

Optimum Currency Areas and Key Currencies: Mundell I versus Mundell II*

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Abstract

The East Asian economies are increasingly integrated in trade and direct investment. More than 50 per cent of their foreign trade is with each other. Both the high growth and level of trade integration is similar to what the western European economies achieved in the 1960s. So, in the new millennium, the inevitable question arises: is East Asia also an optimum currency area (OCA)? Despite the apparent success of EMU, many writers familiar with the East Asian scene think not. Taking the seminal papers of Robert Mundell as the starting point, this article first analyses traditional theorizing on the pros and cons of international monetary integration and then suggests new approaches to the problem of international risk-sharing in OCAs.

Introduction

More than 40 years after Mundell put forward the theory of optimum currency areas (OCAs), the analytical consensus based on his celebrated 1961 paper has disintegrated. Part of the problem stems from a seeming contradiction in Mundell's own work. For offsetting asymmetrical macroeconomic shocks, his 1961 article leans towards making currency areas smaller and more homogeneous – rather than larger and more heterogeneous – while emphasizing the advantages of exchange rate flexibility. However, in a little-known article, 'Uncommon Arguments for Common Currencies', Mundell (1973a) later argued that asset-holding for international risk-sharing is better

*Thanks to Paul De Grauwe and Klaus Desmet for helpful comments.

served by a common currency spanning a wide area within which countries or regions could be, and perhaps should be, quite different.

Paul De Grauwe (2003) characterizes the earlier Mundell as (implicitly) assuming an efficient market for determining how flexible exchange rates vary over time. In contrast, he suggests that the later Mundell (implicitly) assumed an efficient international market for allocating capital when exchange rates were fixed.

This article first critically analyses the plausibility of Mundell's earlier presumption that exchange rates adjust 'efficiently' in response to asymmetric macroeconomic shocks across countries. The focus is then on extending Mundell's later argument on capital-market efficiency for international risk-sharing against shocks to productivity, to the international terms of trade, and so on. Specific classes of financial assets – money, bonds and equities – are examined to see how the exchange rate regime and currency risk affect the incentives for international portfolio diversification.

Across nations or regions, the discussion of OCA theory will proceed on at least four levels:

1. the long-standing debate on the optimum domain of fixed exchange rates in comparison to keeping them flexible when all currencies are treated symmetrically;
2. the asymmetrical role of a key currency in securing exchange rate stability within an optimum currency area;
3. the subordinate debate on whether one needs complete monetary union (as in continental Europe) to secure an optimum currency area's internal domain;
4. even more subordinate is the important issue of whether a group of economies with close trade ties (as in East Asia) gain by collectively pegging to an outside currency such as the US dollar.

Most relevant for East Asia is issue (4). What are the advantages and disadvantages of pegging to the dollar in order to achieve exchange rate stability within the East Asian region? How is this linked to the net debtor or net creditor status of individual East Asian economies?

To encompass all four levels of analysis, a general algebraic model is devoutly to be wished. For a noble attempt to provide one, see Ching and Devereux (2000a, b). Short of this, this article addresses issues on each level – and provides a taxonomic analytical framework to show how they are inter-related. But first, let us re-examine the two Mundell models – hereafter dubbed Mundell I and Mundell II.

I. Mundell I and Stationary Expectations

Like most macroeconomists in the post-war period who had a Keynesian mind set, Mundell in 1961 believed that national monetary and fiscal policies could successfully manipulate aggregate demand to offset private-sector shocks on the supply or demand sides – what Buiters (1999, p. 49) called the ‘fine tuning fallacy’. Underpinning this belief was the assumption of stationary expectations. As a modelling strategy, he assumed that people behaved as if the current domestic price level, interest rate and exchange rate (even when the exchange rate was floating) would hold indefinitely. Not only in his 1961 theory of optimum currency areas, but also in the standard textbook Mundell-Fleming model (Mundell, 1963), stationary expectations underlay how monetary and fiscal policy work themselves out in an open economy. In several influential essays, Mundell (1968) showed how the principle of effective market classification could optimally assign monetary, fiscal or exchange rate instruments to maintain full employment while balancing international payments. He presumed that agents in the private sector did not try to anticipate future movements in the price level, interest rates, the exchange rate, or in government policy itself.

In addition to stationary expectations, Mundell I posited that labour mobility was restricted to fairly small national, or even regional, domains. And these smallish domains could well experience macroeconomic shocks differentially – ‘asymmetrically’ in the jargon of the current literature – from their neighbours. In these special circumstances, Mundell I illustrated the advantages of exchange rate flexibility in what has now become the standard textbook paradigm:

Consider a simple model of two entities (regions or countries), initially in full employment and balance of payments equilibrium, and see what happens when the equilibrium is disturbed by a shift in demand from the goods in entity B to the goods in entity A. Assume that money wages and prices cannot be reduced in the short run without causing unemployment, and that monetary authorities act to prevent inflation ...

The existence of more than one (optimum) currency area in the world implies variable exchange rates ... If demand shifts from the products of country B to the products of country A, a depreciation by country B or an appreciation by country A would correct the external imbalance and also relieve unemployment in country B and restrain inflation in country A. This is the most favorable case for flexible exchange rates based on national currencies. (Mundell, 1961, pp. 510–11)

True, Mundell I carefully hedged his argument by giving examples of countries that were not optimum currency areas, as when the main shocks in the

terms of trade occurred across regions within a single country rather than between countries. And he also worried about monetary 'balkanization' into numerous small currency domains which might destroy the liquidity properties of the monies involved. Nevertheless, the economics profession enthusiastically embraced the above delightfully simple paradigm, often without Mundell's own caveats. Textbooks took existing nation-states as natural currency areas, and argued that a one-size-fits-all monetary policy across nation-states cannot be optimal, firstly, when labour markets are somewhat segmented internationally and, secondly, when the composition of output varies from one country to the next, leading countries to experience macroeconomic shocks differentially.

Following Mundell I, McKinnon (1963) hypothesized that 'openness' with potential currency-area trading partners would militate towards having a fixed exchange rate between them. He argued that the more open the economy, the less tenable would be the Keynesian assumption of sticky domestic prices *and* wages in response to exchange rate fluctuations. For a small open economy, he also worried that the liquidity value of the domestic money would be impaired if its exchange rate, and thus its purchasing power over a broad basket of world goods, fluctuated. He *should* also have made the case that the more open economies are to each other, the less asynchronous would be their output fluctuations arising from demand shocks – a case made empirically, and very neatly, in an article by Frankel and Rose (1998).

