

# **The Successes and Failings of Currency Board Arrangements**

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Major paper presented to  
The Department of Economics of the University of Ottawa  
In partial fulfillment of the requirements of the M.A. Degree

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**ECO 6999**

Ottawa, Ontario

December 2011

## **I. Introduction**

Currency board arrangements (CBA) have long been invented and have functioned with success. However, with the rise of the system of Central Banks, the idea of CBAs has died down in the 1960s. With the recent financial turmoil and unrest, however, economists are now seeking for alternatives to the once thought perfect system. The success of some currency boards, including the ones in Hong Kong, Argentina before the collapse of its currency board, and Bosnia and Herzegovina (BiH), have led more and more economists and politicians to believe that CBAs should be considered again.

Hong Kong, one of the fastest booming economies since the 1980s, has set up a currency board system since 1983. This arrangement has linked the Hong Kong currency to the US currency at a rate of 1US\$ = 7.8HKD. Since its inception, this system has resolutely withstood several financial crises and it seems to be performing well during the current one. It is therefore very interesting to analyse the successful experience of Hong Kong and see whether it can shed some light in offering a new type of monetary arrangement other than a central bank.

The main objective of this paper is to summarize the different theories of currency boards, discuss the different forms of these CBAs and also evaluate the performances of these different types of CBAs. The layout of the paper will be as follows: Section II is about the history of the currency board and where it has originated from. Section III is about the theories of an orthodox currency board. Even though the functionality of an orthodox currency board is rather simple, there are conflicting arguments on its theory and this paper will present both sides of the argument. Section IV contains a discussion of the appropriate timing and request for a country to adopt CBA. Are there any criteria that a successful CBA must meet? Are these criteria universal or are they country specific? These are the main questions that will be tackled in section IV. Section V, VI, VII will then turn to focus on different CBAs around the world and discuss their unique features, with Argentina, Bosnia and Herzegovina and Hong Kong as case studies respectively. The aim here is to understand why some CBAs

are successful while some are not as much. A more in depth discussion about the currency board in Hong Kong is made compared to the other two cases. This is because arguably it has enjoyed the most success as a CBA, as well as the complexity of its unique structure.

## **II. Origins of the Currency Board Arrangements**

The initial form of CBA was first invented by the British during the peak of its colonial influence. The main objective of the initial form of these CBAs was to provide financial stability to the colonies without the cost of colonies using sterling notes and coins. If sterling notes and coins were used instead of the domestic currency, not only Britain would have to replace them regularly, but the colonies would also have to give up the interest it could earn otherwise if they held interest-bearing sterling assets in Britain. The most important benefit for Britain, however, was that CBA provided the British government with an overseeing power over the financial system of these colonies, as the British secretary could halt the spending of the colonies anytime he saw fit. As a result, the British government was able to have a tight grip on the financial developments of its colonies without having to worry that they would create problems on their own account. With these considerations in mind, the first currency board was set up in 1849 in the British Indian Ocean colony of Mauritius. It has since then spread slowly among the British colonies up to the 1900s where it became the standard currency system for the British colonies. It eventually became a universal requirement for British colonies to run currency boards in the 1950s, when most of Africa, South Asia and the Caribbean were using it (Hanke and Schuler 1991, Williamson 1995, Rabuska 2010).

CBAs have faded away at the beginning of the 20<sup>th</sup> century when many of the colonies became independent and chose to adopt central banks instead, but it has recently returned as a hot topic after some success in a few countries. Many economists have noticed its strength in offering financial stability to its country. However, it is important to note that modern currency boards have deviated from the original

“orthodox” form of currency boards and now take many different varieties that are tailored to the country’s circumstances. As of 2009, there are 20 CBAs around the world and most of them take different forms and are no longer the same as the initial form of the currency board (Gedeon 2009). These different types of CBAs, each with unique features and functions, cover different sizes of economies, which range from economies like Estonia to Hong Kong<sup>1</sup>. The purpose for setting up a CBA has also changed over the years. As illustrated by Ponsot (2003), the evolution of CBAs can roughly be divided into three generations, which are the initial CBAs up to the first world war, British colonial CBAs from the West Africa Currency Board and finally the modern CBA. Their motives, respectively for the three generations, are (i) setting local, sound money-issue mechanisms, (ii) monetary integration resulting from an external power and lastly (iii) credibility respectively for the three generations. A quick example would be the case of the Argentinian CBA, where its purpose was to counter hyperinflation rather than to integrate their economy with an anchor country. As Ponsot (2003) stated, “The CBAs in the 1990s and decision in favour of full dollarization at the beginning of the twenty-first century are the fruit of the process of globalization affecting goods and financial markets. They are not motivated by a desire to reinforce integration with the United States, but rather to boost monetary stability, economic openness, and financial liberalization” (Ponsot 2003: 93).

### **III. The Theory of a traditional (orthodox) Currency Board**

#### **3.1 Differences between a CBA and a Central Bank**

A currency board is a monetary institution that issues notes and coins with the backing of a foreign currency. The foreign currency can be a single currency (reserve currency), a basket of different currencies, a commodity (some economists believe that

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<sup>1</sup> GDP of Estonia as of 2010 is roughly 24.6billion, PPP, ranking 112 (CIA, The World Factbook 2010); GDP of Hong Kong as of 2010 is roughly 325.8billion, PPP, ranking 37 (CIA, The World Factbook 2010)

the gold standard system was basically a currency board system that had a fixed exchange rate with gold) or even a basket of commodities (which is essentially inflation targeting) (Mundell 2000). In any case, the CBA will be committed to fix its own currency with this anchor of choice for an undefined duration. With the many different forms of CBAs that exist in the modern world, Hanke (2002), who can be seen as the father of modern currency boards, has summarized and listed six features that must be fulfilled in order to be considered as an orthodox currency board and these six features are: (i) supply notes and coins only; (ii) full convertibility; (iii) not a lender of last resort; (iv) no regulation of commercial banks; (v) no advances to domestic government; (vi) foreign reserves of 100-115 percent (Hanke 2002). As mentioned before, many of the modern currency boards now only satisfy some of these criteria and rarely do they meet all of them.

On the other hand, we have Central banks, which have been the most important financial organizations since the 19<sup>th</sup> century for most countries. They are usually independent of the government of that country, while most of the time the legal structures that they follow are also different. Out of all the functions and powers, Labonte and Makinen (2004) have pointed out the most important ones: (i) alter the reserve and lending base of commercial banks; (ii) act as the lender of last resort to the financial system; (iii) provide facilities for clearing checks; (iv) serve as fiscal adviser to the federal government and provide economic advice. The two types of systems, CBAs and central banks, both have their edges and shortfalls. In order to compare the two, however, we must assume that the central bank is on a fixed exchange rate. There is a belief that if we assume most countries operate in a currency board regime apart from one anchor country, say the United States, then the global economic system will function just as if the gold standard period (Mundell 2000).

A CBA is not a bank, hence, it does not accept any domestic deposits, and it only generates profit from the difference between the interest earned on its reserve assets and the expense of maintaining its note and coin circulation. All the profit that the board generates in excess to all the expenses is then remitted back to the government (Hanke and Schuler 1993). It is clearly depicted in Williamson's (1995) T-table that the major difference between a traditional CBA and a central bank is that you will only see

foreign reserves on the asset side of a CBA's balance sheet. The important point here is that often the domestic assets that the central banks hold contain domestic government's debt. Thus, one of the major advantages for a CBA over a central bank is it can effectively stop the domestic government from debt financing its own operations (Hanke and Schuler 1993). Furthermore, without any domestic assets the currency board is unable to conduct open market operations and therefore one of central bank's major monetary policy tool is ruled out as a result (Labonte and Makinen 2004).

Once a CBA is formed, it is viewed as a permanent agreement that is unlikely to change, thus giving the agreement credibility and also exchange rate stability to the CBA country. Many economists advocate that this is one of the biggest reasons for the adoption of a CBA, which is a form of a super hard peg. The lack of an escape clause is what makes people believe that the fixed exchange rate will not be altered, unlike a normal fixed exchange rate regime where it is only basically a "pegged" exchange rate. (2000) highlighted the significance of the credibility it creates by stating: "If you cannot build credibility for monetary policy at home, then you can presumably import it by fixing the value of your currency to a hard-money country.... The strength of hard pegs lies in the absence of escape clauses" (Velasco 2000:3) This extra credibility arises from a CBA regime is best described by Mundell (2000). Since the central bank with a fixed exchange rate is incapable of keeping its own independent monetary policy, when the country has a surplus, the central bank is required to prevent the pegged rate from appreciating by buying foreign exchange and supplying domestic currency in return. To neutralize the procedure in order to keep a fixed exchange rate, however, the central bank will have to sell an equal quantity of domestic assets in order to cancel the effects on the money supply. This creates a dilemma for the central bank and now it has to decide whether to expand or contract the money supply, increase or lower interest rates. As a result, it is apparent that there is no automatic system that allows the equilibrium to be reached without intervention in a central bank regime. Currency boards – with the endogenous money supply and interest rates – therefore seem like the automatic system that many neoclassical economists have been longing for. This endogeneity of the money supply and interest rate, in terms of mainstream economic theory, can be seen as an emulation of the gold standard with a price-specie-flow mechanism (Mundell 2000).

Another feature of a CBA is that it fails to act as a lender of last resort. Many economists have voiced out their concern about the lack of lender of last resort (LOLR) under the system of a CBA compared to a central bank. With the lack of a LOLR, it is argued that CBAs can be easy prey for speculative attacks or shocks on the anchor country since defending the exchange rate can be costly. Speculative attacks on the Argentinian peso in 1995 and the Asian financial crisis in 1997 were perfect example of such attacks. More on this will be discussed in later sections when the failing and successes of different modern currency boards are being discussed, but in the meantime, it seems apparent that the lack of LOLR is indeed a major drawback for CBAs compared to a central bank system.

