ON THE EAST ASIAN MONETARY UNION: AN “VAR” ANALYSIS

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ABSTRACT

The Asian financial crisis of 1997, progressive economic integration into the world system of countries such as China and India, the introduction of the euro in the European continent and the most recent financial crisis of “subprime” mortgages, collectively constitute the factors that have contributed over the years to search more and more regulated economic relations between the countries of South-East Asia.

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In fact, this kind of trade regionalism, would be enriched and concluded when, following the example of the European Monetary Union, the Pacific Rim countries were united under a single currency (although this situation would result in costs such as the most important: the reduction of monetary sovereignty in favor of a supra-national organism).

The theory that studies by the end of the sixties the costs and benefits of a monetary union is that developed by Robert Mundell later expanded to other contributions-the “optimum currency areas”. It identifies how the cost for future members of the monetary union is bigger than the increase in the risk of asymmetric shocks and less when they are exposed to the possibility of being subjected to the same or similar shock. The asymmetry is reduced by the degree of trade integration between countries (McKinnon), the level of mobility of labor and possible systems of intra-regional fiscal transfers. This study, examining a specific area of South East Asia, will focus on the symmetry of the structural shocks considering it as a precondition for forming an OCA. In particular, we will carry out a VAR to several variables in order to identify, through the function “impulse-response”, the time required to a hypothetical asymmetric shock to be distributed among all the countries in the area.

Keywords: Optimum Currency Area, Trade integration, Gravity Equation, S-VAR.

1.0 MUNDELL, MCKINNON AND KENEN: THE LITERATURE REVIEW

The first contribution on the optimum currency area (OCA) is attributed to Mundell (1961). He published the article on the OCA which defines “OCA” as an area with internal factor mobility (including both interregional and inter-industrial mobility) and external factor immobility. He used the word “optimal” as referring to a regime that currency union maintain external and internal economic balances in a particular region. The word “area” to Mundell is not a geographical area. It is more of an economic region where homogenous products are produced, the technology and knowledge are at the same level, and the region is equally affected by changes. By definition, a region refers to an integration of countries, so one country in isolation can not be a region. The conclusions of this literature depend mainly on the Keynesian monetary and fiscal policies that can be used to stabilize unemployment and output.

McKinnon (1963) emphasised the “degree of openness” as a crucial criterion in forming the OCA and defines it as the ratio of tradables to non-tradables. He argues that the more the economy is open the more arguments there are for having a fixed exchange rate. And if the economy is rather closed, a flexible exchange rate is more advantageous. The reason for this is that when there is a higher degree of openness in the economy, the likelihood that foreign prices of tradables will be transmitted to the domestic cost of living is higher. This effect would cause the reduction of money illusion, so that wage contracts and
prices will be highly influenced by the exchange rate. So, changes in the exchange rate would cause adjustments in those variables, implying that changes in the exchange rate are less efficient in changing the terms of trade and less useful as an adjustment mechanism. Hence, a small open economy would find it advantageous to join a larger common currency area. In order to resolve balance of payments problems in the economies with a high ratio of tradables to non-tradables, McKinnon suggests that those economies should rely more on alternative instruments, for example, on the fiscal policy.

Any exchange rates variation in a highly open country is without any impact on the terms of trade and real wages, because the change in the price of the currency will affect both the export price of domestic

Kenen (1969), additionally to Mundell e McKinnon, introduced product diversification as an important criterion. Since he believes Kenen (1969, p. 49) argues, “...diversity in a nation’s product mix, the number of single-product regions contained in a single country, may be more relevant than labour mobility.” An example of how diversification criterion works could be the following. If a country is not diversified and produces only one product which it also exports, then if there is a negative demand shock affecting its exports, the economy’s export revenue will fall. This fall in revenues can be attenuated by a flexible exchange rate because a fall in demand for export products will reduce the demand for domestic currency, and in turn cause a depreciation of the exchange rate. The exchange rate depreciation improves export revenues due to the fact that for every unit of foreign currency the exporter now gets more domestic currency. If the economy has a fixed exchange rate, this mechanism cannot be exploited and adjustment should be done through a reduction of wages and prices or through increased unemployment.

