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An Overview

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Abstract

This paper selectively reviews the recent literature on currency regimes in Europe, the Americas and East Asia. We argue that, given the global interdependence among today's economies, currency regimes should be always evaluated in relation to monetary policy, fiscal policy, structural policies, and the working of financial markets. Thus currency regimes do matter and are a relevant concern for policy makers.

Keywords: Bipolar view, the euro, Dollarization, regional currency area.
JEL classification code: F31, F33, and E58.

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1. Introduction

Aliber [2000] summarizes the major questions regarding world currency regimes as "to fix or not to fix" and "optimum currency areas or not." The classical answer to both these questions since the late nineteenth century made by modern industrial economies was to fix currencies to gold. Keynes [1923] made the crucial distinction between "internal stability (a stable price level)" and "external stability (a stable exchange rate and equilibrium in the balance of payments)." He favored the former in the presence of nominal rigidity in domestic prices and thus argued in favor of a flexible exchange rate.[1] Many economists in those days were skeptical about free floating exchange rate. Most prominently, Nurkse [1944] regarded the experience of European currencies, such as that of the French franc from 1922 to 1926, as evidence that speculators are in general destabilizing under a floating exchange rate.[2] At the launch of Bretton Woods system in 1944, world economies chose an adjustable fixed exchange rate to the U.S. dollar backed by the gold reserve in the U.S.

During operation of the Bretton Woods system, two distinct views that became the foundations of the analysis of exchange rate regimes appeared. Friedman [1953] eloquently stated the possible merits of a floating exchange rate for the sake of absorbing external shocks.[3] Mundell [1961] and McKinnon [1963] responded that, depending on

[1] Note that whether a country chooses a fixed or floating exchange rate, the real exchange rate has to adjust. Thus, the main choice is whether the cost of adjustment is lower if a country chooses to deflate (which Keynes disagree) or depreciates.

[2] He points out that the system of flexible exchanges in the 1930s uses gold as a vehicle for 'hot money' transfer. He concludes that "If there is anything that inter-war experience has clearly demonstrated, it is that paper currency exchanges cannot be left free to fluctuate from day to day under the influence of market supply and demand (p.137)."

[3] He says "changes in internal prices and incomes are undesirable because of rigidities in internal prices, especially wages, and the emergence of full employment --- or independence of internal monetary policy --- as a major goal of policy (p.172-173)." He argued that floating exchange rate would be stabilizing thanks to speculative transactions. Bordo and James [2001] pointed out that Gottfried Haberler made a strong

the economic conditions, some economies would be better off by retaining a fixed exchange rate.[4] Their contributions are well known as the theory of optimum currency areas.[5] They also stressed that the economically desirable extent of common currency areas might not coincide with national borders.

After the collapse of the Bretton Woods system, many industrial economies chose to float, except for the notable exception of the EMS. Emerging market economies have gradually shifted from a fixed exchange rate system towards a floating exchange rate system, often after experiencing currency crises. Against this background, Krugman [1979] proposes a model of balance of payments crisis that focuses on inadequate government policy.

In the 1990s, many economies moved in the direction of free capital mobility. We found many crises in the 1990s that seem to be correlated with large capital inflows and outflows, and economists have proposed new ways to analyze these new experiences. Motivated by the EMS crisis in 1992, Obstfeld [1994] conjectured that the costs incurred by the authorities in maintaining the pegged exchange rate regime depended on public expectations. In other words, the cost of resisting a currency attack depends on endogenous variables. If governments determine the extent of their resistance through a cost-benefit analysis, however, self-fulfilling crises become likely in situations where economic distress already places the government under pressure. If some exogenous

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intellectual case for floating exchange rates as a mechanism to insulate economies from the transmissions of booms and depressions in his book published in 1937.

[4] For example, if factor mobility could be high enough to smooth out divergent shocks across regions, those regions could adjust for the relative wage discrepancies induced by adverse shocks without adjusting the nominal exchange rate. In a region whose external openness is high, the fluctuations in nominal exchange rate under a floating exchange rate arrangement would have an influence not only on the prices of tradable goods, but also on the wages and the prices of non-tradable goods. Thus a floating exchange rate may not be helpful.

[5] Recent studies such as Frankel and Rose [1998] demonstrate that optimal currency area criteria are endogenous, i.e., although these criteria may not be satisfied before the introduction of common currency,

events change the public's expectation regarding the future exchange rate regime, it might lead to self-fulfilling crises among possible multiple equilibria. It could happen even if the authorities have committed themselves to maintaining the fixed exchange rate regime, thus the authorities' commitment is not time-consistent. Morris and Shin [1998] proposed a way to pin down a unique equilibrium by adding a small amount of noise in speculators' signals regarding the fundamentals.

Observing currency crises in the emerging market economies, such as Mexico in 1994, East Asia in 1997, and Russia in 1998 and Brazil in 1999, Summers [2000] states that the sources of those currency crises are serious banking and financial sector weakness, and short term capital flows.[6] Those episodes remind us of the argument of the *impossible trinity*: economies could not have capital mobility, an independent monetary policy, and a fixed exchange rate simultaneously, which leads to the "Bipolar View." This view suggests that hard pegs and floating exchange rates are good candidates for currency regimes for emerging market economies under conditions of free capital mobility.[7]

This paper has two objectives. It first reviews some debates on the choice of exchange rate regime with special attention to examples of hard pegs, the EMS, the euro and currency boards, in order to evaluate to what extent the "Bipolar view" is useful. Second, it explores the possibility of future regional currencies in Europe, the Americas

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these same criteria might be satisfied once the regions could form a common currency area.

[6] This paper focuses on theoretical literatures. Thus, we do not discuss studies on contagion motivated by the episodes of the Tequila crisis, the Asian flu, and the Russian virus. Recent examples include Kaminsky and Reinhart [2000, 2001].

[7] Even under the surge of global capital flow during the 1990s, "The Original Sin Hypothesis (Eichengreen and Hausmann [1999])," forces most emerging market economies to rely on short-term bank lending denominated in the U.S. dollar, rather than their own national currency. Other economists wonder if capital account liberalization during the 1990s is helpful or not (see Rodrik [1998]). Thus, the word "free capital mobility" here is used for the sake of a conceptual framework. Indeed, capital account liberalization remains one of the most controversial policy issues (see Eichengreen [2001] for recent review).

and East Asia. The rest of this paper is organized as follows.

Section 2 reviews the definition of and trends in exchange rate regimes, and introduces the "Bipolar View."[8] Section 3 examines the experience of European economies. It discusses lessons from the EMS crisis, issues for monetary policy after the launch of the euro, and the possibility of expansion of the euro area. Section 4 first reviews the debate over unilateral Dollarization in Latin America as one of the notable examples of hard pegs. Then we move on to the possibility of a common currency area in the Americas. Section 5 reviews the twin-crisis models motivated by the East Asian crisis. Then we discuss the possibility of an Asian common currency. Section 6 summarizes the observations made in this paper and topics for future study.

Note that illustrations for recent theoretical contributions in this paper show that the traditional Mundell-Fleming model may not be the sole theoretical reference point for policy making. However, space did not allow us to discuss any alternative theoretical buildingbloc in the main text. The Appendix reviews promising theoretical alternative literature following the consideration of the international transmission of monetary policy and exchange rate regimes under conditions of uncertainty. An important policy implication obtained from those literatures is that market structure and parameter of production function would have effect on the transmission process of monetary policy.[9] Consistent with this view, recent empirical studies point out the interaction between real factor and monetary regime.[10]

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[8] One may argue that the choice of exchange rate regime *per se* does not provide any useful lesson, because "no single currency regime is right for all countries or at all times," (Frankel [1999]). A lesson from his point of view is that the exchange rate regime is not a once-for-all question. One should think about this issue always.

[9] Cooper [1999] said that traditional analysis of exchange rate regime was not adequate due to the division of real factor and monetary factor, and that the new approach summarized in the appendix broke with part of its tradition.

[10] Rose [2000] uses bilateral trade data for five years spanning from 1970 to 1995 for 186 counties. He

In this paper, the terms "exchange rate regime" and "currency regime" are sometimes used interchangeably, however, currency regimes could refer to broader issues that make the working of exchange rate regimes better. For example, the gold standard is a currency regime that consists of a fixed exchange rate regime and a fiscal policy that consists of a balanced-budget discipline. Similarly, a floating exchange rate per se does not imply particular monetary rules, such as inflation targeting or monetary targeting.

2. Exchange rate regimes: definitions and current trends

Regarding the definition of exchange rate regimes, the International Monetary Funds reports the exchange rate classification system among IMF members either in its *Exchange Rate Arrangements and Exchange Restrictions* or in its *International Financial Statistics* based on the member economies' own assessments. The classifications of exchange rate arrangements reported in those publications are summarized in Chart 1. There are eight categories: (i) Exchange Arrangements with No Separate Legal Tender, (ii) Currency Board Arrangements, (iii) Other Conventional Fixed Peg Arrangements, (iv) Pegged Exchange Rates within Horizontal Bands, (v) Crawling Pegs, (vi) Exchange Rates within Crawling Bands, (vii) Managed Floating with No Preannounced Path for the Exchange Rate, (viii) Independent Floating.

