

## **A Survey of Currency Anchor Selection in East-West Asia**

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### **Abstract:**

As the number of independent countries increases and their economies become more integrated, we would expect to observe more multi-country currency unions. This paper explores the pros and cons for different countries to adopt as an anchor the US Dollar, the Euro or the Yen. In addition, it addresses the question of how co-movement of outputs and prices would respond to the formation of currency union and investigates the prospect of a Dollar, Euro or Yen currency union in the East and West Asia regions. For this purpose, we use data of 27 selected countries in East and West Asia during the period 1980-2006.

Results show that the effective anchor for most of countries based on volatilities (volatility of price and volatility of output) criteria is the US Dollar.

**Key words:** Currency Convergence, Co-movement, Anchor, West and East Asian

**JEL Classification:** F31, F33.

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## 1. Introduction

Is a country by definition an optimal currency area? If the optimal number of currencies is less than the number of existing countries, which countries should form currency areas? This question, analyzed in the pioneering work of Mundell (1961) and extended in Alesina and Barro (2002), has jumped to the center stage of the current policy debate for several reasons. First, the large increase in the number of independent countries in the world led to a roughly one-for-one increase in the number of currencies, until recently. This proliferation of currencies occurred despite the growing integration of the world economy. Accordingly, the growth of international trade in goods and assets should have raised the transactions benefits from common currencies and led, thereby, to a decline in the number of independent moneys.

Second, adopting another country's currency or maintaining a currency board is seen as more credible commitment devices than a simple fixing of the exchange rate. Third, recent episodes of financial turbulence have promoted discussions about "new financial architectures." Although this dialogue is often vague and inconclusive, one of its interesting facets is the question of whether the one country/one currency dogma is still adequate.

Today many examples of movement toward multinational currencies are observable: twelve countries in Europe have adopted a single currency; dollarization is being implemented in Ecuador and El Salvador; and dollarization is under active consideration in many other Latin American countries, including Mexico, Guatemala, and Peru. Six West African states have agreed to create a new common currency for the region, and eleven members of the Southern African Development Community are debating whether to adopt the dollar or to create an independent monetary union possibly anchored to the South African rand. Six oil-producing countries (Saudi Arabia, United Arab Emirates, Bahrain, Oman, Qatar, and Kuwait) have declared their intention to form a currency union by 2010. In addition, several countries

have maintained currency boards with either the U.S. dollar or the euro as the anchor. Currency boards are, in a sense, mid-way between a system of fixed rates and currency adoption, and the recent adverse experience of Argentina will likely discourage the use of this mid-way approach (Alesina et al., 2001).

Currency unions typically take one of two forms. In one, which is most common, client countries (which are usually small) adopt the currency of a large anchor country. In the other case, a group of countries creates a new currency and a new joint central bank. The second arrangement applies to the euro zone. Many argue that the European Monetary Union is, for instance, a German mark area, but this interpretation is questionable. Although the European central bank may be particularly sensitive to German preferences, the composition of the board and the observed policies in its first few years of existence do not show a German bias (Alesina et al., 2001).

The purpose of this paper is to evaluate whether selected one anchor exchange emerge from an empirical investigation. As a theoretical background, we use the framework developed by Alesina and Barro (2002), which discusses the trade-off between the costs and benefits of currency unions. Based on historical patterns of co-movements of prices and outputs, however, a country's decision to join a monetary area should consider not just the situation that applies *ex-ante* that is, under monetary autonomy, but also the conditions that would apply *ex-post*, that is, allowing for the economic effects of currency union.

This paper is organized as follows. Section 2 summarizes the literature on optimum currency areas. Section 3 presents our data set and the implications of the theoretical model of Alesina and Barro (2002), which we use as a guide for our empirical investigation. Section 4 uses the historical patterns in international co-movements of prices and outputs to attempt to identify optimal currency areas. The last section provides concluding remarks.

## 2. The Literature on Optimum Currency Areas (OCA)

Under a traditional definition, a currency area adopts a fixed exchange rate regime or a single currency within its area, and maintains a flexible exchange rate regime with the rest of the world. An OCA has been implicitly defined by Mundell (1961) as a currency area for which the costs of relinquishing the exchange rate as an internal instrument of adjustment (i.e. within the area) are outweighed by the benefits of adopting a single currency or a fixed exchange rate regime. Most of the subsequent literature on OCA has focused on the costs of renouncing the exchange rate, and devoted more limited attention to the benefits. For further discussions of the optimum currency area literature see, for example: Bofinger (1994), De Grauwe (2003), Ishiyama (1975), Krugman (1992), Masson and Taylor (1992), Mongelli (2002), Tavlas (1993a, 1993b, 1994), Tower and Willet (1976) and Wyplosz (1997).

