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Incomes Policies, Expectations and the NAIRU

By Wolfgang Pollan[*]

One of the few good ways we have to test analytical ideas is to see whether they can make sense of international differences in outcomes by appealing to international differences in institutional structure and historical environment. The right place to start is within each country separately, studied by someone who knows the peculiarities of its history and its data.

You might think that this (...) ought to be obvious. But in fact the usual approach is just the opposite. More often than not we fail to take institutional differences seriously. One model is supposed to apply everywhere and always.

<div align="right">

Robert M. Solow (1986)

</div>

Summary

Since the sixties, several countries have adopted incomes policies in various forms to control inflation that had been interpreted as the result of a distributional struggle between business and labour unions. Recent writings on the NAIRU, however, ignore past policy interventions in the goods and labour market, some of which were designed explicitly to dampen inflationary expectations. This raises the question whether the statistical relationship between inflation and unemployment (and other variables) observed in historical data should be expected to hold as the economic environment changes.

Application of the standard tools of NAIRU analysis yields nonsensical results for the Austrian economy: neither the unemployment rate nor the proxy for expected inflation are strongly correlated with the inflation rate. These results can be traced to the high degree of policy interference in the wage and price setting system. The finding that the coefficient of the expectational term is much below unity seems to resurrect a non-vertical Phillips curve, but is likely just an artefact of policy intervention in the wage and price setting system and has little to say about the NAIRU dynamics.

This paper has focussed on the effects of incomes policy on NAIRU estimates for the Austrian economy, but this criticism can be expanded to encompass any kind of policy measures that affect the labour market and inflation, and it may be applicable to other countries as well.

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1.   Introduction

According to the mainstream view of macroeconomics, the Phillips curve remains an important concept in business cycle models, both theoretically and empirically (Ball and Mankiw, 2002; Blinder, 1997). Since the first empirical applications, the Phillips curve has been developed further. Modern versions of the model contain an expected (or inertial) inflation term on the right hand side of an equation describing the current rate of wage or price inflation. Phelps (1967) and Friedman (1968) challenged the idea that government faced a trade-off between inflation and unemployment. The demand and supply of labour depends on changes in real wages and not money wages. In wage bargaining, workers, being only interested in real wage developments, will try to anticipate future price increases in order to protect their real wage.

Equilibrium can only be obtained when the inflation expectations of workers turn out to be correct. In this type of equilibrium, the Phillips curve is vertical because real variables such as employment and unemployment don't change regardless of the rate of inflation. At the market clearing rate, all workers who are willing to take jobs at the prevailing real wage are employed. This rate has been termed the 'equilibrium' (Phelps 1967) or 'natural rate of unemployment' (Friedman 1968) or 'structural unemployment' or, in empirical applications, the 'non-accelerating-inflation rate of unemployment' (NAIRU). If the actual rate of unemployment is below this baseline rate, inflation tends to accelerate over time; if it is above this rate, inflation tends to slow down.

The mainstream consensus, which underlies much of the literature on the Philips curve and the natural rate of unemployment, views the economy as imperfectly competitive labour and goods markets (Arestis and Sawyer, 2005; Bean, 1994; Beissinger, 2003; Layard et al., 1991; Morgan and Mourougane, 2005). Formal theoretical models along these lines were developed by Akerlof (1969) and Fair (2000). Workers, say, through the intermediation of labour unions, bargain with firms over wages, with the level of wages linked to the relative bargaining power of unions and employers. There is a considerable range within which wages can be set independently of economic variables, and considerations such as bargaining strength and union aggressiveness or docility become important. Firms, on the other hand, exploit their market power in setting prices. Inflation reconciles the competing claims on overall output in the short run; in the long run this balance is brought abaout by unemployment. This theoretical framework of the economy has been termed 'the battle of the mark-ups' (Layard et al., 1991).

It was this very view of the economy which persuaded many economists and policy-makers in the early sixties that incomes policies were needed to control the discretionary market power of business firms and unions (Ulman, 1969, p. 195; Flanagan et al., 1983, pp. 1-5). This view then gave rise to the celebrated U.S. Guideposts for Noninflationary Wage and Price Behavior in the United States. Similar wage policies were adopted in several European

countries (Pollan, 1991); they all provided in one form or another for wage increases in line with economy-wide productivity increases and (past or future) inflation. In the eighties and nineties, new versions of concertation between government, trade unions and employers' organizations have emerged in the form of social pacts, which, in addition to stipulating wage moderation, dealt with labour market reforms.[1] There is, however, little indication in the NAIRU literature that incomes policies and social pacts had ever been implemented.