Fischer [2001] classifies those arrangements into three groups: hard-pegs (arrangement (i) and (ii), forty-seven economies in Chart 1), intermediate group

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regresses these data on real GDP, distance, dummy variables for common language, common border, common trade agreement, colony or not, as well as the volatility of nominal exchange rate and the dummy variables for using same currency. His results show that the effects of currency union on bilateral trade are positive and statistically significant. Two economies that share the same currency trade three times as much as they would with different currencies. Glick and Rose [2001] estimate the same equation as Rose [2000] using panel data methods, and find that two countries that share the same currency trade twice as much as they would with different currencies. Rose and van Wincoop [2001] find modest but still significant effect of a currency union on the increase in the bilateral trade compared with the evidence reported by Rose [2000].

(arrangement (iii) through (vi), fifty-nine economies), and float (arrangement (vii) and (viii), eighty economies). As of the end of March 2001, approximately a third of world economies, presumably developing economies, belong to the intermediate group, as can be seen in Chart 1.

Summers [2000] observes that the sources of recent currency crises are not fiscal deficit and current account crises, but serious banking and financial sector weakness and short term capital flows. He points out that fixed exchange rates work poorly under conditions of financial deregulation and free capital mobility. He states the choice of appropriate exchange rate regime means "a move away from the middle ground of pegged but adjustable exchange rates toward the two corner regimes of either flexible exchange rates or a fixed exchange rate supported, if necessary, by a commitment to give up altogether an independent monetary policy (Summers [2000], p.8)." Is the "Bipolar View" (also known as "Hollowing-out hypothesis" by Eichengreen [1994]) the answer to the choice of exchange rate regime? In the remaining part of this section, we will discuss pros and cons of this idea.

Fischer [2001] argues that in the last decade there has been a hollowing out of the middle of the distribution of exchange rate regimes, with the share of both hard pegs and floating gaining at the expense of soft pegs (See Chart 2). He expects the "Bipolar View" will apply to the emerging market economies. The choice between hard peg and floating depends on the characteristics of the economies, in particular on their inflation history. Hard pegs make sense for economies with a long history of monetary instability or for an economy closely integrated in both capital and current account transactions with another economy. Fischer's view is clear-cut in theory, but what about empirical evidence for the "Bipolar View?"

One may object to the "Bipolar View" based on the classification published by the Fund, especially before 1998, because those classifications might simply reflect legal (*de jure*) institutional frameworks in the reporting economies.[11] Thus, *de facto* exchange rate regimes based on the working of financial markets or macroeconomic variables might be more appropriate. Studies based on *de facto* exchange rate regime give a mixed answer to the "Bipolar view." Levy-Yeyati and Sturzenegger [2000, 2001] classify economies into four exchange rate regimes using cluster analysis based on three macroeconomic variables.[12] According to their analysis, the number of economies classified as "intermediate group" still accounts for more than one-fourth of all economies. Masson [2001] also shows that the intermediate cases will continue to constitute a sizable fraction of actual exchange rate regimes.[13] On the other hand, Frankel, Schmukler and Servén [2000] add an argument against intermediate regimes based on Chile's data and on the results of Monte Carlo simulation.

In our view, a weak point of the "Bipolar View" is that we do not have so many economies with hard pegs, especially large one. Exceptions include the euro-area economies, the CFA Franc Zone economies, Ecuador, Panama and Hong Kong, at the time this paper was written. Thus the next three sections first review a few debates on the management of exchange rate regimes with special attention to examples of the hard pegs listed above to evaluate the "Bipolar view." Then those sections explore the possibility of future regional currencies in each area.

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[11] The classification system since January 1999 is based on the members' actual regimes, which may differ from their officially announced arrangements.

[12] They use monthly percentage changes in the nominal exchange rate, the standard deviation of monthly percentage changes in the exchange rate, and the volatility of reserves. Shambaugh [2001] discusses the problems of coding method by Levy-Yeyati and Sturzenegger [2000] and proposes a new approach of *de facto* two-way coding system between pegs and non-pegs focusing on the volatility of exchange rates.

[13] He computes a transition matrix across exchange rate regimes from the data published by Ghosh *et al*. [1997] and Levy-Yeyati and Sturzenegger [2000] to obtain his conclusion.

3. The European experience

It is well known that one of the economic backgrounds of the EMU was the theory of optimum currency areas. However, according to Dellas and Tavlas [2001], the EU economies do not satisfy optimum currency area criteria sufficiently.[14]

So what is the lesson about exchange rate regimes in the 21st century that we can learn from the European experience? Note that behind the "Bipolar View" lie successive speculative attacks against economies with pegged exchange rates since the EMS crisis in 1992-1993. Thus, in this section, we will review the lessons from the EMS that we may apply to future exchange rate regimes. We then move on to problems faced by policy makers in the euro area following the establishment of the euro. Finally, we will discuss the possibility of a future expansion of the euro area.

(1) The way towards the euro: The Past and Now

A. Lessons from the EMS

After the collapse of the Bretton Woods system, European economies moved to develop their own arrangements for exchange rate stability. These started with the "snake in the tunnel" and moved on to a more structured EMS in 1979. The EMS was *de facto* a system in which "capital controls were permitted to allow governments to negotiate realignment while provide them a degree of policy autonomy" (Aldcroft and Oliver [1998]). It experienced eleven episodes of realignment during the period between 1979 and 1987.[15] However, differentials in rates of inflation in the EMS economies converged remarkably

[14] According to Dellas and Tavlas [2001], among the optimal currency area criteria, the EU economies satisfy only the criteria of openness and trade integration. Note that the EMU is just a factor of European integration, which includes European economic integration and European political integration. Thus, the economic and political integration in the EU economics could allow those economies to satisfy the optimum currency area criteria in the future.

[15] In 1987, Basle-Nyborg Agreement strengthened the intervention in the foreign exchange market.

during the late 1980s, which could be explained by the "credibility hypothesis." According to the credibility hypothesis, economies such as those of France, Italy, or the U.K. can increase the credibility of their national monetary policies and lower their national expected rates of inflation by pegging their currencies to the Deutschemark, which usually records a low rate of inflation under a credible monetary policy.

These successful periods did not last long. By July 1990, most EMS member economies had removed capital controls, which had been one of the most important methods of successful monetary management under the EMS.[16] The removal of capital controls indeed brought about the EMS crisis in 1992-1993 consistent with the "Bipolar View."

Note that free capital mobility is not the only problem in the EMS. Let us briefly summarize two other internal problems that made it difficult for the EMS economies to defend their band following Dellas and Tavlas [2001].

First, suppose that a shock occurs in the central economy (Germany) and that the currency of the central economy appreciates against a currency outside the EMS (say, U.S. dollar). Within the EMS, the currencies of the other member economies (such as France or Italy) also have to be made to appreciate against U.S. dollar to defend the EMS band, although they were hit by no shock at all. Dellas and Tavlas [2001] call such a process of transmitting shocks within the central economies to the other member economies the "magnification effect."[17]

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[16] Wyplosz [2001a] mentions that the conflict between fixed exchange rates and the active use of monetary policy was reconciled through internal financial repression such as quantitative limits on bank credit and ceilings on interest rates in addition to capital controls.

[17] This process illustrates the overall appreciation of European currencies during German reunification. At that time, the Bundesbank tightened monetary policy during the massive fiscal investment that occurred in the former East Germany, and that policy mix led to the appreciation of the German mark. Other member economies maintained exchange rate stability against the Deutschemark by tightening their monetary policies at the cost of accepting appreciation against the U.S. dollar and the yen.

Second, member economies with relatively high inflation and high nominal interest rates experienced capital inflows and their nominal exchange rates become overvalued against the currencies of low inflation economies. Such overvaluation encourages more production of non-traded goods, and leads to current account deficits in relatively high inflation economies. This episode demonstrates that the pegged system has a transition problem.[18]

Based on those arguments, Dellas and Tavlas [2001] conclude that the experience of the EMS provides one piece of evidence that an exchange rate peg nominal anchor contains internal dynamics that make such a regime especially fragile.

B. Issues relevant to a successful single monetary policy

The launch of the euro on January 1, 1999 and the circulation of euro denominated bank notes and coins in January 2002 are two important events that convince people that the European economies have finally completed the formation of a single currency. However, a number of "flaws" or "hazard areas" have been pointed out in the construction or in the working of the EMU. Among these problems, Bordo and Jonung [1999] point out these three issues: (a) the absence of a central LLR function and the lack of supervising authority of the EMU-wide financial system, (b) the absence of central co-ordination of fiscal policy within the EMU, and (c) weak democratic control (accountability) of the ECB. We will discuss these problems in turn.

(a) Maintaining the financial stability of the EMU

In the EMU, it is not the ECB but national central banks (NCBs) that primarily have LLR

[18] This phenomenon is consistent with the many episodes of realignment in the early 1980s. At that time, rates of inflation in the other EMS economies were higher than that in Germany. But the nominal exchange rates of those other economies' currencies did not depreciate much within the EMS. As a result, appreciated real exchange rates led to subsequent realignments.

functions. Bank supervising authorities (NCBs or government agencies) , rather than the ECB, are primarily responsible for bank supervision.

The advent of the euro has stimulated the integration of financial markets of member economies. An integrated financial market might spread a large negative shock in one member economy into area-wide financial instability. Obstfeld [1998] pointed out two problems regarding the Maastricht Treaty's blueprint for safeguarding financial stability.

