# A Bayesian Look at New Open Economy Macroeconomics: Comment

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In this paper Thomas Lubik and Frank Schorfheide introduce and estimate a mid-size two-country model of monetary interdependence. The key building blocks of the model are rather well known, having been extensively investigated in the large (and growing) DSGE literature. The open-economy dimensions of the paper are perhaps less familiar, and it is precisely on those aspects that this comment is focused.

## 1  A Bayesian look at what?

The 'New Open-Economy Macroeconomics' (NOEM) referred to in the title is more of a synthesis of disparate elements than a well-defined 'school of thought' (the term was originally coined by Ken Rogoff to emphasize differences with respect to the 'old' paradigm in international finance, as represented by the Mundell-Fleming-Dornbusch tradition). With important differences in style and emphasis, the NOEM is closely related to recent tendencies in monetary economics, and represents the open-economy counterpart to popular research approaches whose labels range from 'neo-Wicksellian' to 'New Keynesian' to 'New Neoclassical'. In this respect, the basic ingredi-

1

ents of NOEM models are imperfect competition in labor and/or product markets, nominal rigidities, and optimal price-setting behaviors leading to time-varying markups.

The NOEM also attempts to bridge the gap with the recent international trade literature, although the integration between the two research areas is, to say the least, far from complete. For instance, the macroeconomic analyses of openness and interdependence considered in NOEM models typically focus on the 'intensive' margin of international trade (exports and imports of a given set of varieties), downplaying or ruling out *tout-court* its 'extensive' margin (exports and imports of new varieties), even though the latter plays a key role in the new trade literature both at the theoretical and empirical level. While recent work is slowly pushing the research frontier in these respects, the bulk of NOEM contributions do not allow for endogenous entry of firms, the creation of new varieties of goods, or changes in the array of traded and nontraded good. The paper by Lubik and Schorfheide is no exception here.

While NOEM models come in different sizes and varieties, they usually tend to be skewed bimodally either toward the 'Bonsai' end of the complexity spectrum (simple qualitative models of predominantly theoretical interest), or toward the 'Godzilla' opposite end (large-scale multi-country DSGE models with a wealth of parametric features). Among the earliest and most influential examples of the first kind of models, Obstfeld and Rogoff (1995) has now reached the status and reputation of a modern classic. Models of the second type have found fertile grounds among central banks and policy institutions, with the Global Economy Model developed at the International Monetary Fund possibly representing the best-known application so far.[1]

The paper by Lubik and Schorfheide is particularly welcome, as it repre-

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[1]Laxton and Pesenti (2003) and Faruqee et. al. (2005) document different stages of progress in the development of the Global Economy Model.

sents a relatively rare type of contribution equidistantly positioned between the two extreme poles of the complexity spectrum (let's call it the 'Totoro' region[2]). In fact, the authors devote an entire section of the paper to discuss the finely balanced trade-offs between misspecification and identification issues arising in DSGE models. However, this need not mean that theoretical and empirical aspects (or, if one prefers, specification and estimation sides of the model) are given equal attention in the paper. In fact, the formal framework of the paper is a simple variant of the canonical NOEM model, and the theoretical setup turns out to be little more than a pretext for the application of state-of-the-art Bayesian estimation techniques.

In a nutshell, the paper considers a world economy equally split between two large trading partners, the United States (US) and the Euro Area (EU). The two countries are symmetric in terms of technology and tastes (although tastes are skewed toward local goods, and such home bias in preferences implies that purchasing power parity (PPP) would not hold even if the law of one price held for all goods). They differ, however, in two important respects, both related to the specification of the monetary economies: the mechanism of policy transmission (that is, size and persistence of nominal rigidities) is different across countries, and the interest rate rules followed by the two monetary authorities put different weights on output and inflation gaps, presumably reflecting different strategies and policy objectives.

Complete markets are assumed to exist both at the national and international level. For each tradable good the law of one price applies at the border level, that is, the price paid by the importer and the price received by the producer are equalized when expressed in terms of the same currency. This implies complete pass-through of exchange rate movements onto import

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[2]'Tonari no Totoro' ('My neighbor Totoro') is a classic animation film by Hayao Miyazaki.

prices at the *border* level. However, there is imperfect exchange rate pass-through at the *consumer* level, reflecting the monopoly power of importers in the domestic retail market (we will return to this point shortly). Uncertainty is introduced in the model through a smorgasbord of shocks, including a non-structural disturbance that is designed to measure exogenous deviations from PPP (see section 5.1).

