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Eckhard Hein[†], Engelbert Stockhammer[‡]

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Keywords: Macroeconomic policy mix; employment; inflation; New Consensus; Post-Keynesian alternative

JEL-Classification: E12; E20; E52; E61

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Abstract

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1. Introduction

Nowadays, mainstream macroeconomics is dominated by New Consensus Models (NCMs), in particular when it comes to economic policy analysis.¹ These models are basically characterised by three equations: 1. an aggregate demand function derived from households' and firms' optimisation behaviour which relates the output gap inversely to the real interest rate, 2. an expectations-augmented Phillips curve which makes the rate of inflation positively dependent on the output gap in the short run, and 3. a central bank reaction function in which the nominal interest rate set by the central bank is determined by the equilibrium real interest rate, by the output gap and by the deviation of actual inflation from the inflation target. In these models there is again an impact of aggregate demand on output and employment, but only in the short run. Due to nominal and real rigidities, for which microfoundations based on imperfectly competitive markets are delivered, the short-run Phillips curve is downward sloping. In the long run, however, there is no effect of aggregate demand on the 'Non Accelerating Inflation Rate of Unemployment' (NAIRU), which is exclusively determined by structural characteristics of the labour market, the wage bargaining institutions and the social benefit system.² Therefore, the long-run Phillips curve becomes vertical. Monetary policy applying the interest rate tool is able to stabilise output and employment in the short run, but in the long run it is neutral and only affects inflation (Fontana/Palacio-Vera 2007). Fiscal policy is downgraded and is restricted to support monetary policies in achieving price stability (Arestis/Sawyer 2003).

Post-Keynesians (PKs) have criticised these NCMs for a variety of reasons.³ Broadly summarised, the critique is related to the assumption of a stable long-run equilibrium NAIRU determined exclusively by supply-side factors to which actual unemployment, determined by effective demand, can be adjusted by means of monetary policy interventions, on the one hand, and to the assumption of the independence of this NAIRU from the development of

¹ See Clarida/Gali/Gertler (1999), McCallum (2001), Meyer (2001), Romer (2000), Taylor (2000), and Carlin/Soskice (2006: 27-172) for NCMs.

² See Ball/Mankiw (2002), Blanchard/Katz (1997), Layard/Nickell/Jackman (1991: 361-396), and Mankiw (2001) for concepts of a NAIRU.

³ For a discussion and a critique of the NCM and its main elements, the NAIRU and an inflation targeting central bank, from a PK view see, among others, Angeriz/Arestis (2006), Arestis/Sawyer (2004a, 2004b, 2005, 2006), Atesoglu/Smithin (2006), Davidson (2006), Fontana (2006), Fontana/Palacio-Vera (2002, 2004, 2006, 2007), Gnos/Rochon (2007), Hein (2002, 2004, 2006a, 2007: 133-152), Kriesler/Lavoie (2007), Lavoie (2004, 2006), Monvoisin/Rochon (2006), Palacio-Vera (2005), Palley (2006), Rochon/Rossi (2006), Rochon/Setterfield (2007-8a, 2007-8b), Sawyer (2001, 2002, 2006), Seccareccia (1998), Setterfield (2004, 2006a, 2006b), Smithin (2004), Stockhammer (2004a, 2004b, 2008), and Wray (2007).

actual unemployment, and hence from demand and monetary as well as fiscal policies, on the other hand. In short, what is questioned is the assumed long-run neutrality of money in the NCMs.

Already Sawyer (2001, 2002) argued that the NAIRU should not be considered to be a strong attractor for actual unemployment. Stability of the NAIRU has been examined closer by Stockhammer (2004a) including the effects of redistribution between profits and wages on effective demand which occur when actual unemployment deviates from the NAIRU. Hein (2006a, 2007: 133-152) has rather focussed on the effects of redistribution between capitalists and rentiers on aggregate demand, triggered by accelerating or decelerating inflation associated with a deviation of unemployment from the NAIRU. Both authors conclude that the NAIRU is not generally stable, but that a specific demand regime is required for stability. Considering the NCM recommendation of inflation targeting monetary policies in order to adjust actual unemployment to the NAIRU, Arestis/Sawyer (2004a, 2004b, 2005, 2006), Fontana/Palacio-Vera (2007), Hein (2004, 2006a, 2007: 133-152), and Palacio-Vera (2005) have argued that monetary policy interventions will not be able to constrain instability in many cases for several reasons. Finally, long-run endogeneity of the NAIRU with respect to actual unemployment, and hence to macroeconomic and monetary policies, has been related to different channels. New Keynesian authors had already pointed to labour market hysteresis (Blanchard/Summers 1987, 1988, Ball 1999). PKs have added further channels: capital stock and productivity growth effects of investment (Rowthorn 1995, 1999, Sawyer 2001, 2002, Arestis/Sawyer 2004a: 73-99, 2005), adaptive wage and profit aspirations (Setterfield/Lovejoy 2006, Stockhammer 2008), and distribution effects of interest rate variations as the monetary policy instrument (Hein 2006a, 2007: 133-152).

Because of the deficiencies and the problems of NCMs, PKs have started to amend these models and have proposed alternatives to the NCM. First, the inflation generation and the income generation processes have been reformulated. With respect to the inflation generation process, some PK authors have assumed the existence of a short-run inflation barrier and hence the NAIRU away (Atesoglu/Smithin 2006, Setterfield 2004, 2006a, 2006b), whereas others have accepted that there is such a short-run inflation barrier, which, however, is endogenous in the medium to long run through different channels (Lavoie 2004, 2006, Hein 2006a, 2007: 133-152, Stockhammer 2008). With respect to the income generation process, some authors have accepted the interest rate inverse IS-curve from the NCM

(Atesoglu/Smithin 2006, Lavoie 2004, 2006, Rochon/Setterfield 2007-8a, Setterfield 2004, 2006a), whereas others have replaced it by a more elaborated PK/Kaleckian approach to effective demand allowing for real debt and different distribution effects (Hein 2006a, 2007: 133-152, Rochon/Setterfield 2007-8b, Setterfield 2006b, Stockhammer 2008).

Second, different economic policy conclusions, in particular with respect to monetary policies, have been drawn. Whereas some authors have argued that central banks' inflation targeting is generally compatible with PK analysis (Fontana/Palacio-Vera 2006, 2007, Palley 2006, Setterfield 2006a), but have demanded a higher emphasis on real stabilisation and more adequate inflation targets, others have rejected any fine tuning by means of interest rate policies and have rather been in favour of stabilising the interest rate at some growth and employment conducive level (Gnos/Rochon 2007, Lavoie 1996a, Smithin 2004, Rochon/Setterfield 2007-8a, 2007-8b, Setterfield 2006b, Wray 2007). From this perspective it follows that nominal stabilisation should be delegated to wage or incomes policies (Arestis 1996, Davidson 2006, Hein 2002, 2004, 2006a, 2007: 133-152, Kriesler/Lavoie 2007), and that fiscal policies should be in charge of real stabilisation in the short and in the medium to long run (Arestis/Sawyer 2003, 2004a, 2004c, Gnos/Rochon 2007).

What is lacking in the PK discussion so far is a basic but general PK synthesis model, which allows for a short-run inflation barrier, which captures the major causes for short-run instability of the inflation barrier and hence the NAIRU, into which the major channels of medium- to long-run endogeneity of the NAIRU can be integrated, and which allows for the derivation of a complete PK macroeconomic policy-mix of monetary, fiscal and wage policies. Our paper is an attempt to bridge this gap. The paper is organised as follows. In the second section we develop a basic PK model. Our model consists of three classes, rentiers, firms and workers, and it has a short-run inflation barrier derived from distribution conflict between these three classes. Distribution conflict does not only affect inflation but also income shares and hence effective demand and employment in a Kaleckian income generation process. The stability of the short-run inflation barrier and hence the NAIRU is examined in the third section, which also includes the effects of inflation targeting monetary policies, as proposed by the NCM and some PKs, as a potential means of adjustment of the actual unemployment rate to the NAIRU. The major medium-run endogeneity channels of the NAIRU with respect to actual unemployment are introduced in the fourth section: persistence mechanisms in the labour market, adaptive wage aspirations, capital stock effects of

investment, and distribution effects of interest rate variations. In the fifth section we develop a PK macroeconomic policy assignment which allows for improved employment without increasing inflation. The sixth section concludes.

2. A basic Post-Keynesian model

2.1 Production, finance, distribution and the inflation generation process

Production, finance and rentiers' income

We assume a closed economy with only rudimentary economic activity of the state. There will be no taxes and no state employment in the model, but only deficit-financed government demand. Under given conditions of production, there is just one type of commodity produced with a constant coefficient technology. Assuming away overhead labour, the labour-output-ratio and hence labour productivity (y) are constant up to full capacity output given by the capital stock. The capital-potential output-ratio (v), the relation between the capital stock (K) and potential output (Y^v), is also constant. The capital stock is assumed not to depreciate. The rate of capacity utilisation (z) is given by the relation between actual output and potential output. Given these assumption, the supply constraint can be written with the aid of the definition of the rate of profit, relating gross capital income (Π) to the capital stock. The rate of profit is decomposed into the profit share (h), the rate of capacity utilisation and the inverse of the capital-potential output-ratio:

$$(1) \quad r = \frac{\Pi}{K} = \frac{\Pi}{Y} \frac{Y}{Y^v} \frac{Y^v}{K} = hz \frac{1}{v},$$

The supply constraint is only reached by accident and the economy usually operates below maximum capacity given by the capital stock, i.e. usually: $z < 1$.

The pace of accumulation is determined by entrepreneurs' decisions to invest, independently of prior savings because firms have access to credit generated by a developed banking sector ('initial finance'). We assume that long-term investment finance ('final finance') is supplied by firms' retained earnings or by long-term credit of rentiers' households (directly or through

banks).⁴ Introducing interest payments into the model, capital income or gross profits splits into (net) profit of enterprise (Π_F) and rentiers' income (R).

$$(2) \quad \Pi = \Pi_F + R .$$

With respect to interest rate and credit, we follow the PK 'horizontalist' monetary view pioneered by Kaldor (1970, 1982, 1985), Lavoie (1984, 1992: 149-216, 1996b) and Moore (1988, 1989) and assume that the interest rate is an exogenous variable for the production and accumulation process, whereas the quantities of credit and money are determined endogenously by economic activity.⁵ The central bank controls the base rate of interest, commercial banks mark up the base rate and then supply the credit demand they consider creditworthy at this interest rate. In what follows we consider just one interest rate as representative for the whole structure of interest rates.

Writing i_n for the nominal rate of interest, we can define the real interest rate for given inflation expectations (\hat{p}^e), the 'ex ante' real interest rate (i^e), as:

$$(3) \quad i^e = i_n - \hat{p}^e .$$

The 'ex post' real interest rate, i , becomes endogenous to unexpected inflation (\hat{p}^u):

$$(4) \quad i = i_n - (\hat{p}^e + \hat{p}^u) = i^e - \hat{p}^u .$$

Firms' payments to rentiers are given by the stock of debt (B) at issue prices and the nominal rate of interest. Expected rentiers' interest income (R^e) can therefore be decomposed into a part compensating for the expected inflationary devaluation of the stock of nominal assets held by rentiers ($\hat{p}^e B$), and into expected real net income determined by the 'ex ante' real rate of interest ($i^e B$):⁶

⁴ The distinction between short-term finance for production purposes ('initial finance') and long-term finance for investment purposes ('final finance'), not dealt with in the present paper, can be found in the monetary circuit approach. See Graziani (1989, 1994), Lavoie (1992: 151-169), Seccareccia (1996, 2003) and Hein (2007: 70-79).

⁵ See for a similar procedure with respect to the introduction of monetary variables into PK models of distribution and growth Dutt (1989, 1992), Dutt/Amadeo (1993), Hein (2006a, 2006b, 2007: 59-127), Lavoie (1992: 347-371, 1993, 1995), and Taylor (1985, 2004: 272-278).

⁶ Repayment of debt is not considered explicitly.

$$(5) \quad R^e = i_n B = (i^e + \hat{p}^e)B = i^e B + \hat{p}^e B.$$

Firms' 'real' interest payments and rentiers' 'real' gross income (R) are affected whenever unexpected inflation occurs:

$$(6) \quad R = (i_n - \hat{p}^u)B = (i^e + \hat{p}^e - \hat{p}^u)B.$$

The debt-capital ratio relates the stock of debt at issue prices to the capital stock at production prices and is hence given by:

$$(7) \quad \lambda = \frac{B}{K}.$$

Since real debt effects caused by unexpected inflation are delegated to the real income flows, the debt-capital-ratio in our definition above can be taken as a constant for the following analysis.⁷

*Conflicting claims, employment, unexpected inflation and distribution*⁸

Unexpected inflation in our model is systematically generated by inconsistent income claims of rentiers, firms and workers.⁹ The target gross profit share of firms (h_F^T), which has to cover retained earnings and interest payments to rentiers, is given by mark-up pricing on unit labour costs in incompletely competitive goods markets. In the short run, we assume the mark-up to be constant up to full capacity output. Changes in the interest rate, which are costs from the perspective of the firm, will only have medium to long-run effects on the mark-up, which are to be considered below in Section 4. The same is true for persistent changes in the rate of capacity utilisation which will also have only medium to long-run effects on firms' pricing and target profit shares. For the short run we assume that neither a change in capacity

⁷ This means that we will not treat the long-run dynamics of the debt-capital-ratio triggered by changes in the interest rate, capital accumulation or distribution. For such an analysis on the basis of the income generation part of the present model, albeit without (unexpected) inflation, see Hein (2006b, 2007: 100-127).

