University of California Berkeley

CENTER FOR INTERNATIONAL AND DEVELOPMENT ECONOMICS RESEARCH
Working Paper No. C94-036

Monetary Regime Choices for a Semi-Open Country

Jeffrey A. Frankel

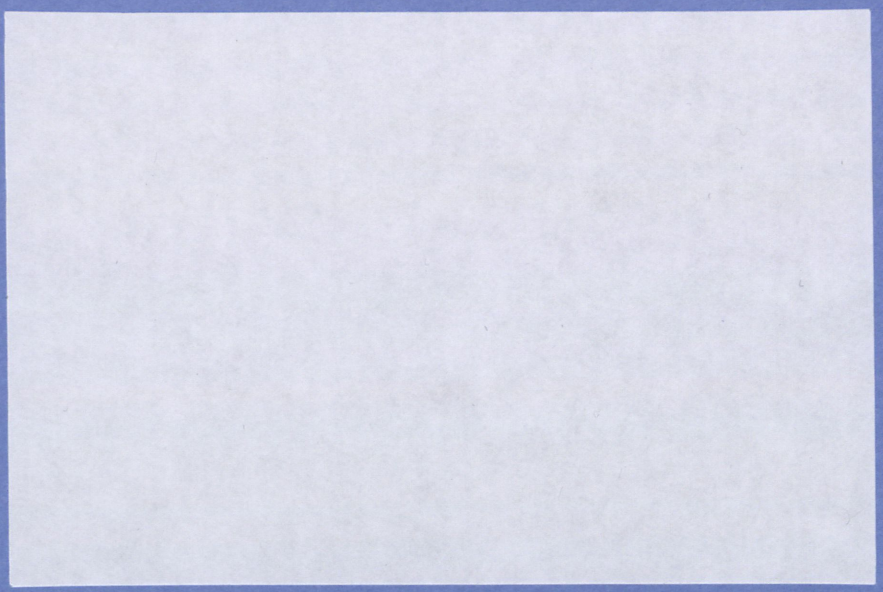
Economics, University of California at Berkeley

April 1994

Department of Economics

iber

CIDER



CIDER

CENTER FOR INTERNATIONAL AND DEVELOPMENT ECONOMICS RESEARCH

The Center for International and Development Economics Research is funded by the Ford Foundation. It is a research unit of the Institute of International Studies which works closely with the Department of Economics and the Institute of Business and Economic Research. CIDER is devoted to promoting research on international economic and development issues among Berkeley faculty and students, and to stimulating collaborative interactions between them and scholars from other developed and developing countries.

INSTITUTE OF BUSINESS AND ECONOMIC RESEARCH

Richard Sutch, Director

The Institute of Business and Economic Research is an organized research unit of the University of California at Berkeley. It exists to promote research in business and economics by University faculty. These working papers are issued to disseminate research results to other scholars.

Individual copies of this paper are available through IBER, 156 Barrows Hall, University of California, Berkeley, CA 94720. Phone (510) 642-1922, fax (510) 642-5018.

UNIVERSITY OF CALIFORNIA AT BERKELEY

Department of Economics

Berkeley, California 94720

CENTER FOR INTERNATIONAL AND DEVELOPMENT
ECONOMICS RESEARCH
Working Paper No. C94-036

Monetary Regime Choices for a Semi-Open Country

Jeffrey A. Frankel

Economics, University of California at Berkeley

April 1994

Key words: regimes, monetary rules, discretion, fixed and floating exchange rates, nominal anchor, Newly Industrializing countries

JEL Classification: F41

This paper was written for a conference on "Monetary Policy in Semi-Open Economies," Seoul, November 6-7, 1992, organized by Yung Chul Park of the Institute of Economic Research, Korea University, and sponsored by the Bank of Korea and the Bankers Association of Korea. It is forthcoming in *Capital Controls, Exchange Rates and Monetary Policy in the World Economy*, edited by Sebastian Edwards, Cambridge University Press. The author would like to thank the Center for International and Development Economics Research (funded at U.C. Berkeley by the Ford Foundation) for research support, and various conference participants for comments.

Abstract

This paper considers regime choices facing relatively small, trade-oriented, financially liberalizing, rapidly growing countries such as the East Asian NICs. The classic question of fixed versus flexible exchange rates is considered first. Of the many factors that determine whether the advantages of fixed rates justify the loss of monetary independence, all depend on the openness of the country. One example is the advantage that stable exchange rates promote trade; the magnitude of this effect is estimated in this paper. Another example is the advantage that a fixed exchange rate can serve as a nominal anchor to monetary policy. The second half of the paper reviews the recent literature on monetary rules versus discretion, and then considers four alternative candidates for the nominal anchor for monetary policy: the money supply, nominal GNP, price level, and exchange rate. It is argued that nominal GNP dominates the money supply in general, and dominates the other two candidates under certain conditions.

Monetary Regime Choices for a Semi-Open Country

It is natural that a country that industrializes will also begin to liberalize its goods and financial markets. As it seeks to move more fully into the international community of industrialized countries, it will be called upon to allow ever-more aspects of its economy to be determined in the marketplace rather than by the government. But it does not follow that every aspect, every macroeconomic variable, should be determined by the marketplace. To focus on the clearest example, the exchange rate should not necessarily be determined in the marketplace. Letting the exchange rate float makes more sense if the monetary authorities have decided to fix the money supply (or other nominal quantity). But an equally admissible alternative plan is to fix the exchange rate and let the money supply do the adjusting. One must choose among equally plausible regimes.

To make this point is not to knock down a "straw man." The U.S. Treasury has in recent years advised Newly Industrialized Countries in East Asia that free-market principles necessarily imply free-floating exchange rates.[1] Free-marketeers Milton

---

[1] In October 1988 the Treasury, in its "Report to the Congress on International Economic and Exchange Rate Policy" required by the Omnibus Trade and Competitiveness Act of 1988, concluded that Korea and Taiwan "manipulated" their exchange rates, within the meaning of the legislation. Financial Policy Talks with Korea followed, in February and November 1990. I discuss recent liberalization of Korean financial markets and foreign exchange markets, and the role of U.S. pressure, in Frankel (1992b).

Friedman and Beryl Sprinkel might agree with that choice, but free-marketeers Robert Mundell and Jack Kemp would not.

1. Democracy, Discipline and Deficits

This paper reviews choices among regimes facing a relatively small, trade-oriented, liberalizing, industrializing country.

We begin by observing that the problem is neither interesting nor realistic unless due allowance is made for market failures, such as sticky prices, as well as political failures, such as populist spending binges. On the one hand, if there are no sticky prices, frictions, or other market failures, then it follows that everything should indeed be left up to the market.[2] If there are no issues of political economy, on the other hand, then the government should retain complete discretion, so as to be free in the future to move all levers in optimal response to the latest developments.

Issues of political economy are particularly relevant if a country is undergoing a transition to democracy at the same time as its economic transition. It is not that an authoritarian government is more likely to produce good economic policies than a democracy.[3] Authoritarians frequently meet neither of the two

---

[2] The authorities still have to choose a money supply. But in a sufficiently perfect world, the choice makes no difference.

[3] Economists have begun to tackle issues like these that they used to leave to political scientists. Barro (1989), for example, finds in a cross-section of countries that a measure of the extent of political rights is positively correlated with

criteria one wants from a philosopher king: being well-informed and being well-intentioned. But democracies are routinely subject to certain pressures in their economic policy-making. Awareness that this is so must heavily condition the problem of what regime to choose in advance.[4] Indeed the argument for the government pre-committing to any regime, rather than retaining short-term discretion, rests on the existence of these pressures and the need for discipline to resist them.

To be more specific, there are good political economy reasons for making (1) a precommitment not to inflate, and (2) a precommitment not to overborrow. The first problem, a bias toward excessive monetary expansion, was amply demonstrated in the worldwide inflation of the 1970s. It gave rise to a burgeoning literature on the desirability of time-consistent rules for monetary policy, i.e., credible pre-commitments to a nominal anchor. It also gave rise to a declaration by major central banks of an allegiance to monetarism. But the 1980s left many central bankers disillusioned with monetarism, and the question of the optimal nominal anchor is still an open one.

The second problem, overborrowing, was amply demonstrated in the international debt crisis of 1982. In theory, openness to international capital flows offers enormous advantages: the ability to borrow abroad to finance development of a country where the rate of return to investment at home is high, the

---

growth.

[4] On populism, see Dornbusch and Edwards (1991).

ability to smooth spending out over recessions and other short-term fluctuations in income, and the ability to diversify risk internationally. In practice, the option to borrow or lend internationally is misused as often as it is used in the optimal way that our theories assume. One has only to observe that countries tend to borrow internationally when they are undergoing temporary booms, and to pay back in downturns, to realize that the theories of intertemporal optimization are missing something. The explanation for such pro-cyclical borrowing probably lies in the nature of the supply of funds from imperfectly-informed lenders and in the political economy of the local groups who get to spend the money.[5] Other possible sources of imperfection in international capital markets include flows motivated by tax-evasion, speculative bubbles, contagion, and the lack of an international enforcement mechanism in case of default. The point is that a case could be made for keeping controls on capital inflows, in order to avoid the temptation to over-borrow.

The argument for pre-committing not to inflate and the argument for pre-committing not to borrow abroad could be seen as two components of a more general pre-commitment not to run an excessive government budget deficit. Such deficits can be financed either by monetization/inflation or by foreign borrowing. In a country with sufficiently developed domestic financial markets, they can also be financed by borrowing from

---

[5] E.g., for the case of commodity-producing countries, Cardenas (1991).

domestic residents. The United States sought a fiscal commitment mechanism in the Gramm-Rudman-Hollings legislation. The members of the European Community sought a fiscal commitment mechanism in the terms of the Maastricht Agreement. Both experiments have been unsuccessful.

Taking our cue from the G-7 countries, we will assume in the remainder of this paper that pre-commitments against domestic borrowing and international borrowing are not practical, presumably because the advantages of being able to run deficits at times are too great. We take as given that the country in question is opening up its capital markets. There do exist, after all, a few countries like Korea that have tended to exhibit the self-control necessary to avoid over-borrowing. (Korea in the 1970s mostly used its international borrowing for high-return investment rather than private or government consumption, and in the 1980s did not wait for international bankers to cut off lending before taking the measures to adjust to higher world borrowing costs.) Korea appears, in any case, to have embarked on a path of financial liberalization. We henceforth focus, rather, on the choice of exchange rate and monetary regimes, taking financial liberalization as given.

2. The Choice of Fixed Versus Flexible Exchange Rate

The debate between adherents of fixed vs. flexible exchange rates is often phrased as a choice between absolutes. But the

Optimal Currency Area literature introduced thirty years ago by Mundell (1961) and McKinnon (1963) demonstrated clearly that one choice cannot be right for all countries. It does not seem sensible for an extremely small open country or province to have an independent currency. This point has been illustrated anew in recent years by plans for European Monetary Union, although Europe has also demonstrated [in recent months] the practical difficulty of knowing when a country is in fact sufficiently open to give up its monetary independence.