### 2.1. Costs of Adopting a Single Currency

When two areas face real and monetary shocks, the extent to which a currency union implies larger adjustment costs than a flexible exchange rate regime depends on the effectiveness and efficiency of the exchange rate as an instrument of short run adjustment.

The exchange rate between two areas is an effective instrument of short-run adjustment if the following three conditions hold: (1) the two areas face asymmetric shocks, so that an adjustment of the relative price of the goods produced in the two areas is required; (2) domestic prices are not fully flexible; hence prices do not adjust immediately to the shocks; and (3) exchange rate pass-through is not large, so that a relative price change due to an exchange rate change is not immediately neutralized by domestic price movements.

The exchange rate between two areas is an efficient instrument of short-run adjustment if in addition to the conditions listed above; adjustment through the exchange rate is less costly than through other instruments, possibly because other mechanisms of adjustment such

as factor movements or automatic fiscal stabilizers are limited. The importance of these alternative mechanisms has often been questioned by the literature.

Overall, Mundell (1961) and McKinnon (1963) suggest that the effectiveness of the exchange rate might decrease with openness, because prices and wages are more likely to rapidly neutralize the change in the exchange rate. However, more open areas are also more exposed to foreign shocks and might therefore face larger adjustment problems. It is therefore unclear whether a more open area should present larger adjustment costs to real shocks within a currency union than under a flexible exchange rate regime. The effect of openness becomes even more uncertain when monetary shocks are taken into account. Bofinger (1994) argues that monetary aspects, such as the degree of asymmetry of monetary shocks and the difference in domestic inflation levels, play a central role in the optimum currency area analysis, overcoming the importance of the traditional elements of labor mobility and openness

### 2.2. Benefits of a Single Currency Implementation

Mundell (1961) stresses in particular the benefits deriving from: (1) the elimination of transaction costs, and (2) a better performance of money as a medium of exchange and as a unit of account. He also briefly discusses the ability of speculators to affect exchange rate markets if these markets are thin, suggesting that the currency area should not be small. The institution of a single currency eliminates the deadweight losses due to currency transactions and to the need to collect and process information related to exchange rates: the factors of production previously involved in these activities now become available for alternative uses. The second kind of benefits related to the efficiency gains from: (2a) the elimination of the relative price distortions generated by the transaction costs, and (2b) the elimination of exchange rate uncertainty. The extent of the relevant exchange rate volatility is,

however, very hard to assess. In fact, part of exchange rate variability is an endogenous response to underlying sources of uncertainty, which would not be eliminated by a currency area (De Grauwe, 2003).

The similarity of pre-union inflation rates across countries has been suggested as an important criterion in the determination of an optimum currency area (see for example Fleming, 1971). The basic idea is that countries may have different Phillips curves or different inflation-employment trade-offs, in which case a currency union, by imposing a unique level of inflation, would generate some costs. The extension of the time-consistency approach to monetary policy (see for example Barro and Gordon, 1983a, 1983b) to open economies suggests another possible benefit from the participation in a currency union. If the low inflation promises of the central bank of a traditionally high inflation country are not time consistent, this country could gain discipline and credibility by pegging its exchange rate to a low inflation currency (Giavazzi Pagano, 1988).

However, the level of inflation of a currency union might end up being higher than the lowest among the pre-union inflation levels of the member countries, in which case some countries would lose from their participation in the union.

To summarize, the countries that have the largest co-movements of outputs and prices with potential anchors are those with the lowest costs of abandoning monetary independence.

### 3. The Model

In this section, we examine the co-movement of prices and outputs to test if there are multi-country currency unions in the countries under consideration. Alesina et al. (2002) and Lim (2005) measure of co-movement of prices between countries  $i$  and  $j$  using the following second-order auto-regression:

$$\ln \frac{P_{i,t}}{P_{j,t}} = b_0 + b_1 \ln \frac{P_{i,t-1}}{P_{j,t-1}} + b_2 \ln \frac{P_{i,t-2}}{P_{j,t-2}} + \varepsilon_{ij} \quad (1)$$

Where  $\frac{P_{i,t}}{P_{j,t}}$  is the ratio which measures the value of one unit of country  $i$ 's output relative to one unit of country  $j$ 's output.

The estimated residual,  $\hat{\varepsilon}_{t,ij}$ , measures the relative price that would not be predictable from the two prior values of relative prices. The co-movement of relative prices ( $VP_{ij}$ ) is measured by the root-mean-squared error as follow:

$$VP_{ij} = \sqrt{\frac{1}{T-3} \sum_{t=1}^T \hat{\varepsilon}_{ij}^2}$$

A lower value of  $VP_{ij}$  implies a higher value of the co-movement of prices between countries  $i$  and  $j$ . Analogously, it is possible to compute a measure of output co-movement ( $VY_{ij}$ ), which comes from the estimated residuals from the second-order auto-regression on annual data for relative per capita GDP (Alesina et al., 2002).