⁸ This part is developed on the basis of Stockhammer (2008) and extends the model presented there. For PK conflicting claims models of inflation see also Arestis/Sawyer (2004a: 73-87, 2005), Hein (2006a, 2007: 133-152), Lavoie (1992: 391-421, 2002), Rowthorn (1977), and Sawyer (2001, 2002).

⁹ Of course, there may also be exogenous shocks generating unexpected inflation.

utilisation, nor in the actual or expected real interest rate affects the mark-up. Therefore, the firms' target profit share is simply a constant in the short run:

$$(8) \quad h_F^T = h_0, \quad 0 < h_0 \leq 1.$$

If unexpected inflation arises, the realised profit share becomes:

$$(9) \quad h = h_0 - h_2 \hat{p}^u, \quad 0 < h_0 \leq 1,$$

with h_2 denoting the effect of unexpected inflation on the realised profit share.¹⁰ The higher h_2 , the less effective are firms in protecting the profit share against unexpected inflation caused by external shocks or workers' wage aspirations. Hence the higher h_2 , the lower is the inflation push originating from firms' profit aspirations.

The target wage share of workers [$W_W^T = (1-h)_W^T$] depends on the rate of employment (e), resp. unemployment (u), because lower unemployment improves workers' or labour unions' bargaining power. Unemployment has the function to contain distribution claims of labourers (Kalecki 1971: 156-164). At this stage, we assume that workers and labour unions do not consider the inflationary macroeconomic effects of their nominal wage demands and the potentially restrictive monetary policy reactions. There is neither co-ordination between unions in different firms or industries, nor between wage bargaining parties and monetary policy, with an eye to avoiding macroeconomic externalities of wage bargaining:

$$(10) \quad (1-h)_W^T = W_0 + W_1 e, \quad 0 < W_0 \leq 1, \quad 0 \leq W_1.$$

We do not assume full utilisation of productive capacities given by the capital stock to be necessarily accompanied by full employment. Therefore, the employment rate is a positive function of the rate of capacity utilisation, but these two rates are not necessarily equal:

$$(11) \quad e = xz, \quad 0 < x \leq 1.$$

¹⁰ It may appear strange that there is unexpected inflation in Kaleckian framework, where firms actually set prices. Indeed, if there were only one firm, it would make no sense. In a more realistic setting, where firms are vertically integrated, there may be unexpected inflation in input prices that eat into firms' mark-up.

Whenever there is unexpected inflation, the realised wage share becomes:

$$(12) \quad (1-h) = W_0 + W_1 e - W_2 \hat{p}^u, \quad 0 < W_0 \leq 1, \quad 0 \leq W_1, W_2,$$

with W_2 denoting the effect of unexpected inflation on the realised wage share. The higher W_2 , the less effective are workers in protecting the wage share against unexpected inflation caused by external shocks or firms' profit aspirations. Hence the higher W_2 , the lower is the inflation push generated by workers' wage aspirations.

With adaptive expectations ($\hat{p}_t^e = \hat{p}_{t-1}$), we obtain the following short-run Phillips curve from equations (9) and (12):

$$(13) \quad \hat{p}_t^u = \Delta \hat{p}_t = \hat{p}_t - \hat{p}_{t-1} = \frac{W_0 + W_1 e + h_0 - 1}{W_2 + h_2},$$

or

$$(13a) \quad \hat{p}_t = \hat{p}_{t-1} + \frac{W_0 + W_1 e + h_0 - 1}{W_2 + h_2}.$$

In our model we have, at each point in time, a short-run inflation barrier which is similar to the NAIRU in the NCMs. With consistent income claims $(1-h)_W^T + h_F^T = 1$, we obtain from equations (8) and (10) for the stable inflation rate of employment (e^N) and the NAIRU $u^N = 1 - e^N$:

$$(14) \quad e^N = \frac{1 - W_0 - h_0}{W_1}.$$

Whenever unemployment falls short of the NAIRU, inflation will accelerate because the sum of the income claims exceeds output, and unexpected inflation will arise, fuelling future inflation expectations. Whenever unemployment exceeds the NAIRU, inflation will decelerate.

Figure 1 shows the target wage shares of workers and firms as well as the realised wage share as a function of employment in the upper part, and the related unexpected inflation in the lower part.

< Figure 1: Conflicting claims, inflation and distribution >

Taking into account equation (11) for the relationship between the employment rate and the rate of capacity utilisation, we obtain the following stable inflation rate of capacity utilisation (z^N):

$$(15) \quad z^N = \frac{e^N}{x} = \frac{1 - W_0 - h_0}{xW_1}.$$

2.2 The income generation process¹¹

Economic activity, and hence capacity utilisation and unemployment in our model, is determined by effective demand. For the analysis of saving and investment and the related goods market equilibrium we also assume that firms, rentiers and labourers form adaptive expectations. We assume a classical saving hypothesis, i.e. labourers do not save. The part of profits retained is completely saved by definition. The part of profits distributed to rentiers' households, i.e. the interest payments, is used by those households according to their propensity to save (s_R). Therefore, total saving (S) comprises expected retained profits ($\Pi - i_n B$) and saving out of expected interest income (S_R). Taking equations (1), (2), (5) and (7) into account, we get the private saving rate (σ) which relates total saving to the capital stock:

$$(16) \quad \sigma = \frac{S}{K} = \frac{\Pi - i_n B + S_R}{K} = h \frac{z}{v} - i_n \lambda (1 - s_R), \quad 0 < s_R \leq 1.$$

For the accumulation rate (g), relating net investment (I) to the capital stock, we follow the arguments in Kalecki (1954) and assume that investment decisions are positively affected both by expected sales and by expected retained earnings.¹² Expected sales are determined by the rate of capacity utilisation. Retained earnings, in relation to the capital stock, are given by

¹¹ The 'income generation process' in this paper is based on Hein (2006a, 2006b, 2007: 103-114) and extends the models developed there. Rochon/Setterfield (2007-8b), Setterfield (2006b) and Stockhammer (2008) have also introduced a more elaborated income generation process than the one in the NCMs. However, they do not take fully into account the distribution effects of unexpected inflation and of changes in the interest rate on effective demand when deriving the goods market equilibrium.

¹² Whereas expected sales are closely related to profit expectations and therefore affect investment decisions, retained earnings are required for long-term investment finance. They also affect the access to external funds on imperfect capital markets and therefore investment finance, according to Kalecki's (1937) 'principle of increasing risk'.

the difference between expected profits and expected payments to rentiers normalised by the capital stock, and hence by the nominal interest rate and the debt-capital-ratio. Taking into account equations (1), (2), (5) and (7) again, we obtain:

$$(17) \quad g = \frac{\Delta K}{K} = \frac{I}{K} = g_0 + g_1 z + g_2 \left[h \frac{z}{v} - i_n \lambda \right], \quad g_0, g_1, g_2 > 0, \quad g_2 < 1.$$

We also include deficit financed demand by the government (D) in relation to the capital stock ($d = D/K$). Government demand is exogenous for the purposes of our model:

$$(18) \quad d = \frac{D}{K} = \bar{d}.$$

The goods market equilibrium is given by:

$$(19) \quad g + d = \sigma,$$

and the stability condition by:

$$(20) \quad \frac{\partial \sigma}{\partial z} - \frac{\partial g}{\partial z} - \frac{\partial d}{\partial z} > 0 \quad \Rightarrow \quad (1 - g_2) \frac{h}{v} - g_1 > 0.$$

From equations (16) – (19), the equilibrium rate of capacity utilisation can be calculated:

$$(21) \quad z^e = \frac{i_n \lambda (1 - s_R - g_2) + g_0 + d}{\frac{h}{v} (1 - g_2) - g_1}.$$

Since equation (21) is based on behavioural equations which by definition can only include expected inflation, the z^e -equilibrium derived from these equations is an ‘ex ante’ equilibrium. Taking into account the relationship between the employment rate and the rate of capacity utilisation from equation (11), we obtain the following rate of employment determined by the ‘ex ante’ goods market equilibrium:

$$(22) \quad e^c = \frac{x[i_n \lambda(1 - s_R - g_2) + g_0 + d]}{\frac{h}{v}(1 - g_2) - g_1}.$$

3. Is the NAIRU a strong attractor in the short run?

The ‘ex ante’ goods market equilibrium rate of employment in equation (22) may deviate from the stable inflation rate of employment determined in equation (14). Such a deviation will trigger unexpected inflation which will change distribution between total profits and wages, on the one hand, and between retained profits and rentiers’ income, on the other hand. The interesting question is now whether unexpected inflation will adjust the goods market equilibrium towards the NAIRU. If there is no endogenous convergence towards the NAIRU, the next question is then whether an inflation targeting central bank can stabilise the system.

In order to be able to calculate the effects of changes in the inflation rate on the employment rate via the channels mentioned above, unexpected inflation and its distribution effects from equations (6) and (9) have to be included into the goods market equilibrium (22):

$$(23) \quad e = \frac{x[(i_n - \hat{p}^u) \lambda(1 - s_R - g_2) + g_0 + d]}{\frac{1}{v}(h_0 - h_2 \hat{p}^u)(1 - g_2) - g_1}.$$

Since unexpected inflation causes a deviation from the ‘ex ante’ goods market equilibrium employment rate in equation (22), equation (23) does not define an equilibrium in the behavioural sense, with expectations fulfilled. It is rather a temporary ‘ex post’ goods market equilibrium caused by unexpected inflation. Since there is no positive or negative excess demand in the goods market, economic agents will not change the activity level defined in equation (23), but adjust inflation expectations in the next period. However, unless the employment rate determined by the ‘ex post’ goods market equilibrium matches the stable inflation rate of employment, unexpected inflation will occur again, causing once more a deviation of the ‘ex post’ from the ‘ex ante’ goods market equilibrium and so on.

3.1 The NAIRU as a strong short-run attractor without central bank interventions?

From equation (23), the effect of unexpected inflation on the goods market equilibrium rate of employment can be derived as follows:

$$(23a) \quad \frac{\partial e}{\partial \hat{p}^u} = \frac{\frac{h_2}{v}(1-g_2)e - x\lambda(1-s_R - g_2)}{\frac{1}{v}(h_0 - h_2\hat{p}^u)(1-g_2) - g_1}.$$

First, there is redistribution between gross profits and wages affecting the goods market equilibrium, with unexpected inflation (disinflation) reducing (raising) the profit share and increasing (reducing) the wage share. Through this channel unexpected inflation (disinflation) has a positive (negative) effect on economic activity and employment, as can be seen in the first term in the numerator. Therefore, our model is unambiguously wage-led, as far as the effects of redistribution between capital and labour on capacity utilisation and employment are concerned. Taken alone, this causes a further deviation of actual unemployment from the NAIRU.

Second, there is redistribution among gross profits, with unexpected inflation (disinflation) reducing (raising) the share of rentiers' income in gross profits. The effect of redistribution between firms and rentiers on economic activity through this channel is not clear in advance, but depends on the values of the rentiers' propensity to consume and the elasticity of firms' investment with respect to internal funds. If the former exceeds the latter ($1-s_R > g_2$), unexpected inflation and redistribution at the expense of rentiers has a dampening effect on economic activity ('puzzling case'). However, if the effect on firms' investment is stronger than the one on rentiers' consumption ($g_2 > 1-s_R$), unexpected inflation will have a stimulating effect on economic activity and capacity utilisation ('normal case').¹³

For the total effect of unexpected inflation on the 'ex post' employment rate determined by the goods market, we therefore obtain:

$$(23a') \quad \frac{\partial e}{\partial \hat{p}^u} < 0, \text{ if } : 1-s_R > \frac{h_2}{v} \frac{e}{x\lambda} (1-g_2) + g_2.$$

¹³ See Lavoie (1995) and Hein (2006b, 2007: 61-127) for a discussion of 'puzzling' and 'normal' cases in Kaleckian distribution and growth models.

The requirements for a negative effect of unexpected inflation on the goods market equilibrium rate of employment driving it towards the NAIRU are quite restrictive. We do not only need the conditions for the ‘puzzling case’ with respect to the macroeconomic effects of redistribution between firms and rentiers ($1-s_R > g_2$), but also very weak demand effects of redistribution between capital and labour caused by unexpected inflation or disinflation.

