

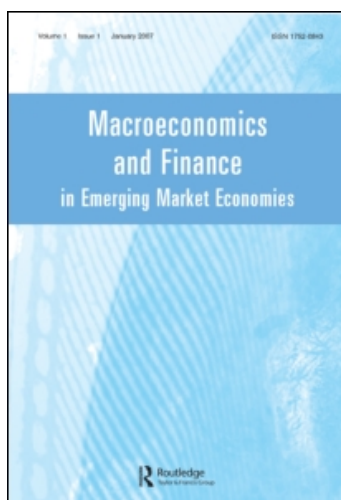
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RESEARCH ARTICLE

The Asian Currency Unit (ACU): exploring alternative currency weights

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While most observers concur that the time is not ripe for Asia to consider a common currency, there has been some discussion about the possible creation of an Asian Currency Unit (ACU). This paper examines the specific issue of the ACU which, in a general sense, is a weighted average of regional currencies *à la* the European Currency Unit (ECU) which was created in March 1979 under the European Monetary System (EMS). The paper critically examines the rationale for the ACU proposal and offers an initial attempt at computing optimal currency composition of the ACU. The optimal basket weights computed are aimed at ensuring a regional currency basket that has minimal variance. Hence it will deliver stability in intra-regional exchange rates for alternative configurations of currency baskets in the Asian and Pacific region.

Keywords: ASEAN; Asian Currency Unit (ACU); currency basket; European Currency Unit (ECU); monetary and financial regionalism; parallel currency

1. Introduction

There are a number of factors that have motivated monetary and financial regionalism (MFR) in Asia (Rajan 2006). First has been the financial crisis of 1997–98 and the perceived inadequate response to it from extra regional players. Second are the ongoing concerns about under-representation of Asia in IMF quota distribution and Asia's apparent lack of voice in international monetary affairs, along with the belief that Asia has ample resources for regional self-help. Third have been external developments in regionalism, particularly the deepening and broadening of the European Union (EU). There is no doubting the inspiration that many Asian policy-makers have drawn from the deepening and broadening of European regionalism, especially with regard to MFR.¹ Fourth has been the growing *de facto* economic interdependence (so-called 'market driven regionalism') as well as the regional nature of spillovers ('contagion').

There are many gradations of MFR, ranging from the weak form involving regional policy dialogue and surveillance, on the one hand, to exchange rate and monetary coordination, on the other (Rajan 2006). While there has been active discussion of the possibility of stronger forms of MFR, effective deepening of regional monetary integration will not happen until there is a considerable strengthening of the regional surveillance mechanism with well worked out surveillance and policy conditionality.

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While most observers concur that the time is not ripe for Asia to consider a common currency, there has been some discussion about the possible creation of an Asian Currency Unit (ACU).² This paper examines the specific issue of the ACU which, in a general sense, is a weighted average of regional currencies *à la* the European Currency Unit (ECU) which was created in March 1979 under the European Monetary System (EMS) and remained in operation until the launch of the euro in January 1999.³ The remainder of the paper is as follows. Section 2 provides a critical overview of and rationale for the ACU proposal. Section 3 offers an initial attempt at computing optimal currency composition of the ACU based on the methodology developed by Hovanov, Kolari, and Sokolov (2004). This methodology develops basket weights in the context of a minimized basket or portfolio of assets expressed in terms of national currencies. The final section offers a few concluding remarks.

2. Rationale for the ACU

At the micro-level the rationale for an ACU is to afford the opportunity for regional economic agents to invoice regional financial and trade transactions in the ACU, hence reducing the region's dependence on the US dollar and other external currencies. If successful, intra-regional intermediation of savings may be promoted, in the process possibly reducing the region's exposure to external shocks as discussed previously. However, in reality, it is unlikely that the ACU will be used on a widespread basis for some time to come.

