

NBER WORKING PAPER SERIES

NO SINGLE CURRENCY REGIME IS
RIGHT FOR ALL COUNTRIES
OR AT ALL TIMES

Jeffrey A. Frankel

Working Paper 7338

<http://www.nber.org/papers/w7338>

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
September 1999

The author would like to thank for comments Barry Eichengreen, Peter Kenen, David Lipton, Larry Summers, and seminar participants at Brookings, Princeton, MIT, Stanford, the University of Michigan, Fletcher School, Federal Reserve Bank of New York, International Monetary Fund and Council on Foreign Relations; and to thank Ron Alquist for research assistance. The views expressed herein are those of the authors and not necessarily those of the National Bureau of Economic Research.

© 1999 by Jeffrey A. Frankel. All rights reserved. Short sections of text, not to exceed two paragraphs, may

be quoted without explicit permission provided that full credit, including © notice, is given to the source.
No Single Currency Regime is Right for All Countries or at All Times

Jeffrey A. Frankel

NBER Working Paper No. 7338

September 1999

JEL No. F3

ABSTRACT

This essay considers some prescriptions that are currently popular regarding exchange rate regimes: a general movement toward floating, a general movement toward fixing, or a general movement toward either extreme and away from the middle. The whole spectrum from fixed to floating is covered (including basket pegs, crawling pegs, and bands), with special attention to currency boards and dollarization. One overall theme is that the appropriate exchange rate regime varies depending on the specific circumstances of the country in question (which includes the classic optimum currency area criteria, as well as some newer criteria related to credibility) and depending on the circumstances of the time period in question (which includes the problem of successful exit strategies). Latin American interest rates are seen to be more sensitive to US interest rates when the country has a loose dollar peg than when it has a tight peg. It is also argued that such relevant country characteristics as income correlations and openness can vary over time, and that the optimum currency area criterion is accordingly endogenous.

Jeffrey A. Frankel

Kennedy School of Government

Harvard University

79 JFK St.

Cambridge MA 02138

and NBER

jeffrey_frankel@harvard.edu

No Single Currency Regime is Right for all Countries or at All Times

Jeffrey A. Frankel

CONTENTS

1. Balancing the Advantages of Fixed vs. Flexible Exchange Rates

The Flexibility-continuum of Exchange Rate Regimes

The Hypothesis of the Vanishing Intermediate Regime

Reminder of the Advantages of Fixed vs. Floating

2. No Single Regime is Right for All Countries: The Optimum Currency Area

Definition of Optimum Currency Area

The Integration Parameters of the OCA Criteria

3. Corner Solutions Are Right for *Some* Countries

Currency Boards

The Alternative of Dollarization

The Argentine Dollarization Proposal: Is it a Good Idea?

4. No Single Regime is Right for All Time

Exit Strategies

5. The Optimum Currency Area Criterion Evolves over Time

The OCA Criterion Might Be Satisfied Ex Post, Even if not Ex Ante

A Question for Empirical Investigation:

Are Trade Links Positively Associated with Income Links, or Negatively?

6. Summary of Conclusions

No Single Currency Regime is Right for all Countries or at All Times

Jeffrey A. Frankel

The sentence chosen for the title of this lecture should be vacuous. *Of course* the choice between fixed, floating, or other exchange rate regimes ought to depend on a country's individual circumstances. But this is not just knocking down a straw man. Many are now talking as if a global move toward fixed exchange rates, on the one hand, or toward greater flexibility, on the other hand, would solve a lot of the problems that the international financial system has suffered in recent years.

Among the many lessons drawn from the East Asia crisis, one hears the lament that if only these countries hadn't been pegged to the dollar, none of this would have happened. The list of countries that have been knocked off a dollar peg of one sort or another, typically at great cost, is growing: Mexico, Thailand, Russia, Brazil... Some would argue that the world is, and should be, drawing the lesson that increased flexibility is needed to forestall speculative attacks that lead to deep financial crises and economic recessions. On the other side are claims that if only countries would adopt truly fixed exchange rates, everything would be fine. After all, none of the crisis-casualty currencies had been literally or formally fixed to the dollar. Enthusiasts point to currency boards that have successfully weathered the storm in Hong Kong and Argentina. Some even go further and suggest full official dollarization. They take encouragement from the euro-eleven's successful move to a common currency on January 1,

1999, a project that has gone more smoothly than most American economists forecast as recently as a few years ago.

I want to make a point stronger than the easy one that no single currency regime is a panacea. Rather my overall theme is that no single currency regime is best for all countries, and that even for a given country it may be that no single currency regime is best for all time. This lecture will also consider the claim that countries are increasingly pushed to choose between the polar cases of free float and rigid peg, with the intermediate regimes no longer tenable.

1. Balancing the Advantages of Fixed vs. Flexible Exchange Rates

But let's start with the easy point. Neither pure floating nor currency boards sweep away all the problems that come with modern globalized financial markets. Central to the economists' creed is that life always involves tradeoffs. Countries have to trade off the advantages of more exchange rate stability against the advantages of more flexibility. Ideally, they would pick the degree of flexibility that optimizes with respect to this tradeoff. Optimization often, though not always, involves an "interior solution."

The Flexibility-continuum of Exchange Rate Regimes

"Fixed vs. floating" is an oversimplified dichotomy. There is in fact a continuum of flexibility, along which it is possible to place most exchange rate arrangements. There are nine, starting with the most rigid arrangement, and becoming increasingly flexible as we go:

1) Currency union: Here the currency that circulates domestically is literally the same as that circulating in one or more major neighbors or partners. Examples include Panama and some East Caribbean islands (the dollar) and European Monetary Union (the euro). Dollarization has recently been proposed in several Latin American countries. The motivation is to get the maximum credibility for inflation-resistant monetary policy by adopting the strongest commitment. Even a currency union can be reversed if desired (witness the Czech and Slovak korunas, whose separation was velvety smooth, and the Former Soviet Union, whose separation was considerably rougher). But it is the firmest commitment to a fixed exchange rate possible.

2) Currency board. The current fad is sometimes sold as credibility in a bottle. Examples include Argentina, Hong Kong, and some Eastern European countries. A later section of this paper defines and discusses currency boards at greater length..

3) “Truly fixed” exchange rate. Members of the francophone West African and Central African currency unions fix to the French franc, while many countries fix to the dollar.

4) Adjustable peg: “Fixed but adjustable” was the description of exchange rate pegs under the Bretton Woods regime. Most countries that declare themselves fixed, in fact periodically undergo realignments, if they do not change regimes altogether.¹

¹ Obstfeld and Rogoff (1995) report that only six major economies with open capital markets, in addition to a number of very small economies had maintained a fixed exchange rate for five years or more, as of 1995. Klein and Marion (1994) report that the mean duration of pegs among Western Hemisphere countries is about 10 months

5) Crawling peg: In high-inflation countries, the peg can be regularly reset in a series of mini-devaluations, as often as weekly. A prominent example is Chile. In one approach, which retains a bit of the nominal-anchor function of an exchange rate target -- the path is pre-announced. The rate of crawl may be set deliberately lower than the rate of forecasted inflation, in an effort by the country to work its way gradually out of the inflation cycle, as in the tablita of southern cone countries in the late 1970s. In another approach, which gives up on fighting inflation and opts instead to live with it, the exchange rate is indexed to the price level, in an attempt to keep the real exchange rate steady.

6) Basket peg: The exchange rate is fixed in terms of a weighted basket of currencies instead of any one major currency, an approach that makes sense for countries with trade patterns that are highly diversified geographically, as many in Asia. In theory, there is little reason why this arrangement cannot be as rigid as an exchange rate fixed to one currency. In practice, most countries that announce a basket peg keep the weights secret, and adjust the weights or the level sufficiently often that the formula cannot be precisely inferred. An exception is the handful of countries that peg to the SDR.

7) Target zone or band: The authorities pledge to intervene when the exchange rate hits pre-announced margins on either side of a central parity. Example: The Exchange Rate Mechanism or ERM, founded in 1979, according to which a number of European countries followed a range of plus-or-minus 2 1/4 percent (still maintained by Denmark). Of course, if the

range is sufficiently narrow, a target zone approaches a fixed rate (such as the 1% width that ruled under the Bretton Woods system, and that is still the official definition of a fixed peg); if sufficiently wide it approaches a float (such as the 15% width of the ERM after 1993, still maintained by Greece).²

8) Managed float: Also known as a “dirty float,” it is defined as a readiness to intervene in the foreign exchange market, without defending any particular parity. Most intervention is intended to lean against the wind -- buying the currency when it is rising (or is already high) and selling when it is falling (or is already low). In a stylized version, a managed floater responds to a one percent fluctuation in demand for his currency by accommodating to the extent of varying the supply of the currency by K percent, and letting the rest show up in the price -- the exchange rate. When K is close to 1, the exchange rate is fixed, when it is close to 0 the currency is floating.

9) Free float: The central bank does not intervene in the foreign exchange market, but rather allows private supply and demand to clear on their own. (Even then, there is the question as to what extent monetary policy responds to exchange rate objectives.) The United States is the closest to a pure example of a free float.

² Target zones come in two varieties -- depending on whether the central parity is fixed in nominal terms (as in the formal model of Krugman, 1991) or is adjusted with inflation and other economic fundamentals (as in the proposal of Williamson, 1985).

The Hypothesis of the Vanishing Intermediate Regime

Non-ideologues look at recent history and agree that both free floating and rigid fixity have flaws. Nevertheless many increasingly hypothesize that intermediate regimes seem no longer tenable. The currently-fashionable view is that countries are being pushed to choose between the extremes of truly fixed and truly floating.³ For example, Summers (1999):

“There is no single answer, but in light of recent experience what is perhaps becoming increasingly clear -- and will probably be increasingly reflected in the advice that the international community offers -- is that in a world of freely flowing capital there is shrinking scope for countries to occupy the middle ground of fixed but adjustable pegs. As we go forward from the events of the past eighteen months, I expect that countries will be increasingly wary about committing themselves to fixed exchange rates, whatever the temptations these may offer in the short run, unless they are also prepared to dedicate policy wholeheartedly to their support and establish extra-ordinary domestic safeguards to keep them in place.”

