Misrepresentation and fudge - the OECD NAIRU consensus

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"Now I want to speak about the unspeakable: I am almost tempted to suggest that women and young people leave the room. The subject is one that, if it is mentioned at all in polite company, is grouped with witchcraft, drunkenness, and the abuse of children, things that we know are there but that are best denied. *It is possible that one source of continued high unemployment in Europe is that the domestic demand for goods and services, and therefore for labor, has been forced to unnecessarily and unhealthily low levels*." (emphasis added) Robert Solow (2000: 9)

1. Introduction

There is now an influential 'macroeconomic consensus' among European researchers, which we term the OECD consensus, as to the cause of unemployment persistence (Arestis and Sawyer, 2002). The consensus posits that "the rigidities imposed by labor market institutions and policies … play a key role in the explanation of the European unemployment crisis of the 1980's and 1990's." The OECD's *Job Study* (1994) and follow-up report (OECD, 1999) exemplify the consensus. There is also a broad consistency between the OECD and academic research on the determinants of unemployment (see Elsmeskov, Martin and Scarpetta, 1998).

On June 19, 2003, the Dutch CPB Bureau of Economic Policy Analysis issued a press release entitled (in English) "Social security and union power induce structural high unemployment", which referred to a comparative study of some OECD countries by van der Horst (2003). The study concluded that the "equilibrium unemployment rate can be explained from (*sic*) fluctuations in the tax wedge, the replacement rate, the minimum wage rate and the user cost of capital" (van der Horst, 2003: 7). Accordingly, cutting labour costs, taxes, social security premiums and general welfare retrenchment will result in lower unemployment. Van der Horst (2003) follows in the recent tradition set by the CPB (Graafland and Huizinga, 1999; Broer *et al*, 2000) and is consistent with studies such as Phelps and Zoega (1998) and Blanchard (2000), which all support the OECD consensus. Interestingly, van der Horst (2003) departs starkly from his earlier work (van der Horst *et al*, 1996: abstract) which concluded that "the elementary requirements of economic plausibility and statistical significance prohibit NAIRU computation for the Netherlands" (NAIRU stands for Non-Accelerating Inflation Rate of Unemployment).

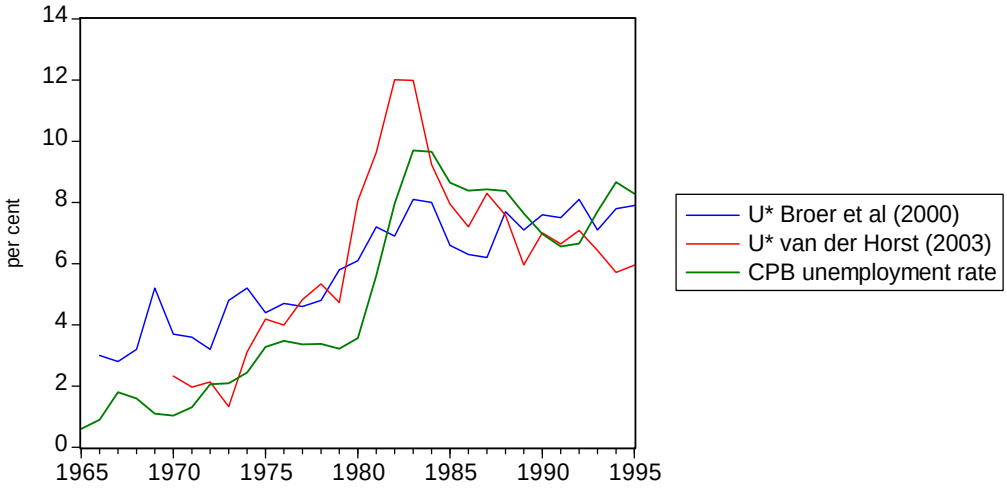
The CPB press release and accompanying policy proposals were feted in leading Dutch newspapers and reflected in social security reductions announced by the new Dutch government in its first budget in September 2003. Alarmingly, the economic analysis underlying these conclusions and proposals has received less scrutiny. Given the strident policy stance arising from the OECD consensus and its potential negative overtones for living standards, a risk-averse strategy is indicated. Researchers should ensure their theoretical and empirical approaches are robust beyond reasonable doubt.

The empirical literature used to support the OECD consensus is now known to have serious problems (for example, Chang, 1997; Fair, 2000; Akerlof *et al*, 2000; Arestis and Mariscal, 2000; Mitchell, 2001a). Baker *et al* (2002) critically examine several key empirical studies that underpin the OECD consensus (OECD, 1999; Nickell, 1997; Elsmekov, Martin and Scarpetta, 1998; Blanchard and Wolfers, 2000; Belot and Van Ours, 2002; Nickell *et al*, 2002; Bertola, Blau and Kahn, 2001). Baker *et al* (2002: 3) say that "while these studies tend to conclude that institutions are a key part of the story, the actual empirical results appear far less robust and uniform across studies than is commonly believed."

Baker *et al* (2002) provide the following assessment of this literature: (a) Using "the most supportive results from each study, we see a disconcerting range of estimates of the impact of institutions" (Baker *et al*, 2002: 43); (b) The size of many of the estimated effects "is too large to be plausible"; "the sizes of several of the coefficient estimates in Nickell (1997) are clearly implausible"; Nickell *et al* (2001) "also reports implausible coefficient estimates" using a "structure of the regressions … [that] … is highly unusual" (Baker *et al*, 2002: 43); (c) Labour market coordination seems to reduce unemployment which makes the OECD's insistence on decentralised wage bargaining appear odd; (d) Bertola *et al* (2001) "mostly finds weak results, although their discussion implies otherwise" (Baker *et al*, 2002: 46); (e) Blanchard and Wolfers (2000) produce "mixed results" which are "highly sensitive to specification, and regressions using time-varying measures of institutions produce weaker results than regressions that assume these institutions never change" (Baker *et al*, 2002: 46); and (f) The results reported in this literature "are decidedly not robust to … variations" (Baker *et al*, 2002: 46) in variable specification, sample, and estimation method.

