

COMMENTS

‘Wage Rigidity and Unemployment in OECD Countries’ by D. Grubb et al.

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Econometric investigations of individual countries' experiences with inflation and unemployment in the 1970's have shown that it is no longer sufficient to simply assume that wages are sticky in order to explain observed macroeconomic phenomena and make policy recommendations. A number of theoretical papers appearing in the last few years, motivated in part by the international econometric comparisons, have shown that the exact form of this stickiness — whether it is due to overlapping contracts, to sticky expectations, to indexing, or to a slow recognition of changes in productivity — is crucial for an understanding of macroeconomic behavior.

This comprehensive empirical analysis by Grubb, Jackman and Layard takes this econometric research further by distinguishing between two important parameters of wage adjustment behavior, and by providing econometric evidence on these parameters for nineteen OECD countries. They also estimate the reaction functions for aggregate demand policy in these countries and examine how these policy reaction functions influence the parameters of the wage adjustment equation. In commenting on the paper, I want to raise some questions about three aspects of their analysis: the distinction made between real and nominal wage rigidity, the policy implications of the estimates, and the specification of the econometric equations.

Real and nominal wage rigidity

An important conceptual distinction is made in the paper between two parameters of the wage and price equations. The authors associate one of these parameters with *real* wage rigidity and the other with *nominal* wage rigidity. In my view, this association is misleading. It introduces a terminology that is much different from that commonly used in discussions

about real and nominal wage rigidity, and tends to confuse issues raised in previous analyses of the accommodation issue.

To see this, consider the elementary example presented at the start of the paper. Using the notation introduced in the paper, the wage equation

$$\dot{w} = \dot{p}_{-1} - \beta(U - U_0) + \dot{q}^e, \quad (1)$$

with the lagged inflation rate \dot{p}_{-1} substituted as a measure of the expected inflation rate, can be used in the price equation

$$\dot{p} = \dot{w} - \dot{q} - \gamma\dot{U}, \quad (2)$$

to obtain

$$\dot{p} - \dot{p}_{-1} = -\beta(U - U_0) + \dot{q}^e - \dot{q} - \gamma\dot{U}. \quad (3)$$

In the authors' terminology, $1/\beta$ is a measure of real wage rigidity. But the usual problem raised by real wage rigidity is that after a decline in productivity, the real wage does not fall with sufficient speed to prevent an increase in unemployment — a problem that has little to do with β . Consider, for example, a single period drop in productivity \dot{q} . According to (2) this raises \dot{p} by the same amount for a single period, and since \dot{w} does not change [see (1)], a drop in the real wage occurs just as required by the drop in productivity. This drop in real wage growth occurs in this formulation regardless of the value of β . If the policy authorities try to keep unemployment at the natural rate, when \dot{q} returns to normal in the next period, \dot{p} will remain at the new higher level with \dot{w} catching up. Hence the rate of growth of real wages increases again. Although real wage rigidity is non-existent for this model, the authors' measure of real wage rigidity could be quite high (β could be low).

While this example generates a permanently higher rate of inflation, an alternative example for the productivity shift would not: if productivity growth falls by one percent for a year, and subsequently rises by one percent for a year, the needed fluctuations in real wages occur, and there is no permanent increase in inflation. The main point also holds for more complex formulations of the wage and price equations. Real wages can be quite flexible in the sense that they adjust quickly — perhaps because the nominal wage lags behind changes in prices — in situations where the authors' real wage rigidity parameter would signal extremely rigid wages. In this sense the authors' terminology is misleading.

'Rigidity' parameters and policy analysis

The parameters estimated by the authors are very significant for policy

analysis, however, despite this criticism. To see this, it is helpful to go beyond the elementary example and consider the equations which are estimated,

$$\dot{w} = \alpha \dot{p} + (1 - \alpha) \dot{w}_{-1} - \alpha \beta U + \alpha \dot{q}^e, \quad (4)$$

$$\dot{p} = \theta \dot{w} + (1 - \theta) \dot{w}_{-1} - \gamma \dot{U} - \dot{q}. \quad (5)$$

Together these imply that

$$\dot{w} - \dot{w}_{-1} = -\frac{\alpha \beta}{1 - \alpha \theta} U + \frac{\alpha}{1 - \alpha \theta} (\dot{q}^e - \dot{q}) - \frac{\alpha \gamma}{1 - \alpha \theta} \dot{U}. \quad (6)$$