First, regarding the structure of euro zone prudential supervision, Obstfeld [1998] wondered if the division of regulatory responsibility among national regulators might be a misguided application of the principle of subsidiarity, because the optimal domain of regulation in an integrated financial market would not be smaller than the market itself. For example, the national regulators may not fully internalize the adverse repercussions of a financial crisis, particularly when the bill for containment arrives at the EMU or EU level. Another concern is that national regulators might favor national institutions or financial centers through lax application of the rules.

Second, regarding the lack of statutory mandate for ECB to act as a LLR, Obstfeld [1998] argues that such an arrangement is only consistent with the special features of the German financial system. Those include a relatively low degree of securitization, the dominant position of large universal banks; the high levels of reserves and collateralizable securities that German banks hold, and other features of the domestic payments system.[19] However, the euro financial system will not share these structural

[19] As for the reason of this argument, Folkerts-Landau and Garber [1992] state "financial systems with a limited extent of securitization have in practice a small number of large universal banks in the market for wholesale funds. Wholesale payments and securities transactions are cleared internally in these organizations. The risk of nonsettlement is low due to the lack of significant exposure to non-bank financial institutions and an increased ability to work out unexpected problems quickly among the small number of players. Hence, although the clearing banks ultimately clear on the books of the central bank, there is little

features of the German system.[20]

Against this criticism, Padoa-Schioppa [1999] claims that many bank supervision procedures have been harmonized within the EMU, and that "there are neither legal-cum-institutional, nor organisational, nor intellectual impediments" to operating LLR when an EMU-wide crisis occurs. Then he concludes, "there is no expectation, at least to my mind, that the division of responsibility ··· should be abandoned."[21]

(b) The central co-ordination of fiscal policy within the EMU

Is harmonized single fiscal policy necessary for a monetary union?[22] In Europe, the Delors Report [1989] emphasizes the necessity of harmonized fiscal policy in the EMU.

Many economists have conducted empirical analyses regarding the necessity of central fiscal policy to guard against asymmetric shocks. For the U.S., von Hagen [1992] estimated that 47 cents of net federal transfers would be made in response to a 1-dollar difference in the level or change in the state income compared to U.S. average income. However, for economies other than the U.S., such as Canada, many research findings have shown different estimates of the transfer in a range from over 10 to over 50 cents (See Kletzer and von Hagen [2000] for recent review). These studies indicate that fiscal transfer may be significant in some existing monetary unions, but that it is difficult to answer the question how important it is in practice for the stabilization of the regional economies.

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need for the central bank to provide intra-day credit or stand ready to act as lender-of-last-resort to the clearinghouse to ensure the payments settlements."

[20] Parti and Schinasi [1999] also insist that the absence of the central LLR and supervising arrangement may undermine the existence of the EMU in the face of area-wide financial crises.

[21] Buiter [2000a] also states that LLR actions should be left at the national level, subject to ECB oversight and coordination, since the capital of the ECB is limited and it is not backed, either formally or informally, by the deep pockets of a ministry of finance.

[22] Optimum currency area criteria suggest the necessity of fiscal transfer within monetary union. If one region suffers from high unemployment due to a region specific negative shock, fiscal transfers from low unemployment regions to high unemployment regions can smooth out the shock without adjusting nominal

Another reason for the need of central co-ordination of fiscal policy within the EMU could be the possibility of dynamic inconsistency problem. One may well wonder if some fiscal authorities would expect that the EMU would accept their discretionary fiscal policies slightly inconsistent with the Treaty, because a single monetary policy could not put emphasis on a particular economic situation of member economies.[23] von Hagen *et al.,* [2001] argue that the EU surveillance of public finance should focus on the contents of consolidation efforts, as well as the ceiling on the gross government debt to GDP ratio and general government deficit to GDP ratio to achieve prudent fiscal policies in monetary union.

(c) Democratic control (accountability) of the ECB

Some economists are concerned about issues relating to democratic control of the ECB, such as its independence and accountability. First, concerning the independence issue, Feldstein [1997] argues that pressure from governments on the ECB would bias monetary policy.[24] The decision making body of the ECB, the Governing Council, consists of six Executive Board Members, appointed by the European Council, and the central bank governors of the EMU member economies. Monetary policy is decided by simple majority in the Governing Council. Therefore, the representatives on the ECB Governing Council might reflect their national attitudes and might be subject to political pressure to represent what domestic governments perceive to be their national interests.[25] Second,

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exchange rates.

[23] von Hagen *et al.,* [2001] show the empirical evidence that the pressure of the Maastricht Treaty might result in some short-lived and revenue-based consolidation efforts during the recession years of the early 1990s. The policy implication of their evidence could be the pressure from the Maastricht Treaty should not be underestimated.

[24] Feldstein [1997] suggests that the future average rate of inflation would rise and that the net economic effect of EMU would be negative, based on the above argument.

[25] The future expansion of EMU means an increase in membership of the Governing Council. If Feldstein [1997] is right, in our interpretation, the future expansion of EMU members might also increase the risk that the ECB receive more pressure from governments and that its monetary policy is biased.

concerning the accountability issues, Buiter [2000a] states that the U.K. arrangements, with an operationally independent central bank pursuing a politically mandated set of objectives, are superior to the current EMU arrangements in a democratic economy. Regarding the procedural openness and transparency of monetary policy, he also suggests that the individual voting records of the members of the Governing Council and its minutes should be in the public domain.

Hämäläinen [2001] opposes these criticisms. First, the Maastricht Treaty prohibits the ECB and NCBs from taking instructions from any external bodies, therefore, the independence of the ECB is firmly safeguarded by the treaty. Second, if the minutes and voting record of the Council were published, there would be a risk that the individual members of the Council might be subject to pressure from their domestic publics, which could discourage their necessary euro area-wide thinking.

(2) Expansion of the EMU in the future

The discussion so far shows that the introduction of a common currency is not a panacea, and that there are still some unsolved problems with regard to EMU. Thus, it is understandable that some EU economies had still not joined the euro at the time when this paper was written.

However, the euro area has its own frontier: with East European economies, Mediterranean economies and African economies. Currently, many East European transition economies are applying for EU accession, and trade and financial links, as well as political dialog, between these economies and the EU have been deepening.[26] Noyer

[26] Regarding the choice of exchange rate regimes in the accession economies, at the beginning of the 1990s, conventional fixed pegs (intermediate based on Fischer [2001]) were the most common among those economies. As of the year 2000, except for Hungary and Slovenia, accession economies employ either hard-pegs (currency board in Estonia, Lithuania, Bulgaria and Latvia) or float (Czech, Poland, Romania,

[2000] expects the future expansion of the euro area, stating that "the more a process of regional integration moves beyond a free trade area towards a single market, or even an economic union, the stronger the need for intra-area exchange rate stability, and eventually, irrevocably fixed exchange rates." Are there any pitfalls during the accession process? In order to analyze this question, we should take care to distinguish EU membership from EMU membership. EMU candidates have to meet both the exchange rate criterion[27] and the inflation rate criterion[28] in addition to the fiscal deficit criterion. Buiter and Grafe [2001] suppose that the productivity growth differential between the traded and the non-traded sectors is larger in the accession economies than EMU member economies. This means that relative price of non-traded goods to traded goods is higher in the accession economies and their overall inflation rate will be higher at a given exchange rate - this is the Balassa-Samuelson effect. Then, the introduction of euro in accession economies would lead to a period of declining price and large cost of adjustment to meet the Maastricht ceiling under sticky price. Buiter and Grafe [2001] suggest that inflation rate criterion should better be specified in terms of traded good price to resolve this conflict. Noyer [2001] responded to such a concern on the consistency of nominal and real convergence during the accession process. First, most empirical studies estimate the Balassa-Samuelson effect within a range of 1 to 2 percentage points. Second, the Maastricht inflation criterion, which will not be revised to take into account any possible Balassa-Samuelson effect, should not be seen as an immediate requirement for

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and Slovak). Thus, Begg *et al.*, [2001] report that after the liberalization of short-term capital flows in the accession economies, "Bipolar View" applies for these economies. We omit the discussion on the two small economies negotiating entry into the EU: Cyprus and Malta, and also Turkey.

[27] The exchange rate criterion requires EMU candidates to stabilize their exchange rates within ± 15 percent band for two years before joining EMU without capital or exchange controls.

[28] The inflation criterion requires that the inflation rate must not exceed the average of the three lowest performing economies by more than 1.5 percentage points.

these countries, but rather as a medium-term objective for central banks.

4. The experience of the Americas

In the Americas, after experiencing large currency crises, such as did Argentina (2002), Brazil (1999) and Mexico (1994), large economies have already moved towards floating exchange rate regimes. Canada, which has sometimes been advised by economists to join the U.S. currency union, remains under a floating exchange rate regime.

However, there are several small economies that are officially dollarized, such as Panama, and some economies have opened the way to unilateral dollarization, such as Ecuador or El Salvador.