### **3.2 Money Supply**

In the theory of neoclassical economics, the domestic money supply under a CBA regime is said to adjust endogenously to changes in the balance of payments, mimicking the self-regulatory mechanism of the gold standard. In a currency board regime, money supply growth is fuelled by two main forces, growth in bank deposits or growth in currency. According to the law of the currency board, any growth in these two variables must be supported by an equivalent amount of increase in the reserve currency. Hence, a trade deficit should trigger a loss in reserves and a tightening of domestic credit thus keeping the financial system in line and stable. On the other hand, a surplus in trade should result in an increase in reserves and lead to an expansion in domestic credit and eventually the money supply. According to this doctrine, a CBA has no discretion over its monetary policy and the supply of money is endogenous, moving along with the balance of payment account. This lack of discretion over the money supply is hailed as one of the greatest benefits for setting up a CBA since it addresses the persistent problem of soft budget constraints by ruling out active monetary policy or temptations by the central bank to devalue the currency. (Williamson 1995, Hanke and Schuler 1993, Labonte and Makinen 2004, Gedeon 2009)

However, on the other side of the argument we have the post-Keynesian “horizontalist” framework, asserting that CBAs in fact have near perfect control over the

monetary base. Within the theory of this framework, CBAs adjust the monetary base according to changes in demand. As suggested by Gedeon (2009), it was clearly shown that despite a prolonged deficit in the balance of payment account in Bosnia and Herzegovina – in contrast to monetarist theory where CBAs can only have money supply growth when there is a trade surplus – the CBA still managed to expand its monetary base constantly and the economy enjoyed healthy growth year after year since its inception. A more detailed explanation of her findings will be presented in section VII.

No matter which view one holds, however, it is widely accepted that the money supply is endogenous under a CBA. The only difference will be whether the CBA can respond to changes in credit demand by altering the money supply. There is no denial that the surplus in the balance of payment plays an extremely important role in the growth of the currency board. Most of the time, the domestic country will have to be a 'client' state with the anchor country in order to ensure the steady inflow of the reserve currency (D'Arista 2002). By trading actively with the anchor country, it is the most straight forward way to gain an abundance of reserve currency in order to keep the 100% back up requirement. As a result, the CBA will have to produce and export goods that are needed by the anchor country.

### **3.3 Interest rates**

Neo-classical economists also believe that interest rates are endogenous under a CBA because of the automatic reflux system. The essence of the CBA lies within this automatic reflux system; rather than having exchange rate volatility, an economy under the CBA regime has interest rates that vary according to changes in the balance of payments. On the contrary, according to the Post Keynesian view, once credit money is created, banks need to refinance themselves by turning to the central bank, which then accommodates the needs for bank reserves. Interest rates are destined to increase when the central bank refuses all accommodation. This coincides with the assertion from post-Keynesian economists who believe that the interest rates are exogenous and can be altered freely by the CBA.

The argument that the central bank can set interest rates freely has important implications on the central bank's monetary tools that it possesses. One of the biggest drawbacks of a CBA in neoclassical monetary economics is that it will have to surrender its ability to set monetary policies, for lack of proper tools. This view is not shared by post-Keynesians and the exogenous interest rate means that the CBA can still influence the economy and is not some passive bystander. In fact, as some economists have shown, a CBA performs with minimal differences from a central bank under a regime of fixed exchange rate. (Lavoie 2006, Labonte and Makinen 2004).

### **3.4 Advantages**

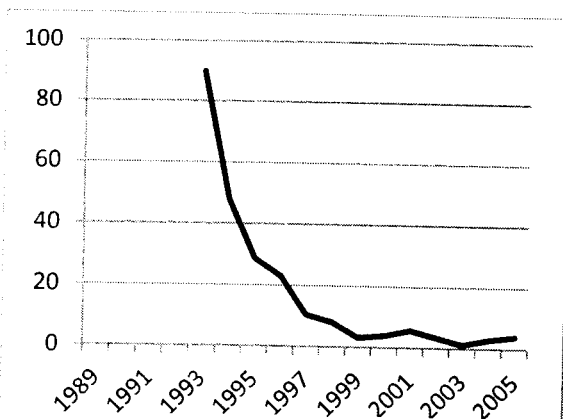
As being discussed, the greatest advantage of a CBA in the view of neoclassical economics is its ability in self-adjustment to the new equilibrium. Both the money supply and the interest rates are determined endogenously and there is no room for the authorities to intervene. With the combined effect of assured convertibility, discipline over fiscal policy and inflation, and a payments adjustment mechanism, in most cases it greatly enhances peoples' confidence in the currency (Williamson 1995, Ponsot 2003).

Stability that arises from the adoption of a CBA has also been evident in examples such as Argentina, Estonia and Lithuania. Argentina was enduring a hyperinflation of over 3,000 percent before its inception of the CBA; Estonia was in a similar position with hyperinflation after they gained independence from the U.S.S.R while Lithuania had a collapsing real economy and a very high inflation (Hanke 2000). As we can clearly see from Figure 3.1 to Figure 3.4, all of the countries in the table enjoyed a sharp decrease in inflation rates soon after the implementation of the CBA. The year of inception for some notable CBAs are: Estonia (1992), Hong Kong (1983), Argentina (1991-2002), Bosnia and Herzegovina (1997), Lithuania (1994), and Bulgaria (1997).

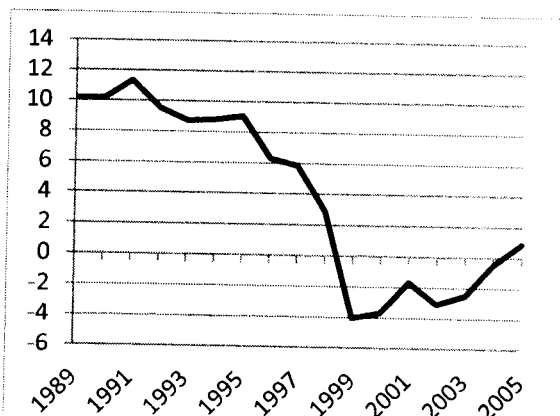
The benefits that arise from a stable economy are well known. They include improved trade and investment resulting from the elimination of exchange rate risk and uncertainty. In addition, CBAs are perfect for emerging countries as a middle step towards a more modern financial system with a conventional central bank. Even for

countries that do not have sufficient experienced personnel and an underdeveloped financial market, CBAs are relatively easy to set up (Williamson 1995, Hanke and Schuler 1993, Kopcke 1999).

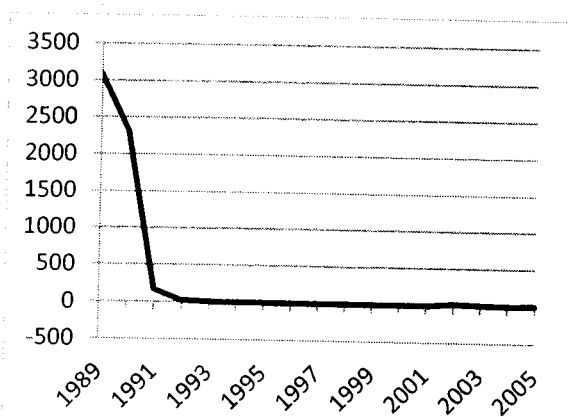
**Figure 3.1** Estonia inflation (CPI, annual %)



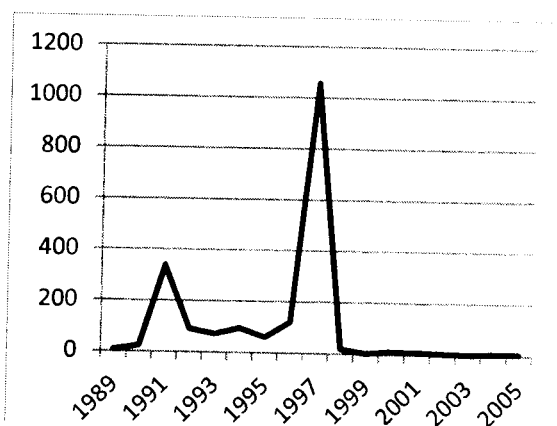
**Figure 3.2** Hong Kong inflation (CPI,



**Figure 3.3** Argentina inflation (CPI, annual %)



**Figure 3.4** Lithuania inflation (CPI,



Source: World Bank databank

### 3.5 Disadvantages

On the other side of the story, however, there are also shortfalls that we must consider. One of the biggest problems with the currency board is the time inconsistency problem, where a country might not be able to honor its agreement and therefore the general public does not see it as a concrete and definite agreement. As it has been

mentioned, one of the strengths of a CBA compared to a normal fixed exchange rate regime is its credibility because of the belief that the exchange rate will not be changing depending on the circumstances. However, if the country has a bad record of violating its agreements, it will be very difficult for the CBA country to convince people that its currency board will still be in place if the short term benefits from violating the agreement exceed the long term gains. It is no surprise that the past record of the government is an important factor and it must be examined when a country decides to adopt the CBA system (Zaragaza 1995, Hanke and Schuler 1993, Williamson 1995).

Another prominent disadvantage for a CBA is its vulnerability to large negative shocks on the economy. Any negative external shock that hits the economy will result in the decrease in demand for goods and hence most of the time it will result in a decrease in labour demand. In the case of a flexible exchange rate, some of the shock can be absorbed by the change in exchange rate. On the other hand, the consequence for a fixed exchange rate, or a CBA, is a decrease in real wages. In reality it is evident that there is a downward rigidity of wages that makes layoffs an easier task than cutting wages. Thus, it is likely that the end result will be a sharp increase in the unemployment rate when there is an external shock on the CBA country (Harberger 2000).