We will review the advantages of flexible exchange rates, and then the advantages of fixed exchange rates. We will take special note of the aspects of a particular country that determine which set of advantages is likely to dominate.

2.1 The advantages of flexible exchange rates

The advantage of flexible rates is that, freed of the obligation to keep the exchange rate fixed, monetary policy can respond independently to disturbances. When a country opens up its financial markets to international capital flows, the point becomes stronger. Monetary policy becomes a powerful instrument. A monetary expansion under floating exchange rates has much of its effect via the international channel -- a depreciation of the currency and the resulting stimulus to net foreign demand -- supplementing the traditional channel of a lower real interest rate and resulting stimulus to domestic demand. The Mundell-Fleming model originally showed that this effect is stronger, the

more highly mobile is capital. In the limit of perfect capital mobility, the expected rate of return in the domestic country is tied to the world rate of return. If exchange rates are fixed, there is no scope for monetary policy to have independent effects at all. In that case, a flexible exchange rate is a sine qua non of monetary independence.

How important is it to have an independent monetary policy, and thus by implication to have a flexible exchange rate? This depends on two questions. (1) How often does the domestic country experience a disturbance that calls for a response that differs from what is occurring among its neighbors? (2) If an independent monetary response (a reduction in interest rates or a devaluation) is not an option, what alternative means of adjustment are there?

The first question in turn sub-divides into two questions. (1a) To what extent does the domestic country experience shocks that are different from those experienced by its neighbors? Here the extent to which the two economies are integrated by trade is key.[6] (1b) When the domestic country experiences a shock similar to that of its neighbors, to what extent does it wish to respond

---

[6] Some economists assume that an increase in trade between neighbors reduces the correlation between their shocks, because it increases specialization, and thus ironically makes the Optimum Currency Area less likely to hold [e.g., recently, Bayoumi and Eichengreen (1992) and Blanchard and Muet (1992)]. This would be an excellent subject for future research; the question must depend on the reason for the increased trade, and the nature of subsequent shocks. I believe, however, that for most sources of trade and most shocks, an increase in trade tends to increase the correlation of shocks, and thereby to strengthen the argument for pegging to neighbors.

independently, for example because of a different priority placed on fighting inflation relative to sustaining output and employment? This is largely a matter of the extent to which the countries have divergent values. If the answer to these questions is "not to a great extent," then the region should be happy to share the monetary policy of its neighbor. But otherwise, it will often find itself, in the aftermath of a shock, wishing to make some sort of independent response or adjustment.

The second question concerns alternative means of adjustment, which if available might make a deliberate monetary response unnecessary. This question also has two components. (2a) If a region experiences a negative shock, such as a loss in demand for its products, and there is no effective macroeconomic response, can its workers easily move to other regions? Labor mobility across geographic boundaries is the Optimum Currency Area criterion on which the original Mundell (1961) paper focussed. It depends both on formal barriers to travel and migration, such as those recently relaxed within Europe, and more broadly on linguistic and cultural compatibility. Recent research has shown that when a region of the United States experiences a negative shock, the major means by which markets eventually adjust is <u>not</u> a gradual reduction in wages; rather workers gradually move to other regions of the U.S.[7]

(2b) If all other means of adjustment fail (macroeconomic

---

[7] Blanchard and Katz (1992).

expansion, devaluation, lower wages, and out-migration), is there a supra-regional or supra-national federal system that will undertake fiscal transfers to the depressed region or country? A federal fiscal system operates in the United States,[8] and France fiscally supports the franc-pegging governments of West Africa. But recent developments in Europe suggest that there is not as much political will in the Northern countries to make transfers to other countries as advocates of European Monetary Union had hoped.

The foregoing cataloging of the various factors that might make an independent monetary policy unimportant or unnecessary shows a common theme. When a region is highly integrated with its neighbors -- sharing common disturbances and values, or with easy movement of labor or transfers across its borders -- monetary independence is less necessary.

We must now ask what advantage there might be in giving up monetary independence. Even if the usefulness of monetary expansion and devaluation diminishes when there are alternatives, are these not options that are always of some use to retain? We have only considered the advantages of flexible exchange rates. We must now consider the advantages of fixed exchange rates.

2.2 The advantages of fixed exchange rates

The advantages of a fixed exchange rate, again, fall into

---

[8] Sachs and Sala-y-Martin (1992) document the transfers from the U.S. federal government that flow automatically to a state experiencing a downturn.

two broad categories. (1) First, stabilizing the currency reduces exchange rate uncertainty facing exporters and importers, as well as international borrowers and lenders. The discouraging effect on international trade and finance that exchange rate risk might have was one of the most important arguments used by those who opposed a general move to floating exchange rates before 1973. (2) Second, a fixed exchange rate can serve as an effective nominal anchor for monetary policy, and thus can assure price stability. We consider each advantage in turn.

The hypothesized advantages of exchange rate stability per se constitute too large a subject even for the sort of capsule summary we are pursuing here. Critics of the way floating rates have operated among the G-7 countries over the last twenty years have tended to focus more on longer-term "misalignments" rather than short-term volatility. Misalignments such as the 1984-85 overvaluation of the U.S. dollar are perceived to impose long-term costs in the form of protectionist barriers and a diminished capital stock in tradable-goods sectors. Key to evaluating arguments regarding either long-term misalignments or short-term volatility is a means of evaluating whether private financial markets, with their occasional speculative bubbles and other possible defects, are more or less likely to produce unneeded or undesirable exchange rate movements or misalignments than is the political process, with all its defects, under a pegged-rate system. This debate is very much unsettled.

2.3 The effect of exchange rate variability on trade

The danger of misalignments is not the major motivation behind European efforts to stabilize exchange rates among themselves. Promoting intra-European trade has been a more important motivation.

Economists reviewing the post-1973 record have tended to be skeptical about the effect of exchange rate uncertainty on trade. They point out that markets in forward exchange and other derivatives allow an importer, say, to hedge the risk of an increase in the price of foreign currency. It would be a mistake, however, to think that all exchange rate risk can be hedged in this way, even in theory. Although any given importer can hedge his exposure, someone, somewhere, will have to bear some exchange risk, and they will demand a price to compensate them for doing so.

The empirical record on the effect of exchange rate variability on trade since 1973 is mixed. Notwithstanding the high level of volatility in the twenty years since exchange rates began to float, the international volume of trade has grown rather rapidly. Time series studies such as Hooper and Kohlhagen (1978) found only very limited evidence of effects. Some later studies found relatively more effects, but overall surveys of the subject do not present a strong case for an effect on trade.

The problem with the time-series studies is that other factors have changed since 1973, at the same time as exchange rate variability. (Some factors leading to greater trade over

the last twenty years are economic growth, reduced tariff barriers, and possibly lower costs of transportation and communication.) Assuming that a quantum change in the level of uncertainty would have to be sustained for a number of years before it could be reliably perceived, let alone before it could lead to a reallocation of resources between traded goods and nontraded goods, twenty years of time-series data is perhaps not the most promising place to look.

Together with Shang-jin Wei, I have applied to this problem a cross-section data set of bilateral trade flows between 1,953 pairs of countries. We use the gravity model, to explain the volume of bilateral trade (in logarithmic form) by four basic determinants: the sizes of the two countries, their GNP/capitas, the distance between them, and a dummy variable indicating whether they share a common border. In Frankel (1992), we see how much of the residual can be explained by regional trade groupings, such as common membership in the proposed East Asian Economic Caucus. In Frankel and Wei (1992a,b), we also see how much can be explained by bilateral exchange rate variability. Volatility is defined to be the standard deviation of the monthly first difference of the logarithmic real exchange rate (**sd**).

The equation estimated is as follows.

$$\log(T_{ij}) = \alpha + \beta_1 \log(GNP_i GNP_j) + \beta_2 \log(GNP/pop_i GNP/pop_j)$$

$$+ \beta_3 \log(DISTANCE) + \beta_4 (ADJ) + \gamma_1 (EC_{ij}) + \gamma_2 (WH_{ij}) + \gamma_3 (EA_{ij}) + \delta (\log sd_{ij}) + u_{ij}.$$

ADJ is a dummy variable indicating when two countries share a

common border. EC, WH, and EA are dummy variables indicating when both countries are located in the same geographic area (the European Community, Western Hemisphere, or East Asia, respectively).

The major advantage of this approach is that it brings data from a wide variety of country experiences to bear on the problem. The major disadvantage is the likelihood of simultaneous causality: if exchange rate variability shows up with an apparent negative effect on the volume of bilateral trade, it could be due to the government's efforts to stabilize the currency vis-a-vis a valued trading partner as easily as the reverse. With this consideration, we also use the method of instrumental variable estimation to tackle the possible simultaneity bias.

OLS estimation results are reported in Table 1. They show a relatively large and statistically significant effect of real exchange rate variability on trade. Consider the hypothetical experiment of a doubling of exchange rate variability, based on the 1980 equation. To give perspective to this experiment, the standard deviation of bilateral changes in the real exchange rate experienced by the average Western Hemisphere country more than doubled between 1980 and 1990 (it increased by a factor of 2.75), while in East Asia and Europe it remained roughly unchanged.[9]

---

[9] The level of the standard deviation was roughly .23 per cent in all three parts of the world in 1980. These statistics for each country represent a simple unweighted averaging across 63 trading partners, and thus do not reflect the greater importance of the larger countries.

Table 1: Exchange Rate Volatility and Bilateral Trade
(OLS Estimation)

		Volat	GNPs	GNP/cap	Dist	Adj	WH	EEC	EAEC	APEC	adj.R^2	S.E.E.
1980												
			.74**	.29**	-.56**	.72**	.52**	.23	.88**	1.51**	.71	1.20
			.02	.02	.04	.18	.15	.18	.27	.17		
	Nominal	-.046*	.76**	.26**	-.68**	.27	.16	.03	1.04**	1.35**	.73	1.20
	Ex Rate	.023	.02	.02	.05	.21	.23	.18	.37	.20		
	Real	-.066*	.74**	.27**	-.67**	.43#	.18	.04	.96**	1.38**	.76	1.14
	Ex Rate	.029	.02	.02	.05	.22	.20	.20	.37	.22		
1985												
			.76**	.25**	-.70**	.75**	.33**	.44*	.59*	1.28**	.74	1.17
			.02	.02	.04	.18	.16	.17	.26	.17		
	Nominal	.015	.77**	.24**	-.74**	.61**	.23	.43*	.79*	1.18**	.75	1.16
	Ex Rate	.021	.02	.02	.05	.19	.18	.17	.36	.19		
	Real	-.026	.76**	.24**	-.75**	.45*	.01	.26##	.72*	1.12**	.78	1.12
	Ex Rate	.028	.02	.02	.05	.22	.20	.17	.36	.21		
1990												
			.75**	.09**	-.56**	.79**	.92**	.47**	.69*	1.36**	.77	1.07
			.02	.02	.04	.16	.14	.16	.24	.15		
	Nominal	.076**	.77**	.09**	-.66**	.61**	.82**	.54**	.75*	1.36**	.79	1.04
	Ex Rate	.014	.02	.02	.04	.16	.14	.16	.33	.17		
	Real	-.048**	.79**	.11**	-.60**	.31##	.51**	.27##	.95*	1.06**	.83	.97
	Ex Rate	.023	.02	.02	.04	.20	.17	.17	.38	.28		

Notes:

(1) All the variables except the dummies are in logarithm. All the regressions have an intercept for which the estimate is not reported here.