In this section, following Edwards and Magendzo [2001], we define "dollarization" as a policy proposal that emerging market nations should give up their national currencies and adopt advanced nations' currency as legal tender. We identify dollarization proposal as one of the two polars.[29] We will first discuss the pros and cons of dollarization relative to clean floating in detail in the context of Latin American economies. Note that the current choice of a floating exchange rate in many American economies does not necessarily mean that there is no possibility of a regional currency area in the Americas in the future. Thus, we will discuss this issue in the latter part of this section.[30]

[29] Broader definition of dollarization would include the holdings by residents of significant share of their assets in the form of foreign currency denominated asset and the use of foreign currency denominated assets for transaction (See Baliño *et al.*, [1999]). It is well known that in high-inflation economies, citizens abandon the local currencies and choose to use dollar as the medium of exchange, that could reduces the base for inflation tax and introduces a parallel currency.

[30] This paper does not attempt to list desirable monetary policy strategies for all American economies. Mishkin and Savastano [2001] regard hard pegs and constrained discretion based on inflation targeting as two promising strategies. They conclude that the choice between the two depends on political and institutional factors that constrain monetary policy.

(1) The pros and cons of unilateral dollarization

A. The case for dollarization

Calvo [2000] points out compelling reasons for emerging market economies to stay away from exchange rate flexibility. Dollarization may be costly, but it may put emerging markets on the first stage of the track leading towards monetary and financial stability. He observes that the heart of the problem may lie in imperfect information, inexperience in handling sudden large capital inflows, and shaky political equilibrium, especially in Latin America.

Calvo [2000] summarizes Mundell's condition regarding the choice of exchange rate regime. Consider a simple model, $y = \alpha e + g + u$ and $m = y + v$. Here, y, e, g and m denote the logs of output, the nominal exchange rate, the shift parameter of an external factor such as U.S. demand, and money supply. The first equation is an open economy IS curve, and the second equation is an LM curve. u and v show random shocks, and α is positive constant. The existence of a fixed exchange rate means e is constant and m is endogenous. The floating exchange rate means m is constant and e is market determined. Hence, under the fixed exchange rate regime, Var(y)=Var(u+g), and Var(e)=0, while under the float, Var(y)=Var(v), and Var(e)=(1/α^2)Var(u+g+v). If we worry about the Var(y), a fixed exchange rate is better if Var(v) is larger than Var(u), abstracting momentarily from g.

In practice, policy makers do not know the size of Var(v) and Var(u). It would be better to have a discretionary exchange rate policy depending on the shock, but for most emerging market economies, it would be impossible. More seriously, if most bank lending is dollarized, an unexpected devaluation of nominal exchange rate could lead to debt deflation, hence it may make more sense to pay attention to Var(e), rather than Var(y). In addition, if the markets of emerging economies are subject to asymmetric information

in financial markets, it makes sense to offset Var(v) by just pegging the nominal exchange rate.[31] By dollarization, an economy's monetary policy obtains credibility, lower information cost, and relative price changes would be moderate compared with floating.

Calvo [2000] also points out that dollarization will provide a cushion for sharp relative price changes in comparison with flexible exchange rate. If prices and wages are sticky, the nominal profit of firms will change slowly. Thus, firms could be more willing to repay debt and they might facilitate a more orderly debt recontracting under Keynesian-type recession. Calvo [2000] admits the cost of losing LLR. However, adding international banking, as can be seen in Panama, would be a solution.[32] An alternative to dollarization is not a textbook style free flexible exchange rate system but a closely managed flexible-rate system because the lack of credibility of central banks would mean a managed float with a lot of intervention, or inflation targeting with less credibility.[33] If this regime is a realistic alternative, dollarization might make sense.

B. Is unilateral Dollarization the solution?

Corbo [2001] discusses the advantages and disadvantages of dollarization in the Americas. He points out that potential benefits of dollarization are low inflation, the elimination of currency risk and its associated risk premium, low transaction costs of using the currency, lower relative price volatility of tradable goods with dollarized economies and thus larger amount of foreign trade with those economies, and the

[31] Calvo and Reinhart [2000a] illustrate why large exchange rate swings are feared when access to international credit may be lost.

[32] Calvo [2000] evaluates Panama's system as follows: "In Panama, banks are subject to minimal reserve requirements and there is no institution in charge of LOLR operations. Seemingly, the *de facto* LOLR has been a large American bank,…., The country has suffered only minor tremors from Tequila and other recent financial crises."

[33] Calvo and Reinhart [2000b] find that economies that say they allow their exchange rate to float mostly do not. Relative to committed floaters such as Japan, the U.S. and Australia, observed exchange rate volatility is small.

elimination of currency mismatch in foreign liabilities. He suggests the main cost is that, in the presence of nominal rigidity in the labor market, real depreciation is hard to make, and thus a real negative shock, such as a terms of trade shock, would lead to serious unemployment.

Consider economies with a poor records of monetary stability, in which currency substitution is high, or economies in which a substantial part of trade in goods and capital flows occurs with the U.S. Corbo [2001] suggests that the benefit of dollarization would outweigh the cost of dollarization in such economies, if labor markets are flexible and the appropriate institutions support the financial system. He suggests that many central American economies satisfy this condition, while in large economies, except for Argentina, their choices are not clear.

Edwards [2001a] admits that the argument made by Calvo and others in favor of dollarization goes beyond the scope of the static theory of optimum currency areas. However, he warns that their policy recommendations are based on very limited empirical and historical evidence in very small economies. He examines a small group of economies that live under a so-called dollarized monetary system[34], and finds that those nations have: (a) had significantly lower inflation, (b) grown at a significantly lower rate, (c) had similar fiscal deficits and current account balances compared with non-dollarized economies. In the case of Panama, he points out its success in achieving lower inflation, but behind these achievements, it has failed to maintain fiscal discipline and has been helped by the IMF programs quite often. He also shows that external shocks in the form of terms of trade disturbances and current account balance reversals have had larger negative effects on Panama than on non-dollarized economies.

[34] These economies are the following very small economies: Andorra, Kiribati, Liberia, Liechtenstein,

Edwards [2001b] stresses that the credibility of hard pegs is not automatic. At least an economy needs to address key structural issues such as fiscal solvency, appropriate preparation for exercising the lender of last resort function[35], a solid banking sector, and a high enough quantity of dollar reserves in the case of a currency board. Based on the information available while this paper is written, the experience in Argentina seems to suggest that even the currency board cannot work if the economy could not follow a prudent fiscal policy. Another lesson could be that an economy's choice of currency regime might take into account of those of their important trading partners.[36] The combination of low inflation and market liberalization in the early 1990s could not result in fast and sustained productivity growth that exceeds the rise in real wages, which could have preserved Argentina's competitiveness under the currency board (Feldstein [2002]).

(2) A common currency area for the Americas in the future

The recent movement towards a floating exchange rate may not be the end of the discussion on the currency regime in the Americas. For example, Dornbusch [2001] recommends that Mexico would benefit from the immediate introduction of a currency board to deepen economic integration with the U.S. Corbo [2001] states that the type of monetary arrangement that would be more appropriate for MERCOSUR as a whole is an open question.

However, in the long run, Corbo [2001] states that interest in moving towards

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Marshall Island, Micronesia, Monaco, Nauru, Palau, Panama, San Marino, and Tuvalu.

[35] For example, one may wonder if the private banks alone could adequately handle a sudden increase in the demand for dollar by citizens in a dollarized economy. Such a demand shock, if large enough, could be transmitted to the U.S. financial market.

[36] Given the devaluation of Peso, Hausmann [2002] recommends establishing an independent central bank with price stability mandate, to increase the jobs in agriculture, industry and tourism, to stimulate foreign demand, to lower tariffs, and to re-establishing financial stability. Sachs [2002] wonders if the Argentina's history of monetary mischief makes the devaluation in no remarkable economic gain, and thus the dollarization would be still preferable.

currency areas in Latin America will increase, as the experience of the euro becomes clear. In this case, as Salvatore [2001] suggests, the U.S. may have a negative interest in the expansion of the dollar area. Suppose many Latin American economies successfully reduce the rate of inflation as low as that of the U.S in the future. In such a situation, the U.S. government may benefit from dollarization in the Americas because of the increase in seigniorage, and the increase in trade flows. At the same time, massive use of the dollar in the Americas, especially in large economies, might make the monetary management task of the FRB harder to gear their policy exclusively towards the U.S economy. And if this difficulty were to raise doubts regarding the credibility of dollar, it could well result in a sudden shift from the dollar to the euro, producing large-scale financial turmoil (Salvatore [2001]).[37]

5. The East Asian experience

At the beginning of the 1990s, many East Asian economies experienced high-speed economic growth. There were many economic discussions regarding the keys of success in the East Asian economies, such as World Bank [1993]. Krugman [1994] was a notable exception, although what he expected was a slowdown of Asian growth based on lower estimates of total factor productivity growth in this region computed by Young [1995], rather than a meltdown of the financial system in some economies in this area.

After the East Asian crisis, we have observed huge amount of literatures on this topic (See, for an example, Corsetti *et al.* [1999a] for an overview of economic fundamentals and the debate regarding this experience). Economists started to complain

[37] One may object this view because the U.S. monetary policy did not show so much external concern during the dollar-standard era. Important assumption here is that the euro becomes another important international currency and the use of dollar prevails throughout the Americas.

about many features of the economic environment in this region, for example, crony capitalism, weak banking sectors, inadequate sequencing of capital account liberalization, lack of legal basis in these economies and so forth, as well as about the *de facto* dollar peg employed in some economies. Since the "Bipolar View" in the Asian context is motivated by the twin crises, in this section, we will review a variety of models of twin crisis and policy debates. We will then move on to the issue of an Asian currency area.

