

# Contents

<i>List of Figures</i>	viii
<i>List of Tables</i>	x
<i>Preface</i>	xiv
<i>Notes on the Contributors</i>	xv
<b>Introduction: New Developments of the Exchange Rate Regimes in Developing Countries</b>	<b>1</b>
<i>Hisayuki Mitsuo</i>	
1. Objective and analytical foundation	1
2. Structure and contents	4
Note	7
References	7
<b>1 De Facto Exchange Rate Regimes in Emerging Market Countries, 1990–2001: Some Empirical Evidence</b>	<b>8</b>
<i>Taro Esaka</i>	
1.1 Introduction	8
1.2 The methodology of classifying exchange rate regimes	11
1.3 The evolution of exchange rate regimes, 1990–2001: does the bipolar view hold?	17
1.4 IMF classification vs de facto classifications	30
1.5 Determinants of fear of floating: an empirical analysis	42
1.6 Summary and concluding remarks	50
Appendix 1A List of countries in Sections 1.3 and 1.4	51
Appendix 1B List of countries in Section 1.5	52
Appendix 1C List of variables, definitions, and data sources in Section 1.5	53
Notes	53
References	56
<b>2 Roles of Hard Pegs in Developing and Transition Countries: Cases of Argentina, Estonia, Bulgaria, and Ecuador</b>	<b>59</b>
<i>Hisayuki Mitsuo</i>	
2.1 Introduction	59

2.2	Roles of a currency board and dollarization: analytical foundation	60
2.3	Currency board in Argentina	62
2.4	Currency board in Estonia	67
2.5	Currency board in Bulgaria	71
2.6	Dollarization in Ecuador	76
2.7	Summary and conclusion	81
	Notes	82
	References	83
<b>3</b>	<b>Monetary Policy in Brazil under a Flexible Exchange Rate</b>	<b>84</b>
	<i>Shoji Nishijima</i>	
3.1	Introduction	84
3.2	Some problems of inflation targeting under a flexible exchange rate system	85
3.3	Inflation targeting policy in Brazil	87
3.4	A theoretical model	93
3.5	Estimation of response function of the SELIC rate	96
3.6	Conclusion	104
	Notes	104
	References	105
<b>4</b>	<b>Fluctuations in the Yen/Dollar Exchange Rate, Business Cycles of East Asian Countries, and the Asian Financial Crisis</b>	<b>107</b>
	<i>Masanaga Kumakura</i>	
4.1	Introduction	107
4.2	Yen/dollar exchange rate and East Asia's business cycle	109
4.3	Global electronics cycle, the yen/dollar exchange rate, and East Asia's export performance	120
4.4	Is East Asia a de facto dollar area?	126
4.5	Conclusion	136
Appendix 4A	System estimation of EA business cycles, 1992–2004	138
	Notes	153
	References	157
<b>5</b>	<b>East Asian Monetary Integration: an Empirical Assessment of the Optimum Currency Area Criteria</b>	<b>159</b>
	<i>Kiyotaka Sato</i>	
5.1	Introduction	159

5.2	The theory of the optimum currency area	160
5.3	Preliminary analysis of the OCA criteria	163
5.4	Empirical analysis	170
5.5	Concluding remarks	179
	Appendix 5A Estimation of structural shocks	181
	Appendix 5B Analysis of output losses	181
	Notes	183
	References	184
<b>6</b>	<b>Trade Competition and Real Exchange Rates</b>	<b>186</b>
	<i>Masanaga Kumakura</i>	
6.1	Introduction	186
6.2	Measuring international trade competition	187
6.3	Application to East Asian countries	191
6.4	Intra-industry trade and trade competitiveness	210
6.5	Application to effective exchange rates	217
6.6	Conclusion	223
	Notes	225
	References	228
<b>7</b>	<b>Effects of Exchange Rate Revaluation under Price Controls and Endogenous Quality Adjustment</b>	<b>231</b>
	<i>Kaku Furuya</i>	
7.1	Introduction	231
7.2	Price ceiling and quality adjustment – an illustration	233
7.3	The model	236
7.4	Discussion	245
7.5	Concluding remarks	245
	Appendix 7A Proof of Proposition 1	246
	Notes	247
	References	248
	<i>Index</i>	249

# 1

## De Facto Exchange Rate Regimes in Emerging Market Countries, 1990–2001: Some Empirical Evidence

*Taro Esaka*

### 1.1 Introduction

The choice of exchange rate regime is one of the most important topics in international economics that have been studied and debated over recent decades. This topic has gained momentum following the major currency crises seen in the 1990s (e.g. the European Monetary System (EMS) crisis in 1992–93, the Mexican crisis in 1994–95, and the Asian crisis in 1997–98). In a world with increasingly integrated capital markets, we are led to pose the question “what sort of exchange rate regime is sustainable?” Recently, some researchers have suggested that, in a world of increasing international capital mobility, only the two extreme exchange rate regimes (either hard pegs such as dollarization, currency boards or monetary unions, or a freely floating regime) are likely to be sustainable (Eichengreen 1994, Obstfeld and Rogoff 1995, Summers 2000, Fischer 2001). Conversely, intermediate exchange rate regimes (such as adjustable pegs, basket pegs, crawling pegs, or bands)<sup>1</sup> are likely to be unsustainable and will disappear. This view has come to be known as the “bipolar view” or the “hollowing-out” hypothesis.

Fischer (2001) has examined the transition of exchange rate regimes in IMF member countries by comparing the distribution of exchange rate regimes in 1991 with that in 1999, on the basis of the data of the IMF official classification. His study has shown that, of 159 countries in 1991 and 185 countries in 1999 in the sample, the proportion of hard pegs increased from 16 percent in 1991 to 24 percent in 1999, that of intermediate regimes decreased from 62 percent in 1991 to 34 percent in 1999, and that of floating regimes increased from 23 percent in 1991 to 42 percent in 1999 (Figure 1.1).<sup>2,3</sup> This evidence shows that, in the last decade, intermediate regimes have hollowed out and hard pegs and floating regimes have increased, indicating that the bipolar view holds.

Before 1998, the IMF official classification system classified IMF member countries on the basis of their own official statements about the degree of

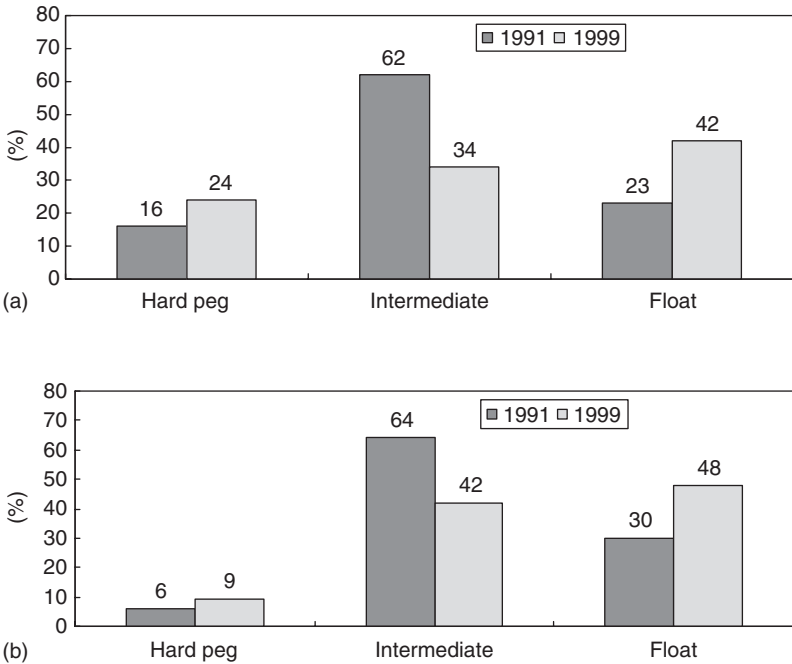


Figure 1.1 The transition of exchange rate regimes, 1991 and 1999, according to Fischer (2001): (a) all countries; (b) emerging market countries

Note: Fischer (2001) defines economies with no separate currency or those with currency boards as “hard pegs,” economies with conventional fixed pegs, crawling pegs, horizontal bands, and crawling bands as “intermediate regimes,” and economies with a managed float with no specified central rate or those with independent floating as “floating regimes.”

Source: (a) Fischer (2001: Figure 1); (b) author's own, based on Table 2 of Fischer (2001).

exchange rate flexibility. Many empirical studies of exchange rate regimes (e.g. the relationship between exchange rate regime and macroeconomic performance (such as inflation rate, interest rate, and output growth) and the determinants of the choice of exchange rate regime) relied on the IMF classification of exchange rate regimes, because the classification system provides classification data of many countries over a long time span.<sup>4</sup>

However, it is well known that several countries' actual (*de facto*) exchange rate regimes are inconsistent with their official (*de jure*) exchange rate regimes. For example, according to the IMF classification, Thailand had a basket peg, Korea, Indonesia, Malaysia, and Singapore had a managed float, and the Philippines even had an independent float before the Asian currency crisis of 1997. However, it is said that their currencies were effectively pegged to the US dollar.<sup>5</sup> Calvo and Reinhart (2002) suggest that, in reality, many countries

that claim to have floating regimes do not allow their nominal exchange rate to float freely. This finding has been referred to as “fear of floating.” Levy-Yeyati and Sturzenegger (2002) show that, in practice, many countries adopt a fixed regime, but they announce a more flexible regime (do not claim to fix). This finding has been referred to as “fear of pegging” (or more accurately “fear of announcing a peg”).<sup>6</sup>

Thus, the official classification suffers from important measurement problems that have been well documented in the literature. This means that the results of empirical studies of exchange rate regimes that are based on the official classification may be biased and provide an inaccurate picture of exchange rate regimes. A means of classification describing actual exchange rate regimes has been called for. In response to this need, over the last few years some researchers have begun to classify exchange rate regimes by applying quantitative and qualitative analyses in order to arrive at a description more appropriate to the real world situation and have provided databases of *de facto* regimes based on these classifications.<sup>7</sup>

In this chapter, we survey the *de facto* exchange rate regimes of the IMF member countries during the period 1990–2001 using databases provided by recent empirical literature on exchange rate regime classification by Bubula and Ötoker-Robe (2002), Reinhart and Rogoff (2002), Levy-Yeyati and Sturzenegger (2002), and Shambaugh (2003).<sup>8</sup> Many empirical analyses of exchange rate regimes will use these classifications of exchange rate regimes,<sup>9</sup> both because they make such *de facto* classification data public and because they cover a large number of countries over a long time period. Thus, it is useful to review methodologies for classifying exchange rate regimes and investigate the structure of the data so provided.

Accordingly, Section 1.2 will present a brief survey of the methodologies for classifying exchange rate regimes under the IMF classification system (Bubula and Ötoker-Robe 2002, Reinhart and Rogoff 2002, Levy-Yeyati and Sturzenegger 2002, Shambaugh 2003). Section 1.3 will present the evolution of exchange rate regimes over the period 1990–2001 in order to examine whether the bipolar view holds in the sense that the proportions of hard pegs and freely floating regimes considerably increased and that of intermediate regimes considerably decreased throughout the sample period, by examining the *de facto* classification data.

By comparing *de facto* classifications with the *de jure* classification provided by the IMF, Section 1.4 will investigate the degree of deviation of actual regimes from official regimes and examine the exchange rate policies labeled “fear of floating” and “fear of announcing a peg.” Furthermore, Section 1.5 will statistically identify the determinants of fear of floating by using logit models. Section 1.6 will present a summary and concluding remarks. Finally, the list of countries and the sources and nature of the data are presented in the Appendix.

## 1.2 The methodology of classifying exchange rate regimes

In this chapter, we examine the de facto exchange rate regimes of the IMF member countries during 1990–2001 on the basis of exchange rate regime classification data. Before we show the de facto exchange rate regimes, let us first present a brief survey of the methodologies used for classifying exchange rate regimes under the IMF classification system (Bubula and Ötoker-Robe 2002, Reinhart and Rogoff 2002, Levy-Yeyati and Sturzenegger 2002, Shambaugh 2003). The methodologies of classifying exchange rate regimes are summarized in Table 1.1.

### 1.2.1 The IMF classification

Before 1998, the (old) IMF official classification system classified members' exchange rate regimes on the basis of their own official statements. Regimes were mainly classified into three categories: (1) peg (a peg to a single currency or a composite of currencies), (2) limited flexibility, and (3) more flexible (managed floating and independently floating). Many empirical studies of exchange rate regimes relied on the IMF classification data, because this classification system had long provided quarterly and annual classification data for many countries.

However, it is well known that several countries' actual exchange rate regimes were inconsistent with the official exchange rate regimes recorded under the IMF classification. For example, according to the IMF classification, Thailand had a basket peg, Korea, Indonesia, Malaysia, and Singapore had a managed float, and the Philippines even had an independent float before the Asian currency crisis of 1997. However, it is widely recognized that their currencies were effectively pegged to the US dollar. Thus, this suggests significant drawbacks in this classification system.

To correct this shortcoming, the IMF has adopted a new classification system based on the IMF members' de facto regimes since January 1999. According to Bubula and Ötoker-Robe (2002), the new classification system classifies the IMF members' regimes on the basis of the degree of flexibility of the arrangement or a formal or informal commitment to a given exchange rate path. It is also based on the information obtained by provision of technical assistance to member countries and regular contact with IMF country economists. These views are supported by analyses of observed exchange rate and reserves behavior.

The new IMF system classifies member countries into eight categories: (1) exchange arrangements with no separate legal tender, including formal dollarization and currency unions, (2) currency boards, (3) other conventional fixed pegs, (4) pegged exchange rates within horizontal bands, (5) crawling peg, (6) exchange rates within crawling bands, (7) managed floating with no predetermined path for the exchange rate, and (8) independently floating. The old and new IMF classifications are given in the IMF's *Annual Report on Exchange*

Table 1.1 Summary of the methodologies of classifying exchange rate regimes

<i>Classification</i>	<i>Sample, frequency, and country coverage</i>	<i>Method or criterion</i>	<i>Data of classification</i>	<i>Categories of classification</i>
The old IMF classification system	IMF members before 1998	This classification system is based on members' official statements about the degree of exchange rate flexibility	Quarterly and annual classifications	Three categories: (1) peg (a peg to single currency and a composite of currencies), (2) limited flexibility, and (3) more flexible (managed floating and independently floating)
The new IMF classification system	IMF members since 1999	This classification system classifies exchange rate regimes on the basis of the degree of flexibility of the arrangement or a formal or informal commitment to a given exchange rate path. This classification system is also based on information obtained by provision of technical assistance to member countries and regular contacts with IMF country economists. These views are supported by an analysis of observed exchange rate and reserves behavior (Bubula and Ötler-Robe 2002)	Quarterly and annual classifications	Eight categories: (1) exchange arrangements with no separate legal tender, including formal dollarization and currency unions, (2) currency boards, (3) other conventional fixed pegs, (4) pegged exchange rates within horizontal bands, (5) crawling peg, (6) exchange rates within crawling bands, (7) managed floating with no predetermined path for the exchange rate, and (8) independently floating
Bubula and Ötler-Robe (2002)	IMF members from 1990 to 2001	Following the new IMF classification system, they construct a historical database on de facto regimes. That is to say, this classification system is based on the information obtained by provision of technical assistance to member countries and regular contacts with the IMF country economists. These views are supported by an analysis of observed exchange rate and reserves behavior	Monthly and annual classifications	Thirteen categories: (1) formal dollarization, (2) currency union, (3) currency board, (4) conventional fixed peg to single currency, (5) conventional fixed peg to basket, (6) pegged within a horizontal band, (7) forward-looking crawling peg, (8) backward-looking crawling peg, (9) forward-looking crawling band, (10) backward-looking crawling band, (11) tightly managed floating, (12) other managed float with no predetermined exchange rate path, and (13) independently floating

<i>Classification</i>	<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>Categories of classification</i>
Reinhart and Rogoff (2002)	Monthly data of official and market-determined (dual and parallel) exchange rates and inflation data for 153 countries from 1946 to 2001	Several measures of exchange rate variability. Twelve-month rate of inflation	They classify exchange rate regimes by using detailed country chronologies and a broad variety of descriptive statistics	Monthly and annual classifications	Fourteen categories: (1) no separate legal tender, (2) preannounced peg or currency board arrangement, (3) preannounced horizontal band that is narrower than or equal to $\pm 2\%$ , (4) de facto peg, (5) preannounced crawling peg, (6) preannounced crawling band that is narrower than or equal to $\pm 2\%$ , (7) de facto crawling peg, (8) preannounced crawling band that is wider than or equal to $\pm 2\%$ , (9) de facto crawling band that is narrower than or equal to $\pm 2\%$ , (10) de facto crawling band that is narrower than or equal to $\pm 5\%$ , (11) moving band that is narrower than or equal to $\pm 2\%$ , (12) managed floating, (13) freely floating, and (14) freely falling.
Levy-Yeyati and Sturzenegger (2002)	Monthly data of exchange rates, international reserves and monetary bases for 183 countries from 1974 to 2000	Three classification variables: (1) exchange rate volatility, (2) the volatility of exchange rate changes and (3) the volatility of reserves	Cluster analysis. For the criteria, see Table 1.2	Annual classification	They create a new separate category for a country whose 12-month rate of inflation is above 40%. This country is classified as freely falling Four categories: (1) fix, (2) crawling peg, (3) dirty float, and (4) flexible, plus an "inconclusive" category
Shambaugh (2003)	Monthly data of exchange rates for 155 countries from 1973 to 2000	The level of the exchange rate	Simple statistical analysis	Annual classification	Five categories: (1) 0% change in the exchange rate, (2) stays within 1% bands, (3) stays within 2% bands, (4) realignment, but zero change in 11 of 12 months, and (5) no peg. He determines if the exchange rate stayed within $\pm 1\%$ ( $\pm 2\%$ ) bands against the base currency

1 Sample, frequency and country coverage; 2 Classification variables; 3 Method or criterion; 4 Data of classification.

*Arrangements and Exchange Restrictions (AREAER) and International Financial Statistics (IFS).*

### **1.2.2 The Bubula and Ötker-Robe (2002) classification**

Many researchers find the lack of historical data available under the new IMF classification a serious impediment to study. Following the new IMF classification system, Bubula and Ötker-Robe (2002) accordingly constructed historical (monthly and annual) data on de facto regimes for all the IMF member countries for the period from 1990 to 2001. As in the new IMF classification, they classify the members' regimes on the basis of the degree of flexibility of the arrangement or a formal or informal commitment to a given exchange rate path. This classification is also based on information obtained through provision of technical assistance to member countries and regular contact with IMF country economists. These views are supplemented with other sources of information, including press reports, news articles, and other relevant papers, and are also supported by analyses of observed exchange rate and reserves behavior.