The experience of Europe is instructive in this regard. The initial creation of the ECU did not lead to a widespread use of the unit. Even in the 1990s, until the actual creation of the euro, the vast majority of intra-European financial and trade transactions were not in ECUs but in US dollars primarily and other sovereign national European currencies. So it is not just the creation that is important; there has to be a coordinated agreement by regional bodies to start transacting in the new unit, failing which no one will want to take the first step.⁴ The ACU has a better chance for success (in terms of becoming a significant regional vehicle currency) if a larger set of countries is included in the basket. In this regard it is imperative that the ACU be broadened from the proposed APT countries to also include India, Australia, and New Zealand (the other members of the EAS), all of which have significant financial market depth.⁵

It has been suggested that the ACU could be used as a means of enhancing *internal* exchange rate stability if the regional central banks begin to stabilize their respective currencies to the regional unit (i.e. helping reduce the possibility of regional competitive devaluations). The notion of stabilization *vis-à-vis* an internal basket *à la* Europe's Exchange Rate Mechanism (ERM) is distinct from stabilization *vis-à-vis* an external unit which would require that the ACU in turn be pegged in some way to external currencies such as the US dollar or euro, or some weighted average thereof.

Of course, internal stability does not require the latter and in fact may exacerbate external currency stability. This may happen if regional countries substitute the use of external currencies for the ACU, hence being less concerned about fluctuations of their currencies relative to the external currencies. Conversely, effective external stability requires internal stability in the sense that if regional central banks do not explicitly or implicitly manage their currencies to the ACU, it is irrelevant whether the ACU *per se* is managed against the external currencies, as the proposed ACU will remain purely a theoretical construct. Indeed, the stated aim of the Asian Development

Bank (ADB) at this stage is for the ACU to serve mainly as a means of benchmarking the extent of currency movements/deviations. As the ADB president, Haruhiko Kuroda, noted:

The ACU ... could be used to monitor the stability of participating currencies and would tangibly demonstrate the need for greater exchange rate coordination. What Asia needs here is basically an exchange rate that is flexible toward the rest of the world but relatively stable within the region. (Kuroda 2005, 5)

Focusing on the notion of stabilization vis-à-vis an internal basket (i.e. regional currencies benchmarking movements to the ACU), while the potential microeconomic benefits noted above do not require internal stabilization, the latter could promote the more widespread use of the ACU. This is so as the regional central banks will automatically begin to use the ACU more extensively as a reserve and possibly even intervention currency, thus providing an additional inducement for private agents to intensify use of the unit in invoicing and transactions.

Needless to say that the long-term viability of internal stabilization in an era of open capital markets requires there be an enhancement of regional surveillance, a degree of policy coordination, and an augmentation of regional liquidity arrangements. Nonetheless, given the divergence in economic and institutional structures in the region, absent macroeconomic policy coordination and mechanisms for automatic intra-regional fiscal transfers, any attempt at formal exchange rate coordination – let alone a full-fledged monetary union – is far too risky and premature and will likely be a failure, setting back prospects for other forms of economic integration.

3. Computation of the ACU

While the ACU cannot be viewed as an attractive nominal anchor for Asian currencies in the near term, it could potentially have a role to play in Asian monetary cooperation in the future.⁶ Given its potential usefulness, it would be useful to explore the issues surrounding its construction.

Broadly speaking, there are two issues that must be addressed in the construction of a regional currency unit based on currency baskets. First, a decision has to be made as to which national currencies should be included in the currency basket. Second, a decision has to be made as to the weights that are to be accorded to the national currencies included in the currency basket.

With regard to the first issue, while there is good reason to start with a sub-set of countries in Asia, it is unclear why it should be restricted to the APT. For instance, Dayaratna-Banda and Whalley (2007) note:

[W]here ... [do] ... India, Australia, and New Zealand (the later two are in the Asia-Pacific grouping) stand in this. ASEAN has already entered into a framework agreement with India on a comprehensive economic partnership. China has entered into arrangements with India, New Zealand and Australia, and Japan also has regional arrangements with these countries. Some initial negotiations for a free trade area between ASEAN, Australia, and New Zealand have also begun. These three countries have increasingly more open economies, and their links with East Asia are likely to expand over time. These economies have been increasingly integrating with East Asia. Including them in East Asian regional forums and arrangements expands the set of developed and fast growing economies with well-functioning economic and financial systems and markets ... The possibility of ASEAN + 6 monetary cooperation can thus not be ruled out. (41)⁷

This said, we consider alternative country configurations of the ACU – from the narrow (ASEAN) to broad (ASEAN + 6). The principal interest of this study is the application of a technique that determines the optimal weights in a regional currency basket.

