simplify the graphic presentation the effects of inflation and income distribution will be discussed separately. Figure 3 shows the interaction of the Phillips curve and demand assuming that $\partial y/\partial \pi = 0$. Without Central Bank intervention the demand curve (u^{IS}) will have a positive slope. If u is below u_N, there will be accelerating inflation. In the next period the Phillips curve will shift upwards (to PC_2) and the resulting u_2 will be further away from u_N than u_1 because inflation is assumed to have an expansionary effect. Thus without Central Bank intervention the system is unstable (at moderate inflation rates). If the Central Bank's reaction function inverts the slope of the demand function ($u^{IS\text{-}CB}$), the system may become stable (at positive inflation rates). In either case because of (9.PK) the NAIRU will follow the actual unemployment.

Figure 4 presents the interaction of the distribution curve and demand assuming that $\partial y/\partial p = 0$, in other words we ignore debt deflation effects and Central Bank behavior for simplicity. u^{IS} is the demand curve that now depends on income distribution. As the demand regime typically assumed by Post Keynesians is wage-led, the demand curve is downward sloping. Instead of the wage setting curve, the distribution function, π, is a function of unemployment. Depending on slopes of the demand and the distribution curves, the equilibrium may be stable (figure 4a) or unstable (figure 4b). Note that a

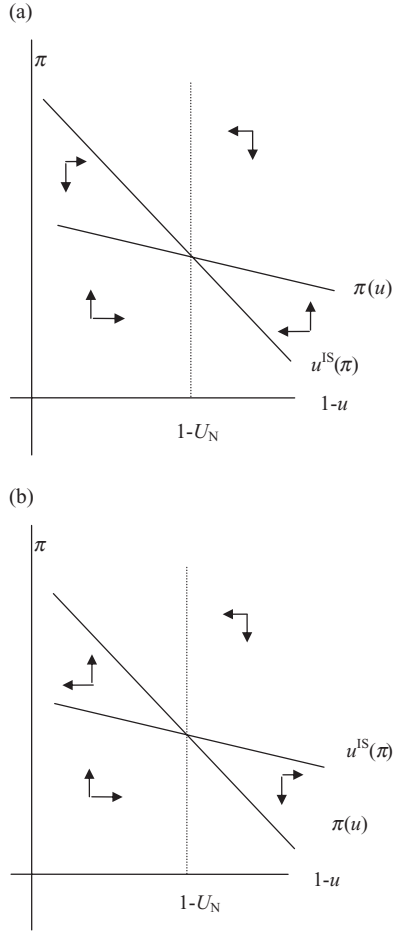

Figure 4. (a) A stable and (b) an unstable Post Keynesian NAIRU with distribution-led demand.

Notes: $\pi(u)$ is the distribution curve, which gives the profit share as function of the rate of unemployment. u^{IS} is the rate of unemployment as determined by the goods market equilibrium given the distribution of income (effects of prices and Central Bank behavior on demand are ignored).

higher wage elasticity gives rise to a higher likelihood of instability. Wage flexibility is thus destabilizing rather than stabilizing in the Post Keynesian model (Stockhammer, 2004b). In either case the NAIRU will follow actual unemployment.

To wrap up, most Post Keynesians would probably accept that there is a NAIRU at any point in time, but it is neither exogenous nor is it a strong

attractor for actual unemployment. Inflation does not have a monetary cause, but a real cause: distributional conflicts. This is why many Post Keynesians would be sympathetic with the inflation aspect of the NAIRU theory. However, there is no automatism that would ensure that actual unemployment returns to the NAIRU. Monetary policy, if following a Taylor rule, however could create a policy mechanism that stabilizes actual unemployment as well as the NAIRU. If so, however, the NAIRU is a policy-induced phenomenon rather than a purely economic one.

The inverse real balance effect and a wage-led demand regime do have an important consequence: the equilibrium will become unstable. If wages increase growth, growth increases employment and higher employment improves the bargaining position of labor, then a deviation from equilibrium will be self-sustaining. In the real world, however, such an effect would be dampened because of two factors that are conveniently ignored in the above discussion. First the foreign trade may make actual national economies (but not the world economy as a whole) profit-led rather than wage-led (Blecker, 1989, 2002).[17] Second, automatic stabilizers or discretionary fiscal policy may push the economy towards equilibrium.

