Currency Boards

Vol. 1. Theory and Policy

Edited By

Steve H. Hanke

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Preface

In 1995, I founded the Johns Hopkins Institute for Applied Economics, Global Health, and the Study of Business Enterprise. One of the purposes of that research institute was to continue a research program on currency board systems, which was established in the early 1980s. The program has included the works of many leading experts on currency boards and has benefitted enormously from the involvement of my former post-doctoral student and long-time collaborator Dr. Kurt Schuler.

Many of the papers in this volume focus on various aspects of currency boards. They are original because they are based on primary data. Indeed, the Johns Hopkins research program on currency boards, which is directed by Dr. Schuler and me, has now collected and digitized all of the financial data for virtually all of the currency boards that have ever existed. So, just what is a currency board?

An orthodox currency board issues notes and coins convertible on demand into a foreign anchor currency at a fixed rate of exchange. As reserves, it holds low-risk, interest-bearing bonds denominated in the anchor currency and typically some gold. The reserve levels (both floors and ceilings) are set by law and are equal to 100%, or slightly more, of its monetary liabilities (notes, coins, and, if permitted, deposits). A currency board's convertibility and foreign reserve cover requirements do not extend to deposits at commercial banks or to any other financial assets. A currency board generates profits (seigniorage) from the difference between the interest it earns on its reserve assets and the expense of maintaining its liabilities.

By design, a currency board has no discretionary monetary powers and cannot engage in the fiduciary issue of money. It has an exchange rate policy (the exchange rate is fixed) but no monetary policy. A currency board's operations are passive and automatic. The sole function of a currency board is to exchange the domestic currency it issues for an anchor currency at a fixed rate. Consequently, the quantity of domestic currency in circulation is determined solely by market forces, namely the demand for domestic currency. Since the domestic currency issued via a currency board is a clone of its anchor currency, a currency board country is part of an anchor currency country's unified currency area.

Several features of currency boards merit further elaboration. A currency board's balance sheet only contains foreign assets, which are set at a required level (or tight range). If domestic assets are on the balance sheet, they are frozen. Consequently, a currency board cannot engage in the sterilization of foreign currency inflows or in the neutralization of outflows.

A second currency board feature that warrants attention is its inability to issue credit. A currency board cannot act as

a lender of last resort or extend credit to the banking system. It also cannot make loans to the fiscal authorities and state-owned enterprises. Consequently, a currency board imposes a hard budget constraint and discipline on the economy.

A currency board requires no preconditions for monetary reform and can be installed rapidly. Government finances, state-owned enterprises, and trade need not be already reformed for a currency board to begin to issue currency.

Currency boards have existed in about 70 countries. The first one was installed in the British Indian Ocean colony of Mauritius in 1849. By the 1930s, currency boards were widespread among the British colonies in Africa, Asia, the Caribbean, and the Pacific islands. They have also existed in a number of independent countries and city-states, such as Danzig and Singapore. One of the more interesting currency boards was installed in North Russia on November 11, 1918, during the civil war. Its architect was John Maynard Keynes, a British Treasury official responsible for war finance at the time.

Countries that have employed currency boards have delivered lower inflation rates, smaller fiscal deficits, lower debt levels relative to the gross domestic product, fewer banking crises, and higher real growth rates than comparable countries that have employed central banks.

Given the superior performance of currency boards, the obvious question is "What led to their demise and replacement by central banks after World War II?" The demise of currency boards resulted from a confluence of three factors. A choir of influential economists was singing the praises of central banking's flexibility and fine-tuning capacities. In addition to changing intellectual fashions, newly independent states were trying to shake off their ties with former imperial powers. Additionally, the International Monetary Fund (IMF) and the World Bank, anxious to obtain new clients and "jobs for the boys," lent their weight and

money to the establishment of new central banks. In the end, the Bank of England provided the only institutional voice that favored currency boards.

Currency boards have witnessed something of a resurgence. In terms of size, the most significant currency board today is Hong Kong's. It was installed in 1983 to combat exchange rate instability. In the wake of the collapse of the Soviet Union, several countries adopted currency boards. They were installed rapidly and without any preconditions. Indeed, in most cases, implementation took a month or less. The reasons for the post-Soviet adoption of currency boards varied. In Estonia in 1992, the overriding objective was to rid the country of the hyperinflating Russian ruble and replace it with a sound currency. In 1994, Lithuania desired to put discipline and a hard budget constraint on the government's fiscal operations. Hyperinflation was ravaging Bulgaria in early 1997, and the Bulgarians wanted to stop it. As a result, Bulgaria adopted a currency board in July 1997. In Bosnia and Herzegovina in 1997, acurrency board was mandated by the Dayton Peace Accords, which ended the Balkan Wars.

None of these modern currency boards has failed to maintain convertibility at their fixed exchange rate. Indeed, no currency board has ever failed, and this includes Keynes's Russian currency board in Archangel. The so-called Russian ruble never deviated from its fixed exchange rate with the British pound. The board continued to redeem rubles for pounds in London until 1920, well after the civil war had concluded.

At present, the following countries and territories use orthodox currency boards: Bermuda, Bosnia and Herzegovina, Brunei, Bulgaria, the Cayman Islands, Djibouti, the Falkland Islands, Gibraltar, Guernsey, Hong Kong, the Isle of Man, Jersey, Macau, and Saint Helena. Note that Estonia and Lithuania are not included in the list

because both transitioned from currency board systems to the Eurozone, in 2011 and 2015, respectively. This was done with ease because both countries were already unified with the Eurozone via their currency boards.

It is worth noting that, contrary to assertions by most economists and reportage in the popular financial press, Argentina did not have a currency board in the 1990s. A Convertibility System was introduced in Argentina in April 1991 to stop inflation, which it did. The system had certain features of a currency board: (a) a fixed exchange rate, (b) full convertibility, and (c) a minimum reserve cover for the peso of 100% of its anchor currency, the U.S. dollar. However, it is important to note that it had two major features that disqualified it from being an orthodox currency board. It had no ceiling on the amount of foreign assets held at the central bank relative to the central bank's monetary liabilities. So, the central bank could engage in sterilization and neutralization activities, which it did. In addition, it could hold and alter the level of domestic assets on its balance sheet. So, Argentina's monetary authority could engage in discretionary monetary policy, and it did so aggressively.

Since Argentina's Convertibility System allowed for both monetary and exchange rate policies, it was not a currency board. Most economists fail to recognize this fact. Indeed, a scholarly survey of 100 leading economists who commented on the Convertibility System found that almost 97% incorrectly identified it as a currency board system.

Currency boards' historical performances have been outstanding.

Editor
Prof. Dr. Steve H. Hanke
Baltimore, USA
13 March, 2020

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1 Feasibility study on the implementation of a unified currency in the gulf cooperation council

Faris Mazen **OMAIR**

Introduction

The Gulf Cooperation Council (GCC) is an alliance between six Middle Eastern membernations: The Kingdom of Saudi Arabia, Kuwait, the United Arab Emirates (UAE), Bahrain, Qatar, and Oman. The council was established in May 1981 in Riyadh, Saudi Arabia with the goals of political and economic unification. A "Supreme Council" is the joint decision-making tool of the GCC and is made up of heads of state from the respective member states. An appointed president oversees the council. The presidency rotates annually among the six heads of state.[1]

Since inception, the GCC has held the goal of creating a unified currency. The Council sees widespread opportunity for mutual benefit across membernations. A unified currency would see the abolition of exchange rates between national currencies, breaking down a barrier to trade between the countries and expanding trade opportunities. This would make the members of the GCC more competitive, in addition to effectively unifying markets across the six nations. A unification of markets would also result in a

1 Gulf Cooperation Council. [Retrieved from].

unification of monetary and economic policy that would strengthen ties between member states and ultimately assist in reaching the wider political goals of the council.[2]

As the next section outlines in detail, the GCC has failed to implement a currency union so far. The subsequentsections of this paper analyze the strategies of existing major currency unionsand one past currency union in the hopes of applying them to a potential currency union in the GCC. The main aspects studied are the governance structures and the profit sharing schemes of each of the respective currency unions. The Eastern Caribbean Currency Union offers an interesting potential solution to the GCC's unique political problem in the form of offering each member of its governing body an equal vote. The now defunct Malayan Currency Board implemented a profit sharing scheme that could be applicable to the GCC. The European Central Bank uses an unbalanced voting right rotation system, but has a streamlined and efficient organizational structure that could be used to the benefit of the GCC. The CFA franc zone, which is actually two currency unions in Africa, is also discussed, but is found to be less relevant to the GCC. This is due to the oversight of the French central bank and France's support for the pegged exchange rate of the CFA francs to the French franc and later the euro.