Also operating within Mundell's 1961 framework, Kenen (1969) looked at the conditions under which asynchronous macroeconomic shocks across countries would become less likely. If output were more diversified, Kenen determined that the country in question would be a better candidate to have fixed exchange rates with its neighbours because shocks focused on this or that industry would offset each other in the aggregate – the law of large numbers. He concluded that

The principal developed countries should perhaps adhere to the Bretton Woods regime, rarely resorting to changes in exchange rates. The less developed countries, being less diversified and less-well equipped with policy instruments, should make more frequent changes or perhaps resort to full flexibility. (Kenen, 1969, p. 4)

Kenen's conclusion, that relatively undiversified less developed countries – often with just one or two dominant export products – should retain exchange flexibility, is consistent with the earlier Keynesian Mundell I who stressed asymmetric shocks in the face of internal price and wage rigidities. However, as we shall see, Kenen's conclusion is quite inconsistent with the later 'forward-looking' Mundell II who emphasized the need to promote asset diversification for international risk-sharing.

In the 1960s, Mundell I – and almost all other economists – presumed that a flexible exchange rate would be a smoothly adjusting variable for stabilizing fluctuations in domestic output and employment and supporting domestic counter-cyclical policies – as prominent Keynesians such as Meade (1955) argued. At the time, this presumption was also shared by monetarists such as Friedman (1953) and Johnson (1972), who were not macro fine-tuners but who wanted domestic monetary independence in order to secure the domestic price level better. Whatever policy a central bank chose, both groups believed a flexible exchange rate would depreciate smoothly if the bank pursued easy money, and appreciate smoothly if the bank pursued tight money. (Because economists – except for Canada – had very little experience with floating exchange rates in the 1950s and 1960s, the great volatility in generally floating exchange rates after 1971 was unanticipated.)

Thus, in the 1960s, Mundell I's theory of 'optimum currency areas' appealed to both monetarists and Keynesians, although for somewhat different reasons. As such, it became enormously influential as the analytical basis for open-economy macroeconomics, and for scholarly doubts as to whether western Europe – with its diverse national economies and relatively immobile labour forces – was ready for a one-size-fits-all monetary policy.

In the 1990s, the outstanding scholarly sceptic of European monetary union (EMU) was Eichengreen, whose many articles (with several co-authors) were consolidated in his *European Monetary Unification* (1997). He acknowledged Mundell I's influence thus:

The theory of optimum currency areas, initiated by Robert Mundell (1961), is the organizing framework for the analysis. In Mundell's paradigm, policymakers balance the saving in transactions costs from the creation of a single money against the consequences of diminished policy autonomy. The diminution of autonomy follows from the loss of the exchange rate and of an independent monetary policy as instruments of adjustment. That loss will be more costly when macroeconomic shocks are more 'asymmetric' (for present purposes, more region- or country-specific), when monetary policy is a more powerful instrument for offsetting them, and when other adjustment mechanisms like relative wages and labor mobility are less effective. (Eichengreen, 1997, pp. 1–2)

Eichengreen and Bayoumi (1993) had used an elaborate econometric analysis to show this asymmetry. 'A strong distinction emerges between the supply shocks affecting the countries at the center of the European Community – Germany, France, the Netherlands, and Denmark – and the very different supply shocks affecting other EC members – the United Kingdom, Italy, Spain, Portugal, Ireland and Greece' (p. 104, reprinted in Eichengreen, 1997).

Even today, the British press and many economists still argue that a one-size-fits-all monetary policy run from Frankfurt cannot be optimal for both continental Europe and the UK. After all, are not business cycle conditions in Britain sufficiently different to warrant a separate countercyclical response from an independent Bank of England? But whether sophisticated or not, writers in this vein – such as Feldstein (2000) in ‘Europe Can’t Handle the Euro’ – are definitely in thrall to the earlier Mundell.

On these conventional doctrinal grounds, some might object that the East Asian countries, with or without Japan, are too diverse to constitute an optimum currency area. In his book, *Yen Bloc*, Kwan (2001) states Mundell’s 1961 argument this way:

The major cost associated with monetary integration arises from the abandonment of an independent monetary policy. By fixing its exchange rate to other members of the monetary union, a country joining a union automatically gives up control over its own monetary policy. When its economy is subject to an external shock, it has no choice but to follow the common monetary policy of the monetary union. Countries with similar economic structures can respond to a common shock with a common monetary policy, and the costs of giving up an independent monetary policy are relatively small. In contrast, countries with heterogeneous economic structures require different policy responses to common shocks, and the costs of sharing a common monetary policy are relatively large. For example, Japan and Korea, both oil importers, can respond to a surge in oil prices with the same monetary policy. This, however, would not apply to Japan and Indonesia, where the latter is an oil exporter ...

In view of the diversity among these countries, it is unlikely that Japan, the Asian NIEs (Hong Kong, Korea, Singapore and Thailand), the ASEAN countries (Indonesia, Malaysia, Philippines and Thailand), and China together and at once form an optimum currency area. Higher income countries such as those of the Asian NIEs have trade structures similar to that of Japan while lower income countries such as lower-income members of ASEAN and China have trade structures very different from that of Japan. Kwan (2001, pp. 11 and 12, parentheses added)

Based on Mundell’s 1961 analysis, Kwan concludes that East Asia collectively is not an optimal currency area – and that exchange rates within the East Asian area should remain flexible. Kwan’s careful analysis is in line with the large literature showing that pre-euro continental Europe was not an optimum currency area either.

II. Mundell II and International Risk-sharing

In a not-much-later incarnation, Mundell (1973a), now called Mundell II, jettisoned his earlier presumption of stationary expectations to focus on how future exchange rate uncertainty could disrupt the capital market by inhibiting international portfolio diversification and risk-sharing. At a 1970 conference in Madrid on optimum currency areas, he presented two prescient papers on the advantages of common currencies. Perhaps in part because the conference proceedings were not published until 1973, these papers have been overshadowed by his 1960s masterpieces.

The first of these later papers, 'Uncommon Arguments for Common Currencies', is of great intrinsic interest because very early on it emphasized the forward-looking nature of the foreign exchange market – which was then worked out in more analytical detail by his students: see, e.g., Frenkel and Mussa (1980). As such, it counters the earlier Mundell idea that asymmetric shocks – i.e. those where an unexpected disturbance to national output affects one country differently from another – undermine the case for a common currency.