To further his point of view, Kenen (1969) argues that a well-diversified economy also has a diversified export sector. And each of the industries in the economy can be subject to some kind of a shock. If those shocks are uncorrelated, a positive shock in one industry and a negative shock in another industry would result in the cancellation effect on the total export, making it more stable. Of course, if the economy is hit by some macroeconomic disturbance, then the whole export sector will be affected and diversification will not help.

2.0 THE MODEL

In the economic literature to test the hypothesis of possible OCA are mostly used models of co-integration and generalization of multivariate AR processes, namely the so-called structural VAR. Considering the following model to three variables:

\[ \Delta y_t = A_0 y_t + A_1 y_{t-1} + A_2 y_{t-2} + A_3 y_{t-3} + \text{con A}(L_1) \epsilon_t \]  
\[ \Delta c_t = c_0 c_t + c_1 c_{t-1} + c_2 c_{t-2} + c_3 c_{t-3} + \text{con C}(L_2) u_t \]  

where \( \Delta y \) is the real GDP, \( \Delta c_t \) is the nominal exchange , and \( \Delta s_t \) is the money supply, taken:

\[ A(L) = a_0 + a_1 L + a_2 L + a_3 L \]

we assume-for-initial data that the structural shocks are uncorrelated. Applying restrictions on long-term (it is assumed that in the long run so the shock of a variable has no effect) as suggested by Blanchard and Quah (1989) obtain a restricted model where the various \( A(L) = 0 \) operators are placed. Therefore, the reduced form of the VAR analysis will be presented as:

\[ \Delta y_t = B(L) \Delta y_{t-1} + u_t \]

considered the latter term a vector "noise" in the reduced form. The application of the rolling average of the last expression we considered outlines an equation: \( \Delta y_t = C(L) u_t \)

\[ \text{where: } C(L)u_t = (1-B(L))^3. \]

Analyzing simultaneously the equation (4) with (5), we obtain finally \( u_t = A0 u_t \) which bound reduced form of the disorder. An analysis of this type (ie with the disorder bound for each country) requires an estimate different from the generic OLS is more properly a model system of equations which NLSUR
with a NLS estimator, as suggested by Fielding (2001). More specifically, NLS analysis, derive the observation of demand shocks, of ‘supply and the exchange rate in relation to whether or not symmetrical correlations.

2.1 THE RESULTS

The calculations have been obtained through the STATA software ver. 11 and were carried out by examining the logarithm of the series, the result of calculations based on economic data. Before you run the VAR model, was the testing of unit root Dickey-Fuller test for stationary of stochastic processes that generate the time series, inserting constant and deterministic trend in the nucleus of each regression. Finally, once developed the VAR, we have implemented the unit root tests on the reverse with respect to the unit circle.

Note (from the chart) that all auto-values lie within the unit circle, to which the VAR is stationary.

The results of the correlation of the shocks to the countries of South-East Asia we have considered (Japan, Korea, Taiwan, Malesya, Singapore and China) over a period from 1996-2011, are shown in Fig. 1.
Japan | Korea | Taiwan | China | Malesya | Singapore
---|---|---|---|---|---
Japan | 1 | Korea | 0.09 | 1 | Taiwan | -0.08 | 0.41* | 1 | China | 0.25 | 0.12 | 0.33* | 1 | Malesya | 0.02 | 0.12 | 0.54* | 0.21 | Singapore | -0.06 | -0.06 | 0.11 | 0.33* | 0.18 | 1

**Fig 2 VAR to 3 variable Model - Correlation of Structural Shocks for the Country of East Asian Economics (Exchange rate)**

Japan | Korea | Taiwan | China | Malesya | Singapore
---|---|---|---|---|---
Japan | 1 | Korea | -0.49 | 1 | Taiwan | -0.42 | 0.7* | 1 | China | -0.88 | 0.77* | 0.85* | 1 | Malesya | -0.29 | 0.38 | 0.17 | 0.54* | 0.48* | 1

**Fig 3 VAR to 3 variable Model - Correlation of Structural Shocks for the Country of East Asian Economics (Demand Shocks)**

