Discussion

Frank Smets

The paper by Bowman and Doyle provides a useful and comprehensive survey of the recent literature on the so-called New Open-Economy Macroeconomics (NOEM), following the seminal work by Obstfeld and Rogoff (1996). The NOEM was developed in parallel with its closed-economy counterpart, which has been labelled New Neoclassical Synthesis, Neo-Wicksellian, or New Keynesian by Goodfriend and King (1997), Woodford (2003), and Clarida, Galí, and Gertler (1999), respectively. The common distinguishing features of both research programs are: (i) a general-equilibrium set-up; (ii) structural macroeconomic relationships based on micro-foundations; and (iii) the introduction of monopolistic competition in goods and labour markets with sticky nominal prices or wages.

The advantages of working with this class of macro models for monetary policy analysis are threefold. First, because of the micro foundations, the use of those models for policy analysis is less subject to the Lucas critique. At a minimum, an explicit discussion of the structural parameters and shocks ensures that the modeller has a better sense for which parameters are likely to be policy-invariant. Second, the utility of the households in the economy provides a consistent welfare criterion for policy analysis. Third, the micro-foundations of the reduced-form parameters and shocks facilitate calibration and estimation. This is particularly useful when samples are short because of, for example, regime changes. Historically, there have also been differences in emphasis between the NOEM and its closed-economy counterpart. Because of its focus on cross-country interactions, the NOEM has had a comparative advantage in analyzing multi-sector models. There was initially a dominant use in the NOEM of one-period price and wage stickiness, which facilitated the theoretical analysis but came at the cost of limited empirical plausibility. And finally, there have been fewer attempts at

bringing the NOEM models to the data. One exception, however, is the work by Bergin (2003). The survey by Bowman and Doyle reflects some of those differences and is complementary to and more up-to-date than recent surveys by Lane (2001) and Sarno (2001).

Rather than add to the survey part in this discussion, I will illustrate the usefulness of the micro-founded approach that underlies the NOEM by addressing two important questions for monetary policy in an open economy. How do exchange rate shocks affect a small open economy? What price index should the monetary authorities target in an open economy? These questions will be addressed using the NOEM-style model developed in Smets and Wouters (2002), which incorporates Blanchard-Yaari households and monopolistic competition and sticky prices in domestic and imported goods markets. I will end my discussion with one area in which the NOEM needs to be strengthened: the theory of exchange rate determination.

1 How Do Changes in the Exchange Rate Affect a Small Open Economy?

The simple NOEM model developed in Smets and Wouters (2002) provides a relatively rich answer. In this model, exogenous changes in the exchange rate affect both the demand and supply sides of the economy. As is common in more traditional open-economy models, an increase in the terms of trade leads to expenditure switching from domestic to foreign goods, reducing the demand for domestic goods. This negative demand effect provides a rationale for the use of monetary conditions indexes (MCIs) to measure changes in the stance of monetary policy. The relative weight on the exchange rate in MCIs typically depends on the elasticity of demand with respect to changes in the exchange rate. However, an improvement in the terms of trade also leads to increased real consumption through its positive effect on real wealth, as the relative value of domestic production increases. This positive demand channel will tend to partially offset the negative effect discussed above.

A common feature of the NOEM models is that they also have a well articulated supply side. Again, an exchange rate appreciation has two supply effects in the Smets and Wouters model. An increase in the price of domestic goods relative to imported goods reduces producer wages for given consumption wages and thereby reduces the real marginal cost of domestic goods producers. This has a positive effect on the supply of domestic goods. Higher consumption, however, reduces the marginal utility of an additional unit of consumption and leads workers to reduce their supply of labour. This will tend to push up real wages and also has a negative effect on the supply

of domestic goods. Which of these two supply effects dominates will depend on the intertemporal elasticity of substitution.