The NAIRU has been given a prominent place in the research of policy making institutions such as the OECD, the European Commission, the European Central Bank, the German Sachverständigenrat (2007), the U.S. Council of Economic Advisors, and the Federal Reserve Board and has been characterised as a useful tool in forecasting macro developments (Ball and Mankiw, 2002; Gordon, 1997; Stiglitz, 1997).

Nonetheless, considerable controversy surrounds the measurement and policy use of the natural rate of unemployment. Estimates of NAIRU have been criticised as being too vague to be a useful guide to macroeconomic policy (Staiger et al., 1997; Franz, 2001; Atkeson and Ohanian, 2001; Fitzenberger et. al. 2007). Another line of criticism concerns the stability of the natural rate (Musso et al., 2007). Empirical work has responded to this criticism by estimating a natural rate of unemployment that changes over time.

It is still unclear, however, which factors drive the development of the natural rate of unemployment. If institutional factors of the labour market are important for the course of inflation and unemployment, as has been asserted by many economists,[2] then the question arises how these institutions have changed over time in response to labour market reforms in particular, and what impact these changes have had on unemployment. A similar argument applies to economic policy measures. These are important issues for the Austrian economy, which has been characterised as a highly corporatist economy, i.e., as an economy in which labour market outcomes, in particular, are strongly influenced by the actions of institutional actors (Calmfors and Driffill, 1988; OECD, 1994; Pollan, 1997; Calmfors, 2001).

Moreover, given the crucial importance of expectations in the NAIRU framework, the question arises whether it is the expectations of *individual* actors in the goods and labour markets or rather the expectations held by *institutional* actors and by policymakers that drive the dynamics of the inflation process.

This paper has two objectives. The first is to show that in the past corporatist policy making, with its focus on incomes policies, has substantially interfered with the movement of the variables that figure prominently in the discussion of the natural rate thesis. The second objective is to draw attention to the role of expectations within an institutional framework and

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[1] Recent examples include the Waasenar agreement in the Netherlands and the Agreement for Stability in Germany. Whether these attempts at incomes policies were successful or not, they do suggest that policy makers identified a need to reign in autonomous institutional forces in the labour market (Hassel, 2001, 2000; Slomp, 2004); for the Irish experience, see Roche (2007) and Teague (2004).

[2] See Nickell (2003), Beissinger (2003) and Nickell et al. (2005).

to outline some of the consequences of disregarding the effects of incomes policies in the estimation of the NAIRU.

The paper is organised as follows. Section 2, after sketching the well known theoretical basis of the NAIRU (for recent expositions see Ball and Mankiw, 2002; Franz, 2001, 2005; Beissinger, 2003), presents preliminary estimates of the Phillips curve for the Austrian economy, which when extended to include expectational terms would lend itself to the calculation of the non-accelerating-inflation rate of unemployment.

NAIRU estimates for Austria turn out to be unstable. But there are more serious objections to the calculation of a natural rate of unemployment in Austria. As in many other countries, the unemployment rate changed substantially from the sixties to the nineties. In the empirical literature this is taken to indicate that the economic environment has changed. In Austria, clearly, this environment includes the policy measures taken by economic policy-makers as well as changes in the institutional framework. This observation applies, of course, to any economy, but is most relevant for countries, such as Germany, the Netherlands, the United Kingdom, Ireland, and the Scandinavian countries, where policy-makers have attempted to implement incomes policies of one sort or another (Fallick and Elliot, 1981; Flanagan et al., 1983; Flanagan 1999; Soskice, 1990; OECD, 1997; Visser, 1998; Wallerstein, 1999 and the literature cited in footnote 1).

