# General Discussion

*Vitor Gaspar*

It was a pleasure for me to participate in the conference and to discuss this session's papers. Both papers emphasize the welfare implications from choices pertaining to the monetary policy regime, and they both use the New Keynesian framework. The authors characterize monetary policy with a Taylor-type instrument rule and interpret a number of parameters in the policy rule as representing target variables. The authors make welfare comparisons resorting to the consumption-compensating variation for the representative consumer. The papers are also similar in a number of other, less significant, aspects. Important differences exist, as well. The Ortega-Rebei paper uses an open economy, two-sector model with eight different shocks and money in the utility function. The Moran paper uses a single-sector, closed economy model, considers a single shock (to monetary policy), and resorts to a cash-in-advance constraint.

I will begin by examining a general issue that seems to me relevant for either paper and that is whether the use of micro-based welfare measures—to evaluate policy options—in the context of a given model, violates Hume's principle, which states that one cannot derive an "ought" from an "is." Another aspect that the two papers share is that they both look at important policy questions. I will examine two such questions addressed by the papers: inflation targeting versus price-level targeting, in the case of Ortega-Rebei, and 2 per cent versus 0 per cent as the inflation target, in the case of Moran.

As stated, the welfare metric used in both papers is derived from the model's microfoundations. The compensating variation derives from the welfare change of the representative household in the model. It allows for a measure of welfare change based on consumption-equivalent units. Thus, it allows a straightforward, intuitive interpretation. Moreover, it is entirely consistent, because it is derived from the underlying model. Consistency and intuitive

interpretation are good things. Nevertheless, it seems justified to examine carefully the transition from the realm of positive to the realm of normative economics. David Hume shows clearly that the transition is not based on a self-evident process. He wrote:

> When of a sudden I am surprised that instead of the usual copulation of propositions, *is* and *is not*, I meet with no proposition that is not connected with an *ought* or *ought not* (. . .) a reason should be given, for what seems altogether inconceivable, how this new relation can be a deduction from others, which are entirely different from it.
>
> —D. Hume (1740)

It may appear at first that the question is trivial in the context of the research presented in the two papers. The idea is that given a representative household framework, it is "natural" to take the utility of the representative as the basis for welfare evaluation. Thus, the argument goes, the welfare metric is not only consistent but follows strictly from the model. I would suggest that Hume's principle is not that easy to overcome and that there is some tension associated with the preceding line of argument.

Models are, at best, simplifications. To fit, many assumptions are made that are not necessarily accurate. These assumptions may have important implications for model-based welfare measures, but it is conceivable that alternative models, fitting equally well, may have significantly different welfare implications. I find it difficult to believe that our confidence in this class of models is such that we are prepared to take the implied normative propositions at face value. Is it meaningless to discuss normative implications? Does Hume's principle prevent us from engaging in micro-based welfare exercises? The answer to both questions is no. It is important, however, to recognize that Hume's principle requires from us an explicit effort of interpretation when we make the transition from positive to normative statements. Moreover, the information from the model-based measure of welfare cannot be interpreted in a mechanical way. It must be complemented with a careful analysis of changes in the relevant economic variables. Such an exercise allows us to understand the drivers of the welfare results and to intuitively assess their reasonableness. In my reading, the procedure I am suggesting is followed in both papers.

Let us turn now to a question addressed by Ortega and Rebei. Should monetary policy target inflation or the price level?

Following, for example, Clarida, Galí, and Gertler (1999), the question may be formulated in the context of a standard, closed economy, new Keynesian model. Such a setting implies a Phillips curve of the form

$$\pi_t = \omega(\gamma\pi_{t-1} + \beta E_t\pi_{t+1} + \kappa x_t + u_t), \quad (1)$$

where $\pi$ is inflation; $x$ is the output gap; $\gamma$, $\beta$, and $\kappa$ are parameters; $u$ is a cost-push shock (assumed identically, independently distributed); and $\omega = (1 + \beta\gamma)^{-1}$. The period social-welfare function is assumed to be of the form

$$L_t = (\pi_t - \gamma\pi_{t-1})^2 + \lambda x_t^2, \quad (2)$$

where $\lambda$ is a parameter indicating the relative weight on output-gap stabilization. We will assume here that the central bank uses the social-welfare function to guide its policy decisions. Note also that the optimal inflation target is assumed to be zero.