If the effect of unexpected inflation on the ‘ex post’ goods market equilibrium is positive:

$$(23a'') \frac{\partial e}{\partial \hat{p}^u} > 0, \text{ if: } \frac{h_2}{v} \frac{e}{x\lambda} (1-g_2) + g_2 > 1-s_R,$$

unexpected inflation will move the ex post goods market equilibrium farther away from the distribution equilibrium. This is shown in Figure 2: The initial ‘ex ante’ goods market equilibrium rate of employment (e^e_1) exceeds the short-run stable inflation rate of employment (e^N) which triggers unexpected inflation. Since unexpected inflation has a positive effect on the ‘ex post’ goods market equilibrium rate of employment, this will move the goods market equilibrium even farther away from the distribution equilibrium. With adaptive expectations economic agents will make the current inflation rate the expected rate in the next period, the ‘ex ante’ goods market equilibrium will move to (e^e_2), and the ‘ex post’ goods market equilibrium function in employment-unexpected inflation space will shift accordingly. Unexpected inflation will be triggered again and, as a result, the goods market equilibrium will diverge monotonically from the stable inflation rate of employment.

< Figure 2: The NAIRU as a non-attractor: monotonic divergence >

A negative relationship between unexpected inflation and the ‘ex post’ goods market equilibrium rate of employment as in equation (23a’), however, is only a necessary but not yet a sufficient condition for the NAIRU to be a strong attractor. This can be seen in Figures 3 and 4.

< Figure 3: The NAIRU as an non-attractor: oscillating divergence >

< Figure 4: The NAIRU as an attractor >

In Figure 3 we have a negatively sloped ‘ex post’ goods market equilibrium employment curve in employment-unexpected inflation space, but the absolute value of the slope falls short of the slope of the short-run Phillips curve, and we obtain diverging oscillations around the stable inflation rate of employment – or around the NAIRU. Therefore, the NAIRU is not a strong attractor in this case. In Figure 4, however, the absolute value of the slope of the ‘ex post’ goods market equilibrium employment curve exceeds the slope of the short-run Phillips curve, and the goods market equilibrium rate of employment converges towards the stable inflation rate of employment.¹⁴

Therefore, for the NAIRU to be a strong attractor for the actual unemployment rate, the following condition derived from equations (13) and (23) has to be valid:

$$(24) \quad \frac{\frac{1}{v}(h_0 - h_2 \hat{p}^u)(1 - g_2) - g_1}{\frac{h_2}{v}(1 - g_2)e - x\lambda(1 - s_R - g_2)} < -\frac{W_1}{W_2 + h_2}.$$

To sum up, the stability of the NAIRU requires a very low propensity to save out of rentiers’ income, a very low elasticity of investment with respect to internal funds, weak redistribution effects of unexpected inflation on labour income and effective demand, and a very flat short-run Phillips curve. Since there is no economic mechanism in our model which will guarantee this very special constellation to hold, we have to discuss the role of the central bank as a stabiliser of the NAIRU next.

3.2 An inflation targeting central bank and the NAIRU as a short-run attractor?

Applying the NCM idea of inflation targeting by the central bank, we have to bear in mind that the central bank controls the nominal rate of interest in our model. Therefore, this is the instrument an inflation targeting central bank can apply in order to achieve some target rate of inflation (\hat{p}^T). Here it is sufficient to assume that the central bank’s inflation target equals expected inflation ($\hat{p}^T = \hat{p}^e$) and that the only aim of the central bank is to erase unexpected inflation from the system. Therefore, the central bank reaction function becomes:

¹⁴ We may also have converging oscillations which are not shown graphically.

$$(25) \quad \begin{aligned} i_n &= i_0^c + \hat{p}^c + \hat{p}^u + i_1(\hat{p} - \hat{p}^T) = i_0^c + \hat{p}^c + \hat{p}^u + i_1(\hat{p} - \hat{p}^c) = i_0^c + \hat{p}^c + (1 + i_1)\hat{p}^u, \\ 0 &\leq i_0^c, 0 < i_1, \end{aligned}$$

with i_0^c being the central bank's estimation of the 'equilibrium real interest rate' and i_1 the reaction parameter with respect to unexpected inflation. From equation (23) we obtain the following effect of a change in the nominal interest rate on employment determined by the goods market:

$$(23b) \quad \frac{\partial e^{cb}}{\partial i_n} = \frac{x\lambda(1 - s_R - g_2)}{\frac{1}{v}(h_0 - h_2\hat{p}^u)(1 - g_2) - g_1}.$$

Changing the nominal interest rate will be positively related to capacity utilisation and employment, if the 'puzzling case' with respect to the demand effects of redistribution between firms and rentiers prevails:

$$(23b') \quad \frac{\partial e}{\partial i_n} > 0, \text{ if } : 1 - s_R > g_2.$$

Inflation targeting monetary policy interventions following equation (25) will hence move employment farther away from the stable inflation level. Note that the condition in equation (23b'), indicating the inappropriateness of inflation targeting monetary policies, is not equivalent with the NAIRU being a strong attractor from equation (24). Therefore, if (23b') is valid, but (24) is not, neither is the NAIRU self-stabilising in the face of accelerating (decelerating) inflation, nor is monetary policy able to adjust actual unemployment to the NAIRU by means of raising (lowering) interest rates. In order to stabilise the NAIRU in this case, monetary policies would have to do just the opposite from what is suggested by equation (25), namely lowering (raising) the interest rate in the face of accelerating (decelerating) inflation.

If the 'normal case' with respect to the demand effects of redistribution between firms and rentiers prevails, inflation targeting monetary policies will have the required effects on economic activity and employment:

$$(23b'') \frac{\partial e}{\partial i_n} < 0, \text{ if } : g_2 > 1 - s_R .$$

If unexpected inflation caused by a deviation of unemployment from the NAIRU is not self-correcting, and the condition in equation (23b'') is fulfilled, the NAIRU may therefore be turned into an attractor by inflation targeting monetary policies following the monetary policy rule in equation (25). In this case, the effects of changes in the nominal interest rate have to over-compensate the effects of unexpected inflation on capacity utilisation and employment. This does not seem to be a problem with unemployment falling short of the NAIRU and positive unexpected inflation. The central bank can always increase its instrument variable, the nominal interest rate, according to equation (25) and wipe out unexpected inflation by means of erasing 'excess employment' from the system. This is shown in Figure 5.

< Figure 5: An inflation targeting central bank >

For a stable adjustment it is again required that the absolute value of the slope of the (ex post) goods market equilibrium employment curve incorporating monetary policy responses (e^{cb}) has to exceed the slope of the short-run Phillips curve in employment-unexpected inflation space. Therefore, central banks have to be careful in their responses in order to avoid excessive over- and undershooting which would destabilise the system, similar to what is shown in Figure 3.

There are further limitations for monetary policies adjusting actual employment to the stable inflation level, if unemployment exceeds the NAIRU and unexpected inflation is negative, in particular in a climate of low inflation and hence low nominal interest rates. With unexpected disinflation or even deflation, a negative nominal interest rate according to equation (25) might be required in order to stabilise the system, which central banks cannot achieve due to the zero lower bound of its instrument variable. Therefore, central banks' capacities to adjust actual unemployment towards the NAIRU may be asymmetric.¹⁵

¹⁵ Another reason for asymmetric effects of central bank policies, not explicitly discussed in our model with only one interest rate, arises from the interaction of the central bank with the commercial banking sector. Whereas the central bank can always force commercial banks to increase market rates by means of increasing the base rate, commercial banks might not follow the central bank decreasing interest rates, in particular in a recession with increasing uncertainty and risk assessments.

If the central bank considers current inflation expectations determined by past inflation being too high and if it sets its target below the currently expected rate ($\hat{p}^T < \hat{p}^e$), it will have to bring down inflation expectations by means of disinflating the economy. This means that the central bank has to generate short-run unexpected disinflation by means of reducing employment below the stable inflation level, and hence raising unemployment above the NAIRU, which will then reduce expected inflation in the next period. However, bringing down inflation expectations by means of slowing down the economy contains major risks, because the deviation of unemployment from the NAIRU may not be self-correcting.¹⁶ Without immediate central bank counter-action in the opposite direction, therefore, the economy may hence suffer from a cumulative slowdown, that is falling employment, cumulative disinflation, and finally deflation, which makes central banks powerless, according to our arguments above.

4. Medium-run endogeneity of the NAIRU

In this section we integrate the major medium- to long-run endogeneity channels of the NAIRU with respect to actual unemployment into our model. We only indicate the effects on the distribution equilibrium and ignore the associated effects on the goods market equilibrium rate of employment, which may then give rise to complex interacting dynamics of these two equilibria in the long run. The detailed analysis of these interactions is well beyond the scope of the present paper.¹⁷ Therefore, what follows in this section has a medium-run horizon. We start with the channels related to the permanent deviation of actual unemployment from the NAIRU (persistence mechanism in the labour market, wage aspirations based on conventional behaviour, investment in capital stock) which are due to a failure to adjust actual unemployment to the NAIRU in the short run, and then we discuss a channel related to the successful adjustment of actual unemployment to the NAIRU by means of monetary policies (persistent change in the real interest rate).

4.1 Persistence mechanisms in the labour market

¹⁶ In the ‚puzzling case’, reducing inflation expectations would require slowing the economy down by means of lowering the interest rate.

¹⁷ For an indication of the related dynamics associated with a persistent change in the real interest rate in a somewhat simpler model, see Hein (2006a, 2007: 133-152).

Labour market related mechanisms for unemployment persistence have already been suggested by Blanchard/Summers (1987, 1988) and Ball (1999). Applying union wage bargaining or insider-outsider models, persistent unemployment and an increasing share of long-term unemployment in total unemployment with the associated loss of skills and access to firms by the long-term unemployed will decrease the pressure of a given rate of unemployment on labour unions' or insiders' target real wage and hence on nominal wage demands. This will then require an increasing total rate of unemployment in order to stabilise inflation.

Into our model this can be integrated as follows. Assume that the share of the long-term unemployed in total unemployment increases when the unemployment rate exceeds some threshold, which is given by frictional unemployment caused by the 'normal' working of the labour market in the face of changing demand patterns and structural as well as regional change. The employment rate hence falls short of a 'full employment' rate (e^f) associated with this rate of unemployment. Since the share of long-term unemployment in total unemployment will now increase, we obtain the following effect of actual employment on the workers' target wage:

$$(26) \quad (1-h)_w^T = W_0 + W_1 [e + \alpha(e^f - e)], \quad 0 \leq \alpha.$$

When actual employment persistently falls short of full employment, long-term unemployment will arise and the workers' target wage share for a given total rate of employment will increase. Combining equation (26) with firms' target profit share from equation (8) we get for the stable inflation rate of employment and hence for the NAIRU ($u^N = 1 - e^N$):

$$(27) \quad e^N = \frac{1 - W_0 - W_1 \alpha (e^f - e) - h_0}{W_1}.$$

Whenever the employment rate determined by the goods market falls short of the full employment rate, it will decrease the stable inflation rate of employment and hence increase the NAIRU.

$$(27a) \quad \frac{\partial e^N}{\partial (e^f - e)} = -\alpha < 0.$$

Figure 6 shows the negative effect of labour market persistence mechanisms on the stable inflation rate of employment, assuming that the initial distribution equilibrium is associated with full employment in the above sense. If the goods market equilibrium rate of employment persistently falls short of this, the stable inflation rate of employment will decrease below the full employment rate.¹⁸

< Figure 6: Labour market persistence mechanisms and the NAIRU >

Note that a readjustment of the stable inflation rate of employment to the full employment rate requires that the goods market equilibrium rate of employment will have to exceed the stable inflation rate for a considerable period of time, facilitating the reintegration of the long-term unemployed.

4.2 Wage aspirations based on conventional behaviour

Following an argument suggested by Stockhammer (2008), we now assume that workers' distribution targets are affected by actual distribution. If there is persistent deviation of the actual wage share from the target wage share, caused by a deviation of the goods market equilibrium rate of employment from the stable inflation rate, wage earners will adjust their targets accordingly. Simply put, workers will get used to the actual distribution of income and incorporate it into their distribution target. Therefore, in the medium run the target wage share from equation (12) becomes:

$$(28) \quad (1-h)_w^T = W_0 + \beta[(1-h) - (1-h)_w^T] + W_1 e = \frac{W_0 + \beta(1-h) + W_1 e}{1 + \beta},$$

$$0 < W_0 \leq 1, \quad 0 \leq W_1, \beta.$$

Combining equation (28) with the firms' target profit share from equation (8), the stable inflation rate of employment becomes:

¹⁸ Whether the change in the NAIRU associated with labour market persistence mechanisms is temporarily or permanent depends on the precise model. Nickell (1998) shows in a standard NAIRU model that labour market-related persistence mechanisms will only have a permanent effect on the NAIRU if the long term unemployed have *no* effect on wages.

$$(29) \quad e^N = \frac{(1-h_0)(1+\beta) - W_0 - \beta(1-h)}{W_1}.$$

A deviation of the actual wage share from the workers' target share has the following effect on the stable inflation rate of employment:

$$(29a) \quad \frac{\partial e^N}{\partial(1-h)} = -\frac{\beta}{W_1} < 0.$$

A positive deviation of the actual wage share from the workers' target caused by unemployment exceeding the NAIRU finally increases the NAIRU, because workers adjust their target share towards the actual share. This is shown in Figure 7. Of course, the process also works in the other direction. Unemployment, falling short of the NAIRU, will be associated with a wage share below workers' target and the workers will finally adjust targets and hence reduce the NAIRU towards actual unemployment.