Instead, Mundell II showed how having a common currency across countries can mitigate such shocks by better reserve pooling and portfolio diversification. Under a common currency, a country suffering an adverse shock can better share the loss with a trading partner because both countries hold claims on each other's output. Under a flexible exchange rate inhibiting portfolio diversification, however, a country facing an adverse shock and devaluing finds that its domestic-currency assets buy less on world markets. The cost of the shock is now more bottled up in the country where the shock originated. As Mundell II puts it:

A harvest failure, strikes, or war, in one of the countries causes a loss of real income, but the use of a common currency (or foreign exchange reserves) allows the country to run down its currency holdings and cushion the impact of the loss, drawing on the resources of the other country until the cost of the adjustment has been efficiently spread over the future. If, on the other hand, the two countries use separate monies with flexible exchange rates, the whole loss has to be borne alone; the common currency cannot serve as a shock absorber for the nation as a whole except insofar as the dumping of inconvertible currencies on foreign markets attracts a speculative capital inflow in favor of the depreciating currency. (Mundell, 1973a, p. 115)

Mundell II's second Madrid paper, 'A Plan for a European Currency' (1973b), makes clear his early enthusiasm for the great European experiment. With the formal advent of the euro on 1 January 1999, the forward-looking Mundell of the Madrid papers 'triumphed' over his earlier Keynesian incarnation as the

originator of the theory of optimum currency areas. But he is intellectual father to both sides of the debate.

III. Mundell I With and Without Capital Controls

To pin down better the theorizing that differentiates Mundell I from Mundell II, Paul De Grauwe (2003) points out that Mundell I implicitly assumed an efficient foreign exchange market when exchange rates were flexible, whereas Mundell II implicitly assumed an efficient international capital (financial) market once exchange rates were convincingly fixed. Let us consider De Grauwe's distinction more closely by first considering Mundell I's implicit assumption of an efficient foreign exchange market.

In the 1950s and into the 1960s, the major industrial countries (except for the United States itself) and most developing countries all had capital controls that limited the possibilities for international risk-sharing. Thus it is not so surprising that Mundell I ignored international portfolio diversification as a way of dealing with asymmetric shocks. So let us reconsider what Mundell I must have meant by foreign exchange market efficiency, first in the presence of capital controls (Mundell IA), and second in the absence of capital controls (Mundell IB).

Mundell IA

Once a country imposes capital controls, a free float becomes impossible. Potentially important market-makers – such as commercial banks – are constrained from taking open foreign exchange positions. Without private 'stabilizing' speculators, the government, as normally represented by its central bank, must make the market and determine the exchange rate through official intervention. With capital controls in place, China is a more recent case in point. The People's Bank of China has opted to keep its exchange rate constant at 8.28 yuan per dollar from 1994 to 2004 – although previously in the 1980s and early 1990s it had opted to change its official rate with discrete controlled devaluations. But, as long as capital controls remain, the Chinese government correctly recognizes that it must manage the exchange rate (McKinnon, 2005).

So what do capital controls imply for Mundell I's presumption that exchange rate flexibility could be used to offset asymmetric shocks? Referring back to his standard textbook paradigm where aggregate demand shifts from the goods produced by country B to those produced by country A, the depreciation of B's currency (appreciation of A's) must be guided and implemented by a least one of the two governments. Through official interventions, B's government could nudge its exchange rate continually downward – or de-

value in one discrete jump if it could judge the 'right' amount. Whatever its choice, efficiency in the foreign exchange market would depend on the government intervening in the foreign exchanges to implement its fine-tuning strategy for maintaining domestic output and employment.

But even this is an oversimplification. A's government would have to agree to let its currency appreciate according to the decision(s) of B's government to intervene. The symmetrical way Mundell set up his paradigm – the increase in demand for the goods of country A being equal to the fall in demand for the goods of country B – could make this agreement easy to come by if both countries start off with balanced full employment before the shock occurs. Nevertheless, there is an intergovernmental co-ordination problem behind the presumption of exchange market efficiency.

However, intergovernmental co-operation would be much harder to come by if there were, say, a fall in demand or negative supply shock in country B without any corresponding increase in demand in country A. Then, A's government would be reluctant to have its currency appreciate and so import deflationary pressure. The matter would be aggravated if both economies started with underemployment. Then, a devaluation by country B to stimulate its exports into A's markets would have a 'beggar-thy-neighbour' effect on country A – and could lead to retaliation rather than co-operation. So much for exchange market efficiency!

The problem of intergovernmental co-operation, and which government(s) should be responsible for setting exchange rates, was not – and typically is not – addressed in the OCA literature. The national monies of anonymous countries – A, B, C, ..., are assumed to be similar with no one being dominant – and spillover effects are ignored. In practice, however, potential intergovernmental conflicts in setting exchange rates are largely resolved by choosing one national money to be the dominant key currency. Then other countries in the OCA peg to, or simply define their exchange rates in terms of, the key currency: they do not attempt to adjust their other bilateral exchange rates directly. In Europe in the 1970s and into the 1990s before the advent of the euro, the German Deutschmark was the key currency to which the other Europeans governments pegged – or at least tracked, with varying degrees of success.

But for the D-mark (or any other currency) to fulfil this central role, three important conditions had to be satisfied. First, the German authorities – with the large and the then very robust German economy behind them – passively allowed other countries deliberately, and often inadvertently, to fix or adjust their exchange rates to the D-mark without retaliating. Within Europe, Germany had no separate foreign exchange objectives of its own. Second, with no exchange rate target, the German authorities could follow an independent

domestic monetary policy for stabilizing the purchasing power of the D-mark in terms of real goods and services. Thus, other European countries could treat the D-mark as a nominal anchor for their own price levels. Third, by the beginning of the 1970s, Germany no longer had capital controls – although most other European countries retained controls into the late 1980s. Other European countries could comfortably hold some of their reserves in internationally liquid mark assets to facilitate stabilizing their exchange rates in terms of D-marks.

Mundell IB

What about the efficiency of the foreign exchange market among countries closely connected in trade with flexible (or insecurely pegged) exchange rates if they all abandon capital controls – as was largely true in Europe after the Single European Act of 1987? Paradoxically, without capital controls, efficiency could well decline. There are two related problems:

1. *Excess volatility* from non-stationary expectations. Contrary to the economic doctrines of the 1960s, we now know that a floating exchange rate behaves like a forward-looking asset price (Frenkel and Mussa, 1980). Agents in the foreign exchange markets continually look forward to what governments might do, or economic shocks that could happen, and often get it wrong. Because movements in market exchange rates can be much greater than in the underlying ‘fundamentals’, such volatility would be particularly disruptive among nations closely integrated in trade.