An indirect shortfall for a CBA is the increase in foreign ownership over domestic banks because of the lack of lender of last resort. Some might argue that it is a threat to the sovereignty of one countries' banking system. Banks have to seek sources to insure themselves against downturns in the market, and since the CBA does not offer such protection, they tend to turn to foreign banks. In 2003, 72 percent of Bulgaria's banks were foreign owned, Estonia had a striking 98 percent of foreign ownership in the banking system (Cardenas et. al. 2003) while Argentina had a 70 percent of foreign ownership in its banking system right before the collapse of its CBA system (Torre et al. 2003).

#### **IV. When should Currency Board Arrangements be considered?**

We can now see that many countries have chosen to set up a CBA as they want to boost the credibility in the currency. There is no denial that a sound and reliable currency is one of the most important aspects for the development of a country. A sound currency improves both domestic and foreign investments and most of the time it can also effectively lower the inflation rate of the country. When we examine the many emerging economies, one of the biggest obstacles that they encounter is their fragile currencies. People are not confident in the currency, thus hesitate to enter the market. This usually leads to a lack of FDI, which may greatly hamper the growth of the country. In addition, as explained earlier a CBA can also effectively stop debt financing from the governments. So why do we not see all emerging economies in need of a sound currency set up a CBA? To answer this question, one must analyze the prerequisites for the creation of a CBA.

It is important to note that the CBA is in fact a Currency Board Arrangement "System". The currency board cannot function alone and in order for it to be successful, it is essential for the country to have a functioning financial system that includes commercial banks and other financial institutions. Without a properly functioning financial institution, the chances of success of a CBA are limited. After all, a CBA is not a legal entity such as a bank, but rather a self-imposed fixed exchange rate arrangement. Thus, various financial institutions are essential for the whole CBA system to work.

A politically stable regime is also desired. It defeats the whole purpose of setting up a CBA – to increase credibility of the currency – when there is constant political unrest in the regime. Furthermore, it is also desirable for the country to be a relatively open economy since this means it is easier for the country to obtain foreign currencies. Williamson (1995) showed that a relatively open country (the definition of a "relatively open country" he used was imports equating at least 50 percent of GDP) will wish to hold more reserves. Hence it is apparent that it is easier for an already open country to

implement a CBA whereas a closed economy will have to first increase their holdings of foreign reserves in order to institute a CBA.

Another attribute that is desired is a flexible labour force. If the CBA country has a sluggish labour market, the problem being discussed earlier where the real wage has to decrease when there is an adverse shock to the economy will most likely take a long time till it returns to the internal equilibrium. If the labour market is flexible, however, unemployment goes up but people will get hired at lower wages.

It is also believed that small economies are better candidates for CBA. First of all, small economies generally hold more foreign reserves relative to the money supply as this allows them to be more prepared for foreign shocks. Secondly, the opportunity cost in terms of forgone seigniorage of operating a CBA is a lot less compared to big countries (Williamson 1995). It is also obvious that large economies would not want to adopt a CBA since it would mean giving up the sovereignty over their own monetary power. Most of the countries that have instituted a CBA – to name a few: Estonia, Lithuania, Faroe Island, Cayman Island – are small economically. Hong Kong is a relatively large economy compared to the countries listed above but it is important to note that Hong Kong fits most of the criteria for an ideal country for CBA. It has an extremely open economy and an already well developed financial sector. The one obvious exception is Argentina. It is a big economy with a relatively closed economy, yet it managed to experience a prolonged period of success before the eventual collapse of the CBA system. So did this mean the CBA did not work in Argentina? Or are there other reasons that led to the failure of the CBA system in Argentina?

## **V. Case of Argentina**

During the years between 1975 and 1990 Argentina had experienced years of high inflation; at one point, in 1989, it even reached 3,000 percent. As a result, after another failed attempt to combat high inflation, in 1991, due to chronic fiscal deficit, Argentina

decided to set up a CBA with a fixed exchange rate of one Argentina peso per US dollar (The official name of the currency board system in Argentina is "Convertibility", but for the clarity and simplicity it will be referred as the Argentinian CBA). The effect of the CBA in lowering inflation was a successful one, as can be seen in Figure 3.3.

However, it is important to note that the CBA in Argentina deviated greatly from an orthodox CBA. First of all, the biggest difference is Argentina's CBA held extensive domestic assets in addition to its foreign assets. Immediately we can see that Argentina's CBA has violated one of the six requirements proposed by Hanke (2002) in order to be classified as an orthodox CBA. The monetary base for the Argentina CBA had never been backed 100 percent by foreign reserves since the convertibility law only required at least 80 percent to be backed up. Hence, the movement between the monetary base and foreign reserves are also not identical, as opposed to an orthodox CBA.

It quickly becomes obvious that, since some local currency will never be presented in exchange for dollar, the monetary base can grow slightly beyond the CBA limit. As a result, the monetary authority could exploit this feature and somewhat act as a lender of last resort (LOLR). However, the Argentina CBA had restrictions on the movements between monetary base and foreign reserves within the frameworks of a fixed exchange rate system and this is why we can observe that whenever there is a change in foreign reserves, sooner or later the monetary base has to be altered as well. Hence, any sustained decline in foreign reserves had to be reflected in a corresponding change in the monetary base as well. Nonetheless, with the ability to control the monetary base to a certain extent, Argentina's CBA wields a much greater discretionary power than orthodox CBAs (Zarazaga 1995). With this extra tool in the Argentinian CBA arsenal, many economists even argue that it resembles more a central bank than a CBA. However, I strongly believe that examining the Argentinian CBA still provides important insights for the analytical purpose of this paper.

### **5.1 The Tequila Crisis, 1995**

So how well did this unique type of CBA work? In order to answer this question one must examine the financial crises and its impact on the CBA system implemented in Argentina. In 1995, Mexico devalued its currency that led to the loss in confidence of the Mexican peso and subsequently led to a financial crisis in Argentina. This episode was often referred to as the tequila crisis. After the devaluation of the Mexican peso, Argentina's financial panic started when one of Argentina's commercial bank, Extrander, failed to deliver its short term liability commitments due to its heavy exposure in Mexican bonds and securities. The size of the bank was extremely small, with less than 0.2 percent of the total deposits in Argentina, but it was sufficient to lead to a nationwide panic of a devaluation of Argentina's own currency. With the lack of deposit insurance in place, there was eventually a run on banks, and by the end of 1995 the financial system had lost up to 18 percent of all the deposits.

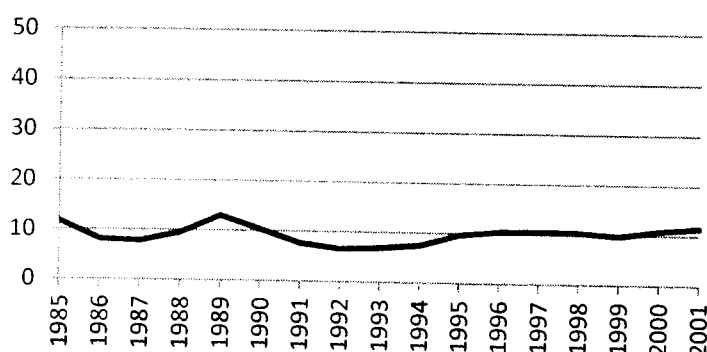
The role of the CBA in the midst of the financial crisis of 1995 was limited. Even though it could act as a limited lender of last resort with the mechanism that was depicted earlier, it was not enough to cover all the demand on the banks. The CBA in Argentina had to persuade the top five banks to create a \$250 million "safety net" to buy the assets of illiquid wholesale banks in exchange for lower reserve requirements. A second safety net of \$790 million soon followed, this time with 25 banks transferring reserves equal to 2 percent of their pre-crisis deposit base from the central bank to the government-owned liquidity providing facility. Not in line with most people's expectation, the CBA in Argentina was able to keep its promise and maintain the fixed exchange rate with the US dollar. However, the cost for doing so left a severe mark on the Argentinian banking system. In the first nine months of 1995, 34 banks and 6 nonbanks financial entities closed, thus destroying almost 20 percent of the banking system. By the end of 1995, Argentina's financial system had lost 18 percent of the deposits it had before the Mexican peso devaluation and many investors had lost some portion of their savings and were unable to recover from the loss for a prolonged period (Carrizosa 1996, Zarazaga 2005).

The severity of the tequila effect led the authorities to launch a series of measures in order to strengthen the convertibility system. Many state-owned banks were privatized and this resulted in better performances<sup>2</sup>. This is because private banks understood the limitations of the Argentinian CBA as a LOLR and became more self-reliant in meeting their short-term liquidity needs. As a result, after a sharp dip in GDP, Argentina recovered well and was back on track, with an impressive growth performance in 1996.

## 5.2 Financial crisis in 1999-2001

However, in 1999, Argentina was once again subjected to another recession, but mainly for different reasons. While there was an inconclusive debate on what the actual cause of the crisis was, it is not the focus of this paper to discuss the catalyst that led to the crisis. The important point is to understand that the Argentinian government at the time was under deep pressure by a huge government deficit with various reasons including extensive expansionary plans and a failure to collect taxes. On top of that, there was also the matter of a sudden loss in the terms of trade due to overvalued currency and the depreciation of the Brazilian real<sup>3</sup>. Now let us take a look at the role of the currency board during the financial crisis.