As motivation, in Figure 1, we show the estimated equilibrium unemployment rates from Broer *et al* (2000) and van der Horst (2003) and the official CPB unemployment rate. The divergent equilibrium estimates in the two studies are notable and support the findings of Baker *et al* (2002) concerning sensitivity of estimates to data and specification (see also Mitchell and Muysken, 2003). Further, the movements in all series appear to be cyclical.

Figure 1 Estimated equilibrium unemployment rates and Official rate, %



Broer *et al* (2000: 363, Figure 2) also provide 95 per cent confidence intervals for their equilibrium estimates (not shown here). There are only 7 years when the actual unemployment rate was outside the 'equilibrium' confidence interval (above) (1982 to 1988). There is thus very little extra information being generated by these models by their 'equilibrium' estimates.

'Telling the story' appears to be more important than attending to anomalies arising from the empirical enquiry (Mitchell, 2001a). Many issues are sidestepped to avoid 'getting in the way of the story'. For example, supply-side theories of unemployment must also explain the rationality of the implied unmet demand for goods. Logically there must be queues of consumers who want to buy items but cannot because labour supply is not sufficient to produce them. Apparently reducing welfare payments

would resolve the unmet demand by increasing production. None of this is believable and similar questions are consistently avoided by NAIRU proponents. Manning (1998: 145) says "we have very strong *a priori* beliefs from theory that there should be such a link [between unemployment benefits and unemployment], beliefs that are so strong that we can read … [Manning refers to a highly spurious claim from the OECD Jobs Study linking reforms in Sweden and Switzerland in the 1970s to rising unemployment in the 1990s] … and not think anything is amiss. We need to be honest about the fact that theory plays a disturbingly large part in informing discussion about the impact of unemployment insurance on the labour market."

In this paper we investigate several propositions that we consider underscore the poverty of the NAIRU approach. We draw on Mitchell and Muysken (2003) where we conduct a detailed analysis of the econometric work provided by Broer *et al* (2000) and van der Horst (2003). In Section 2 we show the strong link between aggregate demand movements and the dynamics and persistence of unemployment for the Netherlands. In Section 3 we review more recent theoretical criticisms of the NAIRU approach, which clearly show that aggregate demand dynamics influence equilibrium unemployment and thus places the 'structural' interpretation of the NAIRU in jeopardy. In Section 4, we focus on Broer *et al* (2000) and Van der Horst (2003), and conclude that key theoretical and empirical claims made by them do not stand up to close scrutiny. We conclude by rejecting the major conclusions of OECD consensus that constructs persistently high unemployment as a problem of labour market rigidities and government welfare and tax policies. It is hard to escape the conclusion that the major reason for unemployment lies in deficient demand.

2. Some basic facts that have to be addressed

Initially, we examine some basic facts that are essential to understanding the evolution of Dutch unemployment but which are largely ignored by the OECD consensus.

2.1 Okun accounting

Table 1 summarise some major Dutch economic aggregates since 1970, using the CPB Main Economic Indicators represented as average annual compound rates of growth.

Table 1 Major Output and labour force growth aggregates, Netherlands, 1970-2002

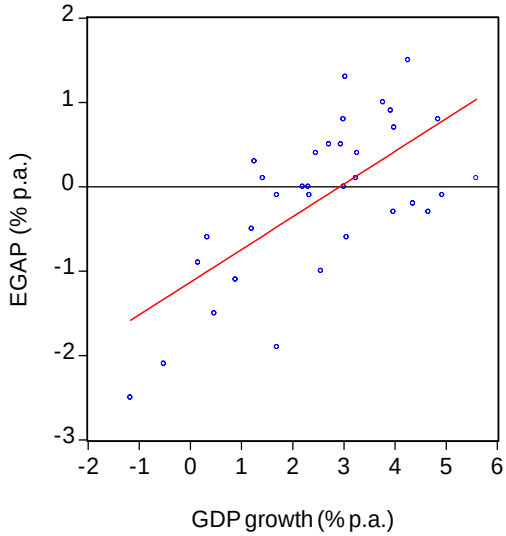
	LF	EMP	LP	GDP	GDP*	GDP Gap	Ave UR
	% p.a.	% p.a.	% p.a.	% p.a.	% p.a.	% p.a.	%
1970-75	0.6	0.4	3.0	3.3	3.6	0.2	1.5
1975-80	1.2	0.9	1.6	2.6	2.8	0.2	3.0
1980-85	0.3	-1.1	2.4	1.3	2.7	1.4	7.5
1985-90	2.3	2.8	0.4	3.2	2.7	-0.5	7.8
1990-95	1.4	1.1	1.0	2.1	2.3	0.2	7.1
1995-00	2.0	2.9	0.8	3.7	2.8	-0.9	5.6
1970-02	1.3	1.2	1.3	2.6	2.7	0.1	5.2

Source: CPB Report 2003/3. LF is the labour force, EMP is total employment, GDP is total real output, LP is labour productivity, GDP* is the required GDP growth to maintain a constant unemployment rate, UR is the unemployment rate averaged over the time period shown. The numbers are rounded.