Bubula and Ötker-Robe (2002) classify the IMF member countries into 13 categories: (1) formal dollarization, (2) currency union, (3) currency board, (4) conventional fixed peg to a single currency, (5) conventional fixed peg to basket, (6) pegged within a horizontal band, (7) forward-looking crawling peg, (8) backward-looking crawling peg, (9) forward-looking crawling band, (10) backward-looking crawling band, (11) tightly managed floating, (12) other managed float with no predetermined exchange rate path, and (13) independently floating. The data of the Bubula and Ötker-Robe (2002) classification can be obtained from Table 7 in their paper.

### **1.2.3 The Reinhart and Rogoff (2002) classification**

Reinhart and Rogoff (2002) constructed a historical (monthly and annual) database on de facto exchange rate regimes for 153 countries over the period 1946–2001. They classify exchange rate regimes by applying detailed country chronologies and a broad variety of descriptive statistics of official and market-determined (dual and parallel) exchange rates.

The basic procedure of their classification is as follows. First, they verify whether there existed a unified rate or dual or multiple rates, or parallel markets, by using detailed country chronologies. Second, if there is no dual or parallel market, they check if there is an official announcement for the exchange rate. If there is, they confirm whether the announced exchange rate passes a statistical verification test. If the regime is verified, it is classified as a peg, band, and so on. If the announcement fails verification, they statistically classify the regime by using their de facto statistical sort. Third, if there is no announcement for the exchange rate, or the announced regime fails to conform to the data, they statistically classify the regime by using a broad variety of descriptive statistics of market-determined exchange rates. Fourth, a characteristic

difference from all other classifications is that they create a new separate category for a country whose 12-month rate of inflation is above 40 percent. This country is classified as “freely falling.”

Following the procedure, Reinhart and Rogoff (2002) classify countries into 14 categories: (1) no separate legal tender, (2) preannounced peg or currency board arrangement, (3) preannounced horizontal band that is narrower than or equal to  $\pm 2$  percent, (4) de facto peg, (5) preannounced crawling peg, (6) preannounced crawling band that is narrower than or equal to  $\pm 2$  percent, (7) de facto crawling peg, (8) preannounced crawling band that is wider than or equal to  $\pm 2$  percent, (9) de facto crawling band that is narrower than or equal to  $\pm 2$  percent, (10) de facto crawling band that is narrower than or equal to  $\pm 5$  percent, (11) moving band that is narrower than or equal to  $\pm 2$  percent, (12) managed floating, (13) freely floating, and (14) freely falling. The data of the Reinhart and Rogoff (2002) classification can be obtained from <http://www.puaf.umd.edu/faculty/papers/reinhart/papers.htm>.

#### 1.2.4 The Levy-Yeyati and Sturzenegger (2002) classification

Levy-Yeyati and Sturzenegger (2002) constructed an annual database of de facto exchange rate regimes for 183 countries from 1974 to 2000. This classification is based on the following three variables related to exchange rate behavior: (1) exchange rate volatility, (2) the volatility of exchange rate changes, and (3) the volatility of reserves. Exchange rate volatility is computed as the average of the absolute monthly percentage changes in the nominal exchange rate during a calendar year, the volatility of exchange rate changes is computed as the standard deviation of the monthly percentage changes in the exchange rate, and the volatility of reserves is the average of the absolute monthly change in net dollar international reserves relative to the monetary base in the previous month.

The criterion of their classification is represented in Table 1.2. According to Table 1.2, for example, flexible exchange rate regimes are characterized by little intervention in the foreign exchange market (i.e. low volatility of reserves) with high exchange rate volatility. By contrast, fixed exchange rate regimes are characterized by heavy intervention (i.e. high volatility of reserves) with low exchange rate volatility. Furthermore, crawling peg regimes are characterized by high volatility of reserves with low exchange rate change volatility and high exchange rate volatility, because a country that adopts a crawling peg actively intervenes in the exchange market and the exchange rate depreciates at a uniform pace.

Levy-Yeyati and Sturzenegger (2002) classify 183 countries into four exchange rate regimes: (1) fix, (2) crawling peg, (3) dirty float, and (4) flexible, plus an “inconclusive” category, by applying a K-means cluster analysis to exchange rate volatility, the volatility of exchange rate changes, and the volatility of reserves. The data of the Levy-Yeyati and Sturzenegger (2002) classification can be obtained from <http://www.utdt.edu/~ely/>.

Table 1.2 The criterion of the Levy-Yeyati and Sturzenegger (2002) classification

	Exchange rate volatility ( $\sigma_e$ )	Volatility of exchange rate changes ( $\sigma_{\Delta e}$ )	Volatility of reserves ( $\sigma_r$ )
Inconclusive	Low	Low	Low
Flexible	High	High	Low
Dirty float	High	High	High
Crawling peg	High	Low	High
Fixed	Low	Low	High

*Note:* Exchange rate volatility ( $\sigma_e$ ) is computed as the average of the absolute monthly percentage changes in the nominal exchange rate during a calendar year. The volatility of exchange rate changes ( $\sigma_{\Delta e}$ ) is computed as the standard deviation of the monthly percentage changes in the exchange rate. The volatility of reserves ( $\sigma_r$ ) is the average of the absolute monthly change in net dollar international reserves relative to the monetary base in the previous month (also in dollars).

*Source:* Levy-Yeyati and Sturzenegger (2002: Table 1).

In the case where a country stabilizes the exchange rate without any direct purchase or sale of foreign exchange in the market, this classification would be inappropriate, because the country would be classified as “inconclusive” when the volatilities of exchange rate and reserves are low (Table 1.2).<sup>10</sup> In developing countries with small and shallow foreign exchange markets, the authorities actually limit exchange rate volatility through administrative foreign exchange controls and regulations or moral suasion (Bubula and Ötler-Robe 2002).

### 1.2.5 The Shambaugh (2003) classification

To examine how a degree of fixed exchange rate regime affects monetary autonomy, Shambaugh (2003) mainly classifies countries as pegged or nonpegged exchange rate regimes. His classification covers 155 countries over the period 1973–2000. The criterion of classifying exchange rate regimes is to verify whether the exchange rate stayed within  $+/-1$  percent ( $+/-2$  percent) bands against the base currency.

Following the criterion, he classifies countries into five groups: (1) zero percent change in the exchange rate, (2) stays within 1 percent bands, (3) stays within 2 percent bands, (4) realignment, but zero change in 11 of 12 months, and (5) no peg. His category (4) can generally be considered as fixed regimes. The data of the Shambaugh (2003) classification can be obtained from <http://www.dartmouth.edu/~economic/faculty/Shambaugh/index.htm>.

As presented above, while Shambaugh (2003) classifies countries into pegged and nonpegged regimes, he does not definitely distinguish hard pegs or intermediate regimes from pegged regimes. For this reason, we cannot examine whether the bipolar view holds, by using this data classification.

### 1.3 The evolution of exchange rate regimes, 1990–2001: does the bipolar view hold?

As shown above, the bipolar view of exchange rate regimes suggests that, in a world of increasing international capital mobility, only the two extreme exchange rate regimes (either hard pegs such as dollarization, currency boards, or monetary unions, or a freely floating regime) are likely to be sustainable, and then intermediate regimes (such as adjustable pegs, basket pegs, crawling pegs, or bands) are likely to be unsustainable and will disappear. In this section, by using the databases of the de facto classifications, we present the evolution of exchange rate regimes of the IMF member countries over the period 1990–2001 in order to examine whether the bipolar view holds in the sense that the proportions of hard pegs and freely floating regimes considerably increased, while that of intermediate regimes considerably decreased, with the result that the share of intermediate regimes has fallen below that of hard pegs or freely floating regimes during the sample period.

For this purpose, we first group exchange rate regimes into three categories: (1) “hard pegs,” (2) “intermediate regimes” (soft pegs), and (3) “independently floating regimes” (freely floating regimes), in each of the de facto classifications. Then, we observe the transition of exchange rate regimes in the IMF member countries during 1990–2001 on the basis of the data of the de facto classifications. If hard pegs and freely floating regimes significantly increased and intermediate regimes significantly declined over the sample period, it can be considered as evidence that the bipolar view holds.

From the standpoint of the bipolar view, it may be surmised that developed countries and emerging market economies are apt to have hard pegs or freely floating regimes, because they can be considered as more integrated or integrating into international capital markets than developing countries. Following Fischer (2001) and Bubula and Ötoker-Robe (2002),<sup>11</sup> we thus classify all the IMF members into three groups: developed countries, emerging market countries or regions, and developing countries or regions (see Appendix 1A).

#### 1.3.1 The Bubula and Ötoker-Robe (2002) classification

Tables 1.3 and 1.4 and Figure 1.2 show the evolution of exchange rate regimes over the period 1990–2001, on the basis of the database of the Bubula and Ötoker-Robe (2002) classification.<sup>12</sup> Here, we define their categories (1)–(3) as “hard pegs,” (4)–(12) as “intermediate regimes,” and (13) as “independently floating regimes” to examine the bipolar view. From these tables and figure, we first observe that, for all countries, while the proportion of hard pegs and independently floating regimes increased over the sample period, the proportion of intermediate regimes decreased over the sample period.

Second, for developed countries, the proportion of hard pegs markedly increased from 0 percent in 1990 to 52.2 percent in 2001 and that of independently floating regimes increased from 21.7 percent in 1990 to 39.1 percent

Table 1.3 The evolution of exchange rate regimes, 1990–2001, according to Bubula and Ötker-Robe (2002) (%)

Categories	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1	1.899	1.875	6.145	2.762	2.717	2.717	2.717	3.243	3.243	3.243	3.784	4.324
2	12.03	11.88	10.61	10.5	10.33	10.33	10.33	10.81	10.81	16.76	16.76	17.3
3	1.899	2.5	2.793	2.762	3.261	3.261	3.261	4.324	4.324	4.324	4.324	4.324
4	24.05	21.25	18.44	19.34	20.11	21.2	19.57	20	18.92	18.38	17.84	16.22
5	19.62	17.5	15.08	13.81	10.33	8.696	7.609	7.027	5.946	5.405	5.405	5.405
6	8.861	8.125	6.145	7.182	8.152	7.065	9.783	8.649	8.649	2.703	3.243	2.703
7	1.899	1.875	1.117	2.21	2.717	2.717	2.717	2.703	1.622	2.162	3.243	1.622
8	0.633	2.5	2.235	2.21	2.174	3.261	4.348	4.324	4.865	3.243	2.703	3.243
9	7.595	7.5	6.145	6.63	3.804	3.804	3.804	4.324	4.324	2.703	0.541	0.541
10	1.266	1.25	0.559	1.105	1.087	2.174	2.174	1.081	0.541	0.541	0.541	0
11	5.063	6.25	6.145	6.077	8.696	9.783	8.152	4.865	3.243	5.405	7.568	8.649
12	9.494	10	11.73	11.6	13.59	10.87	13.04	14.05	16.22	16.76	14.59	15.14
13	5.696	7.5	12.85	13.81	13.04	14.13	12.5	14.59	17.3	18.38	19.46	20.54
Total	100	100	100	100	100	100	100	100	100	100	100	100

Note: Thirteen categories: (1) formal dollarization, (2) currency union, (3) currency board, (4) conventional fixed peg to single currency, (5) conventional fixed peg to basket, (6) pegged within a horizontal band, (7) forward-looking crawling peg, (8) backward-looking crawling peg, (9) forward-looking crawling band, (10) backward-looking crawling band, (11) tightly managed floating, (12) other managed float with no predetermined exchange rate path, and (13) independently floating.

Source: The database of the Bubula and Ötker-Robe (2002) classification.

Table 1.4 Test of the bipolar view by using the data of Bubula and Ötoker-Robe (2002). (%)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<i>All</i>												
Hard pegs	15.8	16.3	19.6	16	16.3	16.3	16.3	18.4	18.4	24.3	24.9	25.9
Intermediate regimes	78.5	76.3	67.6	70.2	70.7	69.6	71.2	67	64.3	57.3	55.7	53.5
Independently floating	5.7	7.5	12.8	13.8	13	14.1	12.5	14.6	17.3	18.4	19.5	20.5
Total	100	100	100	100	100	100	100	100	100	100	100	100
<i>Developed</i>												
Hard pegs	0	0	0	0	0	0	0	0	0	47.8	47.8	52.2
Intermediate regimes	78.3	78.3	56.5	60.9	60.9	60.9	69.6	69.6	65.2	17.4	17.4	8.7
Independently floating	21.7	21.7	43.5	39.1	39.1	39.1	30.4	30.4	34.8	34.8	34.8	39.1
Total	100	100	100	100	100	100	100	100	100	100	100	100
<i>Emerging</i>												
Hard pegs	6.45	9.68	9.38	9.09	9.09	9.09	9.09	12.1	12.1	12.1	15.2	15.2
Intermediate regimes	87.1	83.9	87.5	90.9	87.9	87.9	84.8	75.8	72.7	60.6	54.5	54.5
Independently floating	6.45	6.45	3.13	0	3.03	3.03	6.06	12.1	15.2	27.3	30.3	30.3
Total	100	100	100	100	100	100	100	100	100	100	100	100
<i>Developing</i>												
Hard pegs	22.1	21.7	25.8	20.8	21.1	21.1	21.1	23.3	23.3	23.3	23.3	24
Intermediate regimes	76	73.6	64.5	66.4	68	66.4	68	64.3	62	63.6	62.8	61.2
Independently floating	1.92	4.72	9.68	12.8	10.9	12.5	10.9	12.4	14.7	13.2	14	14.7
Total	100	100	100	100	100	100	100	100	100	100	100	100

Note: In order to examine the bipolar view, we define their categories (1)–(3) as “hard pegs,” (4)–(12) as “intermediate regimes,” and (13) as “independently floating regimes.”

Source: Author's estimates based on the data of Bubula and Ötoker-Robe (2002).

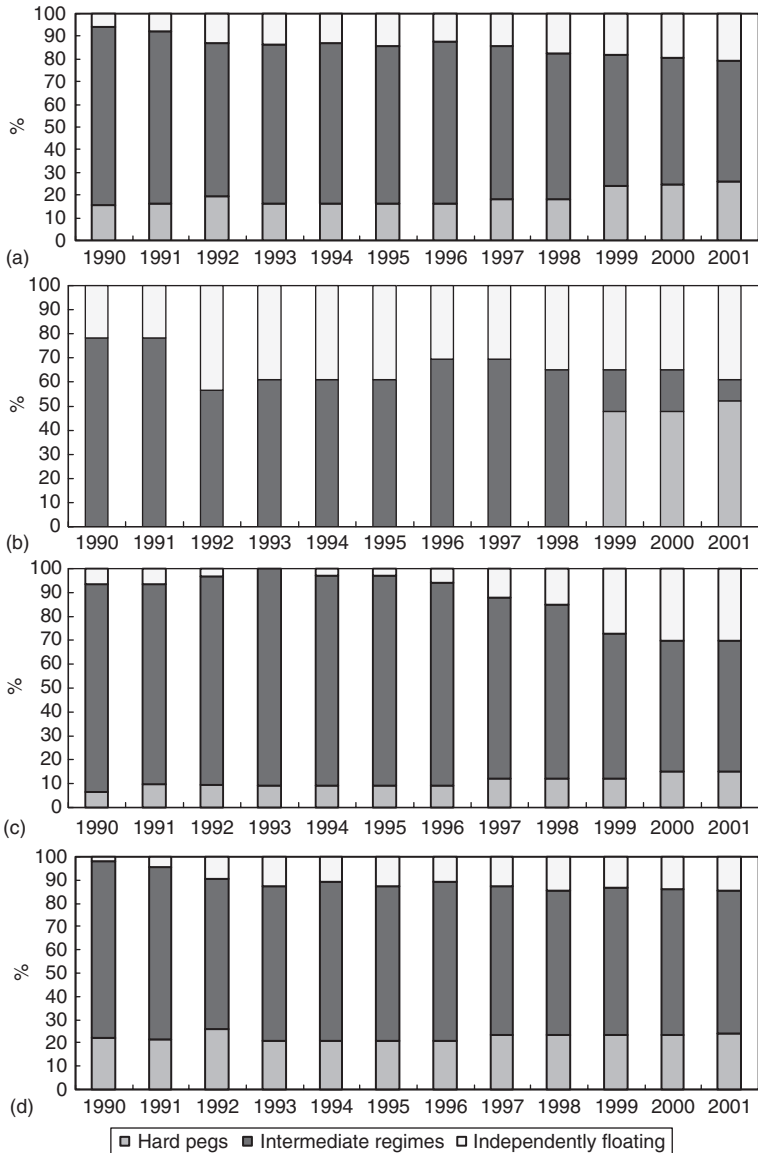


Figure 1.2 The evolution of exchange rate regimes, 1990–2001, according to Bubula and Ötker-Robe (2002): (a) all countries; (b) developed countries; (c) emerging market economies; (d) developing countries

Note: In order to examine the bipolar view, we define their categories (1)–(3) as “hard pegs,” (4)–(12) as “intermediate regimes,” and (13) as “independently floating regimes.”