(2) Standard errors are below the coefficient estimates.

(3) **, *, # and ## denote "statistically significant" at the 99%, 95%, 90% and 85% levels, respectively.

Table 2: Exchange Rate Volatility and Bilateral Trade (Instrumental Variable Estimation)

		Volat	GNPs	GNP/cap	Dist	Adj	WH	EEC	EAEC	APEC	adj.R^2	S.E.E.
1980												
	Nominal Ex Rate	-.008##	.73**	.27**	-.56**	.74**	.54**	.20	.93**	1.48**	.71	1.20
		.005	.02	.02	.04	.18	.15	.18	.27	.17		
	Real Ex Rate	-.010*	.73**	.26**	-.56**	.75**	.56**	.22	.94**	1.48**	.71	1.20
		.005	.02	.02	.05	.18	.15	.18	.27	.17		
1985												
	Nominal Ex Rate	-.001	.76**	.24**	-.70**	.76**	.34*	.43*	.59*	1.28**	.74	1.17
		.005	.02	.02	.04	.18	.16	.17	.26	.17		
	Real Ex Rate	-.000	.76**	.25**	-.70**	.75**	.33*	.43*	.59*	1.28**	.74	1.17
		.005	.02	.02	.04	.18	.16	.17	.26	.17		
1990												
	Nominal Ex Rate	.029**	.77**	.15**	-.57**	.71**	.88**	.44**	.47*	1.40**	.77	1.06
		.005	.02	.02	.04	.16	.14	.16	.24	.15		
	Real Ex Rate	.032**	.77**	.15**	-.57**	.71**	.87**	.43**	.45#	1.39**	.78	1.06
		.005	.02	.02	.04	.16	.14	.16	.24	.15		

Notes:

(1) All the variables except the dummies are in logarithm. All the regressions have an intercept for which the estimate is not reported here.

(2) Standard errors are below the coefficient estimates.

(3) **, *, # and ## denote "statistically significant" at the 99%, 95%, 90% and 85% levels, respectively.

The 1980 OLS coefficient on the log variability is -.066. The implication is that a doubling of uncertainty reduces the volume of trade by an estimated 4.6 per cent (= .066 log(2)).

[Tables 1 and 2 here.]

It is likely, however, that much of this apparent effect is due to reverse causality. Instrumental-variables estimation results, reported in Table 2, show a smaller [and less significant] effect.[10] The 1980 coefficient falls to -.010, which implies that a doubling of the standard deviation reduces trade by an estimated 0.7 per cent. This effect seems relatively small.

2.4 The exchange rate as a nominal anchor

The second kind of advantage of a fixed exchange rate is that it provides one possible nominal anchor for monetary policy. There are other possible nominal anchors; we consider the issue at length in the next part of the paper. But one point regarding openness needs to be made here, because it relates to the optimum currency area question.

For much of the analysis of optimum currency areas, the distinction between a fixed exchange rate and a common currency is not an important one. (There are some minor issues of

---

[10] The instrumental variable is the standard deviation of the logarithmic change in one country's money supply relative to the other. We hypothesize that this variable is correlated with the variability of the nominal and real exchange rate (and indeed it is, in our sample), and we hope that it is uncorrelated with other determinants of bilateral trade patterns.

transactions costs and seignorage.) But when we consider the credibility of a commitment not to increase the money supply or not to devalue, the distinction becomes more important. If a country literally shares a common currency with its neighbors, the commitment not to devalue is close to absolute. The recent examples of the disintegration of Soviet Union and Czechoslovakia illustrate that reintroducing a distinction between one country's rubles and another's is not absolutely impossible. But it is extremely difficult. If a country merely has a fixed exchange rate, but retains a separate currency, the option of devaluation is always there. (The French-speaking West African countries, for example, which have been more completely tied to the currency of their former colonizer than has any other set of countries, are now speaking of the possibility of devaluation for the first time.[11])

If the option of devaluation exists, speculators and other private actors will be fully aware of it. When considering the possibility of using the exchange rate as a nominal anchor for monetary policy, the question then arises (as it does even more for the other possible nominal anchors considered below): What can make the commitment credible? David Romer (1991) has argued that a commitment to fix the exchange rate is more credible the more highly open is the country to international trade. The argument is that the cost of reneging on the commitment and

---

[11] On the rules-vs.-discretion aspect of the West African monetary union, see Devarajan and Rodrik (1991).

devaluing (the adverse impact on the price level, for example) will be higher the more important is trade in the economy. He examines carefully a sample of 114 countries, and finds statistical support for the theory that an exchange rate peg is a more credible anchor for countries that are more open.

Thus openness (as defined by trade) is a key parameter determining the importance of the advantages to pegging the exchange rate. In the preceding section we saw that economic integration was also a key parameter determining how easily a country could dispense with the advantages of floating. (Recall that integration there could be defined by a sharing of common economic disturbances or of common values, or by easy movement of labor or transfers across national borders.) In short, the balance between the advantages of fixed exchange rate and the advantages of a flexible exchange rate depends critically on the degree to which the country in question is economically and culturally integrated with its neighbors.

In the case of Europe, integration is increasing, but is still well behind the standard set by the states of the U.S., as Eichengreen has shown. Recent developments, which appear to have derailed European Monetary Union, suggest that the residents of the EC 12 are far less ready to sacrifice their monetary independence than their leaders had thought.

In the case of Asia, economic integration into the outside world is relatively high, when defined by trade, despite the

existence of some formidable barriers. Trade is a relatively high percentage of GNP for most East Asian countries. This includes a lot of intra-regional trade, especially after adjusting for the fact that the East Asian countries are not as close as to each other nor as high in GNP/capita as, for example, the members of the European Community.[12]

The high level of intra-regional trade may explain why several recent studies have found that economic disturbances are correlated among East Asian countries. Bayoumi and Eichengreen (1992, pp. 17-18) find supply disturbances to be significantly correlated among Korea, Japan and Taiwan (and also among Hong Kong, Singapore, Malaysia and Indonesia; among this latter group demand disturbances are correlated as well). These correlations, like those within Northern Europe, are found to be "not dissimilar from those found in regional data for the United States" (p.23), and to be greater than anything found among Western Hemisphere countries. Goto and Hamada (1992), using a principle-components analysis of macroeconomic variables, also find that "East Asia is a group as homogeneous as the European Community (p.11)," and that real disturbances to investment are

---

[12] Estimates in Table 1 show the extent to which bilateral trade flows can be attributed to special regional factors (which presumably include cultural homogeneity, preferential trading arrangements, and other policy initiatives), as opposed to such readily-observed natural determinants as size and proximity. For further explication, see Frankel (1992) and Frankel and Wei (1992a). Other recent studies of the bias toward intra-regional trade in Asia (and other parts of the world) include Anderson and Norheim (1992), Drysdale and Garnaut (1992) and Petri (1992). Recent studies using the gravity model are Wang and Winters (1991) and Hamilton and Winters (1992).

correlated among East Asian countries.

By other criteria, such as labor mobility, East Asian countries are probably less open than European countries, let alone the regions of the United States.

2.5 Some further arguments for exchange rate flexibility in a country like Korea

There are a few other factors in choosing an exchange rate regime that are particularly relevant to economies in East Asia, countries that are liberalizing financially and rapidly industrializing. We consider in turn some implications of: the East Asian geographical location, financial liberalization, and rapid growth.

Our discussion of openness left out an important difference between the situations in East Asia and Europe. By many measures, such as bilateral trade biases and financial influences, East Asian countries are less closely tied to Japan, or to each other more generally, than they are tied to a Pacific grouping that includes the United States (along with Canada, Australia, and New Zealand).[13] This means that, to the extent that they are judged sufficiently open to merit pegging their currencies, it is not clear whether they should peg to the yen or to the dollar. Park and Park (1991b) highlight the conflict that yen/dollar fluctuations create for East Asian exchange rate

---

[13] The references are those in the preceding footnote. Park and Park (1991a) foresee a continuation of the dependence of the East Asian NICs on the U.S. market.

policies. This issue is missing from the traditional literature on optimum currency areas, which usually makes the simplifying assumption that there is a single large neighbor against which the country in question must simply either peg or float.[14] We return to the issue of which large trading partner to peg to, in a discussion at the end of the paper.

Next, there is the simple point that a floating exchange rate is a more viable option if financial markets are well-developed and internationalized. The two properties, a free-floating exchange rate and free financial markets, are quite distinct.[15] Nevertheless the one is made easier by the other.

Finally, there is the point that rapidly growing countries are known to experience a trend real appreciation in their currencies (assuming the growth comes from supply-side factors, such as rapid increases in productivity). "Equilibrium" theorists who in the abstract attribute every observed short-run fluctuation in exchange rates to fundamental real factors like productivity and consumer tastes usually overreach. Nevertheless, the pattern of real appreciation experienced by industrializing countries is systematic and rooted in real factors. The explanation is that the relative price of non-traded goods is low in poor countries (labor and land are cheap), and rises with the stage of development.

---

[14] An exception is Marston (1984).

[15] A point on which recent U.S. Treasury reports to Congress on the subject of Korean liberalization are less than lucid. Frankel (1992b).

Sometimes, as with Korea and Taiwan in the second half of the 1980s, the real appreciation comes in concentrated form, as the result of substantial capital inflows which force the central bank to choose between a nominal appreciation of the currency and a potentially-inflationary increase in reserve holdings. Some countries may be able to avoid either nominal appreciation or inflation by sterilizing the reserve inflows. The usual view is that this is more likely to be feasible when domestic financial markets are liberalized and well-developed: (1) If the country has liberalized with respect to capital outflows, it can reduce the magnitude of the net inflows. (2) If the country has liberalized with respect to domestic bond markets, there is scope for open market sales by the central bank to sterilize reserve inflows. Korea did some of the right things in 1986-89: paying off external debt, and sterilizing reserve inflows by selling monetary stabilization bonds and raising reserve requirements.[16] But the actions were not strong enough to prevent inflationary growth in the money supply, and nominal appreciation of the won as well. The absence of active domestic bond markets in which the Bank of Korea might have been able more fully to sterilize its purchases of dollars in exchange for won [by selling domestic bonds in exchange for won and thereby preventing the supply of won in the hands of the public from expanding] has been attributed to the cessation of financial liberalization in the

---

[16] See, e.g., Kwack (1992).

period 1984-87.[17] It would follow that further financial liberalization is indeed a good idea for Korea; facilitating sterilization operations in the future is but one of the reasons, so that the central bank can undertake offsetting open market sales.[18]

With or without well-developed financial markets (and with or without political pressure from large deficit-prone trading-partners), a country experiencing sustained rapid productivity growth will eventually have to allow its currency to appreciate in real terms. The implication for the choice of monetary regime is that, if a country hopes seriously to maintain an inflation rate no higher than that of its major trading partners, fixing the exchange rate cannot be a permanent policy; eventually there will have to be an upward revaluation. Reisen (1991) argues on these grounds that the Asian NICs should avoid fixed exchange rates.