3.1. The technique

Initial estimates of the ACU currency weights have been based on some economic indicators across countries. For instance, in a widely cited paper, Ogawa and Shimizu (2005) proposed the construction of an Asian regional currency basket as a weighted average of regional currencies *à la* the European Currency Unit (ECU). They calculate the weights of the national currencies included in the currency basket as an arithmetic average of the country’s respective shares of PPP-based GDP and foreign trade.

Hovanov, Kolari, and Sokolov (2004) showed that the values of any given currency (e.g. British pounds) depend on the base currency chosen (e.g. US dollars, euros, Japanese yen), which creates ambiguity in the valuation of a currency and makes it difficult to examine the dynamics of the time series of currency values. As a matter of caveat, the choice of base currency is critical to obtain a stable exchange rate. For example, using the US dollar as a base currency as opposed to the Japanese yen changes the relationship between the euro and the British pound. To overcome this base currency problem they proposed a *reduced* (to the moment t_0) *normalized value in exchange* of i th currency:

$$R\text{NVAL}_i(t/t_0) = \frac{c_{ij}(t)}{\sqrt[n]{\prod_{k=1}^n c_{kj}(t)}} \bigg/ \frac{c_{ij}(t_0)}{\sqrt[n]{\prod_{k=1}^n c_{kj}(t_0)}} = \sqrt[n]{\prod_{k=1}^n \frac{c_{ik}(t)}{c_{ik}(t_0)}} \tag{1}$$

where $c_{ij}(t)$, $i, j = 1, \dots, n$, are cross-currencies of exchange rates of n currencies at the moment t . By dividing through by the geometric mean of a basket of currencies, the value of any currency is the same regardless of the base currency chosen.

This *reduced normalized value in exchange* ($R\text{NVAL}_i(t/t_0)$) of a currency is useful in comparing the movements of individual currencies and basket currencies. Why? Typically, one makes statements like ‘the US dollar appreciates against the yen but depreciates against the euro’. In contrast, if the *reduced normalized value in exchange* of the US dollar rises, it means that the value of the US dollar rises on average against the national currencies used in the computation of the geometric mean of the basket of national currencies (Hovanov, Kolari, and Sokolov 2004).

Furthermore, it also allows the computation of a unique optimal, minimum variance currency basket regardless of base currency choice. The derivation of this minimum variance currency basket is calculated by searching the optimal weight vector w^* that solves the following optimal control problem:

$$\text{Min} \left(S^2(w) = \sum_{i,j=1}^n w_i w_j \text{cov}(i,j) = \sum_{i=1}^n w_i^2 s_i^2 + 2 \sum_{\substack{i,j=1 \\ i < j}}^n w_i w_j \text{cov}(i,j) \right) \tag{2}$$

under the constraints, $w_i \geq 0$, for all $i = 1, \dots, n$, $w_1 + \dots + w_n = 1$, where $\text{cov}(i, j)$ is the covariance between $R\text{NVAL}_i(t/t_0)$ and $R\text{NVAL}_j(t/t_0)$, and s_i^2 is the variance of

$RNVAL_i(t/t_0)$ for all $i, j = 1, \dots, n$ and all $t = 1, \dots, T$.⁸ The optimal weights can also be transformed into optimal currencies' amounts $q_1^*, q_2^*, \dots, q_n^*$ as follows:

$$q_i^* = \frac{w_i^* \sum_{r=1}^n q_r c_{rj}(t)}{c_{ij}(t)}, \quad \text{let } \mu = \sum_{r=1}^n q_r c_{rj}(t), \quad \text{thus } q_i^* = \frac{w_i^* \mu}{c_{ij}(t)}. \quad (3)$$

Here the positive factor μ can be easily solved from knowledge of the optimal weights $w_1^*, w_2^*, \dots, w_n^*$ derived from the minimization of the variance in Equation (2), and $c_{1j}(t), c_{2j}(t), \dots, c_{nj}(t)$. Substituting μ into Equation (3) we obtain the optimal currencies' amounts $q_1^*, q_2^*, \dots, q_n^*$, which constitute the minimum variance currency basket.

What does the technique presented above have to say regarding the current orthodoxy? For one, a key problem here is that the optimal currency basket weights are dependent on the base currency chosen by the researcher (Hovanov, Kolari, and Sokolov 2004).