6. A MARXIST QUASI-NAIRU

While there is a rich and ongoing debate among Marxists on the theory of money, surprisingly few Marxian contributions exist on the theory of inflation.[18] The basic tension in Marxian monetary theory is the one between commodity money and credit money (nicely highlighted in Foley, 1983). Whereas Volume I of *Capital* presents a theory in which money has to be a commodity itself ('Gold confronts other commodities as money only because it confronted them previously as a commodity'; Marx, 1976, p. 162), he and more so Hilferding emphasized that, at least temporarily, not only fiat money by the state but also endogenously created means of payment such as bills of exchange can play this role. Moreover, in the later chapters of Volume III of *Capital* Marx highlights the role of credit in the business cycle. Today there is a lively debate on whether money in Marxian theory is commodity money or credit money (Itoh and Lapavitsas, 1999; Bellofiore, 2005; Germer, 2005).

[17] The empirical identification of demand regime has been the subject of several studies recently (Bowles and Boyer, 1995; Stockhammer and Onaran, 2004; Naastepad and Storm, 2006–7; Hein and Vogel, 2007; Stockhammer *et al.*, 2007).

[18] Out of some eight consulted introductions to Marxian economics only Harvey (1982) had a section on inflation.

Unfortunately for our purpose the reference point for this debate is the Marxian theory of value and not the explanation of inflation, although these theories will also have implications for inflation theory.

In particular French Marxists have elaborated inflation as a symptom related to the use of credit money in the post-war era and the stagflation of the 1970s as symptom of the crisis of the Fordist mode of regulation (Aglietta, 1979; Lipietz, 1985). Credit in this view is a pre-validation of the value of produced commodities that can smooth out demand variations and enhance accumulation. If, however, the underlying class relations, demand structures and productivity developments are contradictory, credit money will only postpone the day of crisis and adjustment. Lipietz' enchanted world of inflation will eventually hit the hard ground of real constraints.

If money in the last instance is commodity money, then inflation can in a certain sense be due to an 'excessive growth' of the money supply. Strictly speaking, however, inflation is determined by changes in the production costs of the money commodity relative to those of other commodities.[19] The 'true' (i.e. with respect to the realization of values) money supply is given more or less exogenously and credit money only creates temporary deviations from the balance between money and (produced) values.[20] Consequently Itoh and Lapavitsas criticize Post Keynesians (in particular B. Moore) for not realizing that 'Endogenously created credit money can be profoundly destabilizing in terms of both prices and real accumulation' (Itoh and Lapavitsas, 1999, p. 244). Inflation in this view is, or at least can be, caused by an excessive growth of the money supply, which is itself regarded as a symptom of overaccumulation (Harvey, 1982).

So far there is indeed little to recommend the NAIRU theory as a Marxian theory of inflation. The major exception is Rowthorn (1977) who argues that from a class conflict point of view the outcome of inconsistent income claims of workers, capitalists, the state and the foreign sector can be resolved either in real terms by a recession and increasing unemployment or in nominal terms by unexpected inflation. The model he proposes is basically equivalent to what was discussed as conflict inflation under the heading of Post Keynesian theory. Indeed, few Marxists have made reference to Rowthorn (1977),[21] whereas Post Keynesians have integrated his argument, even though Rowthorn developed his arguments in a Marxist terminology.

---

[19] The discovery of a new gold mine, for example, would thus operate through a change in the value of gold, but could be interpreted as growth of the money supply relative to the growth of the rest of the economy.

[20] Proponents of commodity money do not deny that money as medium of exchange can be credit money, but insist that money as a measure of value has to be commodity money.

[21] Remarkably none of the contributions in Michel (1979) refers to Rowthorn (1977).