The GCC's failure to implement a unified currency

One condition for the success of any monetary union is a degree of political cooperation, although, as we will see, the level of cooperation has varied widely across currency unions. There are also significant economic factors that play into the politics of forming a unified currency. In recent history, the GCC nations have not exhibited the prerequisite cooperative attitudesfor the establishment of a unified currency (Kholifey, & Reshan, 2015). Oman pulled out of the unified currency agreement in 2006 due to concerns about its ability to meet the criteria set forth for the unified currency. These concerns were mainly related to maintaining a specific level of debt as a portion of GDP. Similar

2 Gulf Cooperation Council, "The Monetary Union and the Single Currency: Concept and Outset," [Retrieved from].

concerns forthe UAE caused the country's withdrawal from discussions in 2009.

Oman's concerns point to a larger issue with the economic compatibility of the GCC when it comes to the sizes of their respective economies. Figure1 shows the GDP of the countries of the GCC. There is a great disparity in size between the economies. Saudi Arabiaisfar and away the largest economy, with a GDP of $678 billion. The UAE is the second-largest economy, with a GDP of $378 billion. Saudi Arabia is has a greater GDP than most of the other GCC countries combined. This massive gap in economic size is another contributing factor to situations like the one that transpired with Oman. There must be monetary policy set in place when forming the unified currency that levels the playing field between the membernations. Saudi Arabia may be economically ready for a unified currency, but if the other nations in the council are not prepared, the unified currency is bound to fail. As a result, this paper will focus on suggesting monetary policies and institutional arrangements that could help mitigate the issues that arise from this economic disparity, using successful monetary unions as inspiration for solutions.

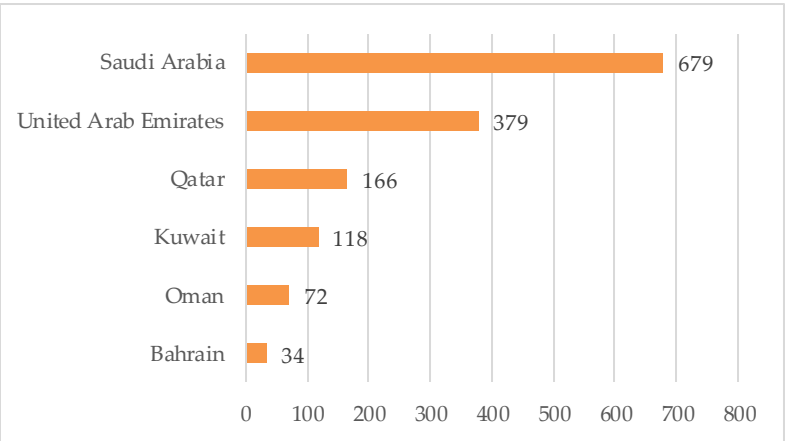


Figure 1. *GDP of GCC Member States in Billions of USD, 2017*
Source: IMF World Economic Outlook Data Mapper, 2017.

An overview of some successful monetary unions

The monetary unions that will be examined in this paper are the Eastern Caribbean Currency Union, Malayan Currency Board, European Monetary Union, and CFA franc zone. All arecurrency unions founded since World War II and each comprisesor has comprised three or more independent countries. The lattercriteria was chosen to exclude currency unions between only two countries, which would not provide an applicable analogue for the GCC since it is made up of several countries. A currency union between two countries lacks the political and governing complexity that is found in currency unions between more countries.

This chapter will use a specific framework to analyze the previously mentioned currency unions and then offer suggestions as to how to apply previously successful policies to the GCC and its potential currency union. The first step of the process is to outline the details of each of the currency unions, how they operate, and how they were formed. This will give insight as to how the GCC could establish its own currency union in the future. Details include the members of the union, whether the currency is linked to another currency, the size of thecentral bank assets by the end of 2016, and any allegiance to a political union.

The second step is to outline the legal framework and governance of the currency union. This is mainly encompassed by how the currency union was adopted, and, most importantly, how the governance of the currency board is implemented. The manner in which the currency union distribute profits generated from central banking activities among its constituents is the third step in the analysis. Finally, any changes to governance as a result of historical controversy will be noted.

Eastern Caribbean Currency Union (ECCU)

Basic facts

The Eastern Caribbean Currency Union (ECCU) is made up of sixformer British colonies — Antigua and Barbuda, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Dominica, and Grenada — plus two British overseas territories, Anguilla and

Montserrat. It was formed in 1983 and is governed by the Eastern Caribbean Central Bank (ECCB), headquartered in Basseterre, Saint Kitts. The members of the ECCU use a common currency called the Eastern Caribbean dollar, which is pegged to the U.S.dollar at 2.70 ECD to 1 USD (van Beek, 2000). At the end of 2016, the ECCU held net assets (foreign and domestic) worth 15.782 billion ECD (IMF, 2017).

The ECCB is the successor to the British Caribbean Currency Board and the East Caribbean Currency Authority. The currency board was established in 1951 as an economic component of the stillborn West Indies Federation. By 1965 the two largest members of the currency board, Guyana and Trinidad and Tobago, had left to establish their own central banks. The remaining members converted the currency board into the currency authority, which had greater discretionary powers but not all those typical of a full-fledged central bank. Barbados left to establish its own central bank in 1972. In 1976 the remaining members switched the anchor currency from the pound sterling to the U.S. dollar at the existing cross rate, and in 1983 they converted the currency authority into a full-fledged central bank. The members of the ECCU are also part of a political union called the Organization of Eastern Caribbean States (OECS). The organization was established in 1981 by the signing of the Treaty of Basseterre, with the aim of creating economic unity and protecting human and legal rights. In 2010, the treaty was revised to create an economic union similar to that of the European Union. It established a unified financial and economic space in which goods can move freely and monetary policy was made uniform.[3]

Legal matters and fovernance

The ECCB Agreement Act of 1983 [4] specified the legal framework and governance of the new central bank. Aside from establishing the bank as an independent legal entity, Part II of the agreement also outlined the main objectives of the central bank. They are: (1) "to regulate the availability of money and credit";(2)

3 "About the Organisation of the Eastern Caribbean States." Organisation of Eastern Caribbean States (OECS). [Retrieved from]..

4 [Retrieved from].

"to promote and maintain monetary stability";(3) "to promote credit and exchange conditions and a sound financial structure conducive to the balanced growth and development of the economies of the territories of the Participating Governments";and (4) "to actively promote through means consistent with its other objectives the economic development of the territories of the Participating Governments."

The agreement also establishes in Part IIA the central bank's powers in times of special emergency. Emergencies, in this case, are times in which the bank perceives the interests of the people to be endangered, or a financial institution is in imminent danger of failing to meet its obligations. This section gives the central bank the ability to investigate, seize control of, and even restructure the capital base of a financial institution, among other powers, during times of emergency.

As for governance, the agreement outlines in Part IV how the central bank will be managed. The central bank's governing body is divided into two main groups, the Monetary Council and the Board of Directors. Monetary and credit policy is determined by the Monetary Council as described in Article 7 of the agreement. Each member country appoints one minister to the council, who has the right to a single vote. The ministers elect a Chairman of the council, who has the right to a single vote, in addition to the ability to break a tie with a casting vote. Decisions are made with a simple majority of present ministers, with a required quorum of five of the six member countries.

