

DOCUMENT OF INTERNATIONAL MONETARY FUND AND NOT FOR PUBLIC USE

MASTER FILES
ROOM C-525 0450

SM/96/302
Supplement 1

December 20, 1996

To: Members of the Executive Board
From: The Secretary
Subject: **Experiences with Currency Board Arrangements**

The attached paper on experiences with currency board arrangements provides background material to the paper on issues, experiences, and implications for Fund-supported programs with respect to currency board arrangements, which was circulated as SM/96/302 on December 20, 1996, and will be discussed in a seminar proposed for Wednesday, January 22, 1997.

Mr. Baliño (ext. 38551) or Mr. Enoch (ext. 35372) is available to answer technical or factual questions relating to this paper.

Att: (1)

Other Distribution:
Department Heads

INTERNATIONAL MONETARY FUND

Experiences with Currency Board Arrangements

Prepared by the Monetary and Exchange Affairs Department
(In consultation with other Departments)

Approved by Manuel Guitián

December 18, 1996

	Page
I. Introduction	4
II. Operating, Legal, and Institutional Features	4
A. Backing Rule	5
B. Exchange Rate Rule	8
C. Legal and Institutional Framework	9
III. Entry and Exit	11
A. Motivations for Establishing Current CBAs	11
High inflation countries	11
Low inflation countries	14
B. Earlier CBA Exiting Experiences	16
Argentina	16
Malaysia and Singapore	17
Ireland	18
IV. Macroeconomic Performance	20
A. Inflation, Economic Growth, and Real Exchange Rate Developments	20
Argentina	20
The Baltic countries	22
Hong Kong	26
Other CBAs	29
B. Interest Rate Developments	30
Argentina	30
The Baltic countries	32
Hong Kong	37
Other CBAs	37
C. Fiscal Adjustment	37
Argentina	39

Contents	Page
The Baltic countries	39
Hong Kong	40
Other CBAs	40
V. Financial Intermediation, Payments System, Banking	
Supervision, and Lender of Last Resort	41
A. Financial Intermediation and Payments Systems	41
Financial intermediation	41
Payments systems and treasury operations	45
B. Prudential and Supervisory Arrangements	46
Institutional arrangements	46
Prudential standards	46
C. Last-resort Support and Banking Crisis Management	49
Argentina	50
The Baltic countries	53
Hong Kong	54
VI. Monetary Policy Implementation	54
A. Reserve Requirements	55
B. Rediscount Facilities	55
C. Open Market Operations	60
D. Other Monetary Instruments	60
E. Policy Issues	61
VII. Conclusion	64
Text Tables	
1. Basic Descriptions of the CBAs	6
2. Prudential Arrangements and Availability of Last-Resort Support Facilities	47
3. Central Banking Operations of the CBAs	56
Figures	
1. Argentina: Broad Money and Reserve Money Growth	12
2. Argentina: Reserve Money and Its Components	13
3. Estonia, Latvia, Lithuania: Inflation	15
4. Malaysia, Singapore, and United Kingdom: Exchange Rate	19
5. Argentina, Chile, and Mexico: Inflation	21

	Page
6. Argentina, Chile, and Mexico: Nominal and Real Effective Exchange Rates	23
7. Estonia, Latvia, Lithuania: Real Effective Exchange Rates	25
8. Hong Kong and Singapore: Inflation	27
9. Hong Kong and Singapore: Nominal and Real Effective Exchange Rates	28
10. Djibouti: Nominal and Real Effective Exchange Rates	31
11. Argentina: Money Market Rates	33
12. Argentina, Mexico, and the United States: Deposit Rates	34
13. Estonia, Germany, Latvia, Lithuania, & the United States: Interbank Rates	35
14. Estonia, Germany, Latvia, Lithuania, and the United States: Deposit Rates	36
15. Hong Kong and United States: Interest Rates	38
16. Argentina: Broad Money/Nominal GDP	42
17. Argentina: Real Growth in Broad Money and Domestic Credit	43
18. Estonia: Real Growth Rate of Claims on the Private Sector	44
19. Hong Kong and the United States: Daily Interest Rates and Exchange Rate	63
20. Argentina and Mexico: Total Foreign Reserves and Reserve Money	65
References	67

I. INTRODUCTION

1. This paper surveys existing currency board arrangements (CBAs) and discusses their performance and related technical issues. The CBAs covered (and the year when they were established) include those of Argentina (1991), Brunei Darussalam (1967), Djibouti (1949), the Eastern Caribbean Central Bank (ECCB) (1965), Estonia (1992), Hong Kong (1983), and Lithuania (1994).¹ In addition, the paper reflects the experiences of Argentina (1902-1929), Ireland (1928-1979), Malaysia (1967-1973), and Singapore (1967-1973) when they exited from their CBAs.

2. While many lessons can be drawn from the currency boards of the colonial period, this paper does not discuss them in detail as their contexts differed significantly from those of the existing CBAs.² Among other factors, the degree of capital mobility during the colonial period was limited, and most colonial governments lacked fiscal independence. Moreover, the banking systems of these colonies consisted of foreign banks which relied on their headquarters for liquidity support and interbank settlements. After gaining their independence, most colonies replaced their currency board with a central bank to strengthen their national sovereignty and conduct an independent monetary policy.

3. This paper has seven sections. Section II describes the basic operating, legal, and institutional features of CBAs. Section III reviews the motivations for establishing CBAs and the experiences on exiting from the arrangements. Section IV compares the macroeconomic performance of CBA countries before and after the CBAs were established, or to that of broadly comparable non-CBA countries. Section V discusses issues related to financial sector developments, including banking supervision and last resort support. Monetary operations in CBAs are discussed in Section VI. Section VII concludes the paper.

II. OPERATING, LEGAL, AND INSTITUTIONAL FEATURES

4. A definition of a pure currency board would be an arrangement that operates under three principles: (1) the exchange rate between the domestic currency and a foreign currency (the reserve currency) is fixed, and full convertibility of notes and coins at that exchange rate is guaranteed; (2) the domestic currency is fully backed by the reserve currency (or by other

¹Other existing CBAs not covered in this paper include those of Bermuda, Cayman Islands, Falkland Islands, Faroe Islands, and Gibraltar.

²In addition to the British colonies, currency boards operated in the U.S. colony of the Philippines and, for a brief period, the Italian colony of Somalia. In most French colonies, Instituts d' Emission operated; they backed their currencies with both French franc and domestic assets. For more information on currency boards during the colonial period, see Hanke and Schuler (1994), Schwartz (1993) and Williamson (1995).

foreign assets and gold); and (3) the currency board is not allowed to undertake any discretionary monetary measures, including lending to the government or commercial banks. In practice, though, current CBA rules—especially those related to backing and central banking operations—have often diverged from those of a pure currency board (Table 1 summarizes the basic rules and features of the CBAs covered in this paper).

A. Backing Rule

5. Backing rules differ substantially across countries. In Djibouti and Hong Kong they mandate at least 100 percent backing of currency in circulation with foreign assets and gold. The CBAs of Argentina, Estonia, and Lithuania back also the deposits held by commercial banks at their central banks, as the latter continue to provide payments and settlement services. In Argentina, however, up to one third of backing can be met with U.S. dollar denominated Argentine government debt; thus, the Central Bank needs to back at least 66 percent of base money with foreign assets, respectively.³ Similarly, the ECCB and the CBA of Brunei Darussalam, respectively, back only 60 percent and 70 percent of reserve money with foreign assets.⁴ While the Bank of Lithuania (BOL) backs 100 percent of currency in circulation and all other central bank liquid liabilities, the Bank of Estonia (BOE) is not required to back its certificates of deposits.⁵

6. In practice, the initial level of the authorities' holdings of international reserves has played a role in the degree of backing provided to the currency. As the BOE held substantial quantities of gold that had been deposited in foreign central banks before World War II, it could meet its backing requirements with its own net international reserves. However, due to a shortage of net international reserves when their CBAs were established, the Central Banks of Argentina and Lithuania were constrained to fulfill their backing requirement on a gross international reserves basis. Part of Lithuania's foreign exchange reserves were obtained from the Fund under a five-year Systemic Transformation Facility (STF) arrangement. In Argentina,

³The Central Bank's Charter also limits the increase in the Central Bank's holding of Argentine government debts, regardless of currency denomination, to 10 percent per year.

⁴ Following the introduction of a minimum cash balance requirement in December 1995, banks were required to maintain accounts at the Brunei Currency Board (BCB), which are backed in the same manner as notes and coins. The BCB must back at least 70 percent of its demand liabilities with external assets, of which at least 30 percent must be liquid.

⁵The BOL's liquid liabilities include reserves and other deposits of commercial banks, government deposits, litas-denominated correspondence balances of former Soviet Union banks, and litas-denominated securities and promissory notes issued by the BOL.

Table 1. Basic Descriptions of the CBAs

	Argentina	Brunei Darussalam	Djibouti	ECCB
Date established	March 1991	1967	March 1949	1965 1/
Administrative agency	Central Bank of the Argentine Republic	Brunei Currency Board	National Bank of Djibouti (NBD)	Eastern Caribbean Central Bank
Previous exchange rate reg.	Floating exchange rate	N/A	N/A	N/A
Exchange rate rule				
Reserve currency	U.S. dollar	Singapore dollar	U.S. dollar	U.S. dollar 2/
Exchange rate	US\$1 = 1 peso 3/	S\$ 1 = B\$ 1	US\$1 = D.fr. 177.72	US\$1 = EC\$ 2.7
Access to convertibility at the monetary authorities	In principle, general public; in practice, only financial institutions and exchange houses	General public; banks are instructed to accept Singapore dollars as local currency	N/A	Through commercial banks
Exchange control	Restrictions on capital transactions were liberalized in 1993.	Removed in 1984	None	Each member applies its own restrictions on capital transactions to members of ECCA and other countries. Each country is required to surrender foreign exchange to the reserve pool.
Backing rule				
Coverage of backing	100% of monetary base	At least 70% of its demand liabilities must be backed by its external assets, of which at least 30% must be liquid assets; actual backing by external assets = 87% in Sept 95	100% of currency	At least 60% of currency and bank reserves (excluding banks' foreign exchange deposits at ECCB); actual backing = 98% in March 95
Assets eligible for backing	Foreign assets, gold, and U.S. dollar denominated Argentine govt. debt. (The govt. debt is limited to up to 1/3 of the total backing and 10% increase per year.) Currently, the Board of Directors limits the coverage by govt. debt to 20% except in an emergency	Liquid foreign assets, foreign securities, and accrued interest	Foreign assets; in practice, foreign deposits held in the U.S. financial system	Foreign assets and gold
Power to change the exchange rate rule and backing rule	Only by the act of Parliament	Only by the act of Parliament	N/A	N/A
Profit transfer rule	N/A	BCB retains interest earned from foreign exchange	N/A	ECCB's profits are distributed among member Governments in proportion to their shares of currency in circulation

1/ The Eastern Caribbean Currency Authority (ECCA) replaced the British Caribbean Currency Board in 1965. The ECCA was subsequently transformed into a central bank (the ECCB) in 1983.

2/ In 1976, after a period of depreciation of the pound, the ECCA switched from pegging the EC dollar with the Pound to the U.S. dollar.

3/ Initially, the exchange rate was set at 100,000 australs per one U.S. dollar; in January, 1993, the peso was introduced as a new currency.

Table 1. Basic Descriptions of the CBAs (concluded)

	Estonia	Hong Kong	Lithuania
Date established	June 1992	October 1983	April 1994
Administrative agency	Bank of Estonia (BOE)'s Issue Department	Exchange Fund (EF) under the supervision of the Hong Kong Monetary Authority (HKMA)	Bank of Lithuania (BOL)
Previous exchange rate regime	Ruble standard	Floating exchange rate	Ruble standard and interim coupon
Exchange rate rule Reserve currency	Deutsche Mark	U.S. dollar	U.S. dollar
Exchange rate	DM 1 = 8 Estonian kroon	US\$1 = HK\$7.8	US\$1 = 4 litai
Access to convertibility at the monetary authorities	In principle, general public; in practice, only banks	Note-issuing banks	24 authorized commercial banks
Exchange control	Surrender requirement and restrictions on capital transactions existed until Dec. 1, 1993.	None	N/A
<u>Backing rule</u> Coverage of backing	100% of monetary base	100% of Certificate of Indebtedness issued to the note-issuing banks as back up for currency	100% of currency and BOL's liquid liabilities
Assets eligible for backing	Foreign assets, mainly gold and DM interest-bearing assets	Foreign assets	Foreign assets and gold ^{1/}
<u>Power to change the exchange rate rule and backing rule</u>	The BOE has the right to revalue the exchange rate. Devaluation needs to be done by the act of Parliament.	N/A	Since June 94, exchange rate can be changed by the BOL in consultation with the Government
<u>Profit transfer rule</u>	Seignorage in the form of interest earned is passed, as it accrues, to the BOE's Banking Department	EF earns interest from foreign exchange and fluctuation in the value of gold	BOL retains interests earned on foreign exchange

^{1/} At the outset, the BOL did not have sufficient net foreign assets to cover the liabilities; as a result, the BOL drew some of its backing from resources borrowed from the Fund.

the Central Bank had substantially negative net international reserves, owing to large short-term and long-term external obligations to the Fund and other creditors.⁶

B. Exchange Rate Rule

7. While in principle a country could peg the exchange rate to a basket of currencies, in practice all existing CBAs peg their exchange rates to a single reserve currency. While Brunei Darussalam ties its currency to the Singapore dollar and Estonia to the Deutsche mark, other CBAs covered in this paper tie their currency to the U.S. dollar. Except for Djibouti, which has tied its currency to the U.S. dollar while trading mostly with France and other European countries, CBA countries have adopted as reserve currency the currency of their main trading partner or the one they use most for international transactions.⁷ The Djibouti franc was revalued twice against the U.S. dollar to maintain its gold parity when the U.S. dollar depreciated against gold and other major currencies during 1971-1973, following the breakdown of the Bretton Woods Agreement. In other CBA countries, the official exchange rate and choice of reserve currency have remained unchanged since the CBAs were established.

8. Despite the fact that a CBA establishes an official exchange rate, that rate applies only to base money, and in some countries only to currency in circulation. In addition, access to the official exchange rate is often restricted. Hong Kong has a particularly restricted access, which is limited to the three note-issuing banks.^{8 9} As compared to Argentina, such restrictions lower

⁶Some of these liabilities were extinguished in June 1992, through a capital injection from the Government.

⁷Argentina's decision to tie the peso to the U.S. dollar was also in part motivated by the high degree of dollarization.

⁸The three note-issuing banks have the right to exchange Certificates of Indebtedness (CI) for foreign currency at the official exchange rate at the Exchange Fund (EF), and vice versa. The EF is an agent of the Hong Kong Monetary Authority (HKMA) which maintains reserves for backing and handles currency conversion, and the CIs are issued by the EF to back bank notes in circulation. Although the official exchange rate applies only to the exchange of CI and foreign exchange between the EF and the three note-issuing banks, banks used the official exchange rate for interbank transactions until January 1994. The practice was suspended because the market exchange rate had stayed slightly more appreciated than the official exchange rate; hence, banks that were net takers of notes had incurred a foreign exchange loss. At present, transactions among the note-issuing banks and other banks occur at the market exchange rate.

⁹Most CBA countries restrict direct access to banks and certain types of financial institutions.

(continued...)

arbitrage opportunities, resulting in larger deviations between the market and official exchange rates in Hong Kong (see Bennett (1994), p. 19 for more information).

9. Some countries have sought to eliminate or sharply reduce the spread between the official and market exchange rates. In Argentina, the central bank formally eliminated its bid and offer spread, bringing the market exchange rate almost to parity with the official exchange rate as of the 1995 currency crisis. Similarly in Estonia, the BOE reduced the spread between its bid and offer rates to one percent. Brunei Darussalam has equated the market and official exchange rates at all times by having a very liberal arrangement in which Singapore dollars are allowed to circulate together with Brunei dollars and banks are instructed to accept Singapore dollars from the public at parity.¹⁰

C. Legal and Institutional Framework

10. A CBA's credibility depends on the legal framework underlying its exchange rate and backing rules. In Argentina and Brunei Darussalam, the official exchange rate can be changed only by an act of parliament. In Estonia, the law provides room for the central bank to revalue the kroon. In Lithuania, when the CBA was introduced the Government was entrusted with the power to change the exchange rate after consulting the central bank. However, in June 1994, the law was amended to grant the central bank power to change the exchange rate in consultation with the Government, in accordance with the central bank's constitutional right to control money emission. In part due to this weak institutional commitment to a fixed exchange rate, rumors of devaluations affected the CBA's credibility during the winter of 1994/95 and prevented interest rates from converging to international levels.¹¹

11. Institutional frameworks differ substantially across countries, to a large extent depending on the institutions prevailing when the CBAs were established. In Estonia and Lithuania, the original central banks' balance sheets were modified to separate the Issue Department from the Banking Department. CBA functions are booked as operations of the former, while the latter takes care of other central banking functions, including bank supervision. In Djibouti, the ECCB, and Hong Kong, existing CBAs were integrated into monetary authorities or central banks once the latter were established. The CBAs' accounts in

⁹(...continued)

Access is limited to banks in Djibouti and Estonia, and to financial institutions and exchange houses in Argentina. Lithuania limits access to authorized foreign exchange dealing banks. Unlike in Estonia where conversion at no charge is guaranteed by law, the BOL is entitled to establish commissions and fees for currency conversion.

¹⁰The authorities of Brunei Darussalam and Singapore have agreed to accept and allow banks to accept both Brunei and Singapore dollars in both countries at parity.

¹¹The performance of CBAs in reducing currency risk is analyzed in Section IV.

Argentina, Djibouti, and Hong Kong are not formally separated from those of the monetary authorities.

12. While CBAs incur the cost of printing and exchanging money, they earn seigniorage in the form of interest income on foreign asset holdings, albeit subject to fluctuations in the value of foreign assets and gold. In Hong Kong, the currency board is allowed to retain full seigniorage, which it uses to increase its foreign exchange reserves.¹² In other CBAs, earnings generated from foreign exchange reserves are not separated from profits generated from other activities and, hence, are not subject to a separate profit transfer rule.¹³

13. Most CBAs are subject to a tight limit on lending to the Government. The central banks of Estonia and Lithuania are prohibited from directly or indirectly granting credits to the state and local budgets and from holding government securities.¹⁴ In Argentina, the Central Bank is prohibited by its Charter from granting loans to the national government, provinces, and municipalities, except through purchases of a limited amount of negotiable instruments issued by the Treasury at market prices. Similarly, the ECCB can extend credit to each member Government within a limit. The National Bank of Djibouti (NBD) is also allowed to lend to the Government with a special approval from the Council of Ministers but has never done so.

¹²This, however, does not include interest earnings on fiscal reserves deposited at the Exchange Fund. The interest earned on fiscal reserves is transferred to the Government.

¹³In part because of the need to borrow reserves for initial backing and, hence, to repay the loans over time, the BOL was allowed to retain part of total profits as reserves. The BOE has the authority to retain at least 50 percent of total profits as statutory and reserve capital, and the remainder must be transferred to the budget or used to establish special funds. In Argentina, central bank profits may be maintained in a reserve fund until they reach 50 percent of its capital; further profits must be transferred to the budget. The ECCB may retain profits or distribute them among member Governments in proportion to their shares of currency in circulation. Similarly, The NBD must distribute profits among its shareholders which include the central government, local governments, and other government entities.

¹⁴The regulations prohibiting central banks' credits to governments could be introduced without much difficulty in Estonia and Lithuania as their Governments had run budget surpluses and there was no credit to Government outstanding when the CBAs were introduced. In Lithuania, such credit was eliminated before the CBA was adopted in 1994.

III. ENTRY AND EXIT

A. Motivations for Establishing Current CBAs

14. Although all existing CBAs were established with the objective of maintaining the long term stability of the currency, they can be divided into two groups, depending on the rate of inflation that prevailed at the time the CBAs were established. High inflation countries—Argentina, Estonia, and Lithuania—introduced a CBA to strengthen the credibility of their price stabilization efforts. Low inflation countries—Brunei Darussalam, Djibouti, the ECCB, and Hong Kong—introduced a CBA to maintain the stability of their currency and/or to simplify monetary and exchange rate management.