Source: As for Table 1.4.

in 2001. On the other hand, the proportion of intermediate regimes dramatically decreased from 78.3 percent in 1990 to 8.7 percent in 2001. Naturally, the fact that 12 European countries entered into Economic and Monetary Union (EMU) from 1999 to 2001 underlies this result. At the end of 2001, in practice, there were two countries (Denmark and Norway) with intermediate regimes (see Table 1.5). Hence, we can be reasonably sure that the bipolar view strongly holds for developed countries.

Third, for emerging market economies, the share of hard pegs increased from 6.45 percent in 1990 to 15.2 percent in 2001 and that of independently floating regimes increased sharply from 6.45 percent in 1990 to 30.3 percent in 2001. On the other hand, the share of intermediate regimes decreased from 87.1 percent in 1990 to 54.5 percent in 2001. In particular, from 1997 to 2001, intermediate regimes substantially decreased and independently floating regimes significantly increased. This result is partly supported by the fact that currency crises (e.g. the Asian crisis in 1997–98) caused emerging market economies to move away from soft pegs toward freely floating regimes. We observe from Table 1.5 that, while most emerging economies adopted intermediate regimes in 2001, many countries moved toward the two edges (i.e. conventional fixed peg and other managed float) although still remaining as intermediate regimes.

However, the proportion of intermediate regimes was more than 50 percent in 2001 and was significantly higher than those of hard pegs (15.2 percent) and freely floating regimes (30.3 percent) in 2001. From this result, we cannot conclude that the bipolar view strictly holds for emerging market economies, even though hard pegs and freely floating regimes increased and intermediate regimes decreased over the sample period, on the basis of the database of the Bubula and Ötcker-Robe (2002) classification.<sup>13</sup>

### 1.3.2 The Reinhart and Rogoff (2002) classification

Tables 1.6 and 1.7 and Figure 1.3 show the evolution of exchange rate regimes over the period 1990–2001, on the basis of the database of the Reinhart and Rogoff (2002) classification.<sup>14</sup> Here, we define their categories (1)–(2) as “hard pegs,” (3)–(12) as “intermediate regimes,” and (13)–(14) as “independently floating regimes” to examine the bipolar view. From these tables and figure, we first observe that, for all countries, while the proportion of hard pegs increased over the sample period, those of intermediate regimes and freely floating regimes showed little change.

Second, for developed countries, the proportion of hard pegs dramatically increased from 0 percent in 1990 to 52.1 percent in 2001 and that of freely floating regimes slightly decreased from 17.4 percent in 1990 to 13.0 percent in 2001. On the other hand, the proportion of intermediate regimes registered a marked decrease from 82.6 percent in 1990 to 34.8 percent in 2001. While there were eight countries with intermediate regimes, five countries (Iceland, New Zealand, Norway, Sweden, and the United Kingdom) had a managed floating regime in 2001 (see Table 1.8).

Table 1.5 Exchange rate arrangements, 1990 and 2001: developed countries and emerging market economies, according to Bubula and Ötker-Robe (2002)

<i>Exchange rate regimes</i>	<i>1990</i>	<i>2001</i>	
<i>Developed countries</i>			
Hard pegs	(1)		
	(2)	Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain	
Intermediate regimes	(3)		
	(4)	Austria, Luxembourg, Netherlands	
	(5)		
	(6)	Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Norway, Spain, Sweden, United Kingdom	Denmark
	(7)	Greece	
	(8)	Portugal	
	(9)		
	(10)		
	(11)		
	(12)	Canada	Norway
Independently floating	(13)	Australia, Japan, New Zealand, Switzerland, United States	Australia, Canada, Iceland, Japan, New Zealand, Sweden, Switzerland, United Kingdom, United States
<i>Emerging market economies</i>			
Hard pegs	(1)	Panama	Ecuador, Panama
	(2)		
	(3)	Hong Kong	Argentina, Bulgaria, Hong Kong
Intermediate regimes	(4)	China, Egypt, Philippines, Poland, Qatar	China, Jordan, Malaysia, Qatar
	(5)	Bulgaria, Hungary, Jordan, Malaysia, Morocco, Thailand	Morocco
	(6)	India, Israel	Egypt, Hungary
	(7)	Ecuador, Mexico	
	(8)		Israel, Venezuela
	(9)	Colombia, Indonesia, Sri Lanka, Turkey	
	(10)	Chile	
	(11)	Korea, Nigeria, Pakistan, Singapore	India, Nigeria, Singapore
	(12)	Brazil, South Africa, Venezuela	Czech Republic, Indonesia, Pakistan, Russia, Sri Lanka, Thailand
	Independently floating	(13)	Argentina, Peru

*Note:* Thirteen categories: (1) formal dollarization, (2) currency union, (3) currency board, (4) conventional fixed peg to single currency, (5) conventional fixed peg to basket, (6) pegged within a horizontal band, (7) forward-looking crawling peg, (8) backward-looking crawling peg, (9) forward-looking crawling band, (10) backward-looking crawling band, (11) tightly managed floating, (12) other managed float with no predetermined exchange rate path, and (13) independently floating.

*Source:* The database of the Bubula and Ötker-Robe (2002) classification.

Table 1.6 The evolution of exchange rate regimes, 1990–2001, according to Reinhart and Rogoff (2002) (%)

Categories	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
1	4.065	3.788	3.731	3.65	3.623	3.521	3.521	3.571	3.597	12.23	13.04	13.14
2	19.51	16.67	16.42	16.79	18.12	19.01	19.01	20.71	21.58	21.58	21.74	21.9
3	0	0.758	0.746	0	0	0	0	0	0	0	0	0
4	8.13	7.576	10.45	10.95	12.32	11.97	13.38	14.29	12.95	6.475	7.971	7.299
5	1.626	1.515	0.746	0	0	0	0	0	0	0	0	0
6	0.813	1.515	0.746	0.73	0.725	1.408	1.408	2.143	2.158	1.439	0.725	0.73
7	5.691	7.576	7.463	9.489	9.42	10.56	11.27	11.43	10.07	9.353	7.971	8.029
8	0.813	0.758	0	0	0.725	0	0	0	0	1.439	0.725	0.73
9	15.45	15.15	14.18	15.33	15.22	16.9	17.61	16.43	15.11	13.67	15.94	16.06
10	8.943	9.091	9.701	8.029	8.696	9.155	9.155	7.857	8.633	7.194	5.797	5.839
11	1.626	2.273	2.239	0.73	0.725	0.704	0.704	0.714	0.719	0.719	0.725	0.73
12	10.57	7.576	6.716	6.569	4.348	4.93	7.042	8.571	9.353	10.79	14.49	16.06
13	5.691	5.303	4.478	3.65	3.623	4.93	5.634	5	6.475	6.475	6.522	6.569
14	17.07	20.45	22.39	24.09	22.46	16.9	11.27	9.286	9.353	8.633	4.348	2.92
Total	100	100	100	100	100	100	100	100	100	100	100	100

Note: Fourteen categories: (1) no separate legal tender, (2) preannounced peg or currency board arrangement, (3) preannounced horizontal band that is narrower than or equal to  $\pm 2\%$ , (4) de facto peg, (5) preannounced crawling peg, (6) preannounced crawling band that is narrower than or equal to  $\pm 2\%$ , (7) de facto crawling peg, (8) preannounced crawling band that is wider than or equal to  $\pm 2\%$ , (9) de facto crawling band that is narrower than or equal to  $\pm 2\%$ , (10) de facto crawling band that is narrower than or equal to  $\pm 5\%$ , (11) moving band that is narrower than or equal to  $\pm 2\%$ , (12) managed floating, (13) freely floating, and (14) freely falling.

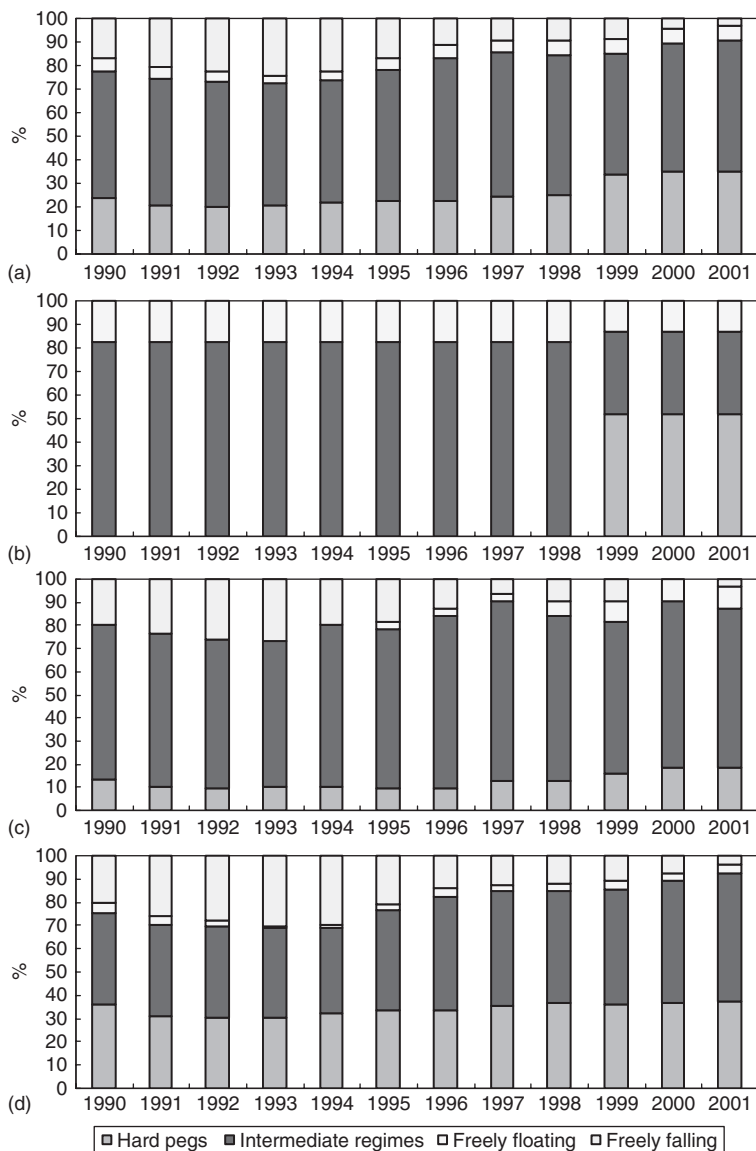
Source: The database of the Reinhart and Rogoff (2002) classification.

Table 1.7 Test of the bipolar view by using the data of Reinhart and Rogoff (2002) (%)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
<i>All</i>												
Hard pegs	23.58	20.45	20.15	20.44	21.74	22.54	22.54	24.29	25.18	33.81	34.78	35.04
Intermediate regimes	53.66	53.79	52.99	51.82	52.17	55.63	60.56	61.43	58.99	51.08	54.35	55.47
Freely floating	5.691	5.303	4.478	3.65	3.623	4.93	5.634	5	6.475	6.475	6.522	6.569
Freely falling	17.07	20.45	22.39	24.09	22.46	16.9	11.27	9.286	9.353	8.633	4.348	2.92
Total	100	100	100	100	100	100	100	100	100	100	100	100
<i>Developed</i>												
Hard pegs	0	0	0	0	0	0	0	0	0	52.17	52.17	52.17
Intermediate regimes	82.61	82.61	82.61	82.61	82.61	82.61	82.61	82.61	82.61	34.78	34.78	34.78
Freely floating	17.39	17.39	17.39	17.39	17.39	17.39	17.39	17.39	17.39	13.04	13.04	13.04
Freely falling	0	0	0	0	0	0	0	0	0	0	0	0
Total	100	100	100	100	100	100	100	100	100	100	100	100
<i>Emerging</i>												
Hard pegs	13.33	10	9.677	10	10	9.375	9.375	12.9	12.9	15.63	18.75	18.75
Intermediate regimes	66.67	66.67	64.52	63.33	70	68.75	75	77.42	70.97	65.63	71.88	68.75
Freely floating	0	0	0	0	0	3.125	3.125	3.226	6.452	9.375	9.375	9.375
Freely falling	20	23.33	25.81	26.67	20	18.75	12.5	6.452	9.677	9.375	0	3.125
Total	100	100	100	100	100	100	100	100	100	100	100	100
<i>Developing</i>												
Hard pegs	36.23	30.77	30.38	30.12	32.14	33.72	33.72	35.29	36.9	36.14	36.59	37.04
Intermediate regimes	39.13	39.74	39.24	38.55	36.9	43.02	48.84	49.41	47.62	49.4	52.44	55.56
Freely floating	4.348	3.846	2.532	1.205	1.19	2.326	3.488	2.353	3.571	3.614	3.659	3.704
Freely falling	20.29	25.64	27.85	30.12	29.76	20.93	13.95	12.94	11.9	10.84	7.317	3.704
Total	100	100	100	100	100	100	100	100	100	100	100	100

Note: In order to examine the bipolar view, we define their categories (1)–(2) as “hard pegs,” (3)–(12) as “intermediate regimes,” and categories (13) (freely floating) and (14) (freely falling) as “independently floating regimes.”

Source: Author’s estimates based on the data of Reinhart and Rogoff (2002).



*Figure 1.3* The evolution of exchange rate regimes, 1990–2001, according to Reinhart and Rogoff (2002): (a) all countries; (b) developed countries; (c) emerging market economies; (d) developing countries

*Note:* In order to examine the bipolar view, we define their categories (1)–(2) as “hard pegs,” (3)–(12) as “intermediate regimes,” and categories (13)–(14) as “independently floating regimes.”

*Source:* As for Table 1.7.



Third, for emerging market economies, the share of hard pegs increased from 13.3 percent in 1990 to 18.8 percent in 2001, that of freely floating regimes increased from 0 percent in 1990 to 9.37 percent in 2001, and that of freely falling regimes decreased considerably from 20 percent in 1990 to 3.1 percent in 2001<sup>15</sup> (i.e. the share of independently floating regimes decreased from 20 percent in 1990 to 12.5 percent in 2001). On the other hand, the share of intermediate regimes showed virtually no change (66.7 percent in 1990 and 68.7 percent in 2001). We observe from Table 1.8 that 22 emerging market economies adopted intermediate regimes in 2001 and 10 countries had a managed floating regime in 2001.

From these results, we can reasonably conclude that the bipolar view holds for developed countries, in the sense that the proportion of hard pegs significantly increased and that of intermediate regimes significantly decreased over the sample period. On the other hand, the bipolar view for emerging market economies cannot be supported by the Reinhart and Rogoff (2002) classification data, because the proportion of intermediate regimes did not change to any great extent between 1990 and 2001 and remained at a significantly high level (68.7 percent in 2001).<sup>16</sup>

### 1.3.3 The Levy-Yeyati and Sturzenegger (2002) classification

Table 1.9 and Figure 1.4 show the evolution of exchange rate regimes over the period 1990–2000, on the basis of the database of the Levy-Yeyati and Sturzenegger (2002) classification. From this table and figure, we first see that, for all countries, the proportion of the floating regimes increased and that of intermediate regimes<sup>17</sup> decreased over the sample period, while that of the pegs was stable at 57.9 percent. The proportion of intermediate regimes (16.4 percent) was considerably lower than that of the peg (57.9 percent) or the floating regime (25.7 percent) in 2000.

Second, for developed countries, the proportion of the pegs markedly increased from 33.3 percent in 1990 to 68.2 percent in 2000 and that of floating regimes decreased from 50 percent in 1990 to 27.3 percent in 2001. On the other hand, the proportion of intermediate regimes decreased from 16.7 percent in 1990 to 4.5 percent in 2000. Third, for emerging market economies, the proportion of the pegs increased from 26.9 percent in 1990 to 34.5 percent in 2000 and that of floating regimes increased considerably from 30.8 percent in 1990 to 48.3 percent in 2000. On the other hand, the proportion of intermediate regimes decreased considerably from 42.3 percent in 1990 to 17.2 percent in 2000.

To test for the bipolar view, we define their category (1) fixed regimes as “hard pegs,” (2) crawling pegs and (3) a dirty float as “intermediate regimes,” and (4) float as “freely floating regimes,” while Levy-Yeyati and Sturzenegger (2002) did not distinguish clearly between hard pegs (such as dollarization, currency boards, and monetary unions) and conventional fixed regimes. These results

Table 1.9 The evolution of exchange rate regimes, 1990–2000, according to Levy-Yeyati and Sturzenegger (2002) (%)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<i>All</i>											
Fix	57.98	56.67	59.17	59.38	49.24	52.7	55.78	51.97	56.58	58.28	57.89
Dirty/crawling peg	9.244	17.5	11.67	10.16	11.36	10.14	15.65	13.82	10.53	11.26	11.18
Dirty float	14.29	9.167	7.5	4.688	21.97	12.16	6.122	7.237	6.579	6.623	5.263
Float	18.49	16.67	21.67	25.78	17.42	25	22.45	26.97	26.32	23.84	25.66
Total	100	100	100	100	100	100	100	100	100	100	100
<i>Developed</i>											
Fix	33.33	36.84	54.55	54.55	61.9	42.86	57.14	50	63.16	68.18	68.18
Dirty/crawling peg	5.556	15.79	0	0	4.762	0	4.762	0	0	4.545	0
Dirty float	11.11	15.79	9.091	4.545	0	14.29	4.762	16.67	5.263	0	4.545
Float	50	31.58	36.36	40.91	33.33	42.86	33.33	33.33	31.58	27.27	27.27
Total	100	100	100	100	100	100	100	100	100	100	100
<i>Emerging</i>											
Fix	26.92	26.92	25	36	34.78	21.43	29.63	24.14	40	33.33	34.48
Dirty/crawling peg	11.54	34.62	33.33	20	26.09	17.86	25.93	24.14	10	11.11	13.79
Dirty float	30.77	11.54	16.67	8	17.39	17.86	7.407	6.897	6.667	11.11	3.448
Float	30.77	26.92	25	36	21.74	42.86	37.04	44.83	43.33	44.44	48.28
Total	100	100	100	100	100	100	100	100	100	100	100
<i>Developing</i>											
Fix	74.67	72	71.62	67.9	50	63.64	62.63	60	60.19	62.75	62.38
Dirty/crawling peg	9.333	12	8.108	9.877	9.091	10.1	15.15	13.33	12.62	12.75	12.87
Dirty float	9.333	6.667	4.054	3.704	28.41	10.1	6.061	5.714	6.796	6.863	5.941
Float	6.667	9.333	16.22	18.52	12.5	16.16	16.16	20.95	20.39	17.65	18.81
Total	100	100	100	100	100	100	100	100	100	100	100

Note: Four categories: (1) peg, (2) dirty/crawling peg, (3) dirty float, and (4) float.  
Source: The database of the Levy-Yeyati and Sturzenegger (2002) classification.