For the unemployment rate to remain constant, output growth has to match the sum of labour force growth (*LF*) and labour productivity growth (*LP*) or *GDP**. The Dutch unemployment rate was 0.6 per cent in 1970 rising to 3.9 per cent in 2002 having peaked in 1983-1984 at 9.7 per cent. The data shows that major changes in unemployment during 1980-85 were accompanied by a shrinking labour force and an even greater decline in GDP growth. The evidence shows that the Dutch labour market responds positively to strong GDP growth driving strong employment growth.

Between 1985 and 1990, as the Dutch economy recovered, unemployment persisted due to strong labour force growth. The sustained strong employment growth in the 1995-2000 period coupled with a somewhat slower labour force growth saw major inroads being made into the Dutch unemployment rate.

Figure 2 Relationship between GDP growth and EGAP, The Netherlands, 1970-2002



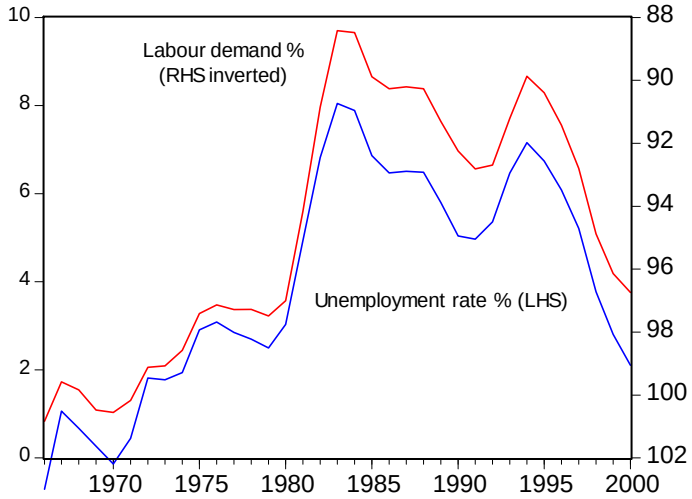
Source: Table 1. EGAP is the annual percentage difference between employment growth and labour force growth. GDP growth is the annual growth in output.

In Figure 2, we plot GDP growth against *EGAP* (the difference between employment growth and labour force growth) with a simple linear regression added. When the economy is adding jobs in excess of the growth in workers *EGAP* is positive. The correlation between the two series is high (0.68) adding weight to our claim that aggregate demand rather than labour force (supply) dominates employment changes.

2.2 Employment and demand

Mitchell and Muysken (2002) conclude after detailed analysis that employment dynamics are driven by variations in aggregate demand. As a summary, and following Modigliani (2000), Figure 3 plots the unemployment rate (left hand scale) against the sum of employment and vacancies (as a percentage of labour force) as a measure of labour demand (right hand scale inverted). The striking correspondence between the two series suggests that variations in unemployment appear to be strongly associated with movements in labour demand. After analysing France, Germany, and the United Kingdom, Modigliani (2000: 5) said “Everywhere unemployment has risen because of a large shrinkage in the number of positions needed to satisfy existing demand.”

Figure 3 Labour demand and unemployment, The Netherlands, 1966-2000



Source: Mitchell and Muysken (2002).

2.3 The dynamics of unemployment and vacancies

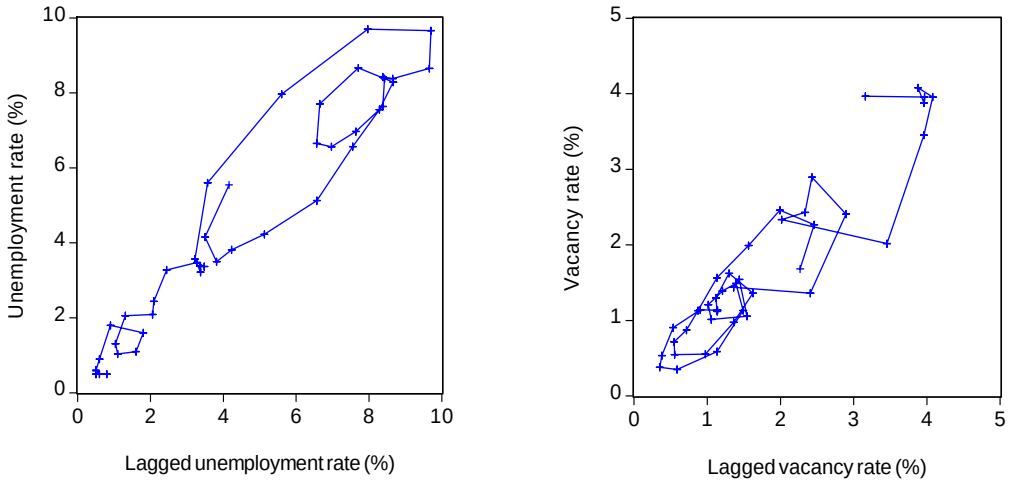
The OECD consensus claims that labour supply changes over the last 25 years have combined to ensure that full employment coincides with much higher unemployment rates than in the past. This is allegedly demonstrated by the outward shift in the unemployment-vacancy (UV) relationship, which occurred in the Netherlands in 1981 (Mitchell and Muysken, 2002). Prominent proponents of the OECD consensus, Layard, Jackman and Nickell (1991: 38), explain the outward shift in the European UV curve by "a fall in the search effectiveness … among the unemployed." However, with Dutch UV ratio averaging around 7 unemployed persons per vacancy over the last 26 years, it is a fallacy of composition to conclude that if all individuals reduced their reservation wage to the minimum (to maximise supply-side search effectiveness) that unemployment would fall significantly (given the small estimated real balance effects in most studies). Further, unless growth in labour requirements and the labour force are cyclically symmetrical, the pool of unemployed can rise and remain persistently high (Mitchell, 2001b).