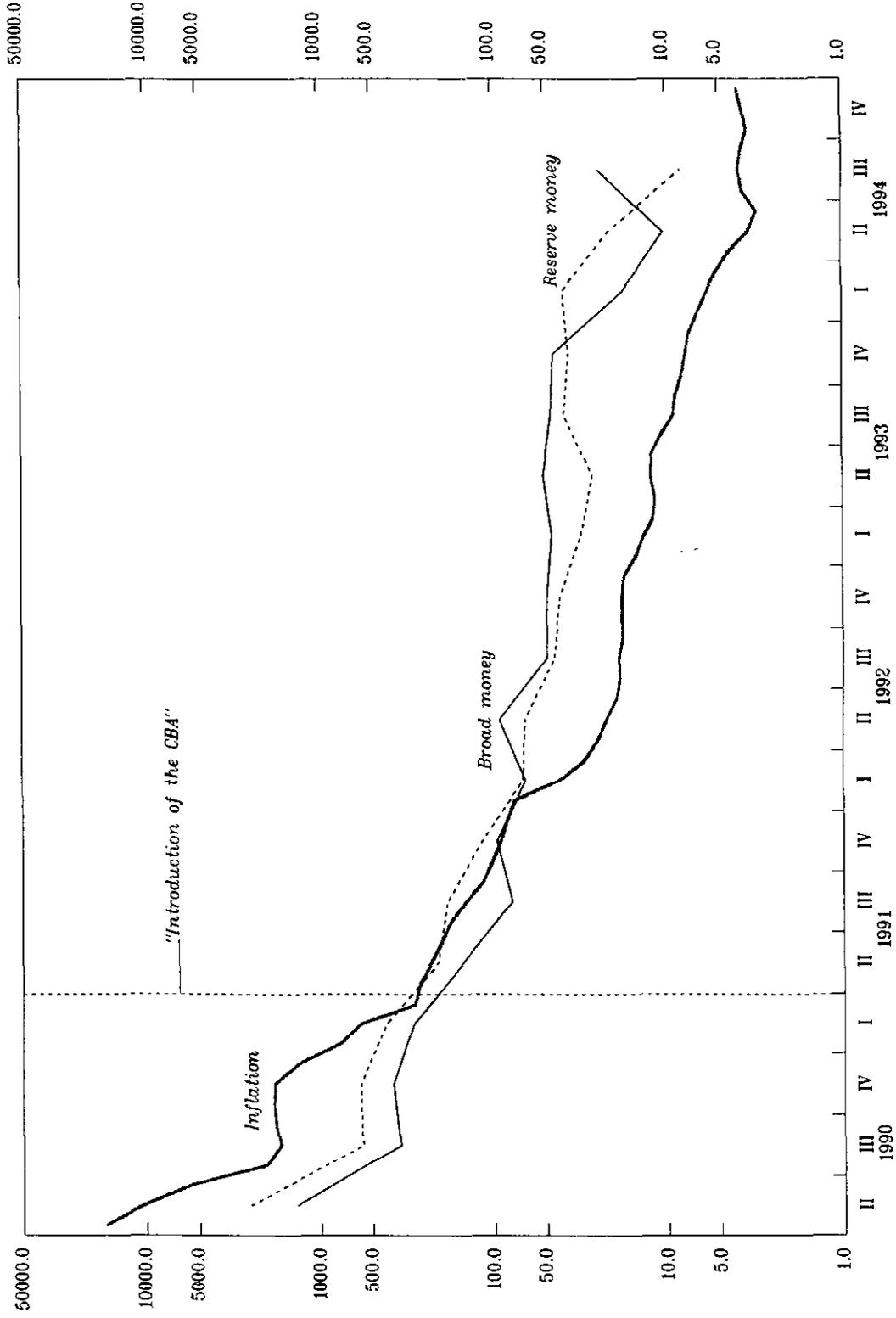
High inflation countries

15. In Argentina, since 1985 the authorities had implemented a series of stabilization programs that included wage and price freezes, measures to strengthen monetary and fiscal discipline, and exchange rate pegs. Nevertheless, continued lax fiscal discipline resulted in a persistently high rate of monetary expansion as the public sector primarily relied on the Central Bank for deficit financing. As a result, inflation accelerated and dollarization became entrenched. Following an extensive flight from local currency (austral) denominated assets during 1988-1989, a national election in 1989, and an assets freeze in January 1990, domestic liquidity became very tight and the exchange rate stabilized during the second and third quarters of 1990, resulting in a rapid fall of inflation (Figure 1).¹⁵ However, reserve money growth expanded in the last quarter of 1990 as the Central Bank extended sizable credits to the social security system and provided rediscounts to provincial banks that were facing runs on their deposits (Figure 2). As a result, the fiscal position weakened further and the austral depreciated by almost 70 percent. The CBA was introduced in April 1991 through the Convertibility Law as part of a comprehensive stabilization package to strengthen the credibility of a nominal exchange rate anchor.

16. Estonia and Lithuania introduced CBAs to deal with high inflation, which resulted, inter alia, from the liberalization of administered prices, terms of trade shocks, and the

¹⁵On January 1, 1990, the Government converted all of its austral-denominated public debt maturing in 1990, and the bulk of the austral-denominated time deposits of the banking system, to long-term U.S. dollar denominated bonds; see Ize and Mackenzie (1992). Between February and December 1990, the austral stabilized at an exchange rate equivalent to around 0.5-0.6 Argentine pesos per U.S. dollar. But it depreciated to around 0.95 pesos per U.S. dollar in January 1991 and to around 0.98 pesos per U.S. dollar by the time the CBA was introduced and the austral was replaced by the peso.

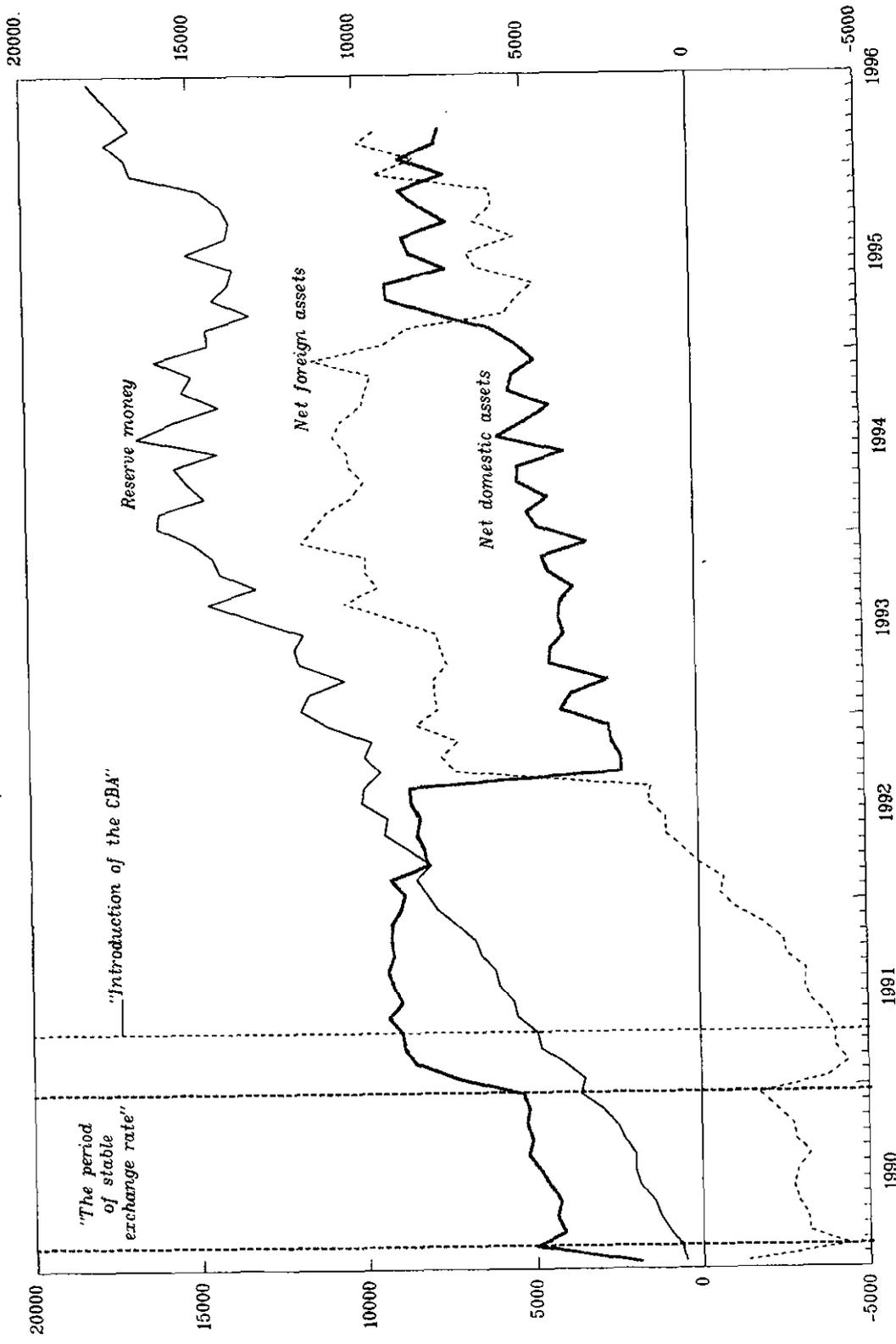
FIGURE 1
ARGENTINA
BROAD MONEY AND RESERVE MONEY GROWTH 1/
(In percent)



Sources: Argentine authorities and; International Financial Statistics.

1/ Calculated as the annualized quarterly change of broad money and reserve money.

FIGURE 2
ARGENTINA
RESERVE MONEY AND ITS COMPONENTS 1/
(In millions of pesos)



Source: International Financial Statistics.

1/ The increase in net foreign assets and decline in net domestic assets at September 1992 reflects primarily a transfer of balance of payments support loans to capital of the Central Bank.

depreciation of the Soviet ruble.¹⁶ After those countries introduced economic reforms and liberalized prices in 1991, their annual inflation rates accelerated from around 200 percent at end-1991 to over 1,000 percent at end-1992 (Figure 3).

17. In Estonia, the use of the rapidly depreciating Soviet ruble led to high inflation and mounting political pressures to introduce a national currency.¹⁷ Lacking a track record in monetary management and believing that policy credibility was important to the success of stabilization, the authorities adopted a CBA in June 1992.

18. In Lithuania, which also experienced high imported inflation during the early stage of transition to a market economy, rather than adopting a CBA from the outset the authorities introduced, in October 1992, talonas, or coupons (at par with the Russian ruble). They initially pursued a relaxed monetary policy, and stabilization was delayed.¹⁸ In June 1993, a new currency, the litas, was issued to replace the talonas, but without sufficiently tight monetary policy, inflation continued. To speed up stabilization, and encouraged by the success of Estonia's CBA, the authorities introduced a CBA through the Litas Stability Law on April 1, 1994.

Low inflation countries

19. In Hong Kong, the decision to adopt a CBA was driven by the need to end the 1983 crisis of confidence in the H.K. dollar.¹⁹ During the crisis, the H.K. dollar depreciated against the U.S. dollar by more than 50 percent; property and stock markets collapsed; and financial institutions experienced widespread deposit runs. As Hong Kong's economy was highly dependent on international trade and financial activities, a credible fixed exchange rate was deemed crucial for economic recovery.

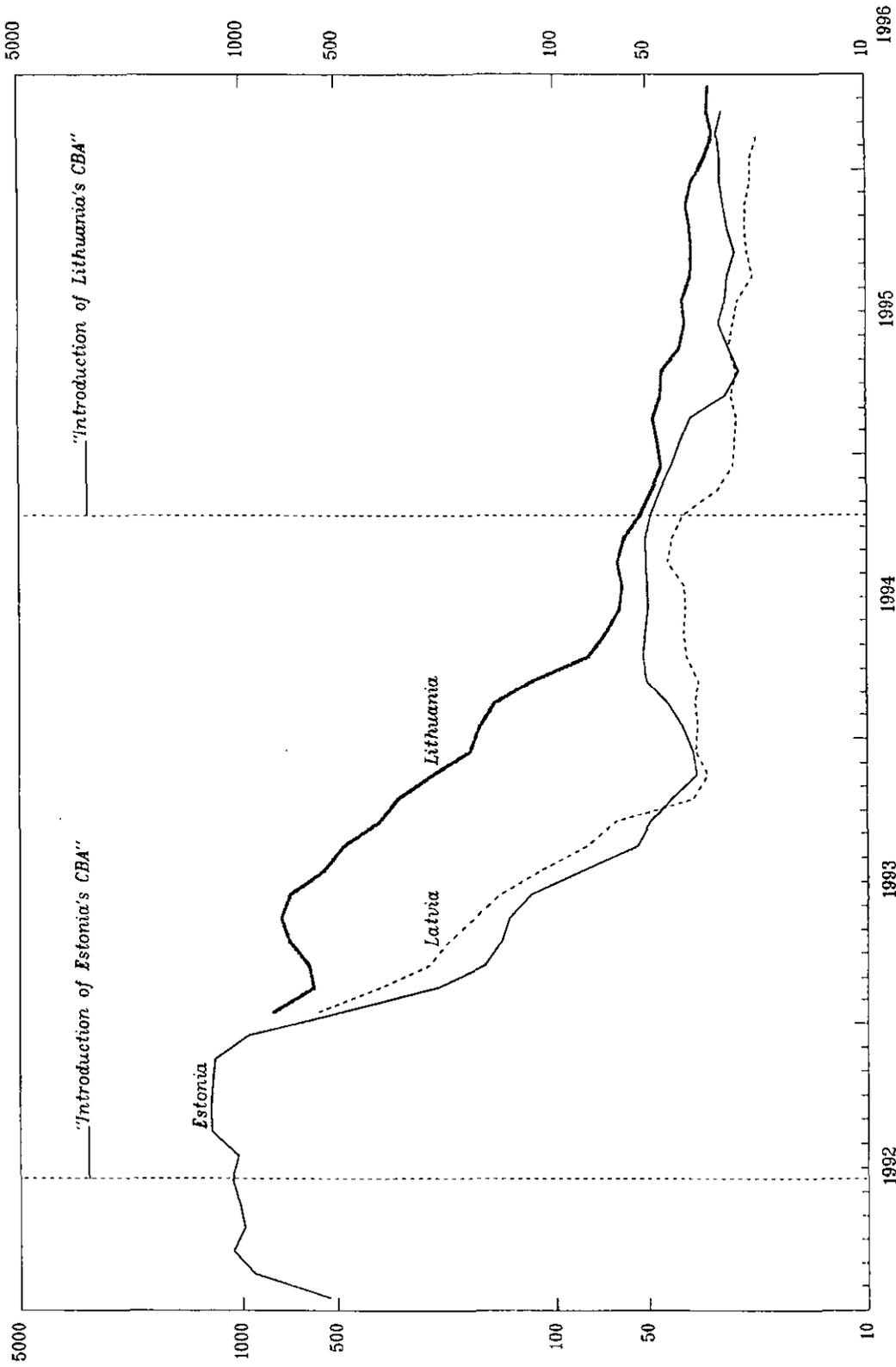
¹⁶The terms of trade shocks were primarily caused by Russia's sudden move towards world market prices for oil and other raw materials imported by the two countries.

¹⁷Estonia was the first country among the Baltic countries, Russia, and the other countries of the former Soviet Union to introduce its own currency.

¹⁸While annual broad money growth in Estonia declined steadily from around 130 percent at end-1991 to 68 percent at end-1992, broad money growth in Lithuania increased from 130 percent to 745 percent during the same period.

¹⁹The crisis occurred after the Chinese Government announced in August 1982 that it would take over Hong Kong in 1997.

FIGURE 3
ESTONIA, LATVIA, LITHUANIA
INFLATION 1/
(In percent)



Source: International Financial Statistics.

1/ Calculated based on year on year basis.

20. Brunei Darussalam, Djibouti, and member Governments of the ECCB adopted a CBA partly due to their limited central banking expertise. In the case of the ECCB, the CBA's simplicity and transparency also facilitates policy coordination between member countries.^{20 21}

B. Earlier CBA Exiting Experiences

21. A key concern in exiting from a CBA is whether the exit would drastically reduce credibility. In this regard, reviewing the experience of past CBAs can provide some insights. Despite the fact that Argentina in 1914 and 1927 and Malaysia and Singapore in 1973 suddenly exited from their CBAs, the authorities did not suffer from a loss of credibility nor unstable economic conditions, as the decisions were made in response to exceptional external shocks which were clearly evident to the public. Ireland avoided disruptions to economic activity by relaxing the backing rule and the power to change the fixed exchange rate gradually over time.

Argentina

22. Argentina had two experiences with gold-backed CBAs earlier this century, in 1902-1914 and 1927-1929.²² The abandonment of the CBA in 1914 followed a series of domestic and, more importantly, external shocks. During 1913-1914, Argentina experienced an economic recession caused by a crop failure and a severe monetary tightening. The latter was due to a fall in the Conversion Office's gold holdings that followed a decline in exports and large repayments of foreign bank loans.²³ With the outbreak of the First World War, capital inflows from Europe declined sharply and the situation deteriorated further.²⁴ To avoid losing more gold, the authorities prohibited gold exports in August 1914. To increase domestic

²⁰For a comparison between the ECCB and the Central African Monetary Union, see Nascimento (1994).

²¹Similarly, owing to a lack of central banking infrastructure and the need to maintain a transparent mechanism with minimal discretion, Bosnia and Herzegovina agreed to establish a CBA as their main monetary arrangement in the Dayton peace agreement.

²²For more information on Argentina's CBA and economic conditions during the period, see Salera (1941), pg. 18-51.

²³During June 1913-August 1914, currency notes fell by almost 20 percent (Salera (1941), pg. 23).

²⁴News about the War created a panic in Argentina. In order to avoid bank runs and further gold flights, the authorities closed all financial institutions, including the Conversion Office, for eight days.

liquidity, the limit on the backing rule was reduced to 40 percent and banks were allowed to rediscount commercial papers with the Central Bank.

23. After exiting from the CBA, the Argentine economy experienced further shocks which led to persistent devaluations of the peso. In 1924, Argentina began to have sizable export surpluses and attract capital inflows—mainly in the form of external borrowing from the New York money market—which led to an appreciation of the peso. With a view to protecting agricultural exports from further appreciation, the authorities reestablished the CBA by returning to the old gold parity and resuming convertibility. However, the new CBA was short-lived. In 1929, the world economy experienced a severe economic recession, a sharp and sustained decline in commodity prices, an emergence of protectionism, and a drastic reduction in foreign lending to developing countries. Under pressures from the agricultural sector to devalue the currency, and to avoid a severe monetary contraction and further gold losses, which could undermine the Government's ability to service its foreign debts, the President exercised his legal power to close the Conversion Office.²⁵ Subsequently, the peso depreciated sharply.

Malaysia and Singapore

24. After the Malayan Currency Board was abandoned in June 1967, following the break-up of Singapore and Malaysia, Singapore established the Board of Commissioners of Currency of Singapore (BCCS) to issue notes and coins which were fully backed by foreign assets and convertible at a fixed exchange rate with the pound sterling. In Malaysia, Bank Negara Malaysia (BNM), established in 1958, also assumed the issuing of notes within a CBA framework. The Malaysian ringgit was fixed at parity with gold, which effectively resulted in fixing the parity between the ringgit and the pound sterling, as the latter also kept a fixed parity with gold.²⁶ During that period, the currencies of Malaysia, Brunei, and Singapore were interchangeable and accepted at par in the three countries.

25. Following the floating of the pound sterling in June 1972, BNM and the Monetary Authority of Singapore (MAS) pegged their currencies to the U.S. dollar, within a band of 4.43 percent.²⁷ This measure was adopted to maintain the parity of the currency with gold, and to prevent it from depreciating along with the pound sterling. When the U.S. dollar devalued against gold in February 1973, the Malaysia and Singapore authorities opted to

²⁵Jiménez (1976), pg. 71-72.

²⁶The Central Bank was required to back at least 80.59 percent of currency outstanding with gold and foreign assets. In practice, the Central Bank maintained foreign assets equivalent to more than 100 percent of the backing coverage.

²⁷Under the Bretton Woods Agreement, Malaysia and Singapore received Fund approval to change their intervention currency and to widen the intervention band.

maintain the parity with gold, thereby revaluing the exchange rate with respect to the U.S. dollar (Figure 4). However, as the U.S. dollar continued to weaken, the ringgit and the Singapore dollar reached the bottom of the exchange rate band and depreciated against the currencies of their trading partners, which resulted in an increase in imported inflation. At the same time, expectations of an appreciation led to capital inflows and excess liquidity.

26. To enhance monetary control, the Malaysian and Singapore authorities in June 1973 terminated the interchangeability of their currencies and adopted floating exchange rate regimes, resulting in an initial appreciation of their currencies. Despite maintaining a backing requirement for notes and coins, the decision to adopt a managed float was essentially an exit from the CBA. These exits were not disruptive,²⁸ as they were effected from a position of strength and amid revaluation expectations.

Ireland

27. After becoming independent in 1927, Ireland established a currency board and tied the Irish pound to the pound sterling at parity.²⁹ Unlike other exit experiences discussed above, Ireland exited its CBA gradually, thereby allowing the central bank to establish a credible track record that facilitated a smooth exit.

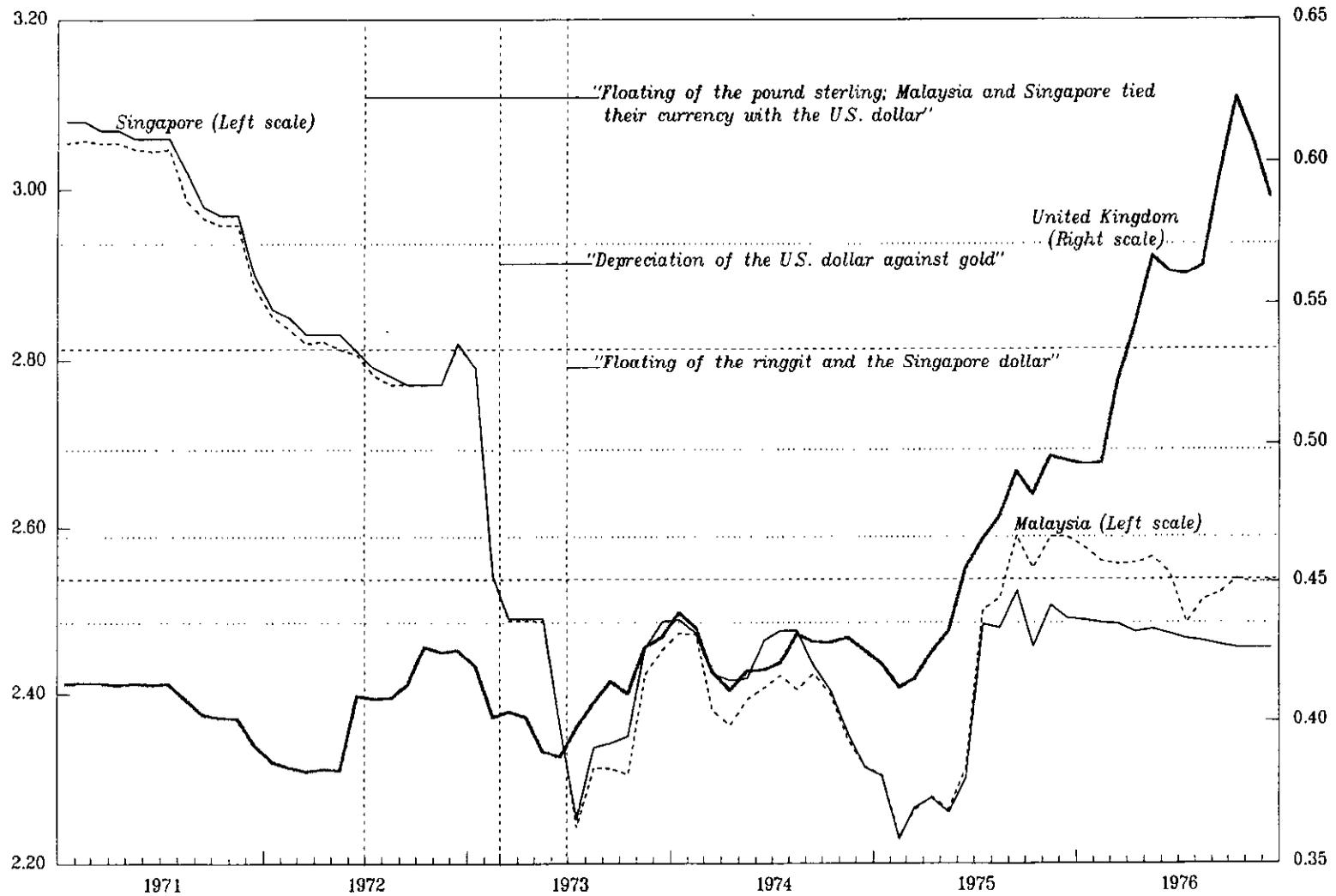
28. Although a central bank was created in 1943, its operations continued to be limited by the backing rule. The banking system resorted to banks in London for liquidity support, and the central bank lent neither to banks nor the Government.³⁰ The backing rule was relaxed by expanding the set of foreign assets eligible for backing, and by lowering, in 1961, the backing coverage to around 75 percent. In 1965, central bank lending to banks and the Government began on a modest scale. After 1971, exchange rate adjustments no longer required legislative change, but could be effected by the Minister of Finance in consultation with the central bank.