Figure 5.1 Export in Argentina from 1985 till the end of the CBA period (% of GDP)



Source: World Bank databank

<sup>2</sup> State banks accounted for 43 percent of total loans in Argentina in June 2005. Most of the public banks were troubled by poor management and made worse portfolio choices compared to private banks (Carrizosa 1996).

<sup>3</sup> The argument about the cause of the financial crisis usually lies in whether the Argentinian peso was overvalued, with Schuler (2002) being one of the advocate that the peso was not overvalued.

One of the problems that the Argentinian CBA faced was the constantly depleting foreign reserves. Argentina, being such a big economy, was surprisingly “closed” as an economy during the CBA regime. Exports remained low year after year and this was the case since long before the inception of the CBA system (Figure 5.1). As a result, the banking system in Argentina lacked dollar liquidity. There was an insufficient access to external financing to cover interest and principal payments on Argentina’s external debt. More importantly, the lack of foreign reserves meant endangering the basic functioning of the CBA system in Argentina. Another problem was the discretionary power that the CBA possessed, which ultimately led the CBA to pursue two incompatible targets, (i) exchange rate targeting and (ii) money supply targeting. At the peak of the 1999 crisis, there was a huge wave of speculation that the peso would devalue, despite constant reassurance from the authorities that they would not do so. The Argentinian CBA intended to defend the fixed exchange rate with the US dollar just like they did in 1995, however, the lack of foreign reserves meant that the same tactic would not be fruitful this time (Hanke and Schuler 2002). The biggest problem, however, was probably the currency-growth-debt trap that Argentina was caught in. Instead of attempting to cut back government spending in order to lower the deficit, the government drained the liquidity in the market by forcing a huge government bond to be placed at the central bank of Argentina. Thus, the banking sector became heavily exposed to government default and became less liquid (Torre 2002 et al.).

To summarize, the CBA did not have enough foreign reserves in US\$ to keep its peg while the huge public deficit had exacerbated the problem. After a chaotic period and financial turmoil, new president Eduardo Duhalde scraped the CBA system in Argentina and eventually allowed the peso to float freely. This resulted in a drastic depreciation of the peso, which lost 75 percent of its value with respect to the US dollar in a matter of months.

### **5.3 Lesson to be learnt from the Argentinian CBA**

After analysing the role of the CBA in Argentina, the lesson to be learnt from the experience of Argentina is that currency boards have very little defence against financial crises when they occur in modern time, as opposed to when they were first invented in the times of colonies. The arrangement of a quasi-currency board did not protect Argentina from a speculative attack against its currency, which was contrary to the predictions of many currency board advocates; nor was the Argentinian CBA able to automatically adjust its money supply according to the balance of payments due to its unique structure and competing objectives. The CBA had to resort to the help from the private sector during the Tequila crisis and the second crisis in 1999 even led to the abolishment of the whole CBA system.

As we can clearly see, some of the features of the Argentinian CBA that deviated from the orthodox model had far-reaching consequences. The incomplete separation between the CBA and the government and the CBA's power to exercise discretionary monetary policy to a certain degree, both greatly undermined the credibility of the CBA. One may argue that the Argentinian CBA had actually failed to truly convince the public that it would defend its currency at all costs, which means one of the main reasons for setting up a CBA had not been fully fulfilled. Moreover, the quasi-currency board system in Argentina was powerless in defending its currency during the Tequila crisis while problems in the fundamental structure of its CBA exacerbated problems during the 2000 crisis.

All in all, even though the implementation of the CBA seemed like a success in the early years, ten years after its inception it had eventually become a total disaster. The biggest problem of Argentina, as Setser (2006) believes, was the unwillingness to devalue and initiate a restructuring before it had depleted both its reserves and its capacity to borrow from the IMF. As the foreign reserves were constantly depleting because of deficits in the current account, it was clear that Argentina should have had reformed its monetary system long before the outbreak of the crisis in 2000. (Zaragaza 1995, Carrizosa et. al. 1996, Torre 2003 et al., Hanke and Schuler 2002, Setser 2006, Huasmann and Velasco 2002)

## **VI. Case of Bosnia and Herzegovina**

### **6.1 Background**

Before analyzing the performance of Bosnia and Herzegovina's (BiH) CBA, it is important to understand the political background of the country, which allows us to have a big picture of the story. In 1992, the declaration of independence in BiH sparked a horrible civil war between the ethnic Serbs, Croats and Muslims. The war eventually ended in 1995 with a peace treaty, the Dayton Peace Agreement, being signed. This civil war marked the worst war in Europe since World War II. The actual figures of casualties are still under debate, but there was an estimated 200,000 dead, injured, and missing as of 1994. In an unclassified CIA memorandum of November 1995, it was estimated that 900,000 to 1.2 million refugees had fled Bosnia to other countries and many more were displaced from their homes, with half of the total pre-war population of the country no longer had a home. The combined direct and indirect physical damages were approximated to exceed 100 billion USD. The war resulted in two separate entities within the sovereign country of Bosnia and Herzegovina: The Federation of Bosnia and Herzegovina that is mainly composed of Bosniaks and Bosnian Croats, and Bosnian Serb's Republika Srpska. Both political entities have their own independent constitutional, legislative, executive and judicial functions. (Kamhi and Dehejia 2005, Burg and Shoup 2000).

### **6.2 Central Bank of Bosnia and Herzegovina**

It is not difficult to imagine that the scale of the war left BiH's financial structure and economy in shambles. The authorities were in desperate need to establish a sound and reliable system in order to recover from the war. With the aid from the IMF, the Central Bank of Bosnia and Herzegovina (CBBH) was finally set up in 1997. The choice of a CBA was believed to be the best option at the time. When the CBBH first started its operations in 1997, there were four currencies being used in the country (BiH dinar, Yugoslav dinar, Croatian kuna and Deutsche mark), while only the Deutsche mark was a generally accepted transaction currency across the entire country. None of the commercial banks had operations over the whole country; the majority of citizens had

lost faith in the banking system and did not use them; each of the regions had their own payment bureaus and they all had a monopoly on non-cash payments in the territory. After consideration, a CBA system was believed to be the best system to provide stability and certainty in such a fragmented and disjointed system (Kovacevic 2003).

The inception of the CBA had pegged the newly-found Bosnian currency, the convertible mark (BAM), to the Deutsche mark (DEM) with a rate of 1:1. BAM was later pegged to the euro with the same rate as the DEM to Euro (1.9558 per euro) since the inception of the euro currency in January 1999. As being clearly stated in the law of CBBH, the domestic currency liabilities of the CBBH have to be fully backed with convertible foreign assets. If we look closely to the balance sheet of the CBBH, we can clearly see that such a practice has been followed tightly. In fact, these foreign assets have been constantly above the domestic currency liabilities, with a growing net reserve year after year. As of December 2010, the free reserves were 486,790 BKM (Figure 6.1).

Figure 6.1 Balance of Central Bank of Bosnia and Herzegovina

	Dec-00	Dec-05	Dec-10
<b>Assets</b>			
1. Foreign Exchange Assets	1,027,532	4,224,516	6,457,692
1.1 Cash	38,116	40,497	102,247
1.2 Short Term Deposit	989,416	4,183,481	3,003,450
1.3 SDR in IMF	0	538	27
1.4 Monetary Gold	0	0	66,896
1.5 Investment Securities	0	0	3,285,072
2. Other Assets	17,966	56,328	68,950
<b>Total Assets (1+2)</b>	<b>1,045,528</b>	<b>4,280,844</b>	<b>6,526,642</b>
<b>Liabilities</b>			
3. Monetary Liabilities	973,207	4,010,080	5,969,551
3.1 Currency in Circulation	695,887	1,907,183	2,497,501
3.2 Deposits of Resident Banks	261,901	2,062,100	3,393,541
3.3 Deposits of Other Residents	15,419	40,797	78,509
4. Liabilities to Non Residents	200	1,035	1,351
5. Other Liabilities	13,631	24,776	21,809
6. Capital and Reserves	58,490	244,953	533,931
<b>Total Liabilities (3+4+5+6)</b>	<b>1,045,528</b>	<b>4,280,844</b>	<b>6,526,642</b>
<b>Net Foreign Assets minus Monetary Liabilities (1-3-4)</b>	<b>54,125</b>	<b>213,401</b>	<b>486,790</b>

Source: Central Bank of Bosnia and Herzegovina

Such a complete backing of foreign reserves ensures that the CBBH is able to deliver any request of domestic demand; hence, the full convertibility condition is also satisfied. The operations of the CBBH do, however, deviate from an orthodox CBA. Most notably is its ability to regulate commercial banks, with the reserve requirement being one of the main monetary tools. As being clearly stated in Article 36 of the Law on Central Bank in Bosnia and Herzegovina, all banks are required to hold a certain amount of reserves. Any bank that fails to fulfill its required reserves for two consecutive periods will be penalized by banking authorities and also receive a penalty up to five per mil (5/1000) per day on the shortfall in such bank's required reserves until the shortfall is corrected. Such a measure ensures the CBBH has the power to alter the required reserves and thus indirectly control the money supply to a certain extent, as being mentioned before.

### **6.3 Monetary policies by CBBH**

As described earlier, one of the features of a CBA regime is the high ownership in the banking sector because of the lack of a LOLR. This is also the case in BiH, with a share of 90 percent dominated by foreign commercial banks as of Dec 2010 (CBBH annual report 2010:82). With the combination of the reserve requirement that the CBBH imposes on commercial banks and the high foreign ownership among domestic banks, Gedeon (2009) pointed out that CBBH actually has the ability to influence the money supply, in contrast to an orthodox CBA.

