

**IMF Paper on Policy Analysis and Assessment**

© 1997 International Monetary Fund

This is a *Paper on Policy Analysis and Assessment* and the author(s) would welcome any comments on the present text. Citations should refer to a *Paper on Policy Analysis and Assessment of the International Monetary Fund*. The views expressed are those of the author(s) and do not necessarily represent those of the Fund.

PPAA/97/11

INTERNATIONAL MONETARY FUND

Monetary and Exchange Affairs Department

**Bank Soundness and Currency Board Arrangements: Issues and Experience**

Prepared by Veerathai Santiprabhob<sup>1</sup>

December 1997

**Abstract**

The rigidity of the backing rule and exchange rate rule of a currency board arrangement (CBA) could substantially enhance the credibility of a stabilization program. However, this credibility is obtained at the expense of sharply reducing the capability and flexibility in lender-of-last-resort support and smoothing monetary operations, which are beneficial for maintaining bank soundness. This paper discusses the designs of existing CBAs that may help maintain bank soundness in view of the rigid backing rule. In addition, it discusses implications of unsound banks for the credibility and efficient functioning of a CBA, and argues that bank soundness, initially and during a life of a CBA, is crucial for the CBA's operations.

**JEL Classification Numbers:** E58, F30, G21

**Keywords:** Currency Board; Banking System

**Author's E-Mail Address:** VSantiprabhob@imf.org

---

<sup>1</sup>This paper is an extension of the IMF Occasional Paper No. 151 entitled "Currency Board Arrangements: Issues and Experiences," by Tomás Baliño, Charles Enoch, Alain Ize, Veerathai Santiprabhob, and Peter Stella (August 1997). An earlier version of this paper was presented at the International Conference on Economic Development and Transformation of East Asian Economies organized by the Chinese University of Hong Kong during July 27-28, 1997. The author would like to thank Alfredo Leone, Warren Coats, and his coauthors of the Occasional Paper for valuable comments, and Claudia Echeverria and Kiran Sastry for capable research assistance.



## I. INTRODUCTION

During the past decade, the notion of establishing a currency board arrangement (CBA) to stabilize an economy has become increasingly popular. While most CBA advocates have focused on the stabilization benefits of a CBA, they have given relatively limited attention to relationships between the efficient functioning of a CBA and banking system conditions. This paper addresses issues related to such relationships and reviews related experience of some existing CBA countries. In particular, it discusses the design of a CBA that is consistent with maintaining bank soundness and argues that bank soundness, both initially and during the life of a CBA, is crucial for the CBA's credibility and efficient functioning.

For the purpose of this paper, a CBA is defined as a monetary arrangement in which the monetary authority is subject to: (1) an explicit legislative commitment to exchange domestic currency for a specified foreign currency, the reserve currency, at a fixed exchange rate; and (2) an explicit requirement that at least a major proportion of its monetary liabilities be backed by the reserve currency or other foreign assets and gold.<sup>2</sup> Because of the difficulty in changing the CBA's exchange rate and the need to fulfill the backing rule, a CBA is more rigid and, hence, more credible than a conventional pegged exchange-rate regime. However, the backing rule generally limits the scope for lender-of-last-resort (LOLR) support and monetary operations, including sterilization operations, to the amount of foreign exchange in excess of that required for backing.

---

<sup>2</sup>This definition is broader than that of the currency boards which were in existence during the British colonial period. These currency boards were required to fully back currency notes and coins and were not allowed to undertake any discretionary monetary operations. For information on currency boards during the colonial period, see Hanke and Schuler (1994), Schwartz (1993), and Williamson (1995).

Institutional arrangements of current CBAs vary substantially—in that they were influenced by macroeconomic conditions, existing institutional arrangements, and the amount of foreign exchange available for backing at the time they were established.<sup>3</sup> Although all CBAs reviewed in this paper were established with the objective of maintaining the long-term stability of their currency, they can be divided into two main groups based on their initial macroeconomic conditions. The first group of countries—Argentina (1991), Bulgaria (1997), Estonia (1992), Hong Kong (1983), and Lithuania (1994)—established a CBA in response to an economic crisis.<sup>4</sup> While the Hong Kong CBA was established to end a currency crisis resulting from the uncertainty of Hong Kong's future, the CBAs of the other four countries were aimed primarily at supporting a stabilization program. By contrast, countries in the second group—Brunei Darussalam (1967), Djibouti (1949), and member countries of the Eastern Caribbean Central Bank (ECCB) (1965)—did not establish a CBA in response to an economic crisis. They were small open economies with relatively limited expertise in monetary management when the CBAs were established.<sup>5</sup> All existing CBA countries, except the ECCB countries, have experienced at least one banking crisis during the past two decades.

## **II. IMPLICATIONS OF A CBA FOR THE BANKING SYSTEM**

By establishing a CBA, the authorities subordinate other policy objectives to defending the exchange rate parity and allow interest rates to play a major role in the CBA adjustment

---

<sup>3</sup>See Appendix I for a summary table of institutional arrangements of the CBAs reviewed in this paper.

<sup>4</sup>The year in which the CBAs were established are noted in parentheses.

<sup>5</sup>By having a CBA as its monetary arrangement, the ECCB has also benefited from the CBA's transparency in creating money and in distributing money across member countries. In this context, the CBA has prevented the possibility that policy objectives of some large member countries may dominate monetary policy of the whole currency union. The member countries also expected that the ECCB's common pool of foreign exchange reserves would generate higher returns than what each country could obtain separately.

mechanism similar to that of the gold standard. Because the backing rule limits the monetary authorities from sterilizing capital flows, a balance-of-payments deficit or rapid capital outflows will automatically be translated into domestic liquidity tightening and higher interest rates, which will, in turn, contribute to a reversal of the deficit or outflows.

Although a CBA may help stabilize inflation and interest rates over the medium to long term, banks operating in CBA countries are likely to face high day-to-day interest rate volatility because interest rates play a major role in the CBA adjustment mechanism and monetary operations are constrained by the backing rule.<sup>6</sup> In other words, banks in CBA countries have to accept the burden of adjustments. Moreover, interest rates may increase sharply to defend the fixed exchange rate in a CBA country that experiences systemic capital outflows. If interest rates remain high for a long period, small and undercapitalized banks may find it difficult to stay liquid and become insolvent.<sup>7</sup> Nevertheless, the difficulty in changing the exchange rate in most CBA countries makes their fixed exchange rate less vulnerable to speculative attacks than those of the conventional pegged exchange rate regimes.<sup>8</sup>

---

<sup>6</sup>As shown in the section on smoothing monetary operations, daily interest rate volatility in Hong Kong declined markedly after monetary operations were introduced.

<sup>7</sup>Goldstein and others (1993, pp. 52-56) argue that, in the countries that allowed interest rates to increase to defend the parity during the European Exchange Rate Mechanism crisis of September 1992, short-term interest rates remained high for about one month after the crisis. Among these countries, Sweden allowed the overnight rate to increase the most, and its short-term interest rates stayed higher than 50 percentage points throughout September 1992. The persistently high interest rates contributed to the banking crisis in 1993.

<sup>8</sup> This, however, does not imply that the exchange rate of a CBA cannot be attacked. The Argentine peso was attacked after the Mexican peso was devalued at end 1994, and the Hong Kong dollar was under pressure during the currency turmoil in Southeast Asia at mid-1997. The speculative attack could be triggered by the belief that the authorities may choose to devalue the currency rather than allowing for a sharp increase in interest rates, which could be detrimental to the banking system and the economy. An attack could also occur if the public believe that the currency should be devalued to restore the country's competitiveness, especially after its competitors have devalued their currencies.

Apart from limiting the scope for sterilization operations and smoothing monetary operations, the CBA backing rule also restricts the monetary authorities from providing LOLR support to banks. Since this support is often helpful in mitigating the effects of a liquidity crisis and containing spreading risks, its absence may allow problems of an individual bank to spread system-wide more easily in a CBA country.

The 1995 crisis in Argentina clearly highlighted these two implications. The attack on the Argentine peso after the Mexican crisis led to systemic capital outflows, liquidity tightening, and a sharp increase in interest rates. Partly because of the restricted scope for sterilizing capital outflows and LOLR support, a small bank failed and the system-wide liquidity crisis emerged.<sup>9</sup>

These implications of a CBA for banks were not as crucial during the British colonial period as they are now. During the colonial period, capital was relatively immobile and, hence, banks were subject to much less interest-rate volatility. In addition, most banks operating in the colonies were branches of foreign banks that settled most payments transactions through their headquarters and could resort to their headquarters for liquidity support.

By contrast, banks operating in many existing CBA countries were incorporated domestically.<sup>10</sup> Although foreign banks currently dominate the banking systems in Brunei Darussalam and Djibouti, it should be noted that most domestic banks in these two countries

---

<sup>9</sup>See Zarazaga (1995) for more information on the 1995 Argentine banking crisis.

<sup>10</sup>In Lithuania, one out of 24 banks operating at end-1994 was foreign owned. In Estonia, only representative offices of three foreign banks existed at end-1994. In Argentina, 31 out of 163 banks operating at end-1991 were foreign-owned, and foreign banks accounted for only 15 percent of total deposits at end-1993. In Bulgaria, the banking system was dominated by state-owned banks, and only four out of 47 banks operating in 1996 were foreign banks. Foreign banks, however, accounted for a large share in Hong Kong and ECCB countries.

failed during the 1980s.<sup>11</sup> In Djibouti, the lack of LOLR support in part contributed to the failure of all domestic banks.

The CBA backing rule also limits the monetary authorities' ability to finance budget deficits. In the countries where the government cannot maintain budgetary discipline, the government has to depend mainly on the banking system for domestic financing. In some cases, banks are required to grant a certain amount of loans to the government or hold a minimum amount of government securities that pay lower interest than the market rate, thereby placing an additional burden on banks and limiting flexibility in banks' portfolio management. In countries where state-owned banks exist, they are often required to finance state enterprises and public projects. These loans could be politically motivated and their values overestimated, with loan collection generally more difficult to administer.<sup>12</sup>

Because of limited financing availability from their respective central banks and the unwillingness to pay market interest rates, some provincial governments of Argentina, and the governments of Djibouti and some ECCB countries resorted to running payments arrears.<sup>13</sup> In Argentina, IOUs issued by these provincial governments were circulated as means of payments during 1994-1995. The circulation of IOUs and the existence of payments arrears adversely affected bank operations, especially their credit risk evaluation and loan collection, as well as the smooth functioning of the payment system.