²⁸Economic growth in Malaysia declined from 12 percent in 1973 to 8 percent in 1974; in Singapore, it declined from 11.4 percent to 6.2 percent during the same period. Inflation increased from 9.9 percent for the year-ending June 1973 to 18.5 percent for the year-ending June 1994 in Malaysia, and from 20 percent to 23 percent in Singapore. However, one should note that the decline in economic growth and increase in inflation were also consequences of an oil shock and world wide recessions during the period.

²⁹Honohan (1994, pg. 19) points out that the Irish CBA coped well with shocks because the banking system had large foreign exchange reserves.

³⁰Honohan (1994, pg. 9).

FIGURE 4
MALAYSIA, SINGAPORE, AND UNITED KINGDOM
EXCHANGE RATE
 (National currency per U.S. dollar, end of period)



Source: International Financial Statistics.

Eventually, the fixed exchange rate with the pound sterling was abandoned after Ireland joined the newly formed EMS in 1979.³¹

IV. MACROECONOMIC PERFORMANCE

29. This section analyzes the macroeconomic performance of CBA countries. Developments after the CBAs were established are compared with those during the preceding periods or with those of comparable non-CBA countries.

A. Inflation, Economic Growth, and Real Exchange Rate Developments

30. The experiences reviewed in this section suggest that, by supplying money according to demand, CBAs have helped to stabilize and maintain low inflation, thereby providing a robust foundation for economic growth. Nevertheless, prices in high inflation CBA countries do not appear to have stabilized faster than those in non-CBA countries which had a comparable macroeconomic policy stance. In fact, because of the fixed exchange rate, some CBA countries have had persistently higher inflation than countries which adopted a flexible exchange rate regime and allowed the domestic currency to appreciate.

Argentina

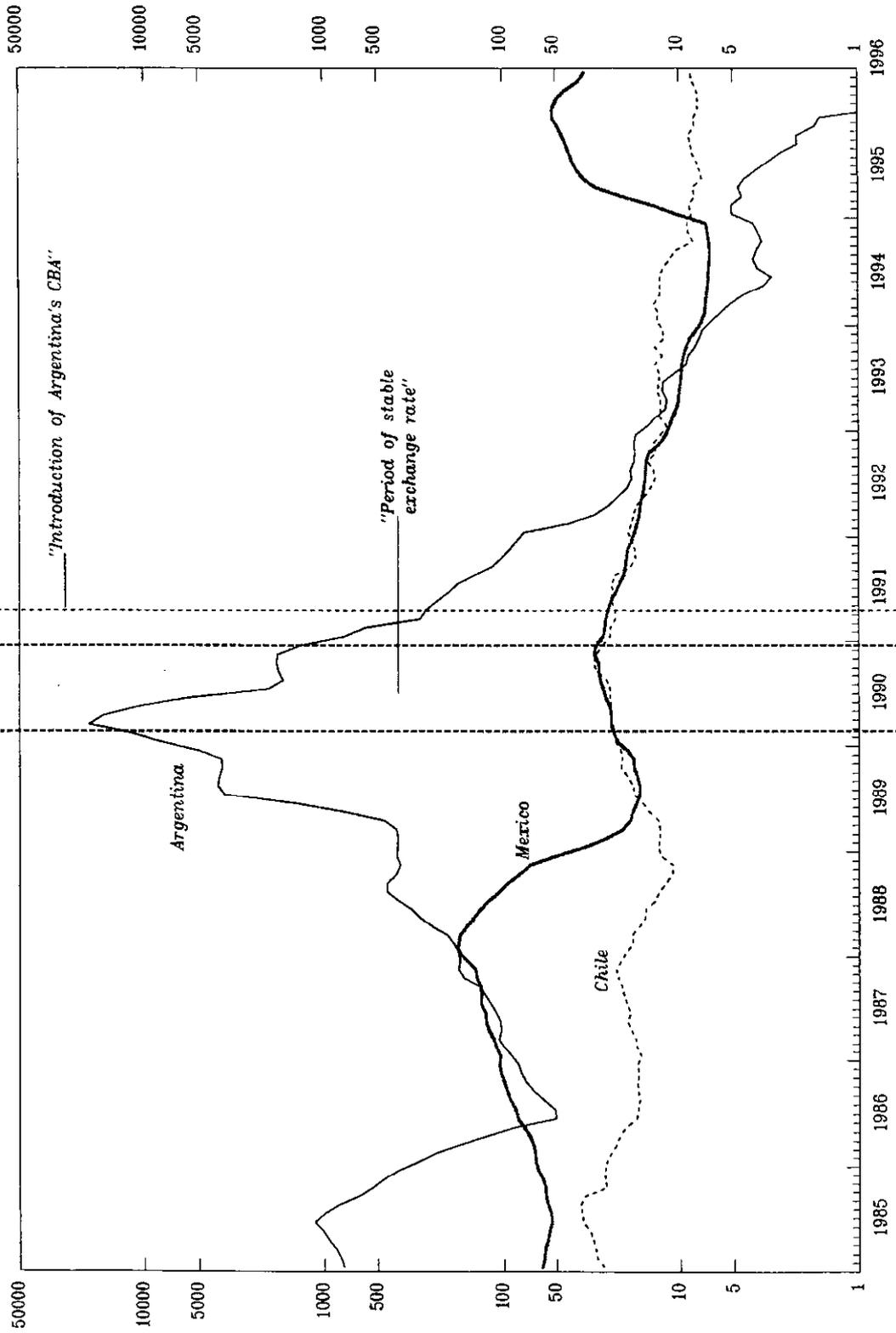
31. In Argentina the introduction of the CBA, together with the strengthening of financial policies, helped consolidate and accelerate the decline of inflation that was already underway. As net domestic assets of the central bank stabilized immediately after the CBA was introduced, reserve money growth decelerated sharply, notwithstanding a rapid build-up of international reserves caused by capital inflows (Figure 2). Since mid-1993, Argentina's inflation has remained lower than that of Chile and Mexico, where a basket-peg exchange rate regime and a crawling-peg exchange rate regime, respectively, were in place (Figure 5).

32. While price stabilization and increased credibility provided the foundation for a strong economic recovery, Argentina's inflation remained above that of its main trading partners until 1994.³² Hence, the real exchange rate appreciated very sharply during 1989-1993, both before the CBA was established and afterwards. The impact of this overall appreciation on competitiveness may have been mitigated by productivity gains and changes in tax structure,

³¹After Ireland joined the EMS, average interest rates on Irish pound-denominated assets substantially exceeded those in Deutschemark, due to the possibility of realignment within the EMS, and the lesser degree of integration between the Irish economy and those of EMS members other than the U.K.

³²In general, other countries that adopted exchange-rate based stabilization programs also experienced rapid growth. See Reinhart and Végh (1995).

FIGURE 5
ARGENTINA, CHILE, AND MEXICO
INFLATION 1/
(In percent)



Source: Information Notice System.

1/ Inflation is calculated based on year on year basis.

particularly the elimination of most export taxes. Thus, although the trade balance deteriorated from a surplus of US\$3.7 billion in 1991 to a deficit of US\$5.8 billion in 1994, both the volume and value of exports increased by around 31 percent during the period.

33. The real exchange rate, however, depreciated modestly—by around 10 percent—between February 1994 and May 1995, in part due to the tight monetary conditions accruing from capital outflows following the Mexican crisis (Figure 6) as well as ongoing structural reforms which raised productivity and lowered prices.

The Baltic countries

34. While both Estonia and Latvia adopted stabilization programs at an early stage, Estonia adopted a CBA while Latvia followed a conventional money-based stabilization program.³³ Notwithstanding these differences, the stabilization performance of the two countries was quite comparable. As argued by Saavalainen (1995) sound fundamentals, rather than the exchange rate regimes and currency arrangements per se, appear to have been the key factor underlying price stabilization in those countries.

35. In Lithuania, as in Argentina, establishment of the CBA does not appear to have directly accelerated the decline of inflation (Figure 3). However, it was instrumental in achieving adequate control of the Central Bank's net domestic assets. Although inflation started to decline after most administered prices were liberalized in mid-1993, broad money growth did not stabilize until the CBA was introduced in April 1994.

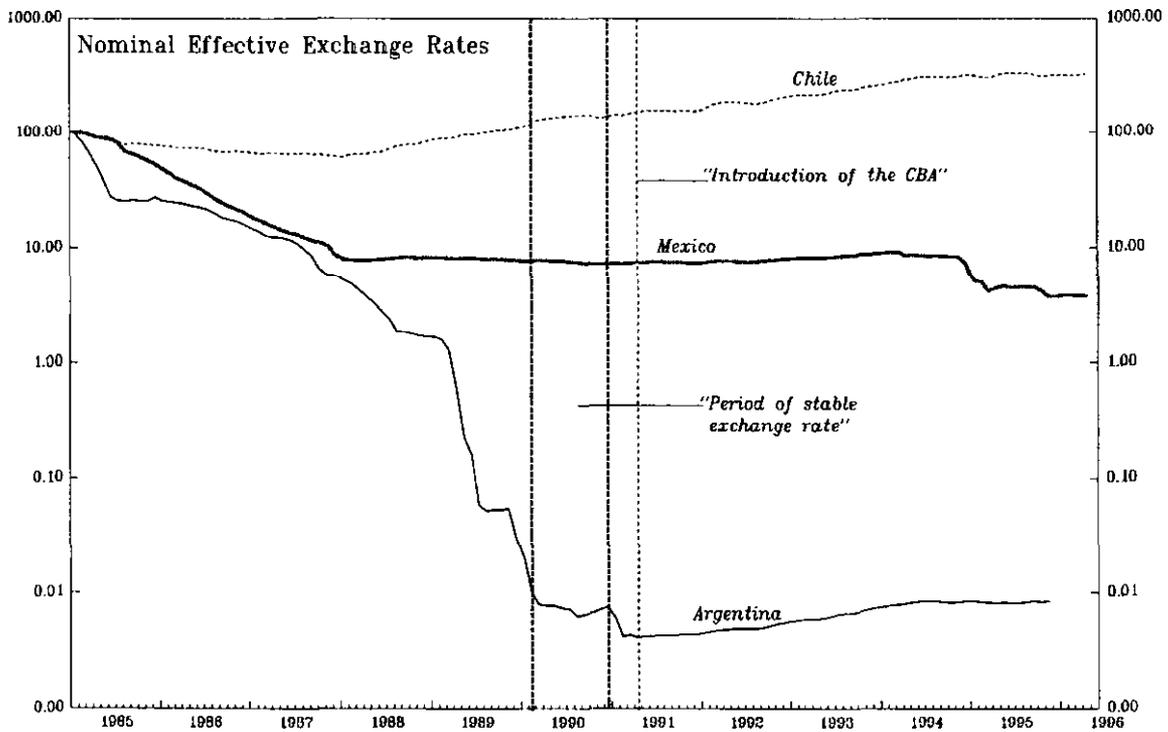
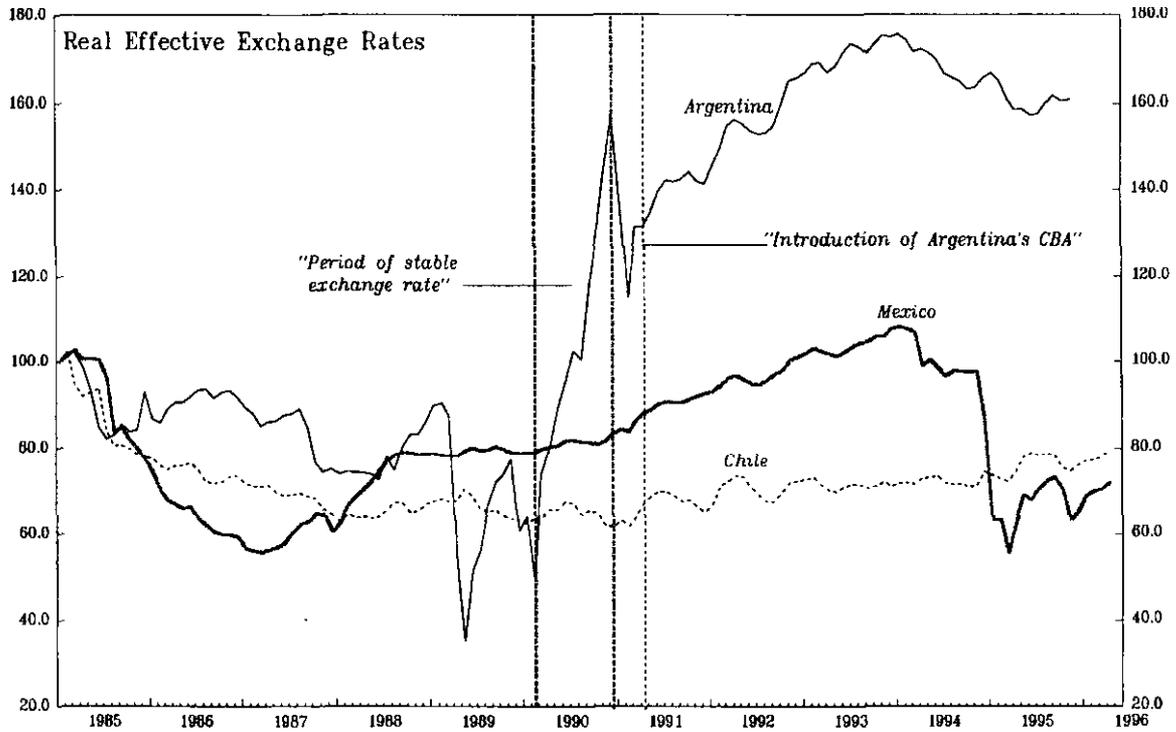
36. While contributing to bring inflation down from initially very high levels, the CBAs' fixed exchange rate appears to have hampered the reduction of inflation to levels comparable with those prevailing in industrial countries. Thus, Latvia's inflation outperformed Estonia's and Lithuania's after the periods of rapid stabilization (Figure 3).³⁴ As Estonia and Lithuania started their economic reforms with an undervalued real exchange rate, their real exchange rates adjusted towards their equilibrium levels through inflation.³⁵ In Latvia, by contrast, the

³³To some extent, the Latvian authorities also seem to have targeted the exchange rate almost immediately after introducing their own currency.

³⁴Of course differences in performance did not result entirely from differences in exchange rate regime. Moreover, since February 1994 Latvia has adopted a fixed exchange rate regime.

³⁵When the CBAs were introduced in Estonia and Lithuania, it was believed that their real exchange rates were undervalued. However, it is difficult to quantify the degree of undervaluation, as various structural reform measures were under way; see Richards and Tersman (1995), Saavalainen (1995), and Camard (1996).

FIGURE 6
ARGENTINA, CHILE, AND MEXICO
NOMINAL AND REAL EFFECTIVE EXCHANGE RATES
(Jan. 1985=100)



Source: Information Notice System.

effect on inflation was mitigated by an appreciation of the nominal exchange rate, as the lats/U.S. dollar exchange rate appreciated by almost 35 percent between end-1992 and end-1994.

37. With regard to the real exchange rate, the real value of the Estonian kroon rose sharply during the six-month period after the CBA was established, and continued to appreciate afterwards, albeit at a much lower rate (Figure 7). However, Estonia's export growth remained strong, suggesting that its competitiveness may not have been overly affected.³⁶ In Lithuania, the talonas appreciated strongly in real terms before the CBA was introduced, owing to high inflation. After the CBA was introduced, the real effective exchange rate of the litas remained stable (Figure 7).³⁷ Nevertheless, export growth declined from around 54 percent in 1993 to 10 percent in 1994 and export volume declined around 7 percent in 1994.

38. Among the three Baltic countries, the output loss was most severe in Lithuania, in part because of delayed stabilization and the authorities' relatively limited commitment to privatization and structural reforms.³⁸ Saavalainen (1995) argues that the CBA was one of the factors underlying the better growth performance in Estonia, compared to Latvia.³⁹ In Estonia, the CBA was perceived to guarantee exchange rate and price stability, thereby leading to

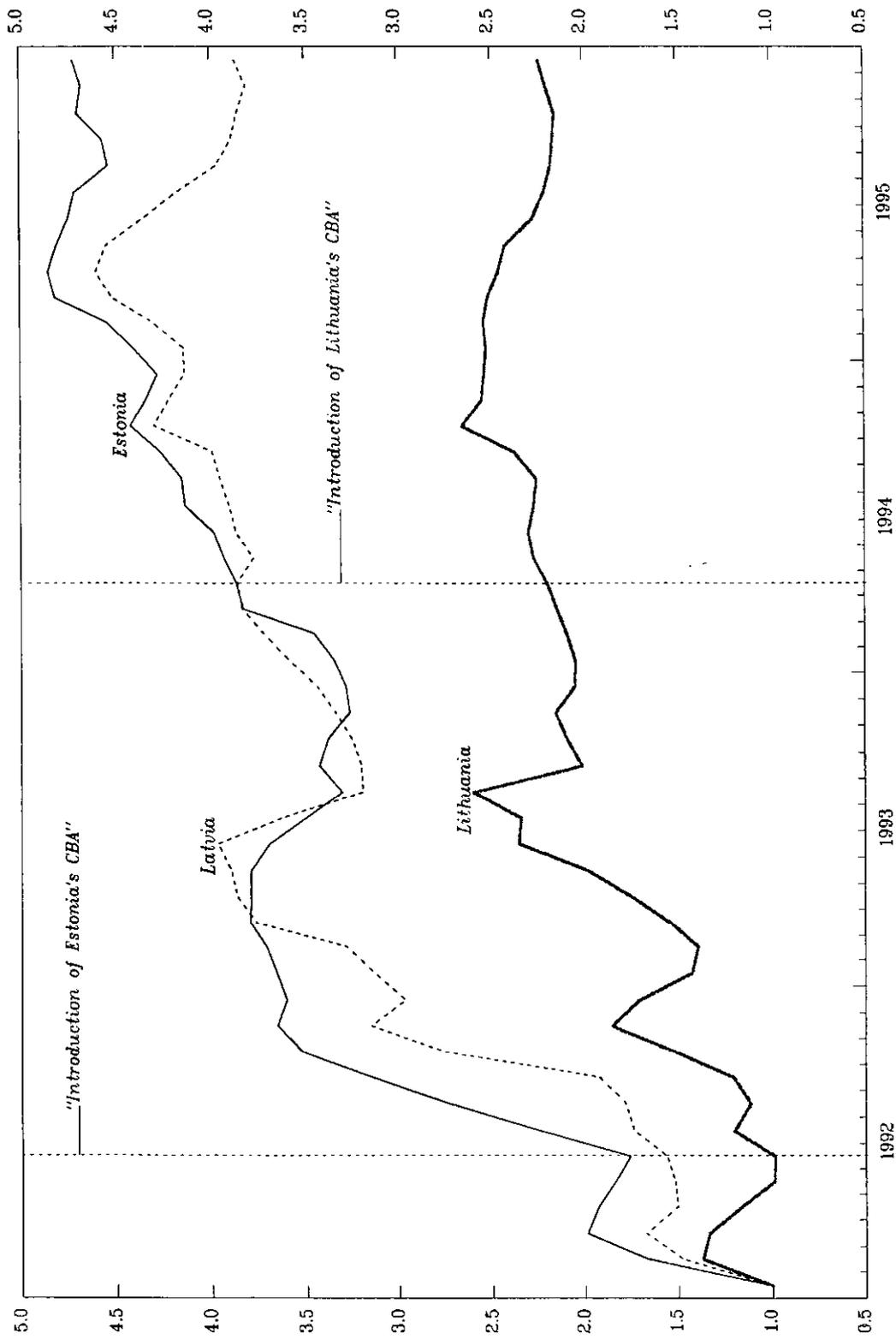
³⁶In U.S. dollar terms, Estonia's exports of goods and services grew by 75.9 percent and 56.2 percent in 1993 and 1994, respectively. The trade balance, however, had been slightly in deficit mainly because of a rapid expansion of imports financed by foreign direct investment.

³⁷The stability of the real effective exchange rate reflects, in part, Lithuania's slower shift in the pattern of trade towards the West, as compared to Estonia and Latvia. Richards and Tersman (1995) show that since 1992 Lithuania's real exchange rate appreciated more than that of Latvia and Estonia when calculated using only five industrialized countries in the SDR basket.

³⁸Saavalainen (1995, pg. 19) estimates cumulative output losses between the second quarter of 1992 and the end of 1994 (in percent of their initial levels) as 6.7 percent in Estonia, 11.8 percent in Latvia, and 17.3 percent in Lithuania.

³⁹Other factors included adverse supply shocks, a faster speed of privatization in Estonia, and closer historical and political ties between Estonia, and Finland and Sweden.