First of all, it is important to note that a significant amount of the liabilities in the BiH banking system are deposited by parent banks. The purposes of these loans are to provide a long term euro cover for loans that the domestic branches made. The lack of a proper discount window also gave rise to this relatively high ratio of deposits from parent banks since the domestic branches must always stand ready for any demand in liquidity.

Whenever a domestic branch needs to make a loan for a domestic project, the branch moves short-term foreign assets that are held against resident time deposits denominated in BKM and resident demand deposits denominated in FX to the parent bank located abroad. They serve as collateral against a loan that the parent bank will now create for the branch bank. The parent loan sits as a guarantor against the long-

term corporate loans that the BiH branch has issued in BKM. The local branch will then have to sell the DEM dominated loan to CBBH for BKM. As a result, the balance sheet for both the commercial banks and the CBA exhibit increase in both foreign liabilities and foreign assets, as well as the monetary base and the money supply, whenever there is an increase in domestic credit demand (Figure 6.2)<sup>4</sup>.

**Figure 6.2** Simplified balance sheets for the banking system in BiH when there is an increase in the demand for credit of 100 BKM

- (1) Parent Bank loans 100DEM to Banking Sector
- (2) Banking Sector deposits 100 DEM at CBA (CBBH) and then redeems 100BKM cash (assume 1BKM = 1 DEM)

**Parent Bank Balance Sheet**

Asset	Liability
(1) +100 DEM collateral from BiH branch	
(1) - 100 DEM deposit to BiH branch	

**BiH banking sector Balance Sheet**

Asset	Liability
(1) +100 BKM collateral to parent bank	
(2) - 100 DEM sold to CBA for BKM	(1) +100 DEM loan from BiH branch
(2) +100 BKM from CBA	

**BiH CBA (CBBH) Balance Sheet**

Asset	Liability
(2) +100 DEM	(2) +100 BKM

At first glance, the CBBH, as a CBA, seems to be powerless to control the money supply because of the loophole in the CBA system that allows for unlimited inflows of borrowed funds from parent banks. However, as Gedeon pointed out, the CBBH can indirectly

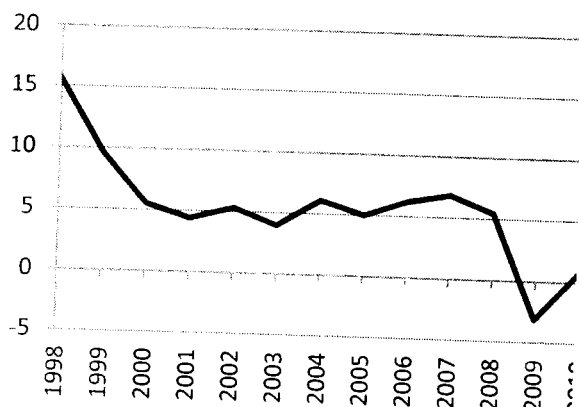
<sup>4</sup> A detailed schematic diagram can be found in Gedeon and Djonlagic (2009:33, figure 1).

influence the money supply through the alteration in the reserve requirements of the commercial banks. In fact, the reserve requirements have been raised four times in a mere six years. As a result, the CBA in BiH cannot be said to be a passive bystander; on the contrary, it actually plays an active role in controlling the money supply (Gedeon 2009).

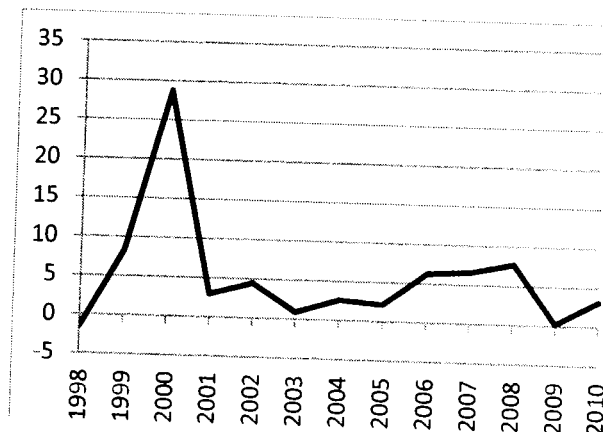
#### 6.4 BiH's economic performance under the currency board regime

So how well have BiH performed under the CBA regime? We can see from figure 6.4 that the inflation has reduced dramatically since the inception of the CBBH and remained quite steadily at around 4% per annum apart from the year 2000. GDP per capita has also enjoyed a healthy growth year after year until the recent financial crisis.

**Figure 6.3** GDP growth (annual %)



**Figure 6.4** Inflation, GDP deflator (annual %)



Source: World Bank databank

There are a few unique features that make CBBH a success in stabilizing the BiH economy. First of all, the independence of the CBBH ensures it can be freed from any political influence and focus on acting in the best interest of the country of BiH rather than the interest of politicians and parties. Article 3 of the CBBH Law clearly states the independent status of CBBH: "Within the limits of its authority established by this Law, the Central Bank shall be entirely independent from the Federation of Bosnia and

Herzegovina, the Republika Srpska, any public agency and any other authority in the pursuit of its objective and the performance of its tasks. Except as otherwise specified by law, the Central Bank shall take no instructions from any other person. The independence of the Central Bank shall be respected and no person shall seek improperly to influence any member of a decision making body of the Central Bank in the discharge of his duties towards the Central Bank or interfere in the activities of the Central Bank.” The CBBH was also prohibited from appointing any citizen of BiH as the chairman of the CBBH for the first six years since its inception, once again, ensuring the independence of the CBBH from political influence. The case in Argentina where the government talked the central bank of Argentina into holding more government bond in an attempt to mitigate the government deficit could not happen in BiH.

Secondly, despite the argument proposed by Gedeon (2009), that the CBBH actually responds to the market demands and hence the lack of discretionary power is an illusion, the important point is that the currency board has successfully gained credibility by sending out the signal that they lack discretionary power. Out of the six criteria for an orthodox currency board that Hanke proposed (2002), CBBH only violated two of them, which is the capability to supply more than notes and coins and also the fact that the CBBH regulates commercial banks. Compared with the case of Argentina and the CBA in Hong Kong that will be discussed in the next section, the CBBH surely is the closest to an orthodox CBA.

Thirdly, as a result of this rule based currency board, it had successfully gained some of the credibility off the DEM in the initial stage of its development. The changeover of the anchor currency to the euro does not seem to have affected the credibility of the currency as well. Hence, BAM has now been widely accepted as the national currency in all regions of the country (Kamhi and Dehejia 2005). The operations of CBBH are also highly transparent, and once again, there is the assurance that the currency board is running by its laws. Any breach of the currency board requirements will be quickly noticeable to all. At the end of the day, the CBBH adopted a currency board monetary approach in order to increase the credibility and soundness of the BAM. The rule based and (seemingly) lack of discretionary power have contributed greatly to the success.

The CBA in BiH does have a potential problem – a huge current account deficit. As we can learn from the Argentinian case, a current account deficit tends to lead to depleting foreign reserves, hence, endangering the fundamental functioning of the system. This is not the case in BiH. As illustrated by Gedeon (2009), the unlimited inflow of capital has ensured the foreign reserves are sufficient in keeping the CBA running. Thus, as long as there is no regulation in controlling capital inflow, the deficit in the current account can be overlooked.

## VII. Case of Hong Kong

### 7.1 The inception of the linked exchange rate system

The linked exchange rate system (LERS) has been the exchange rate system in place in Hong Kong since 1983. In late 1982, the uncertainty surrounding the future of Hong Kong beyond 1997 led to a plummeting confidence in HKD. This confidence crisis had caused a sharp depreciation in the HKD, with around 30 percent of its value vanished between July and September 1982. Under the free exchange rate regime, the Hong Kong government was powerless to combat against such a depreciation and after consideration they decided the best action was to revert back to a CBA system. Thus the LERS was in place and it remained as Hong Kong's monetary arrangement since then (Latter 2007, Yam 2000, Meredith 1999).

**Figure 7.1** Exchange rate regimes for the Hong Kong Dollar, pre 1983

Date	Exchange rate regime	Reference rate
1863 – 4 Nov 1935	Silver Standard	Silver dollars as legal tender
Dec 1935 – June 1972	Link to Sterling	£1 = HKD16 (Dec 1935 – Nov 1967)
	Link to Sterling	£1 = HKD14.55 (Nov 1967 – June 1972)
July 1972	Link to US\$ with +/- 2.25% intervention bands around a central rate	US\$ 1 = HKD 5.65
Feb 1973	Link to US\$	US\$ 1 = HKD 5.85

Nov 1974	Free Float	Free Float
Oct 1983	Link to US\$	US\$ 1 = HKD 7.80

Source: (Hong Kong's Linked Exchange Rate System, Yam 2000)

Hong Kong did not have a central bank in any form for the first five years since the inception of the LERS. Instead, all commercial banks and the government held their liquidity at the Hong Kong and Shanghai Banking Corporation (HSBC) as it effectively acted as the inter-bank clearing system. Essentially, the system during this period did not greatly differ from the free floating period, the only significant difference was that Certificates of Indebtedness<sup>5</sup> were now issued and redeemed at a rate of HKD 7.80 to US\$ 1, thus ensuring that all domestic currency was backed. Any market intervention by the government merely resulted in a change in the ownership of existing balances in the banking system – between the exchange fund<sup>6</sup> and the private sector.