General administration of the central bank and policy decisions are entrusted to the Board of Directors. Directors are selected by member nations just like the Monetary Council. The Governor and Deputy Governor of the Board of Directors are appointed by the Monetary Council and serves for terms of up to five consecutive years. The Governor (or in his place the Deputy Governor) has no vote except in the event of a tie. In essence, the Board of Directors acts as the embodiment of the bank, and the Governor has the power to take action on behalf of the central bank such as signing documents. The Monetary Council, on the other hand, is responsible for making the broad monetary and credit policiesthat the central bank will implement.

The ECCB Agreement does not specify a particular exchange rate or exchange rate policy for the Eastern Caribbean dollar. It does however specify that external reserves must equal at least 60 percent of the ECCB's currency in circulation and demand liabilities—in other words, the monetary base. In addition, the agreement outlines a policy for the establishment and maintenance of a general reserve. At the end of every fiscal year, the ECCB's general reserve holdings must be equal to no less than 5 percent of the bank's demand liabilities. Should the reserve fall below 5 percent, any net profits generated by the bank's activities are used to replenish the general reserve up to 10 percent of demand liabilities.The Agreement does not specify capital contributions, which couldeventually threaten the currency union should tensions arise over uneven contribution. Recent publications by the IMF and World Bank have called on the ECCB to amend their policies to set a minimum capital contribution for admittance into the ECCU (IMF, 2017).

Applying the ECCB's legal structure to the GCC

By inspecting the governance structure of the ECCB, we can identify many potentially useful ideas for the GCC. One important thing to note is the simplicity of the structure of the bank's governing bodies. Although the member nations making up the ECCB are similar in size, giving each country the ability to appoint a minister and director of its choice, each with equal voting power, equalizes power differences between the nations. When considering the nations of the GCC, a massive hurdle in the path of establishing a unified currency is that the Kingdom of Saudi Arabia is so much larger than the other countries. By giving each country equal voting rights on both boards, the political weight of each ECCB member country is not determined by the size of its economy. Doing likewise in the GCC would encouragethe smaller countries to join the currency union, as they would have decision power disproportionate to their economic size.

A second useful idea is the ability of the ECCB Monetary Council to appoint the Governor of the Board of Directors. In the GCC, Saudi Arabiahas historically dominated politicaldiscussions due to its sheer size. Allowing Saudi Arabia only one vote and the

other five, smaller nations one vote each would give the other nations the ability to appoint a Governor who is not from Saudi Arabia. This would give them the opportunity to have more control over the currency union than if Saudi Arabia were to have representatives in locked into position of power on both governing bodies.

That being said, there are some aspects of the ECCB model that likely would not be successful when applied to the GCC currency union. The existence of two separate governing bodies that appear to have similar, nearly overlapping sets of responsibilities could prove to be detrimental to the GCC union. The Middle East is already riddled by bureaucracy, and adding additional layers of complexity would only slow decision-making. The countries of the GCC have tried repeatedly to implement a currency union, with little success. They have already demonstrated an ability to defer decisions and delay implementation, so putting in place two separate governing bodies would only hinder the central bank's ability to operate efficiently. That is especially the case considering the political volatility of the member nations and their interactions. Hence, using one committee, the Board of Directors, to administer the central bank would likely be more efficient in the GCC union's case.

Profit sharing

A central bank, like other types of banks, performs activities that generate revenue. Revenue comes from interest on loans to commercial banks or other entities as well as from interest and capital gains on domestic government securities and foreign securities. As the profits of a central bank are normally kept by its respective country, in the case of monetary unions one of the key monetary policy decisions is how to distribute profits among member nations. Here again the ECCB offers an interesting model.

The Eastern Caribbean Central Bank Act specifies thatnet profits generated by the end of the fiscal year be dispersed among member nations in proportion to the amount of currency in circulation in the respective country (Eastern Caribbean Central Bank, 1995). The ECCU's longevity indicates that this redistribution policy has not caused significant strife between the

member nations. However, this may be because the members of the ECCU are all relatively similar in size.

Figure 2 below shows the GDP in billions of USD for each member of the ECCU. The largest country in the currency union – Saint Lucia – has a GDP of 1.72 billion USD. The smallest country in the currency union – Dominica – has a GDP of 0.61billion USD. This represents a spread of 1.1 billion USD, with Dominica having an economy36 percent the size of Saint Lucia. Now let us consider the nations that make up the GCC. Saudi Arabia has a GDP of 679billion USD, whereas the smallest country in the GCC – Bahrain – has a GDP of 34billion USD. This represents a spread of 645billion USD, with Bahrain having an economy close to only 5 percent the size of Saudi Arabia.

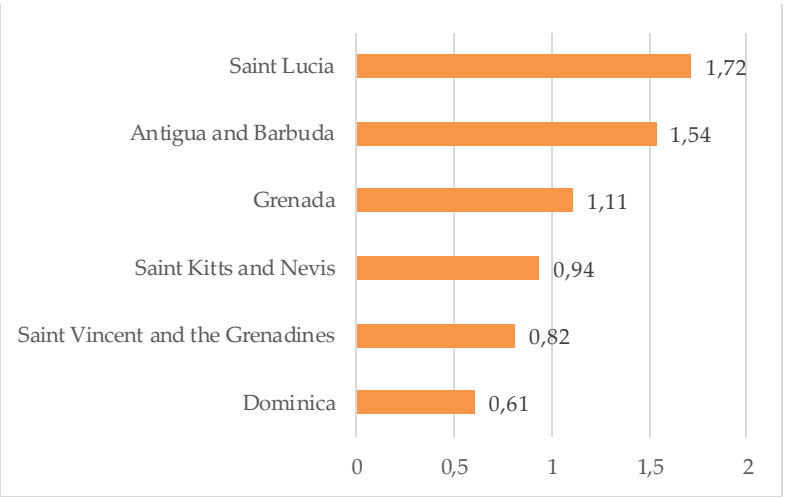


Figure 2. *GDP of Eastern Caribbean Central Bank Member States in Billions of USD, 2017*

Although GDP size is not a direct indicator of the amount of money in circulation, it gives a general idea of proportion. A large economy tends to have more money in circulation than a smaller economy. While it is difficult to compare the exact sizes of money supplies in the GCC countries due to the different compositions of their money supplies, Saudi Arabia did in fact have the largest money supply in 2013 as well as the fastest growth rate (Pratap, 2013).

The large difference in money supply between the GCC countries makes this profit redistribution scheme unsuitable for a potential currency union in the GCC. It provides little incentive for smaller GCC countries like Oman and Bahrain to participate in a monetary union.

Alessandra Casella of Colombia University found that "a small economy will not take part in the [monetary union] agreement unless it can secure influence that is more than proportional to its size and a transfer of seigniorage revenues in its favor." (Casella, 1990).

When considering a political make up like that of the GCC, with countries of extremely varied sizes, profit sharing is an essential piece of the currency union that will draw in the smaller countries. In the case of the ECCU, all the member nations arerelatively close in size. This is not the case for the GCC. Therefore, a profit redistribution scheme based on money supply is unlikely to incentivize smaller countries in the GCC to join a monetary union. A reworked profit sharing formula must be proposed that disproportionately rewards the smaller nations in order to guarantee their participation.

Malayan Currency Board

Basic facts

Unlike the other currency unions discussed, the Malayan Currency Board is no longer in existence. This currency board is considered because it was fairly durable, surviving the independence of its most populous member. The currency board also had unique features, which differed from that of other currency boards due to the Malayan currency board's more limited powers.

The British protectorates of the Malayan States and the British-ruled Straits Settlements formed the Malayan Currency Board (MCB) in 1938. The Malayan States had been using Straits Settlements currency without a share in the profits the Straits Settlements generated from issuing the currency. The MCB permitted them to share in the profits. The MCB used the former exchange rate of the Straits Settlement dollar,$1 Malayan to 2

shillings and 4 pence sterling, or $50 Malayan to £7 (George, 2016). This rate was specified in the agreement establishing the MCB, as was a reserve ratio of 100 to 110 percent, to be held in British securities, British Empire securities other than those of the participating governments, or other assets approved by the British Secretary of State for the Colonies.