< Figure 7: Endogenous wage and profit aspirations and the NAIRU >

4.3 The effect of investment in the capital stock

The effects of investment in the capital stock on employment and the NAIRU have been stressed by Rowthorn (1995, 1999), Sawyer (2001, 2002) and Arestis/Sawyer (2004a: 73-99, 2005).¹⁹ In our model, it can be assumed that the relationship between the employment rate and the rate of capacity utilisation ($x = e/z$), taken to be given in the short run, will be positively affected by investment in capital stock (g) in the medium run, if labour supply is constant or grows with some exogenous rate (n).

$$(30) \quad x = x_0 + x_1 g, \quad 0 < x_0 \leq 1, \quad 0 \leq x_1.$$

Higher capital stock growth will therefore increase the employment rate associated with the stable inflation rate of capacity utilisation in the medium run.

¹⁹ For recent empirical work on the effects of capital stock on unemployment see Alexiou/Pitelis (2003), Arestis/Baddeley/Sawyer (2006, 2007), Arestis/Biefang-Frisancho Mariscal (2000), Palacio-Vera et al (2006), and Stockhammer (2004b).

$$(31) \quad z^N = \frac{e^N}{x_0 + x_1 g} = \frac{1 - W_o - h_0}{(x_0 + x_1 g)W_1}.$$

So far, investment in capital stock only relaxes a potential constraint on the stable inflation rate of employment given by the capital stock: The faster the growth of productive capacities determined by the capital stock growth, the lower the rate of capacity utilisation associated with and hence required for a stable inflation rate of employment. However, capital stock in relation to output, and hence the medium-run capacity utilisation, may also directly affect the stable inflation rate of employment and hence the NAIRU, if firms' target mark-up is positively related to capacity utilisation in the medium run. The lower the growth rate of capital stock, the higher will be medium run capacity utilisation, if the exogenous components of demand remain constant, and the higher will be the firms' target profit share:

$$(32) \quad h_F^T = h_0 + h_3 z, \quad 0 \leq h_1, h_3.$$

Taking also into account equations (10), (11) and (32) we get for the stable inflation rate of employment:

$$(33) \quad e^N = \frac{1 - W_o - h_0 - h_3 \frac{e}{x_0 + x_1 g}}{W_1}$$

From this we obtain for the effect of capital accumulation on the stable inflation rate of employment:

$$(33a) \quad \frac{\partial e^N}{\partial g} = \frac{h_3 e x_1 W_1}{[(x_0 + x_1 g)W_1]^2} > 0.$$

Figure 8 shows this effect associated with weak investment in the short run and therefore low capital stock growth in the medium run.

< Figure 8: Low investment, slow capital stock growth and the NAIRU >

4.4 Persistent changes in the ‘ex ante’ real rate of interest

In Section 3 it has been shown that, depending on the model parameters, inflation targeting monetary policies may be unnecessary, counterproductive, or limited in their effectiveness in the short run. In this section we integrate the medium-run effects of changes in the ‘ex ante’ real interest associated with inflation targeting monetary policies. In Hein (2006a, 2007: 133-152) it has been argued that persistent changes in the ‘ex ante’ real interest rate affect firms’ target profit share in the medium to long run and hence the stable inflation rate of employment.²⁰ Since interest payments are costs from the perspective of the firm which have to be covered by the mark-up on unit labour costs, persistent changes in the ‘ex ante’ real interest rate will cause medium-run changes in the firms’ target mark-up. The firms’ target profit share from equation (8) has therefore to be expanded with h_1 denoting the medium-run interest rate elasticity of the target profit share:

$$(34) \quad h_F^T = h_0 + h_1 i^e, \quad 0 < h_0 \leq 1, \quad 0 \leq h_1 .$$

Note that for a medium-run effect on the target mark-up and the target profit share, it is a change in the ‘ex ante’ real interest rate and not in the actual interest payments which is relevant, because we assume that firms are well aware of imputed interest costs on own capital, i.e. on accumulated retained earnings. Taking into account the workers’ target wage share from equation (10), we obtain the following stable inflation rate of employment:

$$(35) \quad e^N = \frac{1 - W_0 - h_0 - h_1 i^e}{W_1} .$$

A persistent change in the ‘ex ante’ real interest rate will have an inverse effect on the stable inflation rate of employment:

$$(35a) \quad \frac{\partial e^N}{\partial i^e} = -\frac{h_1}{W_1} < 0 .$$

²⁰ The idea that lasting variations in interest rates may affect functional income distribution and hence the share of wages and gross profits in total income goes back to Sraffa (1960: 33) and has been proposed, in particular, by Neo-Ricardian authors (see for example Pivetti 1991, 2001), but it can also be found in earlier PK work (Kaldor 1982: 63, Pasinetti 1974: 139-141). See also Lavoie (1995). This idea is also compatible with Kalecki’s (1954: 18) notion that the degree of monopoly and hence the mark-up ‘may, but need not necessarily, increase’ when overheads and hence interest costs increase.

Applying the inflation targeting interest rate rule (equations 25) may therefore stabilise inflation in the short run, but in the medium run the effects on the firms' target profit share may undermine the short-run stabilisation effects and may create unexpected inflation again, triggering further central bank intervention, as is shown in Figure 9. Note that also this effect works in reverse: expansive monetary policies stimulating the economy by means of cutting interest rates might trigger accelerating inflation in the short run, but in the medium run lower interest costs will reduce firms' target mark-up and hence the inflationary push.

< Figure 9: Persistent change in the 'ex ante' real rate of interest and the NAIRU >

5. A Post-Keynesian macroeconomic policy assignment

From our results so far it follows that the NCM policy assignment has to be completely revised in order to achieve a high and stable medium-run employment rate with stable inflation expectations. Following our model, we restrict our discussion to a closed economy and develop a PK assignment for monetary, wage and fiscal policies without considering open economy issues and the exchange rate.

5.1 Monetary policy

From the criticism of inflation targeting monetary policy developed above, different implications for more adequate monetary policies can be drawn. Applying the distinction made by Rochon/Setterfield (2007-8a, 2007-8b), either an 'activist' position or a 'parking-it' approach for the central bank applying the interest rate has been proposed by PKs. The proponents of the 'activist' position confirm the central bank's responsibility for stable inflation and regard the interest rate as an appropriate tool to achieve this goal. Therefore, PK monetary economics is held to be generally consistent with inflation targeting by central banks and with the application of an interest rate operation procedure (Fontana/Palacio-Vera 2006, 2007, Palley 2006, Setterfield 2006a). Contrary to NCMs, however, they demand more careful counter-cyclical stabilisation by means of interest rate policies, taking into account the short- and medium-run real effects, as well as more reasonable, that is higher, inflation

targets.²¹ The ‘parking-it’ position, however, refrains from recommending fine tuning the economy by means of interest rate policies, but focuses on the long-run distribution effects of the central bank setting the interest rate, which we have highlighted above, and recommends to stabilise the long-term rate of interest at a certain level. Different targets have been proposed. Smithin (2004), for example, suggests that the real interest rate should be set to zero, or as close to zero as possible, allowing rentiers to maintain their stock of real wealth but not to participate in real growth. Lavoie (1996a) and Setterfield (2006b) are in favour of setting the real rate of interest equal to productivity growth, which allows rentiers to participate in real growth and keeps distribution between rentiers, on the one hand, and firms and labourers, on the other hand, constant (Pasinetti’s (1981) ‘fair rate of interest’).²² Since we have abstracted from productivity growth in our model, these two rules are essentially the same. Therefore, we obtain the following monetary policy rule:

$$(36) \quad i_n = i_0^c + \hat{p}^c + \hat{p}^u,$$

with i_0^c being given by medium-run productivity growth. Central banks will have to adjust their policy instrument, the nominal interest rate, so that a constant expected real rate of interest equal to medium-run productivity growth emerges. This implies adjusting the nominal interest rate to unexpected inflation at the end of each period.

Note that monetary policies in this approach should neither pursue an inflation target nor make any attempts at adjusting the employment rate to some target. Of course, monetary policies remain responsible for the orderly working of the monetary and financial system, the

²¹ Taking price stability as the monetary policy goal, Fontana/Palacio-Vera (2006, 2007) recommend a ‘flexible’ or ‘asymmetrical opportunistic approach’ for monetary policy in order to avoid policy induced recessions and negative long-run effects on potential output. If inflation is at or below target, monetary policies should lower real interest rate in order to exploit the flat region of the Phillips curve and to improve potential output by means of stimulating investment and so on. If inflation is above target but below the upper limit tolerated by the central bank, real interest rates should be maintained constant. And only if inflation exceeds the upper limit, real interest rates should be raised. Assuming a backward bending Phillips curve, because workers are assumed to accept inflation induced real wage cuts in order to increase employment when inflation is low, Palley (2006) advocates that the central bank should target a ‘Minimum Unemployment Rate of Inflation’ (MURI). This model neglects conflict inflation and considers inflation to be an adjustment mechanism (grease). Although inflation targeting is seen to be consistent with PK monetary economics, it is considered to be insufficient because of its inability to deal with balance sheet disorders in the private sector (asset price bubbles) and its potentially dangerous implications for the real economy (increasing financial fragility, debt deflation). For this purpose Palley recommends the introduction of ‘asset-based reserve requirements’ as a monetary policy tool.

²² Wray (2007) proposes a zero nominal interest rate in order to get rid of the rentiers’ class. However, this seems to imply overcoming the main characteristics of a monetary production economy, the advancement of credit in order to get production started. Obviously, with a zero nominal interest rate in a single interest rate model there is no incentive for banks/rentiers to grant credit for initial finance of production or final finance of the capital stock.

definition of credit standards for refinance operations with commercial banks (credit controls), the implementation of compulsory minimum reserves of different types to be held with the central bank, the role of a ‘lender of last resort’ in the case of systemic crises, and so on.²³

5.2 Wage policy

The NCM view on the role of wage formation and wage bargaining, demanding nominal and real wage flexibility by means of structural reforms in the labour market and decentralisation of wage bargaining in order to accelerate the adjustment towards the NAIRU and in order to reduce the NAIRU itself cannot be sustained on the basis of our model. Nominal wage flexibility generates unexpected inflation whenever unemployment deviates from the NAIRU. This affects distribution between firms and rentiers, on the one hand, and distribution between capital and labour, on the other hand, and is hence associated with real wage flexibility. With realistic parameters, nominal wage flexibility makes actual unemployment diverge further from the NAIRU in our model, as we have shown above.²⁴

In order to avoid the destabilising effects of nominal and real wage flexibility, PKs advocate rigid nominal wages and hence allocate the role of nominal stabilisation to incomes or wage policies.²⁵ Therefore, nominal unit labour costs should grow at a rate similar to the country’s inflation target, which means that nominal wage growth should equal the sum of medium-run growth of labour productivity (\hat{w}_0) and the target inflation rate:

$$(37) \quad \hat{w} = \hat{w}_0 + \hat{p}^T .$$

Following this wage formula will also keep income shares constant, provided that the mark-up in firms’ pricing remains constant and that imported material costs in an open economy grow in line with domestic unit labour costs (Kalecki 1954: 28-30). Under these conditions,

²³ This view is shared by the PK proponents of the ‘activist’ position (see for example Palley 2006) and of the ‘parking-it’ position (see for instance Lavoie 1996a). A detailed discussion of central bank reactions towards financial market instabilities is outside the scope of the present contribution.

²⁴ Finally, wage moderation and redistribution at the expense of labour will not only negatively affect effective demand and employment in the short run, as well as the inflation barrier in the long run through the channels mentioned above, it will also be associated with weak real wage induced productivity growth which will further add to the weakening of long-run growth. See Bhaduri (2006a, 2006b) on the theoretical arguments and Naastepad (2006) and Naastepad/Storm (2007) for empirical analysis.

²⁵ See, for example, Arestis (1996), Davidson (2006), and Setterfield (2006a).

the destabilising effects of real wage flexibility in wage-led economies will be avoided, too. Implementing this wage formula is tantamount to flattening the short- and the long-run Phillips curve and making it horizontal in the optimal case.