At this point, the maintenance of the fixed exchange with the American dollar was through the adjustment of the lending rate by the commercial banks. Let us imagine a case where the HKD is depreciating and tending towards 7.90. This is not a case where the commercial banks would want to see, since it would mean a loss for every HKD note they issued. In order to avoid such loss, or at least contain it, the commercial banks would want to discourage demand from the public for notes. The most obvious course of action to take was therefore to increase interest rates. By doing so, it was now more beneficial for the consumers to keep their notes in their interest-bearing accounts in the commercial banks. At the same time, the higher interest rate also increased the attractiveness of the HKD, hence the combined effect was an exchange rate that moved

<sup>5</sup> In contrast to most countries, the issue of currency is conducted by three commercial banks: HSBC, Standard Chartered Bank (Hong Kong) and The Bank of China. They are required to hold certificates of indebtedness, denominated in HKD, issued by the government for the account of the Exchange Fund, as backing for those note issuance (HKMA).

<sup>6</sup> The Exchange Fund, an account of the Hong Kong government dominated by foreign currency assets, was established in 1935 and the total asset amounted to HKD 2,345.7 billion as of 31 Dec 2010. The Exchange Fund is often misunderstood as the account of the HKMA; however, it is important to note that although HKMA manages the fund, the Exchange fund is not an account of HKMA since HKMA is not a corporate entity. HKMA is simply the manager of the fund. The fund was originally managed by the "Currency Ordinance". It is now renamed as "Exchange Fund Ordinance" and it is under the jurisdiction of the Hong Kong Monetary Authority. (HKMA press release 28 Jan 2011). It is important to note the currency board account is only a subsection of the entire exchange fund account, as can be seen clearly from the balance sheets that it issues.

back towards 7.80. Vice-versa, an appreciating HKD would move back towards 7.80 with a lower interest rate<sup>7</sup>.

This system worked well until 1988 when there was a worry that the HSBC exercised too much influence over the interbank rate. Hence, the “accounting arrangements” was introduced in July 1988. Under this arrangement, the HSBC no longer acted as the settlement bank. Instead, the HSBC must maintain an account at the Exchange Fund. The Exchange Fund would charge the HSBC with a penalty rate of interest if the balances of the banking system with the HSBC exceeded the balance or if the banks were collectively in deficit on their balances with the HSBC. Hence, it was the first time that the government had access to gain influence over the liquidity of the banking system<sup>8</sup>, which marked the first step to move away from the simple currency board system that only applied to note issue. Two further instruments were subsequently put in place to equip the Exchange Fund with further influence over the liquidity of the banking system.

(i) Exchange Fund Bills and Notes (EFBN)

EFBN was initially introduced to develop the Hong Kong dollar debt market in 1990. However, it can also be used as a tool for open market operations. Whenever there is a need for liquidity in the market, the exchange fund can simply purchase EFBN from the market, thus raise the balance of HSBC at the Exchange Fund. In reality though, the function as a liquidity adjustment mechanism was rarely used (Latter 2007).

(ii) Liquidity Adjustment Facility (LAF)

The LAF was put in place due to the worry that the HSBC had too much influence over the interest rate. Before the introduction of LAF, banks in need of liquidity before the end of the business day could obtain a “late liquidity assistance” from the Exchange Fund. However, the late liquidity assistance fund did not offer any assurance that it would always be available<sup>9</sup>, nor did it have any standardized or pre-announced terms. As a result, the banks feared of its uncertainty and seldom used this official assistance.

<sup>7</sup> A detailed chart for the mechanism can be found in Latter (2007:10)

<sup>8</sup> A detailed explanation of the mechanism can be found in Latter (2007:60)

<sup>9</sup> The Exchange Fund had the right to call off any assistances that it sees fit

Generally, banks that were short of fund would rather overdraw at the HSBC than risk the use of the late liquidity assistance.

In June 1992, the authorities replaced the late liquidity assistance with a more standardized "Liquidity Adjustment Facility", which was essentially the Hong Kong's initial version of a discount window that could be found in many other countries. With the LAF, banks that are short of funds can now borrow from the Exchange Fund at the offer rate<sup>10</sup>, while banks with excess liquidity can lend them to the Exchange Fund at the bid rate.

At this stage, even though the government was able to influence the banking market directly through the penalty rate, it was not until the introduction of the Hong Kong Monetary authority (HKMA) in 1993 that the HSBC's role as the settlement bank ended. The HKMA has been in charge of the linked exchange rate system since then and its main objectives can be outlined as follows: (i) maintaining currency stability within the framework of the linked exchange rate system; (ii) promoting the stability and integrity of the financial system and banking system; (iii) helping to maintain Hong Kong's status as an international financial centre, including the maintenance and development of Hong Kong's financial infrastructure; and (iv) managing the Exchange Fund.

## **7.2 Introduction of the Real Time Gross Settlement system in 1996**

In 1996, HKMA introduced the Real Time Gross Settlement (RTGS) system for inter-bank clearings and all commercial banks were required to hold a settlement account at the Exchange Fund rather than at the HSBC. This effectively disconnected any influence the HSBC previously had with the interbank liquidity and the "accounting arrangements" finally came to an end. More importantly, however, was the monetary control the HKMA gained through the RTGS. Under the RTGS, the sum of all balances in the clearing accounts and reserve accounts held at the Exchange Fund is the Aggregate Balance. The Aggregate Balance represents the level of interbank liquidity and it is part of the Monetary Base (figure 7.2).

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<sup>10</sup> The offer rate was initially set at the US Fed's discount rate plus a margin of 100 basis points, and the bid rate was the discount rate minus a margin of 100 basis points.

**Figure 7.2 Monetary Base in Hong Kong, as of 2 Nov 2011**

	After Discount Window	Before Discount Window
Certificate of Indebtedness	243,165mn	243,165mn
Governemnt Notes/Coins in Circulation	9,574mn	9,574mn
Closing Aggregate Balance	148,644mn	148,644mn
Outstanding Exchange Fund Bills and Notes <sup>11</sup>	658,888mn	658,888mn
:of which held by Licensed Banks	550,062mn	550,062mn
Total		1,060,271mn

Source: *HKMA* <http://www.hkma.gov.hk/eng/market-data-and-statistics/monetary-statistics/monetary-base/2011/20111102-2.shtml>

The Certificates of Indebtedness are convertible into American dollars at the fixed exchange rate of HKD7.80 per USD both ways, but it cannot be transferred to other parts of the monetary base. The Aggregate Balance, however, does not have such a constraint. The Aggregate Balance is convertible into American dollars at the fixed exchange rate, while it is also convertible from American dollar at the market exchange rate.

Now, let us consider the case when there is a huge increase in capital inflow. As American dollars are sold to the Exchange Fund from commercial banks, the Aggregate Balance in the Hong Kong dollar clearing accounts of the bank would increase correspondingly and lead to a decrease in the interbank market rate. In this scenario, there is no limit to the amount of domestic money that can be created if the demand is present. As long as banks sell American dollars to the Exchange Fund, the fund has to accept them, hence the increase in money supply. By the same logic, a capital outflow leads to a contraction of the monetary base, which then leads to an increase in the

<sup>11</sup> Exchange Fund Bills and Notes were added into the Monetary Base after the Asian Financial Crisis. In 1997-98, the aggregate balance proved to be too small and therefore led to a high volatility in the interbank interest rate. As a result, Exchange Fund Bills and Notes were added in order to give a better definition of the Monetary Base.

interbank market rate. However, the HKMA is not without any tools to control the monetary base. The HKMA has the power to introduce charges on large balances maintained by banks in their clearing accounts with the exchange fund, so that the interest rate differential between holding Hong Kong dollars and holding US dollars becomes higher. Outflow from the HKD will then happen, with the aggregate balance returning to a more normal level, along with the decrease of the monetary base (Yam 2004).

### **7.3 Evolution of the HKMA, 1997 – 2005**

Under the governance of the HKMA, the CBA system in Hong Kong has continued to evolve over time. In 1998, the HKD was surrounded by a heavy speculation that it would devalue as a result of the Asian financial crisis. There was an immense pressure on the exchange rate with the equity market being dominated by short positions on the currency. Interest rates shot up rapidly in a matter of months and consequently resulted in a weak financial, property and real market. A more thorough discussion will be given in later sections, but for the time being what is important is to understand that this episode led the HKMA to realize the weakness of its system at the time. They then introduced seven technical measures aiming to improve the strength of the LERS and reassure investors and other market participants that the HKMA would not control its foreign exchange in any way.

Out of the seven measures, one of the most notable changes was the introduction of the weak side commitment<sup>12</sup>. When the LERS was first introduced, it had pegged the Hong Kong Dollar (HKD) to the American Dollar (US\$) at a rate of 1HKD / 7.8 US\$. However, there was no specific intervention point that HKMA committed to defend. The market exchange rate was constantly fluctuating in a range of 7.75 to 7.76, with a general fear that there would be a sudden depreciation to 7.80, which would subsequently lead to substantial volatility in short term rates. The introduction of the weak side commitment ensured market participants that 7.75 would be the lowest rate before any official intervention – this was known as the convertibility undertaking. This rate started at 7.75 and it moved gradually to 7.80 and in August 2000 it reached and

<sup>12</sup> A complete list of the seven measures can be found on 5 Sep 1998 press release of HKMA, <http://www.hkma.gov.hk/eng/key-information/press-releases/1998/980905.shtml>

anchored at that point. There was, however, no strong side commitment announced at this stage.

