Discussion

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The two studies presented in the first session of the conference take quite different approaches to the question of price indexes. On the one hand, Coulombe's study develops the idea that the general level of prices is indeed a relevant intertemporal price under a monetary regime where the general price level is stationary. The author illustrates this viewpoint by analysing the behaviour of real interest rate expectations during the gold-standard era in Great Britain. In doing this, Coulombe suggests a new solution to Gibson's paradox. On the other hand, Crawford, Fillion, and Laflèche, using the latest econometric techniques, set out to determine whether inflation, as measured by the consumer price index (CPI), is a satisfactory way of identifying the underlying trend of inflation in Canada. Their study also attempts to quantify the degree of bias in the CPI as a measure of the cost of living. In this discussion I do not compare and contrast the results of these two studies. The two approaches are very different, making any comparison risky.

The primary objective of Coulombe's study is to reassess to what extent the general price level can convey useful information to economic agents in their intertemporal decisions, beyond what is already revealed by the interest rate. According to conventional interpretation, the real interest rate is the only intertemporal price that is relevant for allocating consumption over time. Once this is known, the general price level does not offer any additional information that would help individuals make better choices. Coulombe's study seeks to show that this result is in fact valid only in an economy where the general price level is integrated of order one. Let me review his argument briefly:

An individual who maximizes his utility will allocate his consumption over periods t and $t+1$ to equalize the marginal rate of intertemporal substitution (MRIS) at the anticipated real interest rate:

$$MRIS_t \equiv \log U'(\cdot_t) - \log U'(\cdot_{t+1}) \cong r_t - \pi_{a,\,t+1}.$$

This is measured by the deviation between the nominal interest rate, r_t, and the expected inflation rate, $\pi_{a,\,t+1} = (p_{a,\,t+1} - p_t)$. Coulombe analyses the implications of this condition for the behaviour of the expected real interest rate under two different monetary regimes. In the one case, the monetary authority seeks to keep the inflation rate constant at its trend value π, while in the other case, monetary policy is aimed instead at keeping the general price level on a deterministic path, growing at rate π. The two regimes differ in a crucial way. Under the first monetary regime, any shocks to the general price level persist indefinitely; under the second, they are eventually completely eliminated by the central bank, since the level of prices will always return to the long-term trend. With the first monetary regime, the expected inflation rate is always equal to the trend inflation rate. There is no possible gap, therefore, between conditional and non-conditional expectations about the inflation rate. It is rational for an individual always to expect inflation to remain at its trend value. For this reason, the current price level gives no information about the intertemporal value of goods and services. Conversely, under the second monetary regime, the price level always returns to its long-term trend. The conditional expectation for the inflation rate—that is, the rational expectation for π_{t+1}—is not generally equal to the trend inflation rate. In fact, in Coulombe's example, the expected inflation rate, $\pi_{a,\,t+1}$, is equal to the trend inflation rate, from which we must subtract a factor that flows from the short-term dynamics of the inflation rate. This short-term factor, which is equal to $\alpha(p_t - \mu_t)$, depends on the deviation of the price level, p_t, from its long-term trend, μ_t. In an economy where the price level is constant over the long term, the Euler condition $(2')$ becomes simply

$$MRIS_t = \ln\left(\frac{C_{t+1}}{C_t}\right) = r_t + \alpha(p_t - p_0)\ .$$

In this case, the individual will assess his subjective real interest rate directly on the basis of information conveyed by the nominal interest rate and the general price level. Coulombe interprets this result as an indication that the general price level is in fact a relative intertemporal price that conveys information that is useful for decision-making. Perhaps the most significant result of this study is to show that the Summers effect is not valid in an economy where the price level is stationary. In effect, as can readily be seen from the above equation, the subjective real interest rate can become

negative, even if there is a minimum floor under the nominal interest rate. If p_t drops enough with respect to p_0, the MRIS becomes negative. In this context, it is as if the economy has a *relative* price as well—the general price level—for making adjustments. The burden of adjustment no longer falls entirely on the nominal interest rate, as it does in the first monetary regime. This might then allow for smoother adjustments to economic shocks. For this reason, and contrary to Summers' conclusion (1991), Coulombe maintains that a monetary regime with stable prices is the better one. Without doubt, this would seem to be the main conclusion of his study, in terms of economic policy.

So far, the analysis has been developed entirely within a context of partial equilibrium. The author considers only the perspective of individuals who are maximizing their utility. Despite the encouraging empirical results obtained for the gold-standard period, it is still difficult to assess whether Coulombe's results can stand up to a general-equilibrium analysis. We must remember that the nominal interest rate is treated here as an exogenous variable. It would be interesting to see whether the mechanism that Coulombe describes is operational when all prices and all quantities are determined simultaneously. It is possible to construct a fairly standard model in which, at general equilibrium, nominal interest rate movements will always cancel out those of the factor $\alpha(p_t - \mu_t)$, leaving the real interest rate independent of the general price level. Benassy (1995) offers a good example of such a model. Moreover, in a general-equilibrium context, the stabilizing effect described by the author is easier to visualize when shocks come from the aggregate demand side, since in this case the GDP and the general price level fluctuate in tandem. Intuitively, those who react according to equation $(2')$ have, as individuals, an interest in reducing (or increasing) their MRIS when they observe a fall (or a rise) in the general price level. This reduction (increase) translates in practice into an increase (reduction) in their current demand for goods and services, C_t, at the expense of their future consumption. Thus, in the case of a negative aggregate demand shock, the drop in the general price level will induce individuals to react in a way that will weaken the shock's initial impact. This is the stabilizing effect mentioned by the author. In the case of an aggregate supply shock, the price effect may function in the opposite direction and, as I see it, could thus be destabilizing for the economy. A recession caused by a negative supply shock is accompanied by an increase in the general price level. Under the second monetary regime, this will lead individuals to increase (reduce) their MRIS and therefore to reduce (increase) their demand for goods and services, C_t. Such a reaction will reinforce, rather than weaken, the initial depressing effect on output and employment. This brings me to the conclusion that the stabilizing effect described by the author will be dominant only if economic shocks come mainly from the