There are understandable reasons for this view. Nevertheless, the generalization is in danger of being overdone. Out of 185 economies, the IMF classifies 47 as independently floating and 45 as following rigid pegs (currency boards or monetary unions, including the franc zone in Africa). This leaves 93 following intermediate regimes. Most of those classified as fixed have in fact had realignments within the last ten years. Even the francophone countries of Africa finally devalued in 1994. Similarly, most of those listed as floating in fact intervene in the foreign exchange market frequently. Only the United States floats so purely that intervention is relatively rare. Most countries still choose something in between rigid fixity and free float, and

³ The original references on the vanishing intermediate regime are Eichengreen (1994, 1998). In the context of the European ERM, the crisis of 1992 and band-widening of 1993 suggested to some that a gradual transition to EMU, where the width of the target zone was narrowed in steps, might not be the best way to proceed after all (Crockett, 1994). Obstfeld and Rogoff (1995) concluded, “.A careful examination of the genesis of speculative attacks suggests that even broad-band systems in the current EMS style pose difficulties, and that there is little, if any, comfortable middle ground between floating rates and the adoption by countries of a common currency.” The lesson that “the best way to cross a chasm is in a single jump” was seemingly borne out by the successful leap from wide bands to EMU in 1998-99.

perhaps with good reason.⁴ Again: close to the center of the economists' creed is that interior solutions are more likely -- for the interesting questions -- than corner solutions.

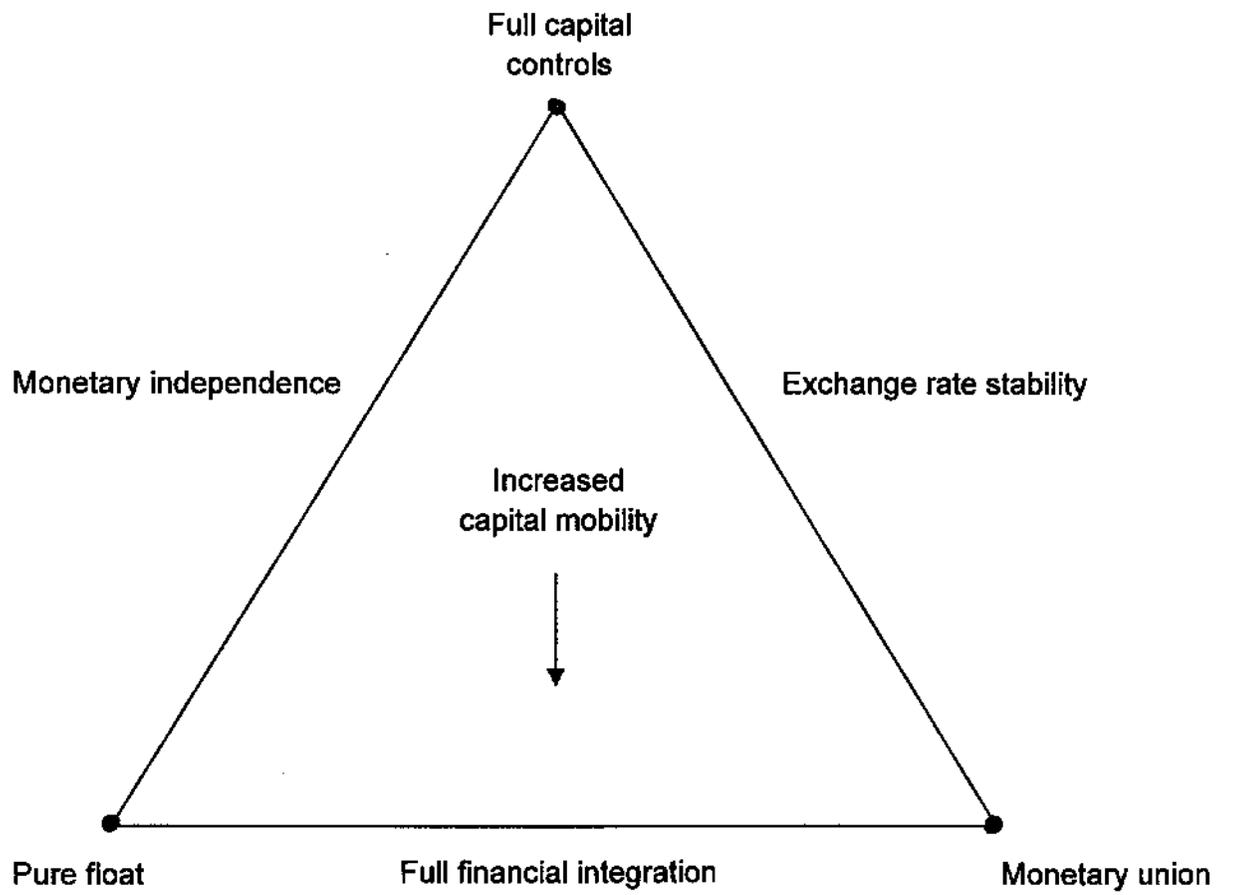
Whence the hypothesis of the disappearing intermediate regime (or the "missing middle"), to begin with? At first glance, it appears to be a corollary to the principle of the impossible trinity. That principle says that a country must give up one of three goals: exchange rate stability, monetary independence, and financial market integration. It cannot have all three simultaneously. If one adds the observation that financial markets are steadily becoming more and more integrated internationally, that forces the choice down to giving up on exchange rate stability or giving up on monetary independence. But this is not the same thing as saying one cannot give up on *both*, that one cannot have half-stability and half-independence. There is nothing in existing theory, for example, that prevents a country from pursuing a managed float in which half of every fluctuation in demand for its currency is accommodated by intervention and half is allowed to be reflected in the exchange rate.

Figure 1 is a simple schematic illustration of the impossible trinity. Each of the three sides has an attraction -- the allures of monetary independence, exchange rate stability, and full financial integration. One can attain any pair of attributes -- the first two at the apex marked "capital controls", the second two at the vertex marked "monetary and financial union", or the other two at the vertex marked "pure float." But one cannot be on all three sides simultaneously. The general trend of financial integration has pushed most countries toward the lower part of the graph. If one is at the bottom leg of the triangle, the choice is narrowed down to a simple

⁴ The intermediate regimes in the IMF classification scheme break down as follows: 25 pegged to a single currency, 13 pegged to a composite, 6 crawling pegs, 12 horizontal bands, 10 crawling bands, and 26 managed floats. The data pertain to January 1, 1999. The source is International Financial Statistics, April 1999.

Figure 1

The Impossible Trinity



decision regarding the degree of exchange rate flexibility. But even under perfect capital mobility there is nothing to prevent the country from choosing an intermediate solution in between floating and monetary union.

Recent history makes it understandable that some would flee the soft middle ground of regimes 4-7 and seek the bedrock of extremes 1-2 or 9. Monetary union and pure floating are the two regimes that cannot be subjected to speculative attack. Most of the intermediate regimes have been tried and failed, often spectacularly so. Contrary to claims that Mexico, Thailand, Indonesia, Korea, Russia or Brazil were formally pegged to the dollar when their recent crises hit, they actually were following varieties of bands, baskets, and crawling pegs. Perhaps when international investors are lacking in confidence and risk-tolerance -- the conditions that have characterized emerging markets during 1997-99, for example -- governments can reclaim confidence only by proclaiming policies that are so simple and so transparent that investors can verify instantly that the government is in fact doing what it claims it is doing. If a central bank, for example, announces a band around a crawling basket peg,⁵ it takes a surprisingly large number of daily observations for a market participant to solve the statistical problem, either explicitly or implicitly, of estimating the parameters (the weights in the basket, the rate of the crawl, and the width of the band) and testing the hypothesis that the central bank is abiding by its announced regime. This is particularly true if the central bank does not announce the weights in the basket (as is usually the case) or other parameters. By contrast, market participants can verify the announcement of a simple dollar peg instantly.

⁵ Israel and Chile, for example, have in the 1990s had crawling bands around basket pegs (Williamson, 1996).

An alternative interpretation is that the search for a single regime that will eliminate currency speculation as an issue, is a search that cannot be successful (short of capital restrictions). Large swings and speculative bubbles intrude on the nirvana of pure floating.⁶ Even the central bankers' oblivion of currency union does not offer an end to earthly sorrows, as political upheavals intrude from time to time. The rejection of the middle ground is then explained simply as a rejection of where most countries have been, with no reasonable expectation that the dreamed-of sanctuaries, monetary union or free floating, will in fact be any better. The grass is always greener on the other side of the parity. Many countries are fated to switch back and forth among various regimes, in an unending markov process. If this is right, the only recommendation one can give most central bankers in vulnerable countries (except those like Panama, Luxembourg or Hong Kong whose country characteristics suit them for a corner solution) is to stay on their toes. A blanket recommendation to avoid the middle regimes would not be appropriate.

Reminder of the Advantages of Fixed vs. Floating

This is not the place to enter into an extended discussion of the advantages of fixed and floating exchange rates. The main points can be stated succinctly. The two big advantages of fixing the exchange rate, for any country, are: (1) to reduce transactions costs and exchange rate risk which can discourage trade and investment, and (2) to provide a credible nominal anchor for

⁶ What would have happened if the emerging-market currencies of East Asia had floated freely throughout the 1990s? Probably they would have appreciated strongly through 1996, producing even larger current account deficits than the countries in fact incurred. The crisis when it came would have taken a different form -- a burst bubble -- but arguably might have been even worse than it was, if larger international debts had been run up in the meantime.

monetary policy. The big advantage of a floating exchange rate, on the other hand, is the ability to pursue an independent monetary policy.⁷

Twenty or thirty years ago, the argument most often made against floating currencies was that higher exchange rate variability would create uncertainty; this risk would in turn discourage international trade and investment. Fixing the exchange rate in terms of a large neighbor would eliminate exchange rate risk, and so encourage international trade and investment. Going one step farther, and actually adopting the neighbor's currency as one's own, would eliminate transactions costs as well, and thus promote trade and investment still more.