---

<sup>11</sup>In Brunei Darussalam, only two of the eight commercial banks are locally incorporated, and the three largest banks which accounted for almost 90 percent of total deposits at end-1994 are foreign-owned. In Djibouti, all four commercial banks currently active are foreign-owned.

<sup>12</sup>In Lithuania, the largest bank, which was state owned, had to extend part of its credit under the direction of the government. In Estonia, a large private bank failed during the 1992 banking crisis because a major state enterprise failed to repay in full a loan it guaranteed.

<sup>13</sup>In Djibouti, persistent budget deficits resulted in an accumulation of government arrears to almost 7 percent of GDP in 1993. Despite the fact that the ECCB is allowed to finance a certain amount of each member's budget deficit, new government arrears in Antigua and Dominica in 1994 were around 4 percent of GDP and 1.5 percent of GDP, respectively.

Although the CBA fixed exchange-rate rule limits bank profits originated from traditional foreign exchange trading, particularly those between the domestic currency and the reserve currency, it does guarantee nominal exchange rate stability. If the nominal exchange rate is fixed at an appropriate level, its stability will help facilitate cross-border transactions and serve as a foundation for economic growth, which would, in turn, improve the quality of bank loans and bank profitability.<sup>14</sup>

### **III. EFFECTS OF UNSOUND BANKS ON THE CREDIBILITY AND FUNCTIONING OF CBAS**

Since many existing CBAs were established to achieve stabilization objectives, their fixed exchange rate must be credible to serve as a meaningful nominal anchor that can influence inflation expectations among the public. Similarly, the backing rule also needs to be credible to guarantee the CBA's rules-based monetary arrangement, especially in countries where the monetary authorities have had poor track records. Therefore, for a CBA to function well and serve its objectives, it has to operate in an environment in which the credibility of its fixed exchange rate and backing rule is unlikely to be undermined. Similarly, a CBA will remain operationally and administratively simple as long as its transparency and adherence to the rules-based mechanism are well-perceived by the public.

As in other monetary and exchange arrangements, weak banking conditions could be detrimental to the CBA, especially to the credibility of its rules-based mechanism. Weak or unsound banks are generally willing to take higher risks and, hence, do not usually respond to monetary signals, especially interest rates, in a predictable manner. Thus, the existence of unsound banks may imply a larger magnitude of interest rate adjustments in response to shocks than would occur otherwise. High and volatile interest rates are detrimental to banks'

---

<sup>14</sup>By contrast, Lindgren, Garcia, and Saal (1996, p. 56) argue that exchange rate shifts played a role in banking crises in many of the thirty-four countries they studied. Goldstein and Turner (1996, pp. 15-16) also highlights banking problems caused by currency mismatches.



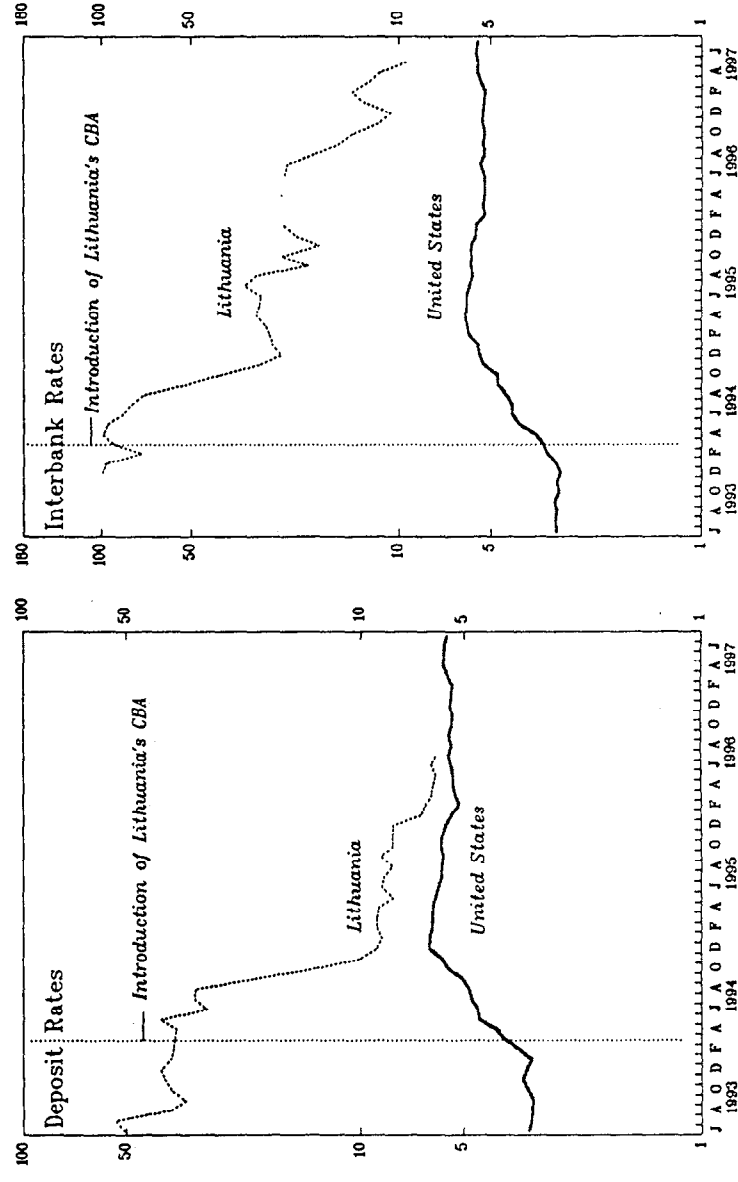
liquidity positions, especially for small and undercapitalized banks, and may exacerbate problems in the banking system. In this context, the market may believe that the authorities will forego the CBA's fixed exchange rate and backing rule to protect the weak banking system. Such a belief could easily lower the credibility of the CBA and the stabilization program, result in capital flights, and further increase liquidity pressures among banks.

Unsound banks could also slow down the processes of interest rate convergence and financial intermediation—both factors are very crucial for a CBA to achieve its stabilization objectives. In most CBA countries, banks play the most important role in facilitating interest rate arbitrage. Since unsound banks tend to take higher risks, depositors typically demand higher risk premiums on their deposit rates. For instance, the large spread between the Estonian and the German deposit rates throughout 1993 was partly caused by the banking crisis of late 1992 and early 1993 (chart 1).<sup>15</sup> Similarly, interest rates in Lithuania did not converge to the levels prevailing in its reserve-currency country due to problems in the banking system at the time the CBA was established (chart 1).<sup>16</sup> Although the Lithuanian deposit rate almost converged to the U.S. level six months after the CBA was established, the interbank rate continued to stay at a level much higher than the U.S. Federal funds rate.

---

<sup>15</sup>The more rapid convergence between the Estonian and the German interbank rates was partially caused by the interest rate targeting practice of the Bank of Estonia when issuing its own certificates of deposits (CDs). An interest rate band for the CDs was set based on the Frankfurt interbank rate adjusted for the liquidity conditions in Estonia.

<sup>16</sup>Many Lithuanian banks were initially undercapitalized, and their assets were inflated by high inflation before the CBA was established in 1994. By the beginning of 1994, many small banks had revealed their weak positions and entered into bankruptcy proceedings. Moreover, the credibility of the Lithuanian CBA was undermined by the relatively limited commitment to its fixed exchange rate. While most CBAs require a parliamentary act to change the official exchange rate, the Bank of Lithuania has power to change the official exchange rate in consultation with the government. See Camard (1996) for more information.



The CBA's credibility and effectiveness in maintaining low inflation should facilitate financial intermediation, but the existence of unsound banks could slow the process.<sup>17</sup> In Estonia, the banking crisis of 1992 led to a substitution of currency for deposits and a sharp increase in the currency to broad money ratio (chart 2). In Lithuania, despite the successful stabilization after the CBA was introduced, the currency to broad money ratio also increased sharply and financial intermediation was delayed because of problems in the banking system and structure reforms (chart 2). In Argentina, the CBA has helped deepen financial intermediation since its inception, except for an interruption during the 1995 banking crisis during which the public began to substitute currency for deposits. The ratio of foreign currency deposits to broad money also increased sharply (chart 3).<sup>18</sup> Because of the public concern over the sustainability of the CBA fixed exchange rate and the conditions of the banking system, bank deposits contracted by around 17 percent between end-November 1994 and end-May 1995.