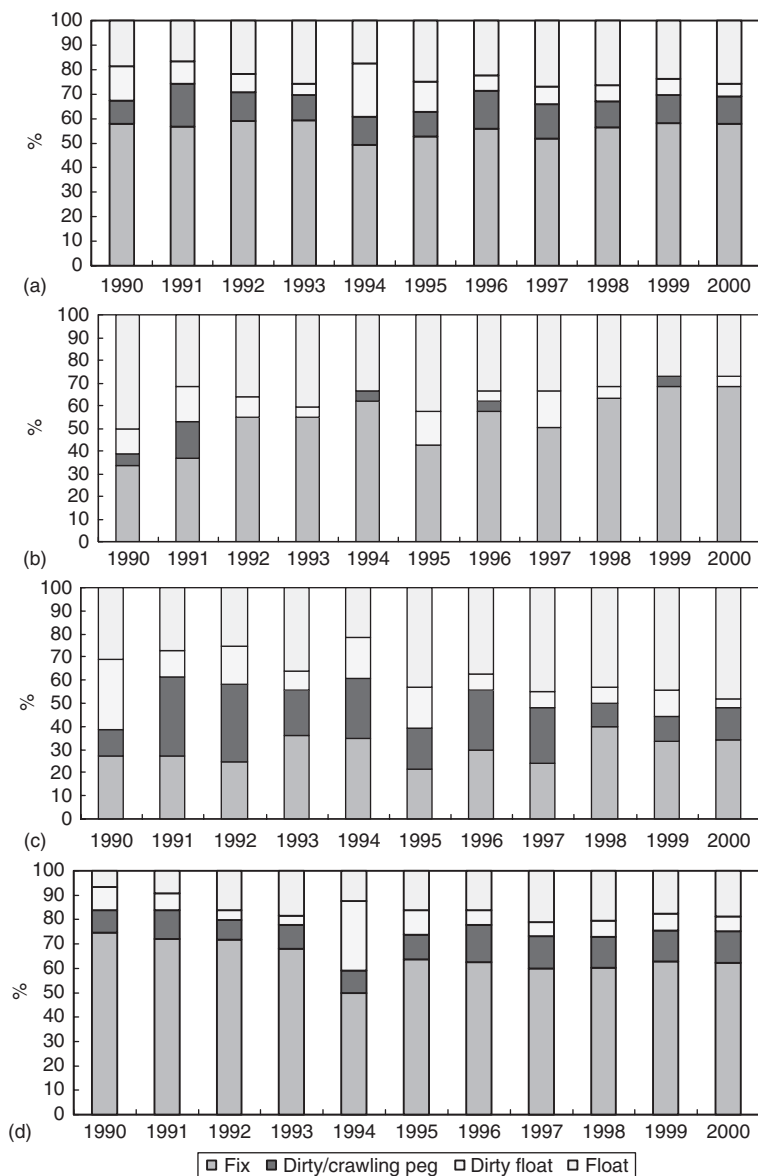


Figure 1.4 The evolution of exchange rate regimes, 1990–2000, according to Levy-Yeyati and Sturzenegger (2002): (a) all countries; (b) developed countries; (c) emerging market economies; (d) developing countries

Source: As for Table 1.9.

from Table 1.9 and Figure 1.4 indicate that the bipolar view holds for developed countries and emerging market economies, on the basis of the database of the Levy-Yeyati and Sturzenegger (2002) classification,<sup>18</sup> while the proportion of floating regimes for developed countries decreased over the sample period.<sup>19</sup>

On the whole, the bipolar view strictly holds for developed countries, on the basis of the databases of de facto classifications. This result can be partly explained by the fact that 12 European countries joined the EMU between 1999 and 2001. On the other hand, we cannot clearly conclude that the bipolar view strictly holds for emerging market economies, because the results of tests for the bipolar view were significantly different in each of the databases of de facto classifications.<sup>20</sup> For example, while the data of the Levy-Yeyati and Sturzenegger (2002) classification supports the bipolar view for emerging market economies, it cannot be significantly supported by the data of the Reinhart and Rogoff (2002) classification.

As shown in Section 1.2, since Shambaugh (2003) does not definitely distinguish hard pegs or intermediate regimes from pegged regimes, from Table 1.10 and Figure 1.5 (the evolution of exchange rate regimes, on the basis of the database of the Shambaugh (2003) classification), we cannot examine whether the bipolar view holds.

## 1.4 IMF classification vs de facto classifications

### 1.4.1 The mismatches between the IMF and de facto classifications

Let us now examine the extent of deviations of actual exchange rate regimes from official exchange rate regimes by comparing de facto classifications with the *de jure* classification provided by the IMF. In order to do so, we first group exchange rate regimes into four categories: (1) "peg," (2) "flexibility limited," (3) "managed floating," and (4) "float," in each of the classifications (Table 1.11).<sup>21</sup> For example, for the Bubula and Ötoker-Robe (2002) classification, we define their categories (1)–(5) as category (1) peg; (6)–(10) as category (2) flexibility limited; (11)–(12) as category (3) managed floating; and (13) as category (4) float. For the Reinhart and Rogoff (2002) classification, following Alesina and Wagner (2003), we define their categories (1)–(4) as category (1) peg; (5)–(9) as category (2) flexibility limited; (10)–(12) as category (3) managed floating; and (13)–(14) as category (4) float.<sup>22</sup>

Then, we estimate the rates of the mismatches (matches) between the IMF and de facto classifications. Tables 1.12–1.14 compare the IMF and de facto classifications.<sup>23</sup> The rows show the exchange rate regimes of the IMF classification. The exchange rate regimes of the de facto classification are shown in columns. Hence, the diagonal of these tables shows the coincidence between both classifications and both sides of the diagonal show deviations of actual regimes from official regimes. Moreover, the elements below the diagonal indicate that, in practice, some countries have a peg more than they announce

Table 1.10 The evolution of exchange rate regimes, 1990–2000, according to Shambaugh (2003) (%)

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
<i>All</i>											
Categories (1) and (4)	23.23	20.65	21.29	20.65	19.35	20	21.29	21.29	23.38	20.13	22.58
Category (2)	16.13	14.84	16.77	14.19	20	18.71	19.35	21.29	20.13	23.38	19.35
Category (3)	6.452	7.097	5.806	7.742	6.452	8.387	7.742	4.516	1.948	3.247	3.226
Category (5)	54.19	57.42	56.13	57.42	54.19	52.9	51.61	52.9	54.55	53.25	54.84
Total	100	100	100	100	100	100	100	100	100	100	100
<i>Developed</i>											
Categories (1) and (4)	4.348	4.348	4.348	4.348	4.348	4.348	4.348	0	4.348	4.348	4.348
Category (2)	26.09	17.39	26.09	8.696	26.09	13.04	17.39	34.78	43.48	43.48	43.48
Category (3)	17.39	26.09	0	4.348	0	8.696	13.04	8.696	0	4.348	4.348
Category (5)	52.17	52.17	69.57	82.61	69.57	73.91	65.22	56.52	52.17	47.83	47.83
Total	100	100	100	100	100	100	100	100	100	100	100
<i>Emerging</i>											
Categories (1) and (4)	10	6.667	6.667	6.667	6.667	6.667	10	13.33	20	16.67	16.67
Category (2)	6.667	3.333	10	16.67	13.33	16.67	20	13.33	6.667	10	6.667
Category (3)	6.667	13.33	16.67	10	10	13.33	6.667	3.333	3.333	6.667	6.667
Category (5)	76.67	76.67	66.67	66.67	70	63.33	63.33	70	70	66.67	70
Total	100	100	100	100	100	100	100	100	100	100	100
<i>Developing</i>											
Categories (1) and (4)	31.37	28.43	29.41	28.43	26.47	27.45	28.43	28.43	28.71	24.75	28.43
Category (2)	16.67	17.65	16.67	14.71	20.59	20.59	19.61	20.59	18.81	22.77	17.65
Category (3)	3.922	0.98	3.922	7.843	6.863	6.863	6.863	3.922	1.98	1.98	1.961
Category (5)	48.04	52.94	50	49.02	46.08	45.1	45.1	47.06	50.5	50.5	51.96
Total	100	100	100	100	100	100	100	100	100	100	100

Note: Five categories: (1) zero percent change in the exchange rate, (2) stays within 1% bands, (3) stays within 2% bands, (4) realignment, but zero change in 11 of 12 months, and (5) no peg.

Source: The database of the Shambaugh (2003) classification.

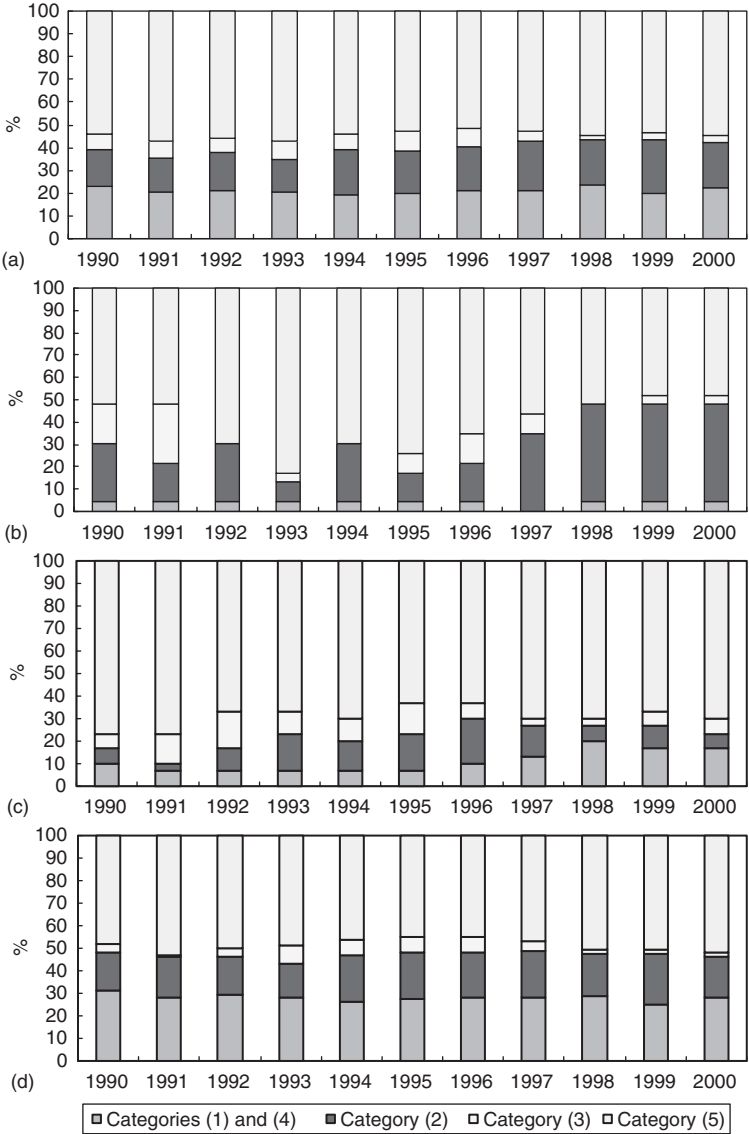


Figure 1.5 The evolution of exchange rate regimes, 1990–2000, according to Shambaugh (2003): (a) all countries; (b) developed countries; (c) emerging market economies; (d) developing countries

Note: Shambaugh (2003) classifies exchange rate regimes into five categories: (1) zero percent change in the exchange rate, (2) stays within 1% bands, (3) stays within 2% bands, (4) realignment, but zero change in 11 of 12 months, and (5) no peg.

Source: As for Table 1.10.

Table 1.11 Classification of the four classifications of exchange rate regimes

IMF	Bubula and Ötker-Robe (2002)	Reinhart and Rogoff (2002)	Levy-Yeyati and Sturzenegger (2002)
1 Pegged to single currency or composite of currencies	(1) Formal dollarization up to (5) Conventional fixed peg to basket	(1) No separate legal tender up to (4) De facto peg	(1) Fix
2 Limited Flexibility limited	(6) Pegged within a horizontal band up to (10) Backward-looking crawling band	(5) Preannounced crawling peg up to (9) De facto crawling band that is narrower than or equal to $\pm 2\%$	(2) Dirty/crawling peg
3 Managed Managed floating	(11) Tightly managed floating or (12) Other managed float with no predetermined exchange rate path	(10) De facto crawling band that is narrower than or equal to $\pm 5\%$ up to (12) Managed floating	(3) Dirty float
4 Float Independently floating	(13) Independently floating	(13) Freely floating or (14) Freely falling	(4) Float

Note: Following the basis of Alesina and Wagner (2003), we classify exchange rate regimes into four categories: (1) "peg," (2) "flexibility limited," (3) "managed floating," and (4) "float," in order to compare the classifications.

Table 1.12 IMF classification vs Bubula and Ötker-Robe (2002) classification, 1990–98

IMF classification	De facto classification				Total numbers	Mismatch
	1 Peg	2 Limited	3 Managed	4 Float		
<i>All countries</i>						
1 Peg	627 (91.0)	40 (5.8)	22 (3.2)	0 (0)	689	62 (9.0)
2 Limited	60 (38.7)	94 (60.6)	0 (0)	1 (0.7)	155	61 (39.4)
3 Managed	62 (18.7)	155 (46.7)	111 (33.4)	4 (1.20)	332	221 (66.6)
4 Float	33 (7.9)	27 (6.4)	166 (39.5)	194 (46.2)	420	226 (53.8)
Total numbers	782	316	299	199	1596	570 (35.7)
<i>Developed countries</i>						
1 Peg	4 (22.2)	14 (77.8)	0 (0)	0 (0)	18	14 (77.8)
2 Limited	23 (23.5)	75 (76.5)	0 (0)	0 (0)	98	23 (23.5)
3 Managed	0 (0)	8 (66.7)	4 (33.3)	0 (0)	12	8 (66.7)
4 Float	0 (0)	0 (0)	10 (12.7)	69 (87.3)	79	10 (12.7)
Total numbers	27	97	14	69	207	55 (26.6)
<i>Emerging market economies</i>						
1 Peg	60 (89.6)	3 (4.4)	4 (6.0)	0 (0)	67	7 (10.4)
2 Limited	9 (50)	9 (50)	0 (0)	0 (0)	18	9 (50)
3 Managed	17 (12.2)	84 (60.4)	38 (27.3)	0 (0)	139	101 (72.7)
4 Float	9 (13.2)	5 (7.4)	36 (52.9)	18 (26.5)	68	50 (73.5)
Total numbers	95	101	78	18	292	167 (57.2)
<i>Developing countries</i>						
1 Peg	563 (93.2)	23 (3.8)	18 (3.0)	0 (0)	604	41 (6.8)
2 Limited	28 (71.8)	10 (25.6)	0 (0)	1 (2.6)	39	29 (74.4)
3 Managed	45 (24.9)	63 (34.8)	69 (38.1)	4 (2.2)	181	112 (61.9)
4 Float	24 (8.8)	22 (8.1)	120 (43.9)	107 (39.2)	273	166 (60.8)
Total numbers	660	118	207	112	1097	348 (31.7)

Note: The figures in parentheses indicate the percentage of the number of countries in the given row category.

Source: Author's estimates based on the data of Bubula and Ötker-Robe (2002) and AREAER.

Table 1.13 IMF classification vs Reinhart and Rogoff (2002) classification, 1990–2001

IMF classification	De facto classification				Total numbers	Mismatch
	1 Peg	2 Limited	3 Managed	4 Float		
<i>All countries</i>						
1 Peg	422 (66.7)	84 (13.3)	88 (13.9)	39 (6.1)	633	211 (33.3)
2 Limited	81 (47.6)	61 (35.9)	16 (9.4)	12 (7.1)	170	109 (64.1)
3 Managed	40 (11.2)	163 (45.5)	86 (24.0)	69 (19.3)	358	272 (76.0)
4 Float	29 (6.5)	127 (28.3)	107 (23.8)	186 (41.4)	449	263 (58.6)
Total numbers	572	435	297	306	1610	855 (53.1)
<i>Developed countries</i>						
1 Peg	38 (73.1)	12 (23.1)	2 (3.8)	0 (0)	52	14 (26.9)
2 Limited	66 (62.9)	29 (27.6)	1 (0.9)	9 (8.6)	105	76 (72.4)
3 Managed	7 (46.7)	1 (6.6)	7 (46.7)	0 (0)	15	8 (53.3)
4 Float	2 (1.9)	32 (30.8)	34 (32.7)	36 (34.6)	104	68 (65.4)
Total numbers	113	74	44	45	276	166 (60.1)
<i>Emerging market economies</i>						
1 Peg	57 (59.4)	24 (25)	10 (10.4)	5 (5.2)	96	39 (40.6)
2 Limited	1 (4.2)	10 (41.7)	12 (50)	1 (4.1)	24	14 (58.3)
3 Managed	23 (14.9)	66 (42.9)	45 (29.2)	20 (13.0)	154	109 (70.8)
4 Float	7 (7.2)	18 (18.6)	30 (30.9)	42 (43.3)	97	55 (56.7)
Total numbers	88	118	97	68	371	217 (58.4)
<i>Developing countries</i>						
1 Peg	315 (64.4)	60 (12.3)	78 (15.9)	36 (7.4)	489	174 (35.6)
2 Limited	14 (34.1)	22 (53.7)	3 (7.3)	2 (4.9)	41	19 (46.3)
3 Managed	10 (5.2)	96 (49.7)	38 (19.7)	49 (25.4)	193	155 (80.3)
4 Float	20 (7.9)	77 (30.6)	44 (17.5)	111 (44.0)	252	141 (56.0)
Total numbers	359	255	163	198	975	489 (50.2)

Note: The figures in parentheses indicate the percentage of the number of countries in the given row category.