(2)

$$\ln \frac{Y_{i,t}}{Y_{j,t}} = c_0 + c_1 \ln \frac{Y_{i,t-1}}{Y_{j,t-1}} + b_2 \ln \frac{Y_{i,t-2}}{Y_{j,t-2}} + u_{ij}$$

The estimated residual,  $\hat{u}_{ij}$ , measures the relative output that would not be predictable from the two prior values of relative output. The co-movement of relative outputs ( $VY_{ij}$ ) is also measured by the root-mean-squared error:

$$VY_{ij} = \sqrt{\frac{1}{T-3} \sum_{t=1}^T \hat{u}_{ij}^2}$$

Again, a lower value of  $VY_{ij}$  implies a higher value of the output co-movements between countries  $i$  and  $j$ .

For most countries all of the data are available. However, we exclude from the computation of co-movements country pairs for which we do not have at least 20 observations.

### 4. Empirical Results

We use data of 27 selected Asian countries to measure the co-movement of prices and outputs. For most countries data are available, except for which a number of observation are missing. Hence based on the criteria discussion above, we consider the U.S. dollar, the euro, and the

yen to determine the appropriate anchor currencies. Therefore, the objective is to address question of which countries would be better served by joining some currency union, as well as the question of which anchor should be chosen if one is needed.

#### 4.1. Result of Co-movements

Tables 1a, 1b, and 1c report the measures of the co-movements of prices for selected countries with the United States, the Japan and Euro Area. Singapore and Hong Kong, which use the U.S. dollar, have the highest co-movements of prices with the United States.

In addition, table 1a shows that Pakistan, Nepal, United Arab Emirates, Jordan and India set on the next ranking. This issue proves that trade level between these countries and the U.S promotion in the late two decade. Table 1a shows Iran has lowest co-movement price with the U.S.

Table 1b shows high co-movement with Japan. Lebanon, Singapore, Thailand, Jordan, South Korea and Kyrgyz Republic are six countries that stand on top of this table and show one geographically parameter for extension the high co-movement price with Japan and converse Bahrain, Syria, Oman, India, Kuwait and Iran stand on down table that these countries are West Asian countries.

Table 1c shows co-movement price with European area. Kazakhstan and Kyrgyz Republic are top of this table and show highest co-movement price with European area. Note that Iran has lowest rank in these three tables and this result proves that Iran has the lowest degree of economic freedom.

Tables 2a, 2b, and 2c report the measures of the co-movements of outputs for selected countries with the United States, Japan and the Euro Area. The general picture is reasonably similar to that for prices. Note that all of the oil exporting countries has relatively high output co-movements with the U.S dollar anchor.

Overall, in East Asia, the Yen is a better anchor than of the U.S Dollar and the Euro because most countries are associated with Japan in terms of price and output co-

movements. Hong Kong and Singapore are more associated with the United States than with Japan. Looking at the tables, the patterns of price and output co-movements suggest geographically connected areas that are linked to the U.S. dollar.

#### 5. Conclusion

The basic implication of this paper is based on the historical data on co-movements of prices and outputs; we argued that for countries that have a higher degree of economic freedom the best anchor is dollar. When we based VY criteria we have three group countries; 1. East Asian countries with yen anchor, 2. Arab-Oil countries with dollar anchor and 3. Low degree of economic freedom with the Euro anchor.

Several issues should be considered in future empirical research. First, the effects of currency union need to be analyzed more fully. Second, these results can be used to estimate how the introduction of a currency union would affect the co-movements of prices and outputs for individual country-pairs under the hypothetical adoption of a currency union with a specified anchor country.

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**Table 1a: Co-Movement of Prices with the U.S, 1980-2006**

Selected Countries	Values of Co-movement
Singapore	0.041073
Hong Kong, China	0.04384
Pakistan	0.050661
Nepal	0.052893
United Arab Emirates	0.058
Jordan	0.059153
India	0.060476
China	0.060785
Thailand	0.065373
Malaysia	0.069172
Kyrgyz Republic	0.069782
Saudi Arabia	0.072413
Australia	0.074986
Philippines	0.077623
Lebanon	0.078482
Kazakhstan	0.08091
Fiji	0.085987
Oman	0.092111
Korea, Rep.	0.093247
Tajikistan	0.09345
Yemen, Rep.	0.10099
Lao PDR	0.102098
Bahrain	0.110318
Syrian Arab Republic	0.110482
Kuwait	0.127414
Indonesia	0.158724
Iran, Islamic Rep.	0.253511