The Malayan Currency Boardwas first headquartered in Singapore, where the Straits Settlements currency board had been, but moved to Kuala Lumpur in 1962, keeping an office in Singapore.

During World War II the territories of the MCB were under Japanese occupation, but the MCB held its assets in London, out of reach for the Japanese, and resumed operations after the war. In 1946 the separate protected states of the Malayan peninsula united to form the Malayan Union. In 1952 Brunei, Sarawak, and British North Borneo joined the MCB, occasioning a revision of the MCB agreement. Malaya became independent in 1957 and there was another revision of the agreement in 1960 to remove certain powers formerly exercised by British colonial officials. In 1963, Malaya, Sarawak, North Borneo, and Singapore united to form Malaysia. Friction within the federation led to Singapore's expulsion from it in 1965. The currency board ceased operation in 1967.

Legal matters and governance

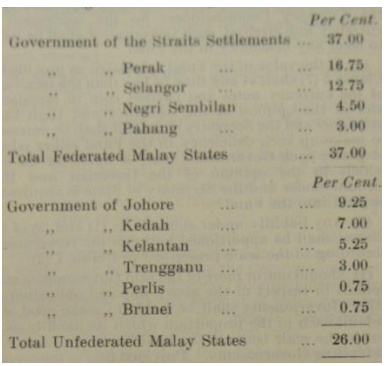
The 1938 constitution of the Malayan Currency Board established the Board of Commissioners of Currency Malaya, which was made up of a maximum of five members. The members were appointed by the Governor of the Straits Settlements and the High Commission of the Malay States. The Commissioners of Currency were endowed with the sole ability to issue currency notes in the territories of the member states. The 1938 agreement did not specify any geographical distribution of the board of commissioners. The 1951 revision of the constitution specified one member each from Malaya, Singapore, and the combined territories of Brunei, Sarawak, and North Borneo, plus two personsagreed upon by the member governments and not representing any particular territory. The 1960 revision of the

constitution gave Malaysia two members; Singapore, Brunei, Sarawak, and North Borneo one member each; plus one person agreed upon by all the member governments, with recognized banking or financial experience, and not representing any particular territory.

The MCB was not a central bank, and accordingly it had no power to act as a lender of last resort to commercial banks. Until the revision of its constitution in 1960, the MCB was expected to refrain from holding securities issued by member governments, and even after 1960, in practice it did not take advantage of its potential ability to hold domestic securities.

Profit sharing

The MCB's 1938 constitution implemented the Currency Fund Income Account, which tracked all of the revenue generated by the Malayan dollar. At the end of the fiscal year, expenses were deducted from this account and the surplus was funneled into the All Malaya (Currency Surplus) Fund. Each government in the union was entitled to a shareof the fund as listed in Figure 3. The shares were determined by an expert committee, which based them on the expected circulation of Malayan currency in each jurisdiction, itself largely a function of the jurisdiction's economic size.



	Per Cent.
Government of the Straits Settlements ...	37.00
,, ,, Perak	16.75
,, ,, Selangor	12.75
,, ,, Negri Sembilan ...	4.50
,, ,, Pahang	3.00
Total Federated Malay States ...	37.00
	Per Cent.
Government of Johore	9.25
,, ,, Kedah	7.00
,, ,, Kelantan	5.25
,, ,, Trengganu	3.00
,, ,, Perlis	0.75
,, ,, Brunei	0.75
Total Unfederated Malay States ...	26.00

Figure 3. *Distribution of Profits, Malayan Currency Board*
Source: Malayan Currency Board constitution, *Singapore Government Gazette,* October 14, 1938, p.2849.

The agreement set the initial shares assigned to each government. Every five years, a new scale could be voted on and if agreed upon by governments with cumulative shares of over 75 percent, the new scale would take effect. If no new scale was agreed upon, the existing scale would stay in effect for the next five years. In addition, any shortage in the Currency Fund Income Account had to be recouped by the governments in the union proportional to their outstanding shares.[5] The MCB had no paid-in capital, so this provision was inserted in case of the unlikely event that the MCB's high level of external assets turned out to be insufficient to meet demands for liquidation.

Applying the MCB's Profit Sharing Procedure to the GCC

The MCB's method of allocating profit shares could be better suited to the needs of the GCC than assigning shares based on capital. By assigning shares more flexibly, the GCC could have more control over how potential members are rewarded. For example, smaller countries such as Oman and Bahrain could be assigned larger shares of the surplus fund to induce them to join the currency union. In addition, the restructuring mechanism would work to the GCC's benefit. Should the smaller countries start to catch up to the larger economies in the future, the shares could be rebalanced every five years to adapt to current conditions without having to adjust the capital contributions (George, 2016).

EuropeanUnion (EU) and European Central Bank (ECB)

Basic facts

The European Union (EU), established in 1993 by the Maastricht Treaty, is a political and economic union that now extends to 27 European countries (Wilde, 2019). The EU is also in part a currency union:19 member nations use the common currency, the euro, and the expectation is that the rest will join eventually, except Britain, which is negotiating to leave the EU. The monetary policy of the currency union is governed by the

[5] Malayan Currency Board constitution (1938), *Singapore Government Gazette*, October 14.

European Central Bank (ECB), headquartered in Frankfurt, Germany.

The euro was launched as a unit of account in 1999, but not issued as cash until January 1, 2002. At inception, the cash was introduced at fixed conversion rates in the countries that adopted it. Between 1999 and 2002, the euro was an "invisible currency."

Today, the euro, like most mature economies' currencies, is a floating currency. This means that its exchange rates are determined by market forces. However, the ECB still plays a major role in monitoring and maintaining the stability of the currency in the exchange markets.[6] As for the assets held by the ECB at the end of 2016, €349 billion worth of assets were reported in its 2016annual accounts.[7]

Legal matters and governance

The main governing body of the ECB is the Governing Council. Members of the Governing Council include the Executive Board of the ECB and the governors of the respective national central banks. All members of the Executive Board receive a vote, but only 15 governors receive a vote. Once there are more than 22 governors, article 10.2 of the ECB statute outlines a method through which voting rights are determined. In short, governors are ranked and placed in groups that receive a different number of voting rights per group, often fewer than the number of governors in said group. The rankings are determined by the relative share of the national central bank of the respective governor in the aggregate GDP of the European Union. The higher the share of a country's GDP in the EU, the better its governor ranks and the higher the likelihood of him receiving voting rights. Governors within a grouping rotate voting rights.[8]

6 "The Euro Area's Exchange Rate Policy and the Experience with International Monetary Coordination during the Crisis." European Central Bank, [Retrieved from].

7 Annual Accounts, 2016, European Central Bank.

8 Protocol on the statute of the European system of central banks and of the European Central bank, European Central Bank.

The responsibilities of this Governing Council are described in Article10.The Governing Council is responsible for making decisions regarding the actions the ECB is mandated to conduct, establishing monetary policy, and intermediate monetary policy. The latter could include setting key interest rates and decisions relating to supplying ECB reserves. The Executive Board essentially implements decisions made by the Governing Board and relays information to the national central banks.

The ECB has some organizational features that should be considered by the GCC union, and others that should be avoided. Placing governors on a voting rotation established by their countries' share of the aggregate GDP could be entirely destructive to the goals of the currency union. If implemented in the GCC, the Kingdom of Saudi Arabia would have a great advantage over the remaining, relatively smaller countries of the GCC. Saudi Arabia represents 47 percent of the aggregate GDP of the GCC (IMF, 2017). Should Saudi Arabia always have a governor, or at least more often than others, with voting rights on the Governing Board, it would have a bigger influence on decision making than other members of the union. This would be politically unsustainable and unrealistic considering historic resistance from other GCC countries towards a currency union for this very reason. (Note that in the euro area, Germany, the largest economy, only has 29 percent of the total GDP (IMF, 2017).