Things look different once we turn to the Marxian theory of unemployment. While few Marxists have emphasized the similarity between the Marxian reserve army of the unemployed and the NAIRU, these two concepts are indeed similar, in particular if one thinks of Goodwin's (1967) formalization of the Marxian argument. While not explicitly highlighting parallels between NAIRU and Goodwin, Shaikh notes a similar property: in Goodwin's model 'greater labor strength would (. . .) serve to increase the long-run equilibrium rate of unemployment' (Shaikh, 2004, p. 140). This has also been noticed by Pollin 'Marx and Kalecki (. . .) share a common conclusion with natural rate proponents, in that they would all agree that positive unemployment rates are the outgrowth of class struggle over distribution of income and political power' (Pollin *et al*., 1998, p. 5).

Obviously the terminology used in these theories differs. Hardly any New Keynesian would write about class struggle, but use the term wage bargaining, which, as Marxists would readily admit, is one important aspect of class struggle in modern capitalism.[22] The biggest difference between Marxian models of the reserve army and NAIRU models is first that the former usually use a real wage Phillips curve (or wage curve), whereas NAIRU models are centered around a nominal wage/inflation Phillips curve; second most Marxists in the Goodwin tradition focus on the disequilibrium dynamics rather than on comparative statics.

Substituting 'factors influencing the relative strength of workers' for 'labor market institutions', most of the variables used by New Keynesians to determine the NAIRU would be acceptable (except maybe the tax wedge). Unemployment benefits, trade union membership, minimum wages certainly qualify and, most of all, unemployment influence the relative strength of workers. Some genuine class struggle variables would have to be added to the determination of workers' wage aspiration, such as labor militancy, although these are rather difficult to measure empirically (strike activity is sometimes used), but New Keynesians would probably not object to including these.

Typically Marxian economic models are profit-driven, because investment is driven by profits.[23] After our discussion of the Marxian theory of inflation failed to find a clear-cut effect of inflation on output, the latter effect is assumed to be zero. Thus the Marxian demand closure is

[22] Indeed Social Structure of Accumulation theorists have highlighted that de-politicized wage negotiations form a crucial part of the Fordist labor accord (Bowles *et al*., 1986).

[23] The profit squeeze theory (of which the Goodwin model is part) is of course not the only Marxist crisis theory. Since the seminal contributions of Shaikh (1978) and Weisskopf (1979) Marxian crisis theories are usually grouped under the heading of underconsumption/realization problems, profit squeeze and organic composition of capital theories. The latter with its focus on technical change is well beyond the scope of this paper. Underconsumptionist theories would for

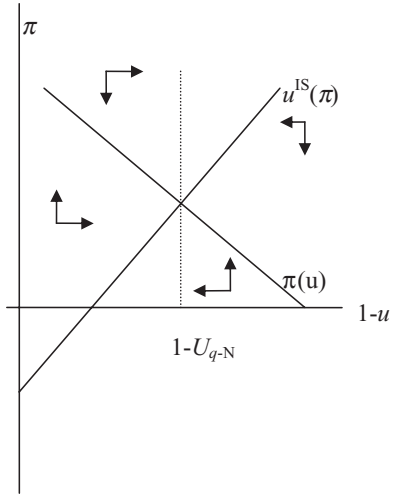

Figure 5. A Marxian quasi-NAIRU.
Notes: $\pi(u)$ is the distribution curve, which gives the profit share as function of the rate of unemployment. u^{IS} is the rate of unemployment as determined by the goods market equilibrium given the distribution of income.

$$y = y_0 + y_3\pi, \quad \text{with } y_2 = 0,\ y_3 > 0 \tag{8.Mx}$$

In the Marxist theory one would also expect the equilibrium reserve army, and thus the NAIRU, to be endogenous as Marx highlights that 'in contrast (. . .) with the case of other commodities, the determination of the value of labor-power contains a historical and moral element' (Marx, 1976, p. 275). As in the Post Keynesian case workers will form their wage claims based on their past wage levels. Again the Marxian quasi-NAIRU is thus endogenous. However, this turns out to be of less significance than in the Post Keynesian case.