The use of the concept of the *reduced normalized value in exchange* ($RNVAL_i(t/t_0)$) of the national currencies included in the regional currency basket avoids the problem of the non-uniqueness of the computed optimal basket weights since their respective *reduced normalized value in exchange* ($RNVAL_i(t/t_0)$) should be the same irrespective of the choice of base currency. Accordingly, it follows that the calculation of the optimal weights in a currency basket as determined on the basis of either trade flows, or any arbitrary choice of economic indicators for that matter, invariant to the choice of base currency is not guaranteed to hold. As a result, different optimal weights will be generated for the national currencies included in the currency basket when the US dollar, for instance, is chosen as the base currency, as opposed to when instead the euro is used as the base currency.

Since we are minimizing a basket or portfolio of assets expressed in terms of national currencies, the currency weights are primarily determined by two main factors, namely, the variance of the *reduced normalized value in exchange* ($RNVAL_i(t/t_0)$) of the national currencies included in the currency basket; and the covariance of the *reduced normalized value in exchange* ($RNVAL_i(t/t_0)$) of the national currencies included in the currency basket, and, hence, their correlations.

3.2. Empirics

The data are sourced from the Pacific Exchange Rate Service website (fx.sauder.ubc.ca) and monthly cross rates of Asian and Pacific currencies are generated for the period January 2000–June 2007. We consider alternative sets of Asian and Pacific national currencies to be included in a regional currency basket – ranging from a smaller core of ASEAN 5 countries (Indonesia, Malaysia, Philippines, Singapore, Thailand) all the way to a much broader set of coverage of national currencies that include the ASEAN 5 + 3 (China, Korea, Japan) + India + Australia + New Zealand. We also consider a regional currency basket that excludes Japan from the set of countries, as it is unclear whether the Japanese yen should be treated as an 'insider' or as an 'outsider' (external) currency in a future regional currency basket arrangement (Kriz and Thai 2006; Ogawa and Kawasaki 2006).

The detailed list of each national currency that comprises a particular currency basket as well as their respective calculated optimal basket weights (w^*) are shown in Table 1. The reported optimal basket weights arise from the optimization method with Equation (2) above as the objective function. In other words, we are minimizing the variance of any

Table 1. Optimal basket weights for various groupings of regional basket currencies, January 2000–June 2007 (in %).

ASEAN 5	Indonesian rupiah	17.4	Philippines peso	18.3	Malaysian ringgit	21.8	Singapore dollar	20.9	Thai baht	21.6												
ASEAN 5 + 2	Indonesian rupiah	11.9	Philippines peso	12.6	Malaysian ringgit	11.4	Singapore dollar	19.3	Thai baht	13.0	Korean won	15.0	Chinese renminbi	16.8								
ASEAN 5 + 2 + India	Indonesian rupiah	10.0	Philippines peso	11.2	Malaysian ringgit	10.9	Singapore dollar	15.1	Thai baht	13.2	Korean won	12.6	Chinese renminbi	13.5	Indian rupee	13.5						
ASEAN 5 + 2 + India + Australia + New Zealand	Indonesian rupiah	7.6	Philippines peso	6.8	Malaysian ringgit	5.2	Singapore dollar	13.4	Thai baht	11.7	Korean won	10.4	Chinese renminbi	11.0	Indian rupee	14.2	Australian dollar	10.3	New Zealand dollar	9.5		
ASEAN 5 + 3	Indonesian rupiah	10.0	Philippines peso	11.2	Malaysian ringgit	11.5	Singapore dollar	15.3	Thai baht	13.7	Korean won	12.6	Chinese renminbi	13.3	Japanese yen	12.3						
ASEAN 5 + 3 + India	Indonesian rupiah	9.0	Philippines peso	9.9	Malaysian ringgit	9.8	Singapore dollar	14.0	Thai baht	11.7	Korean won	11.1	Chinese renminbi	11.3	Japanese yen	10.3	Indian rupee	13.0				
ASEAN 5 + 3 + India + Australia + New Zealand	Indonesian rupiah	7.0	Philippines peso	6.0	Malaysian ringgit	4.5	Singapore dollar	12.6	Thai baht	10.9	Korean won	9.6	Chinese renminbi	9.6	Japanese yen	8.3	Indian rupee	13.7	Australian dollar	9.3	New Zealand dollar	8.4

Source: Authors' calculations.

alternative set of national currencies that comprise a certain regional currency basket (such as those listed in Table 1), wherein the values of these same alternative set of national currencies are cast in terms of their *reduced normalized value in exchange*. A careful examination of the results suggests four discernible patterns.