One feature of the ECB that is applicable to the GCC union is the use of the Executive Board as an implementation tool. The Executive Board serves to "execute" decisions made by the Governing Board, instead of being an additional decision-making hurdle. This could serve as a model for the GCC union as it offers a tool for carrying out decisions. Having a central body that coordinates among the national central banks would offer a streamlined and efficient method of carrying out policy decisions.

Profit sharing

In the ECB statute, Article 28 states that the capital holdings of the ECB shall be €5 billion as of the establishment of the ECB. Currently, the capital holdings of the ECB stand at €10.8

billion.[9]Article 29 details the Key for Capital Subscription, in which the shares of the capital holdingsare distributed among the member nations. This is calculated as the sum of: (1) 50 percent of the share of its respective Member State in the population of the Community in the penultimate year preceding the establishment of the European System of Central Banks (ESCB) and(2) 50 percent of the share of its respective Member State in the gross domestic product at market prices of the Community as recorded in the last five years preceding the penultimate year before the establishment of the ESCB. Later, Article 33 states that all "Monetary Income" – income generated by the execution of monetary policy – shall be redistributed to the member states in proportion to their paid-up shares.

Applying the ECB model to the GCC

Let us use the format dictated by Article 29 to see how these numbers would play out in the GCC. First, each country's share of the total GCC population using the most recently collected census data from the Gulf Labour Markets and Migration Programme are as follows:

Table 1. *Population Shares of GCC States*[10]

Country	Date/Period	Total Population	Share of Total Pop.
Bahrain	mid-2016	1,423,726	2.68%
Kuwait	31 Dec 2016	4,411,124	8.31%
Oman	7 April 2017	4,599,051	8.66%
Qatar	Feb 2017	2,673,022	5.03%
Saudi Arabia	May 2016	31,742,308	59.76%
United Arab Emirates	mid-2010	8,264,070	15.56%
Total		53,113,301	100%

Next, we calculate each country's 2017 GDP as a share of the whole GCC's aggregate GDP using the IMF Data Mapper as a source:

9 Bank, European Central. "Capital Subscription." European Central Bank, [Retrieved from].

10 "GCC: Total Population and Percentage of Nationals and Non-Nationals in GCC Countries (National Statistics, 2010-2017) (with Numbers)." GLMM, 10 May 2017, [Retrieved from].

Table 2. *GDP Shares of GCC States*

Country	GDP (bn USD)	Share of Total GDP
Bahrain	33.873	2.34%
Kuwait	118.271	8.17%
Oman	71.931	4.97%
Qatar	166.346	11.49%
Saudi Arabia	678.541	46.87%
United Arab Emirates	378.656	26.16%
Total	1447.618	100%

Source: IMF, World Economic Outlook (2017)

Finally, we average the two percentages to get the capital key percentages for each country:

Table 3. *Capital Shares of Prospective GCC Central Bank, Calculated Like ECB Shares*

Country	Share of Total Pop.	Share of Total GDP	Capital Key %
Bahrain	2.68%	2.34%	2.51%
Kuwait	8.31%	8.17%	8.24%
Oman	8.66%	4.97%	6.81%
Qatar	5.03%	11.49%	8.26%
Saudi Arabia	59.76%	46.87%	53.32%
United Arab Emirates	15.56%	26.16%	20.86%
Total	100%	100%	100.00%

Source: Author's calculations.

This model employed by the EU has its advantages. The first is the uneven distribution of capital contribution. It is an advantage because the member nations must also contribute capital to the central bank in proportion to their shares. In our above example Saudi Arabia, the largest economy in the GCC and Middle East, would contribute 53.32 percent of the capital holdings of the central bank. If Saudi Arabia were to continue using the EU as an analogue, a capital of €10.8 billion would result in a Saudi contribution of €5.8 billion. The largest economy in the union would be putting up the largest upfront capital. Smaller countries in the union like Oman and Bahrain would be incentivized by this structure, as they would not have to put as much capital at risk.

Saudi Arabia might be getting the most of the redistributed profits, but it would also be taking on the biggest financial burden.

The second advantage of this model is its dynamic nature. By using GDP and population as the determining factors for capital contribution, a country's share of the central bank's capital holdings can grow if its economy grows relative to other union members. This factor will incentivize countries in the union to grow their economies to obtain a higher share of their central bank's capital holdings and the profits associated with it.

That being said, this model also comes with disadvantages. Since the capital being contributed to the currency union's central bank is coming from the member nations' existing capital holdings at their own central banks, the capital contribution could be seen as a simple repositioning of funds. Assuming that each country had enough capital holdings currently to fulfill its contributions to the central fund, no new capital would need to be generated. If this perspective is taken, there would be zero risk in transferring existing funds to another bank that is under the country's purview. Not only that, but each country would still have legal ownership of the capital it contributed, represented by itsshare in the joint central bank. As a result, the differing capital contributions could be seen as inconsequential and not seen as a motivating factor for smaller countries.

The risk here lies in the collective management of the joint central bank. If poorly managed, the contributed capital could be lost. Since the money would not be managed by the national central banks, distrust could sow doubt. In addition, countries like Saudi Arabia and the UAE, whichwould contribute the most capital, might feel a greater sense of investment in the union and attempt to control it. We have seen examples in the past of the larger countries of the GCC strong-arming the smaller ones. The recent tensions between Qatar and the rest of the GCC resulted in the expulsion of Qatari nationals from Saudi Arabia and the UAE. This disproportionate contribution effectively equalizes the economic strain placed on the member nations, but does little to alleviate political tension.

CFA Franc Zone

Basic facts

The CFA Franc Zone is a combination of two currency unions: the Central African Economic and Monetary Community (CEMAC), whose central bank is the Banque des Etats de l'Afrique Centrale (BEAC) and the West African Economic and Monetary Union (WAEMU), whose central bank is the Banque Centrale des Etas de l'Afrique de l'Ouest (BCEAO). Figure 4 is a map of the members of both unions.

Both unions trace back to the Banque de l'AfriqueOccidentale, a Paris bank that issued notes throughout French colonies in Sub-Saharan Africa. During World War II French Equatorial Africa aligned with the Free French government in exile and issued a currency distinct from that issued by the Banque de l'AfriqueOccidentale in French West Africa, which remained aligned with the French wartime regime in Vichy. The division persisted after the war and the independence of most of French colonies in 1960. Guinea and Mauritania left the currency unions and established their own central banks, but the former Spanish colony of Equatorial Guinea and the former Portuguese colony of Guinea-Bissau later joined the unions.

Each union hasits own central bank, issuing currencies that are distinct but both called the CFA franc. Each union has a separate treaty with France with similar features and policies. The CFA franc is pegged at 655.957 CFA francs pereuro. The rate was previously pegged at 100 CFA francs per French franc, and the rate with the euro is the cross rate that existed when France joined the euro area.

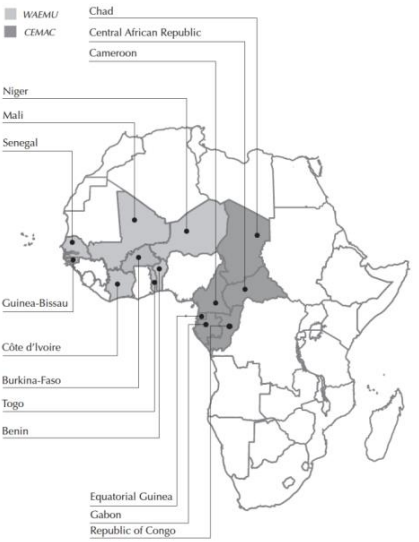


Figure 4. *Map of the CFA Franc Zone and Its Two Central Banks*
Source: IMF – "The CFA Franc Zone: Common Currency, Uncommon Challenges," Anne Marie Gulde, 2 April 2008.

Legal matters and governance

Initially France had half the votes on the boards of directors of BEAC and BCEAO. In 1972 and 1973 revisions of the central bank constitutions reduced France to a single vote, like the African member countries. Arguably the most notable part of the agreements between the two currency unions and France today is that France guarantees the conversion rate of the two currencies. The French Treasury holds a special operations account for the central banks, which serve as a source of overdraft capacity should a reserve shortage ocur (IMF, 2008).