Figure 5 presents the Marxian version of the NAIRU model, where u^{IS} is based on (8.Mx). In contrast to the Post Keynesian NAIRU model, the demand curve now has a positive slope. $\pi(u)$ is a distribution function based on the reserve army effect. The model exhibits a stable equilibrium rate of unemployment, which we refer to as a 'quasi-NAIRU', because inflation itself plays no key role in the Marxian model. In the short run the mechanics of the Marxist model are thus surprisingly close to those of the New Keynesian one, though for different reasons. The adjustment mechanism of

the purpose of this paper be equivalent to the wage-led regimes discussed in the Post Keynesian section. Thus, in the main part of this section only profit squeeze models are discussed as Marxist.

the goods market differs. In the case of New Keynesians, it is a real balance effect, and in the case of Marxists it is profit-driven investment expenditures that adjusts output should actual unemployment deviate from the NAIRU. Unlike the Post Keynesian wage-led growth regime the Marxist profit-led regime is stable. Therefore the endogeneity of the NAIRU itself is less important.

The Marxian quasi-NAIRU model is summarized graphically in figure 5. There is a downward sloping distribution curve (π) based on the reserve army effect. More conventionally this could be called a real-wage Phillips curve and an upward sloping demand curve u^{IS}. The equilibrium is stable.

What are the policy conclusions of the Marxist interpretation of the NAIRU? While the NAIRU story is aimed at making workers accept lower wages, the Marxian story would tell them that wage increases, which would be justified (morally) as workers produce the output after all, will contradict the logic of capitalist accumulation. Thus to actually consume the fruits of their labor, workers ought to do away with capitalism.

While Marxists would have little disagreement with the mechanisms involved in the NAIRU story, they do contradict its empirical claims. The reason for the rise of unemployment is not overgenerous welfare state, but a slowdown in accumulation (Duménil and Lévy, 1999). Thus the empirical claim that unemployment has been pushed up by labor market institutions is disputed. For Marxists, the 1980s is a period of defeat of labor, thus less rather than more unemployment would be needed to stabilize income distribution. Rather changes in the structure of accumulation have caused a slowdown in growth and thus unemployment. The exact definition of and the reasons for these changes are subject to debate. Duménil and Lévy (2001) argue that neoliberalism is characterized by profits being appropriated as financial profits rather than industrial profits, which has a detrimental effect on investment. This would correspond to an inward shift of the IS curve in figure 5, which would give a new equilibrium with higher unemployment and higher profits. This scenario fits the stylized facts for European unemployment since 1980 (Stockhammer, 2004c). Thus while the theoretical model of the Marxists is closer to the New Keynesians, their assessment of the causes of the actual rise of unemployment are similar to those diagnosed by Post Keynesians.

7. CONCLUSION

The task of this paper was to evaluate whether the NAIRU theory is a Monetarist, New Keynesian, Post Keynesian or Marxist theory. We distinguished carefully between the NAIRU theory, which derives an

(expectations-augmented) Phillips curve from income claim functions by labor and capital, and the NAIRU story, which claims that actual unemployment is determined by NAIRU (rather than vice versa) and that actual unemployment in Europe has been rising because of adverse changes in labor market institutions. The paper sought to demonstrate that different demand closures as well as different NAIRU closures give rise to New Keynesian, Post Keynesian and Marxist interpretations of the NAIRU.

The NAIRU theory is a New Keynesian theory, because it does not involve market clearing and the wage-setting function is understood as a bargaining outcome. The resulting unemployment at the NAIRU is involuntary, contrary to the Monetarist natural rate. Thus the Monetarist NRU is not a NAIRU theory (in the strong sense), even though the policy recommendations based on the NAIRU story coincide with Monetarist policies. New Keynesians argue that changes in inflation (caused by deviation of actual unemployment from the NAIRU) will realign output such that actual unemployment will gravitate towards the NAIRU. The NAIRU story is a particular interpretation of this New Keynesian interpretation. However, the NAIRU story involves empirical claims (exogenous NAIRU) that not all New Keynesians share and that are empirically contested.

Post Keynesian reactions to the NAIRU differ, ranging from outright rejection to revisions of the NAIRU model. In fact the NAIRU model is consistent with the Post Keynesian theory of inflation in that inflation is caused by a real distributional conflict rather than by growth of the money supply. The Post Keynesian demand closure has a Fisher effect and a wage-led demand regime. Thus the equilibrium will be unstable and the NAIRU will be a repellant rather than an attractor (in a closed economy), unless the government or Central Banks stabilize. In addition the NAIRU is regarded as endogenous. Thus the policy recommendations are traditional Keynesian demands for active fiscal and monetary policy.