(1) Twin crises and Policy debates: What's new?

There are a variety of research papers that have tried to explain twin-crisis and subsequent policy debates after the East Asian crisis.

Many economists focused on moral hazard as the common source of the over investment, excessive external borrowing, and current account deficits that led to the twin crisis (for examples, Corsetti *et al.* [1999b], Krugman [1998], and Schneider and Tornell [2000]). Among the sources of moral hazard, some economists complain that the involvement of the IMF in Mexico might have allowed foreign investors in East Asian economies to expect that the Fund would come help them. Such concerns led to extensive discussions regarding the role of the IMF (for example, Meltzer commission [2000]).

Excessive investment based on bank lending requires a new way of thinking about policy response to a crisis. The IMF often suggests a temporary sharp tightening of monetary policy to support the exchange rate, followed by gradual loosening once confidence seems to have been restored. Does this cure make the disease worse?

Furman and Stiglitz [1998] argue that high interest rates in highly leveraged economies can drive the exchange rate in an unintended direction. This is because such an operation would force local banks to get into trouble and make the economic situation

worse.

Krugman [2000] gives an intuitive explanation why a low interest rate policy may not help such a crisis-hit economy using a slightly modified Mundell-Fleming framework. In the commodity market, a currency depreciation will increase net exports and domestic output in the ordinary case. Suppose that the adverse balance sheet effects, for example, an increase in the domestic value of debt denominated in foreign currency due to depreciation, were to be sufficiently strong in the crisis. Then, the negative wealth effect due to the balance sheet problem would cause there to be a commodity market equilibrium condition S-shaped curve (SS curve in Chart 3) against the nominal exchange rate. The asset market equilibrium condition will be downward sloping curve AA in Chart 3. Given the domestic GDP, if the monetary authority leans against the exchange rate movement, we can suppose AA is downward sloping. Thus, there are two locally stable equilibria. Suppose a lower interest rate policy and a depreciation of nominal exchange rate is made. If this were done at around the good equilibrium, then the standard remedy would work. However, consider a situation where the self-fulfilling capital flight or political crisis occurs. Then, this economy might jump towards the crisis equilibrium, rather than the good equilibrium in Chart 3. Under the risk of hopping towards the crisis equilibrium, this central bank would be reluctant to loosen the monetary policy because such a policy decision could only ensure that the crisis-equilibrium materializes. Alternatively, if this central bank tighten, at least for temporally, to persuade the market that the currency is strong, a sufficiently severe short-run shock could produce lasting effects, as Indonesian experience. Thus, the traditional policy response in a recession would reach a deadend.

Another group of economists considers the role of liquidity during a banking crisis

and its relationship with exchange rate regimes (for example, Chang and Velasco [2000, 2001]). Caballero and Krishnamurthy [2001] make the important distinction between domestic liquidity constraint and international liquidity constraint. The standard Mundell-Fleming model approximates an external shock either as a rise in the country premium or international interest rates based on interest parity condition. In other words, it assumes that unlimited funds are available from abroad at a high but fixed price. Thus, distressed firms with good collateral would be helped by foreign funds at constant but high interest rates. Reductions in the domestic liquidity constraint due to lower interest rate policy would be also helpful for these distressed firms. However, Caballero and Krishnamurthy [2001] argue that if the international liquidity constraint and domestic liquidity constraint are simultaneously binding, a domestic low interest rate policy would mainly affect the domestic relative price of the limited amount of international liquidity within this crisis-hit economy. Thus, a low interest rate policy during the crisis might bring about a sharp overshoot in the exchange rate depreciation without substantial gain in terms of real activity.

(2) A common currency area in Asia in the future

Based on the IMF classification as of 31 March 2001, we see hard peg economies (Hong-Kong), conventional fixed exchange rate economies (Malaysia), managed floating with pre-announced exchange rate target economies (Singapore), and independent float economies (Korea, Indonesia, the Philippines and Thailand) in East Asia. Before the East Asian crisis, most of these were *de facto* dollar-peg economies. Currently, exchange arrangements in the East Asian economies are becoming diverse. However, it still makes sense to pose the following question: what is a desirable exchange rate regime for the

Asian economies, including a common currency area?

Japanese government officials express their views to support the internationalization of yen, as well as basket pegs for Asian economies as the first step.[38] In our view, academic opinion regarding a future Asian regional currency is mixed. However, there are many Japanese economists who are sympathetic to the internationalization of yen. We will see several opinions in order.

Kawai and Akiyama [2000] observed that the role of the U.S. dollar as the dominant anchor currency in East Asia was reduced during the crisis period, but that its prominence has been restored. They suggest that Asian economies are likely to maintain more flexible exchange rate arrangements, at least officially, but would prefer exchange rate stability without fixed rate commitments. They expect to choose a balanced currency basket system in which the yen and the euro play a more important role. Moreover, given the strong degree of intra-regional trade and investment interdependence, East Asian economies have incentives to avoid harmful large exchange rate fluctuations within this region, hence it would be useful for those economies to choose similar currency baskets.

McKinnon [2000] objects to the proposal of Kawai and Akiyama [2000] and suggests that the simplest conceptual framework is to fix the yen to the dollar, rather than worrying about the empirical difficulty inherent in the measurement of a currency basket.[39]

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[38] See for example, Council on Foreign Exchange and Other Transactions at the Japanese Ministry of Finance pointed out the need for internationalization of the yen for the 21st century on April 20, 1999. Interested readers can download official statements on this matter by the Japanese Ministry of Finance from http://www.mof.go.jp. Japanese Vice Minister of Finance for International Affairs Kuroda said, "It would be difficult for the yen in its own to play a role similar to that of the euro and the dollar; however, the region could start with a basket composed of the yen, the euro, and the dollar before imagining a common currency for Asia."
See Speech at the round table on capital market reform in Asia in Tokyo, 11, April 2000, available at http://www.mof.go.jp/english/if/if015.htm.

[39] Note that a high level of economic integration is possible without a common currency or currency pegs

Ogawa [2001] reports that the exchange rate of some East Asian economies against the U.S. dollar has been stabilized while the exchange rate against the yen has been fluctuating after the crisis. His evidence seems to suggest that some East Asian Economies have returned to a *de facto* dollar peg.[40]

Why the basket-peg is not a wide spread exchange rate regime in East Asian economies so far? Bènassy-Quéré [1999] points out that the mismatch between the country distribution of trade (high weigh of the dollar) and currency distribution of their external debt (high weight to the yen). This mismatch could be the reason that Asian economies prefer low weight for Japanese yen.

In our view, the lessons from the EMS suggest that the arrangement towards stable exchange rate in Asia should accompany a blueprint for the regional safety net of financial stability and a guideline regarding mutual surveillance on the fiscal and structural policies for all member economies including Japan.[41] In this context, the Chiang Mai Initiative, which consists of bilateral swap agreements among the ASEAN economies, Japan, Korea and China could be an important first step.[42] Similarly, the initiatives towards regional free trade area among those economies are also important conditions for deepening regional integration. In particular, the rapid growth and increase in the trade with China[43],

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(for example, Canada and the U.S., Switzerland and Germany). If this is the case, floating currencies with some leaning against the wind would be of considerable appeal for ASEAN economies as an intermediate transition stage. For example, Williamson [2000] regards East Asian economies as "reluctant floaters," and recommends them to introduce publicly announced monitoring band as a viable intermediate regime. The authorities would not be asked to defend a particular rate, and they would announce the rate consistent with long-term fundamentals to enhance the transparency and credibility of the exchange rate regime.

[40] Consistent with his finding, the Study Group for the Promotion of the Internationalization of the Yen [2001] concluded that the internationalization of yen was not so advanced, and thus the internationalization of yen was on the long-term agenda for Japan.

[41] For example, such a guideline could require changes in the current Japanese financial regulatory policies.

[42] Japan has swap agreement with China, Korea, Thailand, Malaysia and the Philippines as of March 28, 2002.

[43] For an impressive example, according to Japanese balance of payment statistics, Japanese imports from China exceeds that from the U.S. in August 2001. However, Young [2000] estimates that the China's per capita output growth rate from 1978 to 1998 is 6.1%, rather than officially reported 7.8% because of the

if continued, would increase the benefit of using a common currency in Asia, although one may not be sure about which currency plays a pivotal role.[44]

One may interpret current Asian arrangement as a commitment to multilateral integration with the minimum set of regional agreement reflecting Asian political environment. For example, Mundell [2000] points out that Asian common currency without the involvement of Japan and China is unrealistic. However, given the differences in the political regimes in two economies, Mundell [2000] expects that it would be unrealistic to consider a common central bank that issues a single Asian currency. Based on such reasoning, Mundell [2000] suggests that the Japanese government should not create an Asian currency zone based on the yen for the sake of achieving exchange rate stability in Asia, and an better alternative is that Japan stabilizes the yen-dollar exchange rate and the yen-euro exchange rate.

If one believes that the stability of current account is the major and urgent concern for the Asian economies, a currency basket proposal without deep commitment could be a good starting point.[45] However, as Wyplosz [2001b] wonders, even if such a practical, but a piecemeal approach could achieve exchange rate stability, it might be subject to the currency attack without well-designed commitment device to make the peg credible enough.