First, when the core consists of ASEAN 5 only, there is a high degree of uniformity in weights, with each of the currencies constituting around 20% of the regional currency basket.

Second, when the currency basket is made up of the core ASEAN 5 + 2 (China + Korea), the Singapore dollar is assigned the highest weight of 19.3%, while the Malaysian ringgit has the lowest weight of 11.4%. China and Korea together constitute about 30% of the currency basket. However, once the Japanese yen is treated as an insider in the basket (ASEAN 5 + 3), the Singapore dollar is still accorded the highest weight of 15.3%, though this time the Indonesian rupiah is accorded the lowest weight of 10%. China, Korea, and Japan now constitute around 40% of the currency basket.

Third, irrespective on whether the Japanese yen is treated as an insider or as an external currency, when the currency basket is enlarged to include the Indian rupee, the highest and lowest weights go to the Singapore dollar and Indonesian rupiah, respectively, once again. When Japan is excluded, China, Korea, and India constitute around 40% of the currency basket. When Japan is included, these four countries constitute about 55% of the regional basket.

Fourth, in a broader currency basket that includes ASEAN plus China, Korea, India, Australia, and New Zealand, the Indian rupee is accorded the highest weight while the Malaysian ringgit gets the lowest weight (again, this is so regardless on whether the Japanese yen is included or excluded from these currency baskets). Australia and New Zealand constitute between 15 and 20% of the regional basket.

Finally, regarding the issue of the frequency of revision of the currency basket weights, due to the nature of the technique we applied here, the regional currency baskets constructed from alternative configurations of Asian and Pacific national currencies are both stable over time and have little or no correlations with the individual currencies in the basket. This implies that an appreciation (depreciation) of any national currency in a given basket would not raise (lower) the value of the regional currency basket (Hovanov, Kolari, and Sokolov 2004). In view of this stability, official regional bodies or agencies do not need to re-compute the currency basket intermittently. This is in contrast to the proposal by Kawai (2006) of revising the currency weights every two to three years. The only time revisions would be needed in the near term is if and when the membership of the ACU changes.

4. Concluding remarks

Empirical evidence reveals that there appears to be a general trend towards somewhat greater exchange rate flexibility in Asia, though not complete flexibility. Unease clearly persists about allowing a completely free float. This is further apparent from the massive stockpiling of reserves in China and many Asian economies (for instance, see Ouyang, Rajan, and Willett 2007a, 2007b).⁹ Many observers have pointed out that the export-oriented nature of the Asian economies – especially those in East Asia – has given rise to a collective action problem (the so-called ‘prisoner’s dilemma’) whereby the fear of losing competitiveness leads each of them to heavily manage their respective currencies, particularly in view of the limited flexibility of the Chinese currency.¹⁰

In view of the above there have been growing calls for greater exchange rate and monetary coordination among Asian economies. It is in this context that there has been active discussion in the region – more specifically the East Asian sub-region – about the possibility of an Asian Currency Unit (ACU) as a means of promoting a degree of explicit exchange rate stability. Clearly it would be premature to consider harmonization of Asian exchange rate and monetary policies to a common currency basket at this stage (let alone a currency union based on the ACU) when neither the economic nor the political preconditions exist to do so.¹¹ Attempting rigid policy coordination before the necessary preconditions are met would be like putting the cart before the horse; it is doomed to fail.¹²

This said, there remains much interest in the region on examining the role of an ACU and its possible uses, including circulation as a parallel currency. Accordingly, much work needs to be done on developing alternative methodologies to determine appropriate basket weights.¹³ This paper has used the methodology of Hovanov, Kolari, and Sokolov (2004) to compute the optimal weights. In essence the optimal basket weights computed are aimed at ensuring a regional currency basket that has minimal variance. Hence it will deliver stability in intra-regional exchange rates for alternative configurations of currency baskets in the Asian and Pacific region.