Figure 4 produces phase diagrams for the unemployment rate and the vacancy rate in the Netherlands (Ormerod, 1994; Mitchell, 2001c). The current values of the series are plotted on the *y*-axis against the lagged value of the same series on the *x*-axis.

Figure 4(a) reveals that the Dutch unemployment attractor shifted outwards around 1974-76. In the early 1990s, the Dutch labour market oscillated rather tightly around this new attractor but in recent years has shown signs of moving downwards. However, with the current contraction incomplete it is unclear whether a new attractor will be established or whether a particularly large oscillation around the previously higher attractor is occurring. It is also clear that the economy takes several years to recover from a large negative shock even when the attractor remains constant.

Figure 4(b) suggests that the 1974-75 disturbances also coincided with a downwards movement in the vacancy rate attractor. Similarly, the outward shift in the vacancy rate (and possibly a new attractor being established) in the 1990s coincides with the favourable downward movements in unemployment during that period.

Figure 4 Phase diagrams for unemployment rate and vacancy rates, The Netherlands



(a) 1961-2003 (b) 1961-2002

Source: Figure 2 and CPB (2003)

The OECD consensus interprets the outward unemployment shift in Figure 4(a) as a decline in labour market efficiency. But the inward shift in Figure 4(b) using the same logic would be interpreted as increasing matching efficiency. Clearly, both states cannot hold. A consistent interpretation can be found in the view that the Dutch economy was demand constrained in the mid-1970s as a result of the collapse of the world trade. The rapid rise in unemployment in 1974 was so large that subsequent (lower) growth with on-going labour force and productivity growth could not reverse the stockpile of unemployed (see Mitchell, 2001a for similar Australian analysis).

Two conclusions can be drawn from the phase diagrams. First, negative shifts in attractors coincide with recessions. Second, the economy tends to oscillate around these attractors once they are established. This implies that adverse demand shocks have a strong negative impact on unemployment through hysteresis. Thus demand shocks have an adverse impact on unemployment through the direct effects on job creation, as highlighted in the previous section, and indirectly, through hysteresis.

The shifts in attractor points depict non-linear time series behaviour. The issue of non-linearity is important to policy makers aiming to minimise the costs of economic fluctuations. Yet macroeconomic models which underpin the OECD consensus generally employ smooth functions with some allowance for persistence and accordingly cannot accommodate asymmetries. Mitchell and Muysken (2002) estimate Current Depth of Recession (CDR) models (Beaudry and Koop, 1993) and show that negative shocks impact more strongly than positive shocks on Dutch and Australian unemployment rates. If one seeks to understand the evolution of Dutch unemployment then it is important to take into account this non-linear behaviour. The OECD consensus models fail in this regard.

3. The NAIRU – from structural invariance to anything goes!

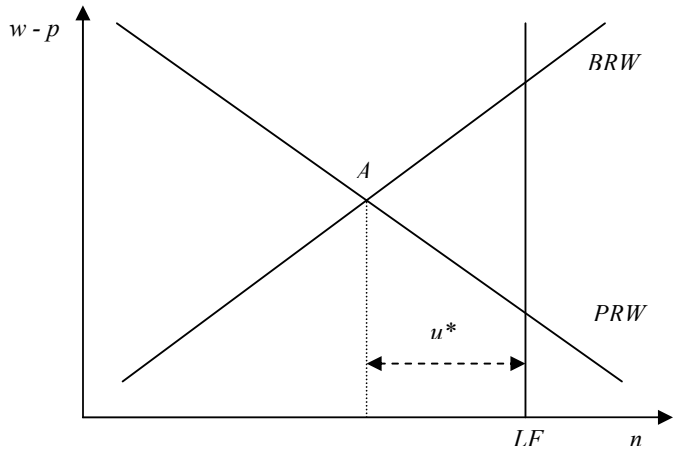
In this section, we consider the evolution of theoretical models that have been used to underpin the OECD consensus. We conclude that once deconstructed it is little wonder that the concept of equilibrium unemployment loses its original ‘structural’ meaning and becomes indistinguishable in dynamics from actual unemployment.

3.1 The basic OECD consensus model

Layard, Nickell and Jackman (1991) start with a right-to-manage bargaining model, which yields a real wage equation where unemployment affects wages through "the ease with which a worker of average effectiveness can find a job if she becomes unemployed." Figure 5 depicts the resulting negative relationship between unemployment and the bargained real wage (BRW). Nickell and van Ours (2000) note that inflation surprises $p - p^e$ reduce the BRW. Prices are mark-ups on marginal costs, after maximising short-run profits. Since the mark-up is negatively related to unemployment, the PRW-curve describes the resulting positive real wage-unemployment relationship (see Figure 5).

The NAIRU, the unemployment rate consistent with both wage setting and price setting behaviour in the absence of inflation surprises (constant inflation), is given by u^* in Figure 5. The NAIRU is 'the' equilibrium rate because inflation-averse authorities use aggregate policy to maintain low inflation. The conduct of fiscal and monetary policy thus determines fluctuations in actual unemployment around the NAIRU (Nickell and van Ours, 2000).