In the context of our model we have two ways of integrating nominal stabilisation by means of incomes policies. The first way is to increase the values of h_2 and W_2 in the Phillips curve (equation 13). This implies making the Phillips curve flatter by means of reducing workers' and firms' inflation push in the face of unexpected inflation, which means increasing firms' and workers' willingness to accept deviations of actual distribution from their respective targets. The second way is to make the target wage shares of workers and firms compatible for a relevant range of employment rates. In the context of our model this requires to reformulate the workers target wage share from equation (10):

$$(1-h)_W^T = W_0 + W_1 e, \text{ if: } e < e_1^N \text{ or } e_2^N < e, \\ (38) \quad \text{and} \\ (1-h)_W^T = (1-h)_F^T = h_0, \text{ if: } e_1^N < e < e_2^N.$$

The stable inflation rate of employment and hence the NAIRU becomes a corridor and the Phillips curve from equation (13) becomes a horizontal line between e_1^N and e_2^N (see Figure 11):

$$\hat{p}_t^u = \frac{W_0 + W_1 e + h_0 - 1}{W_2 + h_2}, \text{ if: } e < e_1^N \text{ or } e_2^N < e \\ (39) \quad \text{and} \\ \hat{p}_t^u = 0, \text{ if: } e_1^N < e < e_2^N.$$

In the first way, maybe the more realistic way, variations in the employment rate will have an – albeit weak – effect on unexpected inflation. If the NAIRU itself is not a strong attractor, any deviation from the stable inflation rate of employment will hence trigger cumulative deviation tendencies and real stabilisation will be required. In the second way, the optimal way, variations in the employment rate between e_1^N and e_2^N do not trigger any unexpected inflation and hence no cumulative processes will set in. In this case, demand management is free to choose a high level of employment close to e_2^N without violating stable inflation rates. PKs argue that in particular a high degree of wage bargaining coordination at the national

level, strong labour unions and employer organisations, and hence organised labour markets should be particularly suitable for pursuing this nominal stabilisation role of wage bargaining.²⁶

5.3 Fiscal policy

Because of the problems associated with real and nominal stabilisation by means of monetary policies mentioned above, the complete neglect of discretionary fiscal policies in the NCM turns out to be a major problem (see in particular Arestis/Sawyer 2003, 2004a, 2004c).²⁷ Therefore, PKs have argued in favour of real stabilisation by means of fiscal policies. This has again two dimensions: Since an adjustment of actual unemployment to a NAIRU cannot generally be expected, neither from market forces nor from monetary policies, fiscal policies are required for short-run real stabilisation. And since the NAIRU is endogenous to actual unemployment and hence to effective demand in the medium to long run, fiscal policies do not only have short-run real effects but also affect long-run development of the economy through the endogeneity channels discussed above. Since fiscal policies are responsible for short- and medium- to long-run demand management, it goes without saying that fiscal policies also have to prevent persistent demand inflation, hence aggregate demand persistently exceeding productive capacities.²⁸

Arestis/Sawyer (2003) demonstrate that the major arguments put forward against a use of discretionary fiscal policies, ‘crowding out’ (through higher inflation and associated real balance effects or higher real interest rates) and the ‘Ricardian equivalence theorem’,²⁹ are unconvincing, both on theoretical and empirical grounds. Both arguments have to assume that the economy operates at full employment equilibrium level. But if there is already full employment, there is no need to implement expansionary fiscal policies in order to achieve full employment and hence there is no need to worry about ‘crowding out’ or ‘Ricardian

²⁶ See Hein (2006a, 2007: 133-152) and Kriesler/Lavoie (2007) for the implementation of coordinated wage bargaining into PK models and Hein (2002, 2004) for reviews of the related literature.

²⁷ For the inappropriateness of this view, also within a NCM framework, see Setterfield (2007), who shows that also within the NCM framework there is good reason to conclude that ‘... fiscal policy is at least as, if not, *more* potent as an instrument of stabilization policy than is monetary policy ...’ (Setterfield 2007: 417, italics in the original).

²⁸ We therefore disagree with Lavoie (1996) who recommends that the central bank should apply credit rationing or credit controls in order to stop demand inflation. We hold that fiscal policies are far more straightforward in achieving this goal.

²⁹ For a discussion of further institutional aspects of fiscal policies that are said to produce ineffectiveness of fiscal policy, as model uncertainty, decision and implementation lags, deficit bias for political economy reasons, etc. see also Arestis/Sawyer (2003).

equivalence’! What might occur, in an economy governed by effective demand - with investment (and government deficit spending) causing saving (mainly through income effects) also in the long run - and characterised by endogenous money, is ‘crowding out’, but only if central banks deliberately raise interest rates in the face of expansive fiscal policies. And even in this case, crowding out might not materialise because the negative effects of rising interest rates on investment may be too small to overcompensate the positive effects of higher demand on investment decisions. However, rising interest rates will have distribution effects which may negatively feed back on economic development in the medium to long run, as argued above. Making use of government deficit spending for stabilising effective demand in the short and in the medium to long run, in the sense of ‘functional finance’, that is compensating private sector full (or stable inflation rate of) employment saving by government deficit spending,³⁰ therefore requires that central banks do not interfere with expansionary fiscal policies and stick to a policy of low interest rates, as recommended above.

In the context of our model real stabilisation should therefore be delegated to fiscal policies and equation (18) can be extended in the following way:

$$(40) \quad d = d_0 + d_1(e^T - e), \quad 0 \leq d_0, 0 < d_1,$$

with d_0 as permanent government deficit spending, which is required if employment is at target (e^T), and d_1 as the reaction in the case of deviations of employment from target. The employment target is, of course, the maximum employment rate achievable without triggering unexpected inflation. However, since high levels of demand and moderate unexpected inflation may have medium run expansionary effects on the stable inflation rate of employment through the endogeneity channels discussed above, fiscal policies should make sure to operate at the upper limit and should always ‘test the waters’.

5.4 A Post-Keynesian policy-mix

³⁰ The ‘functional finance’ view, pioneered by Lerner (1943), recommends government deficits, the difference between government spending (G) and taxes (T), to mop up the excess of private sector planned saving (S) over planned investment (I), plus the difference between imports (M) and exports (X), at a desired (full employment) level of economic activity: $G-T = S-I+M-X$ (see Arestis/Sawyer 2004c). Applying government deficit spending in the ‘functional finance’ way assures that there is always enough saving to fund government deficits by means of issuing bonds and/or increasing the central bank’s money supply, buying government bonds through open market operations. Crowding out will not occur, provided that the central bank does not raise the interest rate.

We can now summarise the alternative PK assignment of macroeconomic policies for a closed economy. The coordination of monetary, fiscal and wage policies along these lines should be more conducive to reasonable growth, high employment, and stable inflation than the NCM economic policy approach. In this assignment or policy-mix, wage policies, and hence wage bargaining parties, are mainly responsible for stable inflation rates, and hence for nominal stabilisation. Fiscal policies are responsible for the management of demand, maintaining effective demand at high employment levels, and hence for real stabilisation in the short and in the long run. Monetary policies by the central bank should neither aim at fine tuning the economy in real nor in nominal terms, and should thus not interfere with the tasks of wage and fiscal policies, but should rather focus on stable distribution between rentiers, on the one hand, and firms and labourers, on the other hand, in order to avoid destabilising distribution effects of changes in the interest rate.

< Figure 10: A ‘realistic’ Post-Keynesian policy mix >

< Figure 11: An ‘optimal’ Post-Keynesian policy mix >

Since we have distinguished two ways of integrating nominally stabilising wage policies into our model, we have two graphical representations of the PK policy-mix. In Figure 10 we have a ‘realistic’ PK policy mix with a flat but not horizontal Phillips curve. This policy mix requires fiscal stabilisation around the unique NAIRU and hence a very activist fiscal policy. In Figure 11 the ‘optimal’ PK policy-mix is shown with a horizontal Phillips curve in which the employment rate is more robust with respect to external shocks and hence less activist fiscal policies are required. It should be noted that in both representations an increasing stable inflation rate of employment can be supposed if actual employment remains at a high level, through the endogeneity channels discussed above, in particular through persistence mechanisms in the labour market and the effects of high investment on the capital stock.

Extending the Post-Keynesian macroeconomic policy-mix proposed here to the open economy is a difficult task due to the unclear determination of the nominal exchange rate, on the one hand, and potential interference with domestic goals, on the other hand. Arestis/Sawyer (2006) argue that monetary policies should be responsible for the exchange rate in a floating exchange rate system. This requires the exchange rate to be mainly affected by interest rate differentials. However, if there are further determinants of the nominal

exchange rate, inflation differentials or (expected) growth differentials, such an assignment could be misleading. In this case, all three policy actors would affect the exchange rate. However, this is only a preliminary conclusion and further research is required to clarify this issue.

6. Conclusions

In this paper we have developed a model which synthesises several of the PK criticisms of the NCM. Based on this model we have developed a PK alternative macroeconomic policy mix to the one proposed by the NCM. Our model consists of three classes, rentiers, firms and workers, and it has a short-run inflation barrier derived from distribution conflict between these classes which, however, becomes endogenous in the medium run. Distribution conflict does not only affect inflation but also income shares and hence effective demand and employment. We have shown that in the short run the stable inflation rate of employment, and hence the NAIRU, may be an attractor of actual unemployment determined by effective demand, but only under very special conditions. If these conditions are not met, inflation targeting monetary policies, as proposed by the NCM, may under certain conditions be able to adjust the economy to the stable inflation equilibrium in the short run, but we have argued that these adjustment capacities may be asymmetric. Under certain conditions inflation targeting monetary policies may be even counterproductive.

Discussing medium-run endogeneity channels of the NAIRU, we have shown that even if monetary policies varying the nominal interest rate are successful in stabilising inflation in the short run, the medium-run cost effects associated with changes in the ‘ex ante’ real rate of interest may generate the inflation problem again. We have also integrated further endogeneity channels into our model which adjust the stable inflation rate of employment towards actual employment determined by the goods market, and hence the NAIRU towards actual unemployment: persistence mechanisms in the labour market, adaptive wage and profit aspirations, and investment in capital stock.

Based on these results we have finally argued that the NCM macroeconomic policy assignment should be replaced by a PK assignment. Enhancing employment without increasing inflation in a closed economy is possible if macroeconomic policies are

coordinated along the following lines: The central bank targets distribution between rentiers, on the hand, and firms and labourers, on the other hand, and sets low real interest rates, wage bargaining parties target inflation, and fiscal policies are applied for short- and medium-run real stabilisation purposes. The extension of this Post-Keynesian economic policy assignment to an open economy remains to be developed.

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Figure 1: Conflicting claims, inflation and distribution