Japan | Korea | Taiwan | China | Malesya | Singapore
---|---|---|---|---|---
Japan | 1 | Korea | 0.18 | 1 | Taiwan | -0.05 | 0.38* | 1 | China | -0.22 | 0.28* | 0.33* | 1
Figures 1,2,3 show the results of the "cross-country correlation" respectively supply, exchange rate and demand. With regard to the analysis that affects the aggregate supply (Fig. 1), the shocks are shown symmetrically and significantly related to Taiwan-Korea, China-Taiwan, Taiwan-Malaysia and China-Singapore. The remaining pairs of analysis are rather asymmetric correlation. In particular, the correlations are not significant in the supply shocks for each country coupled to Japan. In Fig 2 is shown instead of the shock (always on aggregate) due to a change in exchange rates. Again as it emerges from the shock between the countries of South East Asia and Japan have a negative correlation asymmetric. One explanation for this phenomenon might be found, most likely, the different exchange rate regime belonging to the countries under study. In truth, Japan, has a flexible exchange rate could be due to some sort of distortion analysis in the face of regime type "anchor peg", typical of Asian countries.

3.0 THE RESULT OF VAR IMPULSE-RESPONSE

Starting from a stationary VAR of one AD: A (L) yt = ε, we define its response function d’impetus to a shock on the exchange rate or the degree of trade integration as h (i, j, n) xch, trade = (yn) i, j = δyt / δyt-No. The above equation can be interpreted as the response of i-th (h (i, j, n)) variable to the j-th shock on AD after n periods. From the analysis, we aim to make us expect that, thanks to the trade integration of the countries considered (according to the criterion of McKinnon), shock or less autonomous within a country x will be transmitted automatically between all countries doing so, in the shortest possible time-defined in-months, stabilize the economy prone to various shocks.
The result of our structural VAR is shown in the above figure. The nine graphs should be interpreted taking into account that we have to row variables (AD, trade integration and exchange rates) per column we have the structural shocks. Of the nine graphic depictions of what affect our analysis are represented by graphs having as intercepts 0 and affecting mainly AD. We analyze the graphs $ld\_AD \rightarrow ld\_xtch$ and $ld\_xtch \rightarrow ld\_AD$. Their interpretation could be the following: as a result of a change in the exchange rate (appreciation), the response of exports is immediate, by worsening the balance of trade, and consequently also the country’s GDP. Notice, however, the absorption very rapid pulse (two years) and a convergence to zero in the long run.

This result is confirmed by the analysis of the shock in $ld\_AD$ self-$ld\_AD$. As a result of a shock you notice a sudden drop in the value of AD only in the period 1.9 marks a minimum negative value. After about two years, we see that the shock self disappears. Thus, after more than 2 times the shock that has affected a country (eg South Korea) will be absorbed in the short term from every country in the group, due to their high trade integration. Is then emerged that, most countries are integrated and the lower the probability that occur asymmetric shocks of long duration. This is because the increase of trade-area-over the years, it would increase the convergence of production structures and therefore an external shock hit in the same way as all economies.
In addition, because we are not intervene on the exchange rate through constraints in the model in order to stabilize the economy after the shock, we-as suggested by Krugman (1980) - that the waiver for these countries to their exchange rate does not will be expensive and therefore, the costs would be lower for a membership monetary.

4.0 CONCLUSION

This paper has attempted to analyze, through an approach is descriptive and empirical, the criterion for which McKinnon classical theory of optimum currency areas. Considering a specific area of the South-East Asia in a maximum period of twenty years, there where the countries studied have in common and continuous high growth rates of GDP as well as policies such export-led, we tested as a high degree of trade integration and openness to international trade are the determinants of a possible future and monetary union. This statement was reflected by the use of a structural VAR with three variables which showed how, in one or more shock, they are transmitted between countries within a maximum period of ten months. The test on the inverse roots, carried out on the model of multivariate generalization of temporal effects, showed that the variables chosen for analysis were not affected by the volatility of the data series, and this result has been widely confirmed in the absence of auto-correlation between the same. Armed with these results we expect that, in the face of a VAR consider more complex than in a single large Wald representation of all real and monetary variables proposed over the years by the theory of optimum currency areas, autonomous aggregate demand shocks and of aggregate supply will respond positively and-most likely-in the short term. In this case, the area of South-East Asian countries such as limited between China, Taiwan, Singapore, Korea, South America, and Japan

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