While the approach of the paper is "deliberately parsimonious in order to focus on robustness and identification instead of fit," one must of course acknowledge that this level of theoretical abstraction is not problem-free. In fact, several simplifying (and unrealistic) assumptions — that make sense only in the minimalist context of the 'Bonsai' NOEM models — are imported without much discussion in the work by Lubik and Schorfheide, raising the possibility of (mild or severe) misspecification.

Take for instance the assumption of complete markets and full international risk-sharing, according to which a set of contingent transfers guarantee that the real exchange rate moves in tandem with the ratio of marginal utilities of the representative households in the two countries (see eq. 30). This assumption implies that, across countries, consumption should be higher where its price is lower. The problem is that this is not true at all in the data, as recognized by a long tradition of empirical work dating back to Backus and Smith (1993). Besides raising doubts about the ability of the model to fit the dynamic profile of the US-European current account, the crucial question is how empirically reliable should we judge the results of a methodology that forces the correlation between the two key variables in the analysis — relative consumption and real exchange rate — to be high when in the data it appears to be very low, if not negative.

Some problems with the model are discussed in the text — such as the absence of a nontraded sector, acknowledged in the conclusion. Other prob-

lematic aspects are less obvious, such as the specification of exchange rate pass-through. Recall that price stickiness and low pass-through arise at the consumer level. There is no pricing to market or imperfect pass-through at the border level: the importer-currency price of imports moves one to one with the exchange rate, but the price paid by the consumer is less elastic to changes in exchange rates (the empirical evidence is that pass-through is indeed higher at the import level than at the consumer level, although still imperfect).

In the model, producers operate under conditions of monopolistic competition. When they sell in the domestic market, facing a downward-sloping demand for their specific varieties, they exploit their monopoly power by charging a markup over their marginal costs. Due to nominal rigidities, there is asymmetric adjustment, price dispersion among producers and inflation dynamics in the aggregate. When however the same producers sell their products to foreign importers, they do so at precisely the same price charged in the domestic market. In other words, they do not take into account the fact that the demand for their products abroad is a function of the consumer price set by the foreign importers. Since the latter is subject to nominal rigidities unrelated to those in the home market, the demand elasticities at home and abroad can be different. In this case, it is unlikely that the monopolistic producer/exporters find it optimal to give up their monopoly power and charge the same price both domestically and abroad.

Note that in a small open-economy model this particular way of modeling lower pass-through at the consumer level than at the border level would be perfectly valid, as importers face an exogenously given price for their import goods. In the general-equilibrium framework of the model, however, the postulated absence of price discrimination seems logically inconsistent with the principle of profit maximization.

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# 2    Does openness make a difference?

The minimum common denominator of NOEM contributions (and NOEM's *raison d'être*) is the investigation of policy transmission and the design of monetary rules among interdependent economies. To assess the relevance of the contribution by Lubik and Schorfheide in the context of the literature, it may prove useful to keep in mind a few key results in the NOEM tradition. Among those is the characterization of markup stabilization as a principle of optimal monetary policy.

Broadly speaking, in a closed-economy multi-sector setting the key principle underlying optimal monetary policies is the stabilization of some weighted average of markups in the product (and labor) markets, with higher weights assigned to the sectors in which price (wage) adjustment is most sluggish — a principle consistent with the notion of 'core' inflation targeting. In an open-economy context, there is a trade-off between stabilizing markups of local firms selling in the domestic market and markups of foreign exporters also selling in the country. The trade-off may depend on the degree of openness and the pass-through elasticity of consumer prices with respect to exchange rate fluctuations and other factors affecting changes in exporters' marginal costs.