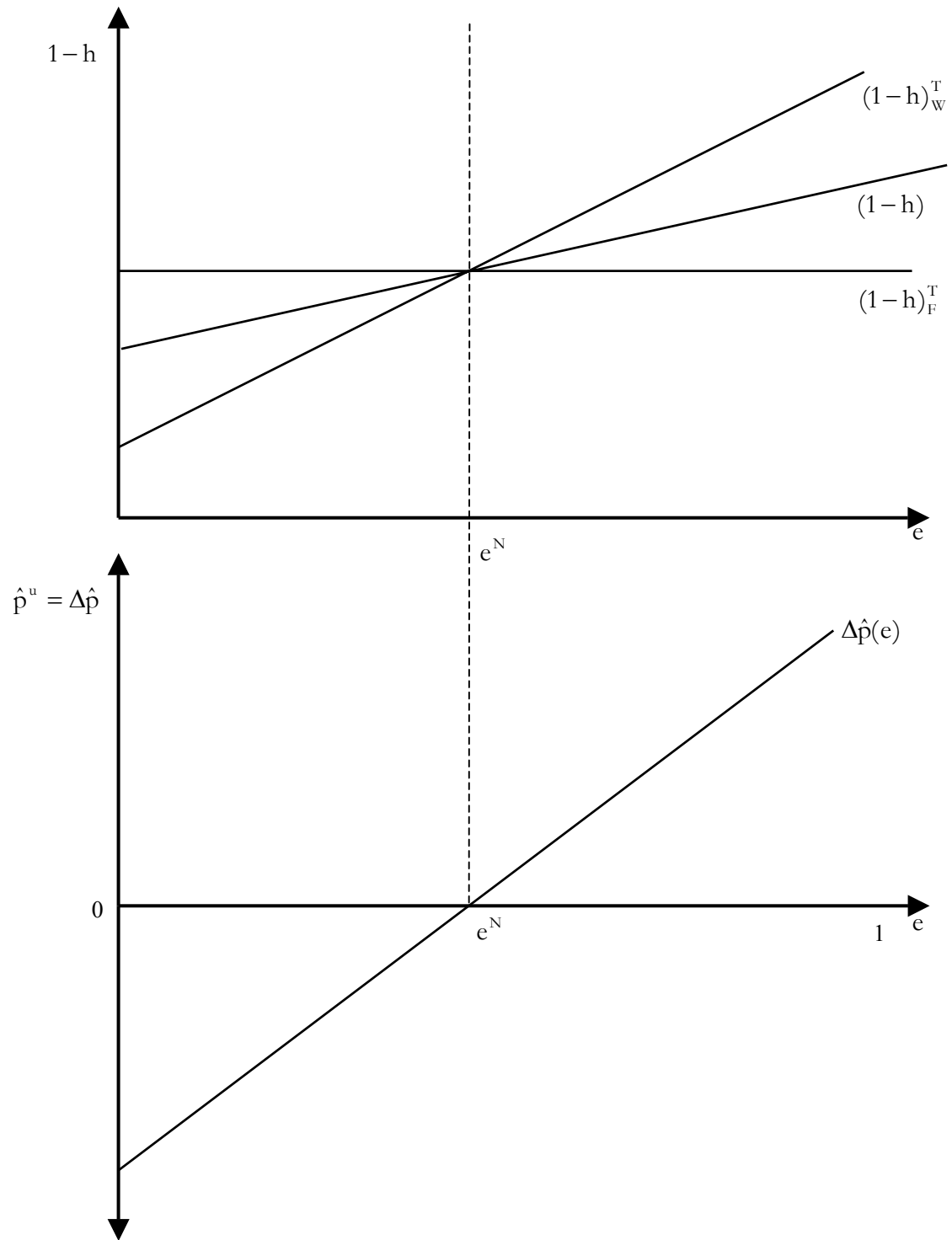


Figure 2: The NAIRU as a non-attractor: monotonic divergence

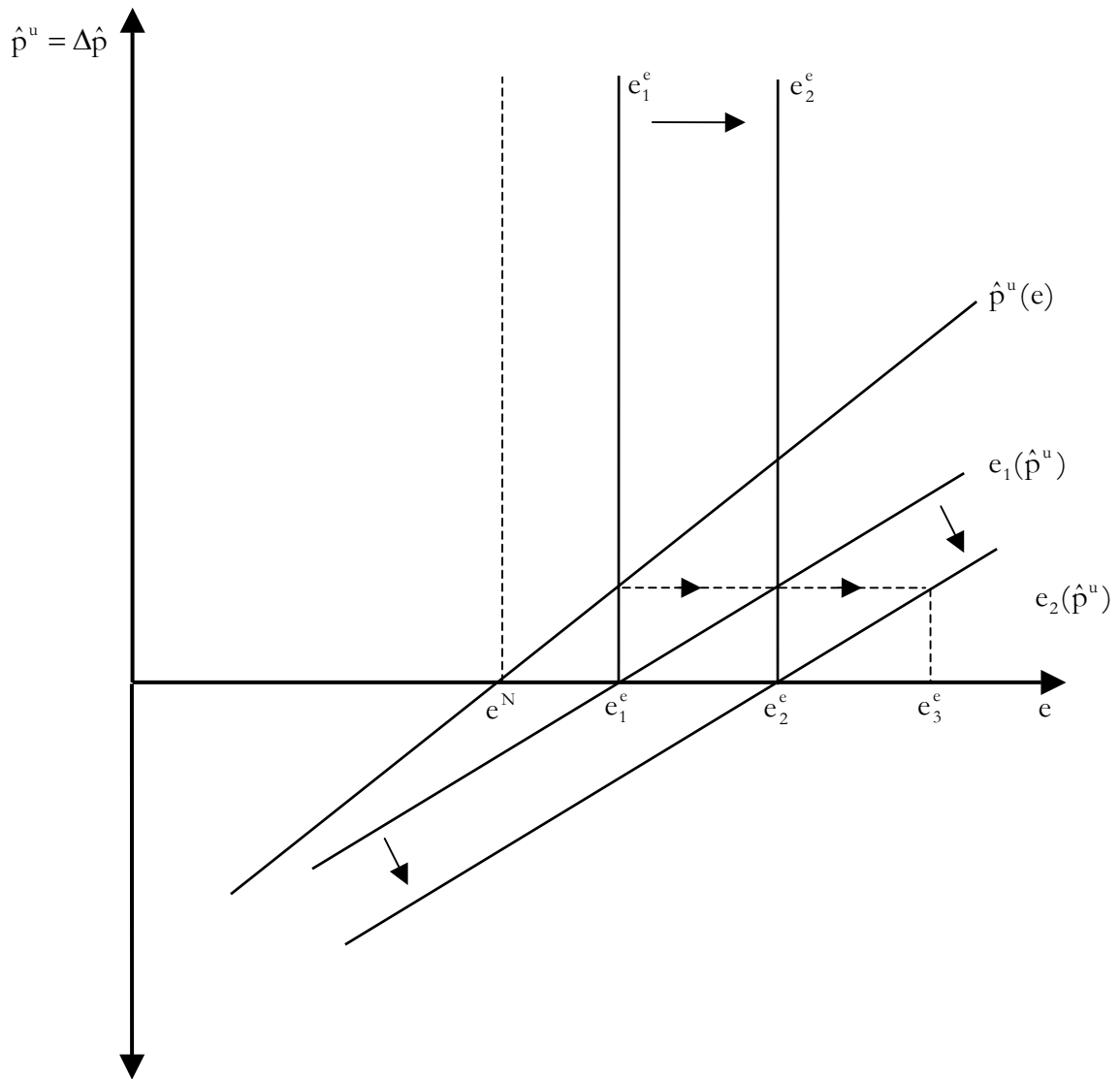


Figure 3: The NAIRU as a non-attractor: oscillating divergence

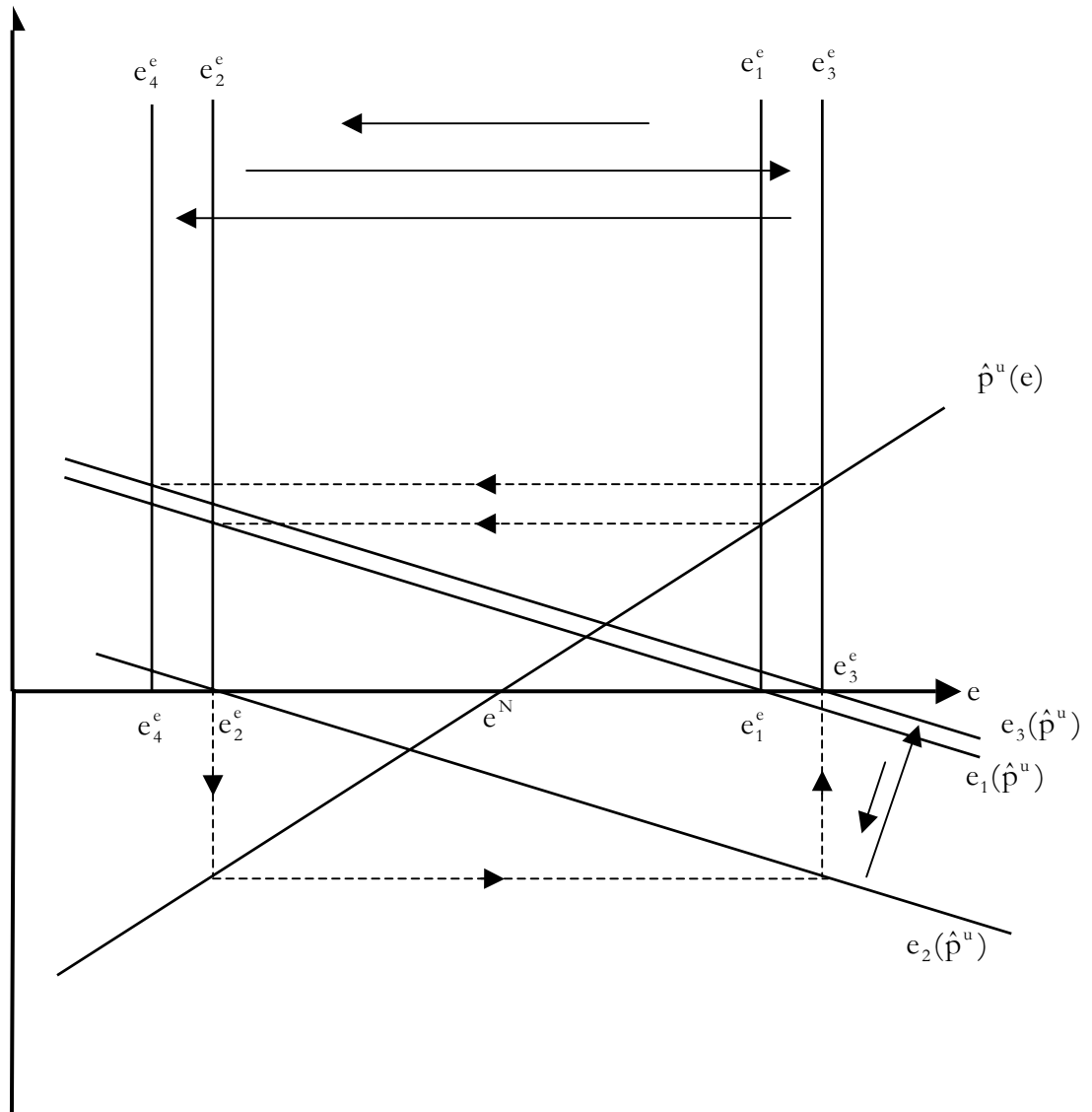


Figure 3: The NAIRU as an attractor

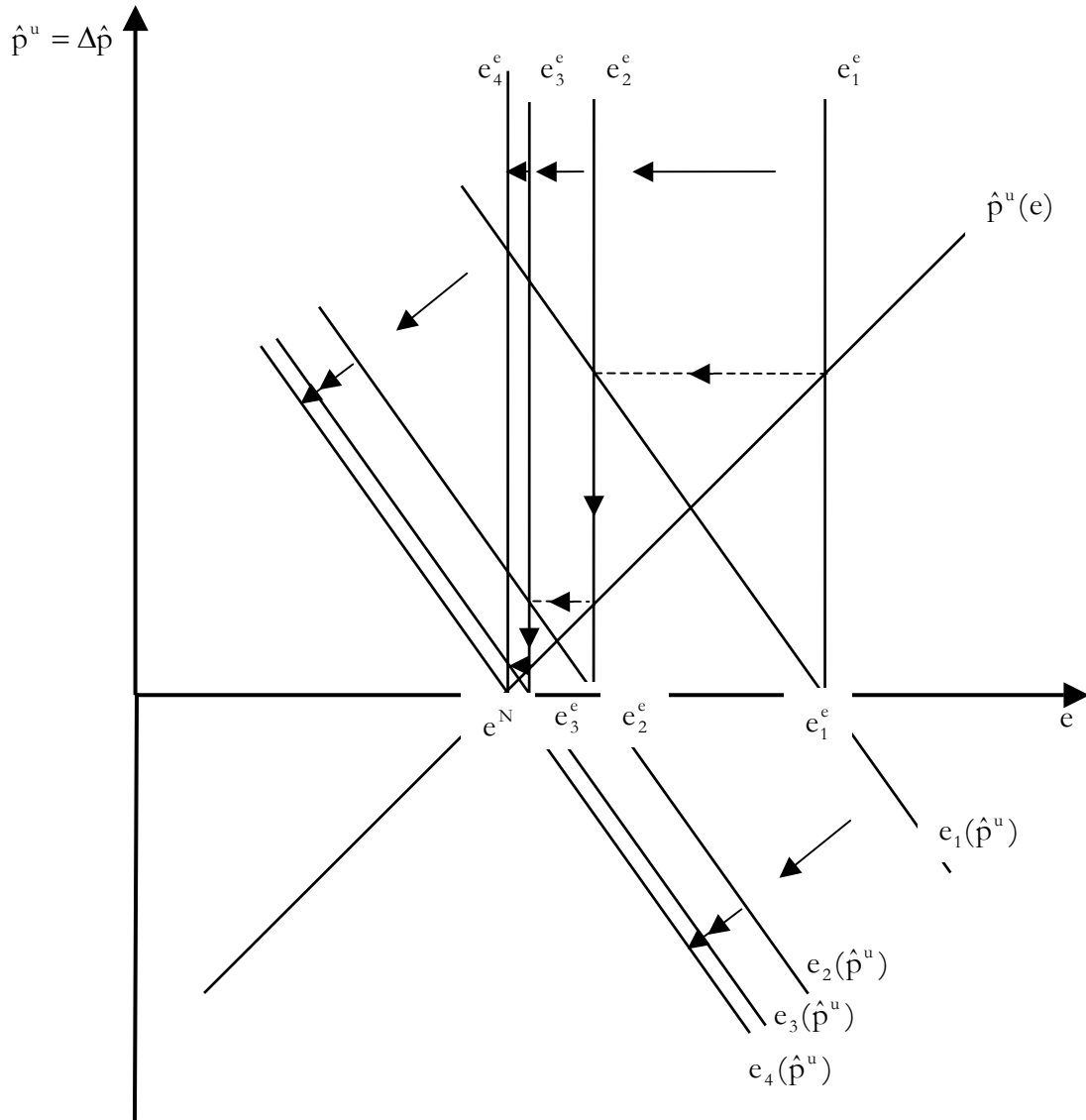


Figure 5: An inflation targeting central bank stabilising the NAIRU