2. *Aggravated currency asymmetry*. The need for a strong key currency to manage mutually consistent official interventions under capital controls, as discussed under Mundell IA, is clear enough. However, this asymmetry among national monies will not disappear when capital controls are removed. The private foreign exchange markets will still select one central money to be the vehicle currency through which foreign exchange trading takes place, and to be the dominant invoice currency in trade in goods and services as well as for international capital flows. This key currency then becomes the definitive money for measuring foreign exchange risk seen by the ‘weaker’ currencies on its periphery (McKinnon, 2004).

Under floating (necessarily without capital controls), (1) and (2) interact: excess volatility aggravates currency asymmetry. On the periphery of the key currency, however, debtor countries are affected differently from creditors.

International debtors find that they cannot *borrow* in their own currencies – the problem dubbed ‘original sin’ by Eichengreen and Hausmann (1999). As their debts cumulate in terms of the central money, they fear a possible speculative attack taking the form of capital flight and forced devaluation that could bankrupt domestic financial institutions. In order to forestall capital

flight, they must then run with positive risk premia in their interest rates. In Europe in the late 1980s and into the mid-1990s, many economies around Germany – particularly the ‘club med’, i.e. Greece, Italy, Portugal and Spain – had higher and more volatile interest rates than Germany itself.

In mirror-image contrast, international creditor countries find that they cannot *lend* in their own currencies – the problem dubbed ‘conflicted virtue’ by McKinnon and Schnabl (2004 and forthcoming). Outside Europe, the rest of the world is on a dollar standard: the US dollar is the dominant key currency. And the US has exploited its central position by running current-account deficits for over 20 years. Thus an increasing number of countries, particularly in East Asia and most notably Japan and China, have become dollar creditors. But instead of building up claims on foreigners in their own currencies, they build up liquid dollar assets – which become an ‘overhang’ in the face of any possible appreciation of the domestic currency. In order to forestall such massive conversions from the domestic privately held dollar assets into the national currency that would impose unwanted appreciation and deflation, they must run with negative risk premia in their domestic-currency interest rates. Not only do their central banks intervene heavily to buy the dollar assets, but they are forced continually to cut domestic interest rates below international levels. The result could be a zero-interest liquidity trap that renders the domestic central bank helpless to stem deflation (for the case of Japan, see Goyal and McKinnon, 2003).

A further consequence of this currency asymmetry is that the international capital market among countries that would otherwise constitute an OCA is impaired. As in East Asia before the currency crashes of 1997–98, large interest differentials between debtor and creditor economies aggravated moral hazard in banks and other financial institutions. Japan, as the region’s main creditor, had deposit interest rates close to zero, whereas heavy borrowing by Indonesia, Korea, Malaysia, Philippines, and Thailand in the early 1990s resulted in unsustainable build-ups of short-term foreign-currency indebtedness and high risk premia in their interest rates. This interest differential aggravated the latent moral hazard in poorly regulated banks and other financial institutions and induced them to overborrow in foreign exchange (McKinnon and Pill, 1999). (China wisely used capital controls to prevent international overborrowing.)

The upshot is that smooth adjustment under flexible exchange rates, as implicit in the ‘efficient’ foreign exchange market imagined under Mundell I to support independent and differing national counter-cyclical policies among countries closely integrated in foreign trade, is an illusion. This is not to deny that exchange rate adjustment occurs when governments follow different macroeconomic policies. But movements in exchange rates, sometimes guided

by official interventions and capital controls, are likely to be erratic at best – and may have serious negative spillover effects in unwary trading partners as disturbances are transmitted from one country to another.

IV. Updating Mundell II's Risk-Sharing Argument

Let us now analyse Mundell II's arguments that, in the absence of capital controls, credibly fixed exchange rates would encourage international portfolio diversification to share the risks from asymmetric economic shocks. Is Mundell II's implicit assumption (as pointed out by Paul De Grauwe) of international capital market efficiency when exchange rates are fixed, tenable?

In developing his formal model of risk-sharing, Mundell II (1973a) made no distinction between money, bonds and equities. Indeed, his analysis proceeded as if the only financial asset in each of his two countries was some form of domestic money. And, he considered risks arising only on the supply side, i.e. where supply shocks affected national outputs differentially. In this context, his risk-sharing argument (p. 692 above) is deceptively simple. However, as we shall see, if money is the only financial asset, i.e. no bonds or stocks, then risk-sharing between two countries will still be incomplete – even when they are joined together by a fixed exchange rate. So we need to bring other forms of financial assets into the analysis.

First, however, let us ask whether a fully efficient international capital market – with 'full' international risk across regions or countries – is ever possible. Purely theoretically, one could imagine an Arrow-Debreu economy with a complete set of cross-country contingent claims, i.e. insurance contracts all specified in real terms. If country *A* experienced a shortfall in output from some specified natural disaster, then it would be compensated by country *B* – and *vice versa*. Similarly, if output increased fortuitously in country *A*, a contract would exist requiring its surplus to be shared with country *B*.

However, an Arrow-Debreu economy cannot actually exist. Besides being inhibited by overwhelming complexity in writing such contingent contracts, any contracts actually negotiated would be fraught with moral hazard. In Arrow-Debreu insurance contracts, the precise meaning of every state of nature requiring a particular payoff would have to be prespecified. Otherwise, countries (the people in them) would slacken their work effort, reduce output, and try to exercise some (false) insurance claim on a neighbour.

Be that as it may, suppose that these problems of complexity and moral hazard in writing such forward contracts could be overcome. That is, a full set of such state-contingent claims on real resources was actually negotiable both within the domestic economy and for trade with neighbouring countries. Then money itself would become redundant! There would be no point in carrying

cash reserves forward, whether in domestic or foreign currency. Nominal exchange rate arrangements, whether fixed or floating, would not matter. In this complete Arrow-Debreu model, all current and future 'real' resources would have been fully bartered in the first negotiating period! So full capital-market efficiency in the Arrow-Debreu sense is a chimera.