Section 3 raises some methodological issues by contrasting the approach underlying the NAIRU papers with the theoretical and empirical literature focusing on the importance of institutions. Section 4 discusses the various policy measures used by Austria's Social Partners in tandem with the government to keep wage and price inflation under control, mainly as a way of achieving or maintaining full employment and external stability. Significantly, some of these measures were designed to prevent the emergence of inflationary expectations and the development of an inflationary spiral in certain time periods. These policies include price policies, policies to regulate the inflow or outflow of foreign workers and, most importantly, the implementation of wage policies. Section 5 presents some conclusions regarding the usefulness of estimating a NAIRU for industrial countries.

2. Preliminary results

The expectations-augmented Phillips Curve

A standard formulation of the inflation – unemployment trade-off is an expectations-augmented Phillips curve of the form:

(1) $\Pi_t = \Pi^e + \alpha - \beta u_t + \gamma z_t + \varepsilon_t$

where t is the time period, Π_t and Π^e denote the realized and expected rate of inflation, u is the rate of unemployment, and z is a vector of supply shift variables (with a mean equal to zero), and ε_t is an error term. A key restriction of equation (1) is that the coefficient of the

expected inflation term is unity, a condition called the dynamic homogeneity condition (Batini and Greenslade, 2006) or Friedman's policy invariance proposition.

According to the adaptive expectations hypothesis (Friedman 1968), inflation expectations are formed adaptively as a weighted average of recent inflation rates; in the simplest case, this process takes the following form:

(2) $\Pi^e_t = \Pi_{t-1}$.

A reformulation yields

(3) $\Pi_t = \Pi_{t-1} - \beta(u_t - u^*) + \gamma z + \varepsilon_t$

where u^* is the NAIRU, and $u^* = -\alpha/\beta$.

Inflation is negatively related to deviations of the unemployment rate from its natural rate and the entire curve shifts one-for-one with changes in Π^e. Aside from short-term changes due to z_t and ε_t, the rate of inflation will not change ($\Pi_t - \Pi_{t-1} = 0$), if u equals u^*. In the long-run, the relationship between inflation and unemployment is vertical at the natural rate of inflation.

Another approach argues that in the long run expectations are rational, i.e., forecasts are not systematically biased, or the average of expected inflation is equal to the average of actual inflation (Lucas, 1972; Ball and Mankiw, 2002, p. 118).

Preliminary NAIRU estimates

This section discusses preliminary results of NAIRU estimates for Austria. These results are called preliminary because the parameter estimates are unlikely to be identified, as will be argued in a later section: they are presented here because they can serve to highlight some of the problems encountered when estimating a Phillips curve for Austria[3].

The parameter estimates are based on a Phillips curve regression over the last four decades, estimated according to the standard approach as used by Gordon (1997). The inflation rate according to the consumer price index is regressed on an expectational term, the rate of unemployment and on a variable representing external price shocks. Given the lack of reliable import prices, the index of raw material prices of the HWWA was used to represent external shocks.

The inflation rate is a function of the rate of inflation lagged one period, the change in raw material prices (up to a lag of two periods), and the rate of unemployment.

The basic inflation equation estimated with annual data is as follows:

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[3] The question of identifiability of the parameter estimates has been raised in the context of reduced structural equation (Manning, 1993; Bean, 1994; Chiarini and Piselli, 2001), but not with regard to policy measures.

Sample period: 1963-2002:

(I) $\Pi_t = 0.027 + 0.45\pi_{t-1} + 0.029HW_t + 0.030HW_{t-1} + 0.012HW_{t-2} - 0.0085\log(u_t)$

$\qquad\qquad$ *3.6* $\qquad$ *4.0* $\qquad\qquad$ *2.9* $\qquad\qquad$ *3.1* $\qquad\qquad$ *1.1* $\qquad\qquad$ *–2.5*

R2 adj = 0.83; D-W = 1.8

The numbers in italics below the coefficients are *t-values*.

The years following Austria's accession to the European Union saw a sharp fall in inflation (increased competition, in particular in the food market) and a, probably unrelated, increase in unemployment. To eliminate this possible source of spurious correlation, the years 1995 to 1998 were excluded from the sample period.