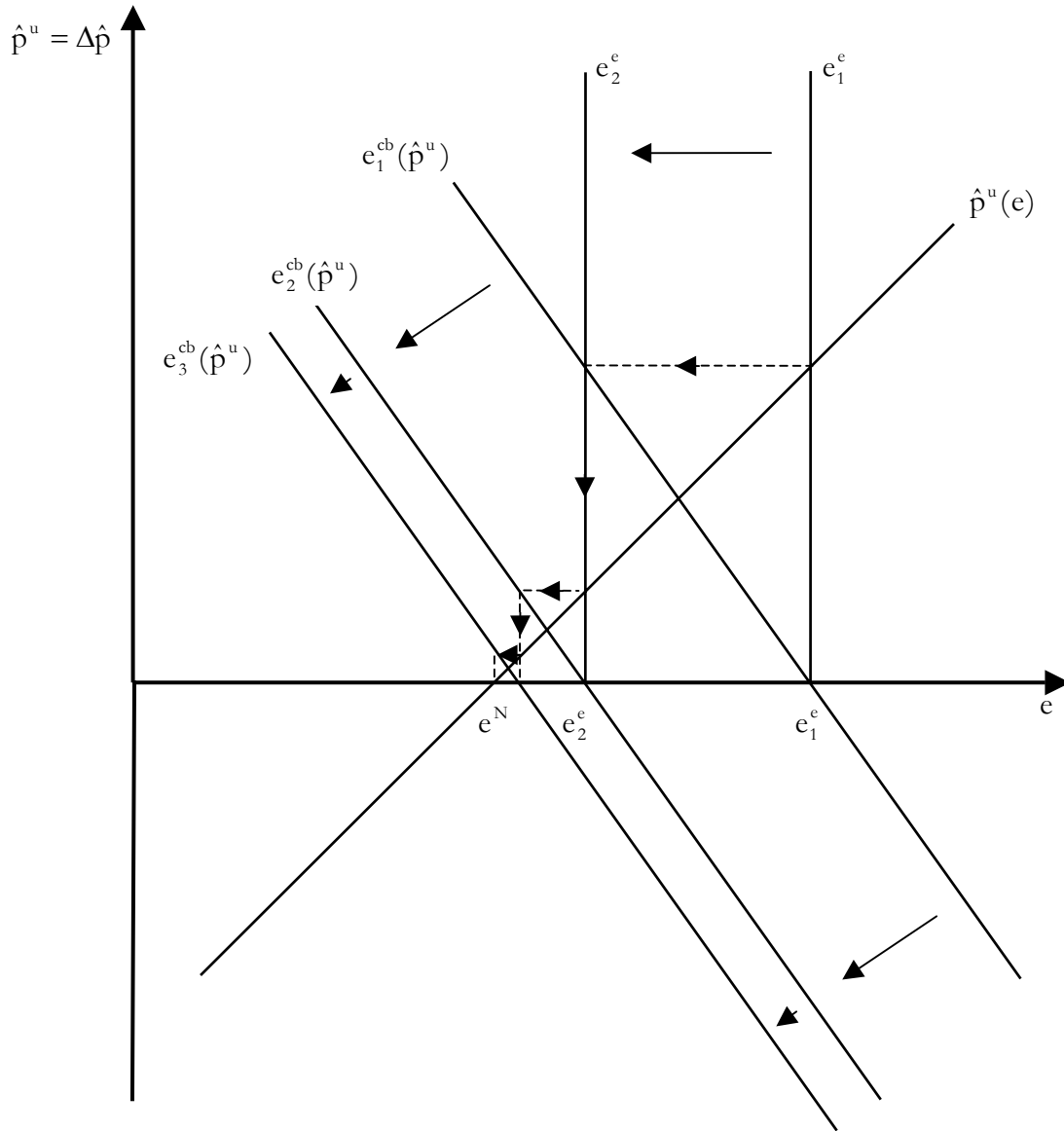


Figure 6: Labour market persistence mechanisms and the NAIRU

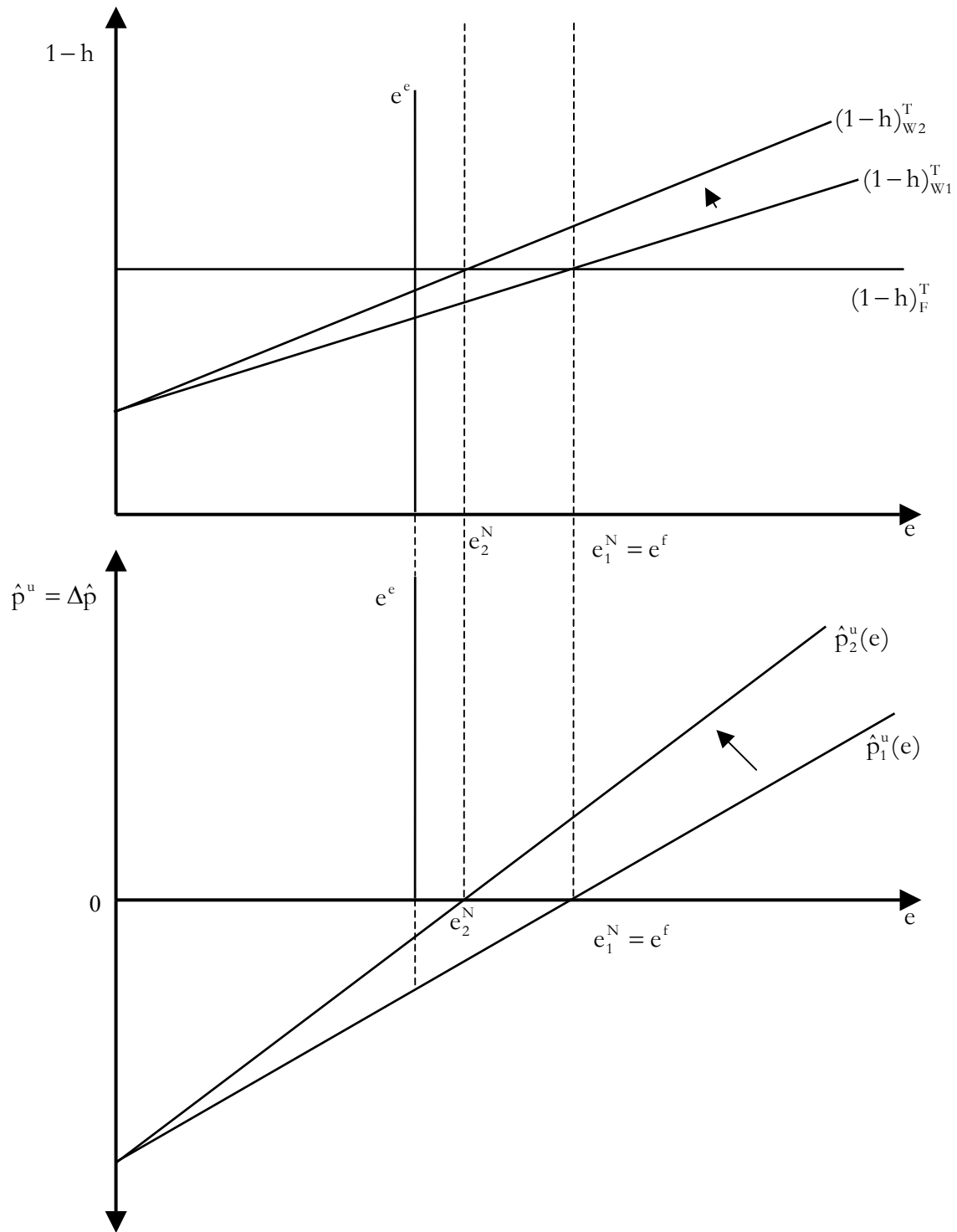


Figure 7: Endogenous wage and profit aspirations and the NAIRU

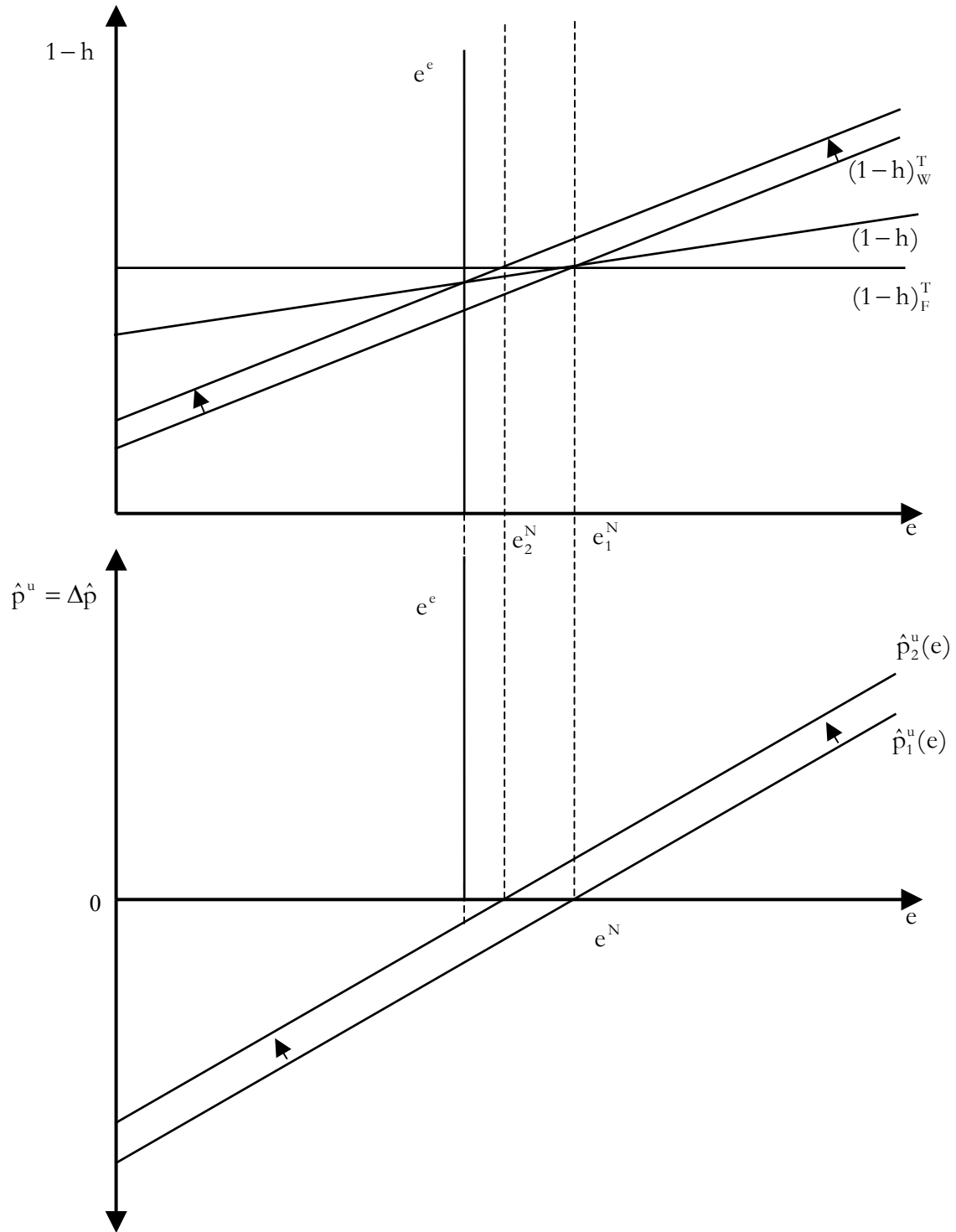


Figure 8: Low investment, slow capital stock growth and the NAIRU

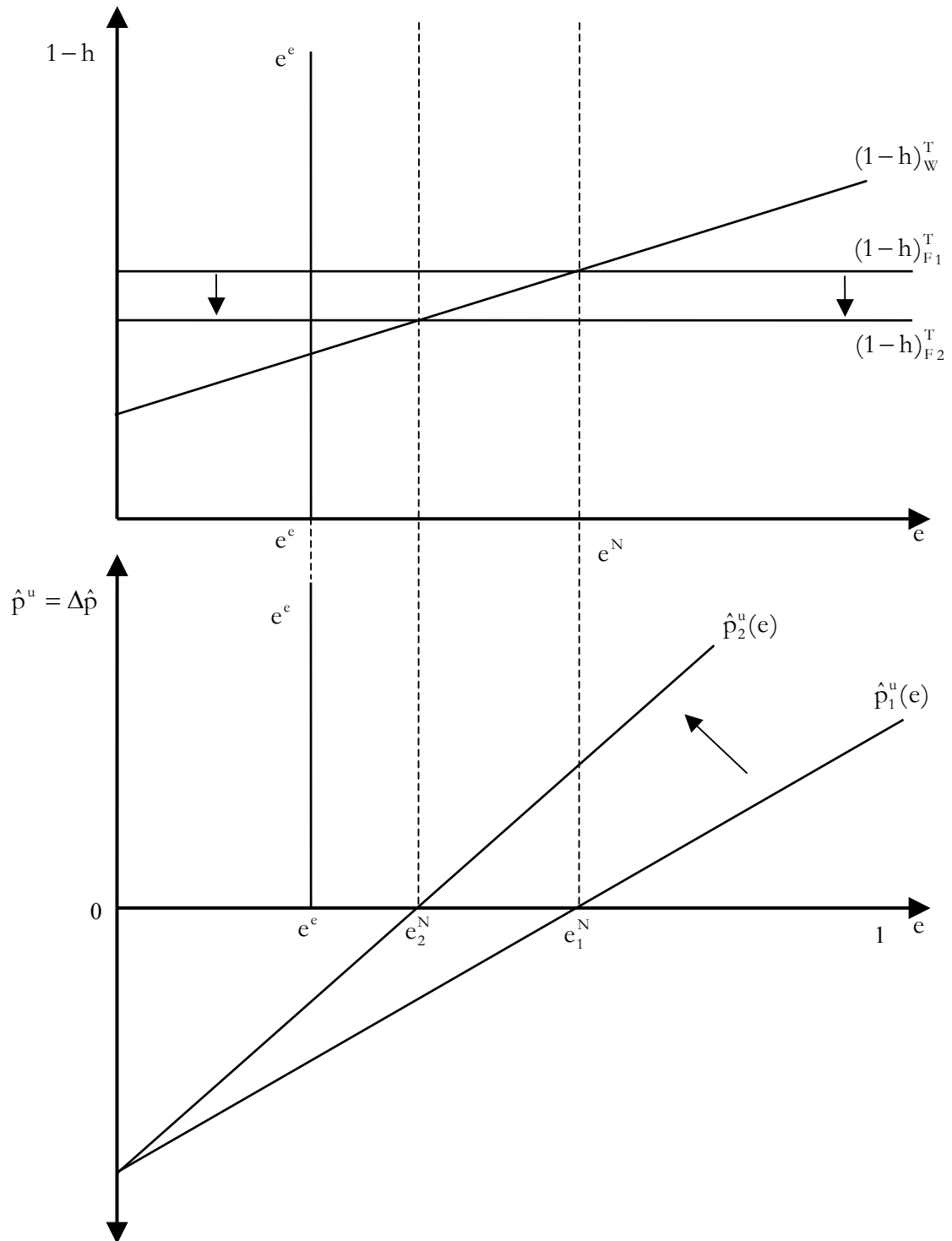


