

Discussion of "Can Endogenous Changes in Price Flexibility Alter the Relative Welfare Performance of Exchange Rate Regimes?" by Ozge Senay and Alan Sutherland.

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This is a very nice and elegant paper by Ozge Senay and Alan Sutherland. The main objective of the paper is to examine the extent to which changes in the degree of price flexibility modify the ranking of alternative monetary policy regimes in an open economy framework. The model that the authors propose belongs to the New Open Economy Macro (NOEM) literature which builds models following the New Keynesian tradition along with rigorous microfoundations. While most of the literature (with the exception of Devereux, 2004) is based on the assumption that the degree of price flexibility is exogenously fixed, Senay and Sutherland depart from it by endogenizing the degree of nominal rigidity. In my comments I will summarize briefly Senay and Sutherland's contribution, compare their results with what we have learned from the literature so far and discuss the implications of some (key) assumptions.

Summary of the paper

As I mentioned earlier, the set-up of the paper is similar to many NOEM models. The authors present a two-country stochastic dynamic general equilibrium model with nominal price rigidities and monopolistic competition. The model differs from the

"standard" framework (see Devereux and Engel, 2003 and Obstfeld and Rogoff, 2002) in several aspects:

- i) It considers an explicit dynamic framework by allowing for prices to follow a partial adjustment rule a la Calvo;
- ii) The structure of international capital market is incomplete: home and foreign agents are allowed to trade a risk-free real bond;
- iii) The elasticity of intratemporal substitution between home and foreign produced consumption good differs from the unitary value.

The key departure, though, with respect to the main literature is that, in i), individual firms choose, endogenously, the probability of adjusting prices. All firms make a once-and-for-all choice of the probability of adjusting prices and face an individual specific cost of choosing a higher degree of price flexibility (i.e. a higher probability of adjusting prices).

In this respect the paper is related to the one by Devereux (2004): in terms of the structure Devereux (2004) considers a single period model and assumes unitary elasticity of substitution among home and foreign produced goods. In terms of the analysis, Senay and Sutherland contribute to the literature by examining the welfare implications of endogenizing the degree of price flexibility. In doing so, the authors compare the choice between monetary targeting, producer inflation targeting and fixed exchange rate regime for an arbitrarily small country given that the foreign country (i.e. the "large" one) follows a policy of targeting its own producer inflation.

The main results of the paper are that:

a) (in terms of positive analysis) among the factors that determine the degree of price flexibility, a critical one is represented by the elasticity of intratemporal substitution, θ . In particular, under fixed exchange rate regime, low values of θ imply higher degree of price flexibility.

b) (in terms of normative analysis) in the welfare ranking, producer inflation targeting is always superior to the two other regimes under endogenous price flexibility (as long as $\theta > 1$). On the other hand greater price flexibility induced by money targeting might reduce welfare for high values of θ compared to a unilaterally fixed exchange rate regime.

As the authors emphasize in the introduction, one of the important aspect of their analysis is that it might help to understand to what extent the formation of a Monetary Union might encourage greater price flexibility so to compensate for the loss of monetary independence. In this sense their question is related to the Frankel and Rose's (1998) argument of endogeneity of optimum currency area criteria.

Why is it interesting to examine the interaction between the degree of price rigidities and the choice of exchange rate regime?

Before analyzing the theoretical results of the paper, I want to briefly summarize here the empirical implications of the endogenous price flexibility mechanism. From the single firm's perspective the decision on the probability of adjusting prices depends on the volatility of the macro variables (such as consumption, output and

prices). On the other hand the volatility of these variables depends on the aggregate degree of price flexibility itself. A nice result (as in Devereux, 2004) is that this mechanism generates very interesting empirical prediction that matches some recent empirical evidence on different performances of macro variables across exchange rate regimes (see Broda, 2001). In particular, a fixed exchange rate regime will reduce the volatility of the terms of trade and increase the volatility of the output gap (measured as a difference between the actual output level and the one that would prevail under price flexibility). This excess volatility of output might be related to the findings of Broda (2001).ⁱ Broda (2001), indeed, finds that, for small developing countries, the effect of real shocks on GDP (in Broda's analysis these shocks are referred to as 'terms of trade shocks') in a fixed exchange regime is large and significant.

On the other hand, for low-inflation OECD countries, the evidence presented by Baxter and Stockman (1989) suggests that, by looking at different exchange rate regimes, the only macroeconomic variable that differs substantially and systematically is the real exchange rate. Indeed, along with Flood and Rose (1995), their analysis suggests little empirical evidence of systematic differences in the behaviour of macro aggregate under alternative exchange rate regimes.

How do the results differ from the case of exogenously fixed prices?