Sample period: 1963-1994, 1999-2002:

(II) $\Pi_t = 0.026 + 0.43\Pi_{t-1} + 0.031HW_t + 0.033HW_{t-1} + 0.014HW_{t-2} - 0.0065\log(u_t)$

$\qquad\qquad$ *3.3* $\qquad$ *3.5* $\qquad\qquad$ *3.0* $\qquad\qquad$ *3.3* $\qquad\qquad$ *1.2* $\qquad\qquad$ *–1.7*

R2 adj = 0.82; D-W = 1.9

Π = inflation rate according to the consumer price index for Austria

HW = HWWA index of raw material prices, dollar basis[4]

u = unemployment rate (according to the traditional Austrian definition: ratio of the number of unemployed to dependent employment plus unemployment).

Π denotes (absolute) changes in the logarithm of the consumer price index, with adjustments in 1978 and 1984 for changes in the value-added tax (Pollan, 2008). HW is in the form of (absolute) changes in the logarithm of the HWWA index. The unemployment rate enters the equation in logarithmic form.

It is remarkable that changes in world market prices plus the lagged endogenous variable explain four fifth of the variance in the inflation rate (world market prices alone account for 60 to 75 percent of the variance, more for the earlier period, less for the full period 1963-2002).

Entering the unemployment rate (in logarithmic form) as an additional explanatory variable adds very little to the explanatory power of the regression equation. The influence of the unemployment rate on the rate of inflation is weak, close to zero for the periods 1963-1994, 1999-2002, somewhat higher for the full period (i.e., including the years 1995-1998), but still marginal. In Austria, the Social Partners have long professed to adhere to a productivity guideline with cost-of-living adjustment in wage bargaining. It is hard to assess how well this wage norm, in which fluctuations in unemployment play no role, was implemented (for an exploration of this question see Pollan 2005), but if it does indeed apply to some extent, there should be only a weak relation between unemployment and *wage* inflation through the intermediation of (positive and negative) wage drift, and a lower one still between

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[4] For a justification of the use of the HWWA-index in this form, see Pollan (2008).

unemployment and *price* inflation. Thus, the low coefficients of the unemployment rate in equations (I) and (II) are not unexpected.

Can the NAIRU be estimated for the Austrian economy?

If the Phillips curve approach to estimating the natural rate of unemployment is to be fruitful, two conditions have to be met: The first condition is that unemployment is a major determinant of inflation. The second condition is that the expected inflation rate enters the expectations-augmented Phillips curve with a coefficient of close to unity. If the results of the Philips curve regressions as reported above are taken at face value, the first condition is only weakly fulfilled, and the second not at all.

For the U.S. economy, the sum of the coefficients of lagged inflation rates is reported to be close to unity in some studies (Gordon*,* 1997; for evidence to the contrary see Fair, 2000), so that the argument that inflation expectations are a crucial variable in explaining shifts in the inflation-unemployment trade-off has some empirical support. This, however, is clearly not the case for Austria: in most of the regressions estimated, the coefficient of the lagged inflation rate (or the sum of the coefficients of the lagged inflation rates, not shown) does not exceed the mark of 0.50.[5] For similar findings for Germany, see Franz (2001, 2005) and Fitzenberger et. al. (2007, p. 21): "One of the most disturbing facts is that the sum of coefficients associated with expected inflation is far beyond unity whatever measure of expected inflation rates is employed, i.e., survey data or lagged distributions of past inflation rates."

3.   Methodological issues

How important are institutions of the labour market?

About 40 years have passed since Friedman (1968) and Phelps (1967, 1968) developed the concept of the equilibrium or natural rate of unemployment, but two main issues have remained the same: The NAIRU concept refers mainly to the labour market, and the natural rate of unemployment is an equilibrium concept for a market which is cleared by the price of labour in the interaction between workers and enterprises. Despite this emphasis on the functioning of the labour market, the empirical literature pays little attention to the institutions of the labour market, and almost none to economic policy.

In most OECD countries, the NAIRU varies considerably over time, but the factors which might cause these movements receive little attention. Gordon (1997, p. 30), in his exposition of the standard estimation procedure for the U.S. economy, lists some of these factors only as an afterthought (changes in labour militancy, in the minimum wage, in the supply in product and

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[5] Higher estimates of the coefficients of lagged inflation are obtained if the inflation forecasts of the Austrian Institute of Economic Research are used as proxies for inflation expectations, lending some support to the thesis that forward-looking inflation expectations are an important determinant of inflation, but then the coefficient of the unemployment rate turns *positive* and the empirical basis for estimating the 'natural rate of unemployment' vanishes altogether.

labour markets in the form of increased global competition and immigration of unskilled labour). A similar list is given by Battini and Greenslade (2006) and Ball and Mankiw (2002), who also mention, without further elaboration, that government policy plays a role in causing the NAIRU to change over time.