Most academic economists tend to downplay this argument today. One reason is that exchange rate risk can be hedged, through the use of the forward exchange market and other instruments. (There are costs to hedging, both in terms of bid-ask spread and in terms of a possible exchange risk premium. These are generally thought to be small, however.) Another reason is that there have been quite a few empirical studies of the effect of exchange rate volatility on trade, and some on investment; most of them find small adverse effects, if they find any at all.⁸

Nevertheless, this argument still carries some weight. It looms large in the minds of European policymakers and businesspeople. Promoting trade and investment in Europe was

⁷ To be sure, other factors enter as well. Another advantage of fixed exchange rates, for example, is that they prevent competitive depreciation or competitive appreciation. Two other advantages of an independent currency are that the government retains seignorage, and floating allows smooth adjustment to real shocks even in the presence of price frictions. Most of the important factors, however, can be lumped into the major arguments presented in the text.

⁸ Surveys of the literature are included in Edison and Melvin (1990) and Goldstein (1995). A recent cross-section approach that finds statistically significant effects of bilateral exchange rate variability on bilateral trade in the 1960s and 1970s is Frankel and Wei (1995) or Frankel (1997, 137-139). The negative effect disappears, however, after 1980.

certainly a prime motivation for the European Monetary Union. Furthermore, there has not been satisfactory testing of the proposition that trade and investment are substantially boosted by full monetary union, in which circumstance even the possibility of a future change in the exchange rate is eliminated, along with all transactions costs. Some recent tests of economic geography suggest that Canadian provinces are far more closely linked to each other than they are to nearby states of the U.S., whether the links are measured by prices or quantities of trade. High on the list of reasons why integration seems to be so much higher between provinces within a federation such as Canada than between countries is the fact that the provinces share a common currency.⁹

Of the advantages of fixed exchange rates, academic economists tend to focus most on the nominal anchor for monetary policy. The argument is that there can be an inflationary bias when monetary policy is set with full discretion. A central bank that wants to fight inflation can commit more credibly by fixing the exchange rate, or even giving up its currency altogether. Workers, firm managers, and others who set wages and prices then perceive that inflation will be low in the future, because the currency peg will prevent the central bank from expanding even if it wanted to (without soon jeopardizing the viability of the exchange rate peg). When workers and firm managers have low expectations of inflation, they set their wages and prices accordingly. The result is that the country is able to attain a lower level of inflation, for any given level of output. This is an argument why countries like Italy, Spain, and Portugal, which had high inflation rates in the 1970s, were eager to tie their currencies to those of Germany and the rest of the EMS countries. In essence, they hoped to import the inflation-fighting credibility

⁹ McCallum (1995) for a quantity-based measure of trade integration, and Engel and Rogers (1994, 1997) for a price-based measure. The most direct test yet of the effect of a common currency on bilateral trade is Rose (1999).

of the Bundesbank. The nominal anchor argument of course presupposes that one is pegging to a hard currency, one that exhibits strong monetary discipline. After the breakup of the Soviet Union, most of the 15 newly independent states wisely reached the judgment that the Russian rouble did not offer a good nominal anchor. The strength of the argument for basing monetary policy on an exchange rate target will also depend on what alternative nominal anchors might be available (money supply, nominal income, or price level).

The advantages of a flexible exchange rate can all be grouped under one major property: it allows the country to pursue independent monetary policy. The argument in favor of monetary independence, instead of constraining monetary policy by the fixed exchange rate, is the classic argument for discretion, instead of rules. When the economy is hit by a disturbance, such as a shift in worldwide demand away from the goods it produces, the government would like to be able to respond, so that the country does not go into recession. Under fixed exchange rates, monetary policy is always diverted, at least to some extent, to dealing with the balance of payments. Under the combination of fixed exchange rates *and complete integration of financial markets*, which characterizes EMU, monetary policy becomes completely powerless. Under these conditions, the domestic interest rate is tied to the foreign interest rate. An expansion in the money supply has no effect: the new money flows out of the country, via a balance of payments deficit, just as quickly as it is created. In the face of an adverse disturbance, the country must simply live with the effects. After the fall in demand, for example, the recession may last until wages and prices are bid down, or until some other automatic mechanism of adjustment takes hold. By freeing up the currency, on the other hand, the country can respond to a recession by means of monetary expansion and depreciation of the currency. This stimulates demand for

domestic products and returns the economy to desired levels of employment and output more rapidly than would the case under the automatic mechanisms of adjustment on which a fixed-rate country must rely.

The argument for stabilizing the exchange rate is sometimes buttressed by reference to an increasingly evident disadvantage of free floating: a tendency toward volatility that does not always derive from macroeconomic fundamentals, including occasional speculative bubbles (possibly rational, possibly not) and crashes. However the argument for flexibility is correspondingly sometimes buttressed by reference to an increasingly evident disadvantage of pegging: a tendency toward borrowers' effectively-unhedged exposure in foreign currency (possibly rational, possibly not¹⁰), ending badly in speculative attacks and multiple equilibrium. Overvaluation and excessive volatility are possible in either regime.

Which factors are likely to dominate, the advantages of fixed exchange rates or the advantages of floating? There is no one right answer for all countries. The answer must depend, in large part, on characteristics of the country in question. If the country is subject to many external disturbances, for example, such as fluctuations in foreigners' eagerness to buy domestic goods and domestic assets (perhaps arising from business cycle fluctuations among the country's neighbors), then it is more likely to want to float its currency. In this way it can insulate itself from the foreign disturbances, to some degree. On the other hand, if the country is subject to many internal disturbances, then it is more likely to want to peg its currency.

¹⁰ Many who have recently argued for floating on these grounds verge on implying that it would be beneficial to introduce gratuitous volatility into the exchange rate, to discourage unhedged borrowing in foreign currency.

2. No Single Regime is Right for All Countries: The Optimum Currency Area

Many of the country characteristics that are most important to the fixed-vs.-floating question are closely related to the size and openness of the country. This observation brings us to the theory of the Optimum Currency Area.¹¹

Definition of Optimum Currency Area

Countries that are highly integrated with each other, with respect to trade and other economic relationships, are more likely to constitute an optimum currency area. An optimum currency area is a region for which it is optimal to have its own currency and its own monetary policy. This definition, though in common use, may be too broad to be of optimum usefulness. It can be given some more content by asserting the generalization that smaller units tend to be more open and integrated with their neighbors than larger units.¹² Then an OCA can be defined as *a region that is neither so small and open that it would be better off pegging its currency to a neighbor, nor so large that it would be better off splitting into subregions with different currencies*. Even to the extent that corner solutions are appropriate for given countries, the optimal geographic coverage for a common currency is likely to be intermediate in size: larger than a city and smaller than the entire planet.

The Integration Parameters of the OCA Criteria

¹¹ A recent survey is Tavlas (1992). The issues are also reviewed by Bayoumi and Eichengreen (1994).

¹² Gravity estimates suggest that for every one percent increase in the size of a country's economy, its ratio of trade to GDP falls by about .3 percent. (Frankel, 1997.)

Why does the OCA criterion depend on openness? The advantages of fixed exchange rates increase with the degree of economic integration, while the advantages of flexible exchange rates diminish. Recall the two big advantages of fixing the exchange rate that we identified above: (1) to reduce transactions costs and exchange rate risk that can discourage trade and investment, and (2) to provide a credible nominal anchor for monetary policy. If traded goods constitute a large proportion of the economy, then exchange rate uncertainty is a more serious issue for the country in the aggregate.¹³ Such an economy may be too small and too open to have an independently floating currency. At the same time, because fixing the exchange rate in such a country goes further toward fixing the entire price level, an exchange rate peg is more likely to be credible, and thus more likely to succeed in reducing inflationary expectations.¹⁴

Furthermore, the chief advantage of a floating exchange rate, the ability to pursue an independent monetary policy, is in many ways weaker for an economy that is highly integrated with its neighbors. This is because there are ways that such a country or region can cope with an adverse shock even in the absence of discretionary changes in macroeconomic policy. Consider first, as the criterion for openness, the marginal propensity to import. Variability in output under a fixed exchange rate is relatively low when the marginal propensity to import is high; openness acts as an automatic stabilizer.

Consider next, as the criterion of openness the ease of labor movement between the country in question and its neighbors. If the economy is highly integrated with its neighbors by

¹³ This is the rationale for the openness criterion originally suggested by McKinnon (1963).

this criterion, then workers may be able to respond to a local recession by moving across the border to get jobs, so there is less need for a local monetary expansion or devaluation.¹⁵

Of course the neighbor may be in recession at the same time. *To the extent that shocks to the two economies are correlated, however, monetary independence is not needed in any case: the two can share a monetary expansion in tandem.* There is less need for a flexible exchange rate between them to accommodate differences.

Consider, finally, a rather special kind of integration: the existence of a federal fiscal system to transfer funds to regions that suffer adverse shocks. The existence of such a system, like the existence of high labor mobility or high correlation of shocks, makes monetary independence less necessary.

Stretching the definition of integration even further, another kind of integration, more political in nature, can help reduce the need for monetary independence: to the extent that domestic residents have economic priorities, especially on fighting inflation versus unemployment, that are similar to those of their neighbors there will be less need for a differentiated response to common shocks.¹⁶ Finally, to the extent that individuals think of themselves as citizens of Europe more than citizens of their own county, they may be willing on political grounds to forego discretionary monetary responses even to disturbances that are so large that a national policy response would be in their economic advantage. Conversely, to the

¹⁴ Romer (1993).

¹⁵ Labor mobility was the criterion identified by Mundell (1961), who originally introduced the concept of the optimum currency area.

¹⁶ Corden (1972) and Alesina and Grilli (1991).

extent they pride their national sovereignty, they will not want to give up their national currency even if it is economically advantageous.