Figure 1 illustrates the effect of a 0.2 percentage point fall in the foreign exchange risk premium in a version of the Smets-Wouters (2002) model calibrated to the euro area. A number of observations are worth making. First, under this calibration, the net supply effect appears to be negative as the flexible price level of output falls slightly (thick solid line in Figure 1). Second, with sticky domestic and imported goods prices, the response of the economy will depend on the monetary policy regime. When the central bank targets consumer price inflation (thin solid line in Figure 1), an appreciation of the exchange rate leads to a fall in import price inflation, but to a rise in domestic inflation. The positive consumption effect of the exchange rate appreciation dominates the negative effect on net exports, creating a positive domestic output gap. The policy implication of this simulation is important: if the central bank wants to stabilize domestic goods price inflation, then the real interest rate will have to rise to close the domestic output gap. While these particular results obviously depend on the specific model and its calibration, the analysis can potentially explain why empirically the exchange rate pass-through to consumer prices is generally very limited.

2 What Price Index to Target?

Should the monetary authorities in an open economy target consumer prices or producer prices? In the closed-economy model of Woodford (2003), price stickiness provides a rationale for stabilizing domestic inflation, because stable prices minimize the costs of inefficient resource allocation among otherwise identical sectors. Moreover, Woodford also shows that in the absence of cost-push shocks, there is no trade-off between output gap stabilization and price stability. As shown by Erceg, Henderson, and Levin (2000) and Benigno (2001), a trade-off generally arises when there are two sectors with different degrees of price rigidity. In that case, however, targeting a weighted average of inflation in the two sectors, where the weight depends on the degree of price stickiness, will be close to optimal. A similar result can be obtained in the open-economy set-up discussed above. Smets and Wouters show that targeting consumer prices (rather than domestic goods prices) will be close to optimal when the degree of price stickiness in domestic goods and imported goods markets is similar.

Figure 1
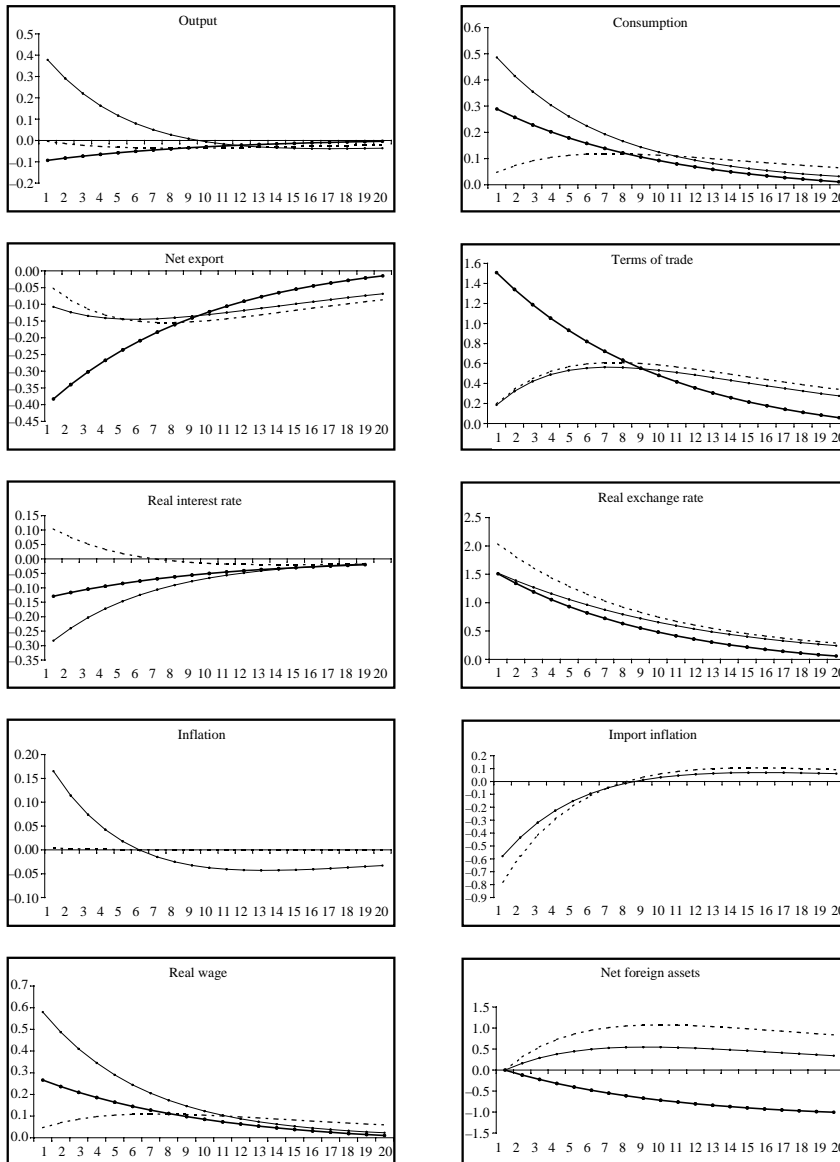
Notes: The thick solid line corresponds to the response of the flexible-price economy; the thin solid line corresponds to the sticky-price economy with optimal discretionary policy; and the broken line corresponds to the sticky-price economy with domestic inflation targeting.
Source: Smets and Wouters (2002).