The OECD (2000), while acknowledging in principle that the NAIRU depends on a wide range of institutional and economic factors, takes account of changes in these factors (such as labour market reforms) only as revisions to preliminary estimates by judgmentally adjusting the NAIRU estimates for a few countries (but not for Austria)[6].

True, some of the factors driving structural change in the labour (and goods) market change only slowly over time, but others, such as tax policies, active labour market policies, labour market reforms as well as incomes policies, exhibit abrupt changes. Abrupt changes, in the form of the initiation of aggressive anti-inflation policies, also seem to characterise monetary policy in the United States (Goodfriend 2007; Bordo et. al., 2007).

As Solow (1986, pp. 31-32) remarks, a paradox arises here. "Those who estimated the natural rate in this way occasionally go on to discuss events or policies that might possibly change the natural rate. . . . But those factors have played no role in the estimation. It seems rather a bold leap, calling for more justification that it gets."

This neglect in the NAIRU literature is the more astounding as analyses of labour markets in the OECD have shown the importance of labour market institutions and of changes in these institutions in explaining cross-country differences and changes over time.

Differences in national labour market institutions have been invoked to explain the divergence in the labour market performance in industrialised countries. The favourable development of the U.S. labour market in recent years has been attributed to the great flexibility of the labour market, while the bad performance of some European labour markets has been attributed to institutional rigidity (Garonna and Sica, 1997; Siebert, 1997; Saint-Paul, 1997; Nickell and Van Ours, 2000; Belot and van Ours, 2004).

Moreover, the neglect of institutional factors is also in conflict with a large body of literature linking the macroeconomic performance in terms of inflation, unemployment as well as growth to labour market institutions (Calmfors and Driffill, 1988; Rowthorn, 1992; OECD, 1997; Nickell, 1997; Nickell and Layard, 1999; Blau and Kahn, 1999; Flanagan, 1999; Blanchard and Wolfers, 2000; OECD, 2001; OECD, 2004). Here, the emphasis is on institutional actors and their ability to restrain wage demands in the pursuit of macroeconomic goals.

Wage bargaining institutions have also attracted a great deal of attention in the literature investigating the interaction between the degree of centralisation/coordination of wage bargaining and central bank independence and credibility and the effects of monetary policy on inflation and unemployment (Hall and Franzese, 1998; Cukierman and Lippi, 1999; Soskice and Iversen, 2000; Calmfors, 2001), with the rankings developed to describe various

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[6] For a review of previous NAIRU estimates for Austria, see Pollan (2008).

characteristics of wage bargaining (Bruno and Sachs, 1985; Calmfors and Driffill, 1988; OECD, 1997; Wallerstein, 1999; Iversen, 1999) forming the basis for empirical work. This literature on the economic policy games between a central bank and wage bargainers focuses on the question of which actors, individual workers, individual unions or peak labour organisations are more inclined to take the (negative) external effects of high wage increases into account and thus bring about a favourable macroeconomic performance.

Economic policymakers as actors in the labour market and their expectations

If indeed institutions of the labour market are important determinants of economic performance then the field of actors whose behaviour is described in the empirical model needs to be enlarged. It is not sufficient to model the behaviour of workers and firms as individual actors as if the economy conformed to the neo-classical market model. An economic model linking unemployment to inflation must also incorporate the behaviour of organised groups that shape economic policy. In Austria, such groups include, on the labour side, the Austrian Trade Union Confederation, the individual unions, the works councils and, on the employers' side, the Economic Chambers, as well as the government and the central bank. This requires that all policy measures be incorporated into the analysis. This may be particularly clear for Austria but also applies to other European countries and perhaps even to the U.S.