In part 5 of this study, we will focus particularly on two OCA criteria: the extent of trade among members of a given grouping, and the correlation of their incomes. The two axes in Figure 2 represent these two parameters. The OCA line is downward-sloping: the advantages of adopting a common currency depend positively on trade integration and the disadvantages of abandoning monetary independence (which is the same thing) depend negatively on income correlation.¹⁷ Points high up and to the right represent groupings that should adopt a common currency among themselves; those down and to the left represent groupings that should float.

3. Corner Solutions Are Right for *Some* Countries

A popular hypothesis is that the world monetary system will feature fewer currencies in the coming decade than it does now. Small open countries (and perhaps not only these) will abandon their independent currencies -- in favor of the firmest institutional constraints possible: either a currency board, or outright monetary union with one of the major-currency countries. One version of the hypothesis overlaps with the familiar claim that the world is breaking up into three blocs, one pegged to the dollar, one to the euro, and one to the yen.¹⁸

Currency Boards

¹⁷ We assume in this project that effective capital controls are not an option. Thus fixing the exchange rate implies abandoning the ability to set the interest rate independently.

¹⁸ The dollar and euro are looking somewhat more credible as bloc anchors than in the past. The yen much less so. (References are in Frankel and Wei, 1995.)

A currency board is a monetary institution that only issues currency that is fully backed by foreign assets. Its principal attributes include the following:

- an exchange rate that is fixed not just by policy, but by law
- a reserve requirement stipulating that each dollar's worth of domestic currency is backed by a dollar's worth of foreign reserves
- a self-correcting balance of payments mechanism, in which a payments deficit automatically contracts the money supply, resulting in a contraction of spending.

The first currency board was established by the British in Mauritius in 1849. The use of currency boards eventually spread to 70 British colonies. The purpose was to provide the colonies with a stable currency without the associated difficulty of issuing sterling notes and coins that were costly to replace if lost or destroyed. The colonies also benefitted from this approach in that they could earn interest on the foreign currency assets being held in reserve. The use of currency boards peaked in the 1940s and declined thereafter. In the 1960s, many newly independent African countries replaced their currency board with a central bank, and most other countries followed suit in the 1970s.

The introduction of currency board-like arrangements in Hong Kong (1983), Argentina (1991), Estonia (1992), Lithuania (1994), Bulgaria (1997), Bosnia (1998) and two smaller countries, constitutes a resurgence in their use worldwide. A currency board can help to create a credible policy environment by removing from the monetary authorities the option of printing money to finance government deficits. Argentina, for example, has benefited from such credibility. Argentina was prompted to adopt a currency board (which it calls the convertibility plan) because of a dramatic hyperinflation in the 1980s and the absence of a credible monetary

authority. Since 1991, Argentina has become a model of price stability and has achieved laudable growth rates, aside from setbacks such as the Mexican peso “Tequila”-induced recession in 1995, from which Argentina soon rebounded strongly. By most accounts, the currency board has worked for Argentina.

And yet Argentina does not fit well the traditional optimum currency area criteria. It is not particularly small or open, or subject to high labor mobility or close correlation with the US economy. Although the traditional optimum currency area criteria are still relevant, we have become aware of a new set of criteria that is also relevant, particularly to the decision to adopt an institutional commitment to a fixed rate. The new characteristics have to do with credibility and the need to satisfy international financial markets. The additional criteria¹⁹ are:

- a strong (even desperate) need to import monetary stability, due to either a history of hyperinflation, an absence of credible public institutions, or unusually large exposure to nervous international investors
- a desire for further close integration with a particular neighbor or trading partner (which has the added advantage of enhancing the political credibility of the commitment)
- an economy in which the foreign currency is already widely used²⁰
- access to an adequate level of reserves,

¹⁹ Similar lists are also offered by Williamson (1995) and Larrain and Velasco (1999).

²⁰ In a country that is already partially dollarized, devaluation is of little use. If many wages and prices are already tied to the dollar, they will simply rise by the same amount as the exchange rate. If liabilities are already denominated in dollars – and, in the case of international liabilities, foreign creditors generally insist on this -- then devaluation may bankrupt domestic borrowers. Such initial conditions are discussed as criteria for dollarization by Calvo (1999) and Hausmann, Gavin, Pages-Serra, and Stein (1999).

- rule of law, and
- a strong, well-supervised and regulated financial system, and

Currency board supporters have recently pushed for their wider use—in particular, for Indonesia, Russia, and Ukraine. Proclaiming a currency board does not automatically guarantee the credibility of the fixed rate peg. Little credibility is gained from putting an exchange rate peg into the law, in a country where laws are not heeded or are changed at will. A currency board is unlikely to be successful without the solid fundamentals of adequate reserves, fiscal discipline, and a strong and well-supervised financial system, in addition to the rule of law.²¹

The Alternative of Dollarization

Currency boards, which not long ago appeared a radical straightjacket, are now in some quarters deemed an insufficiently firm commitment. In January 1999, at the request of Argentina's President, the central bank submitted a report spelling out possible ways to complete the dollarization of that country, that is, to replace the peso fully with the dollar as the legal currency. This plan may well never come to fruition. The timing of the initiative -- immediately after the downfall of the real in neighboring Brazil and in advance of a presidential election in Argentina -- suggests possible short-term objectives: impressing contagion-prone speculators and stability-craving voters. Nevertheless, many Latin Americans are suddenly taking the dollarization alternative seriously, and at least one country, El Salvador, may actually go ahead. And the fact that anyone would consider that talk of official dollarization might earn the

²¹ For a balanced evaluation, see Williamson (1995).

Argentine President political popularity, rather than the reverse, is itself a sign of how much the world has changed.²²

The reasons why most countries would not want to adopt the currency of the United States or any other foreign power as its own are clear. It is a total surrender of monetary independence. Also it adds the insult of surrendering a symbol of national political sovereignty, which is demonstrably important to most people. It is striking that, notwithstanding that in theory the boundaries of political units and optimal currency areas need not coincide, in practice they almost always do. In Israel in 1983, adverse popular reaction to the idea of dollarization was severe, and the finance minister who had proposed it resigned.

Yet, consider a country that already has demonstrated sufficient political support for monetary discipline to go as far as a currency board (and where the foreign currency already plays a large role in the economy). Is there anything further to be lost by going the rest of the way and giving up its currency altogether, beyond the symbolic loss of sovereignty?

The conventional interpretation would be that such a country still retains a degree of monetary independence that, though small, is not zero, and which it would be giving up if it were to dollarize fully. Argentina for example could always change the convertibility law if it wanted to, or short of that could switch its peg from the dollar to the euro, if US monetary policy disappointed.²³

²² Another respect in which the popularity of dollarization might to some extent be specific to the late 1990s is the tremendous reputation enjoyed by US monetary policy during the Greenspan chairmanship and Clinton economic boom.

²³ Furthermore Argentina actually has a “quasi” currency board, which can in effect sterilize a certain proportion of reserve outflows, by allowing banks to acquire domestic dollar-denominated bonds as reserves.

The unfortunate truth is that most developing countries have been unable to make good use of whatever monetary independence they possess. Perhaps the additional loss of discretionary monetary policy for Argentina would be not just small, but zero. Perhaps an emerging-market country under a fixed exchange rate or currency board is in a worse position, as regards having to accept an interest rate that may not be appropriate to its current domestic cyclical conditions, than under dollarization. Under the current regime, when the Federal Reserve Board raises U.S. interest rates, emerging-market interest rates often rise *more than* one-for-one. The differential between Argentine and U.S. interest rates declined after the April 1991 convertibility plan and has been relatively small most of the time since 1993. Nevertheless, the differential is still non-negligible. It is sensitive to external disturbances -- contagion from crises in other emerging markets as well as changes in U.S. interest rates. Renewed sharp spikes following the tequila crisis of December 1994 and Russian crisis of August 1998 illustrated the point dramatically. When the U.S. interest rate increases, the Argentine interest rate increases more than one-for-one. A regression produces the result that when the U.S. fed funds rate rises 1 basis point, the Argentine dollar interest rate on average rises an estimated 2.73 basis points. (Reported in Table 1. The result is statistically significant.²⁴)

The interest rate differential consists primarily of a country premium, supplemented by a small currency premium. The country premium is compensation for perceived risk of default, measured as the Argentine dollar interest rate minus the U.S. treasury bill rate. The currency

²⁴ The sample period runs from November 1994, when the dollar-denominated instrument is first available, to December 1998. If one responds to borderline serial correlation by taking first differences, the estimated coefficient drops to .88. For Hong Kong the estimated coefficient is just above one (though insignificantly so), regardless whether taking first differences or not. (For each currency considered, one cannot reject the hypothesis of a unit root. A need for first differences is conventionally indicated by this result, which, however, could be due to low power.)

premium is compensation for perceived risk of change in exchange rate policy, measured as the Argentine peso interest rate minus the dollar-denominated Argentine interest rate. We used to think of countries' currency premiums and country premiums as independent factors. But we have learned that when there are lingering fears of devaluation, it affects not only the currency premium, but the country premium as well, because investors know that domestic banks and firms may not be able to service their dollar debts in the event of a devaluation.

The currency premium would by definition vanish if Argentina dollarized. It is true that the country premium would not vanish. But it might diminish, or become less sensitive to foreign disturbances, when the possibility of devaluation vanishes.

The interesting hypothesis in Table 1 is that under dollarization the regression coefficient on foreign interest rates would be smaller. For purposes of comparison, we look at Panama. The hypothesis is borne out. When the U.S. fed funds rate rises 1 basis point, the Panamanian interest rate on average rises by only an estimated .43 basis points.²⁵ The suggested implication is that, somewhat paradoxically, Argentina might be less at the mercy of the Federal Reserve if it went on the dollar standard. But a drawback would be that increases in Argentine interest rates would bear US fingerprints more visibly from a political standpoint; the statistical fit is tighter for the dollarized country than for the currency board country.