If a country does opt for floating over fixed exchange rates, that frees up monetary policy for other objectives. But which other objective? Price stability or output stability? (Either way, fiscal policy under a floating exchange rate might

---

[17] Kim (1990, p.17).

[18] Reisen (1992), however, has argued that some Southeast Asian countries have succeeded in sterilizing reserve inflows by using large state-controlled funds to dominate the market, which would presumably not be possible in unregulated and well-developed financial markets.

best be assigned to look after the trade balance.[19]) We turn now to monetary theory's other classic policy debate, rules vs. discretion.

3. A Nominal Anchor for Monetary Policy

The last twenty-five years of research on the use of monetary policy to affect output and inflation has followed a distinct logical progression. First, in 1969, Friedman and Phelps introduced expected inflation into the Phillips curve. They pointed out that a monetary expansion to raise output would come at the expense of ever-accelerating inflation, so that the increase in output could not persist in the long run. Second, Lucas, Sargent and Barro made the expectations rational. The implication was that policy-makers could not have a systematic effect on output even in the short run. They might as well give up on the idea of affecting output, and simply aim for zero inflation. Third, Fischer, Taylor, and others, introduced contracts that made wages and prices sticky. The result was to return some effectiveness to monetary policy in responding to disturbances, but again only in the short run.

---

[19] Boughton (1989). It should be mentioned that fiscal policy and monetary policy are not independent policy instruments, and therefore the issue of what targets to assign them does not arise, until a country undertakes sufficient financial liberalization that trade deficits can be financed by borrowing abroad, and budget deficits can be financed by borrowing both at home and abroad. In a more primitive economy, where deficits can only be financed with money, the distinction between fiscal and monetary policy all but disappears.

3.1 Rules vs. discretion

In the last ten years of monetary theory, the debate on "rules vs. discretion" has moved to the center stage of relevant research. Rational expectations in itself did not imply that the government should abandon all discretionary policy; as noted above there was still scope for responding to disturbances in the short run, provided policy-makers acted with sufficient humility and awareness of the long-run implications. There appeared to be no formal basis to arguments such as Milton Friedman's that the government should completely renounce discretion in favor of rules. How could the country benefit from voluntarily giving up a policy tool?

Kydland and Prescott (1977) introduced the notion of time-consistency, the need for a pre-commitment that would bind government policy-makers and enter private expectations. In the case of monetary policy, a binding pre-commitment to slow money growth would cause workers and others to reduce their expectations of inflation; the result would be a lower actual inflation rate for any given level of output. At first it seemed that such a pre-commitment could only improve welfare if, in its absence, discretionary monetary policy were subject to political pressures that aimed for a point on the short-run output/inflation tradeoff that was higher than optimal. (Such pressures could result because those who dominated the political process either did not understand the longer-run inflationary effects of expansion, or put a lower value on price stability than was in

the national interest, or had a higher discount rate than was in the national interest).

These arguments for insulating monetary policy from populist pressures have some validity in their own right. But Barro and Gordon (1983) showed that discretion could lead to excessive expansion even when the policy-makers sought to maximize the "correct" objective function, i.e., the correct quadratic loss function in output and inflation. The key to this result is the assumption that the loss function (shared by the policy-makers and the country as a whole) is centered around a level of output which is greater than potential output.

This assumption dramatically expanded the boundaries of the existing models. The recognition that any country would like a higher level of output if it could have it sounds obvious. Previous authors had felt bound to rule it out on the grounds that, in the long run, a level of output higher than potential is not attainable. But just because the bliss point is not attainable, does not mean that the correct objective function is not centered around it. (Technically it requires the existence of some other distortion, such as the existence of unemployment compensation, that artificially raises the natural rate of unemployment or lowers potential output. But there are plenty of those.)

Figure 1 illustrates the problem. The objective function is assumed to be centered around the point corresponding to zero inflation and output equal to ky^*, where y^* represents potential

output and $k>1$, capturing the preference for higher output. Iso-welfare curves radiate out from that point. In the long run, the supply relationship is vertical at y^*. In the short-run, for a given expected inflation rate p^e, the supply relationship is an upward-sloping line through the point (y^*, p^e). In the absence of a credible pre-commitment (and in the absence of any disturbances) the optimizing government will set aggregate demand so as to pick out the point (B) on the supply curve where it is tangent to an iso-welfare curve. The graph makes clear that this corresponds to a positive expected inflation rate (which in turn becomes the actual inflation rate, in the absence of disturbances). The country can do better by making a binding commitment to aim for zero inflation, at point C. Here the economy is on a higher iso-welfare line, because inflation is lower, with no loss in output.

[FIGURE 1 HERE]

The superiority of this framework is shown immediately by its ability to explain the fact that virtually all countries experience average inflation rates above zero, lacking as most of them do truly binding commitment mechanisms. In the traditional theory, where potential output and optimal output were assumed to coincide, it followed that positive inflation rates (which followed only in the aftermath of positive shocks) were no more frequent than negative ones (in the aftermath of negative

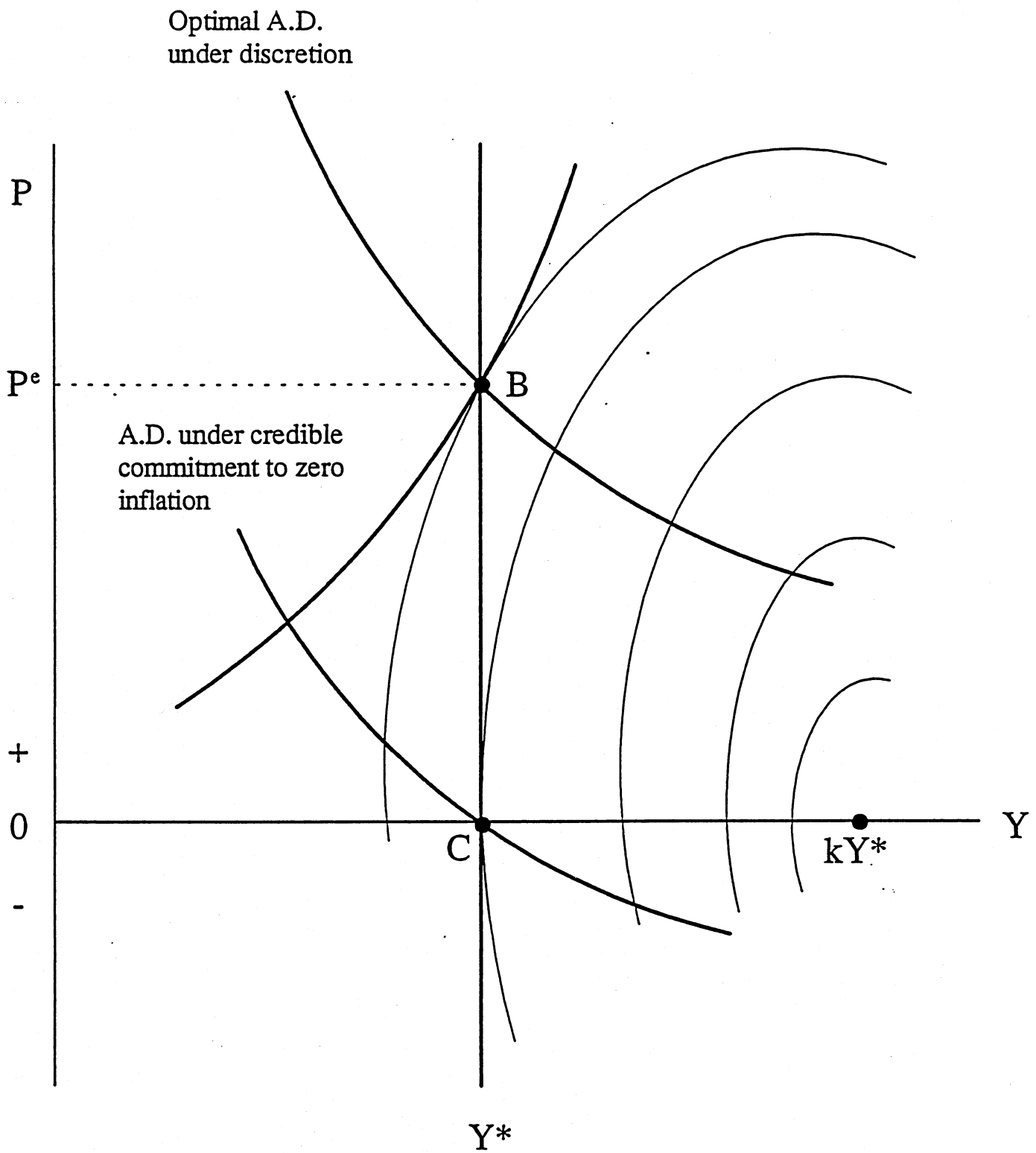


Figure 1: The advantage of rules over discretion
(in a model with inflation bias but no shocks)

shocks). This implication was clearly at variance with reality.

The conclusion from the Barro-Gordon model was that governments should not merely announce their intention to aim for zero inflation and ignore output fluctuations, but should actually be bound in such a way as to prevent themselves from straying from this commitment even if subsequent events seem to call for it. This result was the long-missing formal justification for rules over discretion.

The Barro-Gordon model had stacked the deck in favor of rules, by leaving out the possibility of short-run disturbances to which the authorities might usefully respond if they were free to do so [just as earlier Keynesian authors had stacked the deck in favor of discretion by leaving out the possibility of a bias toward inflation]. The syntheses of Rogoff (1985, 1987), Fischer (1988a) and Persson and Tabellini (1990), included <u>both</u> short-run disturbances <u>and</u> a bias toward inflation. The result was a realistic intermediate case, which called for some intermediate degree of commitment to a nominal anchor [or else, in the last section of Rogoff (1985), appointment of a central banker who placed somewhat more weight on the priority of fighting inflation than did the general population]. The optimal degree of commitment depended on such parameters as the slope of the short-run supply relationship, the weight placed on the inflation objective, etc.

3.2 Alternative nominal anchors for monetary policy

There are a variety of possible candidates for the nominal variable to which monetary policy might commit: the exchange rate, money supply, price of gold or other commodities, general price index, or nominal GNP. In most of the models of credible-precommitment, it makes no difference what is the nominal anchor in terms of which the commitment is phrased, or even whether the commitment is phrased in terms of a complicated linear combination of nominal variables. These are models in which everyone can with certainty observe accurately such variables as the price level and output, infer in detail what disturbances have occurred, and recognize instantly if the monetary authorities are deviating from their announced commitment. So long as the authorities choose a monetary rule that genuinely gives zero inflation in the absence of disturbances, the public will be able to perceive the sincerity of the commitment.

In practice, it is clear that there is a great deal of uncertainty, that central bankers will typically claim they are standing by their commitment (and will attribute any observed deviation from the announced targets to a large unanticipated disturbance), and that the public will have difficulty monitoring the authorities. It follows that only commitments that are simple and are phrased in terms of an observable variable can be monitored. As soon as an unanticipated disturbance occurs, it makes a great deal of difference which variable was chosen for the commitment. A commitment to the wrong nominal anchor can unnecessarily increase the costs of abiding by the commitment

when the disturbance is realized.