Source: Author's estimates based on the data of Reinhart and Rogoff (2002) and AREAER.

Table 1.14 IMF classification vs Levy-Yeyati and Sturzenegger (2002) classification, 1990–2000

IMF classification	De facto classification				Total numbers	Mismatch
	1 Peg	2 Limited	3 Managed	4 Float		
<i>All countries</i>						
1 Peg	565 (89.3)	27 (4.2)	24 (3.8)	17 (2.7)	633	68 (10.7)
2 Limited	108 (65.1)	19 (11.4)	7 (4.2)	32 (19.3)	166	147 (88.6)
3 Managed	59 (20.2)	66 (22.6)	46 (15.8)	121 (41.4)	292	246 (84.2)
4 Float	110 (26.1)	71 (16.8)	61 (14.4)	180 (42.7)	422	242 (57.3)
Total numbers	842	183	138	350	1513	703 (46.5)
<i>Developed countries</i>						
1 Peg	27 (96.4)	0 (0)	1 (3.6)	0 (0)	28	1 (3.6)
2 Limited	65 (73.9)	4 (4.5)	3 (3.4)	16 (18.2)	88	84 (95.5)
3 Managed	10 (71.4)	0 (0)	4 (28.6)	0 (0)	14	10 (71.4)
4 Float	20 (21.0)	3 (3.2)	9 (9.5)	63 (66.3)	95	32 (33.7)
Total numbers	122	7	17	79	225	127 (56.4)
<i>Emerging market economies</i>						
1 Peg	41 (64.1)	16 (25)	4 (6.2)	3 (4.7)	64	23 (35.9)
2 Limited	12 (46.2)	1 (3.8)	2 (7.7)	11 (42.3)	26	25 (96.2)
3 Managed	24 (19.7)	25 (20.5)	18 (14.8)	55 (45.0)	122	104 (85.2)
4 Float	12 (14.6)	18 (22.0)	12 (14.6)	40 (48.8)	82	42 (51.2)
Total numbers	89	60	36	109	294	194 (66.0)
<i>Developing countries</i>						
1 Peg	497 (91.9)	11 (2.0)	19 (3.5)	14 (2.6)	541	44 (8.1)
2 Limited	31 (59.6)	14 (26.9)	2 (3.8)	5 (9.6)	52	38 (73.1)
3 Managed	25 (16.0)	41 (26.3)	24 (15.4)	66 (42.3)	156	132 (84.6)
4 Float	78 (31.8)	50 (20.4)	40 (16.3)	77 (31.4)	245	168 (68.6)
Total numbers	631	116	85	162	994	372 (37.4)

Note: The figures in parentheses indicate the percentage of the number of countries in the given row category.

Source: Author's estimates based on the data of Levy-Yeyati and Sturzenegger (2002) and AREAER.

Table 1.15 The comparison between de facto classification data

	<i>De facto classification</i>				<i>Total numbers</i>
	<i>1 Peg</i>	<i>2 Limited</i>	<i>3 Managed</i>	<i>4 Float</i>	
<i>All countries</i>					
Bubula and Ötker-Robe (2002)	1048 (48.7)	371 (17.3)	424 (19.7)	307 (14.3)	2150
Reinhart and Rogoff (2002)	572 (35.5)	435 (27.0)	297 (18.4)	306 (19.0)	1610
Levy-Yeyati and Sturzenegger (2002)	842 (55.7)	183 (12.1)	138 (9.1)	350 (23.1)	1513
<i>Developed countries</i>					
Bubula and Ötker-Robe (2002)	61 (22.1)	104 (37.7)	17 (6.2)	94 (34.0)	276
Reinhart and Rogoff (2002)	113 (40.9)	74 (26.8)	44 (15.9)	45 (16.3)	276
Levy-Yeyati and Sturzenegger (2002)	122 (54.2)	7 (3.1)	17 (7.5)	79 (35.1)	225
<i>Emerging market economies</i>					
Bubula and Ötker-Robe (2002)	125 (32.0)	116 (29.7)	103 (26.3)	47 (12.0)	391
Reinhart and Rogoff (2002)	88 (23.7)	118 (31.8)	97 (26.1)	68 (18.3)	371
Levy-Yeyati and Sturzenegger (2002)	89 (30.3)	60 (20.4)	36 (12.2)	109 (37.1)	294
<i>Developing countries</i>					
Bubula and Ötker-Robe (2002)	862 (58.1)	151 (10.2)	304 (20.5)	166 (11.2)	1483
Reinhart and Rogoff (2002)	359 (36.8)	255 (26.2)	163 (16.7)	198 (20.3)	975
Levy-Yeyati and Sturzenegger (2002)	631 (63.5)	116 (11.7)	85 (8.5)	162 (16.3)	994

*Note:* The sample of the data of Bubula and Ötker-Robe (2002) and Reinhart and Rogoff (2002) is from 1990 to 2001 and the sample of the data of Levy-Yeyati and Sturzenegger (2002) is from 1990 to 2000 in this table. The figures in parentheses indicate the percentage of the number of countries in the given classification.

and the elements above the diagonal indicate that some countries actually permit floating to a greater degree than they announce.

Table 1.12 shows the comparison between the IMF classification and the Bubula and Ötoker-Robe (2002) classification over the period 1990–98.<sup>24</sup> From this table, we can see that the rate of mismatch was 35.7 percent for all countries, 26.6 percent for developed countries, 57.2 percent for emerging market economies, and 31.7 percent for developing countries, respectively. For the comparison between the IMF classification and the Reinhart and Rogoff (2002) classification during 1990–2001, we can observe from Table 1.13 that the rate of mismatch was 53.1 percent for all countries, 60.1 percent for developed countries, 58.4 percent for emerging market economies, and 50.2 percent for developing countries, respectively.

Table 1.14 shows the comparison between the IMF classification and the Levy-Yeyati and Sturzenegger (2002) classification over the period 1990–2000. From this table, we can see that the rate of mismatch was 46.5 percent for all countries, 56.4 percent for developed countries, 66.0 percent for emerging market economies, and 37.4 percent for developing countries, respectively.

Overall, Tables 1.12–1.14 yield several interesting observations. First, the rates of mismatches between the IMF and *de facto* classifications were significantly large, ranging between 36 and 53 percent for all countries. This indicates that, in practice, some countries had a more fixed regime than announced or others actually allowed their currencies to float to a greater degree than announced. Second, in particular, many countries had a peg more than they announced. Third, the rates of mismatches for emerging market economies were larger (ranging between 57 and 66 percent) than those for developed and developing countries. Fourth, by contrast, the degree to which fixed regimes' IMF and *de facto* classifications matched was very high. This suggests that, in practice, many countries that claimed to have fixed regimes did indeed adopt fixed regimes in order to raise the credibility of their monetary and exchange rate policies.

#### **1.4.2 Fear of floating and fear of announcing a peg**

Next, we investigate the following phenomena of exchange rate policies: fear of floating and fear of announcing a peg, by comparing *de facto* classification data and the IMF classification data. "Fear of floating" can be defined as a behavior (policy) that, in fact, a country that claims to have a floating regime does not allow its nominal exchange rate to float to any great degree (Calvo and Reinhart 2002). "Fear of announcing a peg" can be defined as a behavior (policy) that a country that in practice adopts a fixed regime

announces more flexible regimes (Levy-Yeyati and Sturzenegger 2002). Following Alesina and Wagner (2003), the notions of fear of floating and fear of announcing a peg can be represented in Figure 1.6.

Table 1.16 reports the rates of fear of floating and fear of announcing a peg. Here, the rates of fear of floating 1 and 2 and the rate of fear of announcing a peg are defined as

$$\left[ \text{Rate of fear of floating 1} \right] = \frac{\left[ \text{the number of } de\ jure \text{ freely floats which are not } de\ facto \text{ freely floats} \right]}{\left[ \text{the number of } de\ jure \text{ freely floats} \right]}$$

$$\left[ \text{Rate of fear of floating 2} \right] = \frac{\left[ \text{the number of } de\ jure \text{ freely and managed floats which adopt } de\ facto \text{ more fixed than announced} \right]}{\left[ \text{the number of } de\ jure \text{ freely and managed floats} \right]}$$

$$\left[ \text{Rate of fear of announcing a peg} \right] = \frac{\left[ \text{the number of } de\ facto \text{ pegs which are not } de\ jure \text{ pegs} \right]}{\left[ \text{the number of } de\ facto \text{ pegs} \right]}$$

First, we can see from Table 1.16 that, for the data of Bubula and Ötoker-Robe (2002), the rates of fear of floating 2 for emerging economies (72.9 percent) and developing countries (60.4 percent) were markedly higher than that for developed countries (19.8 percent). On the other hand, the rates of fear of announcing a peg for developed countries (85.2 percent) and emerging market economies (36.8 percent) were considerably higher than that for developing countries (14.7 percent).

Second, we can also observe from Table 1.16 that, for the data of Reinhart and Rogoff (2002), the rates of fear of floating 2 for developed countries (63.9 percent), emerging market economies (57.4 percent), and developing countries (55.5 percent) were significantly high. On the other hand, the rates of fear of announcing a peg for developed countries (66.4 percent) and emerging market economies (35.2 percent) were considerably higher than that for developing countries (12.2 percent).

Third, for the data of Levy-Yeyati and Sturzenegger (2002), the rates of fear of floating 2 for emerging economies (44.6 percent) and developing countries (58.4 percent) were considerably higher than that for developed countries (38.5 percent). On the other hand, the rates of fear of announcing a peg for developed countries (77.9 percent) and emerging market economies (53.9 percent) were markedly higher than that for developing countries (21.2 percent).<sup>25</sup>

			De facto classification (actual exchange rate regime)			
			1	2	3	4
			Peg	Limited	Managed	Float
IMF classification (announcement)	1	Peg				
	2	Limited				
	3	Managed	Fear of floating 2			
	4	Float	Fear of floating 1			

			De facto classification (actual exchange rate regime)			
			1	2	3	4
			Peg	Limited	Managed	Float
IMF classification (announcement)	1	Peg				
	2	Limited	Fear of announcing a peg			
	3	Managed				
	4	Float				

**Figure 1.6** The notions of fear of floating and fear of announcing a peg

*Note:* Following Calvo and Reinhart (2002), Levy-Yeyati and Sturzenegger (2002), and Alesina and Wagner (2003), we define the policies of “fear of floating” and “fear of announcing a peg”.

*Source:* Modified from Figure 1 of Alesina and Wagner (2003).

Table 1.16 Rates of fear of floating and fear of announcing a peg (%)

Classification data		Fear of floating		Fear of announcing a peg
		Fear of floating 1	Fear of floating 2	
Bubula and Ötker-Robe (2002)	All	53.8	58.9	19.8
	Developed	12.7	19.8	85.2
	Emerging	73.5	72.9	36.8
	Developing	60.8	60.4	14.7
Reinhart and Rogoff (2002)	All	58.6	57.7	26.2
	Developed	65.4	63.9	66.4
	Emerging	56.7	57.4	35.2
	Developing	56	55.5	12.2
Levy-Yeyati and Sturzenegger (2002)	All	57.3	51.4	32.9
	Developed	33.7	38.5	77.9
	Emerging	51.2	44.6	53.9
	Developing	68.6	58.4	21.2

On the whole, these results from the rates of fear of floating 1 and 2 suggest that emerging market economies and developing countries exhibited a greater fear of floating behavior than developed countries, because the rates of fear of floating for emerging market economies and developing countries were a lot higher (about 50 percent) than those for developed countries. Moreover, these results from the rate of fear of announcing a peg indicate that developed countries and emerging market economies exhibited a greater fear of announcing a peg behavior than developing countries, because the rates of fear of announcing a peg for developed countries and emerging market economies were considerably higher than those for developing countries.

Calvo and Reinhart (2002) and Hausmann et al. (2001) theoretically suggest that the phenomenon of fear of floating may arise from a lack of ability of a country to borrow abroad in its own currency and a high pass-through from exchange rates to prices.<sup>26</sup> In the case where a country (domestic economy) cannot borrow internationally in its own currency,<sup>27</sup> there are large currency mismatches in the balance sheets of firms, banks, households, or the government. In this situation, as depreciation can damage those exposed to foreign currency liabilities, the authorities limit exchange rate volatility even if they

claim to have floating regimes. Similarly, in the case of a high level of pass-through from exchange rates to prices, as depreciation can substantially raise domestic prices, the authorities limit exchange rate movements through heavy intervention even if they claim to have floating regimes.

Generally speaking, the currency mismatches in the balance sheets in emerging market economies and developing countries may be considerably larger than those in developed countries, because of the lack of ability to borrow abroad in the domestic currency.<sup>28</sup> Moreover, it may be thought that the levels of the pass-through in emerging market economies and developing countries are higher than those in developed countries. Hence, the results for the rates of fear of floating may be related to the cause of the behavior of fear of floating suggested by Calvo and Reinhart (2002) and Hausmann et al. (2001).

Levy-Yeyati and Sturzenegger (2002) suggest that the phenomenon of fear of announcing a peg may arise from an attempt to reduce the exposure to speculative attacks associated with explicit commitments to maintain a predetermined fixed rate. It is likely that, in a world of increasing international capital mobility, such countries do in fact adopt a fixed regime, but announce a more flexible regime (without assuming an explicit commitment with a predetermined parity), because official pegs may become targets of speculative attacks.

It can generally be considered that developed countries and emerging market economies are more integrated, or in the process of integrating, into international capital markets than developing countries. Hence, the results for the rates of fear of announcing a peg may be related to the cause of the behavior of fear of announcing a peg suggested by Levy-Yeyati and Sturzenegger (2002).

## 1.5 Determinants of fear of floating: an empirical analysis

Why do countries adopt a fear of floating policy? In order to answer the question, we make use of a logit model to identify the determinants of fear of floating by using the IMF and de facto classifications data in this section.

### 1.5.1 Measuring fear of floating

Hausmann et al. (2001), Levy-Yeyati et al. (2003), and Alesina and Wagner (2003) empirically examine the determinants of fear of floating.<sup>29</sup> However, the measures of fear of floating (dependent variables of regressions of fear of floating) are different in each of their studies. For example, Levy-Yeyati et al. (2003) restrict their data to countries that claim to have freely floated (*de jure* free floaters) and apply the fear of floating dummy that takes a value of one

if the country that claims to have freely floated actually adopts a more fixed regime.<sup>30</sup> Alesina and Wagner (2003) apply the fear of floating dummy that takes a value of one if the country actually has a more fixed regime than announced, whatever *de jure* regimes are adopted.<sup>31</sup> Therefore, our first task is to measure fear of floating in order to statistically examine the determinants of fear of floating.

First, we restrict our data to countries that claim to adopt a free float or managed float (i.e. *de jure* free or managed floaters). Thus, we use annual data for 43 countries (11 developed countries and 32 emerging and developing countries) over the period 1990–98 (see Appendix 1B).<sup>32</sup> All sample countries are classified as managed floating or independently floating by the IMF classification.

Then, we construct the fear of floating dummy variable (dependent variable of the logit model) by comparing *de facto* classifications with the *de jure* classification provided by the IMF. Following Calvo and Reinhart (2002), we assume that the fear of floating dummy (FFD) variable takes a value of one if the country that claims to have a free float or managed float actually adopts a more fixed regime than announced and zero otherwise. Hence, the fear of floating dummy variable is a discrete qualitative variable. This definition corresponds to the notion of fear of floating 2 in Figure 1.6.

### 1.5.2 The data of balance sheet, currency mismatch, and original sin

As noted above, recent theoretical contributions suggest that the phenomenon of fear of floating may arise from large currency mismatches in the balance sheets (the balance sheet effects) due to the lack of ability to borrow abroad in the domestic currency and a high pass-through from exchange rates to prices (Calvo and Reinhart 2002, Hausmann et al. 2001). In order to test this hypothesis, we thus need to have a measure of the balance sheet effects and obtain the pass-through coefficients.

To measure the balance sheet effects, we use the lagged ratio of foreign liabilities to money stocks (FLM1), which we take as a proxy for currency mismatches in the balance sheets, as in Levy-Yeyati et al. (2003) and Alesina and Wagner (2003). To mitigate potential endogenous problems stemming from the reverse causality from the fear of floating policy to currency mismatches in the balance sheets, we use the lagged variable of currency mismatches. According to this hypothesis, we expect that a larger FLM1 is positively associated with the probability of choosing the fear of floating policy.

It is important to measure the ability of a country to borrow abroad in its own currency, because large currency mismatches in the balance sheets may result from the inability of the country to borrow abroad in its own currency. Thus, we also apply the two indicators of the ability to borrow abroad in the domestic currency, developed (provided) by Eichengreen et al. (2003).<sup>33</sup>

They give the following indicators of original sin (a situation where a country cannot borrow internationally in its own currency):

$$\text{OSIN1}_i = 1 - \frac{\text{Securities issued by country } i \text{ in currency } i}{\text{Securities issued by country } i}$$

$$\text{OSIN3}_i = \max \left( 1 - \frac{\text{Securities in currency } i}{\text{Securities issued by country } i}, 0 \right)$$

The indicator of OSIN1 is defined as one minus the ratio of the stock of international securities issued by a country in its own currency to the total stock of international securities issued by the country. If the country issues all its securities in own currency, OSIN1 takes a value of zero. On the other hand, if the country issues all of them in foreign currency, OSIN1 takes a value of one. Hence, the higher the value, the greater the original sin.