The same pattern holds when the tests are extended to two Latin American countries with a less-firm tie to the dollar. When short-term interest rates in Brazil and Mexico are regressed against the US fed funds rate, the estimated coefficients are substantially higher, even, than they

²⁵ In terms of first differences, the coefficient is .40.

Table 1: Regressions of local interest rates against the U.S. federal funds rate

Country	Period	Specification	Constant	Coefficient	Durbin-Watson	R ²	Mean of dependent variable	SER
Panama	1986:I-1998:II	Deposit rate	4.47	0.44***	0.82	0.64	6.99	0.58
	quarterly	level	(0.29)	(0.05)				
Panama	1986:II-1998:II	Deposit rate	...	0.40**	2.93	0.12	0.02	0.52
	quarterly	first difference	...	(0.16)				
Argentina	1994:10-1998:12	Money market rate for U.S. dollars	-8.11	2.73***	1.48	0.19	6.83	1.66
	monthly	level	(4.38)	(0.80)				
Argentina	1994:11-1998:12	Money market rate for U.S. dollars	...	0.88	2.91	0.00	0.01	2.00
	monthly	first difference	...	(1.90)				
Hong Kong	1993:12-1998:12	Money market rate	0.27	1.03***	1.70	0.17	5.63	1.68
	monthly	level	(1.57)	(0.30)				
Hong Kong	1994:1-1998:12	Money market rate	...	1.09	2.97	0.01	0.03	2.19
	monthly	first difference	...	(1.73)				
Brazil	1995:1-1998:6	T-bill rate	-221.13	45.93***	1.12	0.64	32.78	8.42
	monthly	level	(7.36)	(5.43)				
Brazil	1995:2-1998:6	T-bill rate	...	12.96	2.61	0.03	-0.49	8.08
	monthly	first difference	...	(11.15)				
Mexico	1994:10-1998:12	Money market rate	-112.65	26.65***	0.43	0.25	33.07	13.50
	monthly	level	(35.67)	(6.51)				
Mexico	1994:10-1998:12	Money market rate	...	15.77*	1.78	0.07	0.40	8.63
	monthly	first difference	...	(8.17)				
Mexico	1994:10-1998:12	T-bill rate	-98.98	23.62***	0.34	0.25	30.17	12.04
	monthly	level	(31.81)	(5.81)				
Mexico	1994:10-1998:12	T-bill rate	...	14.21**	1.61	0.09	0.39	6.82
	monthly	first difference	...	(6.46)				

a. Standard errors are reported in parentheses.

b. * indicates coefficient was significant at the 10% level, ** indicates it was significant at the 5% level, and *** indicates it was significant at the 1% level.

were for Argentina.²⁶ But the standard errors are also larger. It seems, unusually, as if the looser the relationship, the higher the regression coefficient. This supports the notion that the presence of exchange rate uncertainty exacerbates swings in the risk premium.

The Argentine dollarization proposal: Is it a good idea?

The blueprint from the Argentine authorities details three possible approaches to dollarization: bilaterally negotiated (through a “treaty of monetary association” with the United States), unilateral, and regional. There are three things that the Argentines might hope to get out of a negotiated agreement. They are not expected to ask for a fourth: voting rights on the Federal Reserve Open Market Committee, as the eleven euro countries have at the ECB. Full dollarization is thus a different kind of monetary union than is EMU.

The first thing they have asked for is a return of the lost seignorage, worth about \$600-750 million, measured as the interest that the central bank now earns by holding \$14 billion of foreign exchange reserves (U.S. treasury bills) against domestic peso liabilities.²⁷ Second is access to the Fed discount window by Argentine banks. Third is cooperation regarding bank supervision. The United States is quite unlikely to agree to offer to compensate Argentina for lost seignorage, nor to agree to an open-ended money pot like the discount window, even with the Argentine proposal to use donated seignorage funds to collateralize borrowing by its banks.

²⁶ Similar results regarding the behavior of interest rates in fixed vs. flexible regimes are found by Hausmann et al (1999). The finding that interest rates in emerging markets react more than one-for-one to U.S. short-term interest rates is not new. More results and references are given in Frankel and Okongwu (1996). Tests of monetary stability under various exchange rate regimes are found in Ghosh, Gulde, Ostry, and Wolf, 1997.

²⁷ Argentina’s seignorage is already smaller than it would be for many countries, because it has already given up the domestic credit component of seignorage.

(Cooperative exchange of information in the area of banking supervision is more likely, especially if U.S. banks continue to play a growing role in the Argentine banking system.) Indeed, the United States is so wary of incurring a contingent liability, that it may refuse to enter even into a symbolic treaty designed to give a stamp of approval to the plan, for fear of creating implicit expectations of future bailouts.

Argentina could choose to dollarize unilaterally instead. Given the proven historical inability to put monetary policy to good use, this might be advantageous to Argentina even without help on seignorage or lender-of-last resort facilities, provided the loss of sovereignty is politically acceptable.

Would dollarization be beneficial to the United States? To say that the effect would be very small is true, but not helpful; the next step would be to ask what would be the effect if other countries wanted the same. The effects would start to add up; so we had better consider their desirability now. Economic benefits for the United States include seignorage, enhanced ease of transactions in Argentina on the part of U.S. businesses and travelers, and the increased trade that stability and prosperity in the area would bring about. Perhaps there are foreign policy benefits to spreading US influence as well, though imperialism is distinctly out of fashion. The only obvious drawback is the danger of implicit bailout liabilities that may be there even without the official sanction provided by a treaty. But the benefits probably outweigh the costs. This is especially true since the United States already bears some responsibility for leadership when international financial crises strike, and the probability of crisis in Argentina would presumably be reduced under a dollarization plan. If this evaluation of U.S. costs and benefits is correct, then

the idea may merit American blessing, even if that blessing must be unofficial. Corner solutions are *sometimes* right.

The last question is the costs or benefits of a *regional* move to dollarization. Clearly the failure of Brazil's link to the dollar in January 1999 threatened Argentina financially, and the change in the real exchange rate disrupted trade relations among the Mercosur partners. The benefits to one country of a firmer dollar link are enhanced if others are moving in the same direction. But this externality is a very general aspect of the benefits of money: a given currency is always more convenient to use, the more others use it. There is little reason to forecast a mass regional movement onto the dollar at this point in history merely on the grounds that it would gather steam as it went. Countries with a past history of hyperinflation, political support for renouncing monetary sovereignty, and a recent record of macroeconomic virtue, are in the minority, and are likely to remain so. The United States should not wish to encourage a premature movement in that direction, but at the same time we can unofficially welcome any countries that find it advantageous.

4. No Single Regime is Right for All Time

The proposition that the optimal or desirable regime sometimes varies over time may be a harder "sell" than that it varies across countries. After all, such criteria as openness and income correlations are called parameters. Does that not imply some permanence? Does not a given economic structure correspond to a given optimal exchange rate regime for all time?

One answer is that parameters in fact change over time. This point becomes particularly interesting when governments deliberately change their economic structure, for example

increasing regional trade integration through regional trading arrangements, or even through currency unions themselves. The endogeneity of the optimum currency area criterion is taken up in section 4.

Another answer is that recent history seems to suggest that occasional regime-switching may be unavoidable for some countries, as messy as such a conclusion must be for central bankers and theorists alike.

Exit Strategies

It is clear that a number of countries that suffered from very high inflation rates, and underwent repeated unsuccessful stabilization attempts in the 1980s, were eventually able to get the monkey off their backs with the aid of exchange rate targets -- Argentina, Brazil, Mexico, and Israel. In each case the exchange-rate based stabilization was highly successful. And yet, in each case, there was enough residual inflation that the currency in subsequent years became progressively overvalued in real terms, putting pressure both on the real economy and on the financial sustainability of the exchange rate target. How to get out of such a situation gracefully is the question of exit strategies.

To say it is a question is to say it is a good topic for research, not that anyone has any very good answers to suggest, as of yet.²⁸ On the one hand, Argentina seems to have done well, all things considered, by sticking with a binding commitment. On the other hand, Israel seems to have done well by introducing more flexibility when the currency became overvalued. Mexico

²⁸ Eichengreen and Masson (1998) suggest that possible ways to facilitate an orderly exit from a fixed exchange rate regime include: announcing a substitute nominal anchor for monetary policy, making the transition during a period of tranquility or upward pressure in the currency market, and pre-announcing a schedule of band-widening or of increases in the trend of the central parity.

in 1994 (and now, some will say, Brazil in January 1999) seem to ended up badly by clinging to their exchange rate policies for too long.

For a certain class of high-inflation countries, one is tempted to recommend an initial peg, to break the inflationary psychology, followed a few years later by a crawl or other flexible regime to cut off overvaluation. But can this advice be right, in a model in which people are forward looking? If they know the depreciation is coming in the future, will the stabilization be credible in the present? If it is optimal for the government to incur some real pain to earn inflation-fighting credibility at the beginning, can it really then be optimal to give up that credibility after it has been earned?

Perhaps one should factor in political support as a source of variation over time in objectives. Absent public support, the mere proclamation of a fixed exchange rate arrangement does not guarantee credibility, notwithstanding the claims of the enthusiasts. This is true even if the commitment is sincerely meant on the part of the President of the Central Bank. After all, he or she can be fired. Most populations are willing to sacrifice monetary sovereignty in the name of fighting inflation only when hyperinflation is fresh in their minds. In some countries, that may be the length of one or more lifetimes (Germany and Argentina). In others, it might not survive more than a few years into single-digit inflation. Then an exit strategy might be appropriate.