Figure 9: Persistent change in the ‘ex ante’ real rate of interest and the NAIRU

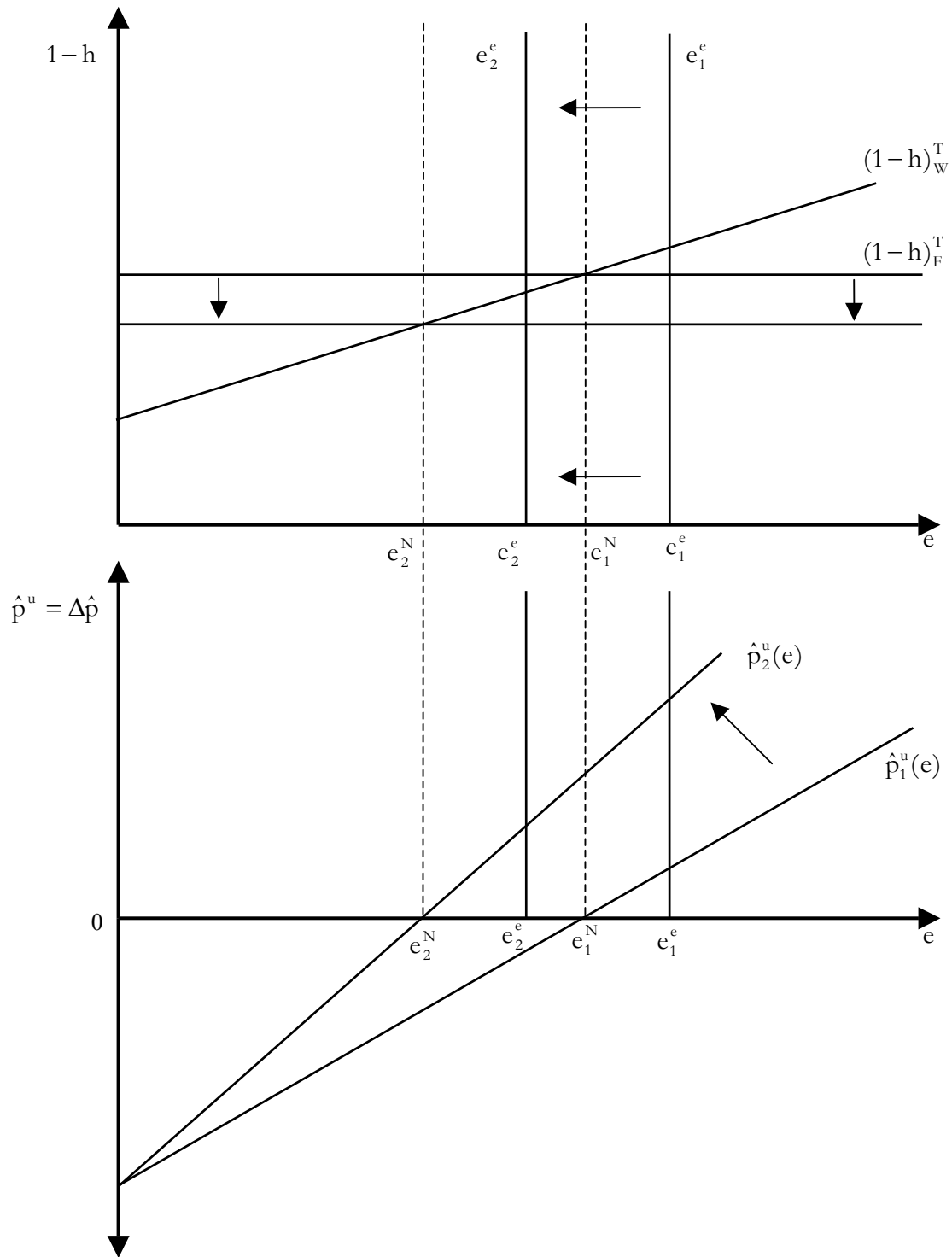


Figure 10: A ‘realistic’ Post-Keynesian policy mix

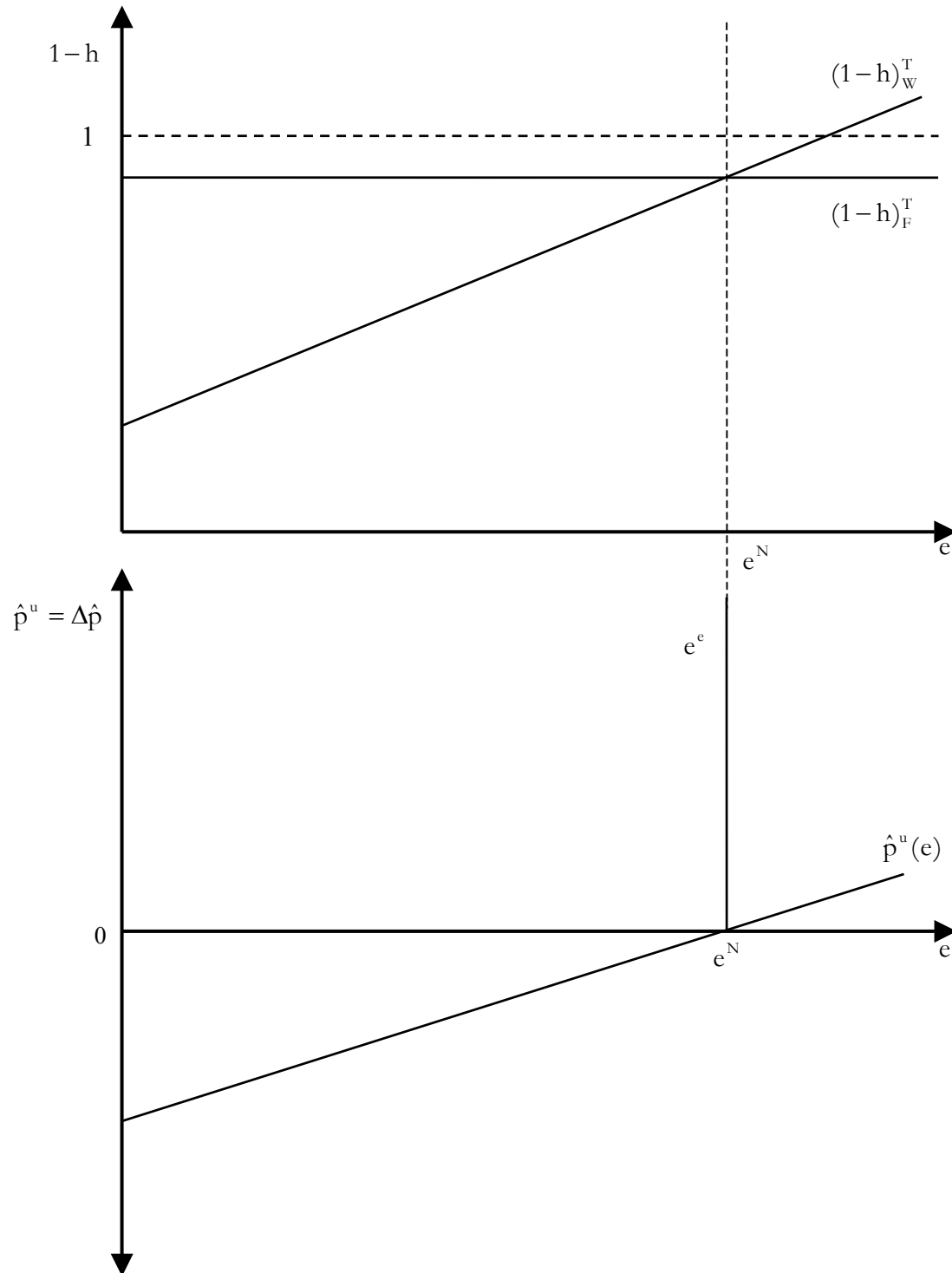
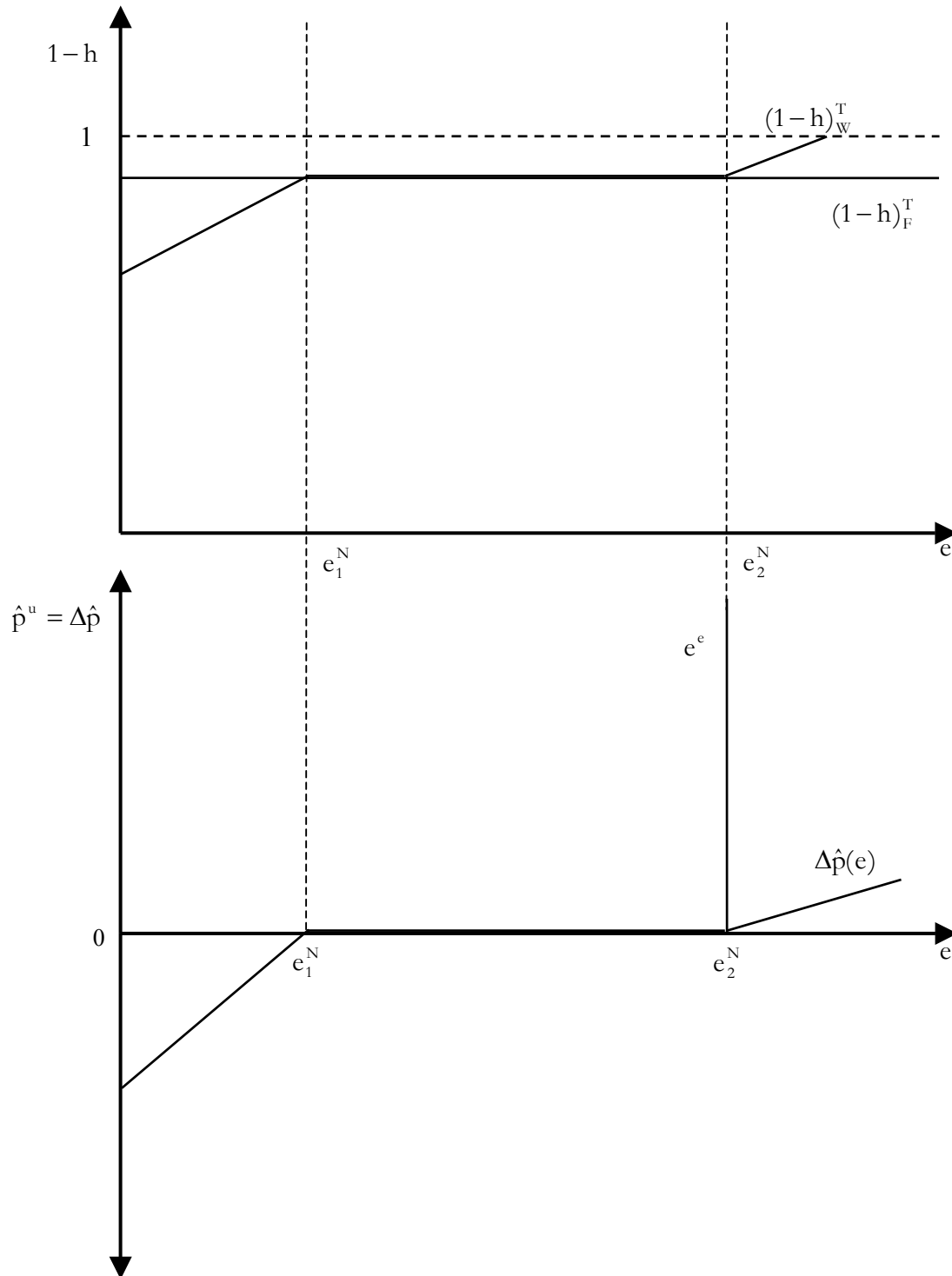


Figure 11: An 'optimal' Post-Keynesian policy mix



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