In the simulations (taken from Gaspar, Smets, and Vestin, forthcoming) and presented for illustration, the following parameters (Table 1) are used:

**Table 1**
**Simulation parameters**

| $\beta$ | $\gamma$ | $\lambda$ | $\kappa$ | $\sigma$ |
|---|---|---|---|---|
| 0.99 | 0.5 | 0.05 | 0.07 | 0.005 |

In general, optimal discretionary policy is described by

$$x_t = -au_t. \quad (3)$$

We assume, for simplicity, that the output gap is the central bank's policy instrument. Without loss of generality, we could alternatively have used a short-term interest rate as the policy-maker's instrument by introducing an IS (investment-savings) curve linking the output gap to the real interest rate. Under the optimal discretionary policy, the output gap responds only to the current cost-push shock. In particular, following a positive cost-push shock to inflation, monetary policy is tightened and the output gap falls. The strength of the response depends on the slope of the New Keynesian Phillips curve and the weight on output-gap stabilization in the loss function. In contrast, if the central bank has access to a commitment technology, optimal policy will be more complicated and will use the fact that credible promises of future policy actions can help stabilize current inflation through expectations.

Figure 1 shows impulse responses for a one standard deviation cost-push shock under both discretion and commitment. The key differences are that,

in the case of commitment, the initial response is smaller, but then persists. The reason is that by creating expectations of deflation, it provides incentives, for current price-setters, to moderate price increases, thereby leading to lower current inflation (see Woodford 2003 for further discussion of this intuition). At first, it may seem like a small gain that the initial response of both inflation and output is slightly smaller under commitment, because the gain should be balanced against the cost of having to continue moving inflation and output also when the shock has left the economy. However, the welfare differences (at least in terms of relative levels) are large. Under discretion, in our example, the loss is 30 per cent higher than under commitment. The reason is that the loss function is quadratic in inflation and output and hence these relative small differences lead to important consequences. From Figure 1, it seems that optimal policy under discretion looks like inflation targeting, since it allows for base drift in response to the cost-push shock. Under commitment, however, persistence in the policy response leads to a lasting undershooting of inflation. For the pure forward-looking case, both Clarida, Galí, and Gertler (1999) and Woodford (1999), have shown that the price level is stationary when the policy regime is inflation targeting under commitment. Vestin (forthcoming) shows that, under discretion, price-level targeting dominates inflation targeting in the pure forward-looking case. The benefits from price-level targeting come from a mechanism whereby expectations operate like automatic stabilizers in response to cost-push shocks. Forward-looking agents, with rational expectations, provide an intertemporal link that allows spreading the effects of cost-push shocks over time.

In our very simple example, extending the framework to allow for demand shocks or productivity shocks would not change the results at all. The reason is that, in our set-up, such shocks would not create a trade-off between inflation volatility and output-gap volatility. Thus, the policy prescription is easy (following Clarida, Galí, and Gertler 1999): accommodate productivity shocks and offset demand shocks.

Interestingly, to complicate matters, when the behaviour of inflation requires a combination of backward- and forward-looking elements, Nessén and Vestin (forthcoming) have shown that average inflation targeting delivers more efficient outcomes than either of the extremes of inflation targeting or price-level targeting.

The simple example and subsequent discussion lead to the following questions: Is the omission of cost-push shocks from the Ortega-Rebei model biasing the field against price-level targeting? Is the use of an ad hoc instrument rule affecting their findings?