That inflation expectations matter is a tenet of mainstream economics[7]. The academic literature, official pronouncements on monetary policy (e.g., European Central Bank 2004, pp. 46-49) as well as central banks' press releases are replete with terms like 'establishing credibility' and 'anchoring expectations'. In a market economy, the expectations of employees and employers are deemed important. In a mixed economy, however, where various institutions, be it the government, the central bank or peak organisations of labour and capital play an important role in the wage and price setting system, it may not be so much the price and wage expectations of individual workers and of individual firms that count but those of the institutional actors and their response to various policy actions[8].

In Austria, where the employers' and employees' organisations, the so-called Social Partners, have been entrusted with managing the social and economic agenda (Pollan 1997), the wage and price expectations formed by the employers' and employees' organisations may be more important than those of individual actors. The involvement of various institutional actors (aside from the government and the central bank) in the conduct of economic policy has two implications: first, empirical studies need to consider the impact of economic policies on the formation of expectations on the part of institutional actors. As Carlson and Parkin

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[7] See, e.g., Kohn (2007), Rudd and Whelan (2007), and Fischer (2007).

[8] While the current discussion in the literature on inflation expectations (see, for example, Mankiw, 2007) seems to center on the question of *which* expectations matter (current expectations of future inflation vs. past expectations of current inflation; forward-looking vs. backwards-looking expectations), this section focusses on the question of *whose* expectations are important in the emergence and propagation of inflation.

(1975, 124), point out with regard to incomes policies, if the actual inflation rate depends partly on expectations, then "means of lowering those expectations are potentially useful devices for controlling inflation". Thus, "if . . . wage-price guidelines or exhortation affect expectations in an important and lasting way, then they become useful instruments of inflation control". Second, while individual actors in the labour and goods market have little or no incentive to take actions not in accord with those expectations, institutional actors, if they pursue macroeconomic goals, are likely to initiate or agree to measures that counteract inflationary tendencies[9].

4. Economic policies and the NAIRU

This section sketches some economic policy measures and points out some of the difficulties caused by such actions in the estimation of price and wage inflation equations. In principle, any kind of economic policy will have an impact on the development of prices, wages and unemployment. In the present context, however, attention has to be restricted to the direct interference with the process of wage and price formation and with the development in the labour market.

In Austria, a broad array of policy measures has been employed to control wage and price inflation and to influence the labour market. Two main types of policy measures can be distinguished: policies to influence wages and prices, and policies to influence the supply of labour.

(1)   Policies to influence the movement of prices and wages directly

In a typical regime of wage moderation, the Phillips curve is closer to the origin, but the shape of the curve depends on how wage moderation is enforced and on the distribution of excess supply across the economy (Lipsey and Parkin, 1970); this question can only be answered by distinguishing between policy-on and policy-off periods, a research strategy not feasible for Austria. This section restricts itself, therefore, to exploring the consequences of incomes policies on the size of the estimated coefficient of the expectational term.

In Austria, policies of wage restraint were, as a rule, supported by measures to control price inflation in a variety of forms. Throughout most of the post-war period, policy-makers (the Social Partners, the federal government) have attempted to directly influence the rate of inflation by changing a wide array of *regulated* prices (basic food stuff, public charges, energy prices, custom tariffs) in an anti-cyclical manner; the express purpose of such policy

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[9] Consider two examples: In the early eighties Austria's economy exhibited a severe trade deficit; to re-establish external equilibrium and to maintain low unemployment, the Austrian Trade Union Confederation supported a hefty increase in the value-added tax (which raised inflation by 1.9 pecentage points in 1984) and persuaded the affiliated unions to negotiate modest wage increases for 1985. The second example centers on the adoption of the so-called hard-currency policy by the Austrian government and National Bank, a move that was supported by the Austrian Trade Union Federation as an anti-inflationary measure.

measures was to break inflationary expectations (Spitäller, 1973; Flanagan et al., 1983; Pollan, 1992) so as to achieve external and internal stability and low unemployment[10]. To be sure, such policy measures were not always successful because they were implemented during the 'wrong' phase of the business cycle, but overall, the movement of regulated prices was strongly *negatively* correlated with the movement of cyclical determined prices in the sixties and seventies (Pollan, 1978)[11].

Policy measures to raise *regulated* prices in periods of low wage and price inflation and to restrain (or reverse) price increases in periods of high wage and price inflation will help to break inflationary expectations and prevent or slow down the development of a wage-price spiral. In terms of the Philips curve (as a relation between the unemployment rate and price inflation), such measures will reduce the effect of past inflation rates on current price inflation and may also, depending on the configuration of the parameters, alter the effect of unemployment on price and wage inflation.

