reaction model for a Central Bank against shocks on labor market - Part I

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Abstract

There's a practical rule in financial and monetary economics: if unemployment rises, the economy needs stimulus, therefore, interest rates will fall. This rule of thumb is derived from the Phillips Curve and the Taylor rule. However, this effect is not formally included in those models. Thus, with small adjustments to the Phillips Curve and Taylor's rule framework one can include the impact of shocks and expectations in the labor market, to overcome shocks on inflation and to improve the adjustments of central bank's interest rate.

1. Introduction.-

It is common to see financiers keeping an eye on unemployment figures, particularly in the US The rule of experience is fairly straightforward: If unemployment rises, the economy needs stimulus, be it a lower interest rate or a higher interest rate. amount of money. Obviously, the latter fuels not only the real sector, but the financial markets.

In theory, this is based on the "artificially immortal" Phillips Curve, where lower job applications, that is, lower labor supply, (lower unemployment proxy) would imply that there are fewer people looking for work, which is why it is necessary to raise wages. to attract them and this implies higher inflation. This in turn requires the Central Bank to take measures to reduce inflation, in case it is not a temporary problem, for example by raising the interest rate to slow down consumption.

The opposite can also be true, that is, if there are more people looking for work, there would be an excess of labor supply, compatible with higher unemployment; and it would allow lower wages given the abundance of labor, thereby reducing inflation. In this case, both the Central Bank and the government could intervene to reactivate the economy, through policies to reactivate the labor market or the consumer market, either with a lower interest rate or more money in the economy.

However, these models do not assume the existence of rigidities in terms of salaries, not only in relation to the contracts already established, but also to the salary structure of the corporations or the State. It is also assumed that the inflation target is rigid and does not allow some flexibility, particularly in the case of seasonal unemployment. Likewise, this model requires considering that discount rates are constantly updated, which is valid for financial markets, but not necessarily for larger real projects.

2.- A reaction model for a central bank

Returning to the starting point, the model requires incorporating expectations into the analysis. In other words, the agents consider that there may be expected unemployment (eu), while real unemployment may be different. This does not necessarily have to do with the natural rate of unemployment, it may be a temporary estimate. In this way, a gap is generated such that: $bu = u^e - u$.

Now, this gap has a notorious impact on the interest rate, in the sense that if the gap is positive, it means that unemployment expectations were higher than real unemployment. From this, inflation expectations would be lower than real inflation.

This can be deduced through the linearization of an inverse function, based on a Phillips curve, that is,

$$ln\ (\pi) = a - ln\ (u). \qquad (1)$$

The aforementioned relationship could be combined as follows:

$$\pi^e - \pi = - \alpha\ (u^e - u) \qquad (2)$$

An example would help illustrate the present case. Let $u^e = 8\%$ and $\alpha = 0.5$. From this, if in the end the real unemployment rate is 6%, this means that the gap is 2%. Following the proposed formula, the unexpected inflation would be equal to -1%. Indeed, it is found that $\pi^e - \pi = -1\%$, then $\pi^e - \pi < 0$, therefore $\pi^e < \pi$, as suggested by the theory.

This in turn means that real inflation was underestimated, that is, there will be higher inflation than expected, with which a reaction from the Central Bank is expected, towards the increase in the interest rate, in order to cool the economy . As mentioned, this rate increase has a faster impact in the case of financial asset prices, such that:

$$p^e = f\ /\ (1 + i^e) \qquad (3)$$

Note that financial assets depend mainly on the nominal interest rate (i) and not so much on the real rate (r)

As in the previous case, the effect of small changes in the interest rate can be approximated through:

$$\Delta i = (i^e - i\ ')\ \text{and,} \qquad (4)$$

$$\Delta p^e = p^e - p = \gamma\ (i^e - i') \qquad (5)$$

In this case, if the unexpected inflation is negative 1%, the interest rate increase could be 1%. However, said increase would only achieve a level of the relationship between the nominal rate and the inflation rate, but not modify the real rate.

3.- Extensions of the model

For this, another equation is necessary, whose approximation is,

$$i \approx \pi + r \qquad (6)$$

This Fisherian equation indicates that if inflation increases and the nominal rate increases, to the same extent, then the real rate will remain constant. $i - \pi \approx r$. Therefore, if the real rate is to be increased, it is necessary that the increase in the nominal rate is greater than that of inflation. In other words, the increase in the interest rate must be greater than 1%, in the proposed example. This can be summarized with the following equation:

$$\Delta i = \theta \Delta \pi, \text{ where } \theta > 1 \qquad (7)$$

After that, it can be seen that the changes in the real interest rate will simply be the sum of the partial changes, that is:

$$\Delta r = \Delta i + \Delta \pi = \Delta i + \Delta i / \theta \qquad (8)$$

$$\Delta r = \Delta i \, (1 + 1 / \theta) = \Delta i \, (\theta + 1) / \theta \qquad (9)$$

Which can be indirectly simplified as:

$$\Delta r = \lambda \Delta i \qquad (10)$$

Being strict with the theory, only the real rate is the one that affects the real variables. By increasing this rate above inflation, these variables will contract: ***C (r), I (r).***

However, these variables already have a trend, which can be expressed as an autoregressive element and / or literally as a trend variable:

$$x^t = \kappa x^{t-1} + \Phi t + \psi r \tag{11}$$

This dynamic approach can be extended to the interest rate, which complements the model:

$$r_t = r_{t-1} + \Delta r \tag{12}$$

4.- Results

By making some dynamic adjustments, the model can be summarized recursively as follows:

Monetary Sector

$$ln\pi^e{}_t = a\text{-}lnu^e{}_t \tag{13}$$

$$i^e{}_t = \pi^e{}_t + r_t \tag{14}$$

$$p^e{}_t = f^e{}_{t+1} / (1+i^e{}_t) \tag{15}$$

$$\Delta\pi^e{}_t = \pi^e{}_t - \pi_t = \; -\alpha (u^e{}_t - u_t) \tag{16}$$

$$\Delta i_t = \; \theta\Delta\pi^e{}_t \tag{17}$$

$$\Delta p = \gamma\Delta i_t \tag{18}$$

$$\Delta r_t = \lambda\Delta i_t \tag{19}$$

Real Sector

$$I_{t+1} = \kappa_i I_t + \Phi i_t + \psi_i \Delta r_t \tag{20}$$

$$C_{t+1} = \kappa_c C_t + \Phi c_t + \psi_c \Delta r_t \tag{21}$$

$$Y_{t+1} = C_{t+1} + I_{t+1} \tag{22}$$

5.- Conclusions

With small adjustments to the Phillips Curve and Taylor's rule framework one can include the impact of shocks and expectations in the labor market, to overcome shocks on inflation and to improve the adjustments of the central bank's interest rate. Therefore, one can finally include the expectations of unemployment in the basic model.

6.- References

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