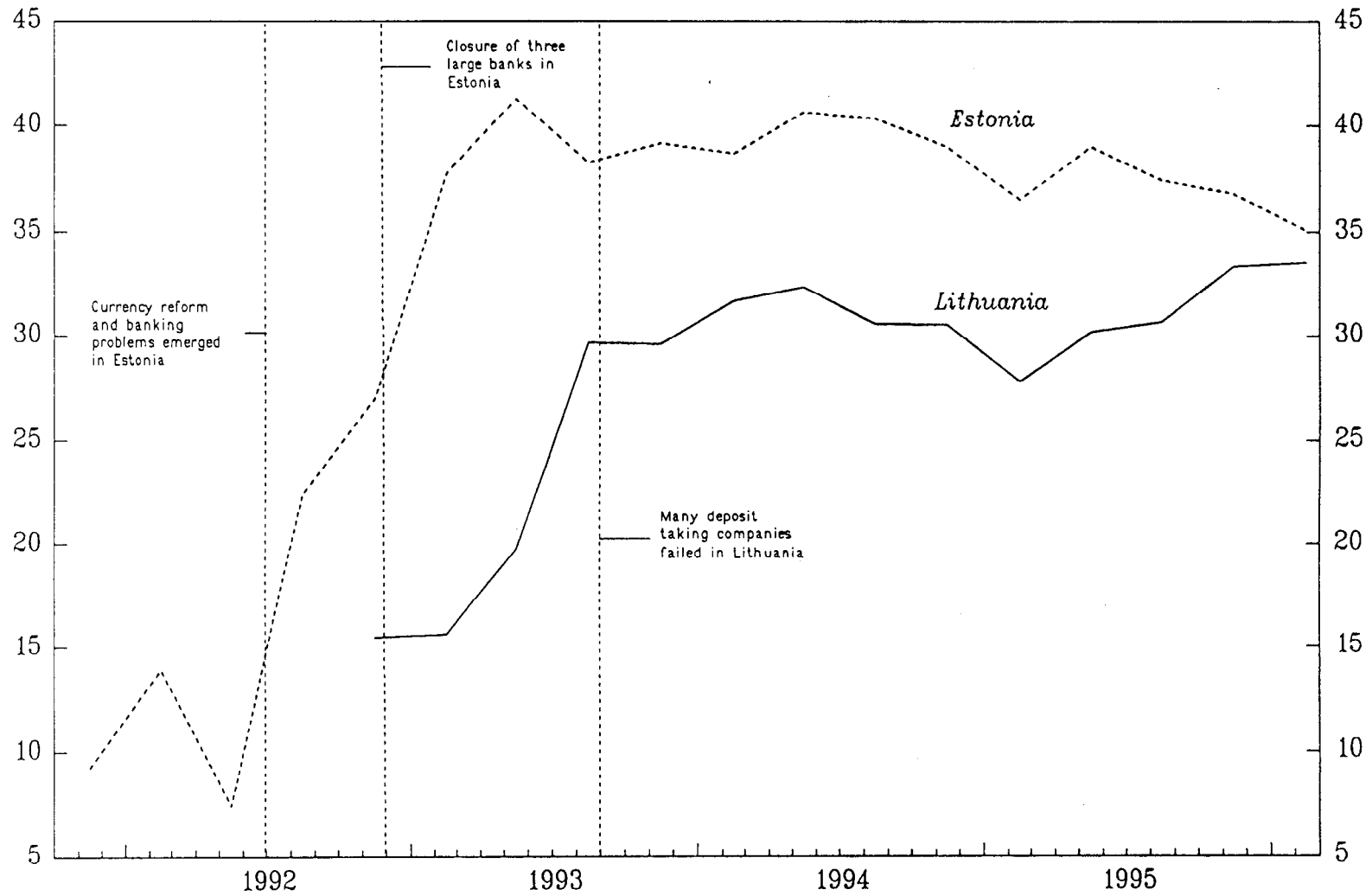
The slow pace of interest rate convergence and financial intermediation caused by the existence of unsound banks could undermine the credibility of the entire stabilization program and, in particular, the nominal exchange rate anchor. Because of the slow interest rate convergence, interest costs will remain high and the public may not be willing to incorporate a lower inflation path into their inflation expectations, thereby slowing down the stabilization process. The slow interest rate convergence may also prevent the government from lowering its debt service expenditures, which could be substantial in countries that have large public

---

<sup>17</sup>The existence of unsound banks could also lead to poor financial intermediation. Since most countries that have stabilized tend to experience capital inflows, it is crucial that these inflows are channeled to productive activities. Unsound banks may channel funds to projects with greater risks which may not generate sufficient return to service the inflows or survive a reversal of capital flows.

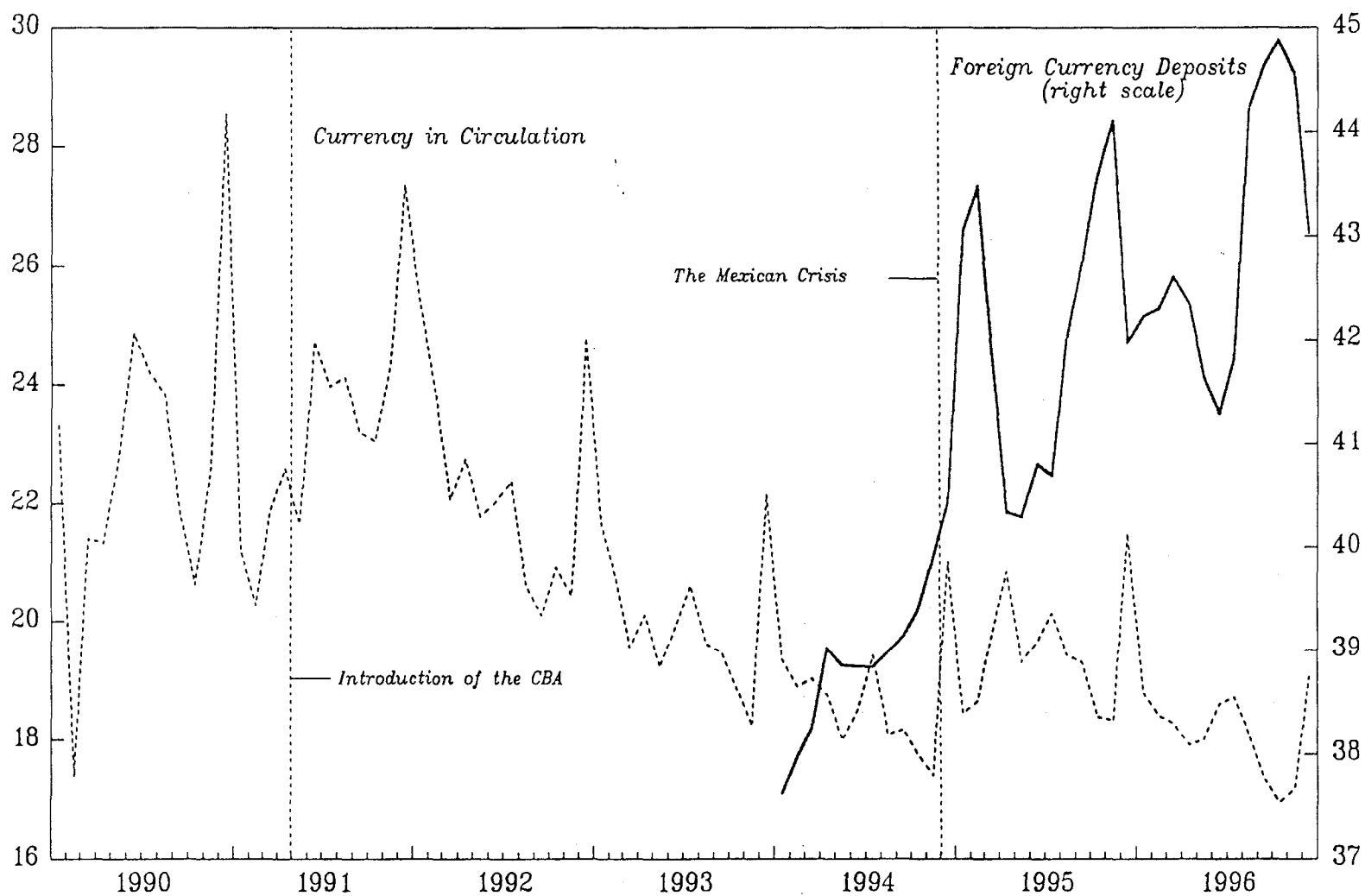
<sup>18</sup>By itself, an increase in the share of foreign currency deposits increased the degree of dollarization without lowering financial intermediation since both domestic and foreign currency deposits in Argentina were subject to the same reserve requirements.

CHART 2  
ESTONIA AND LITHUANIA  
CURRENCY IN PERCENT OF BROAD MONEY



Source: Bank of Estonia and Bank of Lithuania.

CHART 3  
ARGENTINA  
CURRENCY AND FOREIGN CURRENCY DEPOSITS IN PERCENT OF BROAD MONEY



Source: International Financial Statistics.

debt outstanding. The slow process of financial intermediation could also prevent the authorities from achieving their targeted levels of credit to the private sector and, hence, economic growth. This lower than expected performance may pressure the authorities to resort to other measures, including abandoning the CBA and devaluing the currency.

In almost all existing CBA countries, only banks can convert the domestic currency into foreign currencies with the monetary authorities at the fixed exchange rate. Because of the high risks involved, a large spread between the market and the fixed exchange rates could occur if currency conversion has to be done through unsound banks. Thus, unsound banks could deter currency arbitrage and lower the credibility of the CBA's fixed exchange rate. With a view to enhancing the credibility of its fixed exchange rate, the Central Bank of Argentina formally eliminated the spread between the bid and offer rates, bringing the market exchange rate almost to parity with the official exchange rate after the 1995 crisis.<sup>19</sup>

A country that wishes to establish a CBA amid a weak banking system may have to compromise the rigidity and, hence, credibility of the CBA backing rule. The monetary authority may need to ensure its ability to provide limited LOLR support by maintaining a sufficient amount of foreign exchange in excess of that required for backing. Given the limited availability of foreign exchange at most monetary authorities when the CBAs were established, the need to maintain excess foreign exchange implied a narrower scope for backing. In this context, the monetary authorities of some CBA countries chose not to back all of their monetary liabilities with foreign assets. For instance, the Bank of Estonia is not required to back its certificates of deposits (CDs). Unlike the standard treatment of foreign assets, which includes only claims on non-residents, the Central Bank of Argentina is allowed

---

<sup>19</sup>It should be noted that the spread has been completely eliminated in Brunei Darussalam as the country has an agreement with the Singaporean authorities allowing Singapore dollars to circulate together with Brunei dollars at parity in both countries. Similar to Argentina, the Bank of Estonia limited the exchange rate spread to one percent.

to use Argentine Government bonds denominated in U.S. dollars to back up to one-third of the monetary base.<sup>20</sup> In addition, international reserves required for backing in Argentina, Bulgaria, and Lithuania are calculated using the concept that does not take into account central banks' long-term external obligations (mainly to the IMF). While the narrow scope of backing in these countries allows the monetary authorities to hold a larger amount of excess foreign exchange that can be used to provide LOLR support, the narrow scope of backing, together with an opaque backing rule, could severely undermine the CBA's credibility.

Banks' strong foreign asset positions could help mitigate the effects of external shocks in CBA countries. Honohan (1994, p. 19) argues that the ability of the Irish CBA (1928-1979) to cope well with shocks was a result of an additional elasticity provided by the banking system's large foreign assets. In fact, banks' foreign assets were larger than those of the currency board for most of the period. Therefore, net capital outflows after the second World War were absorbed mostly by a decline in the banking system's foreign assets rather than a decline in currency in circulation. Indeed, the Irish monetary authorities could maintain an interest rate lower than the level in London for a certain period in 1955.