For this model, Grubb, Jackman and Layard define real wage rigidity as $1/\beta$ and nominal wage rigidity as $(1/\beta)((1 - \alpha \theta)/\alpha)$. Changing notation slightly and assuming for simplicity that \dot{q}^e and γ are zero, eq. (6) can be written

$$\dot{w} = \dot{w}_{-1} - cU + d\dot{q}, \quad (7)$$

where

$$c = \alpha \beta / (1 - \alpha \theta) \quad \text{and} \quad d = -\alpha / (1 - \alpha \theta).$$

Note that d measures the initial impact of a productivity shock on wage inflation, while c measures the impact of labor market slack on wage inflation. These parameters can easily be obtained from the econometric estimates of the 'rigidity' parameters provided in the paper. It can be shown that the parameters c and d determine the shape and position of the unemployment-inflation trade-off and in this sense are critical for policy analysis.

Suppose the aggregate demand policy reaction function can be represented as

$$U = g(\dot{w}_{-1} - \dot{w}^*), \quad (8)$$

where \dot{w}^* is a target rate of inflation (which I will take to be zero for illustration). The unemployment rate U should be thought of as a deviation from a normal or natural rate. Eq. (8) is the same as the reaction function estimated by Grubb, Jackman and Layard. I have used this same function to illustrate the calculation of an unemployment-inflation trade-off for a model like (6);¹ the method can be briefly summarized. In the context of eq. (6), which is simply a vertical long-run Phillips curve, a convenient way to

¹See J.B. Taylor, 'Policy choice and economic structure', *Occasional Paper No. 9* (Group of Thirty, New York, 1982).

represent the macroeconomic policy trade-off is in terms of the *variability* of inflation and unemployment, rather in terms of their *levels*. If the Phillips curve is vertical in the long run, it makes no sense to talk about a long-run trade-off between inflation and unemployment. However, a long-run trade-off between the cyclical fluctuations in these variables arises quite naturally.

Substitute (8) into (7) to get the first-order difference equation

$$\dot{w} = (1 - cg)\dot{w}_{-1} + d\dot{q}. \quad (9)$$

If the deviation of productivity growth from trend \dot{q} is random with variance σ^2 , then the magnitude of the cyclical variations of wage inflation is given by the variance measure

$$\text{var } \dot{w} = d^2\sigma^2 / (1 - (1 - cg)^2), \quad (10)$$

and from (8), the magnitude of unemployment variations is given by

$$\text{var } u = g^2 d^2 \sigma^2 / (1 - (1 - cg)^2). \quad (11)$$

For different values of g , these equations will trace out a negatively sloped trade-off curve (with $\text{var } \dot{w}$ on one axis and $\text{var } u$ on the other) between the variance of inflation and the variance of unemployment. Accommodative policies (for which g is near zero) give a low value for the variance of unemployment and a high value for the variance of inflation. As can be seen from (10) and (11), the shape and location of this trade-off curve depends on the size of c and d . A higher value of c represents an improved trade-off; a higher value of d represents a deteriorated trade-off. The values of c and d provided in the estimates reported by Grubb, Jackman and Layard, therefore, permit one to estimate such a trade-off for each country. Moreover, since estimates of the policy parameter g have been obtained for each country, it is possible to determine the extent to which policy choices, or these two structural parameters, explain the observed experiences with inflation and unemployment. Germany, for example, could have relatively stable prices — as measured by a low variance of inflation — either because of non-accommodative policy or because of a relatively favorable wage setting structure as represented in the c and d parameters. The information presented by the authors provides the information needed for a systematic accounting of the reasons for policy differences in these countries.

Specification issues

The econometric eqs. (4) and (5) reported in the paper, raise a number of questions about appropriate specifications. Perhaps, there should be a lagged

price term in (4) representing inflationary expectations. Further, actual productivity change could enter the wage equation directly because of automatic pass-throughs of productivity. Or, the nominal wage in (4) might be influenced by the change of unemployment, as well as the level. Moreover, the constraints that the long-run Phillips curve is vertical might lead to bias in a country where inflation expectations have been low and stable.

In order to explore some of these alternatives, it might be useful to 'open-up' the econometrics at the start so as not to rule out such possibilities. Since the policy analysis I outlined above could also be conducted in a more general framework (although the use of optimal control techniques would be necessary), nothing essential would be lost if the models turn out to be more complex, or if the same specifications could not be used in all countries.