In practice, the set of relevant financial assets available for sharing risk among nations is much more restricted. So let us proceed more inductively by restricting our analysis of international capital-market efficiency to those kinds of non-contingent financial assets – bonds or stocks – that we observe in an integrated national financial market, and which, potentially, could be traded internationally. Let me propose the following set of three restrictive axioms for our theoretical modelling to satisfy:

1. *No claims contingent on states of nature*: Although private insurance markets exist at the microeconomic level, individual risks can largely be diversified away. Not so at the macroeconomic level when large supply shocks affect nations differentially.
2. *All financial assets are nominal*: That is, their only intrinsic value is monetary. There are no 'real' (or indexed) bonds, national or international.
3. *Stable fiat money*: Monetary authorities strive – perhaps imperfectly – to stabilize the purchasing power of each domestic money in terms of a broad basket of consumable goods and services. In undiversified economies with just one or two major outputs, the authorities would look to a broad basket of importables as their price-level target.

These axioms are symbiotically related. As per Arrow and Debreu, stable money is not necessary if there are 'real' bonds or a complete set of contingent claims on real output. We know, however, that in practice virtually no state-contingent bonds are actually issued, and that there are no private issues of indexed 'real' bonds.

In contrast, broad markets for *non-contingent* nominal bonds, those whose payoffs are fixed in monetary terms without regard to states of nature, exist on a large scale – but only because buyers and sellers believe that the national monetary authority is committed to stable money. A holder of a fixed-interest nominal bond needs to be reassured *ex ante* that the bond's purchasing power at face value is known – at least approximately. Otherwise, broad and deep long-term bond markets cannot exist.

Finally, theoretical models of open economies with just one, two, or even three goods naturally violate the stable money axiom. In such models, the domestic-currency prices of these few goods – often just one domestic good – vary substantially in response to some supply shock or exchange rate change. But that is inconsistent with having a determinate demand for each domestic

money. People will only hold money if there exists a broad diversity of goods produced at home or abroad whose average price defines money's purchasing power. (Obviously, I am ruling out highly inflationary economies as candidates for joining any kind of co-operative fixed exchange rate regime.) In a literal one-good economy, people would have no incentive to hold money.

Of course, our stable money axiom does not rule out the possibility of major changes in the *relative* domestic prices of particular goods, or in international terms of trade, or (limited) exchange rate flexibility. But large discrete changes, or jumps, in the purchasing power of foreign or domestic money are ruled out.

Under these three restrictive axioms, limiting the potential array of financial assets available (in comparison to the unlimited array in an Arrow-Debreu economy), what can be said about the possibilities for international risk-sharing against supply-side shocks under alternative exchange rate arrangements? To simplify the discussion, consider capital markets as if they contained just one financial asset at a time. I will consider money, bonds and equities in turn.

Money and Official Exchange Reserves

In the face of imperfectly correlated supply shocks, Mundell II's original (1973a) theoretical argument – where 'money' is the only financial asset – still holds. If two countries share a common currency, Mundell II reasoned that the full stock of privately held money in country *A* could be exercised as a claim on country *B*'s resources should *A* be hit with a sudden decrease in output – and *vice versa*. Under flexible exchange rates, however, privately held money in one country would not be an automatic claim on the resources of the other – at least not at par value.

In the absence of a common currency, however, governments could only ensure that the stock of privately held national domestic money would be fully convertible into foreign money at a fixed exchange rate by holding official exchange reserves – possibly on a large scale. Then, issues of national money would be fully backed by foreign-currency assets – as when one of them adopts a currency board.

But even if the domestic stock of narrow money, say M1, is fully backed by foreign exchange, it is simply not 'big' enough for substantial international risk-sharing. Ching and Devereux (2000a) derive this result more formally in the context of a model where money is the only asset in countries forming a monetary union. But it is intuitively obvious. The amount of narrow money individual firms and households wish to hold as domestic means of payment is small relative to their total stocks of bonds and equities – and even small relative to the economy's total stock of short-term liquidity. In the

United States the stock of M1, currency and current accounts, is less than one-fifth of the total stock of private-sector liquid assets (M3) – which also includes money market mutual funds, commercial paper, and short-term Treasury securities. And, narrower still, the American monetary base – currency and commercial bank reserves held with the Federal Reserve – is less than one-half of M1 or only 5.4 per cent of American GNP.

Clearly for financially sophisticated economies, a broader range of financial assets as vehicles for international portfolio diversification needs to be considered.

Diversification in Bond Holdings and the Principal–Agent Problem

Let us define fixed-interest ‘bonds’ very broadly to include virtually all financial assets that are neither narrow money (M1) nor equities. (Because their payoffs are variable, common stocks might be considered natural financial instruments for international risk-sharing – and they will be considered separately below.) Hence, our definition of a bond includes time deposits in banks and commercial bills, as well as mortgages and corporate or government bonds.

A key aspect of the bond market is that most of the ‘bonds’ held by households are not primary claims on ultimate borrowers. Instead, most of these claims are indirect claims intermediated through financial institutions – banks, money market funds, pension funds, insurance companies, and so on. And the size of these holdings is extremely large relative to narrow money. Under this broad definition, direct and indirect bond holdings are about 200 per cent of GNP in the United States. Thus, if different regions (nations) suffer from asymmetrical supply shocks to regional outputs, default risk in the bond market is potentially substantial.

In principle, however, much of this default risk can be shared through portfolio diversification across diverse regions. Indeed, in regions with just one or two products, uninhibited portfolio diversification by financial intermediaries representing domestic households would result in *most* of their bond-type domestic assets being claims on foreigners. But this need not result in a net outflow of capital. Foreigners would happily own most of the domestic bonds issued by any (small) single-product economy as long as the rest of their portfolios was well diversified outside the economy in question – thus leading to compensating capital inflows. Indeed, the less diversified the local economy is in its output structure, the more it has to gain in risk reduction by being plugged into a broader bond market encompassing economies very different from itself.

However, there is trouble in this potential paradise. Unless these diverse economic units are securely connected by a common money, exchange rate

uncertainty – i.e. currency risk – will inhibit the international sharing of default risks.

At first glance, it is not obvious why the presence of currency risk should inhibit international bond portfolio diversification by households and non-financial firms. On the contrary, is not currency risk just another risk that domestic bondholders could diversify away? Indeed, if the future purchasing powers of various national monies were (symmetrically) uncertain, would not risk-averse households in any one country be given additional incentive (beyond their concern for limiting default risks) to hold bonds denominated in foreign currencies?