#### **IV. THE DESIGN OF A CBA THAT IS CONSISTENT WITH MAINTAINING BANK SOUNDNESS**

The designs of CBAs that were set up to end an economic crisis were mainly influenced by an immediate need to establish credibility for the stabilization program. In addition, they were influenced by their existing institutional arrangements, availability of foreign exchange, and prevailing macroeconomic conditions. Because the existence of unsound banks could undermine a CBA's credibility and functioning, the authorities would

---

<sup>20</sup>Consequently, the central bank needs to back only two-thirds of the monetary base with claims on nonresidents. However, the central bank's Charter limits the increase in the central bank's holdings of Argentine government debt instruments, regardless of currency denomination, to 10 percent per year. See Appendix I for more information.

need to take into account tradeoffs between the rigidity of its arrangement, and measures and resources available for addressing problems in the banking system. The remainder of this section discusses elements that may help minimize the tradeoffs between maintaining bank soundness and the CBA credibility.

### **Limiting the effects of inflation volatility**

Because inflation directly influences the values of collateral and bank assets and liabilities and, thus, complicates the assessment of credit risks, large inflation volatility makes bank portfolio management difficult. In fact, high inflation volatility has been one of the factors leading to past banking crises.<sup>21</sup> As in other countries that undertake an extensive stabilization program, a country that wishes to establish a CBA as a stabilization anchor needs to take into account potential effects of disinflation on the value of banking system's assets.<sup>22</sup> In most cases, the authorities would be required to incorporate a contingent bank restructuring program and its projected costs into their stabilization plans. Moreover, resources for bank restructuring have to be clearly allocated in the budget or obtained externally because the monetary authorities are constrained by the CBA backing rule.

With a view to facilitating the maintenance of low inflation and limiting inflation volatility, the authorities should select as its reserve currency a stable currency of one of its major trading partners. This would help minimize the impact on inflation of fluctuations in the exchange rates between its reserve currency and the currencies of its other trading partners. Such an impact could be highlighted by the experience of Djibouti, which ties its currency to the U.S. dollar while trading mainly with France and other European countries. Inflation in

---

<sup>21</sup>See Lindgren, Garcia, and Saal (1996, Chapter 6) and Goldstein and Turner (1996, pp. 10-12) for more information.

<sup>22</sup>For countries in transition, this problem could be aggravated by changes in relative prices.



Djibouti jumped from below 5 percent during the first half of the 1980s to more than 20 percent in 1986 after the U.S. dollar depreciated against the French Franc (chart 4).

In selecting an appropriate reserve currency, the authorities should also consider the linkage between the country's business cycle and the business cycle of the reserve-currency country. The CBA prevents the authorities from changing the exchange rate to counteract external shocks, and forces the CBA country to import monetary policy from its reserve-currency country. For instance, since the CBA was established in 1983, inflation in Hong Kong has been higher and more volatile than in Singapore, which has allowed its currency to appreciate to keep inflation under control (chart 5). During 1989-1993, the high inflation in Hong Kong was also due to the mismatch between the Hong Kong's and the United States' business cycles. During that period, inflation in Hong Kong went up to the range of 8.5 to 12 percent because its economic boom, stimulated by an increase in Hong Kong's economic activities with China, was enhanced by the relaxed monetary policy imported from the United States. Before the Federal Reserve tightened its monetary policy at the beginning of 1994, real lending rates for Hong Kong dollar funds were negative, thereby encouraging credit demand and intensifying inflationary pressure. If the credit boom in Hong Kong were to continue, it could result in another asset-price bubble, followed by the bubble collapsing and a banking crisis.<sup>23</sup>

### **LOLR support and contingency credit line**

The monetary authorities of most existing CBA countries have recognized the need to provide limited LOLR support to banks and, hence, established explicit LOLR facilities.<sup>24</sup> The

---

<sup>23</sup>Goldstein (1996, p.39) argues that many banking crises have been preceded by a very rapid growth in banking system credit relative to GDP.

<sup>24</sup>Only Brunei Darussalam and Djibouti do not have explicit LOLR facilities. Because the ECCB is required to back only 60 percent of reserve money by foreign assets, it can use up to 40 percent of its foreign assets to provide liquidity support to banks, as long as these resources have not already been used to extend credit to member governments.

CHART 4  
DJIBOUTI  
EXCHANGE RATE INDICES AND INFLATION

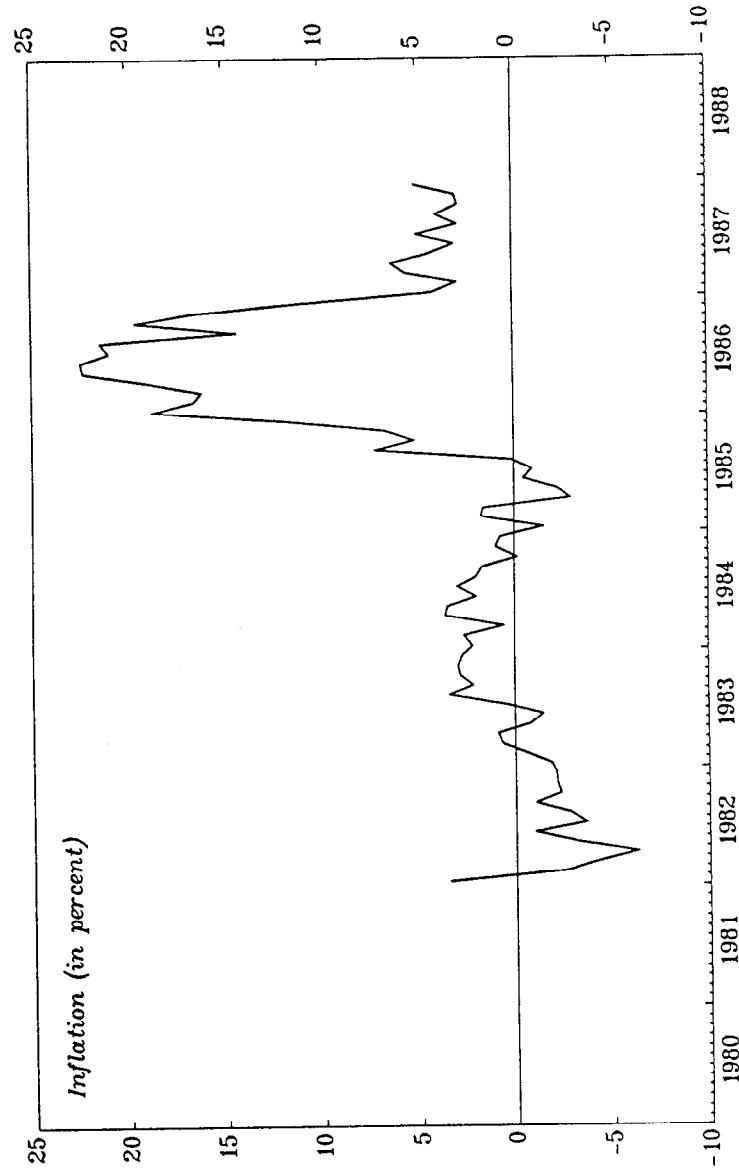
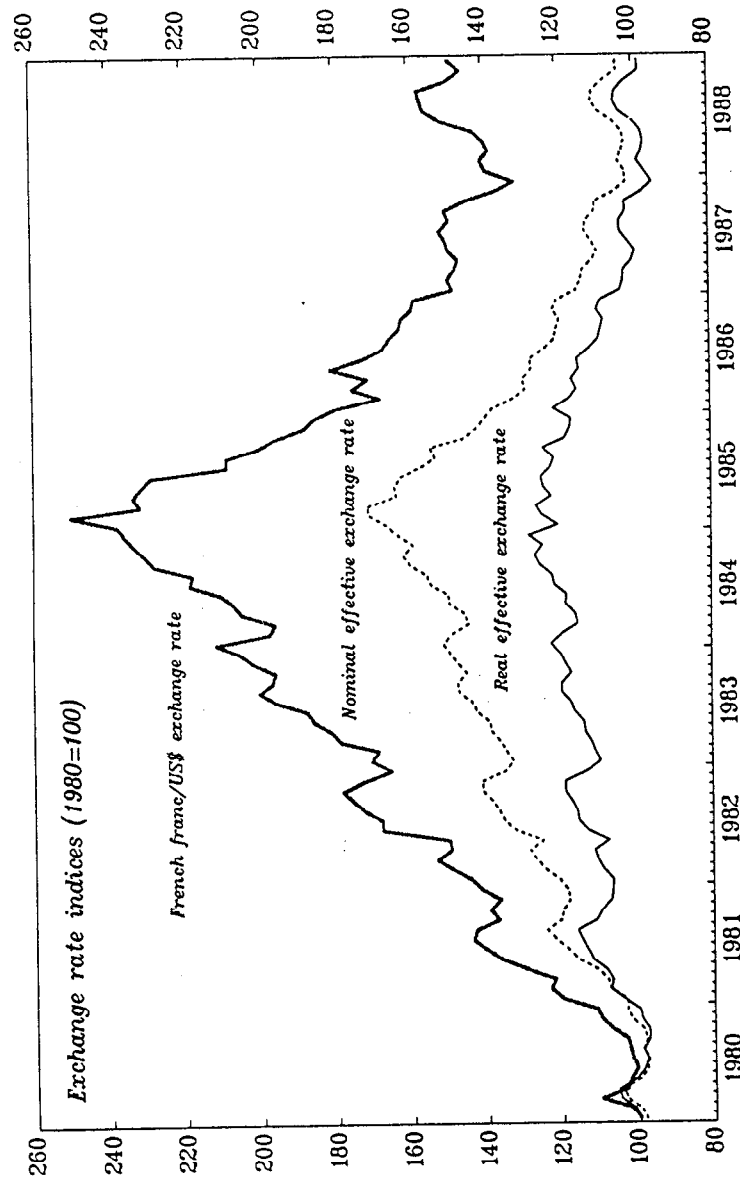
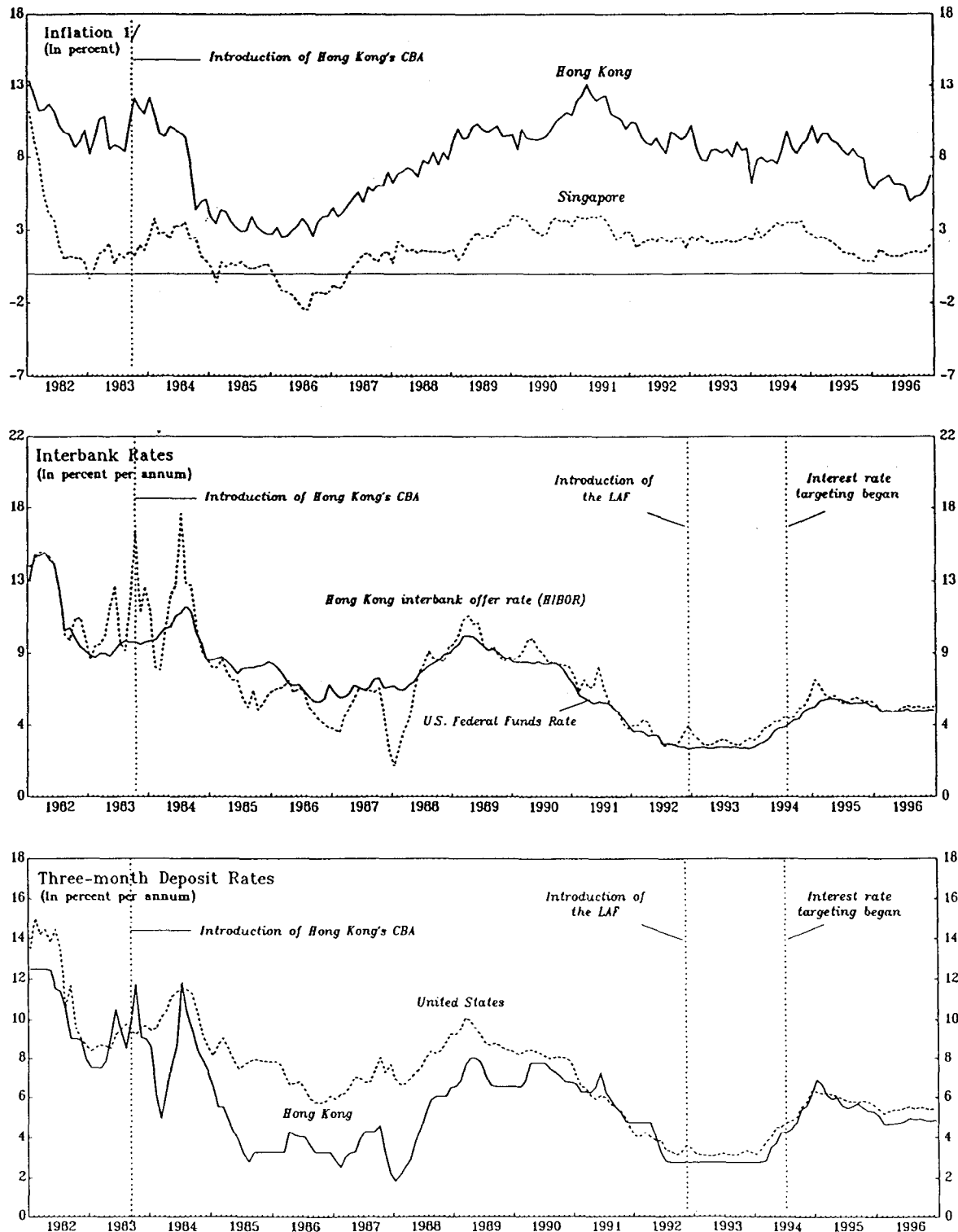