FIGURE 7
ESTONIA, LATVIA, LITHUANIA
REAL EFFECTIVE EXCHANGE RATES
(1992=1)



Sources: Country desks.

larger net inflows of foreign direct investment.⁴⁰ In addition, interest costs were lower as interest rates converged at a much faster pace to levels in the international financial market.⁴¹

Hong Kong

39. Inflation declined from around 10 percent when the CBA was established in 1983 to a trough of 3 percent at end-1986, before rising again to between 8.5 and 12 percent during the period 1989-1993 (Figure 8). The relatively high inflation may be partly explained by differential productivity growth.⁴² In addition, aggregate demand, which was enhanced by an increase in Hong Kong's trade with China, was stimulated further during the early 1990s by relaxed monetary conditions imported from the U.S. through the fixed exchange rate.⁴³ Money also expanded rapidly owing in part to steady surpluses in the trade balance.⁴⁴ In contrast, inflation in Singapore fluctuated between 2.3 to 3.5 percent during this period, as the Singapore dollar appreciated in nominal terms against the U.S. dollar by around 15 percent (Figures 8 and 9).⁴⁵

⁴⁰In 1993, foreign direct investment in Latvia was only US\$51 million as compared to US\$154 million in Estonia. During 1994-1995, cumulative foreign direct investment in Estonia and Latvia was around US\$400 million and US\$300 million, respectively. See Ize (1996) for more information on capital inflows.

⁴¹See section IV.B.

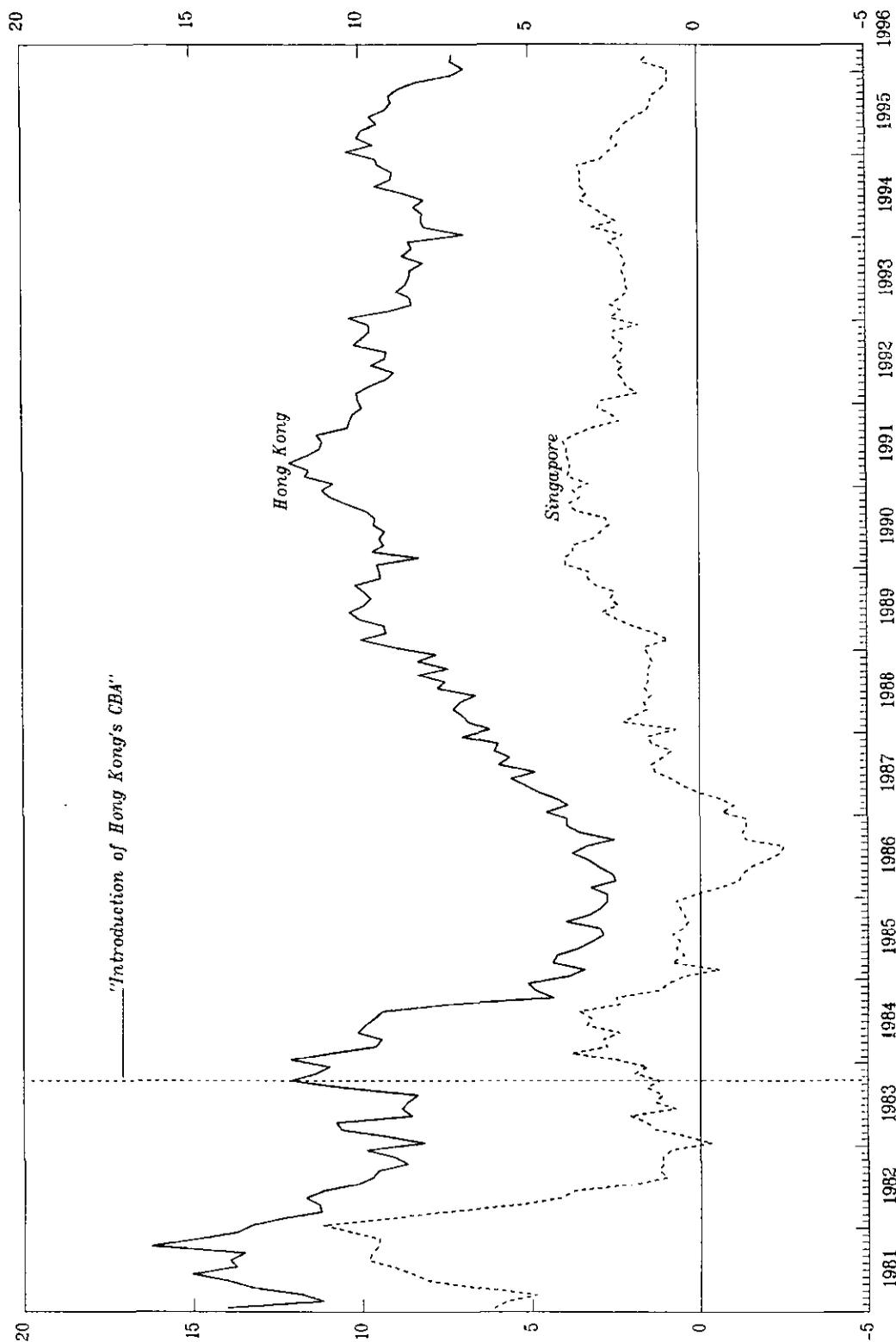
⁴²See Hong Kong Monetary Authority (1995).

⁴³Before the U.S. tightened its monetary policy stance at the beginning of 1994, real lending rates for Hong Kong dollar funds were negative.

⁴⁴From 1990 to 1993, average yearly broad money growth was around 16 percent. During the same period, net balance of trade on goods and non-factor services fluctuated between 5.8 and 8.5 percent of GDP. Capital account statistics are not available in Hong Kong.

⁴⁵Since 1980, the MAS has used the exchange rate as the intermediate target of monetary policy. The MAS has monitored the Singapore dollar against an undisclosed basket of currencies within a target band which, in turn, is set according to actual and projected inflation pressure. During the 1980s, the exchange rate was allowed to appreciate to reduce imported inflation and dampen demand pressure. For more information on Singapore's exchange rate policy, see Bercuson (1995).

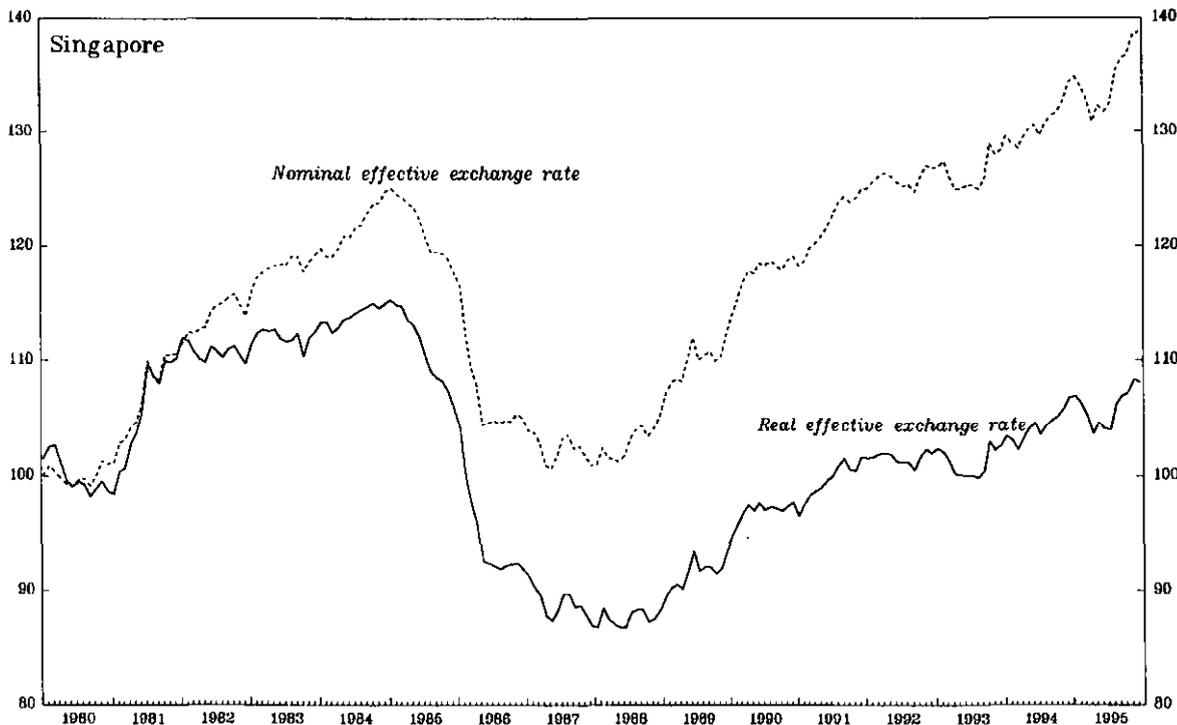
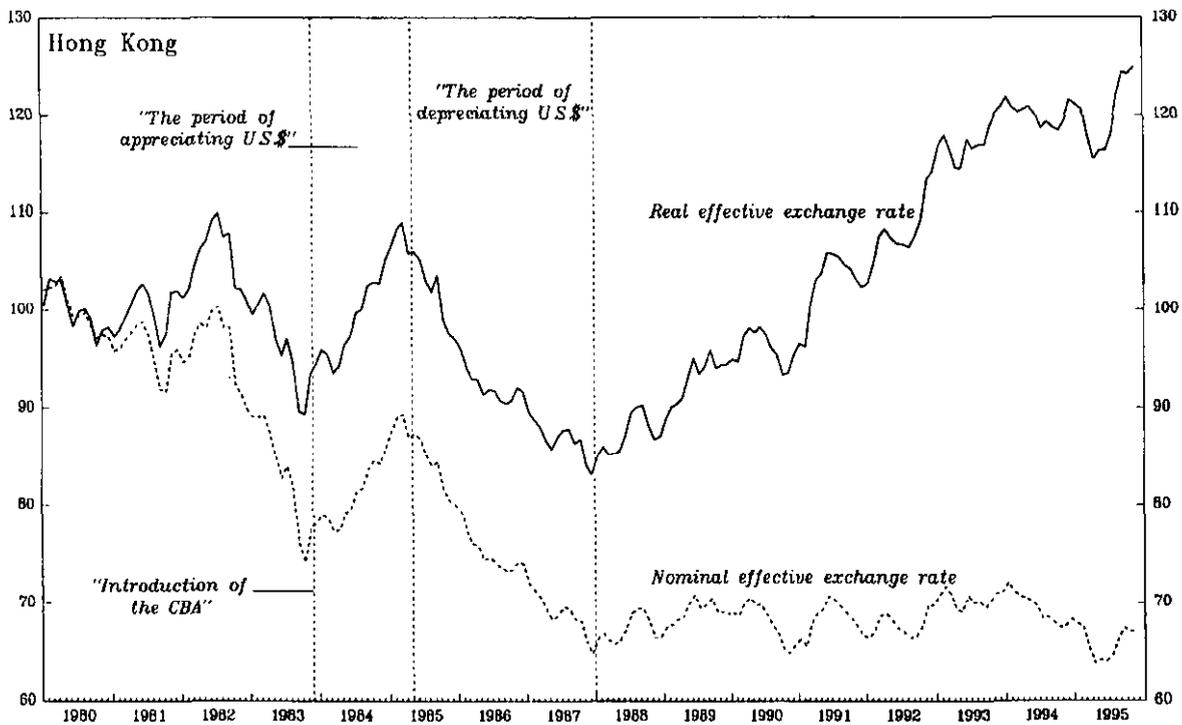
FIGURE 8
HONG KONG AND SINGAPORE
INFLATION
(In percent)



Source: International Financial Statistics.

1/ Inflation is calculated based on year on year basis.

FIGURE 9
HONG KONG AND SINGAPORE
NOMINAL AND REAL EFFECTIVE EXCHANGE RATES
(1980=100)



Source: Information Notice System.

Although the exchange rate was set at a slightly more appreciated level than the concurrent market rate when the CBA was established, both the nominal and real effective exchange rates were the lowest they had been in many years. Nevertheless, Hong Kong did not benefit much from the initial real undervaluation as its real exchange rate was strongly influenced by the fluctuations in the value of the U.S. dollar against the currencies of its other trading partners (Figure 9). Even though the real effective exchange rate appreciated by almost 50 percent between 1988 and 1995, export growth remained strong.⁴⁶ Hong Kong's competitiveness was maintained through various means, including a shift towards higher productivity industries, an increase in investment in higher education, infrastructure developments, and an increase in production linkages with low-cost operations in China.

40. During the currency crisis before the CBA was established, international trade and investment were disrupted by the sharp depreciation of the H.K. dollar caused by capital outflows, and real economic growth declined from 9.2 percent in 1981 to 2.7 percent in 1982. After the CBA was established, economic and exchange rate stability led to a return of capital, and a recovery of international trade, international investment, and economic growth.⁴⁷

Other CBAs

41. As Brunei Darussalam ties its currency to a strong reserve currency, i.e., the Singapore dollar, and imports a large fraction of its basic goods from Singapore, it has benefitted from low inflation imported from that country.⁴⁸ Between 1981 and 1994, inflation in both countries averaged around 2.5 percent.

42. In the case of the ECCB countries, Marston (1995) shows that they had lower inflation than other Caribbean countries. During the period 1987-1992, annual inflation fluctuated between 2 and 5 percent, while that of Barbados, Guyana, Jamaica, and Trinidad and Tobago ranged from 12 to 42 percent. Marston (1995) also suggests that the ECCB countries grew faster, on average, than the other Caribbean countries during 1987-1991, in part, owing to their relatively stable inflation.⁴⁹

⁴⁶The average growth rate of exports reached 24.4 percent during the period of real depreciation, 1986-1987. Average annual growth rates of exports during the periods of real appreciation were 14.2 percent in 1983-1985 and 15.1 percent in 1988-1995.

⁴⁷Economic growth was close to 10 percent in 1984 and averaged 8.8 percent during the remainder of the 1980s.

⁴⁸In 1994-1995, approximately 30 percent of Brunei Darussalam's total imports originated in Singapore.

⁴⁹During the period, the average annual growth rate of the ECCB countries ranged from
(continued...)

43. Djibouti is the only CBA country in the sample that has experienced very low real economic growth.⁵⁰ While inflation has been generally modest, competitiveness has been adversely affected by its choice of reserve currency and labor market inflexibility. Despite the fact that Djibouti trades mainly with France and other European countries, the Djibouti franc is tied to the U.S. dollar. As a result, inflation and competitiveness have experienced sharp swings due to the fluctuation in the U.S. dollar/French franc exchange rate (Figure 10).⁵¹

B. Interest Rate Developments

44. In the absence of capital controls, CBAs are expected to reduce exchange rate risk and, hence, facilitate the convergence of interest rates to levels prevailing in the reserve-currency country.⁵² In addition, during a currency crisis, short-term interest rates should rise to reverse the shift in demand for foreign currency. Experiences clearly confirm those expectations. In almost every country, rapid interest rate convergence occurred immediately after the CBAs were introduced. At the same time, sharp interest rate adjustments were also evident during currency crises in Argentina and Hong Kong.

Argentina

45. Immediately after the CBA was introduced, the monthly deposit rate and interfirm market rate declined from 9.2 percent and 12.5 percent in March 1991 to 1 percent and

⁴⁹(...continued)

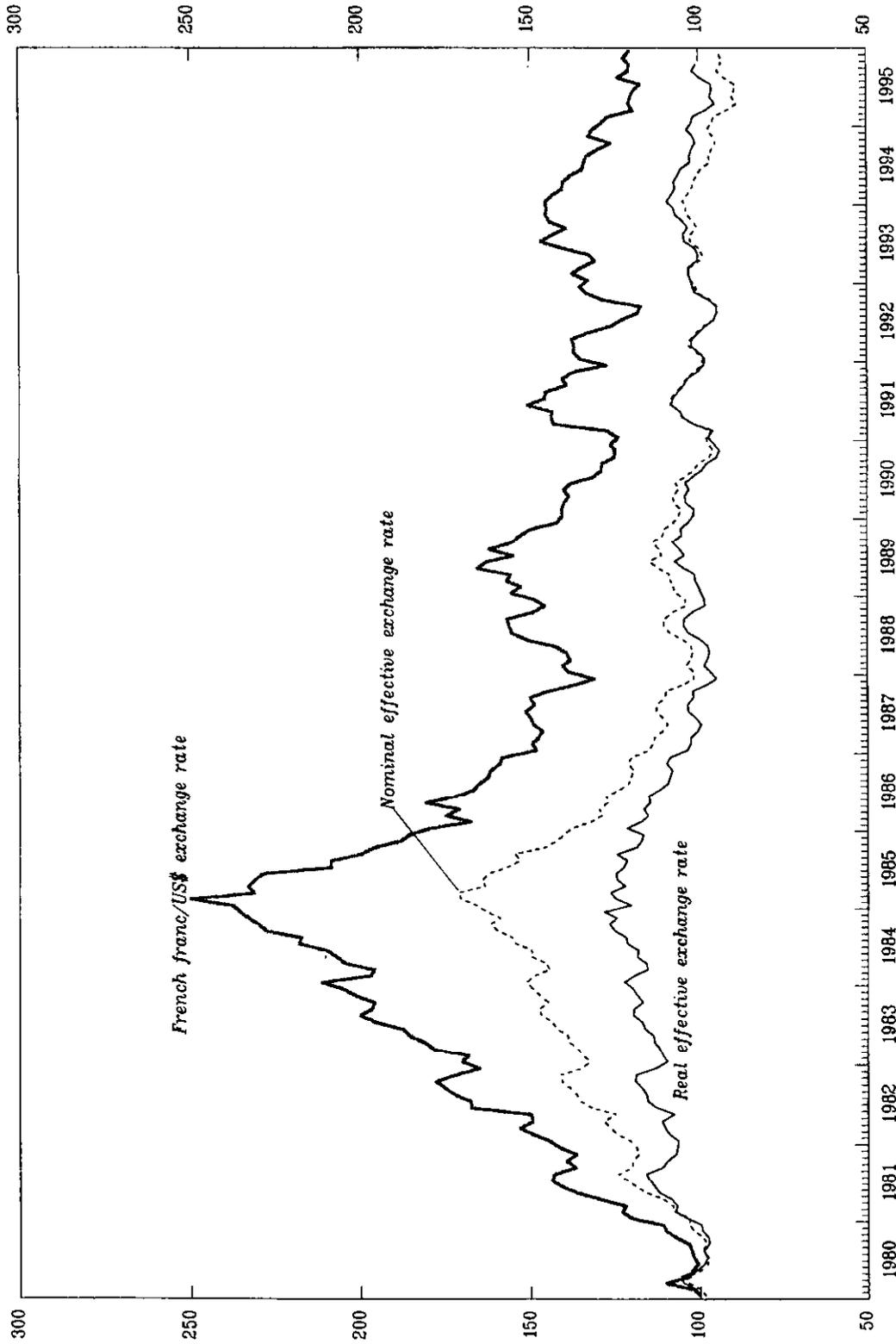
4.0 to 9.5 percent, while that of the other Caribbean countries ranged from 0.4 to 3.1 percent.

⁵⁰During the past fifteen years, real economic growth in Djibouti fluctuated between -4.5 and 2.9 percent, with seven years of negative growth. Besides limited resources, low growth was caused by erratic weather conditions, internal armed conflict, and depressed activity in its main sea-ports. Factors affecting low growth in Djibouti include in recent years the adverse impact of the Government's accumulating arrears to public enterprises and to the private sector.

⁵¹ For example, inflation jumped from below 2 percent in the early 1980s to 16 percent in 1986 when the U.S. dollar depreciated sharply against the French franc. However, it should be noted that there is no comprehensive measure of inflation in Djibouti; only a consumer price index for expatriates exists.

⁵²Among the CBA countries covered in this paper, capital controls remain in place only in the ECCB countries. Estonia maintained capital controls up to end-1993.

FIGURE 10
DJIBOUTI
NOMINAL AND REAL EFFECTIVE EXCHANGE RATES
(1980=100)



Sources: Djibouti desk; and International Financial Statistics.

1.4 percent in April, respectively (Figures 11 and 12).⁵³ Both currency and country risks declined steadily, reflecting the CBA's credibility. Currency risk, which may be inferred from the spread between interest rates on peso and U.S. dollar deposits, fell from around 5 percent in April 1993 to 1 percent in February 1994.⁵⁴ Except for a small run at end-1992, the Argentine peso deposit rate converged to the U.S. deposit rate at a faster pace than the Mexican peso deposit rate (Figure 12). Furthermore, the Argentine peso deposit rate increased less than similar rates in Mexico and returned much faster to its original level during the 1995 currency crisis.⁵⁵ Similarly, the spread between the U.S. dollar deposit rate in Argentina and a comparable deposit rate in the U.S.—i.e., country risk—also declined steadily after April 1993, reaching a marginal level at end-1994. However, it jumped up sharply in 1995 when the pressure on the currency was compounded by banking sector problems (Figure 12).

The Baltic countries

46. As argued by Saavalainen (1995), the rapid decline in interest rates during the early reform period in Estonia, as compared to Latvia, appears to be mostly a result of the higher credibility of its CBA.⁵⁶ In 1994 and 1995, the Estonian interbank rate deviated from the German interbank rate by less than 0.5 percent on average, and the spread between deposit rates in the two countries declined continuously (Figures 13 and 14). By contrast, the interbank rate in Latvia, albeit declining recently, was still at around 20 percent at end-1995. In Lithuania, the interbank rate also declined sharply after the CBA was adopted; however, the rates remained higher than in Estonia due to problems in the Lithuanian banking system and persistent rumors of devaluation.⁵⁷

⁵³The deposit rate reflects the average rate paid on most savings and time deposits as reported in a central bank survey. The interfirm market rate is a lending rate for seven-day operations secured by Argentine Government bonds denominated in U.S. dollars. Lending rates, which were influenced by conditions of the banking system and domestic risk factors, as well as lending policy and strategies of financial institutions, did not converge as rapidly to levels in the U.S.