But for international or even domestic risk diversification, households could hardly manage their own bond portfolios directly. They would lose all the well-known economies of scale, including expert information collection, associated with risk-pooling by financial intermediaries. Thus, a household would prefer to hold general claims with a fixed monetary payout which are, say, an indirect claim on a bank's loan portfolio. Similarly, households seeking insurance would prefer an annuity fixed in nominal terms rather than directly holding some pro rata share of the insurance company's assets.

Reflecting this strong empirical regularity, let us assume that all the holdings of 'bonds' by households are indirect, i.e. general claims on a financial intermediary. Then the resulting *principal-agent problem* becomes the key to understanding why we observe so little international diversification in bond holdings across countries not joined by a common money. The household (the principal) cannot possibly monitor or control the individual investment decisions made by the financial intermediary (the agent). So it buys claims on the financial intermediary – such as a certificate of deposit – whose face value is fixed in monetary terms. And, in non-inflationary economies where foreign monies do not circulate in parallel with the domestic one, the simplest way of establishing the face value of the pay-out, i.e. the intermediary's liability, is to choose the domestic money as the sole currency of denomination. Thus I hypothesize that the fixed face value of bonds held by domestic nationals the world over is largely denominated in the local (national) currency.

But households' demand to have their non-contingent assets fixed in the national currency poses problems for the financial intermediaries, who must eventually make good on these claims. Within the limited domain defined by the domestic currency, risk-averse intermediaries can freely strive to diversify their own asset portfolios to limit default risk. However, if they cross currency boundaries in making loans, they then find themselves in the uncomfortable position of having liabilities with fixed face values denominated in the domestic currency when (some of) their assets are denominated in foreign currencies. Thus, in the foreign exchange markets, if the domestic cur-

rency was suddenly to appreciate against all others, such a financial intermediary could easily go bankrupt, whence various regulatory rules of thumb, especially for banks, that force them to hedge in order to limit the extent of their net foreign exchange exposure. Although short-term foreign exchange risk can be hedged at some cost, long-term holdings of foreign bonds are less amenable to being hedged. A British retirement pension fund with long-term annuity liabilities fixed in sterling would lean strongly to holding fixed-yield sterling assets at a similar long term to maturity.

The bottom line is that the presence of currency risk inhibits international portfolio diversification in bond markets designed to share default risks arising out of asymmetric supply shocks. Insofar as smallish regions are more specialized in what they produce and thus are subject to idiosyncratic output shocks, they would suffer more from allowing their exchange rates to float. Under flexible exchange rates, the inability of a small region to diversify away its default risks could lead to a higher risk domestic premium in the whole structure of its interest rates.

But much of the literature on optimum currency areas has argued just the opposite. Besides Kenen quoted above, other authors have questioned whether regions or nations that are highly specialized in production should give up control over their own monetary policy and exchange rates. As Frankel (1999) has pointed out, Eichengreen (1992) and Krugman (1993) have gone one step further and worried that even a successful monetary and economic union may become less of an optimum currency area over time as its regions naturally become more specialized in what they produce. Eichengreen and Krugman point out that industrial production is now much more specialized across American states than across European nation-states – and that the latter will become more specialized as a result of the very success of European economic union. As reported by Frankel (1999), Eichengreen and Krugman are essentially claiming that an economic entity might fail the criteria to be an OCA *ex post*, even if they had passed *ex ante*. Indeed, Krugman suggests that

Theory and the experience of the of the United States suggest that EC regions will become increasingly specialized, and that as they become more specialized, they will become more vulnerable to region-specific shocks. Regions will, of course, be unable to respond with counter-cyclical monetary or exchange rate policy. (1993, p. 60)

Clearly, Eichengreen and Krugman were (are?) still in thrall to Mundell I's fine-tuning fallacy. But once risk-sharing through portfolio diversification in bond holding is properly weighed, the case for a monetary union becomes even stronger as the constituent parts of the underlying economic union become more specialized in what they produce. Presumably, the productivity

gain from greater regional specialization is one of the major benefits of having an economic cum monetary union in the first place!

Fortunately, we now have the example of EMU to show what happens when one moves from floating or uncertainly fixed exchange rates to full monetary union. The great success of European monetary union was to move beyond an asymmetrical Deutschmark zone to a common currency. Except for some differences in national banking regulations, EMU now comes close to the ideal of allowing unhindered portfolio diversification for international risk-sharing. But systematically testing this proposition empirically is a major task, far beyond the scope of the present article. However, the great natural experiment – the abolition of 11 national currencies in Europe in favour of the euro on 1 January 1999 – is very revealing.

Within Euroland, private euro-denominated bond issues grew explosively after 1 January 1999. Overall euro bond issues in the first half of 1999 were 80 per cent higher than a tabulation of all bond issues in the old legacy currencies for the first six months of 1998. Most strikingly, issues of euro-denominated *corporate* bonds were almost four times higher in 1999 than in 1998. Why the startling difference?

In the pre-euro regime, the D-mark was king – the central or safe-haven European currency for the group. In effect, Europe was on a common monetary standard based on a key currency where other European countries tried, with some uncertainty, to maintain exchange rate stability against the mark. Thus, private corporations in European countries on Germany's financial periphery – such as Italy, Portugal and Spain, which mainly issued bonds in lire, escudos and pesetas respectively – suffered currency risk relative to German issuers of mark-denominated bonds. The resulting risk premia, i.e. higher interest rates particularly longer term in these club-med countries kept finance short term and largely bank based. For example, in the early to mid-1990s, interest rates on Italian lire-denominated bonds were as much as 5 percentage points higher than those on German mark-denominated bonds.

After 1 January 1999, the extinction of these risky 'peripheral' currencies has allowed previously hobbled Italian, Portuguese, Spanish (and even French?) firms to lengthen the term structure of their debts by issuing euro-denominated bonds at much lower interest rates – now close to those paid by German firms – while escaping from the clutches of their bankers. European banks, in turn, are madly consolidating – although unfortunately only at the national level. Even the highly indebted governments of the club-med countries, albeit under the constraint of the Maastricht agreement, can roll over their large government debts (now denominated in euros) at interest rates within a half a percentage point or so of those paid by the German federal government.

The *demand* for longer-term euro denominated bonds has also increased. European insurance companies and pension funds, as well as banks, had been confined to keeping the bulk of their assets denominated in the home or domestic currency in order to match their domestic-currency liabilities. But with the move to a common, and for the formerly peripheral countries, a stronger currency, these financial institutions became free to diversify and acquire euro-denominated assets on a western Europe-wide basis – and from foreigners who are willing to sell euro-denominated bonds in the newly created market. Thus the term structure of corporate finance in western Europe is being lengthened with the lower interest rates reflecting lowered overall portfolio risk.