CHART 5  
HONG KONG, SINGAPORE AND THE UNITED STATES  
INFLATION AND INTEREST RATES



Source: International Financial Statistics and Hong Kong Monetary Authority.  
1/ Inflation is calculated on year-on-year basis.

scope and designs of these facilities were influenced by the differences in institutional arrangements of the CBAs and problems in the banking systems. In Hong Kong, the note-issuing banks, which were also settlement banks, had provided liquidity support, including overdrafts and stand-by credit facilities, to illiquid banks during the 1983-1986 crisis.<sup>25</sup> In Bulgaria, the central bank may provide Lombard credit at a penalty rate against collateral of government securities; however, the decision to grant Lombard credit has to be made by the central bank's managing board. In Argentina, the central bank was initially allowed to provide rediscounts and advances to banks for less than 30-day maturity and the amounts not exceeding the borrowing bank's capital. Banks were also not allowed to request another advance within 45 days of their previous repayments. During the 1995 banking crisis, the central bank's Charter was amended to allow the rolling over of rediscounts, collateralized advances, and swaps for a longer period and an amount larger than the borrowing bank's capital. Although the LOLR support reduced the actual backing of reserve money in Argentina, the backing rule had always been observed (chart 6).

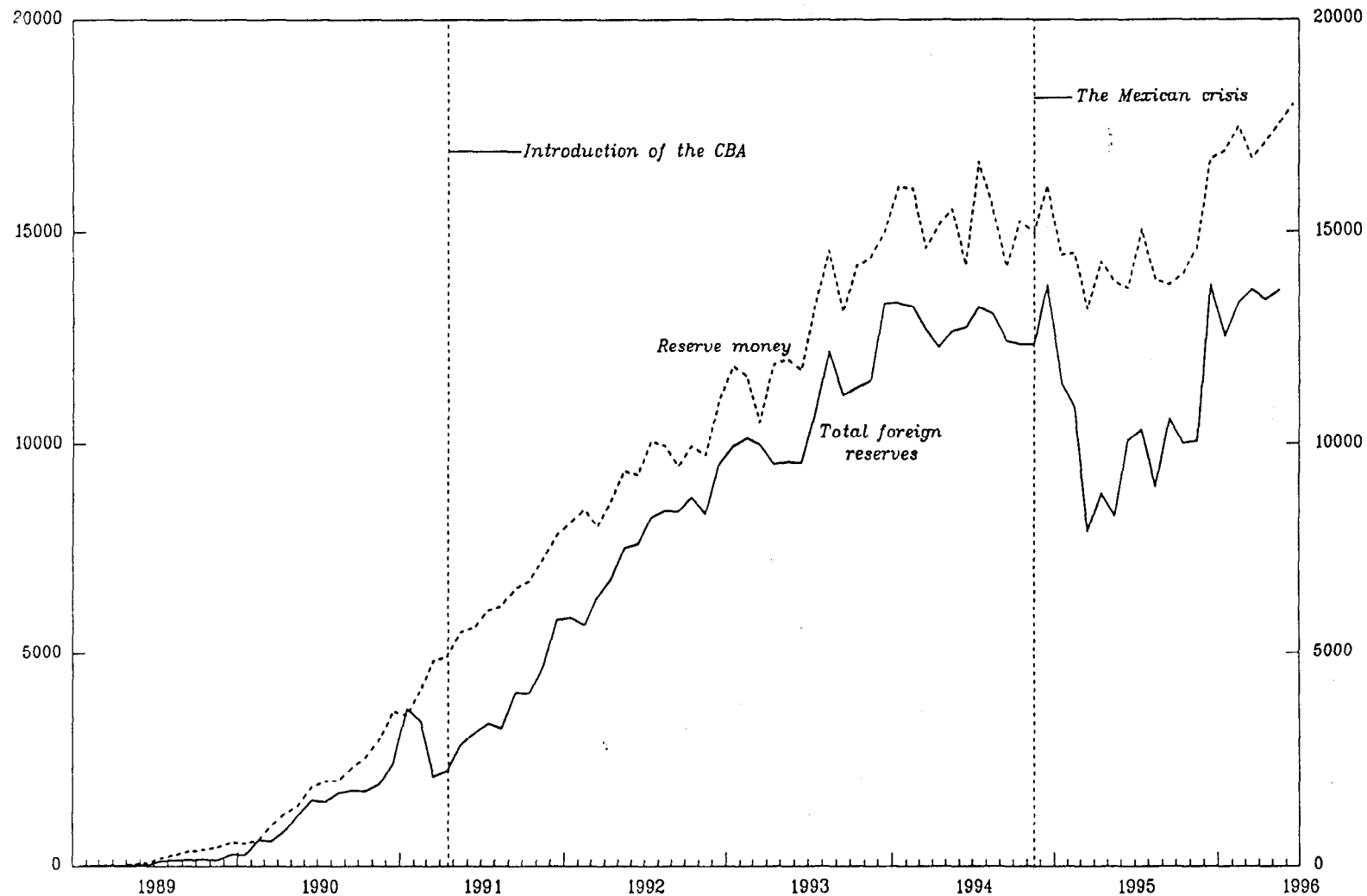
Regardless of the differences in institutional arrangements, LOLR facilities in CBA countries should follow the same best practices as those of traditional central banks. Among others, the loans need to be collateralized by safe assets and are granted only to solvent but illiquid banks on a short-term basis at a penalty rate. These factors would help limit moral hazard in the banking system.

LOLR facilities, however, cannot provide sufficient liquidity during a systemic crisis, especially if a banking crisis is caused by a currency crisis. With a view to avoiding a system-wide liquidity shortage similar to what occurred after the Mexican crisis of 1995, the Central Bank of Argentina established a contingency credit line with international banks from

---

<sup>25</sup>At that time, the note-issuing banks were the Hongkong and Shanghai Banking Corporation (HSBC) and the Chartered Bank. The latter is now the Standard Chartered Bank.

CHART 6  
ARGENTINA  
TOTAL FOREIGN RESERVES AND RESERVE MONEY  
(In millions of pesos)



Source: International Financial Statistics.

which participating local banks can draw if a crisis, triggered by external factors, emerges. At the time the contingency credit line was established in September 1996, the pool of credit amounted to US\$6 billion. Under this agreement, participating banks pay a premium to the central bank which, in turn, pays a commission to the international banks to secure access to the funds. Local banks in need of funds will have to place certain securities with the central bank, which will enter into repurchase agreements with participating international banks.