A second notable addition was the change from the liquidity adjustment facility (LAF) to the discount window. Compared to LAF, the discount window no longer uses a bid rate; rather, it established the concept of the base rate, which is the rate that is being charged when licensed banks acquire liquidity from the Exchange Fund. The base rate is set at either (a) the US federal funds target rate plus a margin of 150 basis points, or (b) the average of 5-day moving average of the overnight and one-month Hong Kong interbank offer rates (HIBOR). HKMA announces the base rate at the beginning of the interbank market each day. The improved mechanism for determining interest rates also reduces the need to quantitatively restrict access to the window, as this function is now performed in a more transparent way by the price mechanism. The greater transparency and functioning of the Discount Window has greatly reduced the reluctance of the commercial banks to borrow from the Exchange Fund. In addition, the linkage between the Discount Window and the currency board principle has been strengthened. Under the LAF, any increase in HKD base money was not automatically backed by foreign reserves. Under the Discount Window, however, the only instruments eligible for rediscounting would be the Exchange Fund Paper, and both outstanding and new issues are formally backed by the USD. This way, the creation of HKD liquidity by the Discount Window would not change the monetary base in Hong Kong, and such liquidity would automatically be backed by USD, thus, everything is automatically in line with the monetary rule of the currency board framework (Meredith 1999, Yam 2004).

#### **7.4 Evolution of the HKMA, 2006 – Present**

In 2005, HKMA had once again introduced some drastic changes to the system. During 2003-2005, Hong Kong experienced a persistent inflow of funds due to a strong recovery economy, the weakness of the US dollar and speculation about a revaluation of the Chinese renminbi(RMB). Due to the lack of a strong side arrangement from the HKMA, the Hong Kong spot exchange rate shot up from 7.80 to 7.70 in late 2003. The HKMA had no choice but to step in and conduct strong side monetary operations in order to stabilize the exchange rate. The result was not a favorable one, with the

interbank interest rate falling close to zero. The problem exacerbated with a reduction in the outflow of funds because the general belief that the Hong Kong dollar would appreciate alongside the RMB, which HKD became the trading proxy. These speculative activities resulted in the failure of the automatic interest rate adjustment system under the LERS.

In order to normalise monetary conditions and to make the interest rate adjustment mechanism more effective, the HKMA introduced "the three refinements" to the LERS on 18 May, 2005. The significant addition out of the three refinements was the introduction of a convertibility zone defined by convertibility undertakings, with the monetary rule of a CBA still being obeyed. The strong-side convertibility undertaking was established at a rate of HKD7.75 / USD 1, while the weak side convertibility undertaking was shifted from HKD 7.80 / USD 1 to HKD 7.85 / USD 1. The explicit definition of the conversion band for the exchange rate between the USD and the HKD greatly enhanced certainty and predictability, which would be favourable for the market. In the speech for "The Second anniversary of the three refinements", Joseph Yam, the chairman of the HKMA at the time, lauded the system for its great success in increasing the transparency of the system, and also the move towards a more rule-based control of the monetary base (Yam 2007).

### **7.5 Differences between HKMA, an orthodox currency board and a central bank**

As one can clearly see, the HKMA does not operate as an orthodox CBA. It is a hybrid of a CBA and a central bank. However, the HKMA is also transforming into a more rule based currency board over the years. In the early stages of the LERS, the authorities had to actively intervene in foreign exchange markets in order to decrease the divergence from the 7.80 exchange rate. As Latter (2007) argued, such action was necessary in order to keep the credibility and the belief in the robustness of the system in its early stages. The changes introduced in 1988 were mainly an attempt to manage the interbank liquidity and short-term interest rates, while little attention was paid to the exchange rate mechanism. These changes marked the first attempt of the authorities to extract the benefit from both the CBA framework and the discretionary power from a central bank. It is important to note that the CBA still obeys the currency

board principles, which meant the monetary base was still being completely backed by foreign currency, and any changes in the monetary base would still be matched by an equal amount of foreign assets.

One particular event that highlights the discretionary power from the earlier CBA was the 1997 Asian financial crisis. The commitment by the HKMA in defending the exchange rate was under attack. Speculators went short both on the HKD forward and the Hang Seng stock price index futures (HSI), hoping that the huge increase in the demand for HKD would drive up Hong Kong's interbank interest rate (HIBOR) through the LERS, subsequently depressing stock prices. This "double play" went according to planned by the speculators and rewarded them handsomely. In early 1998, the HKMA finally responded by spending approximately 15 billion USD to purchase those equities and as a result imposed a loss on those taking short positions on the equity market, thus ending the speculative attack (Hanke 2002; Chakravoti and Lall 2000). It is important to note that the foreign exchange intervention conducted by HKMA was mostly on a sterilized basis, hence, the change in monetary base was minimal. The sterilized foreign exchange transaction enables the Exchange Fund to switch between HKD and the American dollars without affecting the monetary base or the total deposit in the banking system. Figure 7.3 depicts a simplified version of the mechanism that was being carried about by the HKMA in 1998.

As one can see, the action of the HKMA took during the financial crisis in 1997 was not conventional CBA actions. Hanke has put it well "This episode demonstrates once again why the HKMA is not an orthodox currency board. If the HKMA was orthodox, the LAF would not exist, the HKMA would be on autopilot, and the HKMA would never engage in activities designed to fight speculation." (Hanke 2002:213). Noticing the weakness of the existing system, the convertibility undertaking was introduced in 1998, with some of the discretionary power of the HKMA stripped away along with the new arrangement. It has also effectively decreased the uncertainty of the system, restored the credibility of the HKD and halted the speculative attacks.

**Figure 7.3** Simplified balance sheets of the Exchange Fund illustrating interventions in both the foreign exchange and stock market, as was the case in 1998.

1. The Exchange Fund first sold foreign assets for HKD (for the sake of simplicity let's say it is 100USD), thus, a decrease in foreign assets and an increase in bank deposits. The change in composition on the asset side of the balance sheet concluded the sterilized foreign exchange transaction, with no change on the monetary base.

Asset	Liability
foreign assets -USD100	
bank deposits +HKD780	

2. The Exchange Fund then used the bank deposits to purchase HKD securities. The involvement of the Exchange Fund injected confidence into the stock market. Eventually, the HSI rose back up and inflicted losses on the speculators.

Asset	Liability
bank deposits -HKD780	
securities +HKD780	

3. Position of the Exchange fund after the sterilized foreign exchange transaction and the intervention in the stock market.

Asset	Liability
foreign assets -USD100	
securities +HKD780	

Source: *Latter 2007:135*

The operations carried out by the Exchange Fund did not affect the monetary base. The enormous amount of foreign assets the Exchange Fund had ensured the currency board rules were not violated. The combined effect of the foreign exchange sterilization transaction and the purchase of securities stabilized the exchange rate and increased the cost for the speculators. The speculation seized, with the exchange rate remained at HKD7.80 / USD1.

HKMA did, however, retain the power to intervene in the foreign exchange markets. Hanke (2002) introduced the sterilization coefficient that depicts the ratio between the year-to-year changes in net domestic assets to the year-to-year change in net foreign assets. Any change in the monetary base of an orthodox CBA would only

contain a foreign component; hence the coefficient would be zero. Any non-zero values means the CBA deviated from an orthodox form. A full neutralization, with net domestic assets and net foreign assets moving in opposite directions by the same magnitude, leads to a sterilization coefficient of -1. Partial neutralization is denoted by a value between 0 and -1, while more than complete neutralization would see a value of less than 1. According to Hanke's findings, the sterilization coefficient between 1994 to 2002 had a mean rate of -0.73, hence it cannot possibly be an orthodox CBA. Nonetheless, HKMA does obey the "monetary rule" of a currency board, which is to ensure convertibility by backing at least 100% of the HKD with USD. As of 31 August 2011, the backing ratio is 108.95 percent.

Hong Kong's currency board moved a long way since its inception in 1983, with a more rule-based approach now in place for the maintenance of the fixed exchange rate with the American dollar. The changes in 2005 marked the latest and most significant change in the HKMA in surrendering its discretionary power. The well-defined conversion band has greatly limited HKMA's intervention over the exchange rate, although, the HKMA does have the power to intervene within the bands<sup>13</sup>.

On the other hand the HKMA also has some features that resemble those of a central bank. As discussed, the HKMA is capable of controlling liquidity in the market by using mechanisms such as open market operations and the alteration of the base rate, as well as the ability to control the money supply. Hence, it is also able to act as the lender of last resort just like any other central banks.

However, there is one significant structural difference that distinguishes it from central banks: the HKMA is not a corporate entity. It does not hold its own account while the chief executive of the HKMA is directly designated by the Financial Secretary under the Exchange Fund Ordinance. The ordinance permits the appointed chief executive to engage in recruiting staffs and purchasing premises to carry out its operations. Since HKMA is not a corporate entity, the exchange fund is not the account of HKMA, nor does the HKMA have any balance sheets or accounts, unlike other central banks (Latter 2007).

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<sup>13</sup> Since the introduction of the conversion band, the HKMA only intervened once on 25 May 2005 with a sale of HKD 544 million. This was the only intervention since then and the market exchange rate has been entirely determined by the market since then.

That means the HKMA is directly under the authority of the Financial Secretary. HKMA and the Financial Secretary do, however, try their best to separate their responsibilities. Officially, the Financial Secretary only acts as an advisor to the HKMA via the Exchange Fund Advisory Committee, but one may wonder how much influence such "advices" have on the HKMA. Even though there are various sub committees that have been established in recent years<sup>14</sup>, it is doubtful how much independence the HKMA enjoys from the Hong Kong government.

In summary, the CBA in Hong Kong is moving towards a more rule based approach. Since 2005 only the discretionary power to intervene within the conversion band remains. However, the HKMA is definitely not a pure currency board nor is it a typical central bank. It tries to exploit the advantages of both systems, namely the credibility generated by the CBA and also the monetary policies of the central bank to control the liquidity within the financial system.