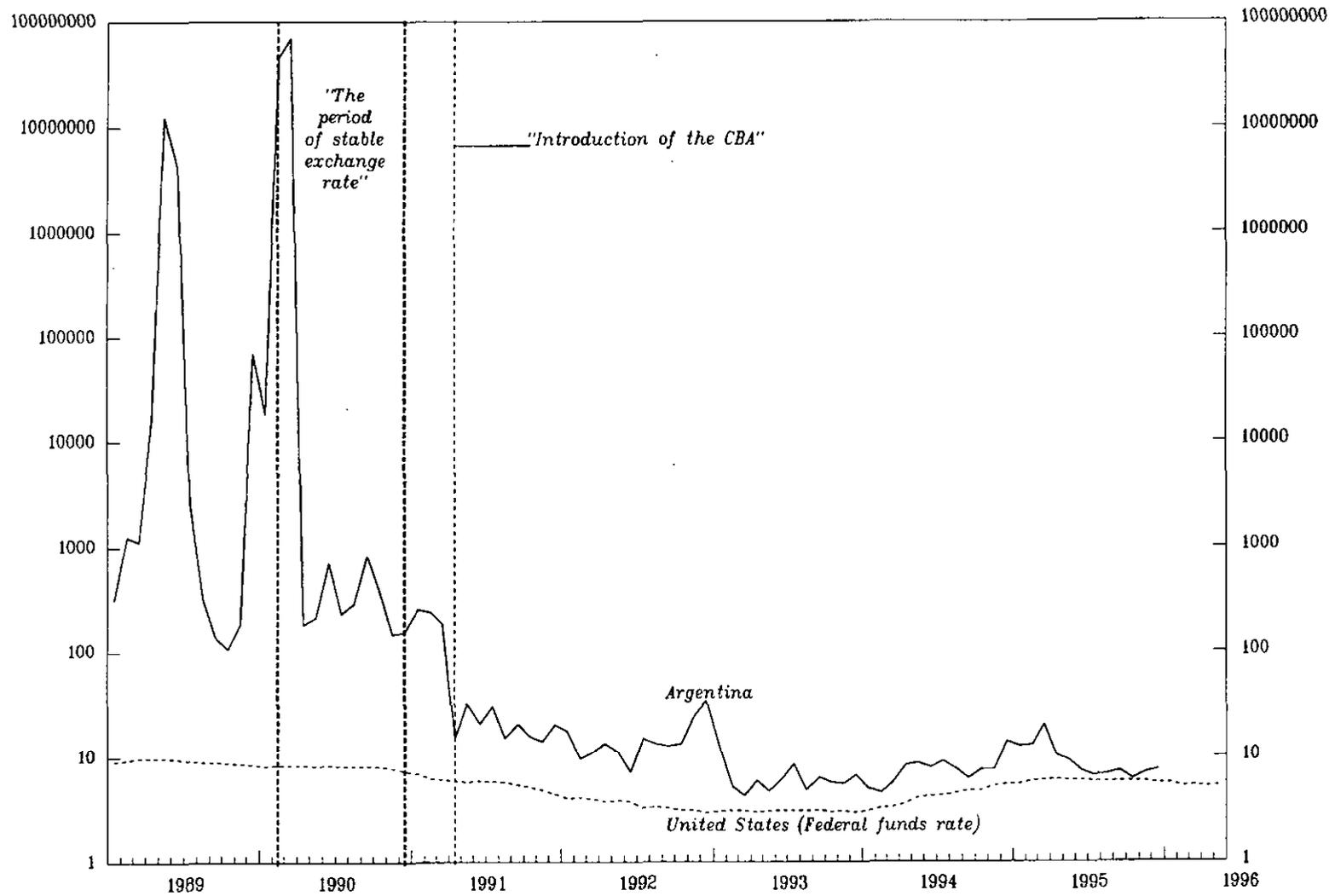
⁵⁴The spread, however, increased to a peak of 9.5 percent in March 1995 following the aftermath of the Mexican crisis.

⁵⁵See Sections V and VI.

⁵⁶For instance, at end-1993, the interbank rate in Estonia was 6.3 percent as compared to 50.8 percent in Latvia and 98.3 percent in Lithuania.

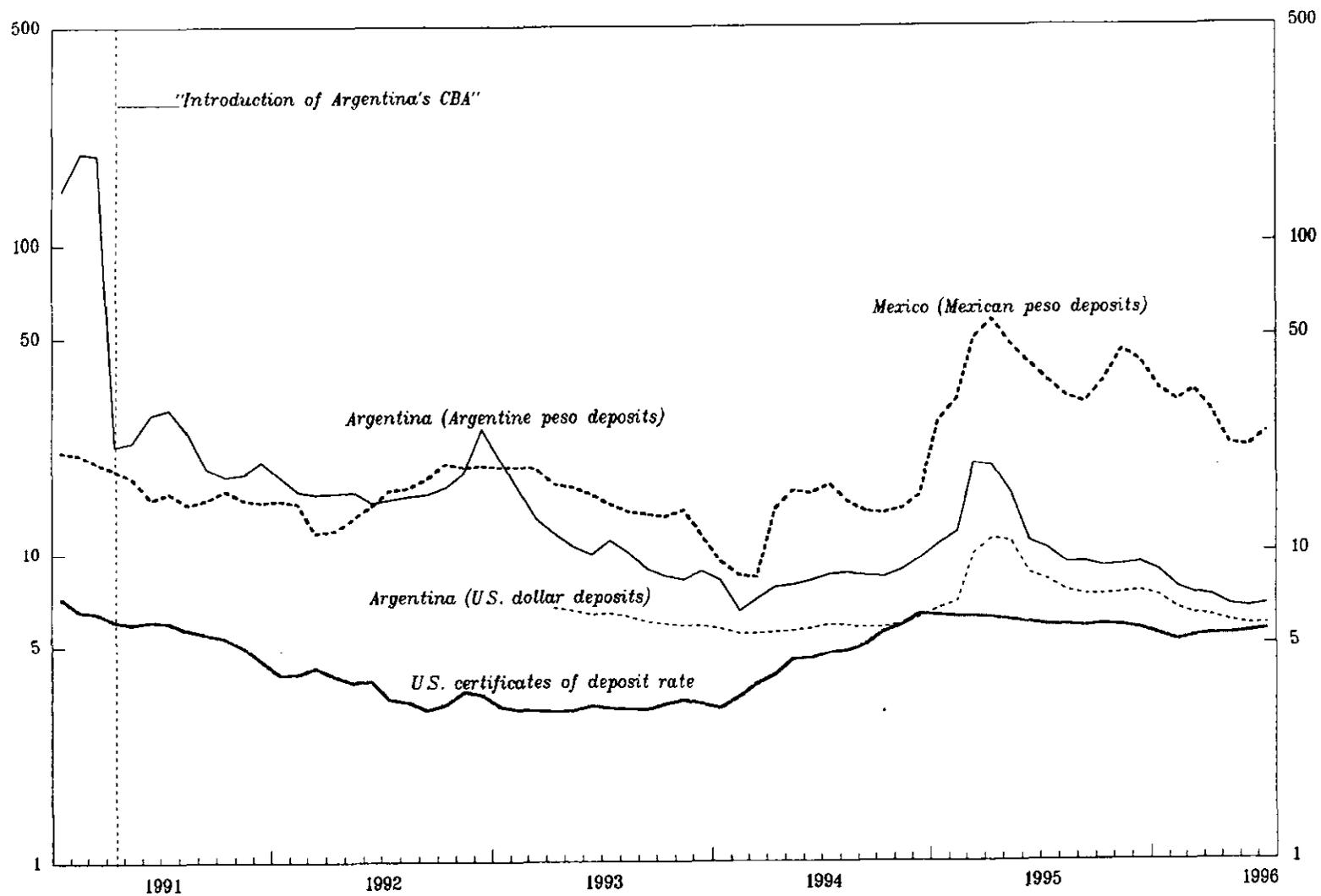
⁵⁷See Camard (1996).

FIGURE 11
 ARGENTINA
 MONEY MARKET RATES
 (In percent per annum)



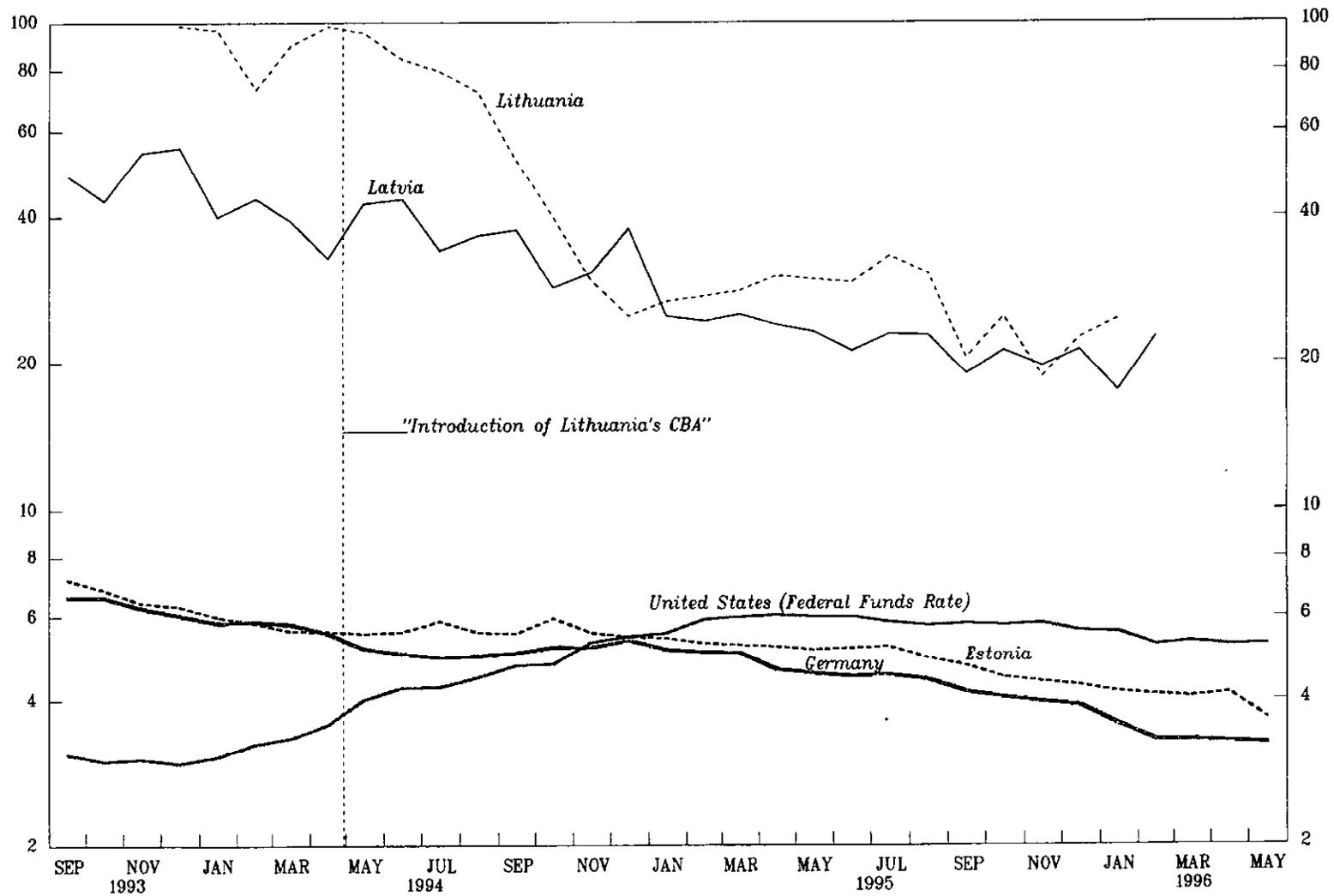
Source: International Financial Statistics.

FIGURE 12
ARGENTINA, MEXICO, AND THE UNITED STATES
DEPOSIT RATES
 (In percent per annum)



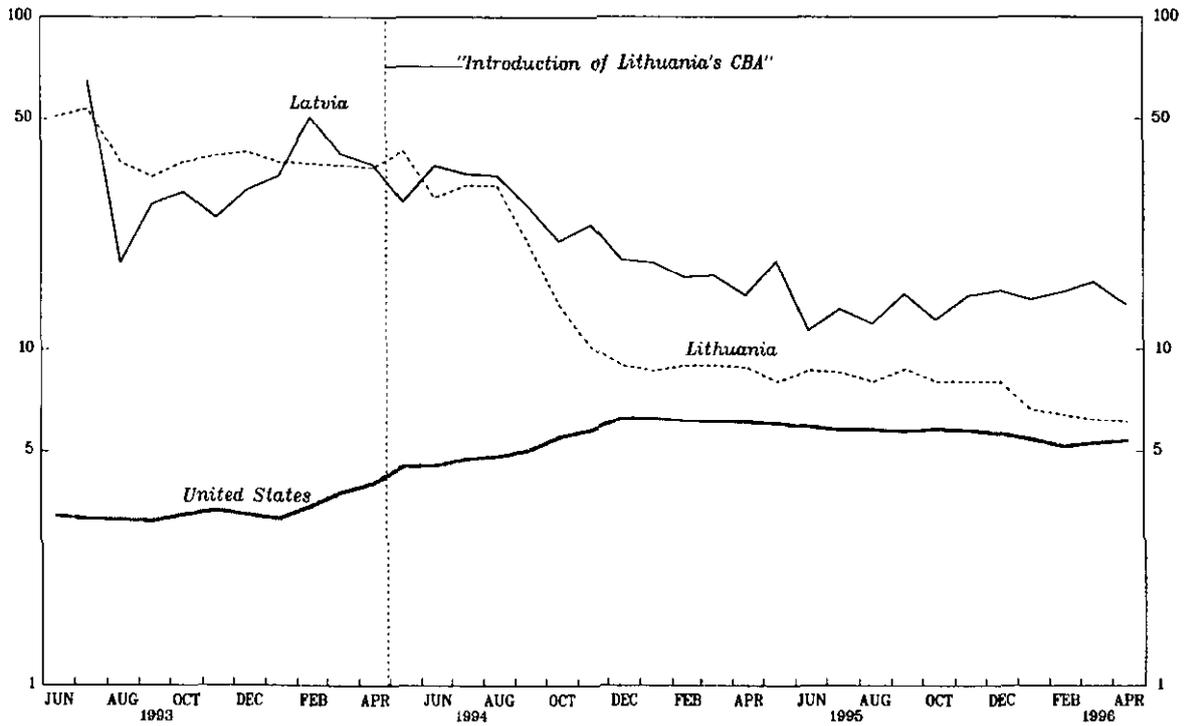
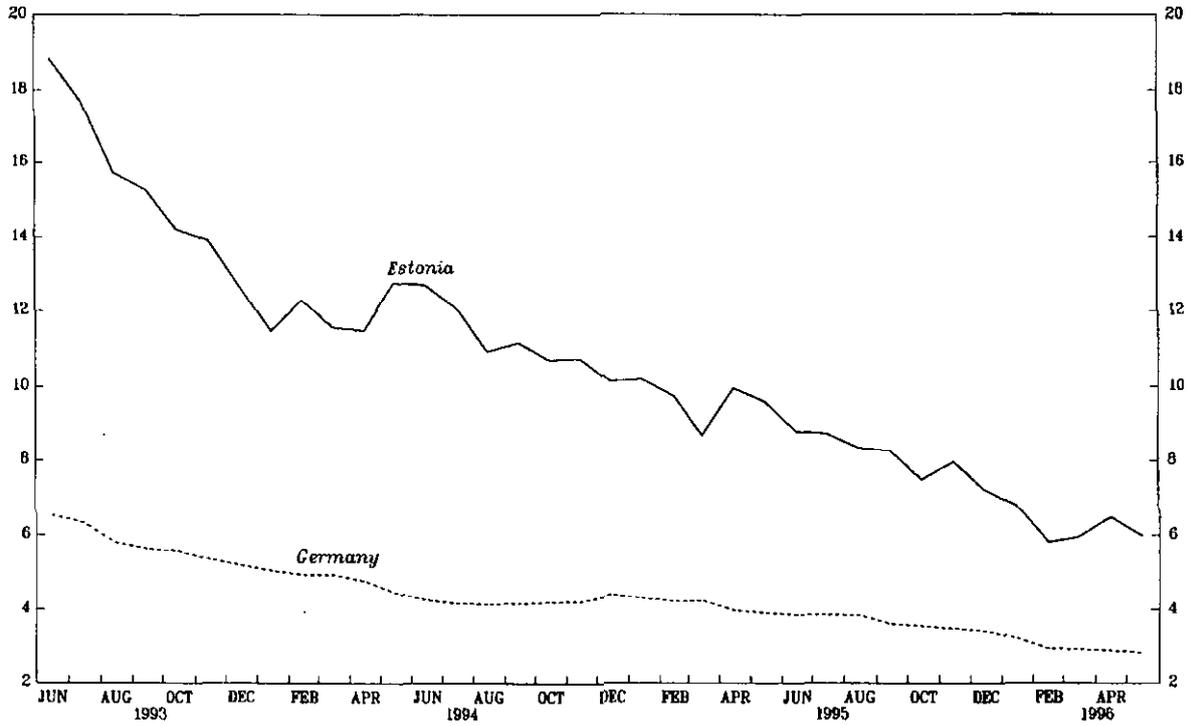
Sources: 1995 Argentina RED (SM/95/248, page 72), 1996 Argentina Selected Issues and Statistical Appendix (SM/96/259, page 77); and International Financial Statistics.

FIGURE 13
 ESTONIA, GERMANY, LATVIA, LITHUANIA, AND THE UNITED STATES
 INTERBANK RATES
 (In percent per annum)



Source: International Financial Statistics.

FIGURE 14
ESTONIA, GERMANY, LATVIA, LITHUANIA, AND THE UNITED STATES
DEPOSIT RATES
(In percent per annum)



Source: International Financial Statistics.

Hong Kong

47. The Hong Kong Interbank Offer Rate (HIBOR) converged to the LIBOR quickly after the CBA was introduced. Since then, spreads between the two rates have been small except during 1985-1987 when revaluation expectations prevailed (Figure 15). While the volatility of the HIBOR and the deposit rate was substantial, it was reduced after the Liquidity Adjustment Facility (LAF), a rediscount facility, was introduced in June 1992 and the HKMA adopted an interest rate targeting strategy in March 1994.⁵⁸ Spreads between the rates for H.K. dollar and U.S. dollar transactions—both deposits and lending—also declined steadily over time.⁵⁹

Other CBAs

48. To benefit from interest rate convergence, a CBA's financial system must be linked to the world financial market. In Brunei Darussalam, the domestic financial market functions as an extension of the Singapore's financial market; thus, interest rates in Brunei Darussalam follow those in Singapore closely. By contrast, in the ECCB countries, there is no interest rate convergence to the U.S. levels and among the member countries due to the existence of capital controls.

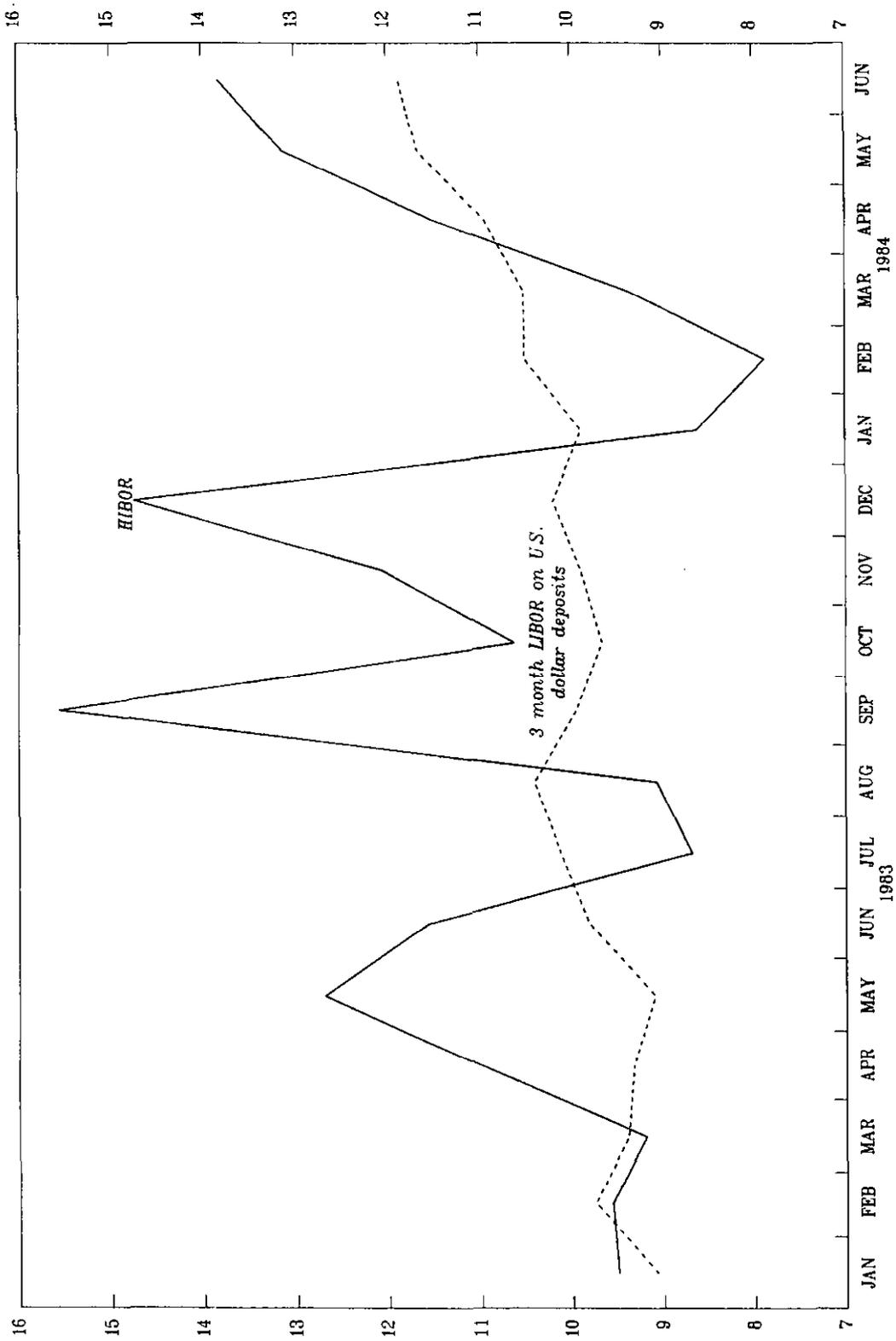
C. Fiscal Adjustment

49. As budget deficits cannot be monetized and other domestic financing is limited, fiscal policy in CBA countries has to be more disciplined. In addition, in view of the limited scope for monetary and exchange rate policies, reliance on sound fiscal policies for macroeconomic management is particularly important. Experience suggests that while CBAs have promoted fiscal discipline, they have not guaranteed it. While significant fiscal adjustments were achieved in Argentina and fiscal discipline was strictly maintained in the Baltic countries, large fiscal deficits and payments arrears persisted in Djibouti and some ECCB countries. Fiscal policy has been used in Hong Kong to strengthen the economy's competitiveness.