However, this deal comes with three caveats. The first is a requirement for 20 percent of the central banks' sight liabilities to be held in foreign exchange reserves. The second is a requirement for 50 percent of those foreign exchange reserves to be held in the French Treasury's operations account. The third is an interest rate hike should an overdraft occur.

What this deal accomplishes for the currency unions is increased stability. Della Corte *et al.*, (2015) found that exchange rates depreciate when there sovereign risk shocks. By offering

WAEMU and CEMAC a peggedexchange rate, it insulates the two unions' currencies from sovereign risk. This provides much needed stability in the region, especially when considering that several member nations are exporters of oil, which is subject to volatile swings in prices.

Despite the provisions to safeguard the exchange rate of the CFA franc, it was devalued in 1994 from 50 per French franc to 100 per French franc. The central banks were not sufficiently vigorous in following the rules. They lent excessively to government enterprises and depleted their foreign reserves. France refused a bailout without a devaluation and a promise to tighten oversight. The CEMAC and WAEMU economic unions are intended to help keep that promise.

The extensive French involvement in the CFA franc zone since its beginning and continuing through today has no potential analogue for the GCC countries. Despite its long history and relatively successful record of maintaining a pegged exchange rate with its anchor currency, it does not seem to be a good example from which to draw lessons for a GCC monetary union.

Conclusion

Type of monetary authority

Whatever the potential merits of a currency board, it does not seem to be in the cards politically for the GCC. Excluding Saudi Arabia, all the GCC members once had currency boards, which they have since replaced with central banks. All now have people with the managerial capacity to operate central banks and all seem to want the degree of discretionary monetary policy that central banking offers, in particular the ability to serve as a lender of last resort to commercial banks. Accordingly, the analysis here has focused on a joint central bank.

Legal matters and governance

Perhaps the most applicable voting model of the central banks and currency board mentioned in this paper is that of the Eastern Caribbean Central Bank. One member is appointed from each member country and each member has an equal vote. A simple majority is required to pass decisions. This can serve to be a great equalizer between the political powerhouses of the GCC. Countries

with more political power like Saudi Arabia or the UAE threaten to dominate the smaller countries of the GCC in the decision-making arena. Although the countries' economic sizes are nowhere near proportional, giving them equal votes in the currency union would incentivize the smaller members to join. In the Eastern Caribbean Currency Union, the member nations wererelatively similar in size, so givingthem equal votes was less of an issue. However, implementing an equal-vote arrangement in the GCC could prove to be a powerful motivator for political unity and success. Perhaps it would be desirable to combine equally weighted voting with a supermajority provision so that certain decisions could only be made by agreement of more than half of the member countries' representatives on the governing board. (Since the GCC has six members, a six-member board could not take action unless at least four countries agreed on a measure; a 3-3 tie would result in no action.)

That being said, it is worth noting that the legal structure of the ECCB could prove to be a hindrance to the GCC union's overall progress. Having two layers of governance within the central bank – a Board of Directors and a Monetary Council – allows redundancies and inefficiencies to arise. Given the historical evidence of the GCC's ability to quickly make decisions, adding extra layers of bureaucracy will inhibit the central bank's agility in response to economic developments. Here, adopting a similar approach to that of the ECB might be more beneficial. Having an Executive Board carry out the decisions made by the Governing Council offers an attractive solution to the efficiency problem. Centralizing decision-making to a single body of members to then be carried out by another group would streamline the roles of each governing body.

Profit sharing

The capital contribution model implemented in the ECB is of particular interest when considering the best option for the GCC. As discussed in a previous section, using this model in the GCC would result in Saudi Arabia putting up the most capital. This is an attractive aspect of the currency union to the smaller economies of the GCC, as they would be taking a smaller share of the risk.

However, the profit payback scheme employed by the ECB might not be the most appealing to them. That being said, it is reasonable for the country taking the most risk to be reaping the most rewards. In addition, the beauty of this model is its adaptability. As countries continue to grow, should the economic composition of the GCC shift in the favor of some country other than Saudi Arabia, they would be compensated as such.

Profit sharing need not be tightly linked to capital contributions. The profit sharing scheme used in the Malayan Currency Board is enticing as it offers a degree of flexibility and agency that is not present in the ECB. The members of the currency union can decide the share of capital that each country must contribute and consequently how much they are compensated for doing so. Using a more arbitrary system for determining profit sharing could incentivize smaller countries like Oman by giving them a disproportionate share of the profits. The advantage of this system as the MCB used it is that it can be changed on a five-year basis, so the profit sharing can be used as a short to medium term tool to incentivize greater political will for joining the union by offering economic compensation.

Choice of exchange rate

As with any kind of union, there are many aspects that all contributing parties must agree on, one of which being the choice of exchange rate. As we have discussed above, in the case of the GCC there are many political tensions surrounding these decisions and they must be made carefully to ensure political unity. When it comes to exchange rate, not rocking the boat may be the best option.

Most countries in the GCC are currently pegged to the dollar, the exception being Kuwait. It would be far more difficult to convince six governments to agree on a new exchange rate rather than to convince only Kuwait to adopt a pegged currency. Not only is it possibly the easiest political solution, but it is also a sound exchange rate choice regardless. Other options such as pegging to the price of oil or a basket of currencies can be more volatile. If the GCC countries were to decide later that it would be better for their currency to float, they could do so. Malaysia and

Singapore both moved from currency boards to pegged exchange rates under central banking and eventually to floating rates. The ECB is the only currency union among those surveyed here that was floating from the start.

Choice of headquarters

While perhaps a less critical choice, the choice of the location for the central bank headquarters serves as a political symbol. In previous discussions, Saudi Arabia insisted that the central bank be headquartered in Riyadh. Though this might make the most sense as Saudi Arabia would be the largest contributor to the currency union, there are already tensions from the smaller nations regarding Saudi Arabia's tendency to use its size to dominate negotiations. A concession from the Saudis on the headquarter location could serve as an olive branch to the other nations and a symbol of its willingness to cooperate. A headquarters would work just as well in any of the other nations, but special consideration should go toward the UAE and Kuwait as they are more established as international financial hubs. As was the case with the Malayan Currency Board, it would be possible to establish one or more branch offices in addition to the headquarters, both for business and political reasons.

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2 An analysis of the performance of currency boards

Rachmiel Joseph **Naness**

Introduction

The currency board is an alternative monetary system to the common central bank. More than 70 countries have had currency boards, and recent decades have seen renewed interest in this type of monetary authority. The typical benefits of currency boards are the lowering and stabilization of inflation and the fixing of exchange rates backed by foreign reserves equal to 100 percent or slightly more of the monetary base.

Several previous researchers have examined the historical performance of currency boards. Schuler (1996) compared the performance of various monetary authorities in 155 countries in the post-World War II period and found the performance of central banks generally wanting. Hanke (1999; 2002: 92) compared currency boards and central banks, surveying 98 developing countries from 1950-1993 concerning GDP growth, annual average inflation, and fiscal deficit as a percentage of GDP. He found that the GDP growth rate was higher for currency boards than for central banks, while annual average inflation and fiscal deficits were lower for currency boards. These data illustrate how currency

board systems impose fiscal discipline. Wolf *et al*., (2008: 204-205) performed an econometric investigation, with an emphasis on recent currency boards. They found that currency boards had low inflation, good output and trade performance, and no greater susceptibility to financial crises than other regimes. The only drawback they noted was higher volatility of output.

This paper analyzes the performance of 54 former and three current currency boards through data including inflation, GDP per person, deficits, foreign reserves as a percentage of the monetary base, financial crises, exchange rates, and convertibility. These measures will analyze how well the countries fared in their currency board and non-currency board periods.[1] The major difference with previous studies is that this one goes back farther for data. Previous studies have relied mainly on post-World War II databasesthat focus on independent countries. In recent years, prewar and colonial data have become more readily available.