For instance, if pass-through is very high, exchange rate fluctuations do not affect exporters' markups. In this case, optimal monetary policy stabilizes only domestic markups (that is, focuses only on domestic inflation). This policy is 'inward-looking', thus substantially similar to the optimal policy strategy in a closed economy, as exchange rate movements make up for the lack of price flexibility in the import sector. This point has been stressed by Clarida, Gali, Gertler (2001) among others. One may refer back to Friedman (1953) for early traces of the same basic idea. But if pass-through is low, and exchange rate plays no expenditure-switching role, optimal mone-

tary policy reacts to shocks worldwide and possibly dampens exchange rate fluctuations.[3]

This paper takes off from these considerations. In fact, its starting point is the Clarida, Gali and Gertler model augmented by monopolistic importers who buy goods at the border and sell them to consumers, as seen above. The key question addressed in the paper is: are monetary policies in open economies significantly different from monetary policies in closed economies? To answer this question, the authors consider two specifications of the model, one in which the US and EU countries are considered as two closed economies coexisting in autarky, and one in which the two countries engage in bilateral trade.

After estimating the model under the two specifications, the answer of the paper is a solomonic 'Yes and no. Depends'. In the European case, moving from a closed- to an open-economy setting seems to make quite a difference. But in the US case, not much differs whether or not the model accounts for the imports sector.[4] As a result, openness makes monetary policies less asymmetric across countries.

What happens is that the estimated degree of price stickiness in the EU market for *domestic* goods increases substantially when we move from the autarkic specification to the world-economy model. This result has important implications for EU monetary policy. When we allow for openness, the weight on inflation falls in the estimated interest rate rule, and concern with the output gap becomes predominant in policy design.[5]

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[3]See Devereux and Engel (2003) and Corsetti and Pesenti (2005) for a synthesis of this argument.

[4]Interestingly, the estimates in the conference version of the model, based on a few different assumptions, led to opposite conclusions, as the authors mention in Section 6.1.3.

[5]Exchange rate movements do not play any autonomous role in policy design, besides their impact on the outlook for prices and output.

Why so? The paper falls a bit short on economic intuition. In the context of the NOEM results above, one could suggest the following hypothesis. Suppose prices in one sector of the EU economy are relatively more sticky (say domestic goods) and prices in the other sector are relatively more flexible (say imports). If the model is brought to the data without accounting for sectoral differences, the estimated degree of nominal inertia relevant for policy decisions is some national average of the two sectors, prompting a relative aggressive reaction to inflationary pressure as the costs of disinflation are perceived as low. But as soon as sectoral differences are taken into account, the degree of consumer price stickiness and inflation persistence in the domestic sector becomes more relevant, raising the sacrifice ratio faced by the EU authorities and prompting a more balanced policy response to inflationary pressure and output gap.

But this interpretation raises as many questions as it answers. If the import sector exhibits more price-flexibility than the domestic one, why is the estimated degree of import price stickiness in the EU *higher* than in the domestic sector? And why don't we observe similar results in the case of the US? One could argue that pass-through is so low in the US to make the estimated differences in the degrees of price stickiness across sectors negligible. But it is not clear whether this is the case: quite interestingly — or puzzlingly — home and foreign output are found to be basically independent of the degree of exchange rate pass-through onto import prices, or more generally the degree of import price stickiness.

Of course, in the light of the theoretical considerations above, one may suggest some caution in interpreting these pass-through estimates. And perhaps, similar results would arise if one moved from a one-sector to a multi-sector model of the EU economy, suggesting that openness and international considerations have little to do with asymmetries in monetary policies. At

the end of the day, it is not clear how robust these results are. After all, they seem to disappear as soon as the estimation is based on demeaned data.

In conclusion, the paper provides food for thought. The open question, needless to say, is to what extent does model misspecification affect the validity of these results. As the bilateral exchange rate is the only open-economy variable used in the analysis, it is not clear how much the model is able to tell us about the international transmission mechanism. And the fact that ad-hoc PPP-shocks explain 93% of the variability of the depreciation rate obviously begs for some drastic improvements in the theoretical specification and a fuller validation of the model.

Fortunately, we won't have to wait too long for corroborations or refutations of these results. It is an easy prediction that, accounting for the user-friendliness of the DYNARE package and its rapid spreading among Bayesian buffs, there will be a bubble-like trend in the number of papers experimenting with the Metropolis-Hastings algorithm in the attempt to re-estimate the Lubik-Schorfheide model or some N-country variant thereof...

# References

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