### **Buffer liquidity provided by required reserves**

Experience during the banking crises in Argentina and Lithuania highlighted the benefit of imposing high reserve requirements that could be relaxed to provide liquidity during the time of stress.<sup>26</sup> By reducing the reserve requirements, the monetary authorities of CBA countries that back reserve money will also require less foreign exchange for backing, thereby increasing the amount of excess foreign exchange and, thus, expanding the scope for LOLR support and monetary operations. In Lithuania, the central bank lowered the reserve requirement from 12 to 10 percent in April 1995 and suspended the penalty for reserve requirement shortfalls in December 1995 to help financially distressed banks.<sup>27</sup>

In Argentina, the banking system experienced a large deposit run triggered by the Mexican crisis at the beginning of 1995. Because most deposit withdrawals and capital flight originated from time deposits, which were subject to relatively low reserve requirements, the automatic reduction in required reserves following the decline in deposits was minimal, thereby resulting in system-wide liquidity shortage. The authorities responded by lowering all reserve requirements; those for demand and savings deposits were lowered in stages from 43 to 30 percent, and those for time deposits from 3 to 1 percent. In order to strengthen

---

<sup>26</sup>Imposing high reserve requirements, however, could be costly to banks and detrimental to bank soundness unless the required reserves are remunerated at market interest rates.

<sup>27</sup>Between end-December 1995 and early February 1996, banks lost almost 15 percent of their domestic currency deposits and 19 percent of foreign currency deposits.

depositors' confidence, banks were subsequently allowed to hold required reserves against foreign currency deposits in U.S. dollars. In March 1995, banks were also allowed to fulfill up to one half of their reserve requirements with vault cash and assets purchased from problem banks participating in the ongoing bank restructuring program.

Unremunerated reserve requirements in Argentina, however, were replaced by liquidity requirements in September 1995 in order to reduce the burden imposed on banks and provide higher flexibility to banks if a systemic crisis reoccurs.<sup>28</sup> The new requirements apply to all non-interbank liabilities, and can be satisfied by holdings of a special account at the Deutsche Bank in New York, central bank's repurchase agreements, certain government bonds of OECD countries, and selected Argentine government securities.<sup>29</sup> By allowing banks to fulfill a certain portion of the liquidity requirements with internationally liquid assets, they would be less constrained by the domestic liquidity condition during a crisis.<sup>30</sup> At present, liquidity requirements also exist in Estonia, Hong Kong, and Lithuania.

### **Stricter prudential regulations**

Because the monetary authorities of CBA countries have limited room to provide LOLR support and banks operating in CBA countries tend to face higher liquidity and interest rate volatility due to the limited scope for monetary operations, banks operating in CBA

---

<sup>28</sup>The central bank is prohibited by its Charter from remunerating bank reserves.

<sup>29</sup>Before December 1996, banks could also meet the requirement by holding Bank Liquidity Certificates issued by the Treasury. The requirements can be fulfilled up to 100 percent by the central bank's repos, up to 50 percent by deposits with the Deutsche Bank, and up to 10 percent by Argentine government securities. At present, the ratio for demand deposits, saving deposits, and time deposits up to 89 days is set at 19 percent and will be raised to 20 percent by February 1998. The ratios for time deposits between 90 and 179 days and between 180 days and 365 days are set at 14 percent and 8 percent, respectively.

<sup>30</sup>As compared to a reserve requirement of the same level, the liquidity requirement lowers the amount of foreign exchange required for backing by the central bank, but does not lower the amount of foreign exchange required for backing by the whole financial system because the backing is done directly by banks.

countries should be able to withstand shocks better than those operating in other monetary arrangements. In order to ensure such ability, many existing CBA countries have imposed stricter prudential regulations and supervision than the international standards.<sup>31 32</sup> For instance, Argentina, Hong Kong, and Lithuania adopted more stringent risk-based capital adequacy ratios than the eight-percent standard recommended by the Basle Committee's Accord for internationally active banks in G-10 countries. In Argentina, the ratio had been increased gradually from 3 percent at mid-1991 to 11.5 percent in January 1995. Although the standard ratio is set at 8 percent in Hong Kong, the monetary authority 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 company. In Lithuania, partly because the accounting practices were not up to international standards, the ratio was initially set at 13 percent before being lowered to 10 percent on January 1, 1997.

Among others, international standards for maximum exposure to a single borrower were also introduced in Argentina and Hong Kong. While the maximum exposure to a single borrower or a group of connected borrowers in Argentina and Hong Kong is set at 25 percent of capital following the EU and Basle standards, the Central Bank of Argentina also imposes a tighter exposure of 15 percent for non-collateralized loans to non-affiliated clients as well as limiting loans and other financing for affiliated clients to the clients' owned capital.

International standards on banks' foreign exchange exposure limits were also introduced in Argentina, Hong Kong, Estonia, and Lithuania. As the reserve currency and the domestic

---

<sup>31</sup>However, it should be noted that Djibouti has imposed relatively lax prudential standards in part because all banks are foreign owned. In other words, the Djibouti authorities depend on the supervising authorities of foreign banks' home countries for supervision.

<sup>32</sup>Many authors have attributed the Hong Kong banking crisis in the early 1980s to inadequate supervision and prudential regulations. For instance, the minimum capital adequacy ratio was previously set at 5 percent, and there were no control on insider lending nor provisioning requirements. Since 1986, the authorities have strengthened prudential regulations substantially. See Ghose (1987), and Ho, Scott, and Wong (1991) for more information.



currency share a similar risk under a CBA, the foreign exchange exposure limits in Argentina, Estonia, and Lithuania exclude their reserve currency from computation. In addition, bank disclosure standards were strengthened substantially in Hong Kong to cover banks' cash flow statement, market risk exposure, and reserves, for example.

### **Deposit insurance and deposit protection**

In CBA countries, losses of an individual bank could easily trigger a deposit run because of the limited LOLR support. A deposit insurance scheme that protects small depositors can help strengthen the depositors' confidence and avoid a deposit run.<sup>33</sup> An incentive-compatible deposit insurance scheme could also help contain moral hazard in the financial system, and limit the involvement of the authorities, especially the monetary authorities, in bailing out failed banks.<sup>34</sup>

In Argentina, a deposit insurance scheme was reintroduced in May 1995. In the former scheme, which ended in 1989 after suffering from severe underfunding, only small peso deposit accounts were covered and the participation was voluntary. In designing the new scheme, the authorities substantially strengthened the incentive-compatibility of the banking system and prevented adverse selection or participation by only weak banks. The new scheme is mandatory and covers only small peso and foreign currency deposits.<sup>35</sup> Premiums are charged based on risk assessment of each bank, and the deposit insurance fund is managed by

---

<sup>33</sup>In general, small depositors are less informed about bank conditions and may not be able to distinguish bad banks from good banks. A bank failure could therefore trigger deposit runs by small depositors and a system-wide liquidity shortage.

<sup>34</sup>See Garcia (1996) for a detailed discussion on the objectives and design of an incentive-compatible deposit insurance scheme.

<sup>35</sup>While deposit insurance schemes in some countries may be designed to protect the payment system by covering a larger amount of demand deposits than other types of deposits, the scheme in Argentina offers coverage of 10,000 pesos for demand deposits and coverage of 20,000 pesos for other types of deposits, while excluding interbank deposits from its coverage.

a joint stock company comprising interested financial institutions with only limited participation by the government. The central bank is prohibited by its Charter from being involved in the new scheme.

In order for a deposit insurance scheme to achieve its objective, it should have sufficient initial funding and be introduced only after severe banking problems have been corrected. When the Deposit Protection Law was introduced in Lithuania in 1995, there were no insurance funds to cover deposits after the banking crisis broke out at the end of the year.<sup>36</sup> As a result, the law effectively placed the government as the ultimate insurer of small depositors of the banks that were liquidated. In Bulgaria, the deposit insurance scheme was first introduced amid a banking crisis at end 1995. Because the scheme explicitly limited the coverage to small depositors, it contributed to further bank runs and deeper banking crises. The authorities had to introduce a new deposit insurance scheme in 1996 that provided full coverage for household deposits and 50 percent coverage for enterprise deposits.

With no explicit deposit insurance, the government of Estonia announced that depositors of a large private bank that failed during the 1992-1993 crisis would be compensated only to the extent that assets of the bank could be liquidated. By contrast, the authorities were heavily involved in compensating depositors in Brunei Darussalam and Hong Kong. In Brunei Darussalam, budgetary transfers were made to repay depositors of banks that failed during the 1980s. In Hong Kong, the government and the note-issuing banks had a history of bailing out failing banks when they threatened the stability of the financial system. During the banking crisis in 1985-1986, the government took over some small banks by using resources from the Exchange Fund (EF). At least in two cases, the EF provided a credit line

---

<sup>36</sup>It should be noted that prior to the introduction of the new Deposit Protection Law, depositors of state-controlled banks were fully protected under the civil code. With the introduction of the new law, the government eliminated the full protection and create a level playing field between state-controlled and private banks.

to the failing banks to ensure that claims of depositors and other creditors were fully met. These unlimited bailing-out activities were likely to increase moral hazard in the banking system.

### **Exit policy for banks**

A clear exit policy for banks and no history of bailing out insolvent banks would call for assessments of bank conditions by depositors and the market. As a result, bank managers will have an incentive to manage their banks prudently.<sup>37</sup> In a CBA country where the banking rule limits the central bank's ability to provide liquidity support to keep troubled banks afloat, such a clear exit policy should be subject to fewer political obstacles.

Most existing CBA countries that experienced banking crises have allowed insolvent banks to fail.<sup>38</sup> However, the speed of closing insolvent banks was slow in most countries. In Hong Kong, the authorities could use sufficiently large resources of the EF to bail out failing banks for a long period during the 1983-86 crisis.<sup>39</sup>

Because a CBA limits the amount of resources that can be used to address banking problems and a sound banking system is crucial for the CBA to function effectively, insolvent banks should be closed before a CBA begins its operation. In Bulgaria, 18 state and private

---

<sup>37</sup>A clear exit policy may take the form of automatic bank closure rules, e.g., the authorities are required by law to close the bank that reaches a certain level of capital impairment. To be able to implement a clear exit policy, supportive laws and infrastructure are needed. Among others, an effective bankruptcy law for banks needs to be in place.

<sup>38</sup>After the 1995 financial crisis in Argentina, the number of private financial institutions declined from 172 in December 1994 to around 125 in August 1995. In Lithuania, only 11 out of 29 banks licensed at end-1994 survived the end-1995 banking crisis and remained in operation in June 1996. In addition, the number of Estonian banks fell to 16, following an increase in the minimum capital requirement on January 1, 1996, as compared to 24 in 1991.