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under estimates of official deflator. He estimates total factor productivity growth in non-agricultural sector is only 1.4% rather than 3.0% using official data.

[44] However, regarding the possible role of future China, Cohen [2000] suggest that even though the yuan's transactional network may eventually become large, the currency's prospects suffer from the backwardness of China's financial markets and still lingering uncertainties over domestic political stability -- to say nothing of the fact that use of the yuan continues to be inhibited by cumbersome exchange and capital controls.

[45] Ogawa and Ito [2000] propose an optimal exchange rate regime that minimizes the fluctuation of trade balances in emerging market economies. Without coordination, a Nash-equilibrium with higher dollar weight would be chosen. They suggest that a common currency unit in Asia will resolve such coordination failure, because two economies would be better off moving to the basket peg.

6. Tentative conclusion and challenges for central banks

(1) Tentative conclusions

The main observations in this paper are summarized as follows.

First, regarding the "Bipolar View," the logic behind it is clear. It is true that many episodes of currency crisis and banking crisis in the 1990s were related to massive capital inflows and outflows. However, in particular in East Asia, many economies do not allow a free float even after the Asian crisis. May be clean float without capital control could be too costly for those economies, perhaps reflecting the lack of deep and liquid financial markets in those economy that a small speculative attacks could hop those economies into crisis hit equilibrium. Moreover, there are so far only a few examples of large economies that have successfully committed themselves to hard pegs except for the Euro-area economies.[46]

Second, the experience of the EMS and recent situation of the currency board in Argentina show that even a strong fixed exchange rate regime may be subject to pressure from financial markets. Such pressure may be due to rapid capital inflows and outflows that induce dynamic inconsistency on the part of policy makers in defending the peg in the case of the EMS. It could be due to political and institutional reasons that are not supportive of an exchange rate peg. The experience in Argentina suggests that even the currency board cannot work if the economy could not follow a prudent fiscal policy. In addition, policy makers should address structural issues, such as the inflexible labor

[46] One may argue that the relevant question for these economies is "how to float." In this context, temporary capital controls to discourage excessive short-term capital inflow while posing little barrier to capital outflows, which are employed in Latin American economies such as Chile, Brazil and Colombia in the 1990s, may be worth mentioning. However, Ariyoshi et al. [2000] concludes that capital controls cannot substitute for sound macroeconomic policies. Edwards [2001b] concludes that Chile's experience is successful in changing the maturity profile of capital inflow, and of the country's debt. However, the effect would be short-run and not very important quantitatively. Reinhart and Smith [2001] calibrate the potential effectiveness and welfare implication of temporary capital inflow controls. They find that for the sake of reducing foreign debt by five percent of GDP requires 88.9% of inflow tax under their reasonable parametric set up. They also find economic benefit of taxing capital inflow is quite small.

market which made the adjustment under hard pegs too costly, or, dependence on the dollar borrowing that might make the policy makers reluctant to revise apparently overvalued parity. Those risks could undermine the achievement of price stability either through political crisis or currency crisis.

Third, the experience of currency crises in the 1990s suggests that economists should prepare better analytical tools beyond the Mundell-Fleming model. The experience requires analysis of financial market imperfection, and general treatment of asset prices. A currency crisis model may in the future be part of an asset pricing model. Indeed, Chart 3 does not look like the traditional model of a currency crisis that focuses on the balance of payments. Krugman [2001] argues that "a fourth-generation crisis model may not be a currency crisis model at all; it may be a more general financial crisis model in which other asset prices play the starring role."

Fourth, the criticism made by Frankel and Rose [1998] and European experience suggest that the static version of optimum currency area criteria should be evaluated carefully to make inferences regarding the pros and cons of a common currency.

Fifth, the prospects for regional currencies are very unclear. In particular, it is very hard to predict the development of an Asian currency area right now.

In sum, we argue that, given the global interdependence among economies that exists today, currency regimes should be always evaluated in terms of their relationship to monetary policy, fiscal policy, structural policies, and the working of financial markets. Thus, currency regime does matter, and is a relevant concern for policy makers.

(2) Challenges for central banks

This paper has not been able to discuss many important issues because of space

limitations. Let us touch on some of these issues for the sake of further discussions.

First, we did not discuss the debate regarding the appropriate policy response to be made by emerging market economies and international organs. Although economists disagree about the role of the IMF and the appropriate response to be made by emerging market economies, the bottom line of the debate seems to be clear. Policy makers need detailed knowledge about the structures of their economies to enable them to think about currency crises and the resolution of such crises, and central banks are no exception. It is indeed a huge area of knowledge. For example, Mishkin [2001] lists twelve issues for crisis prevention. These include: prudential supervision, accounting and disclosure requirements, legal and judicial systems, market based disciplines, the entry of foreign banks, capital controls, reduction of the role of state-owned financial institutions, restrictions on foreign-currency denominated debt, elimination of too-big-to-fail in the corporate sector, the sequencing of financial liberalization, monetary policy and price stability, and exchange rate regimes and foreign exchange reserves. Thus, the exchange rate regime is just one factor of many.

Second, this paper did not make explicit any consideration of the relationship between exchange rate stability and domestic price stability among three major currencies. Standard macroeconomic econometric models (such as Taylor [1993]) suggest that the international spillover effect of domestic monetary policy is small. Therefore, an optimal domestic monetary policy framework would achieve both domestic stability and international stability. Obstfeld and Rogoff [2001] showed that when monetary policy is governed by a rule-based policy, then the gains from international policy coordination are not necessarily very large within the framework of New open-economy macroeconomics discussed in the Appendix (below). Thus, Rogoff [2001] suggests that at least three or

four currencies are preferable in the foreseeable future. Meltzer [1996] suggests the U.S., Germany and Japan should follow an adaptive monetary rule to achieve zero expected inflation. Very small economies should eliminate the monetary operations of their central banks by establishing a currency board or a permanently fixed exchange rate. Those economies should permit their citizens to use a non-inflation foreign currency as a medium of exchange to enforce commitment. This proposal shows that the best policy for a small economy to follow depends on the policies followed by the major currencies. Under this proposal, all small economies gain by pegging to a currency of large economies or the basket. They import low inflation and gain from fixed exchange rate. Moreover, large economies gain too, since they have stable prices at home and for imports from the small economies. But they also buffer real shocks by floating their currencies, facilitating adjustment to real shocks. Are those proposals robust in the world of currency competition made by a few currencies? Could currency substitution be a destabilizing factor in such an era?

Third, although this paper implicitly assumes that the major currencies will be the dollar, the euro, and the yen, could we take this limitation for granted in the long run? For example, Buiter [2000b] expects that "within a decade or two, the advanced industrial countries will have 2.5 currencies among them: the Euro, the US$, and something around the Yen or the Yuan." Those opinions pose another important question: how many central banks will survive in the long run? Alesina and Barro [2000] examine the optimal number of currencies that would balance the gains from more international trade due to the existence of a single currency and the cost of losing an independent monetary policy. Regions joining the same currency area will experience reduced trading cost. Hence, without the cost of integration, regions are better off by having a single currency.

However, the political costs of integration rise as the size of the economy becomes larger, hence single currency equilibrium does not occur. Their model shows that as the number of economies increases, average economy size decreases, and the volume of international transaction increases. Hence, more and more economies will find it profitable to give up independent currencies, possibly even faster than the number of economies. Who knows if their prediction is right or not? However, central banks should be ready to answer those theoretical questions within a decade or so.

Appendix: New open-economy macroeconomics and exchange rate regimes

Obstfeld and Rogoff [1995] presented the dynamic general equilibrium model (O-R model), which incorporated price rigidities – a traditional feature of Keynesian economics– and imperfect competition. At least two advantages would convince researchers that the O-R model is "a superior alternative to the Mundell-Fleming model" (Lane [2001]). First, the classic IS-LM approach may not be useful for the sake of future policy recommendation, since it relies on reduced form macroeconomic models whose parameters can vary under alternative policy regimes. However, "new open-economy macroeconomics" allows a researcher to make a detailed analysis regarding the effect of internal and external shocks on the choice of labor, leisure, and consumption made by a representative agent and the profits of representative firms under the assumption of optimization behavior. Second, "new open-economy macroeconomics" summarizes such effects on the maximum level of utility for a representative agent; thus a researcher does not need to use ad-hoc welfare criteria to evaluate the effectiveness of economic policies and exchange rate regimes. In this appendix, we will review some "new open-economy macroeconomics" models that incorporate uncertainty and the choice of exchange rate regime.

(1) Models with uncertainty in the spirit of the O-R

Many researchers have recently tried to build the stochastic versions of "new open-economy macroeconomics" models with monetary policy shocks or productivity shocks.

For example, Obstfeld and Rogoff [1998] add uncertainty concerning changes in money supply to their original O-R model. They show that the variability of money supply influences not only the variance of consumption and production but also the

expected level of those two variables. The reasons are as follows. Suppose firms risk-averse to changes in profit levels face uncertainty in foreign money supply. They charge higher export prices than they would do without uncertainty, because they add a risk premium to compensate for uncertain changes in foreign monetary policy. Higher export prices decrease the expected level of production. They also improve the terms of trade and change the expected level of consumption. Note that the traditional Mundell-Fleming approach focuses only on changes in the variance of macroeconomic variables across policy regimes. However, the O-R approach suggests that the evaluation of the choice of exchange rate regimes and alternative monetary policy rules would be better compared by means of the maximum attainable utility that reflects both the levels and variances of relevant macroeconomic variables under alternative policy regimes.