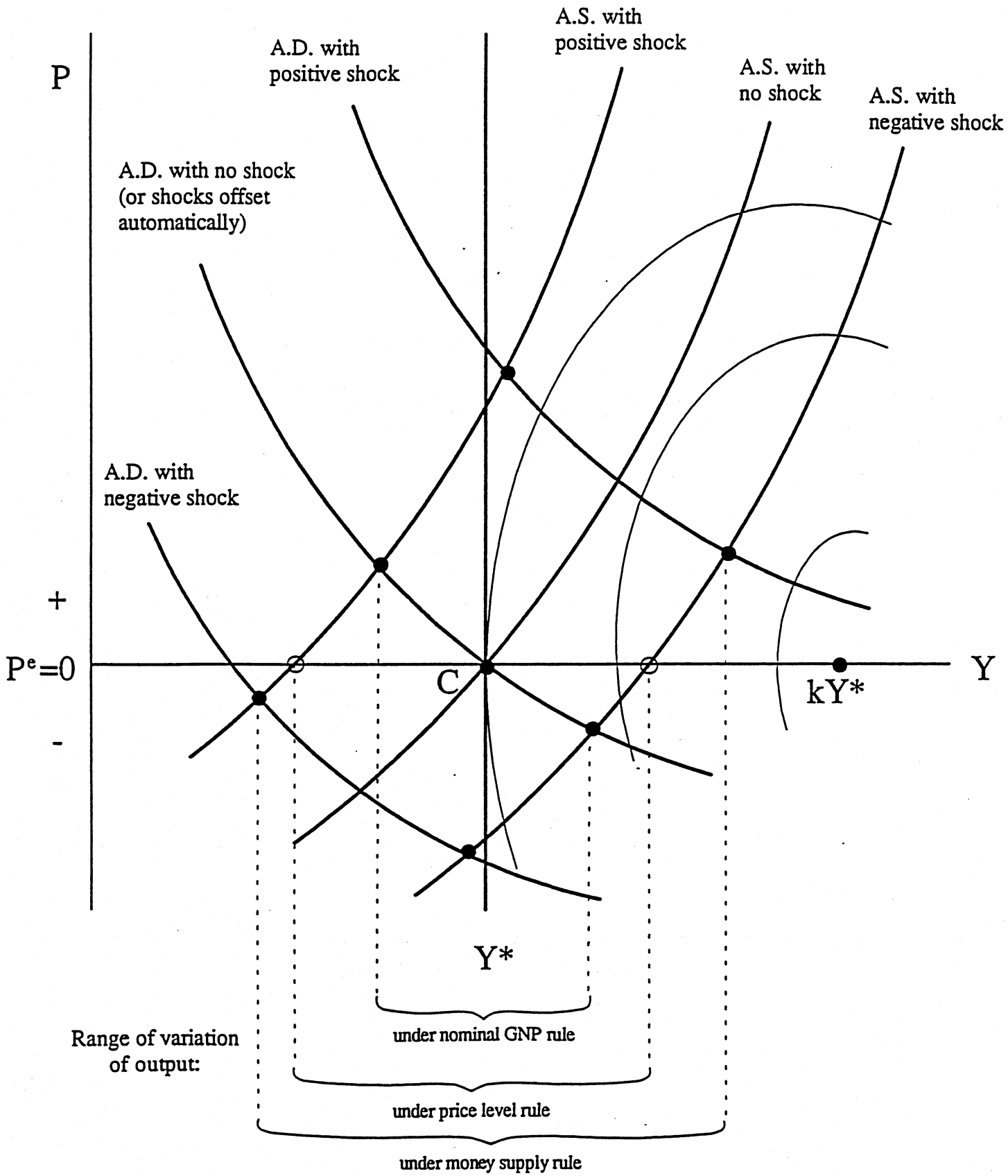
What are the proper grounds for choosing among candidates for the nominal variable to which the monetary authorities commit? The Appendix to this paper considers the problem formally. It makes no judgment on the desirable degree of pre-commitment to a nominal target. But whatever the degree of precommitment to a nominal target, we argue that nominal GNP (or nominal demand) is likely to make a more suitable target than the three other nominal variables that have been proposed: the money supply, the price level, or the exchange rate.

The general argument has been made well by others.[20] In the event of disturbances in the banking system, disturbances in the public's demand for money, or other disturbances affecting the demand for goods, a policy of holding nominal GNP steady insulates the economy; neither real income nor the price level need be affected. In the event of disturbances to supply, such as the oil price increases of the 1970s, the change is divided equi-proportionately between an increase in the price level and a fall in output. For some countries, this is roughly the split that a discretionary policy would choose anyway. In general, fixing nominal GNP will not give precisely the right answer, depending on the weights on inflation and real growth in the

---

[20] Tobin (1980) [, Bean (1983), Meade (1984), Gordon (1985), Hall (1985), Taylor (1985) and McCallum (1987, 1988)], for example, argue in favor of targeting nominal GNP in the closed-economy context. Miller and Williamson (1987, 7-10) propose targeting nominal demand as part of their "blueprint" for exchange rate target zones.

Figure 2: A comparison of three rules:
money, price level, and nominal GNP
(in a model with shocks)



objective function. But if the choice is among the available nominal anchors, nominal GNP gives an outcome characterized by greater stability of output and the price level.

The Appendix begins by showing that a nominal GNP target strictly dominates a money supply target, in the sense of minimizing a quadratic loss function, regardless how important inflation-fighting credibility is. The point can also be made in terms of Figure 2, which illustrates several alternative nominal anchors, all of them set so as to produce zero inflation in the case of zero disturbances. In the case of the nominal GNP rule, any demand-side disturbances are automatically offset, so that the aggregate demand curve is held steady. The range of variation of output is relatively narrow, resulting only from the inevitable aggregate supply shocks. In the case of the money rule, shifts in the aggregate demand relationship gratuitously increase the range of variation of output (and of the price level).

[FIGURE 2 HERE]

We next consider a price level rule. Central banks have long stated that price stability is a central objective. The Bundesbank has "the aim of safe-guarding the currency" as the single ultimate goal written into the institution's charter, but as a strategy puts more emphasis on annual target rates of change of the money supply than of the price level. (Similarly, the

Bank of Japan announces "projections" of M2 money growth; but econometric analysis of BoJ behavior suggests that these are not monetarist targets.[21]) Canada recently gave legal status to explicit annual price level targeting. New Zealand has in a sense gone the farthest, by writing the central bank governor's contract so that his salary is tied directly to his success at eliminating inflation.

The Appendix shows that the price level rule dominates the money rule, so long as any weight at all is placed on the inflation objective. Figure 2 shows why: the price level rule eliminates the effects of demand disturbances.

The price level rule and nominal GNP rule have this latter attraction in common. Which is better? Figure 2 shows that the nominal GNP rule has the advantage of narrowing the range of variation of output. Not surprisingly, the price level rule has the advantage of narrowing the range of variation of the price level. One cannot say for certain which advantage is more important. The Appendix derives the condition under which the nominal GNP rule is the superior one. The condition is likely to hold unless the short-run supply relationship is believed to be very steep, or very low relative weight is attached to the output objective.

The second half of the Appendix introduces an exchange rate target as a candidate for nominal anchor. It shows that the

---

[21] Ito (1989) and Hutchison and Judd (1992).

penalty that goes with a regime of stabilizing the exchange rate is to be saddled with a monetary policy that destabilizes the overall price level, relative to a regime of stabilizing nominal GNP. The conclusion within this framework is that, to opt for a fixed exchange rate regime, one has to put very high weight on the objective of stabilizing the exchange rate. It is natural for the weight on the exchange rate objective to be higher for a relatively small open economy like Hong Kong, than for a large, relatively self-sufficient, economy like the United States. (The reasons are those given above in the discussion of optimum currency areas.) Nevertheless, the model in the appendix gives the result that, for the exchange rate rule to dominate the nominal GNP rule, one has to be prepared to argue that a ten percent fluctuation in the exchange rate causes greater trouble than a ten per cent fluctuation in the price level. It is unlikely that this condition would be met even in a very open economy.

The result seems a little too strong. Perhaps something has been left out of the model? Many things are, of necessity, omitted from a model of this sort. (The possibility of speculative bubbles has been left out. One could rescue the exchange rate rule by assuming that much of the disturbances in the exchange rate equation will disappear when the regime changes, rather than having to be accommodated by the money

supply.[22]) Perhaps the most important factor that is left out is the difficulty of monitoring the government's actions to fulfill its commitment. The model assumes that if the commitment takes the simple form of pegging a single nominal variable, the government can succeed in doing this exactly, and the public can instantly observe that it is doing so. These assumptions clearly do apply to a simple exchange rate peg, but do not apply to the other candidates for nominal anchor.

3.3 Monitoring commitment to the nominal anchor

It is easy to rank the variables that are nominal-anchor candidates according to how frequently they are reported, and therefore how quickly the public can become aware of a deviation from the promised path: The exchange rate is available virtually continuously, the money supply on a weekly basis (in the United States and some other countries), the price level on a monthly basis, and nominal GNP only on a quarterly basis. (Nominal GNP is furthermore often subject to substantial subsequent revisions.) The ranking according to how well the monetary authorities can control the variable in question is similar, with one exception: they can probably control nominal GNP more directly than the price level, under the assumption that their only influence on the price level comes via their influence on

---

[22] Miller and Williamson (1987, 54-55; 1988) do precisely this: assume that there is a large "fad" component to exchange rate fluctuations under the current floating regime, and that it would disappear under their target zone proposal. The idea is not absurd. But it certainly "stacks the deck" in any comparison of the two regimes.

Aggregate Demand. But, to repeat the argument for a nominal GNP target, there is little point in committing to, say, a money supply target merely because the target can be attained; if the variable is far removed from the ultimate objectives (output and inflation), then future shocks will lead one to regret ex post having chosen that nominal anchor.

In practice, proposals that the money supply, nominal GNP, or price level, should be chosen as nominal anchor do not refer to a claim that the variable can be pegged exactly, but rather that it should be controlled so as to lie within a specified target zone for the year. (The same could be done, of course, for the exchange rate. Such target zones have been the basis of both the European Monetary System and a sizeable related academic literature.)

One could formalize the notion of credible commitment to a target zone for any of these variables. The authorities announce that they will guide the variable in question so that, despite the known existence of shocks with certain variances, the variable will fall within the specified zone 95 % of the time. If the authorities do the statistics correctly, setting the width of the band appropriately, and then carry out their commitment faithfully, the public can readily test their performance statistically. To illustrate, if nominal GNP were observed to fall outside the specified band two years in a row, the probability of this happening by chance, i.e., because of unusually large disturbances, would be so small as to be

negligible: (.05)(.05) = .0025. The public would be justified under these circumstances in concluding that the commitment was not genuine. It follows that the commitment can be made credible in advance, provided the band is set sufficiently wide and the central bank faces a perceived penalty (public embarrassment) for violating the target zone.