5. The Optimum Currency Area Criterion Evolves over Time

Such parameters as openness and income correlations are not fixed for all time, but rather change, in response both to countries' fundamental policy choices and in response to exogenous

factors such as declining transportation costs. Integration is increasing worldwide. Most countries have experienced a large increase in the ratio of trade to income during the postwar period. But this trend is far from having run its course.²⁹

The extent of integration among European countries, in particular, is increasing over time, partly as a result of such measures as the removal of barriers to trade and labor mobility in 1992. Even if countries such as the UK did not satisfy the criteria for joining the optimum currency area in the 1990s, perhaps they will in the future. This point is especially acute for new EU members such as Sweden. The long-term effect of EU accession in 1995 will be to promote Sweden's trade with other European countries. Statistical estimates using the gravity model of bilateral trade suggest that membership in the EU increases trade with its members by roughly 60 percent or more.³⁰ Thus Sweden is moving rightward in Figure 3, making it more likely that it will cross the line and satisfy the OCA criterion in the future than in the past.

What about the other parameter, the degree of income correlation among members? We come now to a key point.

Income correlation surely depends on trade integration.

My hypothesis is that this relationship is positive: the more Sweden trades with the EU, the more will Swedish income be correlated with EU income. It seems likely that the incomes of U.S. states, for example, are highly correlated with each other because their economies are highly

²⁹ Endogeneity of the degree of wage and price flexibility with respect to the exchange rate regime has received more attention than endogeneity of trade patterns. But the hope that European countries would respond to EMU by moving in the direction of more flexible labor markets, "because they will have to," shows no sign so far of being realized. Endogeneity of trade patterns seems to me more deserving of attention.

³⁰ The Frankel and Wei papers cited above provide estimates, and other citations to the literature.

integrated. The result would be immediate in a demand-driven model (where the correlation of income depends in a simple way on the marginal propensities of the two countries to import from each other), but it could also follow in a variety of other models (e.g., productivity shocks spilling over via trade). Thus we have drawn the correlation function as upward sloping in Figure 3.

Consider what happens when Sweden joins the EU. Not only does trade integration increase, but so does income correlation. We move up and to the right. The advantages of pegging rise and the disadvantages fall. On both scores, the country comes closer to meeting the OCA criterion than before.

The OCA Criterion Might Be Satisfied Ex Post, Even if not Ex Ante

Now consider what happens when Sweden decides to join EMU. The elimination of exchange rate uncertainty and currency transaction costs further stimulates trade with other EU members. Integration and correlation rise further. The way we have drawn Figure 3, even though Sweden fails the OCA criterion given its current structure of trade, a decision to go ahead and join anyway would promote trade and raise the income correlation enough to put it over the line. It satisfies the OCA criterion ex post, even though it fails ex ante!

The relationship that we have pictured is not the only one that can come from a consideration of the endogeneity of trade patterns and income correlations. Several authors have pointed out that as trade becomes more highly integrated, countries specialize more in production; they have then gone on to argue that this greater specialization will *reduce* the correlation of incomes. (Their logic may be that only supply shocks matter, and that these will

become less correlated due to specialization. But if one is going to decompose shocks, as one should in a fully developed theoretical model, one should take into account that monetary independence is more useful for counteracting idiosyncratic demand shocks. There is relatively little that monetary policy changes can do to counteract supply shocks, though admittedly the same does not apply to other exchange rate changes.) The correlation function would in that case slope downward, as we have drawn it in Figure 4. An increase in integration would actually move Sweden *away* from the OCA criterion.³¹ This outcome would hold regardless whether the increase in integration were due to exogenous forces such as falling transport costs, a deliberate trade policy decision such as joining the EU, or a deliberate monetary policy decision such as joining EMU. At present, we focus on the last source of increased integration. These authors claim that *the country might fail the OCA criterion ex post, even if it passes it ex ante.*

The authors to whom we refer are not minor figures: Barry Eichengreen and Paul Krugman.³² Their view that specialization works against common currencies and diversification of the economy works in favor of it, other things equal, goes back to Kenen.³³ While casual empiricism suggests that integration leads to higher correlations, it is certainly possible that the

³¹ We have drawn the correlation function as steeper than the OCA line, on the grounds that if economists disagree about whether the slope is positive or negative, then the line must be relatively steep. Obviously this logic is far from airtight.

³² "Theory and the experience of the US 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" (Krugman, 1993, p.260). See also Eichengreen (1992, pp.14-16) and Bayoumi and Eichengreen (1994, pp.4-5).

³³ Peter Kenen (1969) argued that regions that are highly diversified economically are better off (which is clearly true), and that such regions are better candidates to fix their currencies to those of neighbors than regions that are more specialized.

Eichengreen-Krugman view is the right one. There is no substitute for formal empiricism of the sort presented in the next section.

For the moment, note an apparent drawback to the Eichengreen-Krugman view that specialization makes countries worse candidates to share a common currency. The drawback derives merely from the logic of drawing boundaries around ever-larger geographical areas. Stipulate that the joining of two or more regions forms a larger unit that tends to be more highly diversified as a whole than are the regions considered individually.³⁴ Then if an individual region is sufficiently diversified to pass the Eichengreen-Krugman test for pegging its currency to a neighbor, it follows that the larger (more diversified) unit that is thereby created will pass the test by an even wider margin, other things equal. It thus will want to peg to other neighbors, forming still larger units, and so forth. The process will continue until the entire world is on one currency. Quite a corner solution.

What if the individual regions are not sufficiently diversified to pass the Eichengreen-Krugman criterion to begin with? Then, under the OCA logic, they should break up into smaller currency units (say, provinces) that float against each other. But these smaller units will be even less diversified, and thus will fail the Eichengreen-Krugman criterion by a wider margin, and will thus decide to break up into still smaller units (say counties). The process of dissolution will continue until the world is down to the level of the (fully-specialized) individual. In other words, the system is unstable. There exists no interior solution that is an equilibrium. Admittedly, governments might not in practice use the OCA criterion in choosing their regime. But it is

³⁴ Statistical estimates suggest that every one percent increase in the size of a region (holding constant income per capita) raises trade by about .7 percent, implying a fall of .3 per cent in openness. (Frankel, 1997, p.64.)

disturbing to think that if governments did follow the "correct" OCA criterion, the outcome must be either a world of one currency or a world of 5 billion. This would be an egregious departure from the economist's belief in interior solutions. It doesn't sound right.

The world seems, rather, to consist of intermediate-sized units. They occasionally join together in attempts to form larger currency areas, or split apart into smaller ones. The world, however, is steadily pushed away from either the extreme of overly small, open, specialized currency units, or the extreme of overly large, closed, diversified units. This logic suggests that regions may be better candidates for an OCA when they trade a lot with each other, not worse.

*A Question for Empirical Investigation:
Are Trade Links Positively Associated with Income Links, or Negatively?*

The empirical work reported here is from Frankel and Rose (1998). Its main goal is to ascertain whether income correlation depends positively on trade integration or negatively, i.e., whether Figure 3 or Figure 4 best represents the world.

Our basic equation is: $\text{Corr}(v,s)_{i,j,t} = a + b \text{Trade}(w)_{i,j,t} + e_{i,j,t}$.

$\text{Corr}(v,s)_{i,j,t}$ is the correlation between country i and country j over time span t for activity concept v. The latter is measured alternatively by various de-trended versions of real GDP, industrial production, employment, or the unemployment rate.

$\text{Trade}(w)_{i,j,t}$ is the log of the average bilateral trade intensity between country i and country j over time span t using trade intensity concept w. The latter is measured alternatively by bilateral export intensities, bilateral import intensities, or bilateral intensities in total trade.

(Intensity refers to the bilateral value divided by the total import or export levels of the two countries.)

The error term $e_{i,j,t}$ represents other determinants of bilateral income correlations.

The data set represents 21 industrial countries, annually from 1959-1993. The object is to see the sign of the slope coefficient b . It should be negative if the Eichengreen-Krugman specialization effect dominates, and positive if our hypothesis is borne out. When the activity variable is the change in GDP over four quarters, the coefficient on the intensity of total trade is .071. The Huber-White standard error is .0088. The results are highly significant, and tend to bear out our hypothesis that close trade links lead to high income correlations. All 60 combinations of activity and trade measures also give this answer. The outcome is the same regardless of the choice of time period, weighting by country size, allowance for nonlinearities or time-specific or country-specific fixed effects.³⁵

A simple OLS regression of income correlations on trade intensity may be inappropriate. Countries are likely deliberately to link their currencies to those of some of their most important trading partners. In doing so they lose the ability to set monetary policy independently of those neighbors, which in turn could result in an observed positive association between trade links and income links. In other words, the association could be the *result* of countries' application of the OCA criterion, rather than an aspect of economic structure that is invariant to exchange rate regime. To identify the effect of bilateral trade patterns on income correlations, we need exogenous determinants of bilateral trade patterns. These can be used as instrumental variables. Our preferred set of instrumental variables includes the most basic variables of the well-known

³⁵ The data sources and results for sixty combinations are reported in Frankel and Rose (1998).

gravity model of trade: distance and dummy variables for common borders and common languages.

First-stage linear projections of trade intensity on these three gravity variables show the expected results: significant negative effects of distance and positive effects of common borders or common language. Instrumental variable estimates of our basic equation give estimates of b that tend to be even higher and more significant statistically than the OLS results. When the activity variable is GDP fourth-differenced, the coefficient on the intensity of total trade is $+1.03$.

The Huber-White standard error is $.015$. Once again, the results are highly significant, and tend to bear out our hypothesis that close trade links lead to high income correlations. As before, the conclusion is robust with respect to choice of activity and trade measures, time period, weighting by country size, allowance for nonlinearities or time-specific or country-specific fixed effects.

Of the various other extensions we tried, one is particularly important. The Bayoumi-Eichengreen view is that the high correlation among European countries is a result not of trade links but of European's decision to relinquish monetary independence vis-a-vis their neighbors. If this is correct, putting the exchange-rate regime variable explicitly on the right-hand side of the equation should show the effect, and the apparent effect of the trade and geography variables should disappear. Instead, it turns out that the addition of the exchange-rate variable does not significantly alter b .

This question bears further exploration, both theoretical and empirical. But the results seem clearly to show that trade links do in practice raise income correlations. It would seem to follow that countries that undergo a gradual rise in trade integration will come gradually over

time to satisfy better and better the criteria for a common currency. This effect is just one example of the more general principle that no single exchange rate regime is right for all time.