⁵⁸See Section VI for more information.

⁵⁹Although the spread between the H.K. dollar Base Lending Rate (BLR) and the U.S. prime lending rate has declined over time, the BLR was quoted by the HSBC at a margin over the U.S. prime lending rate during most of the CBA period.

FIGURE 15
HONG KONG AND THE UNITED STATES
INTEREST RATES



Sources: Hong Kong Monetary Authority; and International Financial Statistics.

Argentina

50. Fiscal adjustment was at the core of Argentina's stabilization efforts during the period in which the CBA was implemented. Fiscal policy aimed at achieving an annual primary surplus (excluding privatization proceeds) sufficient to meet the interest obligations of the nonfinancial public-sector deficit and the quasi-fiscal deficit (net foreign interest outlays) of the central bank. Substantial fiscal adjustments were undertaken, mostly in the form of revenue enhancing measures, including tax policy and tax administration reforms, and privatizations. As a result of these measures, as well as the reduction of the interest rate bill following the conversion of domestic debt into dollar-denominated debt, the overall deficit of the combined public sector fell from 7.3 percent of GDP to 0.4 percent of GDP during 1989-1992.

51. While fiscal reforms at the federal government level were successful, those at the provincial government level were slow.⁶⁰ After lending by the central bank to the provincial state banks (the main source of provincial government deficit finance) was sharply curtailed following the introduction of the CBA, a number of provinces incurred substantial wage and supplier arrears, and IOUs issued by these provincial governments were circulated as means of payments during 1994-1995. Significant expenditure reforms at the provincial government level began in 1995.

52. In addition to revenue enhancement, tax system reforms aimed at strengthening competitiveness. The authorities improved the administration of tax incentives to the industrial sector, reduced employers' social security contributions, modified the import tariff structure, increased reimbursement of import taxes to exporters, and reduced the advance payments of taxes by exporters.

The Baltic countries

53. Before the CBAs were introduced, Estonia and Lithuania were already pursuing fiscal consolidation, resulting from budgetary reforms in 1990-1991. Their central banks were explicitly prohibited from lending to the Government. Although fiscal discipline continued after the CBAs were introduced, Estonia's and Lithuania's fiscal performance was not

⁶⁰Overall deficits of the provincial government budget (excluding federal transfers) fell from 5.8 percent of GDP in 1990 to 5.6 percent of GDP in 1993.

particularly remarkable and not significantly better than Latvia's.⁶¹ Thus, CBAs were not essential in ensuring fiscal discipline in the Baltics.

Hong Kong

54. After the CBA was introduced in 1983, the budget was in surplus in every year except 1995, when a slight deficit occurred.⁶² With a large accumulated fiscal surplus and no history of high inflation, the Government used fiscal expansion to strengthen the economy's competitiveness. The consolidated budget surplus declined from 4.3 percent of GDP in 1988-1989 to 0.8 percent in 1990-1991, as the Government stepped up public expenditures.

Other CBAs

55. In Djibouti, the Government ran budget deficits in every year since 1982, reaching of almost 12 percent of GDP in 1986.⁶³ Because the central bank was prohibited from lending to the Government and there was limited alternative financing available, persistent budget deficits resulted in an accumulation of government arrears, amounting to almost 7 percent of GDP in 1993.

56. Brunei Darussalam has also experienced fiscal deficits since 1992, when government revenue started to decline following a weakening in oil and gas prices. Budget deficits were financed by transfers from the General Reserve Fund.⁶⁴ During 1994-1995, this transfer amounted to more than 40 percent of total government revenues.

57. In addition to extending direct credit to member Governments, the ECCB is allowed to hold a certain amount of treasury bills. Some member Governments, which used up their borrowing limits after running persistent budget deficits, accumulated substantial domestic and

⁶¹In 1994, budget deficits in Estonia and Lithuania amounted to 2.2 and 1 percent of GDP, respectively. In view of the financing constraint imposed by the CBA, the Lithuanian Government resorted to external borrowing at the end of the year and issued Euro-bonds in the international financial markets in 1995. In Estonia, the fiscal deficit has so far been largely foreign financed. Also, due to the limited financial support from the Central Government, the City of Tallinn issued Euro-bonds to finance its infrastructure development project in 1996.

⁶²The budget surplus averaged 2.0 and 1.6 percent of GDP during 1984-1989 and 1990-1995, respectively.

⁶³During 1991-1993, the budget deficit, including grants, averaged about 4 percent of GDP.

⁶⁴The General Reserve Fund is the largest extra-budgetary fund which contains revenues from oil and gas set aside for future generations. The fund is managed by the Brunei Investment Agency.

external arrears. In Antigua and Dominica, new central government arrears in 1994 were equivalent to 4.0 percent of GDP and 1.5 percent of GDP, respectively. In Grenada, new arrears amounted to 2 percent of GDP in 1992.

V. FINANCIAL INTERMEDIATION, PAYMENT SYSTEMS, BANKING SUPERVISION, AND LENDER OF LAST RESORT

A. Financial Intermediation and Payment Systems

Financial intermediation

58. CBAs' credibility and their effectiveness in maintaining low inflation have generally promoted financial intermediation. However, as the nominal supply of reserve money adjusts rapidly to changes in demand, financial intermediation has been vulnerable to currency crises.

59. In Argentina, after having declined for more than two years, the ratio of broad money to GDP increased steadily when the CBA was introduced and prices stabilized (Figure 16). Between 1992 and 1994, the real growth rate of credit to the private sector became significantly positive, and the ratio of deposits to broad money increased. However, in the aftermath of the Mexican crisis deposits at commercial banks declined by around 17 percent, between end-November 1994 and end-May 1995, and real growth of credit to the private sector declined steadily.⁶⁵ In August 1995, the latter turned negative for the first time since the CBA was introduced (Figure 17).

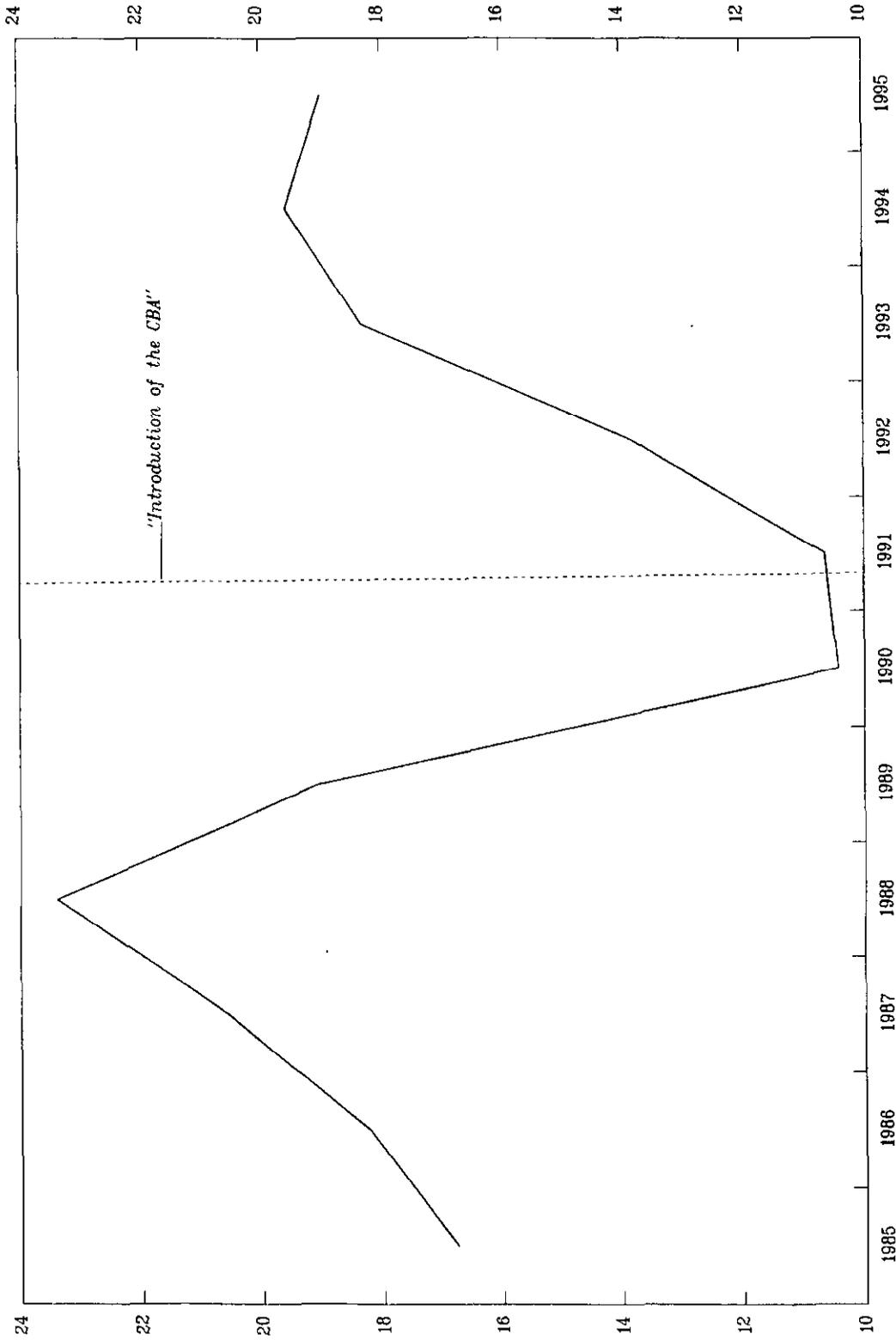
60. In Estonia and Lithuania, despite successful stabilizations, severe banking crises and large structural reforms slowed down the growth of financial intermediation.⁶⁶ However, in Estonia persistent capital inflows, in part encouraged by sound macroeconomic policies within the CBA framework, led to continued real credit growth (Figure 18).

61. In Hong Kong, the credibility of the CBA's fixed exchange rate, together with the presence of active international banks, has facilitated development and competition in offshore banking.

⁶⁵However, only a modest fraction of this decline was directly associated with a decline in base money—i.e. with the functioning of the CBA's monetary adjustment mechanism. Most of the decline was associated with large monetary interventions by the Central Bank—i.e., with conventional sterilization policies. See Section VI.

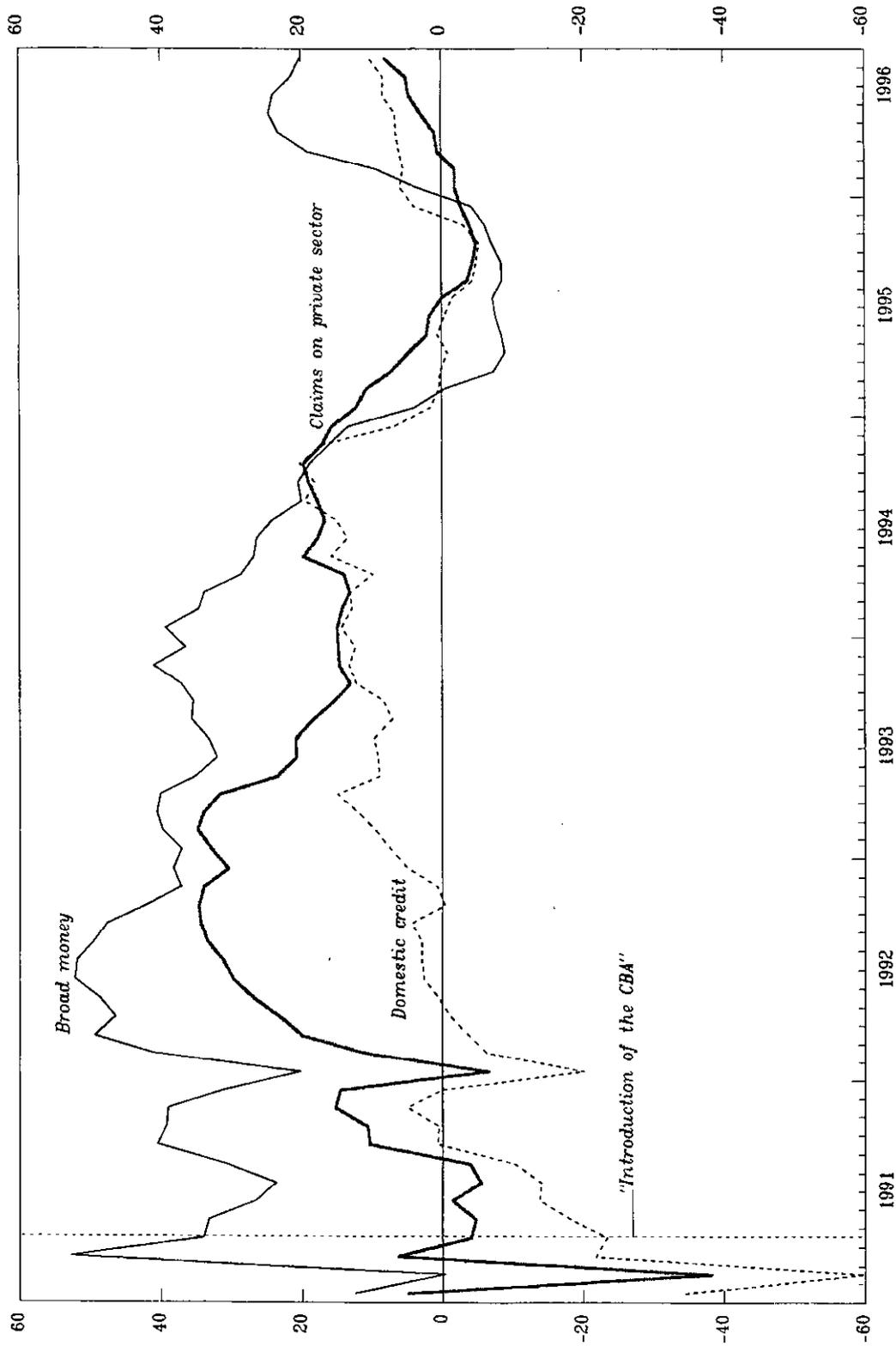
⁶⁶See Section V.C. below.

FIGURE 16
ARGENTINA
BROAD MONEY/NOMINAL GDP
(in percent)



Source: World Economic Outlook.

FIGURE 17
ARGENTINA
REAL GROWTH IN BROAD MONEY AND DOMESTIC CREDIT 1/
(In percent)



Source: International Financial Statistics.

1/ Adjusted by consumer price index.

FIGURE 18
 ESTONIA
 REAL GROWTH RATE OF CLAIMS ON THE PRIVATE SECTOR
 (In percent)



Source: International Financial Statistics.

Payment systems and treasury operations

62. In the British colonies, most commercial banks operating under currency boards were branches of banks with headquarters in London; consequently, large interbank transactions were settled mainly through their home offices. Local clearing houses, generally managed by a large commercial bank, were established only in places where a substantial demand for domestic settlements existed.

63. In current CBA countries, settlement services are provided by the central bank, when the latter exists. In Brunei Darussalam and Hong Kong, where no central bank exists, the private sector provides payments services. In Brunei Darussalam, the monetary authorities maintain accounts with three domestic banks for currency settlements. In Hong Kong, where the payments system was inherited from the colonial period, the HSBC manages the Hong Kong Bankers' Association's Clearing House.⁶⁷

64. Most CBA countries have limited the involvement of their monetary authorities in Treasury operations. Central government deposits in Argentina are held at a state-owned commercial bank. In Brunei Darussalam and Estonia, government deposits are held at various commercial banks. By contrast, central banks hold government deposits in Djibouti, Lithuania, and in the ECCB, in the case of four of its member countries.⁶⁸ In Hong Kong they are held at both commercial banks and the Exchange Fund (EF). While the EF's liability for government

65. deposits is in H.K. dollars, the EF invests these funds in foreign assets on behalf of the Government, thereby contributing significantly to the accumulation of foreign exchange reserves at the EF.⁶⁹

⁶⁷The Clearing House of the Hong Kong Association of Banks operates on a two-tier system consisting of 10 settlement banks in the first-tier and other financial institutions in the second tier. The settlement banks hold accounts at the HSBC for their own purpose and on account of their second-tier customers. The HSBC does not pay interest on other banks' clearing balances, while the operating cost of the Clearing House is shared by all HKBA's members. As the management bank of the Clearing House, the HSBC benefits from having access to information on other banks' positions.

⁶⁸The four ECCB countries are Antigua, Dominica, St. Lucia, and St. Vincent.

⁶⁹At end 1995, the Government's fiscal reserve account at the EF amounted to HK\$126 billion, equivalent to 42 percent of the EF's total liabilities.

B. Prudential and Supervisory Arrangements

Institutional arrangements

66. At present, last-resort support and banking supervision functions are handled by the same institution in all CBA countries, except for Brunei Darussalam and Djibouti (see Table 2). In CBA countries that have a central bank, the latter are responsible for establishing prudential arrangements and supervising the banking system.⁷⁰ In CBA countries without central banks, i.e., in Brunei Darussalam and Hong Kong, prudential and supervisory arrangements vary. In Brunei Darussalam, the Financial Institutions Division of the Ministry of Finance is in charge of banking supervision since 1993. In Hong Kong, the HKMA was granted prudential and supervisory authority in 1993 with a view to strengthening the regulatory framework in response to recurrent instability in the financial sector during the early 1980s. Previously, these functions had been handled by the EF and the Banking Commissioner's Office.⁷¹

Prudential standards

67. The adoption of sound prudential standards is necessary in order to limit, or eliminate, the need for central bank support. Many CBA countries have adopted internationally accepted banking supervision standards including, among others, a risk-based capital adequacy ratio and a liquidity ratio. Estonia followed the Basle Committee's Accord by imposing a risk-based capital adequacy ratio of 8 percent. In view of the limited resources available for last-resort support, Argentina, Hong Kong, and Lithuania adopted more stringent standards.⁷² In Argentina, the ratio has been increased gradually from 3 percent in mid-1991 to 11.5 percent following the banking crisis in January 1995. In Hong Kong, although the standard ratio is 8 percent, the HKMA has the right to increase the requirement up to 12 percent for any general licensed bank and up to 16 percent for any restricted licensed bank and deposit-taking companies.⁷³ In Lithuania, because existing accounting arrangements among banks are not up

⁷⁰However, the National Bank of Djibouti's banking supervision capability is severely limited. It maintains the soundness of the banking system by allowing only reputable foreign banks to operate in the country, and, hence, by implicitly relying on the supervising authorities of these banks' home countries.

⁷¹Previously, the EF managed resources for last-resort-support while the Banking Commissioner's Office had greater authority in bank supervision.

⁷²By contrast, Djibouti imposes a lower risk-based capital adequacy standard of 5 percent. However, as already noted, all banks operating in Djibouti are foreign.

⁷³The average capital ratio reached 17.5 percent at end 1994.

Table 2. Prudential Arrangements and Availability of Last-Resort Support Facilities

	Argentina	Brunei Darussalam	Djibouti	ECCB
Supervising agency	Central Bank of the Argentine Republic (BCRA)	Financial Institutions Division of the Ministry of Finance since 1993	National Bank of Djibouti (NBD)	ECCB; the new Uniform Banking Act extends the supervisory power of the ECCB to include licensing for the ECCB area
Last-resort facilities	By rolling over of BCRA's liquidity rediscounts (after the modification of the BCRA's Charter in early 95)	No	No	No explicit provision; in theory, up to 40% of (currency and other demand liabilities - lending to Governments)
Existence of a deposit insurance	Deposit Guarantee Scheme (April 95); BCRA's involvement prohibited by its Charter	No	No	No
Prudential measures	High reserve requirements (before August 95); liquidity requirement; risk-based capital adequacy ratio	N/A	Maximum total assets-to-capital ratio of 20 to 1; claims to capital plus term deposits below 200%; matching FCDs with net foreign currency assets; risk-based capital adequacy ratio	N/A
Experience with recent banking crises	March 1995	1985-86 and 1988	1991-92	N/A
Other measures taken to mitigate the crisis	Suspension of banks with serious financial difficulty; lowering and changing composition of RRs; setting up of Bank Capitalization Trust Fund (March 95); setting up Trust Fund for Provincial Bank Privatization (March 95); special facility generated through RR and administered by the BNA	The Govt. was heavily involved in the liquidation, asset recovery, and deposit repayments (in one case included a budgetary transfer) after a bank failed	Two banks were liquidated	N/A

Table 2. Prudential Arrangements and Availability of Last-Resort Support Facilities (concluded)

	Estonia	Hong Kong	Lithuania
Supervising agency	BOE	HKMA (relevant sections of the EF and Banking Commissioner's Office were merged in 93)	BOL; BOL Law and Commercial Banking Law were passed in December 94
Last-resort facilities	Lending by the BOE's Banking Dept.; restricted to systemic and emergency situations; limited to the amount of foreign exchange in excess of backing requirement, i.e., reserves of the Banking Department	By the HKMA for the account of the EF through the new accounting arrangements; limited to the EF's excess reserve; in practice, HSBC has served as lender of last resort through the HKBA's clearing system	Limited to the amount of reserves in excess of the backing requirement (BOL intends to maintain this capability of around 15% of total deposits in the banking system; only for emergency cases)
Existence of a deposit insurance	N/A	No; a scheme for small depositors in the event of a bank liquidation is being considered	Deposit Protection Law; plan to change the civil code to eliminate the full deposit protection at state-controlled banks
Prudential measures	Risk-based capital adequacy ratio, liquidity requirement, foreign exchange exposure limit	Risk-based capital adequacy ratio, liquidity requirement, foreign exchange exposure limit	Risk-based capital adequacy ratio, liquidity requirement, foreign exchange exposure limit
Experience with recent banking crises	1992; September 94 (Social Bank)	Closure of BCCIHK, Summer 1991.	Last quarter 1995 and first quarter 1996
Other measures taken to mitigate the crisis	In 1992, banks were allowed to fail. In 1994, problem banks were merged and granted loans by the BOE; some were eventually privatized; a loan recovery agency was established.	N/A	In December 1995, insolvent banks were placed under moratorium or closed; temporary suspension of the penalty for RR shortfall during the system-wide liquidity shortage; recapitalization by the Government before privatization; no financial support from the BOL for failed banks

to international standards, the ratio is set higher than that of the Basle Committee's Accord at 13 percent.