3.4 Basket pegs for East Asian countries

We mentioned in section 2.3 the problem, facing Korea and other East Asian countries who might contemplate pegging their currencies, that their trade is heavily split between the United States and Japan. Given the large variation in the yen/dollar rate, a peg to the dollar creates substantial variability vis-a-vis the yen, and vice versa.

The standard advice to such countries is to peg their currencies to a basket of major currencies, weighted according to shares of trade (or other more sophisticated formulas). A country that follows such a policy will eliminate uncertainty regarding the future value of its effective exchange rate.[23] Indeed Malaysia and Thailand have been officially classified by the IMF as pegging to a currency composite. Korea had an

---

[23] This does not succeed in eliminating bilateral exchange rate variability with major trading partners of the sort examined in Tables 1 and 2. The question whether it is variability in effective or bilateral exchange rates that discourages trade has been insufficiently researched. It depends on whether the exchange rate uncertainty that matters comes at the stage when the firm decides to invest resources in tradable-goods production, or at the stage when it agrees to contract with a specific customer in a specific currency.

announced policy in the 1980s of setting the won with reference to a basket (though an "alpha" term allowed departure from the basket).

In theory, a commitment to peg to a basket should be just as effective a nominal anchor as a commitment to peg to a single currency. Also in theory, it makes no difference whether or not the government announces the weights in the basket. (Most countries in fact do not announce the weights.) In practice however, these differences can be important from the standpoint of the ability of the public to monitor the authorities' faithfulness to their commitment.[24]

If a country truly followed a precise basket peg, without crawl, realignment, minor variation inside a band, or changes in the weights, it would be easy for an observer to verify the commitment. If there were, say, 10 major currencies that might appear in the country's basket, it would take only 11 observations of actual exchange rates to estimate the 10 weights [provided the 10 currencies in question moved vis-a-vis each other during the sample period], and a 12th observation to verify that the peg was being precisely maintained. In practice however, few countries follow such a literal basket peg.

When one seeks to estimate the implicit weights in an econometric equation for the value of the local currency, one should in theory get a perfect R^2. Thailand comes very close for

---

[24] See for example Lowell (1992) and Takagi (1988).

the period January 1991 to May 1992, with an R^2 of .99 and estimated weights of about .8 on the dollar, .1 on the yen and .1 on the mark. But Thailand fails the test for the preceding two-year period. Malaysia also comes close, with an R^2 of .94 (when allowing for a statistically significant trend appreciation) and estimated weights of about .8 on the dollar, .1 on the yen and .1 on the mark, for the period January 1991 to May 1992. But Indonesia does somewhat better than Malaysia throughout the period 1987-92, even though it is classified by the IMF as a managed-floater rather than a basket-pegger.[25]

The Korean won shows up as being linked rather simply to the U.S. dollar in the late 1980s, when it was supposedly following a loose basket strategy. (It shows up as being linked just as closely and simply to the U.S. dollar in 1991-92, after it had announced a switch to a Market Average Rate system. This is somewhat surprising, as the Korean Ministry of Finance and U.S. Treasury Department have agreed that the MAR system constitutes a move away from a dollar peg toward a market float.)

For present purposes, the point is that if one makes allowances for even a small degree of fluctuation within a band, it may take several years to test reliably the central bank's claim to be following a basket peg. The alternative hypothesis is that random or trend variation is sufficiently great that one

---

[25] Indonesia has a significant trend depreciation, as did Malaysia in 1987-88. Frankel and Wei (1992). These tests use weekly data.

cannot distinguish the supposed basket-pegger from a flexible-rate currency. If this is true of inference by the econometrician, it is also true of inference by the market observer, who seeks to monitor the central bank and form expectations of future inflation. One could rank precise pegging arrangements according to the time it takes to verify the commitment: a simple dollar or yen peg comes first (because the man-in-the-street can verify it instantly), then an SDR (or ECU) peg, then a peg to an announced basket, and lastly a peg to an unannounced basket. Needless to say, allowance for a trend, substantial band, or changes in weights or level of the parity, all complicate the process. The conclusion is that, to the extent the motivation for pegging is to make a credible commitment to non-inflationary monetary policy, a basket peg with secret weights is not the best choice. Even a peg with announced weights is not as effective as a simple peg to a single currency, if one wishes the average citizen to be able to monitor the commitment on a daily basis.

4. Conclusions

This paper has considered two fundamental sorts of choices regarding the monetary regime that face any country: the choice of exchange rate arrangement, and the choice whether monetary policy should be governed by a rule. The two choices obviously intersect, in that a fixed exchange rate is one of the possible

rules. However we have examined other rules as well, those phrased in terms of the money supply, price level, and nominal GNP.

We have considered how certain specific characteristics of Korea and other East Asian NICs affect these choices. First, these countries have either already liberalized financially (Hong Kong and Singapore) or are in the process (Taiwan and Korea). This makes a floating exchange rate a more viable option. It also makes a flexible exchange rate a necessary option, if the country wishes to retain monetary independence.

Second, the countries are trade-oriented, even if Korea is not as open as Hong Kong. Four economic and social aspects of openness can reduce the need to have an independent monetary policy, and therefore flexible rates. The four aspects of openness are: common shocks, common objectives, labor mobility, and fiscal transfers. By none of these criteria is Korea as suitable a unit to give up its monetary independence as, for example, the individual regions of the United States, or even the individual countries of Europe. Perhaps more relevant for the East Asian countries are two aspects of openness that increase the attractiveness of fixed exchange rates: the positive, if relatively small, effect that exchange rate stability has on trade (as partially documented here in Tables 1 and 2), and the credibility of using the exchange rate as a nominal anchor for monetary policy (as documented by Romer, 1991).

Third, the East Asians' trade is divided between the United

States and Japan. This makes the option of a simple peg to either the dollar or the yen less attractive. A basket peg is an alternative, but we have argued that it is not quite as effective a nominal anchor.

Fourth, they are undergoing rapid long-term productivity growth, which leads to trend real appreciation. This means that, if they wish to keep the inflation rate down to the level of their major trading partners, they cannot fix the exchange rate indefinitely.

Overall, the aggregate of the arguments seems to recommend a degree of exchange rate flexibility. This leaves the question of the optimal choice for a nominal anchor for monetary policy, if it is not to be a fixed exchange rate. Within the context of the model in the Appendix, a nominal GNP target is shown to dominate a money supply target and, under certain conditions, a price level target as well.

APPENDIX: A comparison of discretion and four alternative rules

We compare five possible policy regimes: (1) full discretion by national policy-makers, (2) a rigid money supply rule, (3) a rigid nominal GNP rule, (4) a rigid price level rule, and (5) a rigid exchange rate rule. (The analysis thus extends that in Frankel and Chinn (1991) by adding a price level rule to the list of candidates.) In the case of each of the possible nominal anchors, proponents sometimes have in mind a target zone system; the assumption of a rigid rule makes the analysis simpler.[26] The approach, incorporating the advantages both to rules and discretion, follows Rogoff (1985b), Fischer (1988a) and Persson and Tabellini (1990).

Throughout, we assume an aggregate supply relationship:

(1) $y = y^* + b(p-p^e) + u,$

where y represents output, y^* potential output, p the price level, p^e the expected price level (or they could be the actual and expected inflation rates, respectively), and u a supply disturbance, with all variables expressed as logs.[27]

---

[26] Rogoff (1985) warns that the welfare-ranking among the candidate variables for rigid targeting need not be the same as the welfare-ranking among the candidate variables for partial commitment.

[27] It should be noted that, if the parameter b is thought to depend on the variance of the price level, then our results could be vulnerable to the famous Lucas critique.

A1. The closed-economy objective function

We begin with the case where the objective function includes output and the price level, but not the exchange rate, import prices, or the trade balance; we call this the case of a closed economy. The loss function is simply:

(2) $L = a\,p^2 + (y - ky^*)^2$,

where *a* is the weight assigned to the inflation objective, and we assume that the lagged or expected price level relative to which *p* is measured can be normalized to zero.[28] We impose $k > 1$, which builds in an expansionary bias to discretionary policy-making.

(3) $L = a\,p^2 + [y^*(1-k) + b(p-p^e) + u]^2$.

(i) Discretionary policy

Under full discretion, the policy-maker each period chooses Aggregate Demand so as to minimize that period's *L*, with p^e given.

(4) $(1/2)\,dL/dp = ap + [y^*(1-k) + b(p-p^e) + u]b = 0$.

(5) $p = [-y^*(1-k)b + b^2p^e - bu] / [a+b^2]$.

Under rational expectations,

(6) $p^e = Ep = -y^*(1-k)b/a$.

---

[28] Bean (1984) and West (1986) use a quadratic objective function that includes only output. But clearly inflation must be added to the objective function if one wants to be able to consider the advantages of pre-committing to a nominal target or rule.

So we can solve *(5)* for the price level:

(7) $p = - y^*(1-k)[b/a] - u\ b/[a+b^2]$.

From *(2)*, the expected loss function then works out to:

(8) $EL = (1 + b^2/a)[y^*(1-k)]^2 + [a/(a+b^2)]\ var(u)$.

The first term represents the inflationary bias in the system, while the second represents the effect of the supply disturbance after the authorities have chosen the optimal split between inflation and output.

(ii) Money rule

To consider alternative regimes, we must be explicit about the money market equilibrium condition. (In case 1, it was implicit that the money supply *m* was the variable that the authorities were using to control demand.)

(9) $m = p + y - v$,

where *v* represents velocity shocks. We assume *v* uncorrelated with *u*.

If the authorities pre-commit to a fixed money growth rule in order to reduce expected inflation in long-run equilibrium, then they must give up on affecting *y*. The optimal money growth rate is the one that sets *Ep* at the target value for *p*, namely *0*. Thus they will set the money supply *m* at *Ey*, which in this case is *y**. The Aggregate Demand equation thus becomes

(10) $p + y = y^* + v$.

Combining with the Aggregate Supply relationship *(1)*, the equilibrium is given by

(11) $y = y^* + (u + bv)/(1+b)$, $\quad p = (v - u)/(1+b)$.

Substituting into (2), the expected loss function is

(12) $EL = (1-k)^2y^{*2} + \{(1+a)var(u) + [a+b^2]var(v)\}/(1+b)^2$.

The first term is smaller than the corresponding term in the discretion case, because the pre-commitment eliminates expected inflation; but the second term is probably larger, because the authorities have given up the ability to respond to money demand shocks. Which regime is better, discretion or a money rule, depends on how big the shocks are, and how big a weight (a) is placed on inflation-fighting.

(iii) Nominal GNP rule

In the case of a nominal GNP rule, the authorities vary the money supply in such a way as to accommodate velocity shocks. (10) is replaced by the condition that $p + y$ is constant. The solution is the same as in case 2, but with the v disturbance dropped. Thus the expected loss collapses from (12) to:

(13) $EL = (1-k)^2y^{*2} + [(1+a)/(1+b)^2]var(u)$.

This unambiguously dominates the money rule case. It is still not possible, without knowing $var(u)$ or a, to say that the rule dominates discretion. It is quite likely, especially if the variance of u is substantial, that an absolute commitment to a rule would be unwisely constraining. Hence the argument for a target zone rather than a single number, and for subjecting the Central Bank Chairman to a mere loss of reputation if he misses the target rather than a firing squad. But it seems clear that,

to whatever extent the country chooses to commit to a nominal anchor, nominal GNP dominates the money supply as the candidate for anchor.