demand side. Of course, my own analysis, like that of the author, ignores movements in the nominal interest rate. It does, however, illustrate the need to examine the mechanism that Coulombe has identified within a general-equilibrium context.

In his conclusion, Coulombe reminds us of the advantages of a regime of price-level stability, and he urges the Bank of Canada to give this option serious consideration. Before choosing such a regime, and thereby imposing the occasional period of deflation, we should look carefully at the costs of moving towards this kind of regime. Unless the new monetary regime could be made instantly credible, the shift towards a regime of price-level stability might well impose great economic and social costs on the Canadian economy. Even if our understanding of economic phenomena today is better than it was 50 or 60 years ago, there is still a risk that our generation, like preceding ones, will adjust only slowly to a radical change of regime. If that is the case, then we should proceed with caution.

I turn now to the study by Crawford, Fillion, and Laflèche, which gives us a highly detailed analysis of inflation measures based on the Canadian CPI. The study has three primary objectives. First, it seeks to determine whether trend movements in the CPI are consistent with those observed in other price measurements—in particular, the implicit GDP deflator and the general level of unit labour costs. Second, the study examines new statistical measurements of the trend inflation rate that are intended to eliminate temporary supply shocks. Finally, the paper summarizes and, more important, quantifies the various biases present in the measure of the Canadian CPI. Overall, the authors have used great care in their study. It provides several new empirical results, particularly with respect to the new measures of trend inflation in Canada, and the measurement biases contained in the CPI. My comments about the study focus on four points.

First, the absence of cointegration between the implicit GDP deflator and the general level of unit labour costs is surprising and deserves more attention. During the period examined, services accounted for an increasingly important share of the Canadian economy. It is possible that the difficulties surrounding the measurement of output in these service sectors may lead to major errors in measuring the deflators. If that is the case, they might contaminate the estimated relationships and produce results where there is no cointegration. It is not surprising, then, given the biases in the CPI measurement noted in Section 3 of the paper, to see that the empirical results reject the hypothesis of a unitary cointegration vector between the CPI and other price measures.

Second, I wonder whether the authors have overlooked the possible positive correlation between the level of inflation and its variance (see Okun

1971; Pagan, Hall, and Trivedi 1983; and Crawford and Kasumavich 1996, for example). Their Table 5 shows that the volatility of inflation has declined with the drop in the average rate of inflation. The authors do not seem to have tested rigorously for heteroscedasticity of errors in the estimated vector error-correction model (VECM). The standard deviations of the residuals shown in Table 2 will overestimate the variability of shocks during periods of low inflation if there is a positive correlation in the data between the level of inflation and its variance. It is thus possible and even probable that the simulation results in Table 3 overestimate the variability of deviations in the inflation rate over the different time horizons calculated. For the same reason, we might suspect that the excess-deviation frequencies calculated in Table 4 are also overestimated. We must remember that a deviation of 1 per cent is proportionately more significant when the average inflation rate is fluctuating around a level of 2 per cent, as at present, rather than around 10 per cent, as in the late 1970s and early 1980s.

Third, it would be interesting to know whether the new measures for Canada's trend inflation are more strongly correlated with aggregate demand shocks, especially with the rate of growth of the money supply, than are the raw data. In the United States, Bryan and Cecchetti (1993) have concluded that growth of the money supply in the past was more strongly correlated with trend inflation measures based on the weighted mean or weighted average of the trimmed distribution than with the overall rate of CPI inflation. What is perhaps even more interesting is that their Granger-causality tests show that lagged monetary growth predicts future trend inflation, even when the forecasting capacity of past inflation is factored in. This would seem to overturn the counterintuitive results of Hoover (1991), which show a correlation in the opposite direction, from inflation to money growth, when inflation is measured with the raw data.

Finally, I believe Section 3 of the paper offers an excellent review of the various biases in the CPI as a measure of the cost of living in Canada. The analysis shows that Canadian biases, while less significant than those observed in the United States, are still not negligible at 0.7 per cent per year. We must remember that a bias of that magnitude produces an accumulated deviation of 10 per cent after 14 years. In theory, the idea of setting the inflation target at the total bias value, with the goal of keeping the purchasing power of money constant, is interesting and deserves to be examined seriously. However, before adopting such a policy, we need to assess whether the bias varies in a predictable way over time, for example as a trend, or as a function of the state of the economy.

References

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