Marxists usually are more concerned with real rather than with nominal wages; however, the NAIRU model is also consistent with a Marxist interpretation. Of course the terminology differs from New Keynesians. Marxists would speak of factors influencing the relative power of workers in class struggle rather than, like New Keynesians, about labor market institutions influencing workers' bargaining power. However, the actual empirical measures used come down to the same effect. There is however a difference on the goods market: rather than a real balance effect or a Central Bank reaction function profit-driven investment provides the goods market adjustment mechanism.

Despite these analytic similarities, Marxists reject the NAIRU story, on the grounds that workers' strength has declined rather than increased in the

1980s and 1990s. Their explanation of the rise of unemployment in Europe is closer to the Post Keynesian interpretation, in that the slowdown in private accumulation and government expenditures is blamed.

Where does the conceptual clarification attempted in this paper leave the researcher working on unemployment? First, a simple model nesting competing economic theories can be built. In this model the various theories discussed can be regarded as special cases that correspond to particular restriction in the model. Second, these restrictions can be tested empirically to assess the plausibility of the various closures imposed by the theories discussed. In particular this would require empirical answers to the following questions: Is actual unemployment driven by changes in labor market institutions? Does demand respond positively or negatively to changes in inflation? Is demand wage-led or profit-led? Some of the relevant tests have already been carried out, if not exactly in the framework outlined above. Evaluating these tests or performing them will be subject of future research.

REFERENCES

Aglietta, M. (1979): *A Theory of Capitalist Regulation. The US Experience*, Verso, London.

Akerlof, G., Dickens, W., Perry, G. (2000): 'Near-rational wage and price setting and the long-run Phillips curve', *Brookings Papers on Economic Activity*, 2000 (1), pp. 1–44.

Alexiou, C., Pitelis, C. (2003): 'On capital shortages and European unemployment: a panel investigation', *Journal of Post Keynesian Economics*, 25 (4), pp. 613–40.

Arestis, P., Biefang-Frisancho Mariscal, I. (1998): 'Capital shortages and asymmetries in UK unemployment', *Structural Change and Economic Dynamics*, 9, pp. 189–204.

Arestis, P., Sawyer, M. (2002): ' "New Consensus", New Keynesianism, and the economics of the "third way" ', Levy Institute Working Paper 345.

Arestis, P., Sawyer, M. (2005): 'Aggregate demand, conflict and capacity in the inflationary process', *Cambridge Journal of Economics*, 29 (6), pp. 959–74.

Asada, T., Chen, P., Chiarella, C., Flaschel, P. (2006): 'Keynesian dynamics and the wage–price spiral: a baseline disequilibrium model', *Journal of Macroeconomics*, 28 (1), pp. 90–130.

Baker, D., Glyn, A., Howell, D., Schmitt, J. (2005): 'Labor market institutions and unemployment: a critical assessment of the cross-country evidence', in Howell, D. (ed.): *Fighting Unemployment. The Limits for Free Market Orthodoxy*, Oxford University Press, Oxford.

Ball, L. (1999): 'Aggregate demand and long-run unemployment', *Brookings Papers on Economic Activity*, 1999 (2), pp. 189–236.

Ball, L., Mankiw, G. (2002): 'The NAIRU in theory and practice', *Journal of Economic Perspectives*, 16 (4), pp. 115–36.

Balogh, T. (1982): *The Irrelevance of Conventional Economics*, Weidenfeld and Nicolson, London.

Bellofiore, R. (2005): 'The monetary aspects of the capitalist process in the Marxian system: an investigation from the point of view of the theory of the monetary circuit', in Moseley, F. (ed.): *Marx' Theory of Money. Modern Appraisals*, Palgrave Macmillan, Houndsmills.

Bhaduri, A., Marglin, S. (1990): 'Unemployment and the real wage: the economic basis for contesting political ideologies', *Cambridge Journal of Economics*, 14, pp. 375–93.