#### **7.6 Economic performance under the currency board regime**

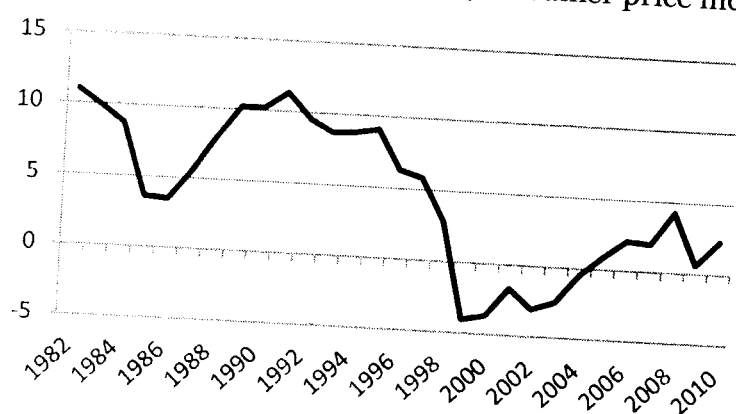
Over the years, the HKMA has resolutely defended its peg with the USD and kept its promise to maintain the rate at HKD 7.80 to USD 1. Some economists have argued that the HKMA actually paid a heavy price over the years for doing so. They argue that one major misconception of Hong Kong is that it has a highly flexible labour market, which is a welcoming characteristic for an economy that adopts the CBA. However, as being shown empirically by Yip and Wang (2002), the flexible labour market in Hong Kong is being perceived by many is in fact a false observation. On the contrary, Yip and Wang assert that the wage and price adjustment system is sluggish at best.

During the post - financial crises period after 1997, Yip (2005) suggested that since Hong Kong has a sluggish labour market, a flexible exchange regime would have significantly hastened the recovery of the economy. He pointed out that Hong Kong would have encountered far less burden on the price and wage adjustment if Hong Kong was allowed to depreciate its exchange rate freely.

<sup>14</sup> The goal of these sub committees are to ensure the soundness of HKMA's performance, varying from different departments covering the currency board, investment management, financial infrastructure, internal administration and audit. A full list of the committees can be found on <http://www.hkma.gov.hk>

In addition, the inflation rate in Hong Kong is uncontrollable under the CBA regime. Since Hong Kong and its anchor country, i.e. the United States, are often in different stages of their business cycle, the inflation between the two also does not share any identical trend. As can be seen in Figure 7.4, inflation in Hong Kong has been unstable over the years, with a high point of 11.34 percent in 1991 to - 4.02 percent in 1999.

**Figure 7.4** Hong Kong inflation (Consumer price index, annual %)



Source: World Bank databank

A study from Kristen (2006) compared the performance under the current rule and the performance of two other hypothetical regimes. The two alternative monetary policy regimes both assume an implicit inflation target. In the first alternative monetary policy regime, monetary policy is conducted by means of a Taylor type reaction function<sup>15</sup>, hence, the nominal interest rate is adjusted in response to deviations of inflation from target, to movements in the output gap and to changes in the targeted rate of inflation. The second monetary policy regime being discussed is a Singapore-style rule, where the exchange rate is being determined by an undisclosed currency basket. Under this regime, monetary policy mainly occurs through the management of a trade-weighted exchange rate. The similarities between the Hong Kong economy and Singapore economy, i.e. both economies have highly developed financial sectors, similar

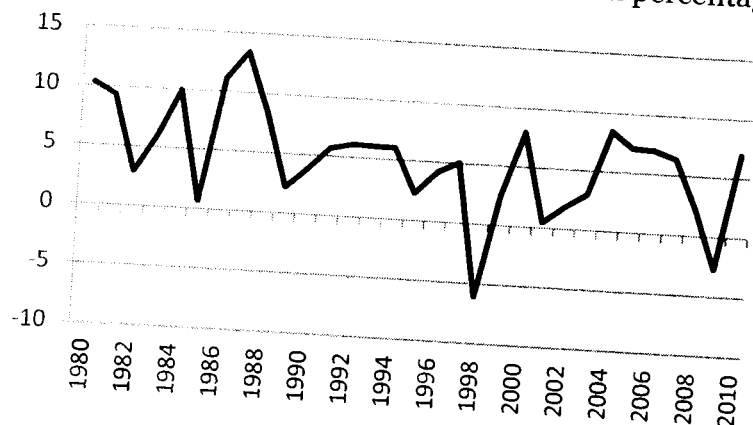
<sup>15</sup> Taylor (1993) found that the US federal fund rate between 1987 and 1992 can be captured by the formula:  
 $i_t = r - 0.5\bar{\pi}_t + 1.5\pi_t + 0.5y_t$   
 r is the equilibrium real interest rate,  $\bar{\pi}_t$  is the target level of inflation,  $\pi_t$  is the actual level of inflation.

GDP, similar trade volume with the rest of the world and were both exposed to the 1997 Asian financial crisis, provide sufficient rationale for Singapore being a valid choice of comparison.

According to his simulations, both of the alternative monetary regimes yield lower inflation before the financial crisis in 1997 and the deflation after the crisis would also be less severe, but these benefits come at the expense of a lower output achieved by the Hong Kong CBA regime (Kristen 2006). The Hong Kong economy enjoyed a generally healthy GDP growth (see Figure 7.5) – apart from the two financial crises in 1997 and 2008 – and the current CBA system has definitely played an important role.

The CBA system is also regarded by the Hong Kong authorities to be the best system for Hong Kong because of the openness nature of the economy. It is evident that external trade plays an extremely large role in Hong Kong's economy (in fact it is getting more and more important). It is believed that such openness leaves the market highly exposed to financial shocks stemming from volatilities in external markets. Furthermore, the simplicity of the system to the general public is also one of the lauded attributes of the LERS, since it greatly reduces uncertainty in the market for making business decisions. All in all, the LERS, a rule-based, transparent and clearly-defined system, is perceived to be the best arrangement for the specific economic environment of Hong Kong (Yam 2000, Latter 2007).

**Figure 7.5** Hong Kong GDP growth, annual percentage



Source: World Bank databank

## VIII. Assessment

Three cases have been examined in this paper and they all had their unique problem before their CBAs were implemented: Argentina was suffering from hyperinflation; BiH just ended a bloody war with most of the financial system left in shambles; whereas the political uncertainty surrounding Hong Kong had caused a loss of confidence in the currency. Ultimately, what they needed was a sound and reliable currency, and the CBA seemed the most sensible arrangement that could tackle their problems.

Out of the three cases being discussed, the CBA in Hong Kong and BiH can be considered a success, whereas Argentina had a rather successful ten years but some fundamental reasons led to its collapse in 2001. Lack of sufficient foreign reserves, and an enormous government debt accompanied with failure in tax collection all contributed to the inevitable failure in the Argentinian CBA. Most importantly, however, is that the CBA in Argentina never really convinced the public that they would defend the CBA arrangement at all cost. In fact, the worries from the public were true; the success during the early years of the system led the authorities to pursue two different objectives – money supply targeting and exchange rate targeting. The authorities eventually chose money supply targeting and gave up the fixed exchange rate. In short, the unorthodox approach had never truly forged a sound currency and thus led to the eventual collapse of the CBA system.

The current CBA in Hong Kong is also unorthodox, with a mixture of the functions of a CBA and a central bank at the same time. Just like Argentina, this unorthodoxy has also invited speculative attacks, most notably the crisis in 1997. The HKMA endured the attacks by committing to the fixed exchange rate, even though it had to pay a heavy price for doing so. Interventions in the foreign exchange market from the authorities were frequent during the arrangement's early stages.

These interventions were necessary to keep the faith in the system high; but as time goes by, the HKMA gives up more and more of its discretionary power. Now, it only

retains the power to intervene within the conversion band. Even so, no interventions have taken place for the past six years. On the other hand, the HKMA also implemented tools in controlling the interbank liquidity at the same time, i.e., the discount window and the EFBN. Thus, the HKMA leaves the automatic forces to keep the fixed exchange rate while minimizing the interest rate volatility through various techniques. The auto-reflux system does not exist, nor is it wanted to exist. With Hong Kong being such an open financial center, high volatility in either variable is undesired.

Out of the three cases, BiH operates in a way which most resembles an orthodox currency board. All local currency is backed by more than 100 percent of foreign reserves and also the currency board is politically independent from the government. The auto-reflux process of a currency board partially works – with the authorities able to intervene afterwards. The only significant deviation from the orthodox principles is the regulation over commercial banks. As a result, BiH has a very rule-based system with far less intervention compared with the previous two cases. The rule based approach, combined with the complete independence from political influence, has ensured that BiH would not run into the same problem as Argentina.

In conclusion, CBAs have their own features that make them more preferable compared to central banks, but at the same time they have drawbacks that must be considered. The implementation of a CBA depends on the unique economic environment of a country. The examples of Argentina, BiH and Hong Kong have already demonstrated this. Anyhow, CBAs that follow closely the rules of an orthodox currency board are more likely to inject confidence into the currency, as we learned from the examples of BiH and Hong Kong, even though a completely orthodox CBA is often impossible and undesirable. Hence, an automatic reflux system, desired by many monetarists, cannot function as intended.

In all cases, the foreign reserves (most importantly those in the anchor currency) are crucial for the survival of the CBAs. As long as there is a way for the country to gain foreign reserves to back up the functioning of the CBA, a more rule-based approach can be adopted, thus successfully achieving the goal of boosting credibility of the currency. Hong Kong is a relative success in the implementation of a CBA, though its current form

is the result of several modifications since 1983. The new type of Hong Kong's CBA has provided a solution for the interest rate volatility problem that arises from the use of a CBA, yet at the same time appears to fully obey the currency board rules. Can this hybrid between a CBA and Central Bank become fruitful in the long run? Does this open up a new generation of CBAs? Can other countries gain valuable insight into the experience from Hong Kong? No doubt, it will be fruitful to continue to monitor the development of the CBAs.

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