Data

Data [for source] come from a number of standard sources, including the International Monetary Fund's International Financial Statistics database, Global Financial Data, and work by Carmen Reinhart and Kenneth Rogoff for their book *This Time Is Different*. For a full list, see the references at the end of the paper. All the data are available in an accompanying spreadsheet workbook, and unless otherwise stated, data mentioned in the paper come from the workbook and its sources. Because some data are from copyrighted sources, only part of the workbook will be posted, but the full workbookwill be available on request to interested researchers for their personal use, on the condition that they respect copyright.

[1] Some economists distinguish between orthodox currency boards, which have no central banking-type powers, and unorthodox currency boards, which do (Hanke & Schuler 2015 [1994]: 1, 42-44). Even acknowledging the distinction, the difference in theory and in performance between currency boards on the one hand, whether orthodox or unorthodox, and non-currency board systems—in practice almost all central banks—is stark enough that it seems worthwhile to consider all currency boards together.

The data coverage starts in 1914 since there are not many currency boards before then and because 1913 or 1914 is typically the first year of data coverage by the League of Nations. The League made the first really comprehensive international data collection of statistics from independent countries, and a few dependencies. Its effortswere later be carried on by the United Nations and the IMF. In addition, 1914 marks a break with certain pre-World War I economic and political institutions, notably the "classical" gold standard and the dominance of European empires. As a result, the modern world is more like 1920 than the world of 1920 was like the world of 1910.

The focus on currency board and former currency board countries is done as a way of controlling for some economic, political, and cultural factors. Also, comparing currency board and former currency board countries to all countries, including those that have never had currency boards, would have been a much bigger data-gathering endeavor, not feasible within the timeframe of this research.

The chapter omits a number of countries that currently have currency boards or quasi currency boards but that lack good pre-currency board data. They include the Cayman Islands, Gibraltar, and other cases that do not seem significant enough to change the conclusions based on the countries that are included. Readers should also note that data for many countries and years are missing. For example, for inflation, there are a total of 1,608 currency board years and 4,116 years that are not during a currency board. The inflation data collected consist of 546 years of currency board data and 2,674 years of non-currency board data. This is 40 percent of the currency board era inflation data and 65 percent of the non-currency board era data. Other indicators have similar percentages. Data since 1948 are readily available for most independent countries because that is when the IMF's International Financial Statistics database begins since then. Global Financial Data has a majority of the data before this period, with various other sources supplying the rest.

Inflation

The data on inflation for currency boards reveal several key trends that permeate the entire data set. Initially, one must consider that for the period covered, 1914-2015, there are more data for non-currency boardsystems. There are 546 total currency board years, and 2,674 non-currency board years. The average annual inflation rate for the currency board years is 7.3 percent, compared to 34.0 percent for the non-currency board years.

Another metric to analyze the relative performance of the different periods is how many years the inflation rate exceeded certain thresholds. Overall, currency boards have 6.6 percent of total years above 20 percent inflation compared with 13.3 percent for non-currency board systems. Per the table below, currency boards have lower incidences of inflation above 100 percent and 1,000 percent compared with non-currency board systems. These figures suggest that a currency board leads to less inflation overall than not having a currency board.

Table 1. *Selected Inflation Rate Data*

	Currency Board	Non-Currency Board
Total Years of Data	546	2,674
Mean Annual Inflation Rate	7.3%	34.0%
Years above 20% (and % of Total)	36 (6.6%)	355 (13.3%)
Years above 100% (and% of Total)	3 (0.6%)	72 (2.7%)
Years above 1,000% (and % of Total)	1 (0.2%)	13 (0.5%)
Median Annual Inflation Rate	2.9%	5.4%
Standard Deviation	47.7%	347.3%

In addition to the mean being lower for currency boards, the median and standard deviation are also much lower. This is a result of a higher frequency of low inflation levels for currency boards than for non-currency boards. There are, however, several currency board countries that have experienced high inflation. Their cases warrant further consideration, because they support the view that currency boards typically result in lower inflation rates.

Lithuania established a currency board in 1994. Inflation at the end of the Soviet period was repressed by price controls. After the Soviet Union dissolved and Lithuania became independent again

in late 1991 it reduced or eliminated controls, resulting in high open inflation, which was exacerbated by a newly reconstituted and inexperienced central bank. Inflation reached 410 percent in 1993. In April 1994 Lithuania established a currency board to curb inflation, which fell to 72 percent that year, falling further to 40 percent in 1995 and 25 percent in 1996. By 2000, the inflation rate was at 1 percent and did not climb above the 20 percent a year benchmark for the duration of the currency board era. In 2015 Lithuania joined the euro area and ceased to issue a national currency.

Similar events happened in nearby Estonia, which like Lithuania became independent again in late 1991 when the Soviet Union dissolved. Estonia at first continued to use Russian currency, but in June 1992 became the first of the newly independent former Soviet republics to establish its own currency. Its currency board lasted from 1992-2010 with the initial currency board era having inflation rates that peaked in 1992 at 90 percent, stabilizing at 8 percent five years later. The inflation rate would never climb higher than 10 percent until the currency board period ended when Estonia joined the euro area.

Another Eastern European country with a successful currency board is Bulgaria, which adopted this monetary policy in 1997, continuing to today. At the time of adoption, the inflation rate was a staggering 1,058 percent as the country was in the midst of a period of high inflation for the past five years. As a result of the shocks arising from the political collapse of communism in Eastern Europe, the parallel collapse of Soviet-led economic arrangements, and a central bank not equipped to handle the transition, the country experienced inflation of 338 percent in 1991. Inflation would not dip below 20 percent until the introduction of the currency board system. After two years of the currency board, the inflation rate stabilized to 2.6 percent. This stable rate has continued for the duration of Bulgaria's currency board era, never reaching above 15 percent.

Yet another notable case is that of Argentina. The South American country experienced inflation rates of 4,925 percent in 1989 and 1,344 percent in 1990. A currency board was established in 1991 and inflation dropped to 84 percent that year, never

reaching higher than 20 percent for the currency board's duration from 1991-2001. However, Argentina's "convertibility" system, as it was called did not act in the way that Professor Steve Hanke originally proposed an orthodox currency board, and Hanke warned that the convertibility system would act like a central bank, leading to failure. The later portion of the 1990s saw the Argentine convertibility system act as a central bank, engaging in actions such as sterilization, with the system ultimately failing (see Hanke & Schuler 2015 [1994]: 44-45). The year after the currency board system was replaced, inflation rose to 41 percent a year. Average inflation was 13.5 percent a year from 2002-2015 by the official measure, eventually acknowledged by the government itself to have been understated in the later years of the period. By comparison, the inflation rate during the currency board era from 1992-2001 was 2.7 percent a year.

Another country to consider is Zimbabwe, which had a currency board from 1939 to 1955. The average inflation rate during this time was 4.3 percent a year, compared with 367,658 percent from 1956 to today. This African country fared well during the currency board period, further promoting the idea that the currency board is an effective measure against rising inflation.

The table below gives explanations for periods of double-digit or higher inflation in currency board systems where they could be ascertained. The table shows a hitherto unremarked spate of inflations in the early 1950s, definitely in some cases and possibly in others related to Korean War demand for certain products.

The currency board that started in the Philippines in 1903 would see tumultuous inflation by the next decade as a result of deviation from currency board principles. The Currency Reserve Fund lost 84 percent of its pesos due to loan defaults by 1919, and as a result, the government lost or diverted 80 percent of annual revenue from taxes and tariffs to refill the reserve. Because of these fiscal issues, the country suffered staggering inflation in 1919, reaching 94.0 percent. Two years later, as a result of the inflated prices surrounding sugar and other goods collapsing, the country suffered massive deflation of 49.9 percent. The matter would be fixed by a net decline in currency circulation, export trade being revitalized, and a curbing of imports that would lead to the peso's

return to near par by 1922. The original issues were caused by a misunderstanding by Philippine government officials regarding the currency board arrangement and the gold–exchange standard (Luthringer 1934: 175).