6. Summary of Conclusions

Three propositions are currently heard, either as predictions or prescriptions, regarding countries' choice of exchange rate regimes. On the one hand, some veterans of the currency wars yearn for a general move toward increased flexibility. On the other hand some herald a general move toward reduced flexibility, including rigid commitments via institutional arrangements that lock in fixed rates; these include currency boards or even the outright disappearance of national currencies in some parts of the world. A third view, which is rapidly becoming a new conventional wisdom, subsumes the first two: countries are increasingly finding the middle ground unsustainable -- such intermediate regimes as adjustable pegs, crawling pegs, basket pegs and target zones -- and are being forced toward either extreme, free float or rigid peg. The hypothesis of the missing middle has yet to be rationalized theoretically. Possibly a valid rationale is that complicated intermediate regimes are insufficiently verifiable or "transparent" to satisfy hard-to-please global investors. But it may be that in fact no exchange rate regime would have prevented the recent crises in emerging markets. Rather the grass always looks greener at the edges of the pasture, compared to the intermediate positions where the victims had previously been contentedly grazing.

One theme of this paper is that the optimal exchange rate regime depends on the circumstances of the particular country and time. For some countries, corner solutions are indeed good options. Floating will continue to be desirable for large economies. Fixity may be

desirable for very small open economies, or for those where a history of hyperinflation or the dominance of finicky global investors has rendered confidence scarce and independent monetary policy no longer usable. Providing the public is willing politically to give up monetary sovereignty, even full official dollarization may be attractive for some countries in Latin America, where interest rates currently react more than one-for-one to the U.S federal funds rate.

But another theme of this paper is that intermediate solutions are often more likely to be appropriate than corner solutions. For many countries, regimes in between the extremes of pure floating and rigid fixity will continue to be appropriate, the new conventional wisdom notwithstanding. This is true, for example, for some developing countries for whom large-scale capital flows are not an issue. For many intermediate emerging-market countries with open capital markets, there is no single regime that is the obvious choice. It is important to remember that in the past some of them have found exchange rate targets a useful component of monetary stabilization programs when seeking to end a period of high inflation, while at other times it has been crucial that the same countries exit from pegs that may have become overvalued before a crisis develops.

Another dimension on which an intermediate solution is more plausible than corner solutions regards the geographic area over which it is optimal to have a common currency. Optimum currency area criteria include the intensity of trade links and the magnitude of income correlations. Small political units that have tight economic links with their neighbors are too small to float. If the boundaries of a geographic area are drawn sufficiently large that the trade links and income links among its constituent parts are strong compared to the trade links and income links with its neighbors, then it is of the optimal size to constitute an independent

currency area. Empirical results suggest that when a political unit adopts the currency of a neighbor, the creation of the monetary union over time promotes trade between the neighbors, which in turn has a positive effect on the correlation in incomes. The implication is that the optimum currency area criterion may be satisfied ex post even if it fails ex ante. This endogeneity of the criterion is another example of the general proposition that the optimal regime varies across countries and over time.

* * *

Figure 2: Two Key Parameters in the OCA Criterion

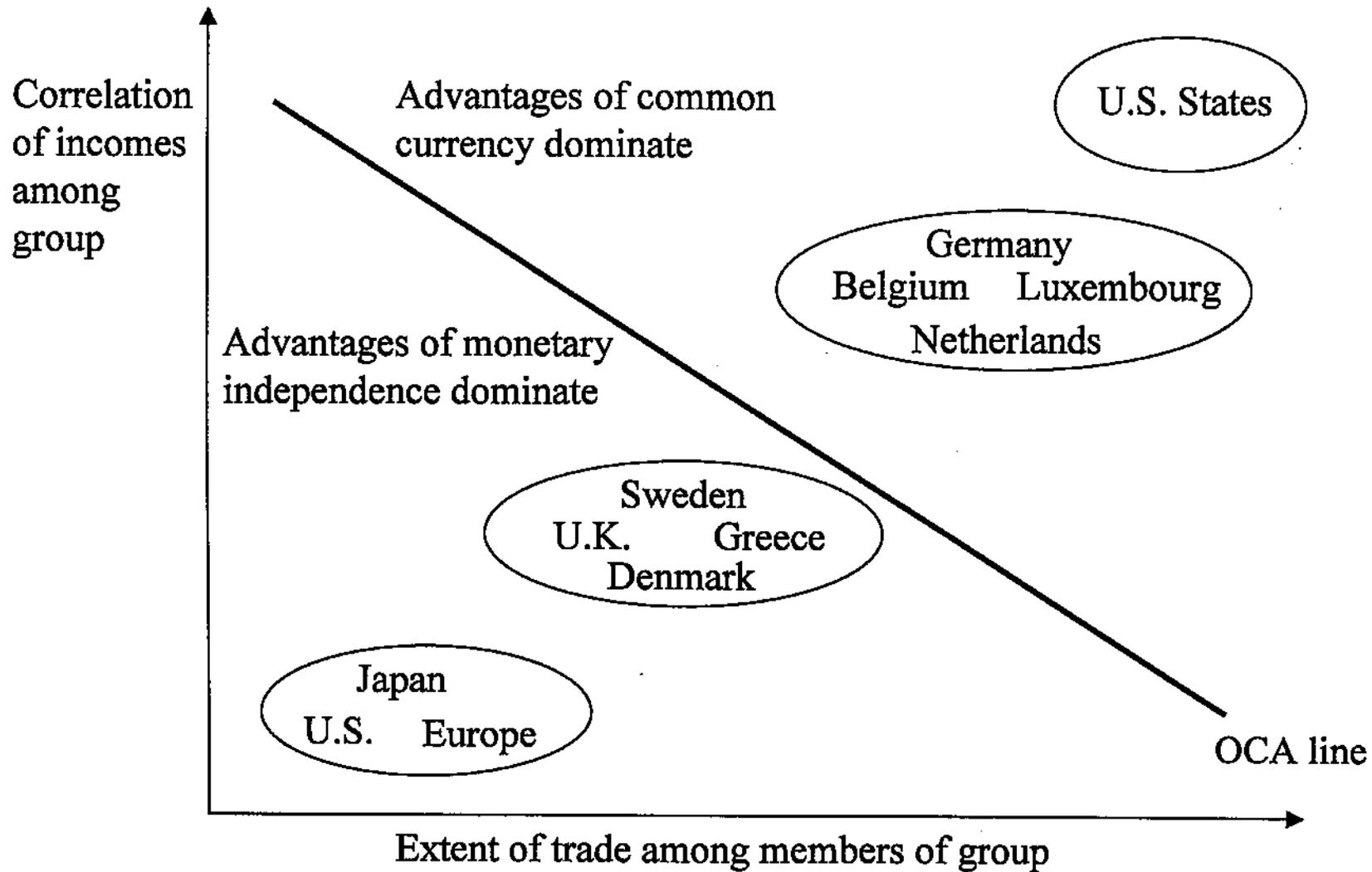
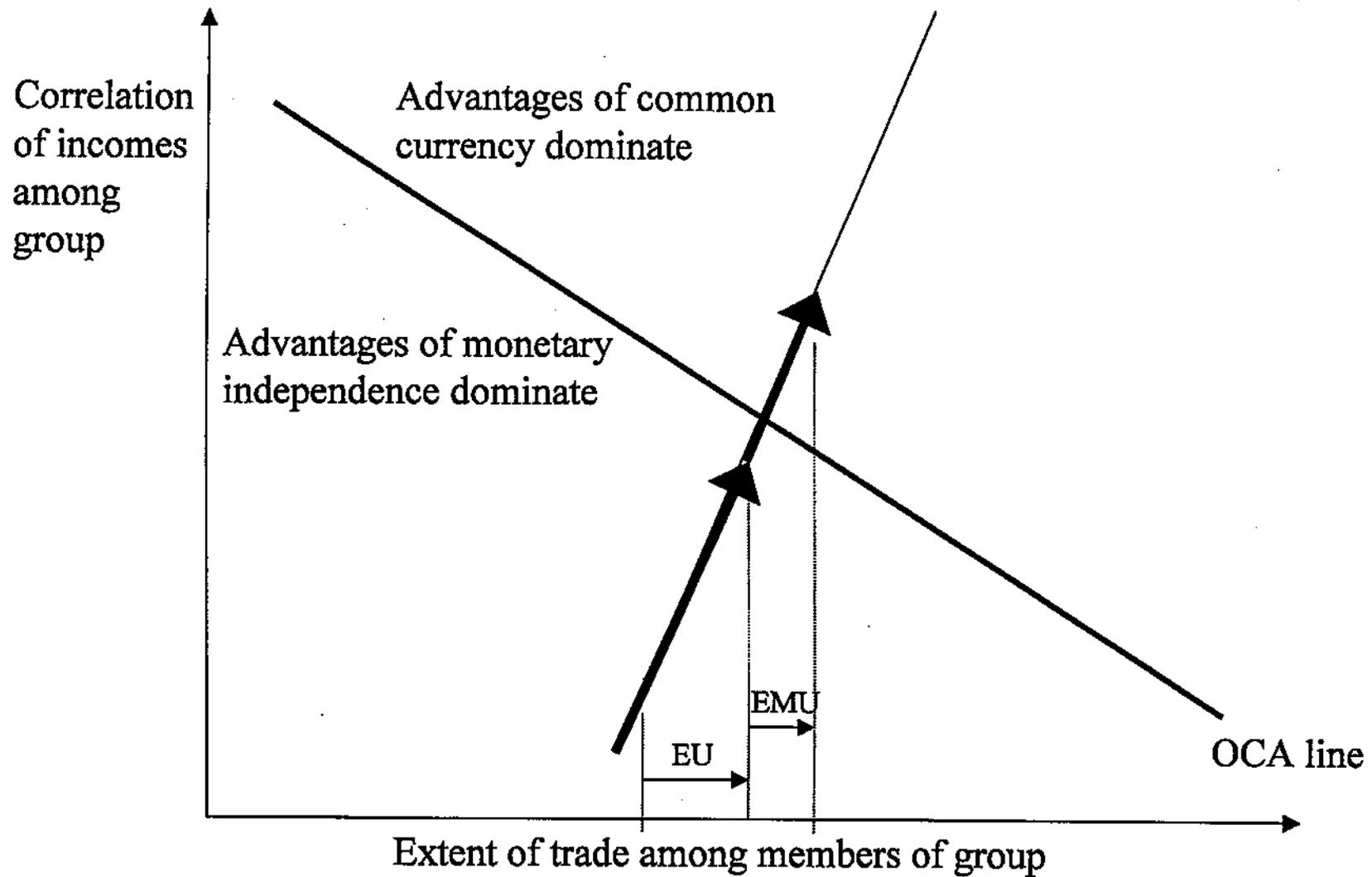
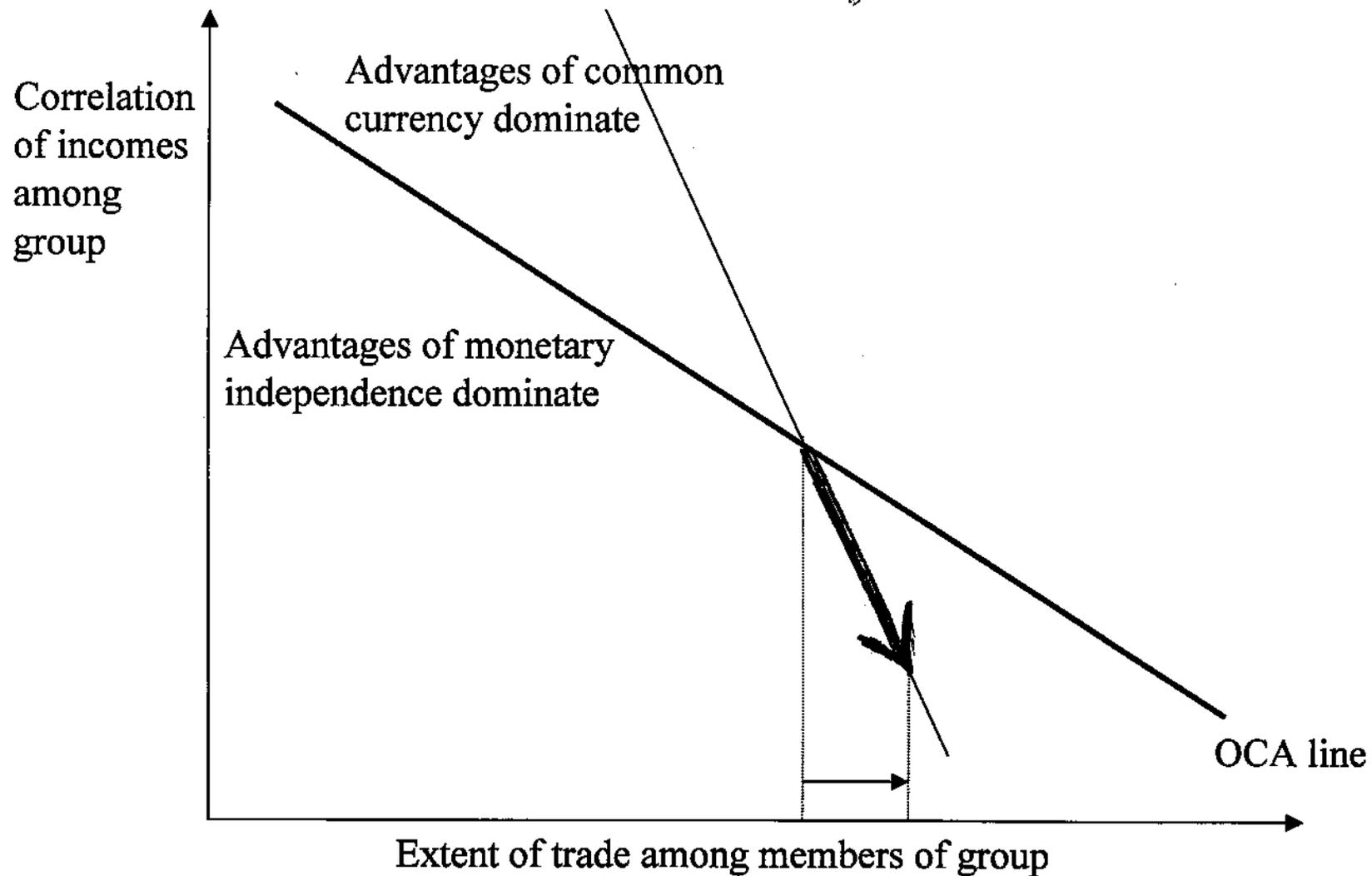