3 The Theory of Exchange Rate Determination

One of the areas in international finance that receives very little attention in the survey of Bowman and Doyle is the theory of exchange rate determination. To some extent, this can be explained by the fact that the NOEM does not have much new to say about the issue. The exchange rate is typically determined by an interest rate parity condition, which often in combination with purchasing-power parity (PPP) implies a monetary model of exchange rate determination. Historically, these theories have not been very successful in explaining the empirical behaviour of the exchange rate. This lack of success is emphasized by Devereux and Engle (2002) who focus on the various modelling features that are necessary to explain the empirical disconnect between the exchange rate and its macroeconomic fundamentals.

Recent developments in the NOEM literature appear to point to three directions, which could lead to an improvement of the NOEM to better capture and explain exchange rate movements. First, as emphasized by Corsetti and Dedola (2002), transportation and distribution costs are important features of the international economy that can drive a wedge between exchange rate movements and the economy's fundamentals. Second, more work needs to be done on analyzing stochastic models and their implications for how risk premiums interact with the macroeconomy. One example of this work is Obstfeld and Rogoff (1998). Third, there is a need to integrate micromarket-structure theories that can explain the correlation between order flows and exchange rates in the NOEM (see, for example, Lyons 2001 and Hau and Rey 2003).

References

Benigno, P. 2001. "Optimal Monetary Policy in a Currency Area." CEPR Discussion Paper No. 2755.

Bergin, P.R. 2003. "Putting the 'New Open Economy Macroeconomics' to a Test." *Journal of International Economics* 60 (1): 3–34.

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.

Corsetti, G. and L. Dedola. 2002. "Macroeconomics of International Price Discrimination." ECB Working Paper No. 176.

Devereux, M.B. and C. Engle. 2002. "Exchange Rate Pass-Through, Exchange Rate Volatility and Exchange Rate Disconnect." *Journal of Monetary Economics* 49 (5): 913–40.

Erceg, C.J., D.W. Henderson, and A.T. Levin. 2000. "Optimal Monetary Policy with Staggered Wage and Price Contracts." *Journal of Monetary Economics* 46 (2): 281–313.

Goodfriend, M. and R.G. King. 1997. "The New Neoclassical Synthesis and the Role of Monetary Policy." In *NBER Macroeconomics Annual*, edited by B. Bernanke and J. Rotemberg, 231–83.

Hau, H. and H. Rey. 2003. "Exchange Rates, Equity Prices and Capital Flows." CEPR Discussion Paper No. 3735.

Lane, P.R. 2001. "The New Open Economy Macroeconomics: A Survey." *Journal of International Economics* 54 (2): 235–66.

Lyons, R.K. 2001. *The Microstructure Approach to Exchange Rates*. Cambridge, Mass.: MIT Press.

Obstfeld, M. and K.S. Rogoff. 1996. *Foundations of International Macroeconomics*. Cambridge, Mass.: MIT Press.

———. 1998. "Risk and Exchange Rates." NBER Working Paper No. 6694.

Sarno, L. 2001. "Toward a New Paradigm in Open Economy Modeling: Where Do We Stand?" Federal Reserve Bank of St. Louis *Review* 83 (3): 21–36.

Smets, F. and R. Wouters. 2002. "Openness, Imperfect Exchange Rate Pass-Through and Monetary Policy." *Journal of Monetary Economics* 49 (5): 947–81.

Woodford, M. 2003. *Interest and Prices*. Photocopy.