Figure 5 NAIRU determination by the BRW and PRW curves



3.2 The role of capital costs

With mark-up prices, wage costs relative to capital costs are relevant, meaning that capital costs should be included in the price equation (Blanchard, 1997). Moreover, the real interest rate may also affect hiring costs, investment in firm-specific human capital and costs of creating customer markets (Phelps, 1994; Phelps and Zoega, 1998). Accordingly, real interest rate rises increase the NAIRU. This induced Phelps and Blanchard to blame high unemployment in the 1980s on high real interest rates.

In this spirit Broer *et al* (2000) analysed Dutch unemployment from 1966 to 1996. Their 'steady-state' model ignores inflation surprises with a wage equation written as:

$$w - p = h + \gamma_0 - \gamma_1 u + z_w \qquad (1)$$

where w and p are log wages and prices, respectively, h represents log productivity, u is the unemployment rate and z_w reflects other wage setting influences.

To introduce labour augmenting technological change, they use a CES production function with an elasticity of substitution σ of less than unity. Capital costs now explicitly appear in the profit-maximising labour demand function:

$$l = \beta + \theta + y - \sigma(p_l - c_c) - w + p_l \qquad (2)$$

where y, l and p_l are log output, labour and efficiency corrected price for labour, respectively, c_c is a log unit cost measure and β is an efficiency parameter.

Prices p are mark-ups on marginal costs:

$$p = \mu + \beta + c_c \qquad (3)$$

where μ is log mark-up (we ignore foreign prices here). Equations (2) and (3) yield a PRW-curve which is independent of unemployment and where capital costs play a role through $f(c_c - p_k)$ with $f' > 0$:

$$w - p = h - \mu + \theta + (1-\sigma) f(c_c - p_k) \qquad f' > 0 \qquad (4)$$

Equation (4) shows that rising capital costs shift the now horizontal PRW-curve downwards in Figure 5.

Combining Equations (1) and (4), the NAIRU becomes:

$$u^* = [\mu - \theta - (1-\sigma) f(c_c - p_k) + \gamma_0 + z_w]/\gamma_1 \qquad (5)$$

Equation (5) shows that the rental price of capital p_k impacts positively on the NAIRU via labour demand. A unit elasticity of substitution would eliminate the impact of capital costs on unemployment (see also Rowthorn, 1999).

3.3 Productivity shocks and the adjustment process

Broer *et al* (2000) do not analyse the equilibrium adjustment process following shocks. They impose error correction mechanisms in their dynamic specifications without explanation and restrict them in such a way that "the equilibrium … will eventually be reached" (Broer *et al*, 2000: 355-56). Blanchard (2000), however, does focus on adjustment processes and distinguishes between a short- and medium-run labour demand function. He concludes that slowing Total Factor Productivity growth caused the European unemployment up to the 1980s. However, the 1980s increase in real interest rates explains a significant amount of the European unemployment persistence during that decade and into the 1990s. Blanchard (2000) considers high real interest rates resulted from erroneous monetary policies pursued during that period and his work represents a significant and explicit shift in the NAIRU literature.

While Blanchard analyses the impact of productivity shocks through delayed wage adjustment, Rowthorn (1999) presents a different mechanism. He shows that the invariance of unemployment to technical change and productivity shocks in Layard, Nickell and Jackman (1991) results from two key assumptions: (a) a unit elasticity of substitution, and (b) a constant benefit rate. If the elasticity of substitution is less than one the capital stock influences the labour demand and via price equation (4) is implicit in unit costs. So interest rate rises also result in higher unemployment by reducing the capital stock and labour demand. In that context, Rowthorn (1999: 422-423) emphasises that investment should be "on average just sufficient to keep pace with ... any bias in technical progress … [and] … measures to stimulate investment could play an important role in helping to reduce unemployment, and that the present emphasis on labour market policies is exaggerated." By pushing the PRW-curve out, interest rate rises increase the NAIRU.

3.4 The importance of aggregate demand

Modigliani (2000) observed a strong correlation between actual unemployment and the net investment rate and claims that this is due to aggregate demand effects. While Blanchard (2000: 29) is unable to explain this phenomenon, which he dubs the "Modigliani puzzle", Sawyer (2002) presents an interesting solution arguing that a sufficiently expansionary environment can generate sufficient investment to make the NAIRU compatible with full employment.

In terms of Figure 5, Sawyer (2002) suggests that the BRW curve does not necessarily increase proportionally with productivity (coefficient before h in Equation (1) can be less than one). Labour demand by firms is influenced by their price-setting behaviour, where he assumes a counter-cyclical mark-up (which increases again close to full-capacity utilisation). Since Sawyer assumes nominal wages are set at firm level according to efficiency wage level W^* (which is independent of overall demand), a unique level of labour demand l_0 results from short-run profit maximising behaviour of firms, which is conditional on the firm's capital stock and aggregate demand. The price is set at P_0. Sawyer derives the analogue of the PRW-curve by varying the level of aggregate demand Z. Since for each different Z a different l_0 and P_0 will result, a relationship between labour demand l_0 and the real wage W^*/P_0 can be drawn, which reflects the result of firm price-setting and labour demand at different levels of Z. The resulting PRW-curve shifts upwards when the capital stock increases.

Point A in Figure 5 indicates the rate of unemployment consistent with stable inflation. Sawyer (2002) suggests that boosting aggregate demand will stimulate investment and, as the inflation barrier is simultaneously driven out, the NAIRU can be rendered consistent with full employment. Sawyer (2002: 92) says "Policies which seek to restrain inflation through higher levels of unemployment may well cause the NAIRU to rise and to sustain higher levels of unemployment."