Figure 3: Sweden Joins the European Union and EMU



**Figure 4: Sweden Joins the European Union or EMU,
But the Eichengreen-Krugman Effect Dominates**



References

- Alesina, Alberto, and Vittorio Grilli, 1991, "The European Central Bank: Reshaping Monetary Politics in Europe," in M.Canzoneri, V.Grilli and P.Masson, eds., Establishing a Central Bank: Issues in Europe and Lessons from the US, CEPR, London, Cambridge University Press: Cambridge UK.
- Bayoumi, Tamim, and Barry Eichengreen, 1994, *One Money or Many? Analyzing the Prospects for Monetary Unification in Various Parts of the World*, Princeton Studies in International Finance no. 76, September, Princeton.
- Calvo, Guillermo, 1999, "On Dollarization," University of Maryland, April.
- Corden, W. Max, 1972, *Monetary Integration*, *Princeton Studies in International Finance*, No. 93, International Finance Section, Princeton University, April.
- Crockett, Andrew, 1994, "Monetary Policy Implications of Increased Capital Flows," Changing Capital Markets: Implications for Monetary Policy, Symposium sponsored by Federal Reserve Bank of Kansas City, Jackson Hole, August 1993.
- Eichengreen, Barry, 1992, "Should the Maastricht Treaty Be Saved?" *Princeton Studies in International Finance*, No. 74, International Finance Section, Princeton Univ., December.
- Eichengreen, Barry, 1994, International Monetary Arrangements for the 21st Century, Brookings Institution, Washington DC.
- Eichengreen, Barry, 1998, "The Only Game in Town," UC Berkeley, November.
- Eichengreen, Barry, and Paul Masson, 1998, "Exit Strategies : Policy Options for Countries Seeking Greater Exchange Rate Flexibility," Occasional Paper No. 168, International Monetary Fund, Washington DC.
- Frankel, Jeffrey, 1997, Regional Trading Blocs, Institute for International Economics, Washington DC.
- Frankel, Jeffrey , and Chudozie Okongwu, 1996, "Liberalized Portfolio Capital Inflows in Emerging Markets: Sterilization, Expectations, and the Incompleteness of Interest Rate Convergence," International Journal of Finance and Economics 1, no. 1, Jan., 1-23.
- Frankel, Jeffrey, and Andrew Rose, 1998, "The Endogeneity of the Optimum Currency Area Criterion" The Economic Journal, vol. 108, no. 449, July, 1009-1025.
- Frankel, Jeffrey, and Shang-Jin Wei, 1995, "Emerging Currency Blocs," in The International

Monetary System: Its Institutions and its Future, edited by Hans Genberg, Springer, Berlin, 111-143.

Ghosh, Atish, Anne-Marie Gulde, Jonathan Ostry, and Holger Wolf, "Does the Nominal Exchange Rate Regime Matter?" NBER Working Paper No. 5874, January 1997.

Hausmann, Ricardo, Michael Gavin, Carmen Pages-Serra, and Ernesto Stein, 1999, "Financial Turmoil and the Choice of Exchange Rate Regime," InterAmerican Development Bank.

Kenen, Peter, 1969, "The Theory of Optimum Currency Areas: An Eclectic View," in R. Mundell and A. Swoboda, eds., Monetary Problems in the International Economy, Chicago: University of Chicago Press.

Klein, Michael, and Nancy Marion, 1994, "Explaining the Duration of Exchange Rate Pegs," NBER Working Paper No. 4651.

Krugman, Paul, 1991, "Target Zones and Exchange Rate Dynamics," Quarterly Journal of Economics 106, 669-682.

Krugman, Paul, 1993, "Lessons of Massachusetts for EMU," in F. Giavazzi and F. Torres, eds., The Transition to Economic and Monetary Union in Europe, Cambridge University Press, New York, 241-261.

Larrain, Felipe, and Andres Velasco, 1999, "Exchange Rate Policy for Emerging Markets: One Size Does Not Fit All," July; forthcoming, Essays in International Finance, Princeton University Press.

McKinnon, Ronald, 1963, "Optimum Currency Areas" American Economic Review, 53, September, 717-724.

Mundell, Robert, 1961, "A Theory of Optimum Currency Areas", American Economic Review, November, 509-517.

Obstfeld, Maurice, and Kenneth Rogoff, 1995, "The Mirage of Fixed Exchange Rates," NBER Working Paper No. 5191

Romer, David, 1993, "Openness and Inflation: Theory and Evidence," Quarterly Journal of Economics, 108, no.4, November: 869-903.

Rose, Andrew, 1999, "One Money, One Market? The Effect of Common Currencies on International Trade," U.C. Berkeley, July.

Summers, Lawrence, 1999, testimony before the Senate Foreign Relations Subcommittee on International Economic Policy and Export/Trade Promotion, January 27 .

Williamson, John, 1985, *The Exchange Rate System*. Policy Analyses in International Economics, Institute for International Economics, Washington, D.C..

Williamson, John, 1995, *What Role for Currency Boards?* Policy Analyses in International Economics no. 40, Institute for International Economics, Washington DC.

Williamson, John, 1996, *The Crawling Band as an Exchange Rate Regime: Lessons from Chile, Colombia, and Israel*, Institute for International Economics, Washington DC.