<sup>39</sup>The EF maintained a large amount of excess foreign exchange resulting from a sharp depreciation of the Hong Kong dollar before the CBA was established. Moreover, the Hong Kong CBA backs only notes and coins. The total size of bank rescuing operations by the EF, however, was disclosed to the public only after the crisis.

insolvent banks were closed during the one-and-a-half year period before the CBA was established. By then all remaining banks were solvent and had complied with most of the key prudential regulations.

### **Smoothing monetary operations**

Bank soundness could also be promoted by limiting interest rate and liquidity volatility. In most CBA countries, the monetary authorities have conducted limited monetary operations to smooth day-to-day liquidity fluctuations. As in the case of LOLR support, the scope for monetary operations is limited by the amount of foreign exchange in excess of that required for backing.

Apart from providing buffer resources for banks when a crisis occurs, reserve and liquidity requirements could also help smooth day-to-day liquidity conditions and interest rate volatility if they are calculated on an averaging basis over a long maintenance period. Reserve requirements would also help contain risks of settlement failures and can be used to sterilize the impacts of capital flows. Indeed, reserve requirements have been imposed in all existing CBA countries except Djibouti and Hong Kong.

However, it is not flexible to adjust the levels of reserve and liquidity requirements. The monetary authorities of all existing CBA countries, except Brunei Darussalam and Djibouti, have introduced rediscount facilities for commercial banks and/or conducted limited open market operations. The monetary authorities of Argentina and Hong Kong and the ECCB have all used rediscount facilities to facilitate banks' liquidity management.<sup>40</sup> In Hong Kong, the HKMA introduced the Liquidity Adjustment Facility (LAF) in May 1992 to provide

---

<sup>40</sup>However, the facilities in Argentina and of the ECCB played only limited roles in monetary management. In Argentina, the central bank had rolled over rediscounts as a means to help banks in financial difficulties during the 1995 banking crisis. The rediscount facility at the ECCB has not been used since March 1994.

banks with overnight funds for late adjustments in their liquidity positions. The Bank of Lithuania also plans to introduce short-term credit facility for banks by end-1997.

As regards open market operations, the monetary authorities of Argentina and Hong Kong have managed liquidity using repos. In Argentina, the transactions are done in both pesos and U.S. dollars with the rate and maturity fixed by the central bank. In March 1991, the central bank also introduced a swap facility which was heavily used to provide short-term credits to banks in July 1994 and after the Mexican crisis in March 1995. Swaps were also used to withdraw liquidity when capital inflows accelerated at end 1995.

In Hong Kong, the HKMA has issued EF bills and notes for open market operations since 1990 and 1993, respectively.<sup>41</sup> The bills and notes are traded actively between the HKMA and the public in well-developed secondary markets, especially when the HKMA wishes to counteract liquidity pressure resulting from large public offerings of stocks or seasonally high demand for funds around the end of the month and the quarter. It should be noted, however, that the need for active open market operations in Hong Kong is partly due to the lack of an averaging reserve requirement, which could serve as an automatic stabilizer.

Unlike in Argentina and Hong Kong, the Bulgarian National Bank does not perform open market operations as it wishes to maintain the highest level of transparency of its CBA operation. However, the authorities realize the need to limit liquidity fluctuation. The Ministry of Finance may, therefore, conduct outright purchase in the secondary market for government securities at the central bank's recommendation to offset liquidity fluctuation caused by movements in fiscal positions, for instance, during the tax payment period.

Stable liquidity conditions achieved by smoothing monetary operations would in turn limit fluctuations in the market exchange rates in CBA countries that allow exchange rate

---

<sup>41</sup>EF bills and notes are not subject to the backing rule. The EF bills have 28-, 91-, 182-, and 364-day maturity, and the EF notes have 2-, 3-, 5-, 7-, and 10-year maturity.

spreads to exist, thereby enhancing the CBA's credibility. This is especially evident in the case of Hong Kong whose fixed exchange rate has been subject to various destabilizing rumors and external developments.<sup>42</sup> In order to strengthen the credibility of the official exchange rate, in March 1994 the HKMA switched from using the level of bank balances at the clearing house to the Hong Kong interbank offer rate (HIBOR) as its guiding indicator for open market operations. Indeed, the HKMA has tried to stabilize the HIBOR within the band of the LAF bid and offer rates, which are kept around the U.S. Federal funds rate. At the same time, the range of securities eligible for discounting at the LAF was also widened from only EF bills and notes and government bonds to include high quality Hong Kong dollar debt papers issued by statutory bodies and the private sector. After these measures were introduced, the deviations between HIBOR and the U.S. Federal funds rate became smaller and the market exchange rate has stayed relatively stable (charts 5 and 7). The daily volatility of the HIBOR also declined. Furthermore, the market exchange rate did not depreciate with subsequent increases in the U.S. Federal funds rate after the interest rate targeting was adopted.

### **Backing requirement and payment settlement**

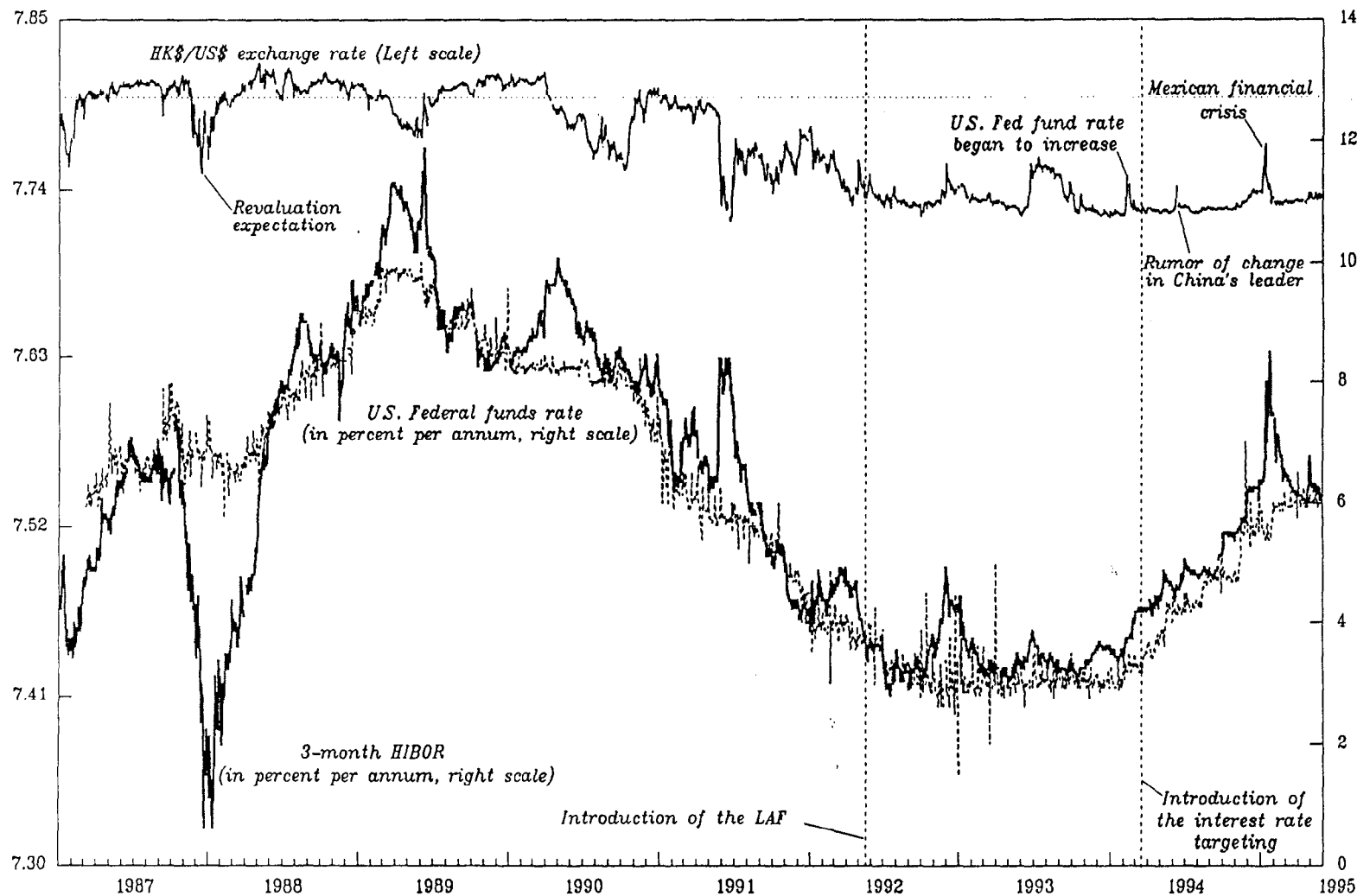
To minimize systemic payment system risks, banks should be required to settle their payments on the books of the monetary authority. To this end, banks need to maintain settlement balances at the monetary authority, and the balances should be backed by foreign assets as they are short-term monetary liabilities. With the exception of Brunei Darussalam, settlement services in the existing CBA countries are provided by their monetary authorities.

In Hong Kong, the HKMA began to provide settlement services only when it introduced a Real Time Gross Settlement (RTGS) system in December 1996. In the past, the

---

<sup>42</sup>The credibility of the Hong Kong's CBA and, in particular, its exchange rate are vulnerable because the CBA backs only currency notes and coins and only the three note-issuing banks have access to currency conversion at the fixed exchange rate. To a large extent, this restriction has limited the possibility for exchange rate arbitrage by the market.

CHART 7  
HONG KONG AND THE UNITED STATES  
DAILY INTEREST RATES AND EXCHANGE RATE



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

HSBC managed the Hong Kong Bankers' Association's Clearing House, which operates on a two-tier system consisting of ten settlement banks in the first-tier and other financial institutions in the second tier. In the old arrangement where private banks handled payment settlements for the whole banking system, the payment system could be disrupted if a settlement bank encountered financial difficulty, and liquidity problems at one settlement bank could simply spread system-wide.<sup>43</sup>

These payment risks are minimized under the new RTGS system in which all licensed banks are required to maintain settlement accounts with the HKMA. The HKMA is, however, not required to back these accounts by foreign assets.<sup>44</sup> In order to ensure the system's smooth operations, the HKMA also established a facility to provide intraday liquidity to banks by conducting intraday repo transactions against EF bills and notes.