While Sawyer (2002) confirms the link between the NAIRU and aggregate demand and thus helps jettison the cyclical invariance argument, the novelty of his analysis is that firm price setting behaviour is linked to aggregate demand through counter-cyclical variations in the mark-up. Accordingly, at given levels of capacity, increases in aggregate demand will lead to an upward shift in the PRW curve for relatively low values of capacity utilisation and a downward shift for higher values. Hence, starting from a low value of capacity utilisation, the NAIRU will initially decrease when aggregate demand is stimulated and increase again when full capacity is approached. Sawyer (2002) also emphasises a positive accelerator effect from aggregate demand and the resulting reductions in the NAIRU.

4. Empirical links between aggregate demand and the NAIRU

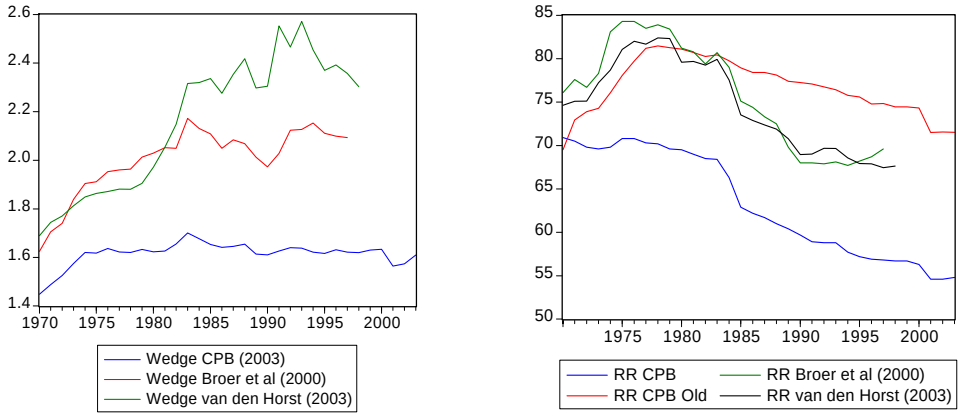
The analysis in Section 3 confirms that any notion that the business cycle cannot influence the NAIRU is unsustainable. Aside from cyclical mark-up behaviour and investment variations which influence the NAIRU, one might conjecture that other wage and price-setting 'structural' influences are also sensitive to aggregate pressures. We consider this question with reference to the models presented in Broer *et al* (2000) and van der Horst (2003), both reflecting the current OECD and CPB-tradition.

4.1 Making sense of the data

A major problem we have in determining the validity of the various CPB offerings is the seeming endless variations in data used. This holds in particular for wedge and the

replacement rate variables. In 2002, the CPB made major revisions to wedge and replacement rate data (CPB, 2003) without adequate explanation and were content to merely source Stegeman (2002). However, Stegeman (2002) fails to explicitly justify the revisions saying only that in the past, data was mainly based on national accounts and that with the growing CPB use of computable "general equilibrium" models more data is now derived from household surveys.

Figure 6 Dutch wedge and replacement rate inconsistencies

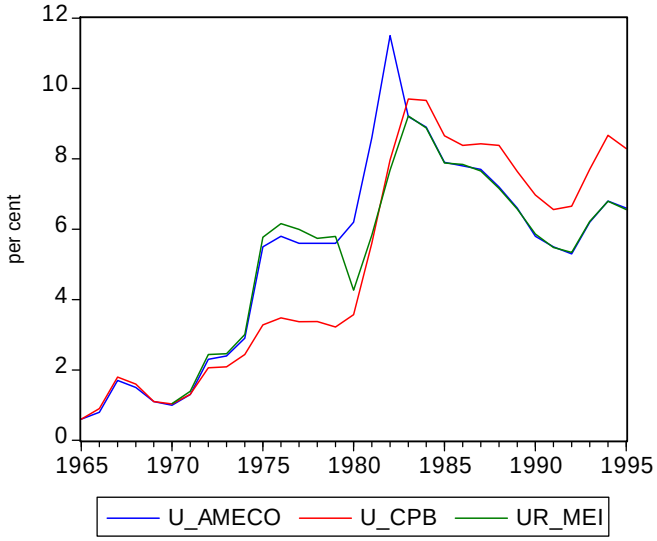


(a) Wedge (b) Replacement rate

Source: CPB (2002), Broer *et al* (2000), van der Horst (2003).

There are many well documented difficulties encountered in the measurement of the wedge and replacement rates (van Veen 1997). Figure 6 plots three wedge and four replacement rate series that have been used, variously, in Broer *et al* (2000), van der Horst (2003) and the old and recent official CPB data (CPB 2002, 2003). Clearly, both the wedge and replacement rate have been grossly overestimated in the past (van Veen 1997). Since all authors mention the CPB as their data source, we can not trace the reasons for these discrepancies any further.

Figure 7 Dutch unemployment rate concepts



Source: OECD Main Economic Indicators, Eurostat Macroeconomic Database and CPB (2003).

Several unemployment rate series have also been used. In Figure 7 we show the OECD Standardised Unemployment Rate (UR_MEI), the Eurostat unemployment rate (U_AMECO) used by van der Horst (2003), and the official CPB rate (U_CPB) used by Broer *et al* (2000). *Ad hoc* definitional changes and differences in definitions *per se* appear to be the explanation for the variations.

Table 2 shows the wide variation in wage and labour demand estimates from Broer *et al* (2000) and van der Horst (2003) using this data. Although the evolution of the replacement rate since 1970 is quite similar in both studies (Figure 6b), van der Horst estimates the impact on wages around 2.5 times larger that that found by Broer *et al*. The opposite holds for the impact of the wedge and unemployment. It therefore also is not surprising that the two studies provide quite different NAIRU estimates (see Figure 1). However, it is obvious that the implications for economic policy also are quite different between both studies if one were to take their results seriously.