68. Liquidity ratios have also been introduced in Argentina, Hong Kong, Estonia, and Lithuania. The ratios have been set at 17 percent and 25 percent in Argentina and Hong Kong, respectively, and 30 percent in Estonia and Lithuania.⁷⁴

69. In addition, international standards on banks' foreign exchange exposure limits were introduced in Hong Kong, Estonia, and Lithuania. In Estonia and Lithuania, the foreign exchange exposure limits exclude the Deutsche mark and the U.S. dollar, respectively, from the computation as the reserve currency and the domestic currency share a similar risk in a CBA.⁷⁵

C. Last-Resort Support and Banking Crisis Management

70. While colonial-period currency boards were constrained from providing last resort support, commercial banks could rely on their headquarters for liquidity support. By contrast, banks that operate in many existing CBA countries are domestically owned.⁷⁶ While the relaxation of high reserve requirements or liquidity requirements has helped release liquidity rapidly under emergency conditions, experience suggests that last resort support is also needed to mitigate the effects of banking crises and contain spreading risks. Indeed, banking crises have occurred in all CBA countries, except in the ECCB countries, and all CBAs have explicit last-resort facilities (Table 2), except for Brunei Darussalam and Djibouti, whose banking systems are mostly or totally foreign owned.⁷⁷ To comply with the backing rule, the

⁷⁴ See Section V. C below for more details on Argentina's liquidity ratios.

⁷⁵ In Djibouti, the National Bank has the authority to impose foreign exchange exposure limits, but has not exercised such power.

⁷⁶ In Lithuania, only one of the 24 banks was a foreign bank at end-1994. In Estonia, only representative offices of three foreign banks existed at end-1994. In Argentina, the banking system was also dominated by local and provincial banks.

⁷⁷ In Brunei Darussalam, only two of the eight commercial banks are locally incorporated. Moreover, the three largest banks which at end-1994 accounted for almost 90 percent of total deposits were foreign owned. Nevertheless, the Government of Brunei Darussalam was heavily involved in providing support to failed domestic banks during banking crises in the 1980s. In one case, budgetary transfers were made to repay depositors. In Djibouti, all four active commercial banks are foreign owned. The lack of last resort support may have been partly responsible for the failure of all domestic banks during the 1980s.

scope for last resort support is limited to the foreign exchange reserves held in excess of the minimum amount required for backing.⁷⁸

Argentina

71. In Argentina, the banking system experienced a large deposit run triggered by the Mexican crisis at the beginning of 1995. The crisis began with the closure of a small bank that was heavily exposed in Mexican assets and, hence, could not honor its obligations after the Mexican peso was devalued.⁷⁹ As there was no explicit lender of last resort and the public feared that other banks could be similarly exposed, the closure of the bank triggered a chain-reaction. Between end-November 1994 and end-May 1995, despite the rationing of bank deposit withdrawals at some banks, aggregate bank deposits declined by about 17 percent.⁸⁰ Wholesale banks, small private and cooperative banks, and provincial and municipal banks were most heavily hit, with some banks losing more than 50 percent of their deposits.⁸¹

72. The authorities responded by lowering unremunerated reserve requirements. However, this was not entirely effective as most flight capital originated from time deposits, which were subject to relatively low reserve requirements.⁸² Subsequently, banks were allowed to hold their settlement accounts and required reserves at the Central Bank in U.S. dollars, which lowered their demand for base money in local currency. In March 1995, to facilitate the on-

⁷⁸The ECCB can use up to 40 percent of its international reserves to provide liquidity support to banks, provided these resources have not been already used to extend credit to member Governments.

⁷⁹For more information, see Zarazaga (1995), p. 17.

⁸⁰The decline in bank deposits during the period was financed by an increase in other items net (liabilities) of around 2 billion pesos, an increase in credit from the Central Bank of 1.8 billion pesos, a reduction in banks' reserves at the Central Bank of 1.2 billion pesos, a reduction in banks' net foreign assets of 1 billion pesos, and a reduction in credit to the private sector of around 0.3 billion pesos. As a large part of the deposits withdrawn left the country, the Central Bank lost foreign exchange reserves by around 5 billion pesos during the period.

⁸¹The deposit run put additional strain on many provincial banks which had weak financial positions caused by non-performing loans to provincial governments.

⁸²Throughout 1994, reserve requirements for domestic and foreign currency demand and saving deposits were 43 percent as opposed to 3 percent for time deposits. Subsequently, reserve requirements on demand and savings deposits were lowered in stages from 43 percent to 30 percent, and those on time deposits by 2 percentage points to 1 percent.

going bank restructuring program, banks were also allowed to fulfill up to half of their reserve requirements with cash-in-vault and assets purchased from problem banks.

73. To limit the adverse effects of the banking crisis, the Central Bank's Charter was modified to allow the rolling over of central bank rediscounts, collateralized advances, and swaps for a longer period and a larger amount.⁸³ As a result, the stock of rediscounts increased from 400 million pesos (equivalent to 3 percent of reserve money) in February 1995 to a peak of around 1,800 million pesos (equivalent to 12 percent of reserve money) in July 1995. In addition, a special facility for distressed banks was established. The facility was administered by the BNA, a state-owned bank, and financed by 2 percent of banks' required reserves.

74. Several banks in financial difficulty were suspended,⁸⁴ and the Bank Capitalization Trust Fund and the Trust Fund for Provincial Bank Privatization were established to facilitate the capitalization of failed banks.⁸⁵ By August 1995, 11 provincial banks had received 225 million pesos from the Trust Fund for Provincial Bank Privatization in support of their privatization plans.⁸⁶ By mid-September 1995, 255 million pesos had been disbursed by the Bank Capitalization Trust Fund in support of the private bank restructuring programs.

75. With a view to reducing the burden imposed on banks by unremunerated reserve requirements, while safeguarding their liquidity and limiting the need for central bank support, reserve requirements were replaced with a system of liquidity requirements in September 1995. The new requirements apply to all non-interbank liabilities and can be satisfied by holdings of interest-earning Bank Liquidity Certificates issued by the Treasury, a special account at an international bank abroad, central bank's reverse repurchase agreements, certain

⁸³Previously, the rediscounts were limited to 30 days and for the amounts not exceeding the borrowing bank's capital. Moreover, banks were not allowed to request another advance within 45 days of their previous repayments to the central bank.

⁸⁴The number of private financial institutions declined from 172 in December 1994 to around 125 in August 1995.

⁸⁵The Bank Capitalization Trust Fund was set up to provide financial assistance for the acquisition of banks. It offers subordinated convertible loans and other loans to refinance banks' outstanding obligations to the Central Bank and the BNA. The subordinated loans, with maturity up to eight years, can only be used to meet capital shortfalls.

⁸⁶These banks accounted for around 5 percent of the assets of the financial system. Disbursements were used mainly to cancel outstanding rediscounts with the central bank and liabilities to the central bank associated with transactions of the latter's safety net for banks.

government bonds of OECD member countries, and Argentine securities.⁸⁷ Since banks can fulfill liquidity requirements with foreign assets, they can earn interest on their reserves.⁸⁸ At the same time, the need for backing banks' reserves at the monetary authorities is reduced.

76. The deposit insurance scheme was reformed in 1995 and converted to a trust fund with mandatory contributions from financial institutions, based on portfolio risk.⁸⁹ Unlike the old scheme where the central bank provided part of the capital, the Central Bank's Charter prohibits its involvement in the new scheme.

77. These facilities, combined with fiscal adjustments and a financing program supported by the Fund, proved to be effective in restoring confidence and gradually ending the banking crisis. Between May and September 1995, the banking system recovered around 40 percent of the deposit outflow. However, several banks have recovered only a modest share of the deposit loss and remained heavily dependent on the central bank's rediscounts and the special facility administered by the BNA.⁹⁰

78. In September 1996, the central bank set up a US\$5 billion pool of emergency stand-by credit from international banks. In the event of illiquidity, local banks that choose to participate in the scheme can access the funds.⁹¹

⁸⁷The proceeds from the Bank Liquidity Certificates must be placed in the international reserves of the central bank. The special account abroad must be held at the Deutsche Bank in New York. The requirements can be fulfilled up to 100 percent by the central bank's reverse repos or the Bank Liquidity Certificates, up to 50 percent by deposits with the Deutsche Bank, and up to 10 percent by Argentine securities.

⁸⁸The central bank is prohibited by its Charter from paying interest on bank reserves.

⁸⁹In the old scheme, which suffered from severe underfunding, only small peso-denominated deposit accounts were covered, and the participation was voluntary. Many banks chose not to participate in the scheme. The new scheme is mandatory and covers small local and foreign currency deposits. Its fund is managed by a special joint stock company comprising interested financial institutions with only a limited Government participation.

⁹⁰Albeit falling over time, the stock of rediscounts outstanding continued to be high (around 1,200 million pesos) at end-March 1996.

⁹¹Participating banks will pay a premium to the central bank which guarantees access to the funds. The central bank, in turn, uses the premium to pay a commission to international banks.

The Baltic countries

79. In both Estonia and Lithuania, excess foreign reserves are held in the Central Banks' Banking Department and can be used for monetary operations and last-resort support, although only in the case of systemic crisis. In Estonia, three major banks encountered financial difficulties causing system-wide payments delays at the end of 1992.⁹² The BOE initially extended EEK 75 million of emergency credit (around 4 percent of reserve money) to the Northern Estonian Bank, one of the three problem banks which was previously the Central Bank's commercial banking arm. Despite the relatively large size of the three banks, the BOE closed them in November 1992 when the emergency credit failed to improve their positions. Although the closures had serious consequences for the economy and the financial system, they did not precipitate further bank runs. Instead, there was a shift to quality, as deposits were transferred to other banks which were perceived as being solvent, and enterprises switched to using cash in effecting transactions.

80. The BOE resumed its support to the Northern Estonian Bank after it became wholly owned by the Government at the beginning of 1993.⁹³ Liquidity support and recapitalization needs were provided through the takeover of the bank's frozen deposit accounts in Moscow and a transfer of government bonds to the bank by the BOE. Following an increase in the minimum capital requirement on January 1, 1996, the number of Estonian banks fell to 16 as compared to 24 in 1991.

81. In Lithuania, the central bank intended to maintain excess foreign exchange reserves at around 15 percent of total deposits as last-resort support capability. The reserves were used to provide liquidity support during the December 1995 financial crisis when the operations of two of the country's largest private banks were suspended.⁹⁴ With a view to easing the system-wide liquidity shortage, the central bank also temporarily suspended the penalty for reserve requirement shortfalls; nevertheless, the central bank refrained from providing support to recapitalize failing banks.

⁹²The three banks accounted for almost 40 percent of broad money at that time. To a large extent, financial difficulties were caused by the poor quality of the loans inherited from the pre-reform era and weak economic activity during the initial stages of transition to a market economy.

⁹³The Northern Estonian Bank was merged with another problem bank before becoming government-owned.

⁹⁴Between end-December 1995 and early February 1996, banks lost about 15 percent of their litai deposits and 19 percent of deposits in convertible currency. At end-March 1996, 14 of the 29 banks licensed at end-1994 had their licenses withdrawn and entered into bankruptcy procedures. In June 1996, only 11 banks were in operation.

82. A deposit insurance was also introduced in Lithuania in 1995, in the form of the Deposit Protection Law.⁹⁵ As there were no insurance funds when the banking crisis broke out at end-1995, that law effectively placed the Government as the ultimate insurer of small individual depositors (up to litai 2,000 or US\$500) of the 13 banks which were liquidated.

Hong Kong

83. Although four fifths of the 179 banks registered in Hong Kong as of September 1994 were incorporated outside the colony, the authorities established last-resort facilities primarily to assist small local banks, which were heavily involved in past banking crises. Despite the fact that the banking system has in general been strong and highly profitable, banking crises occurred during 1982-86, and most recently in 1991. The first crisis was the result of aggressive lending by local banks and poor prudential supervision, particularly on risks attached to excessive property lending. The second crisis was triggered by the collapse of BCCI Hong Kong, which led to bank runs on some local banks.

84. In the past, the HSBC, as management bank of the Clearing House, was the primary source of last resort support to illiquid banks. However, owing to the large liquidity shortages during the first banking crisis, the Government took the lead in providing last-resort support and taking over failed banks.⁹⁶ During the second crisis, the EF provided last-resort support. Nevertheless, the role of the HSBC as a provider of last-resort support became restricted after the new accounting arrangement between the EF and the HSBC was introduced in 1988.⁹⁷

VI. MONETARY POLICY IMPLEMENTATION

85. In a conventional currency board with perfect capital mobility and full credibility the scope for monetary operations is very limited, as money supply is determined by money demand and interest rates are tied to comparable rates in the reserve-currency country. However, experience suggests that monetary operations can play a useful role in smoothing day-to-day monetary conditions or accelerating adjustment to changes in foreign interest rates in countries which have imperfect capital mobility or where interest rate arbitrage is costly. As in the case of last resort support, the scope for monetary operations is limited by the

⁹⁵With the introduction of this law, the Government planned to change the civil code to eliminate the full deposit protection at state-controlled banks.

⁹⁶Many failed banks were also taken over by large foreign banks.

⁹⁷See Section VI.

amount of excess foreign exchange reserves.⁹⁸ Table 3 provides a summary of monetary operations which are conducted in all CBA countries except Djibouti.

A. Reserve Requirements

86. In CBAs with a central bank, reserve requirements on commercial bank deposits are commonly used for liquidity management purposes.⁹⁹ If fulfilled on an average basis, they help to smooth short-term monetary conditions and serve as an automatic stabilizer.

87. Cash balance requirements were introduced in Brunei Darussalam at end-1995. Reserve requirements were replaced with liquidity requirements in Argentina in August 1995, and do not exist in Djibouti and Hong Kong. Reserve requirements were recently lowered in Estonia and Lithuania with a view to relaxing monetary conditions (see Table 3).¹⁰⁰

B. Rediscount Facilities

88. With the exception of Brunei Darussalam and Djibouti, all CBAs have introduced rediscount facilities for commercial banks and/or implemented limited open market operations. The monetary authorities in Argentina, Hong Kong, and the ECCB, use rediscount facilities to facilitate banks' liquidity management. In Argentina, the central bank has, since early 1995, rolled over rediscounts in order to help banks in financial difficulties.¹⁰¹ In Hong Kong, the Liquidity Adjustment Facility (LAF), introduced in May 1992, assists banks in adjusting their liquidity positions by acquiring overnight funds from the HKMA. At the same time, a group of commercial banks has established a private interbank standby credit facility.

⁹⁸ Although the monetary authorities can affect the money multiplier and the monetary base within a CBA, the authorities would not be able to target broad money or interest rates.

⁹⁹ Reserve requirements were also adjusted for prudential reasons in Argentina and Lithuania (see Section V).

¹⁰⁰ The central banks of Estonia and Lithuania effectively lowered reserve requirements by allowing banks to fulfill the requirements with assets other than deposits with the central bank.

¹⁰¹ In Argentina, the rediscount facility was suspended for a short period after the Convertibility Plan was introduced because the facility had been the major source of indirect financing for the public sector in the past.

Table 3. Central Banking Operations of the CBAs

	Argentina	Brunei Darussalam	Djibouti	ECCB
Monetary Operations Instruments Available Reserve requirements	Yes until replaced by liquidity requirements in August 1995	Yes since December 1995; 6% minimum cash balance requirement on banks and finance companies	No	Yes; 6% of deposits; non-remunerated; averaged over weekly maintenance period
Liquidity requirements	Yes since September 1995; satisfied through holdings of interest-earning Bank Liquidity Certificate (issued by the Treasury), a special account abroad, BCRA's reverse repurchase agreements, OECD government bonds, or Argentine securities	No	No	ECCB is allowed to require financial institutions to hold government securities up to 10 percent of any institution's deposits and liabilities
Rediscounts and advances	Yes; since early 1995 the BCRA can renew discounts for a prolonged period and provide for amounts in excess of the banks' capital; collateralized	No	No	Yes; with treasury bills; for reserve management; it has not been used since March 1994
Treasury bills	N/A	No	N/A	Issued by 5 member Governments within each country's limit on its recurrent revenue
Central bank bills	No	No	No	No
Swaps	Yes	No	No	No
Repos and reverse repos	Yes; in pesos or in dollars; collateralized by dollar-denominated public securities or foreign exchange; rate set by BCRA	N/A	No	N/A
Others	N/A	N/A	N/A	N/A

Table 3. Central Banking Operations of the CBAs (continued)

	Argentina	Brunei Darussalam	Djibouti	ECCB
<u>Payment systems</u>	Handled by the BCRA	BCB maintains accounts in three domestic banks for settlements of currency transactions	Handled by the NBD	Handled by the ECCB
<u>Treasury operations</u> Government deposits	Central government deposits are held at the BNA, a state-owned bank; provincial and municipal government deposits can be held at any banks	Held at commercial banks	Held at the NBD	ECCB holds deposit accounts for the Governments of Dominica, Antigua, St. Lucia, and St. Vincent
Credit to Government by the monetary authorities	Yes; with limits on both stock outstanding and annual increase (see Table 1 under backing for more details)	No	Yes, but only with special approval from the Council of Ministers. However, such lending has never occurred	Yes; with sub-limits allocated by country on the basis of government recurrent revenue, i.e., 5% of for temporary lending, 10% for ECCB's treasury bill holdings, and 5% for long-term bond holdings
<u>Experiences with currency crisis</u>	November 1992; January 1995, spill-over from the Mexican crisis	No	N/A	N/A

Table 3. Central Banking Operations of the CBAs (continued)

	Estonia	Hong Kong	Lithuania
Monetary Operations Instruments Available Reserve requirements	Yes; effectively reduced by including vault cash holding in July 94	No	Yes; December 1994, the BOL temporarily waived RR for the Agriculture Bank so that the Bank could extend a loan to the energy sector; April 1995, lowered from 12% to 10%; holding 1-month average amount for litai deposits, but end-day amount for FCDs; can only be met by deposits at the BOL; December 1995, banks were temporarily allowed to count treasury bills towards RR
Liquidity requirements	No	No	No
Rediscounts and advances	N/A	Yes; direct borrowing and lending by HKMA to the interbank market; standby credit facilities arranged by commercial banks	N/A
Treasury bills	No	No	Yes, since July 1994; weekly auction; one- and three-month maturities
Central bank bills	Yes; BOE CDs were initially issued in May 1993 with a view to increasing collateral that banks can use in inter-bank market	Yes; EF bills (since 1990) and EF notes (since 1993) to be used for OMO by HKMA	No
Swaps	No	Yes	No
Repos and reverse repos	N/A	Yes; overnight repo and reverse repo of eligible assets with the HKMA's Liquidity Adjustment Facility to smooth short term rate around the target rate, i.e, with fixed bid and offer rates (June 1992); broadening of the scope of assets eligible for repos (1994 and 1996)	N/A

Table 3. Central Banking Operations of the CBAs (concluded)

	Estonia	Hong Kong	Lithuania
Others	N/A	Transfer of government deposits between EF and commercial banks; accounting arrangement between EF and HSBC to control clearing balance of commercial banks at HSBC (1988); introduction of a charge on interests earned from H.K. dollar deposits to reduce H.K. dollar liquidity (1988)	BOL reduced the stock of credits outstanding, granted to banks before the CBA period, over time to tighten monetary condition
<u>Payment systems</u>	BOE's Banking Department handles payments arrangements with the FSU; at the beginning, BOE also handled all Russia/Estonia financial settlements	Managed by HSBC; licensed banks maintain clearing accounts with each of the 10 settlement banks which in turn maintain clearing accounts with the HSBC; HSBC acts as agent for the HKMA in its money market operations	BOL handles litas-denominated correspondent balances of FSU central banks (also backed by foreign exchange)
<u>Treasury operations</u> Government deposits	At commercial banks.	At EF and commercial banks, mainly the HSBC; fiscal reserves are transferred to EF's account at the HKMA	At BOL (also fully backed by foreign exchange)
Credit to Government by the monetary authorities	Prohibited	N/A	Prohibited
<u>Experiences with currency crisis</u>	First quarter 1994	January 1988 (expected revaluation); January 1995, spill-over from the Mexican crisis	November 1994

C. Open Market Operations

89. Argentina actively uses repos and reverse repos for liquidity management. The transactions can be done in pesos or in U.S. dollars.¹⁰² In March 1991 the central bank also introduced a swap facility, which was heavily used in July 1994 to provide short-term credits to banks (771 million pesos—equivalent to 5 percent of reserve money) and after the Mexican crisis in March 1995 (805 million pesos—equivalent to 6 percent of reserve money). After capital inflows accelerated during September 1995-February 1996, swaps were also used to withdraw liquidity from the system.¹⁰³

90. Neither Lithuania nor the ECCB has used government securities as a monetary control instrument.¹⁰⁴ In May 1993 the BOE initiated fortnightly auctions of 28-day certificate of deposits (CDs) to banks with the primary objective of providing the banking system with collateral that can be used in the interbank market. To guarantee the liquidity of the bills, the BOE stands ready to buy them back and to enter into repurchase agreements with banks.

91. In Hong Kong, the EF started issuing EF bills (91-, 182-, and 364-day maturity) and EF notes (two-, three-, five-, seven- and ten-year maturity), since 1990 and 1993, respectively. Because there are well-developed secondary markets, the notes and bills are traded actively between the HKMA and the public, especially when the HKMA needs to counteract liquidity tightening caused by large public offerings of stocks or seasonally high demand for funds around month and quarter-ends. At end-1994, total outstanding EF bills and notes amounted to HK\$52.3 billion, equivalent to almost 20 times the average level of interbank liquidity.

D. Other Monetary Instruments

92. In addition to the above-mentioned liquidity management instruments, the BOL has gradually reduced its outstanding stock of credit to banks, which was granted before the introduction of the CBA, with a view to tightening monetary conditions.

¹⁰²The rate has been set by the central bank, and the minimum maturities are fixed at 30 days for peso-denominated reverse repos and 7 days for both peso- and dollar-denominated repos.

¹⁰³BCRA's swap liabilities jumped from 858 million pesos in October 1995 to 2,320 million pesos in November, and 3,566 million pesos (equivalent to 20 percent of reserve money) in February 1996.