#### **Interbank market development**

Because the scope for LOLR support and monetary operations is limited in a CBA environment, banks have to depend among themselves for liquidity management and, thus, the interbank market needs to be actively developed. In this context, the monetary authority should take the lead in developing the necessary infrastructure for interbank dealing, including an efficient payment and settlement systems and a code of conduct that sets the standard dealing practice and the rights and obligations of parties involved. In the country that has no liquid government securities market, the monetary authority may wish to introduce a safe asset that could be used as collateral for interbank transactions. In this context, the Bank of Estonia has issued its certificates of deposits (CDs) to banks since May 1993. The Bank of

---

<sup>43</sup>Settling payment transactions in the books of private banks may also complicate monetary operations and create a non-level playing field in the banking system as settlement banks have access to other banks' proprietary information.

<sup>44</sup>Similarly, the central bank of Djibouti is not required to back bank settlement accounts.



Estonia guarantees the liquidity of these CDs by standing ready to buy them back and to enter into repurchase agreements with banks.

### **Participation of foreign banks**

As suggested by the experience of CBAs during the British colonial period, participation of foreign banks in the domestic banking system could complement the limited availability of LOLR support because these banks could rely on their headquarters when obtaining liquidity in the local markets becomes difficult.<sup>45</sup> Participation of foreign banks is also likely to enhance competition and efficiency in the domestic financial system, which, in turn, would help increase the financial system's ability to withstand shocks. Therefore, financial systems of CBA countries should be open to foreign financial institutions that are prudently and adequately supervised, on a consolidated basis, by the supervisors of their home countries.

### **Maintaining the transparency of CBA operations**

The monetary authorities of CBA countries that wish to provide LOLR support and conduct monetary operations need to ensure the public that the backing rule is always observed, and the transparency and, thus, the credibility of their CBAs maintained. This would help avoid a confidence crisis and potential disruptions in the financial system.

In this context, the designs of CBAs in Bulgaria, Estonia, and Lithuania divide the central banks into two notional departments: the Issue Department and the Banking Department. The former department is only in charge of issuing currency notes and coins and ensuring that the backing rule is always observed. The central banks are also required to publish the account of their Issue Department on a weekly basis. All excess foreign exchange will be transferred to the Banking Department, which is responsible for providing limited

---

<sup>45</sup>It should be noted, however, that foreign banks also had liquidity problems during the Argentina financial crisis of 1995 because their headquarters initially perceived the crisis as a currency crisis and wanted to limit their exposure to Argentina.

LOLR facilities, and conducting limited monetary operations, bank supervision, and other traditional central banking functions.

By contrast, the EF of Hong Kong published its account on a less frequent basis. Moreover, the public were not informed about the EF's foreign exchange position when it was heavily involved in bailing out failing banks during 1983-1986. This practice had raised concerns among the public over the availability of the EF's foreign exchange for backing and for further supporting banks that, at that time, began to show signs of weakness.

## V. CONCLUSION

Experiences from the existing CBA countries suggest that, while the rigidity of the CBAs' backing and exchange rate rules could substantially enhance the credibility of a stabilization program, this credibility is attained at the expense of sharply reducing the capability and flexibility to engage in LOLR support and monetary operations. Because these functions have proved to be beneficial for addressing banking problems and maintaining bank soundness, a careful case-by-case approach must be utilized to weigh their potential costs and benefits when designing or adapting a CBA. The authorities should, however, keep in mind that banks operating in CBA countries are likely to face higher interest rate volatility given the constraints to conduct smoothing monetary operations. Moreover, if banking problems emerge and are not properly addressed, the efficient functioning and credibility of the CBA could be hampered.

## REFERENCES

- Baliño, Tomás J.T. and others, 1997, *Currency Board Arrangements: Issue and Experiences*, IMF Occasional Paper No. 151 (Washington: International Monetary Fund).
- Bank of Estonia, 1992, "The Monetary Reform in Estonia."
- Bennett, Adam, 1993, "The Operation of the Estonian Currency Board," *Staff Papers*, International Monetary Fund, Vol. 40 (June), pp. 451-70.
- \_\_\_\_\_, 1994, "Currency Boards: Issues and Experiences," IMF Paper on Policy Analysis and Assessment 94/18 (Washington: International Monetary Fund, September).
- Camard, Wayne, 1996, "Discretion with Rules?: Lessons from the Currency Board Arrangement in Lithuania," IMF Paper on Policy Analysis and Assessment 96/1 (Washington: International Monetary Fund, March).
- Central Bank of the Argentine Republic, 1992, *Charter General Provisions*, September 23.
- Garcia, Gillian, 1996, "Deposit Insurance: Obtaining the Benefits and Avoiding the Pitfalls," IMF Working Paper 96/83 (Washington: International Monetary Fund, August).
- Ghose, T.K., 1987, *The Banking System of Hong Kong*, (Singapore: Butterworth & Company).
- Goldstein, Morris, 1996, "Presumptive Indicators/Early Warning Signals of Vulnerability to Financial Crises in Emerging-Market Economies," (unpublished, Institute for International Economics, January).
- Goldstein, Morris and Philip Turner, 1996, "Banking Crises in Emerging Economies: Origins and Policy options," BIS Economic Papers No. 46 (Basle: Bank for International Settlements, October).
- Goldstein, Morris and others, 1993, *International Capital Markets, Part I: Exchange Rate Management and International Capital Flows*, (Washington: International Monetary Fund).
- Hanke, Steve H. and Kurt Schuler, 1994, *Currency Boards for Developing Countries: A Handbook*, (San Francisco: International Center for Economic Growth).
- Ho, Richard Y.K., Robert H. Scott, and Kie A. Wong (editors), 1991, *The Hong Kong Financial System*, (Hong Kong: Oxford University Press).
- Hong Kong Monetary Authority, 1994, *The Practice of Central Banking in Hong Kong*.

- Honohan, Patrick, 1994, "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.
- Lindgren, Carl-Johan, Gillian Garcia, and Matthew I. Saal, 1996, *Bank Soundness and Macroeconomic Policy*, (Washington: International Monetary Fund).
- Machinea, José Luis, 1996, "The Argentine Financial Crisis of 1995: Causes, Characteristics, and Lessons," (unpublished, January).
- Marston, David, 1995, "Financial Sector Reform in Jamaica During 1985-92: Possible Lessons for the Caribbean," IMF Working Paper 95/90, (Washington: International Monetary Fund, September).
- Reinhart, Carmen M. and Carlos Végh, 1996, "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.
- Saavalainen, Tapio, 1995, "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 No. 127, (Washington: International Monetary Fund, September).
- Schwartz, Anna, 1993, "Currency Boards: Their Past, Present, and Possible Future Role," Carnegie-Rochester Conference Series on Public Policy No. 39.
- Villanueva, Delano, 1993, "Options for Monetary and Exchange Arrangements in Transition Economies," IMF Paper on Policy Analysis and Assessment 93/12, (Washington: International Monetary Fund, September).
- Williamson, John, 1995, *What Role for Currency Boards?*, Policy Analyses in International Economics No. 40, Institute for International Economics, September.
- Zarazaga, Carlos E., 1995, "Argentina, Mexico, and Currency Boards: Another Case of Rules versus Discretion," *Federal Reserve Bank of Dallas Economic Review*, fourth quarter, pp. 14-24.

### Basic Descriptions of the CBAs

	Argentina	Brunei Darussalam	Bulgaria	Djibouti
Date established	March 1991	1967	July 1997	March 1949
Administrative agency	Central Bank of the Argentine Republic	Brunei Currency Board	Bulgaria National Bank	National Bank of Djibouti
<u>Exchange rate rule</u> Reserve currency	U.S. dollar	Singapore dollar	Deutsche mark	U.S. dollar
Exchange rate	US\$1 = 1 Argentine peso <sup>1/</sup>	S\$1 = B\$1	DM1 = lev 1,000	US\$1 = DF177.72
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	General public	N/A
<u>Backing rule</u> 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	100% of monetary base	100% of currency
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 a 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 and gold	Foreign assets; in practice, foreign deposits held in the U.S. financial system
Power to change the exchange rate rule and backing rule	Only by the act of Congress; however, the central bank is not required to buy foreign exchange at the fixed exchange rate and, hence, can let the peso appreciate.	Only by the act of Parliament	Only by the act of Parliament	N/A

<sup>1/</sup> Initially, the exchange rate was set at 10,000 australs per one U.S. dollar; in January, 1993, the peso was introduced as a new currency.

### Basic Descriptions of the CBAs (continued)

	ECCB	Estonia	Hong Kong	Lithuania
Date established	1965 <sup>2/</sup>	June 1992	October 1983	April 1994
Administrative agency	Eastern Caribbean Central Bank (ECCB)	Bank of Estonia	Exchange Fund (EF) under the supervision of the Hong Kong Monetary Authority (HKMA)	Bank of Lithuania
<u>Exchange rate rule</u> Reserve currency	U.S. dollar <sup>3/</sup>	Deutsche Mark	U.S. dollar	U.S. dollar
Exchange rate	US\$1 = EC\$ 2.7	DM 1 = 8 Estonian kroon	US\$1 = HK\$7.8	US\$1 = 4 litai
Access to convertibility at the monetary authorities	Commercial banks	In principle, general public; in practice, only banks	Note-issuing banks	Commercial banks
<u>Backing rule</u> Coverage of backing	At least 60% of currency and bank reserves (excluding banks' foreign exchange deposits at ECCB)	100% of monetary base	100% of Certificate of Indebtedness issued to the note-issuing banks as back up for currency	100% of currency and the central bank's liquid liabilities
Assets eligible for backing	Foreign assets and gold	Foreign assets, mainly gold and DM interest-bearing assets	Foreign assets	Foreign assets and gold
Power to change the exchange rate rule and backing rule	N/A	The central bank has the right to revalue the exchange rate. Devaluation can be done only by the act of Parliament.	N/A	Since June 1994, the exchange rate can be changed by the central bank (only under extraordinary circumstances) in consultation with the government.

<sup>2/</sup> 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.

<sup>3/</sup> In 1976, after a period of depreciation of the U.K. pound, the ECCA switched from pegging the EC dollar to the U.K. pound to the U.S. dollar.