(2) Choice of exchange rate regime based on O-R

Recent studies examine the optimal exchange rate regime taking into account three different macroeconomic environments. First, alternative price setting behaviors of firms (PCP: producer's currency pricing or LCP: local currency pricing). Second, different types of uncertainty (such as monetary shock or productivity shock). Third, whether an economy should accommodate external shocks or not (that is, whether it is insulated from the foreign shock or else imports a foreign discipline in the presence of domestic monetary shock). We will review three recent theoretical contributions to the choice of exchange rate regime, based on “new open-economy macroeconomics” in turn.

A. Devereux and Engel [1998]

Devereux and Engel compared fixed versus floating exchange rate regimes based on their

usefulness in insulating an economy from foreign monetary shock.[47] They showed that the optimal exchange rate regime depends on whether prices are set in the producer's currency or the local (buyer's) currency.

First, under symmetric LCP, variability in the exchange rate does not influence import prices in the home economy, thus the economy is completely insulated against external shocks. Therefore the ranking in the variance of the relevant macroeconomic variables satisfies the following inequality: Floating exchange rate regime under LCP < Floating exchange rate regime under PCP < Fixed exchange rate regime.[48] The latter part of inequality in this result is consistent with Friedman [1953], who assumed PCP and concluded that floating exchange rate regime was superior to fixed exchange rate regime.

Second, let us see the effects on the expected levels of key macroeconomic variables. Since firms add a risk premium to local currency denominated export prices taking into account exchange rate volatility under PCP, the expected level of consumption will decrease. However, under LCP, firms do not change their local currency denominated export prices to compensate for changes in the exchange rate, thus an external monetary shock does not influence the expected level of consumption at home. After estimating changes in overall welfare, they conclude that a floating exchange rate regime is desirable under LCP, since it can insulate the economy completely from an external monetary shock. However, they also show that a floating exchange rate regime is not always desirable under PCP, because it cannot completely prevent an external shock from affecting the home economy.

[47] Devereux and Engel [1998] assume foreign monetary shock not as the change in the average of foreign money supply but the rise in its variance.
[48] When the fixed exchange rate regime is adopted, choice of currency is irrelevant.

B. Engel [2001]

Engel investigates the welfare effects of fixed and floating exchange rate regimes under PCP and LCP when a domestic monetary shock is not negligible and on this basis he proposes an optimal exchange rate regime between the U.S. and Mexico.[49] He assumes that the monetary policy in each country is independent of other and that money supplies in each country follow random walks.

According to his analysis, if foreign firms set export prices in local (home) currency (LCP), a fixed exchange rate regime is superior to a floating exchange rate regime, provided that the variance of the domestic money supply is larger than that of the foreign money supply. In other words, the credibility of domestic monetary policy is lower than that of the foreign economy. Intuitively, the home economy can eliminate domestic monetary shock through the import of a credible foreign monetary policy.

Consider the case where foreign firms set export prices in the home currency (PCP). Engel shows that a floating exchange rate regime could be desirable even if the variance of the domestic money supply is to some extent larger than that of the foreign money supply. This may be puzzling because fixed exchange rates eliminate idiosyncratic risk. The answer to this puzzle is that, for the certain value of the variances of home and foreign money supplies, floating exchange rates can reduce aggregate risk at the risk of increasing idiosyncratic risk. Intuitively, under floating exchange rate regime, real money supply (or, real consumption in his specification) is less volatile than the nominal money supply if there is any pass-through of the exchange rate price to prices. More specifically, he proves that under floating exchange rate regime, the variance of consumption is $var(c) = n^2\sigma_m^2 + (1-n)^2\sigma_{m*}^2$, where σ_m^2 is the variance of home money

[49] He also analyzes the asymmetric case where a domestic firm's price setting behavior is LCP and a foreign firm's behavior is PCP.

supply, σ_{m*}^2 is that of foreign money supply and n is relative country size. On the other hand, under fixed exchange rate regime, $var(c) = \sigma_{m*}^2$. Therefore, even if σ_m^2 is larger than σ_{m*}^2, the variance of consumption under floating exchange rate regime could be smaller than under fixed exchange rate regime, depending on the value of σ_m^2, σ_{m*}^2 and n.

C. Obstfeld and Rogoff [2000]

Obstfeld and Rogoff construct a stochastic model with productivity shock and examine the optimal exchange rate regime under the assumption that firms set their export prices in producers' currency (PCP).

First, they investigate "constrained-efficient" monetary policy rules, in the sense of maximizing an average of home and foreign expected utilities subject to the optimal wage setting behavior of workers and optimal price setting behavior of monopolistically competing firms. Then they show that, under their parameterization, if policy makers can absorb the productivity shock, by suitably adjusting home and foreign monetary policy rules, this behavior replicates an efficient resource allocation under flexible price setting, and those rules are optimal from the viewpoint of an economy's individual perspectives.[50] This policy rule is procyclical with regard to productivity shock. For example, a positive productivity shock under conditions of flexible prices increases the wage level, labor supply and production. Under the pre-determined wage, "constrained-efficient" monetary policy requires an increase in money supply in responding to a positive productivity shock, thus the response is inherently procyclical. Since the nominal exchange rate is determined by both domestic and foreign money supplies, "constrained-efficient" monetary policy allows the exchange rate to fluctuate in response to cross-

[50] The monetary policy rules discussed here cannot offset the monopoly distortions, merely bring the economy to the flexible price equilibrium with the monopoly distortions.

country differences in productivity shocks under a floating exchange rate regime.

Second, Obstfeld and Rogoff calculate the expected utility for three alternative monetary regimes, a fixed exchange rate regime, a floating exchange rate regime, and world monetarism[51] to compare the performance of mitigating the effects of uncertainty in productivity. They conclude that a floating exchange rate regime can realize the highest welfare, since exchange rate moves respond to differences in productivity shocks between the home economy and a foreign economy under the optimal monetary policy.

D. Summary

We may well consider that the choice of optimal exchange rate regime with productivity shock and foreign monetary shock is relevant to the choice of exchange rate regime between developed economies if we assume that monetary disturbances in developed economies are negligible enough to ignore. On the other hand, we may also regard models with home monetary shock as approximating an optimal exchange rate regime between developed economies and emerging economies under the assumption that domestic monetary shocks in developing economies are large.

Based on those assumptions, we summarize tentative conclusions obtained from these recent studies in Chart A-1. This shows, first, that the welfare-based approach will be a promising way to consider the choice of optimal exchange rate regime. The welfare-based approach requires us to examine not only changes in variance of macroeconomic variables but also changes in their expected level. The latter effect is ignored in the traditional Mundell-Fleming approach. Second, regardless of firms' price setting behavior, when domestic central banks do not have enough credibility, a fixed

[51] This regime considers a case where both home and foreign economies fix not only the exchange rate but also an exchange rate weighted average of world money supply.

exchange rate regime would be desirable as a way to eliminate home idiosyncratic shocks.[52] However, if the credibility of the home central bank is not so low, there might be some cases where a floating exchange rate regime would be better. Third, the choice of optimal exchange rate regime between advanced economies depends on firms' price setting behavior and the nature of the shocks (monetary shock or productivity shock). To the best of our knowledge, few works using the framework of "new open-economy macroeconomics" show fixed exchange rate regime is desirable. Many works demonstrate that a floating regime is better.

(3) Reservations

We conclude this appendix by pointing out some reservations about these recent intensive analyses.

First, recent researches focusing on firms' price setting behavior can be divided into the symmetric PCP approach and the symmetric LCP approach, in the sense that there is a globally unique price setting strategy. Therefore, under PCP, PPP (purchasing power parity) holds both in the short run and in the long run, and the exchange rate pass-through is always 100%. On the other hand, under LCP, the exchange rate pass-through is zero and the depreciation of the home currency leads to an improvement in terms of trade in the home economy (Obstfeld and Rogoff [2000]). However, empirical studies (such as Marston [1990] or Knetter [1993]) indicate that exchange rate pass-through lies in the range of zero to 100%, and that a depreciation of the home currency causes a deterioration

[52] Shioji [2001] builds a three-county model of Japan, U.S., and East Asian economies, extending Corsetti *et al.* [2000], and examines the choice of optimal exchange rate regime in East Asia. He shows that switching from a fixed exchange rate regime to a floating regime or basket regime, which makes it possible to allow a depreciation of the domestic currency, is theoretically beneficial when the yen depreciates as a result of an increase in money supply or a negative productivity shock in Japan. However, he also concludes that the theoretical model which induces the above result, is not supported empirically.

in domestic terms of trade. To resolve this problem, a mixed PCP/LCP approach could be promising. This approach assumes that some firms set their export prices in producers' currency and that others set theirs in local currency in an open economy, and that the ratio of PCP/LCP is asymmetric. For example, the ECU institute [1995], cited in Obstfeld and Rogoff [2000], shows that the percentages of exports and imports which are denominated in home currency in developed economies are relatively low, except in the U.S.[53] These pieces of evidence may justify the usefulness of a mixed PCP/LCP approach (see Otani [2001] for an example).[54]

Second, to the best of our knowledge, studies based on the O-R model assume that the choice of currency in which prices are set is exogenous. However, the exporter's choice of currency may well be endogenous. Devereux and Engel [2001] analyze this point using the framework of new open-economy macroeconomics. They show that exporters generally set prices in the currency of the economy with the most credible monetary policy. Thus, the interaction between price setting behavior and monetary policy might be a promising future research topic.