¹⁰⁴In the ECCB, under the current conditions, the central bank cannot tighten monetary policy by open market operations as it lacks bills to sell and the secondary market is virtually non-existent.

93. In Hong Kong, owing to the special characteristics of the payment system (discussed in Section V. above), the HKMA has managed liquidity conditions through a correspondent account arrangement that was introduced in July 1988.¹⁰⁵ The old arrangements had undermined the ability of the monetary authorities to influence short-term monetary conditions. Because those arrangements did not require the HSBC to maintain its own correspondent account at the Clearing House, there was no safeguard against the expansionary impact of HSBC's credits.¹⁰⁶ Under the new accounting system, the HSBC is required to hold a minimum balance at the EF, the "Balance," and to manage the net clearing balance of other banks at the Clearing House taking into account this balance, which can be influenced at the discretion of the monetary authorities.¹⁰⁷ Through this new accounting arrangement, the HKMA can influence the interbank rate. At times, the HKMA has also managed liquidity conditions of the banking system by transferring government deposits between accounts at commercial banks and the EF.

E. Policy Issues

94. In Hong Kong, the primary objective of monetary operations is maintaining the stability of the market exchange rate, thereby strengthening the credibility of the CBA. They serve to prevent changes in liquidity from affecting the exchange rate.¹⁰⁸

¹⁰⁵This accounting arrangement was introduced as part of the package to strengthen the effectiveness of the authorities' monetary operations after a small financial crisis occurred.

¹⁰⁶For example, interbank liquidity would increase when a check written by an HSBC's customer was deposited for clearing at another bank as the money would be drawn directly from the customer's account at the HSBC. If the HSBC were required to maintain a minimum clearing balance, the interbank liquidity would not be affected as the check would be drawn from the HSBC's clearing balance, which would offset the increase in the balance of the receiving bank.

¹⁰⁷The HSBC has to pay a penal interest to the HKMA if the net clearing balance of other banks at the HSBC is greater than the "Balance," i.e., if the HSBC has overlent to the banking system. If the net clearing balance of other banks is negative, the HSBC also has to pay penal interest on the debit amount. Since the HKMA does not pay interest to the HSBC on the "Balance," the benefit to the HSBC of using other banks' interest free clearing balance was also ended. The HKMA could influence the "Balance" through open market operations, foreign exchange intervention, and direct lending and borrowing from the banking system.

¹⁰⁸For instance, the market exchange rate depreciated on February 4, 1994 after the U.S. Federal funds rate went up for the first time since January 1993, and on June 10 when there was a rumor about changes in China's leadership.

95. To strengthen further the stability and credibility of the official exchange rate, the HKMA switched from using bank liquidity, in March 1994, to the HIBOR as an indicator to guide open market operations. The HKMA aims to stabilize the HIBOR within the band of the LAF bid and offer rates, which it keeps around the U.S. Federal funds rate.¹⁰⁹ At the same time, with a view to making interest rate targeting more effective and the LAF more accessible to banks, the range of securities eligible for discounting at the LAF was widened to include high quality H.K. dollar debt papers issued by statutory bodies and the private sector.¹¹⁰ After these measures were introduced, the deviations between the HIBOR and LIBOR narrowed, and the market exchange rate stayed relatively stable (Figure 19).¹¹¹ Moreover, the daily volatility of the HIBOR declined substantially.¹¹²

96. Monetary operations could have been useful in handling currency crises in Hong Kong as illustrated by the pressure experienced by the Hong Kong dollar at the beginning of 1988. Amidst widespread expectations of revaluation of the official exchange rate, following a sharp depreciation of the U.S. dollar against other currencies, the public converted their foreign currency deposits into H.K. dollar deposits. The sharp decline of H.K. dollar deposit rates was not sufficient to stem the surge in H.K. dollar liquidity. As no effective monetary control instruments were available at that time, the Hong Kong Government had to introduce a charge on large clearing balances of licensed banks and on interest earned from nonbank's large H.K. dollar deposits.¹¹³

¹⁰⁹Previously, the HKMA had targeted the net amount of liquidity held in the clearing houses of all licensed banks. The HKMA influenced the liquidity of the banking system by affecting—through open market operations, foreign exchange operations, or transfers of government deposits—the account that the HSBC has to maintain with the EF.

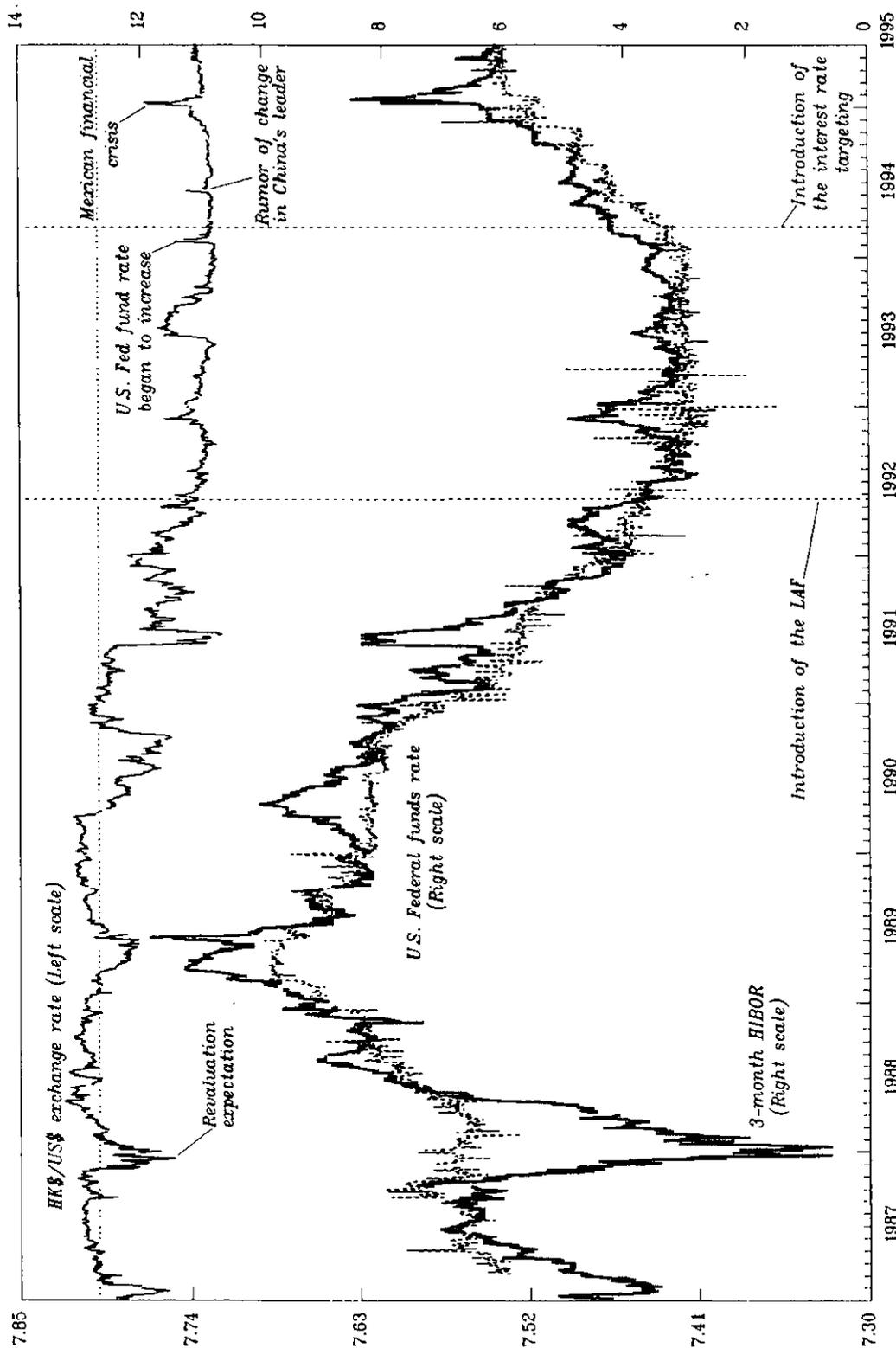
¹¹⁰The broadening of the range of eligible securities for the LAF was also intended to stimulate growth of the HK dollar debt market. This range of securities was further broadened in 1996.

¹¹¹Unlike when the U.S. Federal funds rate went up on February 4, 1994, the market exchange rate did not depreciate when the U.S. Federal funds rate continued to increase after the interest rate targeting was adopted. See Hong Kong Monetary Authority (1994), pg. 18.

¹¹²Average daily deviation of the 3-month HIBOR from its 5-day moving average declined from 2.03 percent between October 12, 1993 and end-May 1992 to 0.11 percent between June 1993 and end-February 1994, and to 0.09 percent between March 1994 and end-December 1995.

¹¹³At that time, the HKMA was not established and the EF could intervene in the domestic money market only through foreign exchange intervention and transfer of government deposit accounts between banks and the EF.

FIGURE 19
HONG KONG AND THE UNITED STATES
DAILY INTEREST RATES AND EXCHANGE RATE



Sources: Hong Kong Monetary Authority; and Exchange and Interest Rates Bank.

97. The importance of monetary operations during a financial crisis is also illustrated by Argentina's 1995 experience. As liquidity fell and interest rates steadily increased, the central bank intervened, through a lowering of reserve requirements and an expansion of the rediscount facility, to preserve the stability of the banking system.¹¹⁴ The resulting support induced a sharp drop in the actual backing of reserve money by the BCRA's foreign reserves (Figure 20). However, unlike in the case of Mexico where capital outflows were continuously sterilized, the scope for accommodating operations in Argentina was limited by the CBA's backing rule.¹¹⁵ The margin for central bank support was exhausted by mid-March 1995 after the central bank had lost about US\$5 billion of gross international reserves and the ratio of gross international reserves to monetary liabilities was only slightly above its 80 percent limit. At this point, the Government sought financial assistance from multilateral organizations, including the Fund, and the international financial community.

VII. CONCLUSION

98. The experiences of CBA countries suggest that the enhancement of credibility has been a major reason to introduce CBAs. However, credibility is attained by reducing the capability and flexibility to engage in last-resort support and monetary operations. Because these functions have proved to be beneficial and effective in handling banking and currency crises in many CBA countries, a careful case-by-case approach must be utilized to weigh potential costs and benefits when designing or adapting a CBA.

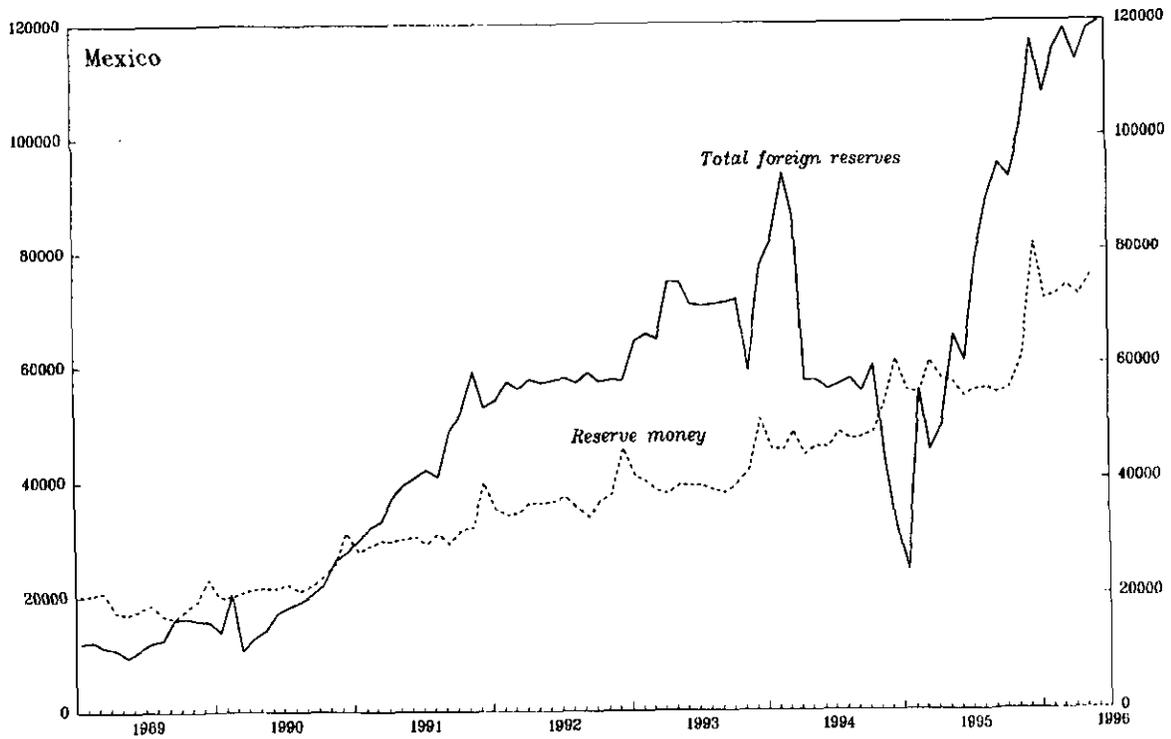
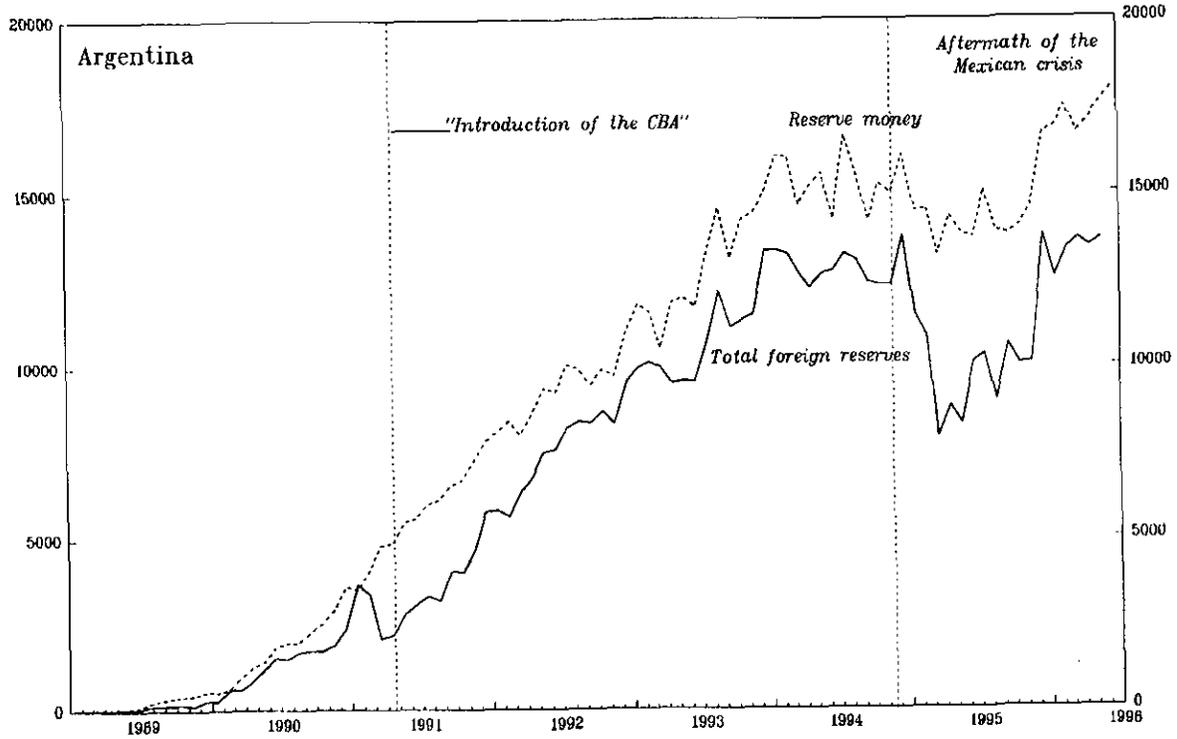
99. Besides affecting the CBA's credibility and scope for last-resort support and monetary operations, the exchange rate rule and the choice of reserve currency could have substantial impacts on macroeconomic developments. Fixing the official exchange rate at an undervalued level may result in a higher inflation path as the real exchange rate adjusts to its equilibrium. Monetary conditions and international competitiveness of a CBA country are also dictated by its choice of reserve currency as the monetary conditions are imported from the reserve-currency country, and the competitiveness depends on the value of the reserve currency against currencies of the CBA country's other trading partners.

100. In order for a country to benefit fully from its CBA, other supportive policies are needed. Most importantly, stringent banking supervision needs to be in place to protect the soundness

¹¹⁴In March 1995, the interbank rate peaked at 70 percent, and prime rates for loans in pesos and U.S. dollars reached 49 percent and 33 percent, respectively. Deposit rates in pesos increased from around 10 percent at end-1994 to its peak of 19 percent in March and April 1995. The deposit rate in U.S. dollars also increased by around 4 percentage points during the period.

¹¹⁵Moreover, the central bank's last-resort operations already absorbed much of the scope available for domestic credit creation.

FIGURE 20
ARGENTINA AND MEXICO
TOTAL FOREIGN RESERVES AND RESERVE MONEY
(In millions of pesos)



Source: International Financial Statistics.

and efficiency of the banking system as resources for last-resort support are limited. And, given the limited scope for monetary and exchange rate policies, reliance on sound fiscal policies for macroeconomic management is particularly important. Structural policies may also be needed to protect the country's competitiveness when the real exchange rate appreciates. Finally, the capital and current accounts need to be open for the country to benefit from international interest rate and goods arbitrage.

REFERENCES

- Bank Negara Malaysia, Money and Banking in Malaysia, Kuala Lumpur; 1994.
- Bank of Estonia, "The Monetary Reform in Estonia 1992."
- Bayoumi, Tamim and Barry Eichengreen, "The Stability of the Gold Standard and the Evolution of the International Monetary System," CEPR Discussion Paper No. 1248 (October 1995).
- Bennett, Adam, "The Operation of the Estonian Currency Board," Staff Papers 40, No. 2 (June 1993).
- _____, "Currency Boards: Issues and Experiences" IMF PPAA/94/18 (September 1994).
- Bercuson, Kenneth (edit), Singapore: A Case Study in Rapid Development, IMF Occasional Paper 119 (February 1995).
- Camard, Wayne, "Discretion with Rules?: Lessons from the Currency Board Arrangement in Lithuania," IMF PPAA/96/1 (March 1996).
- Central Bank of the Argentine Republic, Charter General Provisions, September 23, 1992.
- Eichengreen, Barry, "Central Bank Cooperation and Exchange Rate Commitments: The Classical and Interwar Gold Standards Compared," Financial History Review, 1994.
- Hanke, Steve H. and Kurt Schuler, Currency Boards for Developing Countries: A Handbook, (International Center for Economic Growth, San Francisco) 1994.
- _____, and Alan Walters, "Currency Boards," The John Hopkins University Working Papers in Economics 281 (April 1992).
- Ho, Richard Y.K., Robert H. Scott, and Kie A. Wong (ed), The Hong Kong Financial System, Oxford University Press, 1991.
- Hong Kong Monetary Authority, Annual Report, 1994.
- _____, The Practice of Central Banking in Hong Kong, 1994.
- _____, "Monetary and Exchange Rate Management with the International Capital Market Mobility: The Case of Hong Kong," Quarterly Bulletin (February 1995).

- Honohan, Patrick, "Currency Board or Central Bank?: Lessons from the Irish Pound's Link with Sterling, 1928-79," Center for Economic Policy Research Discussion Paper 1040 (October 1994).
- Ize, Alain, "Capital Inflows in the Baltic Countries, Russia, and Other Countries of the Former Soviet Union: Monetary and Prudential Issues," IMF WP/96/22 (February 1996).
- _____, and G.A. Mackenzie, "Assets Freeze and Stabilization: Lessons from Argentina and Brazil," unpublished manuscript, March 1992.
- Jiménez, Rafael Olarra, Evolución Monetaria Argentina, Buenos Aires; Editorial Universitaria de Buenos Aires, 1976.
- Lam, Anthony, "The Currency Board Approach to Monetary Policy: from Africa to Argentina and Estonia via Hong Kong," in Monetary Management in Hong Kong, the Hong Kong Monetary Authority, 1993.
- Machinea, José Luis, "The Argentine Financial Crisis of 1995: Causes, Characteristics, and Lessons," January 1996.
- Marston, David, "Financial Sector Reform in Jamaica During 1985-92: Possible Lessons for the Caribbean," IMF WP/95/90 (September 1995).
- Monetary Authority of Singapore, The Financial Structure of Singapore, 1989.
- Nascimento, Jean-Claude, "Monetary Policy in Unified Currency Areas: The Case of the CAMA and ECCA during 1976-90," IMF WP/94/11 (January 1994).
- Osband, Kent, and Delano Villanueva, "Independent Currency Authorities: An Analytical Primer," IMF WP/92/50 (July 1992).
- Reinhart, Carmen M. and Carlos Végh, "Do Exchange Rate-Based Stabilization Carry the Seeds of Their Own Destruction?," a paper presented in the session on Empirical Aspects of Exchange Rates at the American Economic Association Meetings, 1996.
- Republic of Singapore, Currency Act, 1967.
- _____, White Paper on Currency, 1965.
- Richards, Anthony, and Gunnar Tersman, "Growth, Nontradables, and Price Convergence in the Baltics," IMF WP/95/45 (April 1995).

- Saavalainen, Tapio, "Stabilization in the Baltic Countries: Early Experience," in Road Maps of the Transition: The Baltics, the Czech Republic, Hungary, and Russia, by Biswajit Banerjee and others, IMF Occasional Paper 127 (September 1995).
- Salera, Virgil, Exchange Control and the Argentine Market, New York; Columbia University Press, 1941.
- Schwartz, Anna, "Currency Boards: Their Past, Present, and Possible Future Role," Carnegie-Rochester Conference Series on Public Policy 39 (1993).
- Villanueva, Delano, "Options for Monetary and Exchange Arrangements in Transition Economies," IMF PPAA/93/12 (September 1993).
- Williamson, John, What Role for Currency Boards?. Policy Analyses in International Economics No. 40, Institute for International Economics (September 1995).
- Zarazaga, Carlos E., "Argentina, Mexico, and Currency Boards: Another Case of Rules versus Discretion," Federal Reserve Bank of Dallas Economic Review, fourth quarter 1995.