Table 2 Estimation results of Broer *et al* (2000), van der Horst (2003)

	Broer *et al.* (2000)	Van der Horst (2003)
	1966-1995	1970-1998
Wage Equation:		
Wedge	0.28 (0.09)	0.13 (0.06)
Replacement rate	0.29 (0.08)	0.75 (0.08)
Unemployment rate[1]	-1.76 (0.35)	-1.07 (0.23)
Labour Demand Equation:		
Sigma[2]	0.34 (0.08)	0.33 (0.06)
Trend	0.014 (0.001)	0.010 (0.001)
Trend squared	-0.001 (0.000)	-0.004 (0.001)

1. Broer *et al* (2000) use the current unemployment rate while van der Horst (2003) uses the lagged unemployment rate. 2. sigma is the elasticity of substitution. Standard errors are in parentheses

4.2 The BRW-curve: when structural becomes cyclical

In line with many NAIRU studies, Broer *et al* (2000) and van der Horst (2003) represent the structural variables using the tax wedge and the replacement ratio which they consider modify the wage-unemployment rate relationship (Equation 1). Mitchell and Muysken (2003) question the validity of the wage-unemployment relationships they propose, but as a prior issue, how certain are we that the so-called 'structural' variables are cyclically invariant? This issue mirrors the 1980s debate between Lilien (1982) and Abraham and Katz (1986). For example, the wedge attempts to measure differences between gross wage costs (borne by employers) and net wage income (received by workers). In a bargaining context the wedge will, plausibly, be compressed at higher unemployment rates which makes it problematic using the wedge as a right-hand side variable along with the unemployment rate.

From Table 3, it is clear that the 'structural' variables used by Broer *et al* (2000), van der Horst (2003), and the official CPB measures vary counter-cyclically with capacity utilisation which is consistent with *a priori* reasoning. In the upturn falling unemployment means that lower social security premiums are needed to cover expenses and the wedge will be lower. The replacement rate rises as unemployment

rises because there is increasing-pressure to increase social security in a downturn. As a consequence of the counter-cyclical behaviour of these so-called 'structural' variables the NAIRU will tend to track the actual unemployment rate in line with demand changes rendering it void of any meaningful independent content. Pairwise Granger-causality tests confirm the results reported in Table 3 (results on request).

Table 3 Testing wedge and replacement rate variables for cyclical influence

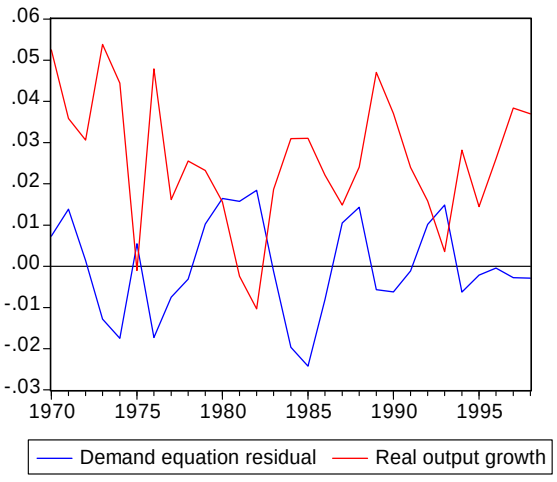
	Replacement Rate			Wedge		
	VDH	Broer	CPB	VDH	Broer	CPB
dvar(-1)	0.21	0.02	0.18	-0.09	0.20	0.26
	(1.42)	(0.21)	(1.07)	(0.43)	(1.04)	(1.55)
dlog(CU)	-0.19	-0.23	-0.23	-0.24	0.10	-0.01
	(1.73)	(3.05)	(2.97)	(0.83)	(0.57)	(0.06)
dlog (CU(-1))	-0.29	-0.18	-0.14	-0.21	-0.39	-0.23
	(2.56)	(2.26)	(1.64)	(0.73)	(2.19)	(1.96)
R^2	0.35	0.37	0.39	0.06	0.19	0.19
Smple	1970-2003	1970-2003	1972-2003	1971-1998	1970-1997	1972-2003

Notes: Constant not reported; dependent variables were in change of log form; dvar(-1) is the lagged dependent variable; CU is the rate of capacity utilisation; *t*-statistics are in parentheses. Data is from Broer = Broer *et al* (2000), VDH = van der Horst (2003) and CPB = current official data from the CPB.

4.3 The PRW-curve : A mark-up on (labour) demand

The PRW-curve (Equation 4) of Broer *et al* (2000) is derived from the labour demand equation (2) and the price mark-up equation (3). Van der Horst (2003) assumes without explanation that there is no mark up, so $p = c_c$. Thus, the price of labour relative to output price is his measure of relative factor prices in labour demand equation (2). So if the mark-up p/c_c is not constant then the residuals from the estimated demand function will reflect variations in the mark-up. The residuals will reflect trends in working time, which declined consistently over the estimation period. All three factors show a clear correlation with output (Mitchell and Muysken, 2003). It therefore is not surprising that the residuals from the estimated labour demand function are negatively related to output growth (Figure 8) (correlation = -0.58).