The indicator of OSIN3 is constructed in consideration of an opportunity for countries to hedge currency exposures via the swap market. If the ratio of the stock of international securities issued by the country and the other countries in currency  $i$  to the total stock of international securities issued by the country  $i$  is large, OSIN3 is close to zero. Hence, the higher the value, the greater the original sin.<sup>34</sup> According to the hypothesis of fear of floating, we expect that higher OSIN1 and OSIN3 are positively associated with the probability of choosing the fear of floating policy.<sup>35</sup>

Next, we need to obtain the coefficients of pass-through from exchange rates to prices. However, it is difficult to obtain accurate and stable coefficients of pass-through, because the estimated coefficients are significantly different, depending on the specifications, methods, and samples (Calvo and Reinhart 2000, Hausmann et al. 2001). Since the results of empirical studies that used inaccurate coefficients of pass-through may be biased, we exclude the coefficients of pass-through from the explanatory variables in the analysis.

### 1.5.3 Control variables

As control variables, we use the following: trade openness, financial openness, economic size, economic development, as well as a dummy variable for emerging and developing countries, emphasized in the literature on the determinants of the choice of exchange rate regime. We measure trade openness by using the lagged ratio of (export + import)/2 over GDP (TOPEN1). For de facto financial openness, we calculate the indices of financial openness by using the lagged ratio of total actual foreign assets and liabilities to GDP (FOPEN1).<sup>36</sup> The data of actual foreign assets and liabilities is obtained from Lane and Milesi-Ferretti (2001).

We also include variables for economic size and economic development. Economic size is measured as the country's GDP in dollars relative to US GDP

(SIZE) and economic development is measured as a logarithm of GDP per capita (ED). Moreover, we use a dummy variable (EMDD) for emerging or developing countries (EMDD takes a value of one if the country is an emerging or developing country) to verify whether emerging market economies and developing countries exhibit a greater fear of floating behavior than developed countries, as shown in Section 1.4.<sup>37</sup>

#### 1.5.4 Empirical results

In order to empirically examine why countries adopt the fear of floating policy, we estimate a variety of logit models of the determinants of fear of floating during the period 1990–98, using the maximum likelihood (ML) method.<sup>38</sup> Here, the dependent variable is the fear of floating dummy (FFD) that captures whether the country in question, in a certain year, adopts a fear of floating policy or not. The explanatory variables include potential variables (FLM1, OSIN1, or OSIN3) for determinants of adopting fear of floating and control variables (TOPEN1, FOPEN1, SIZE, ED, and EMDD).<sup>39</sup> In the logit model, a positive coefficient suggests that the explanatory variable increases the likelihood of adopting the fear of floating policy. According to Calvo and Reinhart (2002), we expect that larger FLM1, OSIN1, and OSIN3 are shown to increase the probability of the choice of the fear of floating policy.

To check whether the results of the logit model for the determinants of choosing fear of floating depend on the classifications data of exchange rate regimes, we apply some data of comparing *de facto* classifications (Bubula and Ötoker-Robe (2002), Reinhart and Rogoff (2002), and Levy-Yeyati and Sturzenegger (2002) classifications) with the *de jure* IMF classification. If the estimated results by some classifications are the same, we can obtain robust results for the determinants of adopting the fear of floating policy.

Table 1.17 shows the results of estimating the logit models of the determinants of fear of floating by using the IMF and the Bubula and Ötoker-Robe (2002) classifications data. From this table, we note that the coefficients of FLM1 are significantly positive for all models (1)–(4), indicating that the probability of the choice of fear of floating is likely to increase with larger currency mismatches in the balance sheets. The coefficients of OSIN1 and OSIN3 are significantly positive, except for model (8), indicating that the probability of the choice of fear of floating is likely to increase with the lack of ability to borrow abroad in its own currency. It is statistically confirmed that fear of floating arose from large currency mismatches in the balance sheets that resulted from the lack of ability to borrow abroad in the domestic currency (the situation of original sin).

For control variables, the coefficients of TOPEN1 are statistically significant and negative, indicating that higher trade openness tends to decrease the likelihood of adopting the fear of floating policy.<sup>40</sup> The coefficients of SIZE and ED are significantly negative, indicating that smaller economic size and lower level of economic development tend to increase the probability of

Table 1.17 Determinants of fear of floating: the Bubula and Ötör-Robe (2002) classification

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
FLM1	3.239*** (0.664)	1.768*** (0.575)	1.539*** (0.556)	1.261** (0.550)					
OSIN1					11.496*** (2.720)	5.963** (2.483)			
OSIN3							3.889*** (0.745)	1.686 (1.100)	2.707*** (0.872)
TOPEN1			-3.838*** (1.209)	-2.035** (1.004)		-3.895*** (1.286)		-5.236*** (1.471)	-4.167*** (1.325)
FOPEN1			-2.717*** (0.793)	-1.177 (0.806)		-0.662 (0.920)		-2.452*** (0.945)	-0.804 (0.946)
SIZE			-16.433*** (5.154)					-20.384*** (7.800)	
ED				-0.812*** (0.152)		-0.657*** (0.178)			-0.610*** (0.180)
EMDD		2.656*** (0.416)							
Constant	-0.111 (0.145)	-2.024*** (0.377)	2.540*** (0.461)	7.845*** (1.350)	-10.829*** (2.674)	1.461 (3.187)	-3.169*** (0.703)	1.645 (1.210)	4.542** (1.868)
Observations	318	313	318	318	230	230	230	230	230
Fraction of correct predictions	0.711	0.770	0.818	0.827	0.704	0.804	0.696	0.800	0.787
Scaled R-squared	0.140	0.311	0.399	0.362	0.208	0.405	0.212	0.412	0.414

Note: The logit models are estimated by the maximum likelihood method. The numbers in parentheses are robust standard errors.

\* Significant at the 10% level.

\*\* Significant at the 5% level.

\*\*\* Significant at the 1% level.

choosing a fear of floating policy. In the case of EMDD, the coefficient is significantly positive, indicating that emerging market economies and developing countries have been more inclined to adopt a fear of floating policy than developed countries.

Table 1.18 shows the results of estimating the logit models for the determinants of fear of floating by using the IMF and the Reinhart and Rogoff (2002) classifications data. We can see from this table that the coefficients of FLM1 are all significantly positive, indicating that larger currency mismatches in the balance sheets are likely to increase the probability of adopting the fear of floating policy. The coefficients of OSIN1 and OSIN3 are significantly positive, except for models (9) and (10), indicating that lower ability to borrow abroad in the domestic currency tends to increase the probability of the choice of the fear of floating policy. We statistically confirmed that countries that had some problems with large currency mismatches in the balance sheets significantly adopted the fear of floating policy.

While the coefficients of TOPEN1 are significantly negative for the Bubula and Ötker-Robe (2002) classification data, they are significantly positive for the Reinhart and Rogoff (2002) classification data. Moreover, the coefficients of FOPEN1 are significantly positive for the Reinhart and Rogoff (2002) classification data. This result suggests that higher trade and financial openness tend to increase the likelihood of choosing the fear of floating policy. The coefficients of SIZE and ED are significantly negative, indicating that smaller economic size and lower level of economic development tend to increase the probability of the choice of the fear of floating policy.<sup>41</sup>

Table 1.19 presents the results of the logit models for the IMF and the Levy-Yeyati and Sturzenegger (2002) classifications data. From this table, we note that the coefficients of FLM1, OSIN1, and OSIN3 are always significantly positive, indicating that larger currency mismatches in the balance sheets due to inability to borrow internationally in its own currency tend to increase the probability of having the fear of floating policy. Moreover, the coefficients of SIZE are negative, although it is not statistically significant in model (6), indicating that smaller economies adopted the fear of floating policy.<sup>42</sup>

In Table 1.20, we present the combined results for the determinants of fear of floating to find robust results in some classifications of exchange rate regimes. For the balance sheet effects, the coefficients of FLM1 are always significantly positive. For the ability to borrow abroad in the domestic currency, the coefficients of OSIN1 and OSIN3 are significantly positive, except for OSIN3 of the Reinhart and Rogoff (2002) classification. Robust results suggest that countries with large currency mismatches in the balance sheets due to inability to borrow internationally in the domestic currencies did adopt the fear of floating policy. That is, they actually adopted more fixed regimes than announced freely floating or managed float. Hence, these results are consistent with the predicted theoretical effect of currency mismatches in the balance sheets on the choice of exchange rate regimes.

Table 1.18 Determinants of fear of floating: the Reinhart and Rogoff (2002) classification

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	
FLM1	1.418*** (0.503)	1.117** (0.503)	1.178** (0.519)	0.959* (0.515)							
OSIN1					4.650*** (1.067)	5.307* (3.208)	3.394* (2.101)				
OSIN3								1.765*** (0.446)	0.637 (0.934)	0.241 (0.796)	
TOPEN1									3.674** (1.727)	5.730*** (2.076)	
FOPEN1									0.823 (0.828)	3.039*** (0.972)	
SIZE									-3.608* (2.075)		
ED										-0.939*** (0.195)	
EMDD											
Constant	0.754*** (0.152)	0.377 (0.249)	-0.487 (0.442)	-0.575 (0.439)	-3.084*** (0.994)	-5.132 (3.321)	2.986 (2.771)	-0.846*** (0.189)	-0.216 (0.380)	-0.350 (1.061)	6.595*** (1.911)
Observations	313	313	313	313	228	228	228	228	228	228	
Fraction of correct predictions	0.738	0.738	0.760	0.767	0.794	0.820	0.807	0.781	0.811	0.785	
Scaled R-squared	0.036	0.047	0.218	0.224	0.099	0.191	0.285	0.068	0.180	0.271	

Note: The logit models are estimated by the maximum likelihood method. The numbers in parentheses are robust standard errors.

\* Significant at the 10% level.

\*\* Significant at the 5% level.

\*\*\* Significant at the 1% level.

Table 1.19 Determinants of fear of floating: the Levy-Yeyati and Sturzenegger (2002) classification

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
FLM1	1.701*** (0.386)	1.385*** (0.387)	1.208*** (0.376)	1.308*** (0.390)				
OSIN1					6.824*** (1.819)	9.368*** (3.233)		
OSIN3							1.196*** (0.456)	1.523*** (0.650)
TOPEN1			0.081 (0.605)	0.615 (0.569)		-1.291* (0.742)		-0.135 (0.708)
FOPEN1			-0.818 (0.608)	-0.746 (0.683)		1.455** (0.697)		0.033 (0.640)
SIZE			-6.119** (2.780)			-1.558 (4.345)		
ED				-0.203* (0.125)				0.107 (0.149)
EMDD								
Constant	-0.533*** (0.143)	-1.099*** (0.281)	0.001 (0.241)	1.205 (1.011)	-6.567*** (1.774)	-8.987*** (3.242)	-1.067*** (0.413)	-2.198 (1.508)
Observations	306	306	306	306	223	223	223	223
Fraction of correct predictions	0.624	0.624	0.592	0.618	0.570	0.574	0.570	0.556
Scaled R-squared	0.085	0.105	0.157	0.113	0.118	0.142	0.034	0.036

Note: The logit models are estimated by the maximum likelihood method. The numbers in parentheses are robust standard errors.

\* Significant at the 10% level.

\*\* Significant at the 5% level.

\*\*\* Significant at the 1% level.

Table 1.20 Combined results of determinants of fear of floating

Classification	Fear of floating dummy		
	Bubula and Ötker-Robe (2002)	Reinhart and Rogoff (2002)	Levy-Yeyati and Sturzenegger (2002)
FLM1	+ (significance)	+ (significance)	+ (significance)
OSIN1	+ (significance)	+ (significance)	+ (significance)
OSIN3	+ (significance)	+	+ (significance)
TOPEN1	– (significance)	+ (significance)	+ / –
FOPEN1	–	+ (significance)	+ / –
SIZE	– (significance)	– (significance)	– (significance)
ED	– (significance)	– (significance)	+ / –
EMDD	+ (significance)	+ (significance)	+ (significance)

Note: + (–) indicates that the coefficient of the explanatory variable is positive (negative), + / – indicates that the coefficient is either positive or negative depending on the specifications, and “significance” indicates that the coefficient is statistically significant in most cases.

In the cases of trade and financial openness, we cannot obtain robust results, because the coefficients are either positive or negative and significant or insignificant, depending on the classifications of exchange rate regimes. On the other hand, for economic size and the level of economic development, we can obtain robust results, because the coefficients are significantly negative, except for ED of the Levy-Yeyati and Sturzenegger (2002) classification data. This result suggests that small economies and countries with a low level of economic development actually adopted the fear of floating policy.

## 1.6 Summary and concluding remarks

In this chapter, we have surveyed the de facto exchange rate regimes of the IMF member countries over the period 1990–2001 on the basis of the data of classifying exchange rate regimes. First, we have presented the evolution of exchange rate regimes over the period 1990–2001 in order to examine whether the “bipolar view” holds, by using the data of de facto classifications of exchange rate regimes. It was shown that the bipolar view strictly holds for developed countries. This result can be partly explained by the fact that 12 European countries joined the EMU between 1999 and 2001.

On the other hand, we cannot clearly conclude that the bipolar view strictly holds for emerging market economies, because the results of tests for the bipolar view were significantly different in each of the databases of the de facto classifications. For example, while the data of the Levy-Yeyati and Sturzenegger (2002) classification supports the bipolar view for emerging market economies, it cannot be significantly supported by the data of the Reinhart and Rogoff (2002) classification.

Second, we have compared *de facto* classifications with the *de jure* classification provided by the IMF. By doing so, we have ascertained the extent of deviations of actual regimes from official regimes. It was found that the rates of mismatches between the IMF and *de facto* classifications were significantly large, ranging between 36 and 56 percent for all countries. This result indicates that, in practice, some countries had adopted a peg to a greater degree than announced, while others actually allowed their currencies to float to a greater degree than announced. In particular, the rates of mismatches for emerging market economies were larger than those for developed and developing countries, and many emerging market economies actually pegged their currencies to a greater degree than announced.

Third, we have investigated the exchange rate policies of “fear of floating” and “fear of announcing a peg,” by estimating the rates of fear of floating and fear of announcing a peg. It is true that emerging market economies and developing countries exhibited a greater fear of floating behavior than developed countries. This result clearly confirms the stylized finding of Calvo and Reinhart (2002). It was also found that emerging market economies and developed countries exhibited a greater fear of announcing a peg behavior than developing countries. As Levy-Yeyati and Sturzenegger (2002) suggested, this result may arise from an attempt to reduce the exposure to speculative attacks associated with explicit commitments to maintain a predetermined fixed rate in a world of increasing international capital mobility.

Finally, we have statistically examined the determinants of fear of floating during the period 1990–98, by using the data of some classifications of exchange rate regimes. It was shown that countries with large currency mismatches in their balance sheets due to inability to borrow internationally in the domestic currency did adopt a fear of floating policy. Hence, this result is consistent with the fear of floating theory presented by Calvo and Reinhart (2002) and Hausmann et al. (2001).

## **Appendix 1A List of countries in Sections 1.3 and 1.4**

In Sections 1.3 and 1.4, following Fischer (2001) and Bubula and Ötoker-Robe (2002), we classified all the IMF members into three groups: developed countries, emerging market countries or regions, and developing countries or regions.

### **Developed countries (23)**

Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, United Kingdom, United States.

### **Emerging market countries or regions (33)**

Argentina, Brazil, Bulgaria, Chile, China, Colombia, the Czech Republic, Ecuador, Egypt, Hong Kong SAR, Hungary, India, Indonesia, Israel, Jordan,

Korea, Malaysia, Mexico, Morocco, Nigeria, Pakistan, Panama, Peru, the Philippines, Poland, Qatar, Russia, Singapore, South Africa, Sri Lanka, Thailand, Turkey, Venezuela.

### **Developing countries or regions (131)**

Afghanistan, Albania, Algeria, Angola, Antigua and Barbuda, Armenia, Aruba, Azerbaijan, the Bahamas, Bahrain, Bangladesh, Barbados, Belarus, Belize, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brunei Darussalam, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Republic of Congo, Costa Rica, Cote d'Ivoire, Croatia, Cyprus, Czech Republic, Djibouti, Dominica, Dominican Republic, El Salvador, Equatorial Guinea, Eritrea, Estonia, Ethiopia, Fiji, Gabon, the Gambia, Georgia, Ghana, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, India, Iran, Iraq, Jamaica, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Laos, Latvia, Lebanon, Lesotho, Liberia, Libya, Lithuania, Macedonia, Madagascar, Malawi, Maldives, Mali, Malta, Marshall Islands, Mauritania, Mauritius, Micronesia, Moldova, Mongolia, Mozambique, Myanmar, Namibia, Nepal, Netherlands Antilles, Nicaragua, Niger, Oman, Palau, Papua New Guinea, Paraguay, Romania, Rwanda, Samoa, San Marino, São Tomé and Príncipe, Saudi Arabia, Senegal, Seychelles, Sierra Leone, Slovak Republic, Slovenia, Solomon Islands, Somalia, St Kitts and Nevis, St Lucia, St Vincent and Grenadines, Sudan, Suriname, Swaziland, Syrian Arab Republic, Tajikistan, Tanzania, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkmenistan, Uganda, Ukraine, United Arab Emirates, Uruguay, Uzbekistan, Vanuatu, Viet Nam, Yemen Arab Republic, Yugoslavia, Zambia, Zimbabwe.

### **Appendix 1B List of countries in Section 1.5**

In Section 1.5, we used annual data for 43 countries (11 developed countries and 32 emerging and developing countries) over the period 1990–98. The sample countries were as follows: Algeria (the period of *de jure* free or managed floats, 1992–98), Australia (1990–98), Bolivia (1990–97), Brazil (1990–98), Canada (1990–98), Chile (1990–97), Colombia (1990–97), Costa Rica (1990–97), Dominican Republic (1991–98), Ecuador (1990–97), Egypt (1990–97), El Salvador (1990–97), Finland (1992–95), Guatemala (1990–98), India (1990–98), Indonesia (1990–98), Israel (1991–97), Italy (1992–95), Jamaica (1990–98), Japan (1990–98), Korea (1990–98), Malaysia (1992–97), Mauritius (1994–98), Mexico (1990–98), New Zealand (1990–98), Norway (1992–98), Pakistan (1990–98), Paraguay (1990–98), Peru (1990–98), Philippines (1990–98), Singapore (1990–98), South Africa (1990–98), Sri Lanka (1990–97), Sweden (1992–98), Switzerland (1990–98), Thailand (1997–98), Tunisia (1990–97), Turkey (1990–97), United Kingdom (1992–98), United States (1990–98), Uruguay (1990–97), Venezuela (1990–93 and 1996–97), and Zimbabwe (1994–98).