Finally, the O-R model does have its own limitations. Many central banks would think that the omission of political and strategic factors would in practice complicate the choice of currency regime and the credibility of monetary policy rules. Some might wonder if the assumption of perfect capital markets[55] and the omission of the

[53] As for the U.S. 92% of exports and 80% of imports are denominated in U.S. dollars. For other economies, the percentages of exports and imports, respectively, denominated in home currency are: Japan (40% in export, 17% in import), Germany (77% in export, 56% in import), and so forth (Obstfeld and Rogoff [2000], p.123).

[54] Otani [2001] explicitly incorporates asymmetric price setting behavior into Betts and Devereux [2000] and shows that the international transmission effect of monetary policy is not symmetric, depending on the difference of price setting behavior between the home economy and the foreign economy.

[55] For example, Devereux [2001] assumes that economies cannot access international financial market and concludes that fixed exchange rate regime is superior to floating exchange rate regime based on the maximum attainable welfare level. However, in practice, emerging market economies can access

accumulation of physical capital[56] would be appropriate for only a few economies.

international financial market subject to "The Original Sin Hypothesis (Eichengreen and Hausmann [1999])." Therefore, researches on the optimal currency regime under incomplete international financial market might be desirable.

[56] Recently, a number of researchers have tried to incorporate capital accumulation into "new open-economy macroeconomics." For example, see Kollmann [2001] and Chari, Kehoe, and McGrattan [2000].

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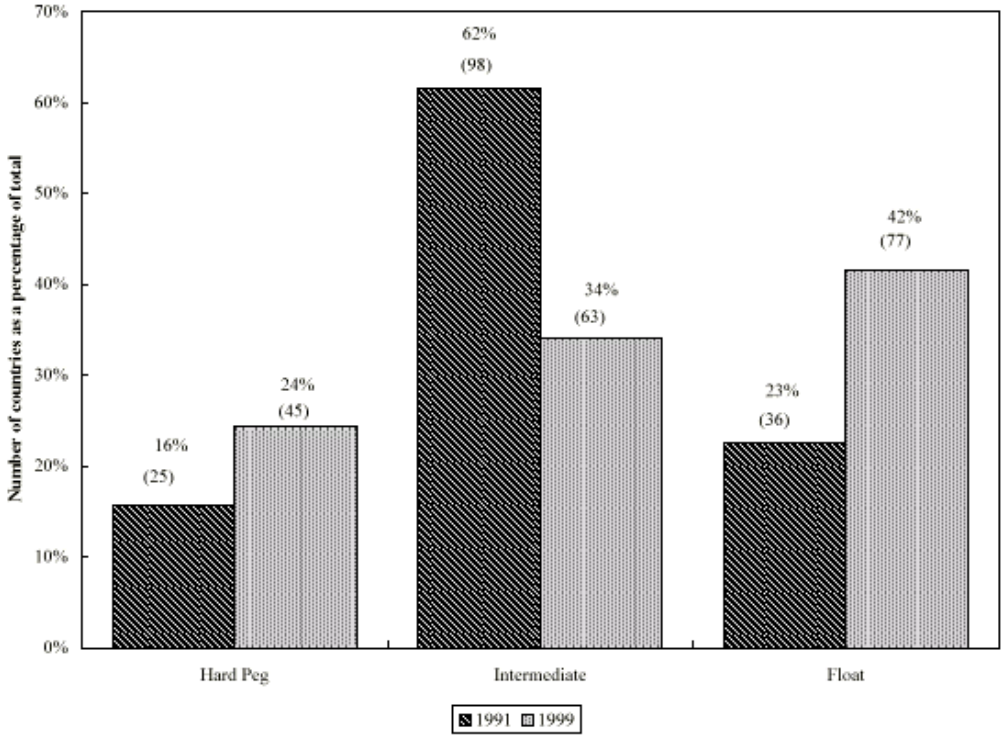
Chart 1: Exchange Rate Arrangements

Exchange Rate Regime as of March 31, 2001.	Number of Countries	
(1) Exchange Arrangements with No Separate Legal Tender: The currency of another country circulates as the sole legal tender or the member belongs to a monetary or currency union in which the same legal tender is shared by the members of the union.	39	OECD Members (Euro Area 12) Latin America (8) Europe* (1) Oceania (4) Africa (14)
(2) Currency Board Arrangements: A monetary regime based on an implicit legislative commitment to exchange domestic currency for a specified foreign currency at a fixed exchange rate combined with restrictions on the issuing authority to ensure the fulfillment of its legal obligation.	8	Latin America (1) Europe* (4) East Asia (1) Southeast Asia (1) Africa (1)
(3) Other Conventional Fixed Peg Arrangements: The country pegs its currency (formally or de facto) at a fixed rate to a major currency or a basket of currencies where the exchange rate fluctuates within a narrow margin of at most ±1 percent around a central rate.	44	Latin America (6) Europe* (5) East Asia (1) Southeast Asia (2) South Asia (4) Middle East (11) Oceania (5) Africa (10)
(4) Pegged Exchange Rates Within Horizontal Bands: The value of the currency is maintained within margins of fluctuation around a formal or de facto fixed peg that are wider than ±1 percent around a central rate.	6	OECD Members (Denmark) Latin America (1) Europe* (1) Southeast Asia (1) Africa (1)
(5) Crawling Pegs: The currency is adjusted periodically in small amounts at a fixed preannounced rate or in response to changes in selective quantitative indicators	4	Latin America (3) Africa (1)
(6) Exchange Rates Within Crawling Bands: The currency is maintained within certain fluctuation margins around a central rate that is adjusted periodically at a fixed preannounced rate or in response to changes in selective quantitative indicators	5	OECD Members (Hungary) Latin America (3) Middle East (1)
(7) Managed Floating with No Preannounced Path for the Exchange Rate: The monetary authority influences the movements of the exchange rate through active intervention in the foreign exchange market without specifying, or precommitting to a preannounced path for the exchange rate.	33	OECD Members (Czech Republic, Norway, Slovak Republic) Latin America (4) Europe* (11) South Asia (3) Southeast Asia (3) Africa (9)
(8) Independent Floating: The exchange rate is market determined with any foreign exchange intervention aimed at moderating the rate of change and preventing undue fluctuations in the exchange rate rather than at establishing a level for it.	47	OECD Members (Australia, Canada, Iceland, Japan, Korea, Mexico, New Zealand, Poland, Sweden, Switzerland, Turkey, UK, USA) Latin America (6) Europe* (5) East Asia (1) Southeast Asia (3) Middle East (2) Oceania (1) Africa (16)

Source: International Monetary Fund, *International Financial Statistics, 2001, pp.124-25.*

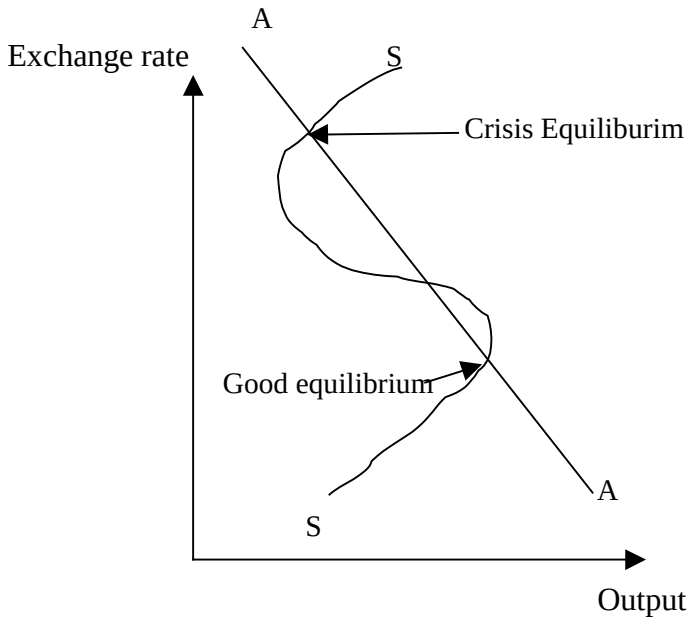
Note: *Europe includes NIS (Newly Independent States of the Former Soviet Union) countries.

Chart 2: Exchange Rate Regimes, in 1991 and 1999.



Source: Fischer [2001], Figure 1.

Chart 3: Krugman [2000] model



Sources: Krugman [2000]

Chart A-1: Optimal Exchange Rate Regime

based on "New Open Economy Macroeconomics"

	PCP (Producer's currency pricing)	LCP (Local currency pricing)
monetary shock		
Foreign monetary shock (exchange rate regime between developed economies)	trade off between variance and expected level	Floating
home monetary shock (exchange rate regime between developed economies and emerging economies)	floating -- fixed regime might be better when home shock is far larger than foreign shock	Fixed
productivity shock	floating	---