Figure 8 Estimated labour demand residuals and output growth, van der Horst (2003)



Another way of examining this issue is to estimate van der Horst's (2003) labour productivity equation (column 2 Table 4) as an employment function with the coefficient on output freely estimated. In Table 4, we see that the coefficient on real output is clearly below unity (Prob value = 0.04 on restriction) (column 3) and the real wage becomes insignificant. Care is needed, however, in conducting any inference on van der Horst's (2003) equations given the severe serial correlation.

Table 4 van der Horst's (2003) employment function re-estimated

	employment/output	employment
	(2)	(3)
Real output	1.00	0.664
	(-)	(4.12)
Real wage	-0.325	-0.163
	(-5.47)	(-1.70)
Trend	-0.016	-0.012
	(-10.00)	(-4.95)
Trend-squared	0.000	0.000
	(5.21)	(5.55)
R^2	0.986	0.985
S(1) Prob value	0.02	0.00
Sample	1970-1998	

Notes: van der Horst (2003) estimates his labour demand function with the unit coefficient on real output imposed so the equation is a labour productivity relation (column 2), *t*-statistics in parentheses, S(1) is the Prob value for the LM test for first-order serial correlation.

While van der Horst (2003) estimates the PRW-curve (7) directly, Broer *et al* (2000) derive this from Equations (2) and (3), which they estimate separately. The underlying cost function is $C = \beta\, y\, c_c$, where c_c are unit labour costs. When scale effects are absent, $\beta = 1$, and average costs equal marginal costs. However, Broer *et al* (2000) introduce a fudge factor claiming that oil price shocks might affect productivity (Bruno and Sachs, 1985), which they 'capture' with a dummy to β that is linear in the relative price of energy and its growth rate. As a consequence the variable β follows the pattern which is inversely presented on the left-hand side of Figure 8(a). It clearly follows a pattern similar to that of the growth rate of output (lagged, right-hand scale) and hence might obscure the impact of aggregate demand on the mark-up.

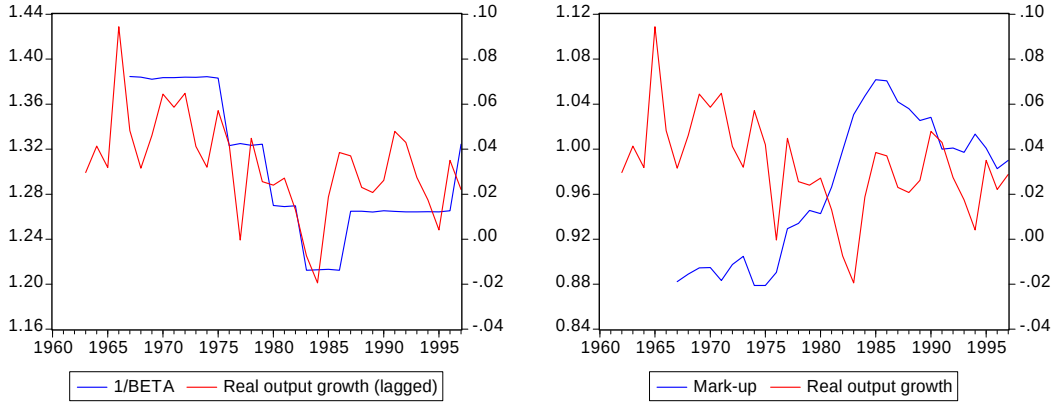
If we assume β constant and compare the movements in the mark-up p/c_c with real output growth, Figure 8(b) shows that the co-variation is mixed, but suggests the presumed counter-cyclical pattern. To examine this further we estimated a general first-order dynamic model with percentage change in the mark-up on the rate of capacity utilisation and lags. This specification reflected the finding that the mark-up is I(1) and the rate of capacity utilisation is I(0) by construction. The general regression displayed stationary residuals and was simplified using valid *F*-tests to yield the equation as follows:

$$d\log(m) = \underset{(5.61)}{-0.07} - \underset{(6.01)}{0.38}\log(cu)$$

$$R^2 = 0.55 \qquad S(1) = 0.09 \qquad A(1) = 0.44$$

where *m* is the mark-up and *cu* is the rate of capacity utilisation. The Prob values are shown for LM test for first-order serial correlation S(1) and heteroscedasticity A(1); the Ramsey reset test Prob value was 0.92; *t*-statistics are shown in parentheses.

Figure 8 "Productivity shocks" and the mark-up in Broer *et al* (2000)



(a) "Productivity shocks" and output growth (b) The mark-up and output growth

Source: Broer *et al* (2000)

Our findings support Sawyer's (2002) counter cyclical mark-up hypothesis and suggest that increasing aggregate demand reduced the NAIRU (compare Equation (5) with a counter-cyclical μ). We note that Broer *et al* (2000) introduce, in an ad hoc fashion, foreign output prices in their price equation which fudges the impact of capacity utilisation. Further, as our discussion of van der Horst has indicated, the impact of changes in output on other variables in the PRW equation cannot be ignored. A complete picture of the impact of aggregate demand on the mark up and the NAIRU therefore requires a more extensive analysis.

5. Concluding remarks

This paper is a precursor to Mitchell and Muysken (2003) which conducts a forensic examination on recent Dutch research on equilibrium unemployment to test whether they stand up to scrutiny? In this paper, we document some major preliminary concerns with are consistent with recent developments in the theoretical literature on the NAIRU.

We argue that it cannot be reasonably concluded that the evolution of unemployment is driven by misguided tax and welfare policies and the research that tries to support this type of reasoning is without firm foundation. We show that there is a plausible case that employment dynamics are driven by aggregate demand movements with the unemployment rate being residual. The concept of equilibrium unemployment appears to contain no additional information to that already known from the evolution of the unemployment rate.

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