## Appendix 1C List of variables, definitions, and data sources in Section 1.5

### Dependent variables

- Fear of floating dummy (FFD): 1 if the country that claims to have a free float or managed float actually adopts more fixed regimes than announced, 0 otherwise.

### Explanatory variables

The data of balance sheet, currency mismatch, and original sin:

- FLM1: lagged ratio of foreign liabilities to money. Source: IFS.
- OSIN1:  $OSIN1_i = 1 - \frac{\text{Securities issued by country } i \text{ in currency } i}{\text{Securities issued by country } i}$ .
- OSIN3:  $OSIN3_i = \max\left(1 - \frac{\text{Securities in currency } i}{\text{Securities issued by country } i}, 0\right)$ .

Source: Eichengreen et al. (2003).

### Control variables

- TOPEN1: trade openness. Lagged ratio of (export + import)/2 to GDP. Source: IFS.
- FOPEN1: financial openness. Lagged ratio of gross actual foreign assets and liabilities to GDP. Source: Lane and Milesi-Ferretti (2001).
- SIZE: economic size. GDP in dollars over USA GDP. Source: World Bank, *World Development Indicators* (WDI).
- ED: economic development. Logarithm of GDP per capita. Source: WDI.
- EMDD: dummy variable for emerging and developing countries.

## Acknowledgments

The author would like to thank Andrea Bubula, Philip Lane, Eduardo Levy-Yeyati, İnci Ötker-Robe, Carmen Reinhart, and Jay Shambaugh for making their data available. However, the author alone is responsible for any remaining errors.

## Notes

- 1 Intermediate exchange rate regimes are referred to as “soft pegs.”
- 2 Fischer (2001) defined economies with no separate currency or those with currency boards as “hard pegs,” economies with conventional fixed pegs, crawling pegs, horizontal bands, and crawling bands as “intermediate regimes,” and economies

with a managed float with no specified central rate or those with independent floating as “floating regimes.” From the standpoint of the bipolar view, however, his classification would be inappropriate, because the managed float was not defined as an “intermediate regime.”

- 3 According to Fischer (2001), of the 33 emerging market countries over the 1990s, the share of hard pegs increased from 6 percent in 1991 to 9 percent in 1999, that of intermediate regimes decreased from 64 percent in 1991 to 42 percent in 1999, and that of floating regimes increased from 30 percent in 1991 to 48 percent in 1999 (Figure 1.1).
- 4 As notable empirical studies, Ghosh et al. (2002) examined the relationship between exchange rate regimes and macroeconomic performance using the data of *de jure* and *de facto* classifications. Juhn and Mauro (2002) reviewed the empirical studies of the determinants of choosing exchange rate regimes.
- 5 For the exchange rate policies of East Asian countries before the Asian currency crisis of 1997, see, for example, Ito et al. (1998) and Esaka (2003).
- 6 While Levy-Yeyati and Sturzenegger (2002) call this behavior “fear of pegging,” Alesina and Wagner (2003) call it “fear of announcing a peg.” In this chapter, following Alesina and Wagner (2003), we mainly call it “fear of announcing a peg.”
- 7 As shown in Section 1.2, the IMF has adopted a new classification system based on members’ *de facto* regimes, which has become the official arrangement since January 1999.
- 8 Some of these articles will be published in the top economic journals.
- 9 For empirical analyses of exchange rate regimes by using *de facto* classifications, see, for example, Levy-Yeyati and Sturzenegger (2001, 2003), Alesina and Wagner (2003), and Rogoff et al. (2004). Levy-Yeyati and Sturzenegger (2001) examined the effects of different exchange rate regimes on macroeconomic performance by using the *de facto* classification data of Levy-Yeyati and Sturzenegger (2002). Alesina and Wagner (2003) examined the determinants of the choice of exchange rate regimes by using the *de facto* classification data of Reinhart and Rogoff (2002).
- 10 In addition, there were many countries (cases) that could not be classified by the Levy-Yeyati and Sturzenegger (2002) classification, because of the lack of reserve data in IMF member countries.
- 11 On the basis of the IFS, Emerging Markets Bond Index Plus (EMBI+), and Morgan Stanley Capital International (MSCI) index, Fischer (2001) and Bubula and Ötoker-Robe (2002) classified the IMF members into three groups: developed countries, emerging market countries or regions, and all other countries (developing countries).
- 12 Bubula and Ötoker-Robe (2002) examined the bipolar view by using their classification data. From the standpoint of the bipolar view, however, their definition would be inappropriate, because the managed floating regime was not coded as “intermediate regimes.”
- 13 For developing countries, the share of hard pegs slightly increased from 22.1 percent in 1990 to 24 percent in 2001 and that of freely floating regimes considerably increased from 1.9 percent in 1990 to 14.7 percent in 2001. On the other hand, the share of intermediate regimes decreased from 76 percent in 1990 to 61.2 percent in 2001 (Table 1.4).
- 14 Rogoff et al. (2004) empirically examined the evolution and performance of exchange rate regimes by using the Reinhart and Rogoff (2002) classification data. They suggested that the bipolar view of exchange rate regimes does not hold for emerging market economies and developing countries.

- 15 The marked decline in freely falling regimes suggests that prices have become stable throughout the period 1990–2001.
- 16 For developing countries, the proportion of hard pegs virtually did not change (36.2 percent in 1990 and 37.0 percent in 2001). On the other hand, the proportion of independently floating regimes decreased from 24.6 percent in 1990 to 7.4 percent in 2001, and that of intermediate regimes increased considerably from 39.1 percent in 1990 to 55.6 percent in 2001 (Table 1.7).
- 17 We defined their categories of crawling pegs and the dirty float as “intermediate regimes.”
- 18 For developing countries, the proportion of pegs decreased from 74.7 percent in 1990 to 62.4 percent in 2000 and that of floating regimes increased from 6.7 percent in 1990 to 18.8 percent in 2001. On the other hand, the proportion of intermediate regimes virtually did not change (Table 1.9).
- 19 For developed countries, the proportion of intermediate regimes (4.5 percent) was remarkably lower than that of the pegs (68.2 percent) or the floating regimes (27.3 percent) in 2000 (Table 1.9).
- 20 It is shown that the bipolar view for developing countries cannot be significantly supported by the data of some de facto classifications.
- 21 For the new IMF classification, we define categories (1)–(3) as category (1) peg; (4)–(6) as category (2) flexibility limited; (7) as category (3) managed floating; and (8) as category (4) float.
- 22 In the case of the Levy-Yeyati and Sturzenegger (2002) classification, following Alesina and Wagner (2003), we define their category (1) as category (1) peg; (2) as category (2) flexibility limited; (3) as category (3) managed floating; and (4) as category (4) float.
- 23 Table 1.15 shows the comparison between de facto classification data. From this table, we find that there were significant differences between de facto classification data. First, for the Bubula and Ötoker-Robe (2002) and the Levy-Yeyati and Sturzenegger (2002) classifications, 50 percent of observations were classified as peg. Second, in the case of the Reinhart and Rogoff (2002) classification, 45 percent of observations were grouped as flexibility limited or managed floating.
- 24 Following the new IMF classification system, Bubula and Ötoker-Robe (2002) constructed a historical database on de facto exchange rate regimes during 1990–2001. Accordingly, we compared their classification data with the IMF classification data during 1990–98.
- 25 As compared with the rates of fear of floating 2, the results of the rates of fear of floating 1 were substantially the same.
- 26 Calvo and Reinhart (2002) also suggested that the phenomenon of fear of floating may arise from lack of credibility and execution of inflation targets.
- 27 This situation has been referred to as “original sin” (Eichengreen and Hausmann 1999).
- 28 As noted in note 38, there is significant positive correlation between emerging and developing countries dummy variables and the variable of original sin. It can be surmised that emerging and developing countries cannot borrow abroad in the domestic currency.
- 29 For example, Levy-Yeyati et al. (2003) used the Levy-Yeyati and Sturzenegger (2002) classification data and Alesina and Wagner (2003) mainly used the Reinhart and Rogoff (2002) classification data.
- 30 Their definition corresponds to the notion of fear of floating 1 in Figure 1.6.
- 31 That is, Alesina and Wagner (2003) did not restrict their data to *de jure* floaters.

- 32 We excluded the following from the sample countries: some small countries, the Middle Eastern countries, transition economies, and other countries with incomplete data.
- 33 Eichengreen et al. (2003) constructed the indicators of original sin by using the data of the Bank for International Settlements (BIS) and empirically examined the effects of original sin on the stability of output, exchange rate volatility, and the level of country credit ratings by using some indicators of original sin.
- 34 The indices of OSIN1 and OSIN3 range from 0 (lower original sin) to 1 (higher original sin).
- 35 Eichengreen et al. (2003) also constructed OSIN2 as a proxy for the situation of original sin. Accordingly, we estimated the logit models by using OSIN2. The results of OSIN2 were substantially the same as OSIN3.
- 36 We used the lagged variables of trade and financial openness to mitigate potential simultaneity problems.
- 37 For the list of variables and the definitions and the sources of the data, see Appendix 1C.
- 38 Before proceeding to apply the logit regressions, we estimated the pairwise correlations between the explanatory variables. OSIN1 and OSIN3 were both significantly and negatively correlated with SIZE and ED, and there was significant positive correlation between SIZE and ED. In addition, OSIN1 and OSIN3 were both significantly and positively correlated with EMDD. This result suggested some potential problems of multicollinearity. Thus, we selected the combination of the explanatory variables and estimated some logit models to cope with multicollinearity.
- 39 Since Calvo and Reinhart (2002) also suggested that fear of floating may arise from execution of inflation targets, we also included the dummy variable of inflation targets in the logit model. However, the coefficient was not statistically significant.
- 40 The optimum currency area theory suggests that high trade openness is likely to be associated with fixed regimes. According to Juhn and Mauro (2002), however, previous empirical studies have not found much support for this hypothesis.
- 41 For the Reinhart and Rogoff (2002) classification, the coefficient of EMDD is also significantly positive, indicating that emerging market economies and developing countries exhibited a greater fear of floating behavior than developed countries.
- 42 In the case of the Levy-Yeyati and Sturzenegger (2002) classification, the coefficient of EMDD is also significantly positive, indicating that emerging market economies and developing countries exhibited a greater fear of floating behavior than developed countries.

## References

- Alesina, Alberto and Alexander Wagner, 2003, "Choosing (and Reneging on) Exchange Rate Regimes," NBER Working Paper No. 9809, June.
- Bubula, Andrea and İnci Ötker-Robe, 2002, "The Evolution of Exchange Rate Regimes since 1990: Evidence from De Facto Policies," IMF Working Paper No. 02/155, September.
- Calvo, Guillermo and Carmen M. Reinhart, 2000, "Fixing for Your Life," NBER Working Paper No. 8006, November 2000.

- Calvo, Guillermo and Carmen M. Reinhart, 2002, "Fear of Floating," *Quarterly Journal of Economics* 117(2), May: 379–408.
- Eichengreen, Barry, 1994, *International Monetary Arrangements for the 21st Century*, Washington: Brookings Institution.
- Eichengreen, Barry and Ricardo Hausmann, 1999, "Exchange Rates and Financial Fragility," NBER Working Paper No. 7418, November.
- Eichengreen, Barry, Ricardo Hausmann and Ugo Panizza, 2003, "The Pain of Original Sin," August. Available at <http://emlab.berkeley.edu/users/eichengr/research/ospainaug21-03.pdf>
- Esaka, Taro, 2003, "Was It Really a Dollar Peg?: the Exchange Rate Policies of East Asian Countries, 1980–97," *Journal of Asian Economics* 13(6), January: 787–809.
- Esaka, Taro, 2004, "De Facto Exchange Rate Regimes: Evidence from Some Classifications of Exchange Rate Regimes," in Hisayuki Mitsuo (ed.), *Exchange Rate Regimes in Developing Countries*, Institute of Developing Economies, JETRO, March, pp. 1–54.
- Fischer, Stanley, 2001, "Exchange Rate Regimes: Is the Bipolar View Correct?," *Journal of Economic Perspectives* 15(2), Spring: 3–24.
- Ghosh, Atish, Anne-Marie Gulde and Holger Wolf, 2002, *Exchange Rate Regimes: Choices and Consequences*, Cambridge, Mass.: MIT Press.
- Hausmann, Ricardo, Ugo Panizza and Ernesto Stein, 2001, "Why Do Countries Float the Way They Float?," *Journal of Development Economics* 66(2), December: 387–414.
- Ito, Takatoshi, Eiji Ogawa and Yuri Nagataki Sasaki, 1998, "How did the Dollar Peg Fall in Asia?," *Journal of the Japanese and International Economies* 12(4), December: 256–304.
- International Monetary Fund, *Annual Report on Exchange Arrangements and Exchange Restrictions*, various issues, Washington: International Monetary Fund.
- International Monetary Fund, *International Financial Statistics*, various issues, Washington: International Monetary Fund.
- Juhn, Grace and Paolo Mauro, 2002, "Long-run Determinants of Exchange Rate Regimes: a Simple Sensitivity Analysis," IMF Working Papers 02/104, June.
- Lane, Philip R. and Gian Maria Milesi-Ferretti, 2001, "The External Wealth of Nations: Measures of Foreign Assets and Liabilities for Industrial and Developing Countries," *Journal of International Economics* 55(2), December: 263–94.
- Levy-Yeyati, Eduardo and Federico Sturzenegger, 2001, "Exchange Rate Regimes and Economic Performance," *International Monetary Fund Staff Papers* 47, Special Issue, 62–98.
- Levy-Yeyati, Eduardo and Federico Sturzenegger, 2002, "Classifying Exchange Rate Regimes: Deeds vs. Words," Universidad Torcuato Di Tella. Available at <http://www.utdt.edu/~ely/>. Now available as 2005, *European Economic Review* 49(6), August: 1603–35.
- Levy-Yeyati, Eduardo and Federico Sturzenegger, 2003, "To Float or to Fix: Evidence on the Impact of Exchange Rate Regimes on Growth," *American Economic Review* 93(4), September: 1173–93.
- Levy-Yeyati, Eduardo, Federico Sturzenegger and Iliana Reggio, 2003, "On the Endogeneity of Exchange Rate Regimes," Universidad Torcuato Di Tella. Available at <http://www.utdt.edu/~ely/>
- Obstfeld, Maurice and Kenneth Rogoff, 1995, "The Mirage of Fixed Exchange Rates," *Journal of Economic Perspectives* 9(4), Fall: 73–96.
- Reinhart Carmen M. and Kenneth S. Rogoff, 2002, "The Modern History of Exchange Rate Arrangements: a Reinterpretation," NBER Working Paper No. 8963, May. Forthcoming in *Quarterly Journal of Economics*.

- Rogoff, Kenneth S, Aasim M. Husain, Ashoka Mody, Robin Brooks and Nienke Oomes, 2004, "Evolution and Performance of Exchange Rate Regimes," International Monetary Fund Occasional Paper No. 229, May.
- Shambaugh, Jay C., 2003, "The Effects of Fixed Exchange Rates on Monetary Policy," Dartmouth College. Available at <http://www.dartmouth.edu/~economic/faculty/Shambaugh/index.htm>. Now available as 2004, *Quarterly Journal of Economics* 119(1), February: 301–52.
- Summers, Lawrence H., 2000, "International Financial Crises: Causes, Prevention, and Cures," *American Economic Reviews, Papers and Proceedings* 90(2), May: 1–16.