Blanchard, O. (1990): 'Unemployment: getting the questions right—and some of the answers', in Dreze, J., Bean, C. (eds): *Europe's Unemployment Problem*, MIT Press, Cambridge, MA.

Blanchard, O. (1997): 'The medium run', *Brookings Papers on Economic Activity*, 2, pp. 89–141.
Blanchard, O., Katz, L. (1997): 'What we know and what we don't know about the natural rate of unemployment', *Journal of Economic Perspectives*, 11 (1), pp. 51–72.
Blanchard, O., Summers, L. (1988): 'Beyond the natural rate hypothesis', *American Economic Review* 78 (2), pp. 182–7.
Blanchard, O., Wolfers, J. (2000): 'The role of shocks and institutions in the rise of European unemployment: the aggregate evidence', *Economic Journal*, 110, pp. 1–33.
Blecker, R. (1989): 'International competition, income distribution and economic growth', *Cambridge Journal of Economics*, 13, pp. 395–412.
Blecker, R. (2002): 'Distribution, demand and growth in neo-Kaleckian macro-models', in Setterfield, M. (ed.): *The Economics of Demand-led Growth*, Edward Elgar, Cheltenham.
Bowles, S., Boyer, R. (1995): 'Wages, aggregate demand, and employment in an open economy: an empirical investigation', in Epstein, G., Gintis, H. (eds): *Macroeconomic Policy after the Conservative Era. Studies in Investment, Saving and Finance*, University Press, Cambridge.
Bowles, S., Gordon, D., Weisskopf, T. E. (1986): 'Power and profits: the social structure of accumulation and the profitability of the postwar US economy', *Review of Radical Political Economics*, 1986 (1–2), pp. 132–67.
de Brunhoff, S. (2005): 'Marx's contribution to the search for a theory of money', in Moseley, F. (ed.): *Marx's Theory of Money. Modern Appraisals*, Palgrave Macmillan, Houndsmills.
Bruno, M., Easterly, W. (1998): 'Inflation crises and long-run growth', *Journal of Monetary Economics*, 41, pp. 3–26.
Carlin, W., Soskice, D. (1990): *Macroeconomics and the Wage Bargain. A Modern Approach to Employment, Inflation and the Exchange Rate*, Oxford University Press, Oxford.
Cassetti, M. (2003): 'Bargaining power, effective demand and technical progress: a Kaleckian model of growth', *Cambridge Journal of Economics*, 27 (3), pp. 449–64.
Davidson, P. (1998): 'Post Keynesian employment analysis and the macroeconomics of OECD unemployment', *Economic Journal*, 108, pp. 817–31.
Davidson, P. (2003): 'Setting the record straight on a history of post Keynesian economics', *Journal of Post Keynesian Economics*, 26 (2), pp. 245–72.
Duménil, G., Lévy, D. (1999): 'Structural unemployment in the crises of the late 20th century: a comparison between the European and the US experiences', in Bellofiore, R. (ed.): *Global Money, Capital Restructuring and the Changing Patterns of Labour*, Edward Elgar, Cheltenham.
Duménil, G., Lévy, D. (2001): 'Costs and benefits of Neoliberalism: a class analysis', *Review of International Political Economy*, 8 (4), pp. 578–607.
Ehrbar, M., Gambacorta, L., Maretinez-Pagés, J., Sevestre, P., Worms, A. (2003): 'The effects of monetary policy in the Euro area', *Oxford Economic Policy Review*, 19 (1), pp. 58–72.
Foley, D. (1983): 'On Marx's theory of money', *Social Concept*, 1 (1), pp. 5–19.
Franke, R., Flaschel, P., Proano, C. (2006): 'Wage–price dynamics and income distribution in a semi-structural Keynes–Goodwin model', *Structural Change and Economic Dynamics*, 17 (4), pp. 452–65.
Friedman, M. (1968): 'The role of monetary policy', *American Economic Review*, 58, pp. 1–117.
Friedman, M. (1977): 'Inflation and unemployment', *Journal of Political Economy*, 85 (3), pp. 451–72.
Germer, C. (2005): 'The commodity nature of money in Marx's theory', in Moseley, F. (ed.): *Marx' Theory of Money. Modern Appraisals*, Palgrave Macmillan, Houndsmills.
Goodwin, R. M. (1967): 'A growth cycle', in Feinstein, C. H. (ed.): *Socialism, Capitalism and Economic Growth*, Cambridge University Press, Cambridge.
Gordon, R. (1997): 'The time-varying NAIRU and its implications for economic policy', *Journal of Economic Perspectives*, 11 (1), pp. 11–32.
Harvey, D. (1982): *The Limits to Capital*, Blackwell, Oxford.
Hein, E. (2006): 'Wage bargaining and monetary policy in Kaleckian model', *Intervention*, 3 (2), pp. 305–30.