**Figure 1a**
**Discretion and commitment under rational expectations**

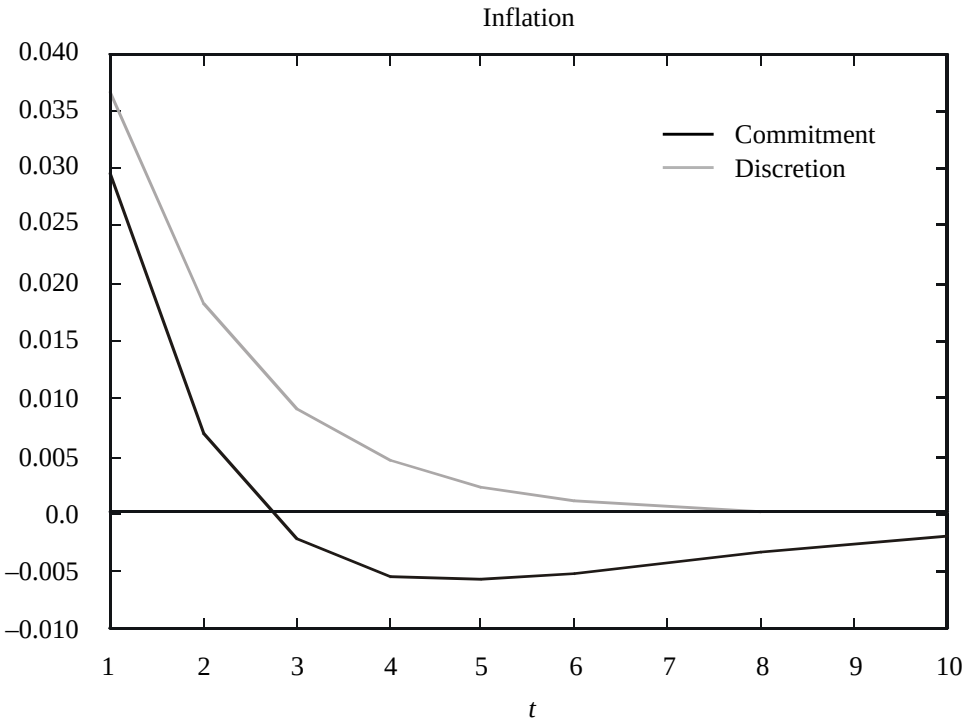
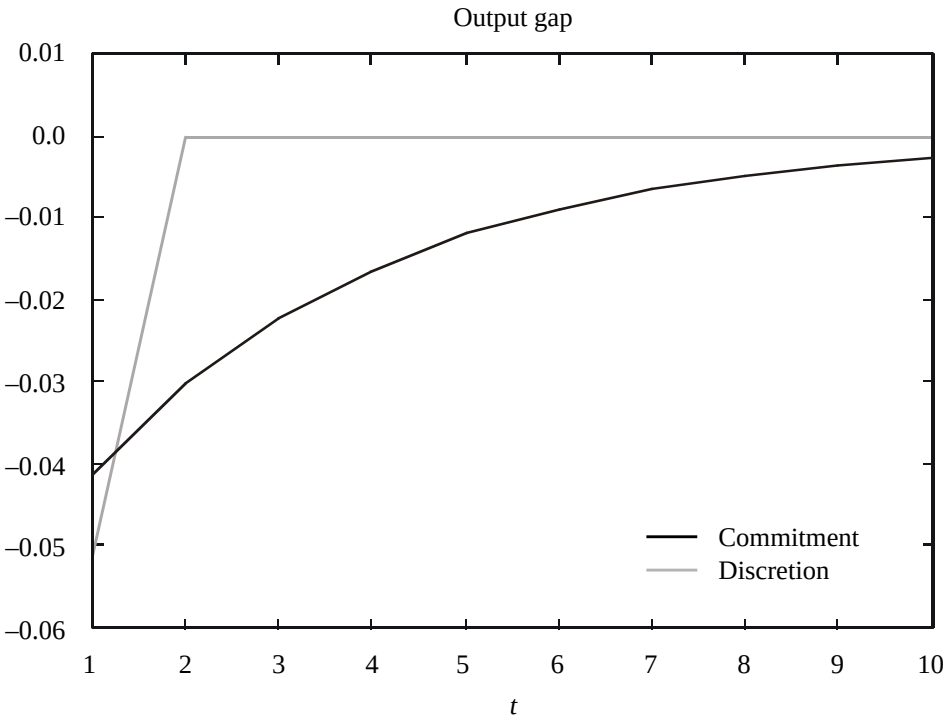