In summary, in encouraging risk-sharing through portfolio diversification in international bond markets, preliminary evidence from the great western European experiment suggests that – on both the demand and the supply sides – a common currency may be considerably better than a common monetary standard based on a key currency. In middle and eastern Europe, countries now use the euro itself as a key currency for securing exchange stability. Although the greater price-level stability and mutual exchange rate security from such a policy are still substantial, the full benefits of international bond-market diversification will have to wait until these countries become part of Euroland.

Stock Markets and Home Bias

An enduring empirical puzzle in the finance literature is why owners of common stock appear to diversify much less internationally than might be predicted by a proper risk–return trade-off based on the capital-asset pricing model (CAPM). Lewis (1999) nicely reviews this huge literature. But what is striking, at least to this author, is how little emphasis was given to currency risk *per se* in explaining home bias.

In computing historical means, variances and covariances of returns to holding foreign stocks in comparison to American, authors typically translate everything into dollar terms at the exchange rate prevailing during the period over which the foreign returns were calculated. In these econometric studies (often quite elaborate), industry risks are thereby completely melded with exchange rate risks.

However, absent currency risk *within* a country like the United States, the stock market ideally distributes capital across industries according to their expected returns and risks *vis-à-vis* the general market. Highly paid analysts specialize in particular industries to estimate the future risk and return of industry X against the general market, and then disaggregate further to pick winning firms within that industry. In the absence of stock market bubbles and crashes, all this is well and good for increasing industrial efficiency.

Now take such a group of domestic industry specialists and broaden their range to study the same industries in a foreign country, with its own monetary regime, as well as those at that home. In picking winners abroad compared to at home, exchange rate risk now tends to reduce the effective expertise of our industry analysts. Noise is introduced into the information set within which they normally work because their profit projections have to be translated back into dollars through the uncertain exchange rate.

And this noise problem is not easily resolved by hiring foreign exchange specialists to project the future course of the exchange rate. Because a floating exchange rate between any pair of industrial economies moves like a random walk, the rate cannot be predicted with any accuracy.

The upshot is that expert industry analysts and portfolio managers tend to pull in their horns and recommend, for any one industry, smaller holdings of those common stocks denominated in foreign currencies than in the domestic currency. In the aggregate across all industries, therefore, holdings of foreign stocks will be less than a purely mechanical application of an international CAPM would project. This loss-of-technical-expertise argument is probably not the only reason for home bias in international equity holdings, but it is a leading candidate.

Considering money, bonds and equities together, what can we conclude about asset diversification to deal with asymmetric supply shocks across regions or countries? Clearly, under floating exchange rates, currency risk will undermine international risk-sharing and diminish cross-holdings of all three financial assets. But even a credibly fixed exchange rate between any pair of countries will still leave a residual currency risk because of the 'natural' currency asymmetry that develops. Full asset diversification by risk-averse financial intermediaries with narrow profit margins will still be inhibited. Only a common money will convince financial intermediaries to diversify as freely across national boundaries as they do across regions in the same country – as seems to be implicit in Mundell II.

V. Aggregate Demand Shocks: A Further Taxonomy

Mundell I focused on asymmetric demand shocks and the need for counter-cyclical macroeconomic policies: 'Suppose demand shifts from the products of country B to the products of country A ... with the need to allow an appreciation of B's currency to restrain aggregate demand in B – and a depreciation of A's currency to stimulate it in A'. But under what circumstances are such asymmetrical demand shocks likely to occur?

Diversified Industrial Economies

Suppose A and B were highly diversified industrial economies, say, Germany and France, each producing thousands of goods with a huge overlap in product lines. Could consumer preferences suddenly shift in the way the quotation from Mundell I implies? It is difficult to imagine that consumer preferences would suddenly shift en masse away from thousands of French goods in favour of thousands of German goods. The law of large numbers in product diversification would be overturned. One could, perhaps, imagine a narrower demand shift away from cars toward motor cycles – but this would not be particularly country specific. Thus, for diversified economies, the need for exchange rate flexibility to offset volatility in consumption preferences is negligible.

Apart from pure shifts in consumer preferences, there is another kind of ‘demand’ shock which economists, e.g. Johnson (1972), used to believe would warrant an exchange rate adjustment. Suppose country A began to inflate aggregate demand so as to create incipient (or actual) inflation. An ongoing depreciation of A’s currency could accommodate this to avoid a loss in A’s international competitiveness while obviating the need for domestic disinflation and a possible rise in unemployment.

But, with the death of the Philips curve, we now know that such accommodation would violate the principle of time consistency in policy-making – and simply lead to further instability. Unless the country in question has a chronic need for revenue from the inflation tax, better that it be forced to disinflate to maintain the exchange rate.

This dilemma – to disinflate or not to disinflate to maintain economic competitiveness with one’s trading partners – arises only because they have separate monetary regimes. Under a common currency, differential rates of inflation could not persist.

Undiversified Economies

Particularly for primary product producers with unstable terms of trade, the argument is often made (Kenen, 1969) that countries retain exchange rate flexibility – devalue when the terms of trade turn against you – in order to ameliorate the resulting income fluctuations. But this view has several problems.

First, tying the exchange rate to the fortunes of one or two primary products undermines private portfolio diversification and international risk-sharing – as described above. Foreigners would not want to hold financial claims on the domestic economy if they knew the exchange rate was volatile. And this reluctance would make it difficult for domestic nationals to hold financial

claims on foreigners without the economy as a whole running (an expensive) current account surplus, i.e. allowing net capital flight.

Second, the liquidity value of the domestic money itself could be impaired. If only one product was produced domestically – say, coffee – and the purchasing power of domestic money was tied to the price of coffee, people would opt to hold foreign currencies for domestic transactions. In an economy producing one or two exports but importing a broad basket of goods of all kinds, the natural way of satisfying our stable money axiom is to peg your currency to that of a highly diversified trading partner. Otherwise workers would be reluctant to accept wages specified in term of domestic rather than foreign money.

The Endogeneity of the OCA Criteria

The presence of asynchronous demand shocks, or asynchronous income fluctuations more generally, could well diminish as trade integration increases. Of course, under a common currency, asynchronous demand shocks would be quite minor because of the disappearance of separate national monetary policies. As Frankel (1999 p. 24) puts it for nascent monetary unions ‘the OCA criterion might be satisfied ex post even if not ex ante’.

