



On the use of open economy new Keynesian models to evaluate policy rules



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ABSTRACT

This paper considers the use of new Keynesian open economy models to evaluate monetary policy rules. While recognizing the importance policy evaluation with such models, it presents a number of criticisms about assumptions relating to wage determination, the real interest rate, divine coincidence and financial stability.

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The open-economy new Keynesian model developed by [Clarida et al. \(2002\)](#) and [Galí and Monacelli \(2005\)](#) has become very influential over the years. Students absolutely must understand this model if they specialize in international economics. I have long taught a version of it in my graduate class, and I have posted the lecture notes on my website. Moreover, my textbook with Paul Krugman and Marc Melitz ([Krugman et al., 2015](#)), for several editions now, has featured the so-called bad news/good news application of this model ([Clarida and Waldman, 2008](#)), which does so well at capturing regularities about exchange rates and interest rates that regularly appear in press commentary. So I start out with a strong prior belief that further exploration of the basic framework is useful for both understanding and informing monetary policy.

The main goal of Rich Clarida's paper is to set out and draw out the implications of this model for monetary policy rules. The paper explains the channels through which economic openness matters in the standard dynamic new Keynesian model. It also adds a version with enhanced persistence and explores the implications of that version. And it shows that the optimal monetary policy without commitment resembles the Taylor Rule. In the process of doing these things, the paper derives implications for the natural real rate of interest, the co-integration properties of exchange rates and price levels, and the relationship between inflation surprises and exchange rates.

My assignment as a discussant, however, is critique. So I present a number of criticisms, which I will flesh out by saying what I think the model captures and what it omits.

1. Basic concerns about the model

Many implications ride on the model's assumptions about wage determination, which I do not believe. This feature – which makes nominal wages, as opposed to nominal output prices, perfectly flexible – has important implications for the slope of the open economy Phillips curve, a crucial element in the policy prescription. The assumption of Calvo pricing is beautifully convenient, but there is significant evidence against it due to [Klenow and Kryvtsov \(2008\)](#) and others. In the Calvo model, firms hold prices constant for a stochastic time period, until they receive a signal that allows them to change and re-optimize prices. The result – absolutely key to how the model is set up and interpreted – is that there is

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heterogeneity among firms, as some have reset their prices and others have prices that were set at a range of periods in the past.

The Law of One Price is another element that is critical in the model. In other words, there are no trade barriers and there is perfect arbitrage for tradable goods. In this model, economic openness never actually complicates the policymaker's life. And that, it seems to me, may be a simplification too far.

If you look into the guts of the model, you will find it assumes that the economy uses all its labor to produce differentiated, nontradable goods (the goods that carry the sticky nominal prices subject to Calvo pricing). These nontradables are intermediate inputs into a final tradable good. The reason for this modeling approach is as follows: Under the heterogeneity that the Calvo assumption implies, it is not trivial to aggregate the firms that employ workers. If those firms produced final goods, you would have a separate, global, equilibrium condition for each variety. This would be hard to handle analytically. But the final tradable good is an aggregator for all the economy's heterogeneous employers.

Once you have this aggregator, you can write down a very simple market clearing condition for domestic final output and foreign final output in which the value of domestic output is equal to the demand for it from both the home and the foreign country. If you have a unitary substitution elasticity between domestic and foreign output, then you get a complete markets allocation and balanced trade. In the end it is a very simple model of global equilibrium, despite the Calvo pricing setup for differentiated inputs.

Given its importance in allowing one to solve the linearized model analytically, I cannot resist commenting on the empirics of the Clarida–Gali–Gertler model's unitary elasticity assumption with respect to home–foreign substitution, because it is actually quite controversial. The relevant preference parameter has been estimated many times over the years. In a recent paper (Feenstra et al., 2014), my colleagues and I try to sort it all out, and we find that the elasticity is probably closer to two than to one. Moreover, while macroeconomists always work with two-country models, it turns out that multi-country models can have very different implications.

Also central to understanding the model is its first order condition for labor supply – which is that the marginal utility of the real wage is equal to the marginal disutility of labor. The model introduces the twist that suppliers of labor are local monopolists of their type of labor. That creates a markup, assumed to be stochastic. The labor markup shock is important because it provides a stochastic driver of marginal production cost to which the monetary authority might respond. However, the empirical shortcomings of this labor-market model are well known.

Under the Cobb–Douglas preference assumption, the CPI equals a weighed combination of the domestic and the foreign price levels, where the weight on the foreign price level depends on how open the economy is. That is fairly standard, but it implies that the CPI depends on the terms of trade between home and foreign final goods, as well as the price of home goods. In the model, this fact furnishes the main transmission mechanisms from the foreign to the domestic economy.

In equilibrium, marginal production cost of intermediates depends on a number of factors, including domestic and foreign output, which affect the terms of trade. An important point here is that “marginal cost” (as relevant for domestic pricing decisions) is measured in terms of the domestic good, and a key driver of the results is the distinction between the domestic good's supply and domestic consumption, which includes foreign goods.

Terms of trade effects introduce a complication relative to the closed-economy case, but the model still abstracts from some relevant phenomena. Given the shocks that Clarida's setup allows, all you really have are shifts in the supply curve, and so you are always riding along an unchanging demand curve. In reality, however, the demand curve shifts too, and shifts in the demand curve also drive changes in measured aggregate output. So real life is more complicated than in the model's version of the world.

2. Slope of the Phillips curve

In Clarida's model, inflation in domestic intermediates' prices depends on marginal cost in terms of home final output, and marginal cost itself depends on output. Thus the slope of the Phillips curve here depends crucially on marginal cost, and the slope is smaller or flatter in the open economy than in the closed economy.

While this flattening effect is very common in open-economy new Keynesian models, it is dependent on the implausible labor-market assumptions, and the mechanism through which they channel terms-of-trade effects. If you go back to the very early days of flexible exchange rate modeling, Dornbusch and Krugman (1976) argued that in an open economy, the Phillips curve is steeper. The currency appreciates when you carry out a monetary contraction, and that brings inflation down faster for a given rise in unemployment. But the new Keynesian model tells me that Dornbusch and Krugman had it backward. It would be interesting to analyze this issue, because a steeper Phillips curve would make it harder to conduct monetary policy in the open economy.

3. The natural real interest rate in terms of domestic goods

The natural real rate is a key concept for monetary policy: it is the intercept in the Taylor Rule. In the usual closed-economy case we define the real interest rate as the nominal rate less expected CPI inflation. So it is important to keep in mind that Clarida's definition of the natural real rate is the flex-price real interest rate in terms of the domestic good – and not in terms of the CPI.

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