Control of *regulated* prices was one instrument used to directly influence price inflation. A more broad-based instrument, that was used from time to time, was the Social Partners' agreements on wage and price stops. These wage and price stops were, however, often implemented in the form of wage pauses only (Pollan, 1992). In such cases, a period of high price inflation was followed by a period of low wage inflation, as the wage pause took effect. Failure to distinguish between policy-on and policy-off periods produces downward biased estimates of the coefficient of past price inflation in a *wage inflation* equation, as high price inflation in period t-1 is related to low wage inflation in period t [12].

To the extent that price inflation depends on current wage inflation (say, through service prices), this kind of anticyclical policy intervention will also impart a downward bias to the coefficient of past inflation in a *price inflation* equation.

In order to illustrate this type of anticyclical interference in the price-wage setting process (direct control of prices, wage and price moderation and wage and price stops), let the size of the inflation adjustment depend on the distance between the desired rate of inflation and the actual rate of inflation in the preceding period: $\beta*(\Pi^* - \Pi_{t-1})$, where Π^* is the desired rate of inflation. Adding this term to the Phillips curve yields

(4) $\Pi_t = \alpha + \beta*(\Pi^* - \Pi_{t-1}) + \gamma*U_t + \delta*\Pi_{t-1}$

For $\beta>0$, this proportional adjustment rule is equivalent to a reduction in the coefficient of the expectational term:

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[10] According to Tichy (1982), the stabilisation of expectations was the main merit of what has been called Austro-Keynesianism.

[11] In the 1990s such policy measures were discontinued, partly because a much smaller part of the items in the consumer price index basket were then under the control of policy-makers, partly because agreements between the Social Partners and various government levels proved ineffective (Pollan, 1993).

[12] Indeed, a wage equation estimated for the years 1954-1968 does yield a negative coefficient for the lagged inflation rate (Nowotny et al., 1972, pp. 129-132).

(5) $\Pi_t = \alpha + \beta * \Pi^* + \gamma * U_t + (\delta - \beta) * \Pi_{t-1}$

Thus, a countercyclical price (wage policy) serves to break the force of inflationary expectations (or of inflation inertia)[13].

(2) Policies to control the supply of labour

Throughout the sixties to the nineties, policy-makers controlled the supply of labour, first to restrain wage inflation (by allowing an influx of foreign labour in the sixties and the first half of the seventies), then to reduce unemployment by partially reversing the inflow of foreign labour (in the second half of the seventies and in the eighties), by government-sponsored labour hoarding in state-owned companies, and by pushing large groups of employees into early retirement from the early eighties onward.

Some measures were designed to stabilize unemployment, some to stabilize wage and price inflation (and to bring about external stability). Phillips curve estimates that do not take account of these policy measures may be biased in a variety of ways, with the bias depending partly on the reaction of other policy-makers, such as the labour unions. In general, measures to restrict the supply of labour need to be supported by policies to moderate wage increases; in other words, if inflation is not to accelerate as unemployment is lowered, incomes policy must offset the weakening of market forces in the labour market.

(3) Changes in economic policy

If policy-makers pursue a certain strategy, a standard device in empirical work for identifying structural relationships is the estimation of a reaction function, a function which identifies the objectives of the policy-makers. Examples are the estimation of the targeting rules of monetary authorities[14]. Difficult as it is to identify the objectives of one policy actor, say the central bank, such an approach faces even greater obstacles when one tries to incorporate the policy measures described above into the estimation of the Phillips curve.

First, there is not just one policy-maker but several, the federal government and the various Social Partners; this would call for the estimation of several policy reaction functions, and perhaps even of the interaction of these policy-makers. Second, some of the policy measures described above were implemented in weaker form in later years or discontinued altogether[15]. Direct price controls were gradually discontinued in the eighties[16] and so were policies to change public charges in an anticyclical way. The case is not so clear for wage moderation: there are some indications that wage restraint weakened in the early eighties and that this change contributed to the rise in unemployment as the labour movement found

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[13] For another version of a countercyclical price policy see Pollan (2008).