# Index

- Akiyama, S., 133  
Alesina, A., 42, 43  
Allen, C., 186  
*Annual Report on Exchange Arrangements and Exchange Restrictions*, IMF, 11
- Argentina  
Convertibility Law, 62  
currency board, 1, 3, 62–7: collapse, 59; economic indicators, 63  
currency crisis, 66–7  
external debt, 66  
fiscal sector, 66  
foreign exchange reserve vs monetary base, 62  
inflation, 62, 64  
interest rates, 64  
main trading partners, 64  
real effective exchange rate, 66  
trade and capital flow, 64
- Armington, P., 188  
ASEAN, 203  
Asia, trade with the US, 202  
Asian financial crisis, 109, 164, 176, 180, 186  
role of exchange rates, 221  
role of exchange rates in recovery, 221–2
- balance sheets, currency mismatches in, 51
- Baldwin, R., 186  
Ball, L., 93, 95  
Bayoumi, T., 162, 174  
Bernanke, B., 85  
Bernard, A.B., 214  
bilateral exchange rate, 129, 131, 132  
bilateral trade, 189, 190, 202  
bipolar view, 8, 50  
exchange rate regimes, evolution, 17–30  
and Levy-Yeyati and Sturzenegger classification, 27–30  
and Reinhart and Rogoff classification, 21–7
- Blanchard, O.J., 85, 173  
Blejer, M.I., 85  
borrowing in domestic currency, 42  
“original sin”, 44, 47
- Brazil  
capacity utilization, 92  
Central Bank, 88, 92, 93, 104:  
estimation of response function, 100  
emerging markets bond index plus, 90  
estimation of response function of the SELIC rate, 96–103  
exchange rates against US dollar, 91  
IC index, 89  
inflation rate, 89  
*Inflation Report*, 97  
inflation targeting regime, 3, 5, 87–94:  
institutional aspects, 87–9; main characteristics, 88  
interest rates, 90, 95, 102  
macroeconomic performance under inflation targeting policy, 89–93  
monetary policy, 84–106  
Monetary Policy Committee, 88  
National Monetary Council, 88  
percentage of public debts to GDP, 91  
public debt, 86  
*Real Plan* stabilization policy, 84, 87  
response function considering risk premium and government debt, 98–103
- Bubula, A., 10, 11, 39, 45, 47  
Bubula and Ötker-Robe classification of exchange rate regimes, 14, 30  
and the bipolar view, 17–21  
versus IMF classification, 34, 39
- Bulgaria  
currency board, 5, 59, 71–5: economic indicators, 72  
current account and FDI flow, 74  
external debt, 75  
fiscal sector, 75  
foreign exchange reserve vs monetary base, 73

- Bulgaria – *continued*  
inflation, 73–4  
interest rates, 75  
main trading partners, 74  
real effective exchange rate, 75  
real gross domestic product by  
expenditure, 75  
trade and capital flow, 74–5
- business cycles and world electronics  
cycle, East Asia, 119
- business cycle synchronization, 159,  
165–9  
and symmetry in shocks, 161–2
- Calvo, G., 2, 9, 38, 41, 42, 43, 44, 45, 51
- capital mobility, 8
- China, 137  
exports to non-Asia, 127  
intra-industry trade with Japan, 214  
price regulation in the nontradable  
sector, 3  
revaluation, 231, 245  
trade competition indices, 193, 194,  
205, 207  
trade with Japan, 211, 214  
as a trading partner, 209–10
- Chinn, M.D., 162
- Chow, H.K., 162
- Clark, P.B., 138
- common basket peg (CBP), 204, 209,  
224
- competitiveness indicators, 187
- COMTRADE database, 191
- Connolly, M., 247
- CPI (consumer price index) inflation  
rates, correlation, 169
- crawling pegs, 27
- currency boards, 1, 59  
Argentina, 3, 5, 62–7  
Bulgaria, 5, 59, 71–5  
Estonia, 5, 59, 67–71  
and the fiscal sector, 61  
and inflation, 60  
and interest rates, 60–1  
role, 60  
and trade and capital flows, 60
- currency mismatches, in balance sheets,  
51
- currency union, and intra-industry  
trade, 223
- current account  
effect of revaluation, 241–4  
surpluses, 231, 232
- de facto classification  
compared to *de jure* classification, 30  
comparison between data, 37  
mismatches with IMF classification, 30
- de facto exchange rate regimes  
in emerging market countries  
(1990–2001), 8–58  
evolution, 4
- De Grauwe, P., 161
- de jure* classification, 43  
compared to de facto classification,  
30
- de jure* exchange rate regimes, 4, 9
- developed countries, floating regimes,  
30
- developing countries  
borrowing difficulties, 2  
exchange rate regimes, 1
- Devereux, J., 247
- dollar, exchange rate between East Asian  
currencies and, 128
- dollarization, 59  
Ecuador, 1  
roles of, 61
- dollar peg, 136
- domestic currency, borrowing in, 42
- Doraisami, A., 107
- Duttagupta, R., 221
- East Asia  
average output losses, 179, 180  
business cycle correlation with other  
countries, 110  
business cycles, 108: and the world  
electronics cycle, 119  
criteria for OCA, 163–70  
as a de facto dollar area, 126–36  
dollar peg, 2  
economic growth, 178  
exchange rate, between East Asian  
currencies and the dollar, 128  
exchange rate management, 108  
exchange rate movements, 163–4  
exchange rate policies, 204  
exchange rate regimes, 6  
export growth, 124

- export performance, yen dollar
  - exchange rate, and the global electronics cycle, 120–6
- exports, 166: of electronic goods, 113
- FDI from Japan, 211
- financial integration, 169–70
- imports, 167
- intra-regional trade and fragmentation, 210
- manufacturers' competition, 204, 209
- merchandise exports growth rate, 121
- monetary integration, 1, 4
- monetary unification, 204
- optimum currency area, 6
- real effective exchange rate (REER), of currencies, 219
- regional exchange rate regimes, 186
- seemingly unrelated regression (SUR), for business cycles, 140–3, 145–53
- supply shocks, 4
- system estimation of business cycles 1992–2004, 138–53
- trade competition, 191–210
- trade with EU, 202
- trade integration, 164–5
- trade structure, 4
- Ecuador
  - dollarization, 1, 5, 59, 76–83
  - dollarization indicators, 80
  - economic performance: and potential risk under dollarization, 81; and structure before dollarization, 76
  - external debt, 79
  - fiscal, monetary and exchange rate policies, and external debt up to dollarization, 76, 80–1
  - main export items, 78
  - main trading partners, 78
  - monetary integration with the US, 4
  - public finance – nonfinancial public sector, 78
  - real gross domestic product by expenditure and sectors, 77
- Ehrlich, L., 70
- Eichengreen, B., 2, 8, 43, 162, 174
- emerging or developing countries, “fear of floating”, 47
- emerging market countries (1990–2001) de facto exchange rate regimes in, 8–58
- hard pegs, 21
- Estonia
  - currency board, 5, 59, 67–71:
    - economic indicators, 69
  - external debt, 71
  - fiscal sector, 71
  - foreign direct investment, 70
  - foreign exchange reserve vs monetary base, 68
  - gross domestic product by expenditure, 71
  - inflation, 68
  - interest rates, 70
  - main trading partners, 70
  - real effective exchange rate, 71
  - trade and capital flow, 68–71
- European Monetary System (EMS), crisis in 1992–93, 8
- European Monetary Union (EMU), 107, 187
- European Union, trade with East Asia, 202
- exchange rate depreciation, 3
- exchange rate flexibility, 2, 11
- Exchange Rate Mechanism (ERM), 107, 209
- exchange rate regimes
  - Bubula and Ötker-Robe classification, 14
  - classification of four classifications, 33
  - evolution, bipolar view, 17–30
  - IMF classification, 11–14
  - Levy-Yeyati and Sturzenegger classification, 15–16
  - methodologies of classifying, 12–13 and national economy, 2
  - Reinhart and Rogoff classification, 14–15
  - Shambaugh classification, 16
- exchange rate revaluation, 231–48
  - under a price ceiling, model, 6–7
- exchange rates
  - and export competitiveness, 204
  - real exchange rates, and trade competition, 186–230
  - relationship between nominal and real, 231–2
  - role in Asian crisis, 221
  - role in recovery after Asian crisis, 221–2

- export competitiveness, and exchange rates, 204
- export rivalry, 224
- external debt, Argentina, 66
- factor market integration, 161
- Favero, C., 86
- FDI, Bulgaria, 74
- "fear of announcing a peg", 51  
 definition of, 38–9  
 and "fear of floating", 38–42
- "fear of floating", 2, 4, 10  
 combined results of determinants, 50  
 and comparison of de facto classifications, 45  
 control variables, 44–5  
 definition of, 38  
 determinants, 42–50  
 emerging or developing countries, 47  
 empirical results, 45–50  
 and "fear of announcing a peg", 38–42  
 list of countries, 52  
 measurement of, 42–3  
 variables, definitions and data sources, 53
- fear of floating dummy, 43
- "fear of pegging", 10
- Feenstra, R., 192
- financial integration, East Asia, 169–70
- financial market integration, 162–3
- fiscal sector  
 Argentina, 66  
 Bulgaria, 75  
 and currency boards, 61  
 Estonia, 71
- Fischer, S., 8, 9, 17, 51
- flexibility limited regimes, 30
- flexible exchange rate system, inflation targeting under, 85–7
- floating exchange rate regimes, 1, 4
- floating regimes, 30, 38  
 developed countries, 30
- foreign direct investment, Estonia, 70
- foreign exchange reserve vs monetary base  
 Argentina, 62  
 Bulgaria, 73  
 Estonia, 68
- fragmentation, and intra-regional trade, 210
- Frankel, J.A., 129, 162, 186
- Frankel/Wei/McKinnon regression, 130
- free trade agreements, 159
- Fukuda, S., 128
- GDP, correlation of real GDP growth rates, 168
- Germany, revaluation, 231
- Ghosh, A.R., 173, 181
- Giavazzi, F., 86
- Glick, R., 162
- global electronics cycle, 137, 153  
 the yen-dollar exchange rate, and East Asia's export performance, 120–6
- Grubel-Lloyd (GL) index, 188, 191
- Haldane, A., 85
- hard pegs, 1, 4, 17, 21, 27  
 in developing and transition countries, 4–5, 61–83  
 in emerging market countries, 21  
 and inflation, 82
- Hausmann, R., 2, 41, 42, 43, 44, 51
- "hollowing-out" hypothesis, 8
- Hong Kong  
 export growth, 124  
 exports to non-Asia, 127
- Hutchison, M., 162
- IMF  
*Annual Report on Exchange Arrangements and Exchange Restrictions*, 11  
 classification of exchange rate regimes, 8, 9, 11–14: mismatches with de facto classification, 30, 38; old system, 11; versus Bubula and Ötler classification, 34; versus Levy-Yeyati and Sturzenegger classification of exchange rate regimes, 36; versus Reinhart and Rogoff classification, 33  
 classification of members, 51–2
- imports  
 East Asia, 167  
 Japan, 167
- independently floating regimes, 17, 21
- Indonesia, 120  
 export growth, 124  
 exports to non-Asia, 127  
 managed float, 9

- real effective exchange rate (REER), 219, 220
- trade competition indices, 193, 195, 205, 207
- inflation
  - Argentina, 62, 64
  - Bulgaria, 73–4
  - and currency boards, 60
  - Estonia, 68
  - and hard pegs, 82
- inflation targeting, under a flexible exchange rate system, 85–7
- inflation targeting regimes, 2–3
- interest rates, 87
  - Argentina, 64
  - Brazil, 90, 95, 102
  - Bulgaria, 75
  - and currency boards, 60–1
  - Estonia, 70
  - parity conditions, 170
  - real interest parity tests with realized inflation series, 171–2
- intermediate regimes, 1, 8, 17, 21, 27
- international trade competition, measurement, 187–91
- intra-industry trade, 186
  - and currency union, 223
  - and trade competitiveness, 210–17
  - value in East Asia, 214
- intra-product trade, 210–11
- intra-regional trade, 224
  - and fragmentation, 210
- Ito, T., 108, 120, 128, 221
- Jácome, L.I.H., 81
- Japan, 154 n. 5
  - average output losses, 179, 180
  - customs data, 211
  - economic growth, 178
  - export growth, 124
  - exports, 166
  - exports to non-Asia, 127
  - FDI in East Asia, 211
  - imports, 167
  - intra-industry trade with China, 214
  - number of goods in bilateral manufacturing trade, 215–16
  - product coverage, 214
  - real effective exchange rate (REER), 219, 220: quarterly series for yen, 222
  - reevaluation, 231
  - trade with China, 211, 214
  - trade competition indices, 193, 205, 207, 212, 213
  - as a trading partner, 209
  - volatility, 164
- Kawai, M., 107, 133, 160
- Kim, Y., 162
- Korea
  - export growth, 124
  - exports to non-Asia, 127
  - managed float, 9
  - real effective exchange rate (REER), 219, 220
  - trade competition indices, 193, 195, 196, 205, 207
- Kumakura, M., 133, 161
- Kwan, C.H., 107, 108, 109, 111, 118, 139
- Kwan/McKinnon/Schnabl hypothesis, 112, 113
  - reformulated regression, 115, 117
- Lane, P.R., 44
- Lepik, I., 70
- Levy-Yeyati, E., 10, 39, 42, 43, 45, 50, 51
- Levy-Yeyati and Sturzenegger
  - classification of exchange rate regimes, 15–16, 49
  - and the bipolar view, 27–30
  - versus IMF classification, 36, 38
- McKinnon, R.I., 2, 107, 108, 109, 111, 118, 120, 126, 129, 133, 134, 136, 137, 139, 161, 221
- Malaysia
  - export growth, 124
  - exports to non-Asia, 127
  - managed float, 9
  - real effective exchange rate (REER), 219, 220
  - trade competition indices, 193, 195, 196, 197, 205, 207
- managed floating regimes, 21, 27, 30
- Mihov, I., 73
- Milesi-Ferretti, G.M., 44
- Minella, A., 96, 97, 99
- Mishkin, F., 85, 86, 92, 232
- Monetary Authority of Singapore, 126
- monetary policy autonomy, 59
- monetary unification, East Asia, 204

- Mundell-Fleming model, 231  
 Mundell, R.A., 161
- NAFTA (North Atlantic Free Trade Area), 192  
 national economy, and exchange rate regimes, 2  
 national monetary policy, 186  
 Nishijima, S., 93  
 nontradable sectors, price regulation, 3
- Obstfeld, M., 8  
 OECD, 245  
 Ogawa, E., 108, 128, 133, 221  
 openness and goods market integration, 161  
 openness indices, 165  
 optimum currency area (OCA), 159, 186  
   analysis of criteria, 163–70  
   correlation analysis in shocks, 174–7  
   correlation of demand shocks, 176  
   correlation of supply shocks, 175  
   criteria, 159: business cycle  
     synchronization and symmetry in shocks, 161–2; factor market integration, 161; openness and goods market integration, 161  
   estimation of structural shocks, 181  
   financial market integration, 162–3  
   model, 170–4: analysis of output losses, 173, 181–2; data, 175; result of output loss analysis, 177–8; results, 175–9  
   policy coordination, 163  
   structural VAR analysis, 170–3  
   theory of, 160–3
- Ötker-Robe, I., 10, 11, 39, 45, 47
- Parsley, D., 138  
 pegs, 30
- Philippines  
   business cycle, 154 n. 12  
   export growth, 124  
   exports to non-Asia, 127  
   independent float, 9  
   real effective exchange rate (REER), 219, 220  
   trade competition indices, 193, 195, 196, 197, 198, 205, 207
- Phillips curve, 94
- Phylaktis, K., 162  
 Ping, N.Y., 113  
 policy coordination, 163  
 price ceiling  
   and quality adjustment, 233–6: effect of revaluation on current account, 241–4; model, 236–44: effects of revaluation on relative price and real exchange rate, 239–41; firms, 238; general equilibrium, 238–9; households, 236–7; proof of Proposition 1, 246–7  
 price regulation, in nontradable sectors, 3  
 producer prices index (PPI), 217  
 product coverage, 214  
 purchasing power parity (PPP), 231
- Quah, D., 173  
 quality adjustment, and price ceiling, 233–6
- real effective exchange rate (REER), 217  
   Argentina, 66  
   Bulgaria, 72  
   of East Asian currencies, 219  
   Estonia, 69  
   quarterly series for Japanese yen, 222
- real effective exchange rate (REER) indices, 217, 218, 224–5
- real exchange rates, and trade competition, 186–230
- regional business cycle synchronization, 161
- regional exchange rate regimes, 186
- regional policy coordination, 204
- Reinhart, C.M., 2, 9, 10, 38, 39, 41, 42, 43, 44, 45, 47, 50, 51, 81
- Reinhart and Rogoff classification of exchange rate regimes, 14–15, 48  
 and bipolar view, 21–7  
 versus IMF classification, 33, 38
- reevaluation  
   effect on current account, 241–4  
   effects on relative price and real exchange rate, 239–41
- Rodlauer, M., 139
- Rogoff, K.S., 8, 10, 39, 45, 47, 50, 81
- Rose, A., 186
- Rosen, S., 233

- Sato, K., 162
- Savastano, M., 85, 86
- Schnabl, G., 2, 107, 108, 109, 111, 118, 126, 134, 139
- seemingly unrelated regression (SUR), 139
- East Asia, business cycles, 140–3, 145–53
  - regressions for East Asian business cycles, 140–3
- semiconductor sales, 114
- Shambaugh, J.C., 10, 11, 13, 16, 30
- Shambaugh classification of exchange rate regimes, 16, 31–2
- Shin, K., 161
- shocks, 2
- estimation of structural shocks, 181
- Singapore
- export growth, 124
  - exports to non-Asia, 127
  - managed float, 9
  - real effective exchange rate (REER), 219, 220
  - trade competition indices, 199, 206, 208
- Smithsonian Agreement, 231
- Spilimbergo, A., 188, 221
- Standard International Trade Classification (SITC), 191
- Statistics Canada, World Trade Database, 191
- structural VAR analysis, optimum
- currency area (OCA), 170–3
- Sturzenegger, F., 10, 39, 42, 45, 50, 51
- Summers, L.H., 8
- Svensson, L., 85, 93, 95
- swap market, 44
- Taiwan, 191
- export growth, 124
  - exports to non-Asia, 127
  - real effective exchange rate (REER), 219, 220
  - trade competition indices, 199, 200, 206, 208
- Takagi, S., 107
- Taylor, J., 85
- Taylor rule, 87
- Thailand
- basket peg, 8
  - export growth, 124
  - exports to non-Asia, 127
  - real effective exchange rate (REER), 219, 220
  - trade competition indices, 201, 206, 208
- Tonooka, E., 93
- Tors, J., 70
- trade and capital flows
- Argentina, 64
  - Bulgaria, 74–5
  - and currency boards, 60
  - Estonia, 68–71
- trade competition
- East Asia, 191–210
  - and real exchange rates, 186–230
- trade competition index, Japan, 212, 213
- trade competition indices, 193–201, 205–8
- trade competitiveness, and intra-industry trade, 210–17
- trade integration, East Asia, 164–5
- US
- dollar exchange rates, 134
  - monetary integration with Ecuador, 4
  - trade with Asia, 202
- Vamvakidis, A., 188
- Vanhaverbeke, W., 161
- volatility, 15
- Wagner, A., 42, 43
- Wang, Y., 161
- Wei, S.-J., 129, 138
- Williamson, J., 107, 108, 133
- Wolf, H.C., 173, 181
- World Customs Organization's Harmonized System (HS), 211
- World Trade Database, Statistics Canada, 191
- Yam, J., 137
- yen, depreciation, 120, 138, 155 n. 17, 223
- yen-dollar exchange rate
- and East Asia's business cycle, 109
  - global electronics cycle and East Asia's export performance, 120–6
- Zhang, Z.Y., 162
- Zirnask, V., 68, 70