Hein, E., Vogel, L. (2007): 'Distribution and growth reconsidered—empirical results for Austria, France, Germany, the Netherlands, the UK and the USA', IMK Working Paper 3/2007.
Itoh, M., Lapavitsas, C. (1999): *Political Economy of Money and Finance*, Macmillan, Houndsmill.
King, J. (2002): *A History of Post Keynesian Economics since 1936*, Edward Elgar, Cheltenham.
Kriesler, P., Lavoie, M. (2004): 'The New View on monetary policy: the New Consensus and its Post-Keynesian critique', Manuscript.
Krugman, P. (1994): 'Past and prospective causes of high unemployment', in Federal Reserve Bank of Kansas City (ed.): *Reducing Unemployment: Current Issues and Policy Options*, Federal Reserve Bank of Kansas City, Kansas City.
Lavoie, M. (1992): *Foundations of Post-Keynesian Economic Analysis*, Eduard Elgar, Aldershot.
Lavoie, M. (2002): 'The Kaleckian growth model with target return pricing and conflict inflation', in Setterfield, M. (ed.): *The Economics of Demand-led Growth: Challenging the Supply-side Vision of the Long Run*, Edward Elgar, Northampton.
Lavoie, M. (2004): 'The new consensus on monetary policy seen from a post-Keynesian perspective', in Lavoie, M., Seccareccia, M. (eds): *Central Banking in the Modern World*, Edward Elgar, Cheltenham.
Layard, R., Nickell, S., Jackman, R. (1991): *Unemployment. Macroeconomic Performance and the Labour Market*, Oxford University Press, Oxford.
Lipietz, A. (1985): *The Enchanted Word*, Verso, London.
Madsen, J. (1998): 'General equilibrium macroeconomic models of unemployment: can they explain the unemployment path in the OECD?', *Economic Journal*, 108, pp. 850–67.
Marx, K. (1976): *Capital. A Critique of Political Economy*, vol. 1, Penguin Books, London.
Naastepad, R., Storm, S. (2006–7): 'OECD demand regimes (1960–2000)', *Journal of Post-Keynesian Economics*, 29 (2), pp. 213–48.
Nickell, S. (1997): 'Unemployment and labor market rigidities: Europe versus North America', *Journal of Economic Perspectives*, 11 (3), pp. 55–74.
Nickell, S. (1998): 'Unemployment: questions and some answers', *Economic Journal*, 108, pp. 802–16.
OECD (1997): *Implementing the Jobs Strategy*, OECD, Paris.
Palacio-Vera, A. (2005): 'The "modern" view of macroeconomics: some critical reflections', *Cambridge Journal of Economics*, 29, pp. 747–67.
Palley, T. (1996): *Post Keynesian Economics. Debt, Distribution and the Macro Economy*, Macmillan, London.
Phelps, E. (1968): 'Money–wage dynamics and labor-market dynamics', *Journal of Political Economy*, 78 (4), pp. 678–711.
Pollin, R. (1998): 'The "reserve army of labor" and the "natural rate of unemployment": can Marx, Kalecki, Friedman, and Wall Street all be wrong?', *Review of Radical Political Economics*, 30 (3), pp. 1–13.
Robinson, J. (1937): *Essays in the Theory of Employment*, Reprinted 1980, Blackwell, Oxford.
Robinson, J. (1956): *The Accumulation of Capital*, Macmillan, London.
Rochon, L.-P. (1999): *Credit, Money and Production. An Alternative Post-Keynesian Approach*, Edward Elgar, Aldershot.
Romer, D. (2000): 'Keynesian macroeconomics without the LM curve', *Journal of Economic Perspectives*, 14 (2), pp. 149–69.
Rowthorn, R. (1977): 'Conflict, Inflation and Money', *Cambridge Journal of Economics*, 1 (3). Reprinted in: Bob Rowthorn: *Capitalism, Conflict and Inflation*, Lawrence and Wishart, London, 1980.
Rowthorn, R. (1995): 'Capital formation and unemployment', *Oxford Review of Economic Policy*, 11 (1), pp. 26–39.
Rowthorn, R. (1999): 'Unemployment, wage bargaining and capital–labour substitution', *Cambridge Journal of Economics*, 23, pp. 413–25.