According to the technique applied in this paper the optimal solution to a regional currency basket in the Asian and Pacific region is an almost symmetric or similar currency weighting scheme between ASEAN and non-ASEAN currencies. This can be seen easily from Table 1, as the + 2 (China and Korea) non-ASEAN national currencies and the + 3 (China, Japan, Korea) non-ASEAN national currencies are effectively assigned total weights of only around 30–40%, respectively.¹⁴ This finding is in sharp contrast to what previous studies have proposed. For instance, Ogawa and Shimizu (2005) effectively assigned a total weight of over 70% for the three non-ASEAN national currencies in a regional currency basket consisting of the ASEAN 10 + 3 (China, Japan, and Korea). This symmetry of weighting may make the regional currency unit somewhat more politically feasible for smaller economies in ASEAN.

Notes

1. However, many economists have remained circumspect about the potential benefits of deeper monetary integration in Asia (do the microeconomic benefits outweigh the macroeconomic costs arising from loss of monetary policy sovereignty?), and there are signs of emerging tensions within the EU regarding the net benefits of a single currency.
2. The acronym ACU is actually already used in Asia – the ‘Asian Clearing Union’ has been in existence since December 1974 and is based in Tehran, Iran. This ACU was an initiative of the Bangkok-based UN-ESCAP aimed at developing a region-wide system for clearing payments among members. The current members are Bangladesh, Bhutan, India, Iran, Nepal, Pakistan, Sri Lanka, and Myanmar.
3. The weights in the ECU were determined primarily by each member’s shares in EC-wide GDP, intra-regional trade, and total quota of EMS financial support system.
4. This inertial effect of existing currencies (i.e. advantage of incumbency) is based on the concept of ‘network externalities’ or ‘lock in’ effects, whereby there are limited incentives for economic agents to unilaterally take on a new currency (particularly for invoicing transactions). The network aspects of the internal currency status have been analysed theoretically by Matsuyama, Kiyotaki, and Matsui (1993).
5. The membership issue is discussed further in Section 3.
6. For instance, Moon, Rhee, and Yoon (2007) have argued in favour of the creation of an Asian Exchange Stabilization Fund (AESF). As they observe:

The objective of the AESF is more comprehensive in that it includes exchange rate stability in addition to liquidity support. In fact, the case of the EMS suggests that three

pillars be combined into one institution: ECU, Provision of liquidity, and ERM. Thus, in Asia, once the (A)CU is created and once the provision of emergency liquidity can be strengthened through the CMI, then the next natural step will be to set up an appropriate exchange rate system. This could be carried out with the establishment of the AESF. (20)

7. Also see Rajan (2005). India, Australia, and New Zealand have joined the APT economies to be founding members of the East Asian Summit (EAS). The inaugural meeting was held in Kuala Lumpur, Malaysia in November 2005 (Kumar 2005).
8. The optimal weights that minimize the variance of a currency basket can be easily computed using familiar optimization methods for diversifying a portfolio of assets. See Hovanov, Kolari, and Sokolov (2004) for details.
9. We do not broach the much-debated issue of the reasons behind the reserve build-up (i.e. insurance vs. export-stimulus), except to note the following – quite reasonable observation – by the World Bank (2005):

Intervention was initially motivated by a desire to build up a buffer stock after the Asian crisis had depleted levels of reserves ... [H]owever [r]apid reserve accumulation continued through late 2004, as countries sought to limit the impact of heavy capital inflows on external competitiveness, at a time when domestic demand generally remained subdued. (29)

10. This in turn is contributing partly to large and growing global macroeconomic imbalances and global liquidity.
11. For a recent discussion of how well Asia fits the Optimum Currency Area (OCA) criteria, see Moneta and Ruffer (2006) and Watanabe and Ogura (2006).
12. It is possible – though unlikely – that OCA criteria may be at least partly endogenous, suggesting that some unions may be more justifiable *ex post* rather than *ex ante* (Frankel and Rose 1998).
13. Also see Moon, Rhee, and Yoon (2007) and Watanabe and Ogura (2006) for alternative computations of ACU weights.
14. If India is also included, the non-ASEAN share is still significant at around 45%.

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