

## **A Comment on Empirical Estimation of Patterns of Shocks Utilizing the VAR Methodology on Developing Countries**

**Nephil Matangi Maskay**  
*College of Wooster*

What is a country's optimal choice of an exchange rate regime? One avenue which has gained prominence is the Optimum Currency Area criteria of patterns of shocks which suggests that a flexible exchange rate may be less costly for regions who face asymmetric shocks, since they are forced to have conflicting policy responses, and vice versa.<sup>1</sup> While there are a number of methodologies to calculate the patterns of shocks, the VAR methodology, which results from a technique introduced in Bayoumi and Eichengreen ([1992, 1994]; B&E from now on), may be at present one of the most popular. In the estimation of their model the authors have introduced some "over-identifying conditions"<sup>2</sup> (called OIC from now on) which confirm the validity of their decomposition.

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\* Correspondence Address: Department of Economics, College of Wooster, Wooster, OH44691, (Tel) 330-263-3357, (Fax) 330-263-2614, (E-mail) nephil-m-maskay@hotmail.com.; Thanks to T. D. Willett for comments. All errors are mine alone.

1. Such as Agheveli, Khan and Montiel [1991], Masson and Taylor [1993] and Pilbeam [1992] although for a cautionary note see Maskay [1998].

2. They are called OIC since these restrictions were not imposed in the estimation procedure and predict that a positive demand shocks will cause a price increase while a positive supply shock will cause a price decrease.

While these conditions seem to be met for developed countries,<sup>3</sup> it does not seem so for developing economies. I comment on a recent article by Horvath and Grabowski ([1997]; HG from now on) who look at the prospect of African integration although ignoring the OIC.

Is the OIC important? Although it does not seem to significantly alter the conclusion for the question of African integration, I would argue that its failure indicates that something is wrong with the VAR decomposition. One problem may deal with the quality of data where developed countries have, on average, better quality data than developing countries (Summers and Heston [1993]). Another potentially serious problem is that the model may not capture reality. This is seen in B&E's [1995] explanation for the perverse price response in Bordo [1993] as the close connection of prices in a commodity standard. Likewise, it may be that the VAR technique does not differentiate between nominal and real demand shocks (Nueman [1993]) where for Nepal and India there is the presence of temporary real shocks from agriculture (Bajracharya and Maskay [1998]). While the explanations of why developing countries fail the OIC are many, overlooking these results, ignores some valuable information in the dynamics of developing countries.

However HG<sup>4</sup> ignore the OIC when doing a VAR analysis, such as B&E, and conclude that the scope for integration in Africa is limited. This contrasts with Bayoumi and Ostry ([1995]; B&O from now on), who look at Africa during roughly the same period (*i.e.* 1964-1993 vs. 1960-1992), and comment that :

“Unfortunately...the results from the vector autoregression did not satisfy the expected “over-identifying restrictions” on price responses...to confirm the validity of [the] decomposition..” (from B&O [1995], p. 14)

B&O then went on to use a simpler estimation methodology<sup>5</sup> to reach

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3. For example Bayoumi [1992] and Bordo [1993] look at G7 countries, B&E [1992] looks at EC countries and U.S. regions, while B&E [1994] looks at highly developed countries around the world.

4. Also, Arnon and Spivak [1996], who look at the possibility of monetary integration between Israeli, Jordanian and Palestinian Economies.

5. However, in my estimation, the authors fall into the same critique of “conflating” information on shocks and responses (from B&E).

roughly the same conclusion as HG based on the pattern of real shocks.

While both results are similar, the model implied by HG is inconsistent with the standard aggregate supply (AS) – aggregate demand (AD) model of B&E (*i.e.* that the AD curve is down ward sloping while the short run AS curve is upward sloping and the long run AS curve is vertical). That is, the failure of the OIC suggests, from the impulse response function of prices (as with Bordo [1993] and Maskay [1998]), that a positively sloped AD curve, rather than a negatively sloped AD curve, exists. In other words there is a conflict between the estimated model and the model described by the data. Thus, due to this inconsistency, any conclusion based upon these results would not be valid.<sup>6</sup>

To conclude, the failure by HG to examine the OIC brings into question the validity of their results. More generally, the dichotomy of accepting and rejecting the OIC between developed and developing countries (suggested from the above, albeit limited, samples) would seem to imply that the VAR is too sophisticated a technique for the quality of data to be found in developing economies.

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6. While this information suggests that application of a VAR analysis is not valid, its failure convey information which, through further examination, may result in broader insight. Consider the case of Nepal and India which failed the OIC (Maskay [1998]). The results from a simpler estimation strategy, B&O, suggest that neither country faced symmetric patterns of shocks. This can be traced to the developing, agricultural based nature of their economies which are susceptible to the vicissitudes of the weather (Bajracharya and Maskay [1998]). Likewise, the transformation by B&E [1995] suggest that the money supply may be “endogenous” to shocks. This observation is consistent with Maskay [1998 a, b] where the money supply responds to maintain balance of payments equilibrium given a long lived pegged exchange rate with India.<sup>6</sup> Since empirical results are robust to estimation methodology and are consistent with reality (*i.e.* the pegged exchange rate has existed from 1960-1997 with an absence of financial crisis and speculative attacks), our understanding of Nepal-India monetary and exchange rate policy seems to have been broadened.

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