Sarantis, N. (1993): 'Distribution, aggregate demand and unemployment in OECD countries', *Economic Journal*, 103, pp. 459–67.
Sawyer, M. (1996): 'Post-Keynesian macroeconomics', in Greenaway, D., Bleaney, M., Stewart, I. (eds): *A Guide to Modern Economics*, Routledge, London.
Sawyer, M. (2002): 'The NAIRU, aggregate demand and investment', *Metroeconomica*, 53 (1), pp. 66–94.
Setterfield, M. (2005): 'Worker insecurity and US macroeconomic performance during the 1990s', *Review of Radical Political Economy*, 27 (2), pp. 155–77.
Shaikh, A. (1978): 'An introduction to the history of crisis theories', in URPE (ed.): *U.S. Capitalism in Crisis*, URPE, New York.
Shaikh, A. (2004): 'Labor market dynamics within rival macroeconomic frameworks', in Argyrous, G., Forestater, M., Mongiovi, G. (eds): *Growth, Distribution and Effective Demand. Alternatives to Economic Orthodoxy*, Essays in Honor of Edward J. Nell, M.E. Sharpe, Armonk, NY.
Siebert, H. (1997): 'Labor market rigidities: at the root of unemployment in Europe', *Journal of Economic Perspectives*, 11 (3), pp. 37–54.
Skott, P. (2005): 'Fairness as a source of hysteresis in employment and relative wages', *Journal of Economic Behavior and Organization*, 57, pp. 305–31.
Snowden, B., Vane, H., Wynarczyk, P. (1994): *A Modern Guide to Macroeconomics: An Introduction to Competing Schools of Thought*, Edward Elgar, Northampton, MA.
Staiger, D., Stock, J., Watson, M. (1997): 'The NAIRU, unemployment and monetary policy', *Journal of Economic Perspectives*, 11 (1), pp. 33–50.
Stockhammer, E. (2004a): 'Explaining European unemployment: testing the NAIRU hypothesis and a Keynesian approach', *International Review of Applied Economics*, 18 (1), pp. 3–24.
Stockhammer, E. (2004b): 'Is there an equilibrium rate of unemployment in the long run?', *Review of Political Economy*, 16 (1), pp. 59–77.
Stockhammer, E. (2004c): *The Rise of Unemployment in Europe: A Keynesian Approach*, Edward Elgar, Cheltenham.
Stockhammer, E. (2008): 'Wage moderation doesn't work', *Review of Radical Political Economics*, 39 (3), pp. 391–7.
Stockhammer, E., Onaran, O. (2004): 'Accumulation, distribution and employment: a structural VAR approach to a Kaleckian macro-model', *Structural Change and Economic Dynamics*, 15 (4), pp. 421–47.
Stockhammer, E., Onaran, Ö., Ederer, S. (2007): 'Functional income distribution and effective demand in the Euro-area', Vienna University of Economics and Business Administration, Department of Economics Working Papers 102.
Weisskopf, T. (1979): 'Marxist crises theory and the post-war U.S. economy', *Cambridge Journal of Economics*, 3, pp. 341–78.

Engelbert Stockhammer
Wirtschaftsuniversität Wien
Augasse 2-6, 1090 Wien
Austria
E-mail: engelbert.stockhammer@wu-wien.ac.at