(iv) Price level rule

Under a price level rule, the authorities set monetary policy so that the price level is not just zero in expectation, but is zero regardless of later shocks. From equation (3), we have directly,

$$L = [y^*(1-k) + u]^2.$$

$$(14)\quad EL = [y^*(1-k)]^2 + var(u).$$

A comparison with (12) shows that the price level rule is likely to dominate the money supply rule if velocity shocks are large. (If velocity shocks are small, the money supply rule collapses to the nominal GNP rule, which we now consider.)

A comparison of (14) with (13) shows that the price level rule is in turn dominated by the nominal GNP rule if

$$[(1+a)/(1+b)^2] < 1, \text{ i.e., so long as } a/b < 2 + b.$$

This condition does not automatically hold. But the condition $a/b < 1$ is not a very difficult one to satisfy, from which the necessary condition easily follows.

The reader can decide whether he or she believes the condition $a < b$ by conducting a simple thought experiment. If it were possible, hypothetically, to double output permanently at the cost of doubling inflation (starting from the position where optimal discretion produces an inflationary steady-state,

presumably the norm for most countries), would the output gain be worth the cost? Most economists do not believe that the short-run costs of inflation ("shoe-leather costs" of trips to the bank, confusion of relative price signals, uncertainty, etc) are very high. The argument against inflating rather consists of the long-run considerations, with which the adoption of any nominal anchor (money supply, nominal GNP, exchange rate, or price level) is explicitly designed to deal. It follows that *a* in the objective function is thought to be less than *b*.

A2 The open-economy objective function

We reconsider here a likely objection to choosing nominal GNP as the focus of monetary policy in an open economy, that it neglects the exchange rate. The alternative of setting monetary policy so as to stabilize the exchange rate will not look attractive unless the exchange rate enters the objective function, perhaps indirectly via the consumer price index or the trade balance. Here we confront the argument head-on, and include the exchange rate directly in the loss function along with output and the price level; we call this the case of the open-economy objective function. Thus we replace *(2)* with:

(15) $$L = a\,p^2 + (y-ky^*)^2 + c\,s^2,$$

where *s* is the spot exchange rate measured relative to some equilibrium or target value and *c* is the weight placed on exchange rate stability per se. We are implicitly assuming that

policy-makers wish to minimize long-term swings of the exchange rate around its average value, rather than short-term uncertainty in the exchange rate.

There is no point in specifying an elaborate model of the exchange rate under free floating. All the empirical results say that most of the variation in the exchange rate cannot be explained (even ex post; to say nothing of prediction) by measurable macroeconomic variables, and thus can only be attributed to an error term that we here call e. But we must include the money supply in the equation; otherwise we do not allow the authorities the possibility of affecting the exchange rate. Our equation is simply:

$$(16)\quad s = m - y + e.$$

We assume that e is uncorrelated with the supply disturbance u.

From *(9)*,

$$(17)\quad s = p - v + e.$$

We assume that the same Aggregate Supply relationship holds as before, equation *(1)*.

So we can write the loss function *(15)* as:

$$(18)\quad L = ap^2 + [(1-k)y^* + b(p-p^e) + u]^2 + c(p-v+e)^2.$$

We proceed as before to consider possible regimes.

(i) Discretion

$$(1/2)DL/dp = ap + [y^*(1-k) + b(p-p^e) + u]b + c(p-v+e) = 0.$$

$$(19)\quad p = [-y^*(1-k)b + b^2p^e - bu + c(v-e)] \;/\; [a+b^2+c].$$

The rationally expected p is given by $p^e = Ep$:

(20) $p^e = -(1-k)by^*/(a+c)$.

Substituting into (20) yields:

(21) $p = -(1-k)y^*[b/(a+c)] + [c(v-e)-bu]/[a+b^2+c]$.

The loss function is

(22) $EL = [(1-k)y^*]^2 (a+b^2+c)/(a+c) +$

$\{(a+c)var(u) + c(a+b^2)[var(v) + var(e)]\}/(a+b^2+c)$.

(ii) Money rule

As when we considered a money rule before, so that expected inflation is zero the authorities set m at y^*, and (10) applies. Thus the same solution (11) for y and p also applies. The exchange rate is given by substituting the solution for p from (11) into (15):

(23) $s = e - [(u+bv)/(1+b)]$.

The additional s term is the only difference from (12) in the expected loss function:

(24) $EL = [y^*(1-k)]^2 + [(1+a+c)/(1+b^2)]var(u) +$

$[(a+b^2+cb^2)/(1+b)^2]var(v) + [c]var(e)$.

Again the comparison with discretion depends on the various magnitudes.

(iii) Nominal GNP rule

When the monetary authorities are able to vary m so as to keep $p + y$ constant, the velocity shocks v drop out. The expected loss function becomes

(25) $EL = [y^*(1-k)]^2 + [(1+a+c)/(1+b)^2]\ var(u) + c\ var(e)$.

As before, the nominal GNP rule unambiguously dominates the money rule.

In practice the *e* shocks in the exchange rate equation are very large, and dwarf the *u* shocks in the aggregate supply equation, as is documented below. (The exchange rate often moves ten per cent in a year, without corresponding movements in the money supply or other observable macroeconomic variables; try to imagine similar movements of real output.[29]) If the weight *c* on the *s* target is substantial, then the last term in the expected loss equation may be important.

(iv) Exchange rate rule

Again, the authorities cannot affect *y* in long-run equilibrium. But now it is the exchange rate that they peg in such a way that $Ep = 0$, which from *(17)* is $s = 0$. The ex post price level is then given by

(26) $p = v - e.$

From *(1)*,

(27) $y = y^* + b(v-e) + u.$

From *(14)*,

(28) $EL = (a+b^2)Var(v-e) + [y^*(1-k)]^2 + Var(u).$

Assume that *v* and *e* are uncorrelated, so that $Var(v-e)$ can

---

[29] These assertions are documented in Frankel and Chinn (1991).

be replaced with $Var(v) + Var(e)$[30]. The coefficient on $var(e)$ is $(a+b^2)$, as compared to the coefficient c in the expected loss (25) under the nominal GNP rule. We made the point above that e shocks in practice dwarf u shocks. Reasoning on this basis, even if v shocks are also small and $a=c$ (the objective function puts no greater weight on a 10 per cent fluctuation of the price level than on a 10 per cent fluctuation of the exchange rate), which is extremely conservative, the expected loss from fixing s is greater than the expected loss from fixing nominal GNP. The reason is that under an exchange rate rule e shocks are allowed to affect the money supply and therefore the overall price level. Once we allow for v shocks (which are in between u and e shocks in magnitude, as we will see below), the case for nominal GNP targeting is even stronger. One would have to put extraordinarily high weight on the exchange rate objective to prefer an exchange rate rule.

(v) Price level rule

Finally we return to the price level rule. From equation (18), with the price level at zero,

$$(29)\quad L = [(1-k)y^* + u]^2 + c(-v+e)^2.$$

A comparison with (28) shows that the price level rule dominates the exchange rate rule if $a + b^2 > c$.

---

[30] The case where they are correlated, which is likely to be relevant, is considered in the second half of Frankel and Chinn (1991).

The condition $a > c$, again, merely says that fluctuations in the exchange rate are not as damaging as equal-percentage fluctuations in the price level. So the price level rule appears easily to dominate the exchange rate rule. The comparison with the nominal GNP rule is more difficult to make, however. Using (25), the nominal GNP rule dominates if the condition $a + c < b^2$ holds. (In addition, velocity shocks add to the relative superiority of the nominal GNP rule.) We have already argued that a is small relative to b, and that c is small relative to both of them. Still, the condition is not assured, and one would not want to assert an answer in the absence of more information.

References

Anderson, Kym, and Hege Norheim. 1992. "History, Geography and Regional Economic Integration," Workshop on Regionalism and the Global Trading System, September 3-5.

Barro, Robert. 1989. "A Cross-Country Study of Growth, Saving and Government," NBER Working Paper No. 2855, February.

Barro, Robert, and David Gordon. 1983. A positive theory of monetary policy in a natural rate model. Journal of Political Economy 91, 4, August, 589-610.

Bayoumi, Tamim, and Barry Eichengreen, 1992 "One Money or Many? On Analyzing the Prospects for Monetary Unification in Europe and Other Parts of the World," IMF and U.C., Berkeley, August.

[Bean, Charles, 1983, "Targeting Nominal Income: An Appraisal," Economic Journal 93, December, 806-819.]

Blanchard, Olivier and Pierre Muet, 1992, "'Competitiveness through Disinflation' An Assessment of the French Macroeconomic Strategy," 16th Panel Meeting, CEPR, London, forthcoming Economic Policy.

Blanchard, Olivier, and Lawrence Katz, 1992, "Regional Evolutions," Brookings Papers on Economic Activity.

Boughton, James, 1989, "Policy Assignment Strategies with Somewhat Flexible Exchange Rates," in M.Miller, B.Eichengreen and R.Portes, Blueprints for Exchange Rate Management, Academic Press, for Centre for Economic and Policy Research.

Cardenas, Mauricio, 1991, Coffee Exports, Endogenous State Policy and the Business Cycle, Ph.D. thesis, University of California at Berkeley.

Devarajan, Shantayanan, and Dani Rodrik, 1991, "Do the Benefits of Fixed Exchange Rates Outweigh their Costs? The Franc Zone in Africa," NBER Working Paper No. 3727, June.

Dornbusch, Rudiger, and Sebastian Edwards, 1991, editors, The Macroeconomics of Populism in Latin America, University of Chicago Press: Chicago.

Drysdale, Peter, and Ross Garnaut. 1992. "The Pacific: An Application of a General Theory of Economic Integration," Twentieth Pacific Trade and Development Conference, Washington, D.C. September 10-12.

Fischer, Stanley. 1988. Rules vs. discretion in monetary policy. NBER Working Paper No. 2518, February.

Frankel, Jeffrey. 1992a. "Is Japan Creating a Yen Bloc in East Asia and the Pacific?" Presented at an NBER conference, April 3-5, 1992, Del Mar, California. Forthcoming in Regionalism and Rivalry: Japan and the U.S. in Pacific Asia, edited by Jeffrey Frankel and Miles Kahler.

Frankel, Jeffrey, 1992b, "Foreign Exchange Policy, Monetary Policy and Capital Market Liberalization in Korea," in Korean-U.S. Financial Issues, U.S.-Korea Academic Symposium III, September 1992. Forthcoming, Korea Economic Institute of America, edited by Chwee-Huay Ow-Taylor.

Frankel, Jeffrey, and Menzie Chinn, 1991, "The Stabilizing Properties of a Nominal GNP Rule in an Open Economy," UC Berkeley Economics Working Paper No. 91-166, May 1991.

Frankel, Jeffrey, and Shang-Jin Wei. 1992. "Yen Bloc or Dollar Bloc: Exchange Rate Policies of the East Asian Economies", Third Annual East Asian Seminar on Economics, organized by Takatoshi Ito and Anne Krueger, held in Sapporo, Japan, June 17-19; forthcoming, NBER.