*Source: Authors***Table 1b: Co-Movement of Prices with Japan, 1980-2006**

Selected Countries	Values of Co-movement
Lebanon	0.087462
Singapore	0.090147
Thailand	0.090948
Jordan	0.095249
Korea, Rep.	0.098845
Nepal	0.099661
Kyrgyz Republic	0.101074
Australia	0.102143
Lao PDR	0.105186
Pakistan	0.108315
Hong Kong, China	0.110092
United Arab Emirates	0.114626
Indonesia	0.116697
Philippines	0.120151
Malaysia	0.120593
Yemen, Rep.	0.124669
Kazakhstan	0.127938

Tajikistan	0.129721
China	0.132329
Saudi Arabia	0.139594
Fiji	0.149195
Bahrain	0.152256
Syrian Arab Republic	0.165786
Oman	0.167514
India	0.186902
Kuwait	0.223523
Iran, Islamic Rep.	0.264348

Source: Authors

**Table 1c: Co-Movement of Prices with Euro, 1980-2006**

Selected Countries	Values of Co-movement
Kazakhstan	0.075162
Kyrgyz Republic	0.075357
Singapore	0.082347
Tajikistan	0.083455
Jordan	0.083767
India	0.087745
Thailand	0.088339
Australia	0.090367
United Arab Emirates	0.094334
Yemen, Rep.	0.094647
Pakistan	0.095701
Fiji	0.098213
Hong Kong, China	0.099229
Nepal	0.099932
Saudi Arabia	0.101754
China	0.102057
Malaysia	0.104688
Philippines	0.106201
Korea, Rep.	0.109845
Kuwait	0.123358
Lao PDR	0.126259
Lebanon	0.126338
Bahrain	0.131132
Oman	0.139638
Syrian Arab Republic	0.14302
Indonesia	0.183424
Iran, Islamic Rep.	0.30399

Source: Authors

**Table 2a: Co-Movement of Outputs with U.S, 1980-2006**

Selected Countries	Values of Co-movement
Australia	0.012156
Yemen, Rep.	0.017129
India	0.020188
Pakistan	0.021977
China	0.02394

Nepal	0.026716
Kazakhstan	0.028469
Lebanon	0.028927
Lao PDR	0.029586
Philippines	0.031474
Saudi Arabia	0.033817
Oman	0.034075
Hong Kong, China	0.034726
Korea, Rep.	0.035331
Singapore	0.036664
Thailand	0.039285
Malaysia	0.040816
Indonesia	0.042401
Bahrain	0.043278
Fiji	0.045653
Jordan	0.049423
Syrian Arab Republic	0.055088
Iran, Islamic Rep.	0.055139
Kyrgyz Republic	0.056086
United Arab Emirates	0.068133
Kuwait	0.083868
Tajikistan	0.085617

Source: Authors

**Table 2b: Co-Movement of Outputs with Japan, 1982-2006**

Selected Countries	Values of Co-movement
Yemen, Rep.	0.016651
Pakistan	0.017261
India	0.022449
Nepal	0.025957
China	0.026198
Kazakhstan	0.027587
Australia	0.02782
Korea, Rep.	0.02788
Thailand	0.031148
Lebanon	0.031899
Philippines	0.032953
Lao PDR	0.034048
Hong Kong, China	0.035384
Singapore	0.035512
Malaysia	0.035523
Indonesia	0.037607
Oman	0.039539
Saudi Arabia	0.040305
Kyrgyz Republic	0.047688
Fiji	0.048089
Bahrain	0.048884
Iran, Islamic Rep.	0.053668
Syrian Arab Republic	0.05426
Jordan	0.056197

United Arab Emirates	0.076871
Tajikistan	0.078701
Kuwait	0.103149

*Source: Authors*

**Table 2c: Co-Movement of Outputs with Euro, 1982-2006**

Selected Countries	Values of Co-movement
Yemen, Rep.	0.015385
Pakistan	0.017019
India	0.020229
Lao PDR	0.020857
Australia	0.021066
Nepal	0.022353
China	0.025307
Lebanon	0.029968
Korea, Rep.	0.031072
Kazakhstan	0.031368
Philippines	0.031586
Saudi Arabia	0.035378
Fiji	0.036707
Oman	0.037048
Hong Kong, China	0.037065
Thailand	0.037136
Singapore	0.037181
Malaysia	0.039851
Indonesia	0.043082
Bahrain	0.046808
Jordan	0.052062
Iran, Islamic Rep.	0.052149
Syrian Arab Republic	0.052321
Kyrgyz Republic	0.053786
United Arab Emirates	0.073447
Tajikistan	0.080584
Kuwait	0.099225

*Source: Authors*