But short of adopting the rather draconian solution of forming a monetary union, Frankel and Rose (1998) show that trade integration itself reduces the extent to which income fluctuations are uncorrelated, i.e. are asynchronous. For 21 industrial countries from 1959 to 1993, they first computed correlations of income changes between every pair of countries. They then regress these correlation coefficients on a measure of trade integration for each pair. Across their 21 countries, higher trade linkages are associated with higher correlations in income fluctuations.

Asymmetric demand shocks across countries of the kind that so concerned Mundell I seem to be diminishing as globalization proceeds. But even with an efficient international capital market under fixed exchange rates as envisaged in Mundell II, problems of macroeconomic control would still remain. In normal times, having portfolio diversification across countries would smooth consumption in the face of (regional) output shocks – and monetary union is a big boost to financial market integration so that financial flows within the union are normally stabilizing.

However, even a fairly efficient international capital market would not rule out local booms and busts, as in California’s Silicon Valley boom from 1995 to 2000 and subsequent bust, or within Euroland as with Ireland’s boom and (mini) bust. Indeed, as Paul De Grauwe (2003) points out, being hooked up to a larger capital market could exaggerate regional bubbles if animal spirits prevail and capital markets are not fully efficient. Even here, however,

returning to separate currency regimes as under Mundell I would not solve this problem. In the absence of capital controls, problems of moral hazard in capital flows crossing international currency boundaries leading to over-borrowing can be more acute (McKinnon and Pill, 1999) than if countries shared a common currency. This undue incentive to build up debts in foreign currencies was only too obvious in the East Asian boom before the great crisis of 1997–98. Then, once the crash occurred, the resulting wave of domestic bankruptcies was exacerbated because most of the debts were denominated in foreign monies.

VI. A Negative Summing Up

There are only two good reasons for any country *not* to be on a common-currency regime or a common monetary standard with its trading partners. A common monetary standard is one of highly credible fixed exchange rates but national monies remain in circulation. The late nineteenth-century gold standard is a good example.

First, a country could not participate in either a common-currency regime or a common monetary standard if its own public finances were too weak. If its government needs to retain control over issuing its own currency in order to extract more monetary seigniorage from the financial system – possibly through inflation – than a common-currency regime would permit, then no fixed exchange rate regime is feasible or advisable. More subtly, by owning its own central bank, the government becomes the preferred borrower in the national capital markets. Because the government alone owns the means settlement on interest-bearing debt denominated in the domestic currency, it can float public debt at the lowest interest rates in the domestic capital market (McKinnon, 1997). This preferred access to the domestic bond market also allows the national central bank to act as a ‘lender-of-last resort’ for domestic commercial banks.

For example, several eastern and middle European countries do not yet have sufficient fiscal and financial control domestically to allow them to give up their national central banks in order to join a broader monetary union. And, as Nuti (2000) suggests, adopting a currency board may not be a satisfactory half-way house: the country loses control over its national central bank without yet gaining access to the discount window of the central bank for the broader monetary union.

Second, no sufficiently stable monetary standard exists in the rest of the world. Natural trading partners, by the OCA criteria, are themselves not stable in a monetary sense. The now 12 members of Euroland took several dec-

ades of intense bargaining over economic integration and mutual fiscal constraints before the stage was set for the European Central Bank (ECB) credibly to issue a common currency. However, because the euro is now firmly established as a stable European monetary standard, the much smaller eastern and middle European countries now have more incentive to join it.

At the present time, the political will for full-scale economic and monetary integration with neighbouring countries simply does not exist elsewhere. However, a less politically demanding common monetary standard based on a key currency might achieve much – although certainly not all – of the benefits of a common currency (McKinnon, 1996, 2005). A successful common monetary standard requires two key interrelated conditions:

1. a credible anchoring mechanism so that countries which attach themselves to the standard succeed in stabilizing the purchasing powers of their national monies; and
2. close trading partners which attach themselves convincingly to the same standard.

The gold standard's great advantage was that it was international. By the late 1870s, most economies that were significant international traders had adopted it. Moreover, it provided a credible anchoring mechanism for national price levels until terminated by the First World War in August 1914. This lack of persistent inflation and the gold standard's universality meant that exchange rates were credibly fixed and capital markets – particularly bond markets – were remarkably well integrated from the 1870s to 1914. The gold standard's great drawback, of course, was recurrent liquidity crises from runs on gold – which was a principal reason for the advent of the Great Depression of the 1930s.

In the modern period, the US dollar serves as a (quasi) monetary anchor for most countries outside Europe. It has the great advantage over the nineteenth-century gold standard of being a fiat managed currency – and, in the modern period, not itself subject to runs or liquidity crises. However, the dollar standard has major drawbacks.

First, although informal pegging to the dollar is widespread in Asia, the Americas, and much of Africa in the short run (Calvo and Reinhart, 2002), these exchange rate pegs are 'soft' and lack credibility – particularly over the long term. In contrast, gold mint parities in the nineteenth century were highly credible on a long-term basis – although occasional short-term suspensions could occur. But it is the long-term credibility in exchange rate parities which was the key to the remarkable integration of capital (mainly bond) markets in the late nineteenth century (McKinnon, 1996).

Second, the modern dollar standard is not universal enough in securing stable exchange rates. In the 1990s when Argentina pegged strongly to the dollar, the other members of Mercosur did not. So even if one considered Mercosur to be an OCA, Argentina was upset by Brazil's large discrete devaluations and by Chile allowing its currency to float downward. Similarly, in the increasingly integrated East Asian economies before the 1997 crisis, all countries except Japan had been informally pegged to the dollar. However, because of weak or non-existent commitments to maintain their dollar exchange rates in the long run, they were all vulnerable to inadvertent 'beggarthy-neighbour' devaluations. But the desire for a common monetary standard in East Asia remains strong. After the 1997–98 crisis, most East Asian countries resumed informal dollar pegging (McKinnon, 2001; McKinnon and Schnabl, 2004). Nevertheless, positive or negative risk premia – resulting in large interest differentials – can only be eliminated by lengthening the terms to maturity over which these exchange rates are stable.

In conclusion, outside of Euroland and the drive for 'euro-ization' in middle and eastern Europe, the best interim hope for a natural OCA such as East Asia is to recognize the inevitability of dollar predominance and work towards rationalizing the rules of the dollar-standard game (McKinnon, 1996, 2004). But that is a story for another time.

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