[14] See Primiceri (2006) and Surico (2003) and, as an early example, Goldfeld and Blinder (1972).

[15] For details see Pollan (2005, pp. 18-23).

[16] Austria's entry into the EU in 1995 put an end to Austria's agricultural market regime and the price system governing agricultural products.

it more and more difficult to hold the individual unions to a policy of wage moderation (Pollan, 2005). Another policy interference in the labour market and wage formation involves control over the supply of labour, which is based on several policy measures; here too, it would prove very difficult to pinpoint changes that have occurred at specific dates.

To compund these difficulties, the question remains how the structure of the economy, and of the labour market in particular, has changed over time. Prominent examples of regime changes are Austria's adoption of the hard-currency policy in the mid-seventies, the collapse of the state-owned industries, and Austria's accession to the EU.

Thus, Phillips curve estimates are subject to the Lucas critique (Ericsson and Hendry, 1997). Given the substantial shifts in policy regimes over the last three or four decades, there is no theoretical presumption that a statistical relationship combining information about the actual historical pocess of inflation would be stable enough to be useful for forecasting and policy analysis when that economic environment changes.

5.   Concluding remarks

Since the sixties, several countries have adopted incomes policies in various forms to control inflation that had been interpreted as the result of a distributional struggle between business and labour unions. Incomes policy has been viewed as a tool of stabilisation policy that would avoid the increase in unemployment resulting from tight monetary and fiscal policy designed to curb inflation. Recent writings on the natural rate of unemployment, however, seem to neglect the effects of incomes policies on inflation and on the labour market, even though a large body of literature deals with the strategic interaction between monetary authorities and wage bargaining units. It is paradoxical that the literature on the NAIRU, an economic indicator that has been developed explicitly to guide economic policy, ignores past policy interventions in the goods and labour market, some of which were designed explicitly to dampen inflationary expectations. This raises the question whether the statistical relationship between inflation and unemployment (and other variables) observed in historical data should be expected to hold as the economic environment changes, rendering the NAIRU of dubious usefulness as an analytical tool.

Application of the standard tools of NAIRU analysis yields nonsensical results for the Austrian economy. The two foundations for establishing the existence of the natural rate of unemployment are lacking: neither the unemployment rate nor the proxy for expected inflation are highly correlated with the inflation rate. These empirical findings can be traced to the high degree of policy interference in the wage and price setting system. The finding that the coefficient of the expectational (inertial) term is much below unity seems to resurrect a non-vertical Phillips curve, but is likely just an artefact of policy intervention in the goods and labour market and has little to say about the NAIRU dynamics. It does raise the possibility, though, that wage and price setting involve elements of money illusions, contrary to the assumptions of naural rate theory (Akerlof, G. A., R. J. Shiller (2009, ch. 9).

This paper has focussed on the effects of incomes policy on NAIRU estimates for the Austrian economy, but as Solow (1986) notes, this criticism can be expanded to encompass any kind of policy measures that affect the labour market and inflation, and it may be applicable to other countries as well.

There seem to be significant differences between the U.S. economy and the economies of Europe. While it may be appropriate to model anti-inflationary policy for the USA as if the central bank were the only policy maker of importance, this approach may not suffice for Europe. There, incomes policies in various forms have been implemented repeatedly as a way of stabilizing the economy. The importance of institutional factors in Europe and their changes over time may be one of the reasons why Phillips curves for European countries are found to be unstable and that NAIRU estimates, if they can be established at all, are subject to great imprecision.

There is great consensus that expectations play a large role in the generation and propagation of inflation. But for all the emphasis on establishing the monetary authorities' credibility and on anchoring inflation expectations in the economic literature and official statements, it remains unclear at which economic agents the policy-makers' efforts are directed. But if institutional actors are acknowledged to play an important role in the wage and price setting system, policy measures could be targeted specifically at these groups. And indeed, practitioners of economic policy in Europe seem to recognise the importance of institutional forces more readily than their U.S. counterparts: In a recent statement, reminiscent of incomes policy qua exhortation, the president of the European Central Bank warned politicians and trade unions that interest rates could be raised 'pre-emptively' if wage settlements threatened to set off a wage-price spiral (Financial Times (Europe), 2008, p. 2).

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