[Gordon, Robert. 1985. The conduct of domestic monetary policy. In Monetary policy in our times. A.Ando et al, eds. Cambridge, Ma.: M.I.T. Press. Pp. 45-81.]

[Hall, Robert. 1985. Monetary policy with an elastic price standard. Price stability and public policy, Federal Reserve Bank of Kansas City.]

Hamilton, Carl, and L.Alan Winters. 1992. "Opening Up International Trade in Eastern Europe," Economic Policy (April).

Hooper, Peter and Steven Kohlhagen. 1978. The effect of exchange rate uncertainty on the prices and volume of international trade. *Journal of International Economics* 8 (December): 483-511. [II.2]

Hutchison, Michael, and John Judd, 1992, "Central Bank Secrecy and Money Surprises: International Evidence," Review of Economics and Statistics, Feb.

Ito, Takatoshi, 1989, "Is the Bank of Japan a Closet Monetarist? Monetary Targeting in Japan, 1978-88," NBER Working Paper No. 2879, March.

Kim, Kihwan, 1990, "Deregulating the Domestic Economy: Korea's Experience in the 1980s," presented at Senior Policy Seminar, Caracas; revised December.

Kwack, Sung, 1992, "Monetary Control, Sterilization, and Exchange Rate Policy: Korea during the Period of Current Account Surpluses, 1986-1990," August 10; forthcoming in Exchange Rate

Policies in Pacific Basin Countries, edited by R. Glick and M. Hutchison.

Kydland, F. and E.Prescott. 1977. Rules rather than discretion: The inconsistency of optimal plans. Journal of Political Economy, 85, June: 473-491.

Lowell, Julia. 1992. Ph.D Dissertation. University of California, Berkeley.

Marston, Richard. 1984. "Exchange Rate Unions as an Alternative to Flexible Rates: The Effects of Real and Monetary Disturbances," in Exchange Rate Theory and Practice, edited by J. Bilson and R. Marston, University of Chicago Press, Chicago, 1984.

[McCallum, Bennett. 1987. The case for rules in the conduct of monetary policy: A concrete example, Federal Reserve Bank of Richmond Economic Review, September/October: 10-18.

_____. 1988a. Robustness properties of a rule for monetary policy. Carnegie-Rochester Conference Series on Public Policy. Revised, February.]

McKinnon, Ronald. 1963. Optimum currency areas. *American Economic Review* 53 (September), 717-24.

[Meade, James. 1984. A new Keynesian Bretton Woods. Three Banks Review, June.]

Mundell, Robert. 1961. The theory of optimal currency areas. *American Economic Review* 51 (November), 509-517.

Park, Yung Chul, and Won-Am Park, 1991a, "Changing Japanese Trade Patterns and the East Asian NICs," in Paul Krugman, ed., Trade with Japan: Has the Door Opened Wider?, University of Chicago Press, Chicago, for National Bureau of Economic Research.

Park, Yung Chul, and Won-Am Park, 1991b, "Exchange Rate Policies for the East Asian Newly Industrialized Countries," in Emil-Maria Claasen, ed., Exchange Rate Policies in Developing and Post-Socialist Countries, ICS Press, San Francisco.

Persson, Torsten, and Guido Tabellini, 1990, Macroeconomic Policy, Credibility and Politics, Harwood Academic Publishers, Chur, Switzerland.

Petri, Peter. 1992b. "The East Asian Trading Bloc: An Analytical History." Presented at an NBER conference, April 3-5, 1992, Del Mar, California. Forthcoming in Regionalism and Rivalry: Japan and the U.S. in Pacific Asia, edited by Jeffrey Frankel and Miles Kahler.

Reisen, Helmut, 1991, "Exchange Rate Policies for the East Asian Newly Industrialized Countries: Comment," in Emil-Maria Claasen, ed., Exchange Rate Policies in Developing and Post-Socialist Countries, ICS Press, San Francisco.

Reisen, Helmut. 1992. "The 'Impossible Trinity' in South-East Asia," September; forthcoming, International Economic Insights.

Reisen, Helmut, and Axel van Trotsenburg. 1988. "Should the Asian NICs Peg to the Yen?" In Intereconomics, July/August. 172-77.

Rogoff, Kenneth. 1985. The optimal degree of commitment to an intermediate monetary target. Quarterly Journal of Economics 100, November: 1169-1189.

_____. 1987. Reputational constraints on monetary policy. In K.Brunner and A.Meltzer, eds., Carnegie-Rochester Conference Series on Public Policy 26, Spring (Supplement to the Journal of Monetary Economics).

Rogoff, Kenneth. 1985. The optimal degree of commitment to an intermediate monetary target. Quarterly Journal of Economics 100, November: 1169-1189.

_____. 1987. Reputational constraints on monetary policy. In K.Brunner and A.Meltzer, eds., Carnegie-Rochester Conference Series on Public Policy 26, Spring (Supplement to the Journal of Monetary Economics).

[Taylor, John. 1985. What would nominal GNP targeting do to the business cycle? Carnegie-Rochester Conference Series on Public Policy 22: 61-84.]

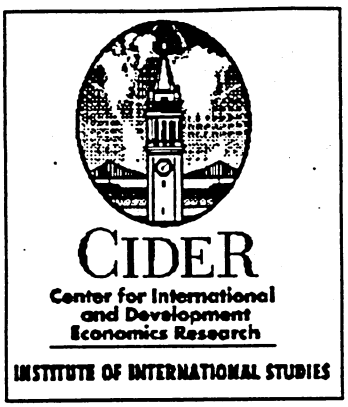
Romer, David, 1991, "Openness and Inflation: Theory and Evidence," NBER Working Paper No. 3936, December.

Takagi, Shinji. 1988. "A Basket Policy: Operational Issues for Developing Countries." World Development, 16, no.2, 271-79.

Tobin, James. 1980. Stabilization policy ten years after. Brookings Papers on Economic Activity 1: 19-72.

Wang,, Zhen Kun, and L.Alan Winters, 1991, "The Trading Potential of Eastern Europe," Centre for Economic Policy Research Discussion Paper No. 610, November, London, UK.

Williamson, John and Marcus Miller. 1987. Targets and indicators: A blueprint for the international coordination of economic policy. Policy analyses in international economics, no. 22, September. Washington, D.C.: Institute for International Economics.



Center for International and Development Economics Research

The Center for International and Development Economics Research is funded by the Ford Foundation. It is a research unit of the Institute of International Studies which works closely with the Department of Economics and the Institute of Business and Economic Research (IBER). All requests for papers in this series should be directed to IBER, 156 Barrows Hall, University of California at Berkeley, Berkeley CA 94720, (510) 642-1922.

Recent Papers in the Economics Department/CIDER Working Paper Series:

C92-003 "Arbitration in International Trade." Alessandra Casella. December 1992.

C92-004 "The Political Economy of Fiscal Policy After EMU." Barry Eichengreen. December 1992.

C92-005 "Financial and Currency Integration in the European Monetary System: The Statistical Record." Jeff Frankel, Steve Phillips, and Menzie Chinn. December 1992.

C93-006 "Macroeconomic Adjustment under Bretton Woods and the Post-Bretton-Woods Float: An Impulse-Response Analysis." Tamim Bayoumi and Barry Eichengreen. January 1993.

C93-007 "Is Japan Creating a Yen Bloc in East Asia and the Pacific?" Jeffrey A. Frankel. January 1993.

C93-008 "Foreign Exchange Policy, Monetary Policy and Capital Market Liberalization in Korea." Jeffrey A. Frankel. January 1993.

C93-009 "Patterns in Exchange Rate Forecasts for 25 Currencies." Menzie Chinn and Jeffrey Frankel. January 1993.

C93-010 "A Marshall Plan for the East: Options for 1993." Barry Eichengreen. February 1993.

C93-011 "Model Trending Real Exchange Rates." Maurice Obstfeld. February 1993.

C93-012 "Trade as Engine of Political Change: A Parable." Alessandra Casella. February 1993.

C93-013 "Three Comments on Exchange Rate Stabilization and European Monetary Union." Jeffrey Frankel. March 1993.

C93-014 "Are Industrial-Country Consumption Risks Globally Diversified?" Maurice Obstfeld. March 1993.

C93-015 "Rational Fools and Cooperation in a Poor Hydraulic Economy." Pranab Bardhan. May 1993.

C93-016 "Risk-Taking, Global Diversification, and Growth." Maurice Obstfeld. July 1993.

C93-017 "Disparity in Wages but not in Returns to Capital between Rich and Poor Countries." Pranab Bardhan. July 1993.

C93-018 "Prerequisites for International Monetary Stability." Barry Eichengreen. July 1993.

C93-019 "Thinking about Migration: Notes on European Migration Pressures at the Dawn of the Next Millennium." Barry Eichengreen. July 1993.

C93-020 "The Political Economy of Fiscal Restrictions: Implications for Europe from the United States." Barry Eichengreen and Tamim Bayoumi. September 1993.

C93-021 "International Monetary Arrangements for the 21st Century." Barry Eichengreen. September 1993.

C93-022 "The Crisis in the EMS and the Transition to EMU: An Interim Assessment." Barry Eichengreen. September 1993.

C93-023 "Financial Links around the Pacific Rim: 1982-1992." Menzie David Chinn and Jeffrey A. Frankel. October 1993.

C93-024 "Sterilization of Money Inflows: Difficult (Calvo) or Easy (Reisen)?" Jeffrey A. Frankel. October 1993.

C93-025 "Is There a Currency Bloc in the Pacific?" Jeffrey A. Frankel and Shang-Jin Wei. October 1993.

C93-026 "Emerging Currency Blocs." Jeffrey A. Frankel and Shang-Jin Wei. October 1993.

C93-027 "The Implications of New Growth Theory for Trade and Development: An Overview." Pranab Bardhan. October 1993.

C93-028 "The Reconstruction of the International Economy, 1945-1960." Barry Eichengreen. November 1993.

C93-029 "International Economics and Domestic Politics: Notes on the 1920s." Barry Eichengreen and Beth Simmons. November 1993.

C93-030 "One Money or Many? On Analyzing the Prospects for Monetary Unification in Various Parts of the World." Tamim Bayoumi and Barry Eichengreen. November 1993.

C93-031 "Recent Changes in the Financial Systems of Asian and Pacific Countries." Jeffrey A. Frankel. December 1993.

C94-032 "Deja Vu All Over Again: Lessons from the Gold Standard for European Monetary Unification." Barry Eichengreen. January 1994.

C94-033 "The Internationalization of Equity Markets: Introduction." Jeffrey A. Frankel. April 1994.

C94-034 "Trading Blocs: The Natural, the Unnatural, and the Super-Natural." Jeffrey Frankel, Ernesto Stein and Shang-jin Wei. April 1994.

C94-035 "A Two-Country Analysis of International Targeting of Nominal GNP." Jeffrey A. Frankel and Norbert Funke. April 1994.

C94-036 "Monetary Regime Choices for a Semi-Open Country." Jeffrey A. Frankel. April 1994.