**Figure 1b**
**Discretion and commitment under rational expectations**



The paper by Kevin Moran addresses the question: Which inflation target—0 per cent or 2 per cent? The question of the optimal rate of inflation was addressed by the European Central Bank (ECB) at the time of its evaluation of its monetary policy strategy in 2003 (Issing 2003). The ECB carefully considered the arguments discussed in the literature. These included transactions costs, distortionary taxation, price setting by monopolistic competitive firms and product market frictions, wage setting and labour-market frictions, deflationary risks and the zero nominal bound on interest rates, and, finally, measurement issues. At the end of the day, the most important argument was linked to deflation risks and the zero bound. Research included in the set of background studies (Coenen 2003; Klaeffling and Lopez Perez 2003) found that an inflation rate of 2 per cent is enough protection against the risk of hitting the lower bound.

What is the value added from Moran's paper? He considers a model where there are gains associated with moving from 2 per cent to 0 per cent inflation. However, he shows that taking into account transition dynamics significantly reduces such gains. The paper provides a very good example of the importance of explicitly modelling transition dynamics in the event of regime change. It seems to me that it is a general point. Frank Smets, David Vestin, and I have looked at another example. In Gaspar, Smets, and Vestin (forthcoming), we have looked at the Volcker disinflation in a set-up with optimal monetary policy and adaptive learning on the part of the private sector. We also found it important to consider transition dynamics explicitly.

I enjoyed reading and discussing the two papers. They are examples of applications of state-of-the-art dynamic stochastic general-equilibrium models to important and timely monetary policy questions.

## References

Clarida, R., J. Galí, and M. Gertler. 1999. "The Science of Monetary Policy: A New Keynesian Perspective." *Journal of Economic Literature* 37 (4): 1661–707.

Coenen, G. 2003. "Zero Lower Bound: Is It a Problem in the Euro Area?" European Central Bank Working Paper No. 269.

Gaspar, V., F. Smets, and D. Vestin. "Monetary Policy Over Time." *Macroeconomic Dynamics*. Forthcoming.

Hume, D. 1740. *A Treatise of Human Nature, Book III: Of Morals*, Part 1, Section i.

Issing, O. (ed.). (In co-operation with I. Angeloni, V. Gaspar, H.-J. Klöckers, K. Masuch, S. Nicoletti-Altimari, M. Rostagno, and F. Smets.) 2003. *Background Studies for the ECB's Evaluation of Its Monetary Policy Strategy.* Frankfurt: European Central Bank.

Klaeffling, M. and V. Lopez Perez. 2003. "Inflation Targets and the Liquidity Trap." European Central Bank Working Paper No. 272.

Nessén, M. and D. Vestin. "Average Inflation Targeting." *Journal of Money, Credit and Banking.* Forthcoming.

Vestin, D. "Price-Level Targeting Versus Inflation Targeting in a Forward-Looking Model." *Journal of Monetary Economics.* Forthcoming.

Woodford, M. 1999. "Optimal Monetary Policy Inertia." National Bureau of Economic Research Working Paper No. 7261.

———. 2003. *Interest and Prices: Foundations of a Theory of Monetary Policy.* Princeton: Princeton University Press.