The early contributions in the NOEM literature by Devereux and Engel (2003) and Obstfeld and Rogoff (2002) have focused on model with prices exogenously fixed one-period in advance and unitary elasticity of intratemporal substitution.ⁱⁱ Their main result is that, under productivity shocks, reproducing the allocation that would arise under price flexibility is optimal both from a cooperative and a non

cooperative perspective (in a Nash-game between the two monetary authorities). This result would imply that it is optimal for both countries to target domestic producer inflation, no matter what their size is.

Here we have two key departures from the baseline framework. The first departure is the assumption of non-unitary elasticity of intratemporal substitution (along with international market incompleteness as in P. Benigno (2001)); the second is the endogenous degree of price flexibility.

Not surprisingly, indeed, for the case in which the elasticity of intratemporal substitution is unitary, $\theta=1$, given the timing of events and the assumption that the foreign ('large') country follows an inflation targeting policy, producer inflation targeting will be preferred to a fixed exchange rate regime. So that enhancing price flexibility does not substitute for the loss of monetary independence in terms of a utility-based welfare criterion.

The dominance of inflation targeting holds across the ranges of plausible value for the elasticity of intratemporal substitution. This result parallels the one obtained by P. Benigno (2001) in a similar framework with exogenously given probability of adjusting prices: in his work, the allocation that would arise if the two countries follow a policy of producer price stability is indeed close to the optimal cooperative outcome. ⁱⁱⁱ

In what follows I want to discuss a couple of aspects of the analysis related to the welfare analysis and clarify to what extent the analysis departs from the determination of the optimal policy.

The first element has to do with the assumption of small open economy and the absence of strategic interaction among countries. In this paper, a small open economy is characterized by assuming that the parameter n , corresponding to the country size,

is set to a very small value. Other than that, the framework would be identical to the aforementioned contributions by Devereux and Engel (2003) and Obstfeld and Rogoff (2002). But in those contributions, as in P. Benigno (2001) with a similar market incompleteness structure, the size of the country does not matter for determining the optimal policy or the extent to which the producer inflation targeting differs from the optimal policy. Given the fact that the authors focus on productivity shocks^{iv} and no asymmetries in the initial holdings of foreign assets, the assumption that the foreign authority follows a producer inflation targeting policy is innocuous and indeed the best policy (among the ones considered) would target home producer inflation. It seems to me then, endogenizing the degree of price flexibility, does not undermine the dominance of strict inflation targeting.

The second element is related to another dimension of the analysis that might be interesting to pursue. In terms of the sequence of events, we have that, initially, the foreign monetary authority sets its policy of targeting its own producer inflation. Then the small country chooses its policy regime: that could be domestic producer inflation, a unilaterally fixed exchange rate regime or monetary targeting.

The agents observe the policy choices and then firms will set the optimal degree of price flexibility once for all by comparing expected benefits and costs.

I think then that it would be interesting to explore how the determination of the optimal policy should take into account the endogenous degree of price flexibility that is affected by the chosen policy itself. In equilibrium then the degree of endogenous price flexibility and monetary policy are jointly determined by optimizing agents.^v

Conclusions

Senay and Sutherland have written an interesting and stimulating paper. It examines how the degree of price flexibility is affected by the choice of the policy rules by monetary authorities. The welfare implications of this interaction are explored. The main conclusion is that, given the structure of the economy, producer inflation targeting dominates the other two proposed regimes for an arbitrarily small open economy. It would be interesting to explore the robustness of this results by considering other disturbances (as government or mark-up shocks) as well as other distortions for which the assumption that the foreign country follows an inflation targeting policy might not be innocuous and the interaction between the degree of endogenous price flexibility and monetary policy is more relevant.

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ⁱ I want to emphasize here that Broda's analysis considers developing countries for which the assumptions of the Senay and Sutherland's model are less suitable. It might well be that other frictions or mechanisms are responsible for explaining the empirical findings by Broda (2001).

ⁱⁱ Under unitary elasticity of intratemporal substitution, the structure of international financial markets is irrelevant. Note that for the purpose of normative analysis, it makes no difference if we consider a one period model (with prices set one period in advance) or a dynamic model in which prices follows a partial adjustment rule a la Calvo.

ⁱⁱⁱ This result holds as long as the initial holdings of foreign assets are zero.

^{iv} For an analysis of how different types of shocks affect the determination of the optimal policy when prices are fixed exogenously and markets are complete see Benigno and Benigno (2003).

^v This would be similar to Corsetti and Pesenti (2002) analysis in which firms choose the optimal degree of exchange rate pass-through for given monetary policies and monetary authorities choose optimal policy rules while taking firm's pass-through as given.