Table 2. *Moderate and High Inflation Episodes in Currency Board Systems*

Country	Years Inflation ≥ 10%	Explanation
Argentina	1991-92	Inflation stabilization
Bahrain	1973	OPEC price hike oil boom
Barbados	1951	Korean War commodity boom
Bulgaria	1997-98	Inflation stabilization
	2000, 2008	Rapid growth
Burma (Myanmar)	1949	Devaluation of pound sterling
Cyprus	1943	Word War II shortages
	1947-48	Postwar price liberalization
	1951	Korean War boom
Estonia	1993-97	Inflation stabilization
	2008	Rapid growth
Fiji	1946-47	Postwar price liberalization
	1951	Korean War boom
	1972	Floating and depreciation of pound sterling
Ghana	1949-51	Devaluation of pound sterling; cocoa boom
Guyana	1951	Korean War commodity boom
Hong Kong	1949	Devaluation of pound sterling
	1951	Korean War boom
	1989-91	Rapid growth
Iraq	1940-43	World War II oil boom
Ireland	1940-42	World War II growth and inflation
Israel	1938-39	Rapid growth
Jamaica	1940	Word War II shortages
	1947-48	Requires further investigation
	1951	Korean War commodity boom
Kenya	1951	Korean War commodity boom
Lithuania	1994-96	Inflation stabilization
	2008	Rapid growth
Malaysia	1950-51	Korean War commodity boom
Malta	1951	Korean War commodity boom
Mauritius	1948	Post-World War II price liberalization
	1951	Korean War commodity boom
Philippines	1927	Commodity boom
	1934	Recovery from bottom of Great Depression
Seychelles	1971-77	Depreciation of pound sterling from 1972
Singapore	1950-51	Korean War commodity boom
Sri Lanka	1939, 1942	Word War II shortages
Swaziland	1974-75, 1977	Double-digit inflation in anchor country

Tanzania	1951-52	Korean War commodity boom
	1965	Requires further investigation
Tonga	1977, 1980-82	Double-digit inflation in anchor country
	1985-86	Inflation near double digits in anchor country
Trinidad & Tobago	1940, 1942-43	Word War II shortages
	1946	Postwar price liberalization
Zimbabwe	1949	Devaluation of pound sterling

One key year to discuss is 1949, when the pound sterling was devalued. The currency issued by a board currency acts more or less like a clone of the anchor currency and will adjust and respond to market forces in tune with the anchor currency. As a result of this devaluation, inflation increased in many countries that had the pound sterling as their anchor currency. The countries that experienced the biggest increases in inflation were Burma (Myanmar), Ghana (then known as the Gold Coast), Hong Kong, and Zimbabwe (then known as Southern Rhodesia). Zimbabwe's inflation increased 5.2percentage points, Hong Kong's increased 17.2 percentage points, Ghana's increased 13.0 percentage points, and Burma's increased 18.7 percentage points from the previous year.

Iraq is yet another country to focus on, for its extremely high inflation during its currency board in World War II. From 1940-1944, the country's average inflation was 46.9 percent, peaking at 119.7 percent in 1942. This is a result of Britain's sudden surge in demand for Iraq's oil. However, the inflation did not cause pressure for a currency devaluation, but ratherwas in the nature of international arbitrage. The Iraqi economy suddenly grew as a result of the surging demand for Iraqi oil and other wartime goods Iraq supplied to the British.

Experience indicates that ordinarily, the annual inflation rate of the currency board system should stay within 5 percentage points of inflation in the anchor currency as a result of a fixed exchange rate plus arbitrage. However, there are a few exceptions such as the Eastern European inflation stabilization episodes or other countries experiencing unusually fast growth. The generalization still holds, though, so for currency board years where data is lacking, periods over several years more or less tracked inflation in the anchor currency country.

Consider the pound sterling, the anchor currency of most currency boards. While the UK's retail price inflation rose into low double digits during World War I, a reversal into deflation followed the postwar depression and the resulting inflation remained in low single digits until 1940. Then, the first full year of World War II, the UK's inflation again rose into low double digits and rose to almost 10 percent during the Korean War, dropping down until the end of the Bretton Woods international monetary system in late 1973. Consequently, inflation was in the low double digits from 1974-1981 for all but one year. Currency boards that anchored their currencies to the pound sterling experienced the general inflation trends that the UK did over the period mentioned—an empirical illustration of the theoretical point that arbitrage keep a currency board system's inflation close to that of the anchor currency.

There have been some episodes in currency board systems of very high inflation, 100 percent a year or more. The reason for such high inflation rates is usually the legacy of a pre-currency board crisis. For example, as already discussed, Argentina and Bulgaria had crises in the years directly preceding the establishment of their currency board. The inflation rates of Argentina and Bulgaria in the year before their currency boards were established were 1,343percent and 121 percent, respectively. Even though the inflation rate was exceptionally high, the currency board corrected rampant inflation and within a short period brought the rate to a manageable value. While countries that were experiencing inflation crises and employed a currency board found that doing so lessened inflation, ex currency board countries usually inherited single-digit inflation and would subsequently have episodes of rising inflation. For example, Tanzania, Zimbabwe, and Singapore experiencing double-digit inflation in the years after their currency boardsended. In the two years following Singapore's currency board era, inflation reached 19.6 percent and 22.3 percent. By the mid 1970s Singapore had become a low-inflation country, but Tanzania experienced a number of years of inflation in low to mid double digits and Zimbabwe suffered the second-largest hyperinflation on record. As another example, Mauritius had a stable inflation rate of 2.5 percent in its last year as a currency

board, yet less than ten years later, its inflation would skyrocket to 29.1 percent. From these results, there is more evidence of a high correlation of high inflation being internally generated rather than just being an inheritance.

One final note to be made is that for the most part, simple tabulations were used rather than sample statistics. This was done because as the share of actual data points to possible total data points becomes large, one is no longer sampling, and as a result, sample statistics were not appropriate for the situation.

GPD per person

The data results for GDP per person growth are summarized in the table below. The average annual world growth in GDP per person from 1960 to 2015 was 1.9 percent. The average annual growth in GDP per person over the same period was 3.3 percent for currency boards and 3.2 percent for non-currency boards—a difference so small as to be within the likely margin of error.

Table 3. *Number of Years Growth of GDP per Person Was Below 0 and -3 Percent*

	Currency Board	Non-Currency Board
Years with Data	588	3010
Years below 0% Growth (% of Total)	146 (24.8%)	825 (27.4%)
Years below -3% Growth (% of Total)	78 (13.3%)	415 (13.8%)

Table 4. *Growth of Average Annual Real GDP per Person in Currency Board and Non-Currency Board Systems versus World Average over Ten-Year Intervals (Percent)*

	1961-70	1971-80	1981-90	1991-00	2001-10	2011-15
World	3.4	2.0	1.4	1.3	1.6	1.4
Currency Board	3.0	6.7	7.6	4.0	4.3	2.4
Non-Currency Board	3.9	4.6	1.6	2.8	3.8	3.9

Reminder: "Non-currency board" countries have at some point had currency boards, so "world" includes many countries not in the currency board or non-currency board groups.

The above data highlight a distinction between currency boards and alternative monetary systems. While the difference in annual growth of real GDP per person between currency and non-currency boards from 1961 to 2015 was only 6 basis points, looking more in depth at the numbers generates further insights. Note that

there arefewer years of data for currency boardsthan for non-currency boards. While 24.8 percent of currency boards experienced periods of growth under 0 percent, non-currency boards fared worse, at 27.4 percent. The statistic for number of countries below -3 percent growth is only separated by 52 basis points, currency boards having slightly fewer episodes of -3 percent growth though it is open to question whether the difference is economically significant. This is much less than the 257 basis points separating the two in the previous statistic, so there are more non-currency boards that fared worse than currency boards categorized under less than 0 percent growth.

The most interesting data come from comparing currency and non-currency boards with the world average over ten-year intervals since 1961. This is done to highlight that certain periods overall experienced higher growth, and to point them out. The 1960s are distinct in being the only period out of the six considered where the currency board systemswere below the world average and the non-currency board data were above it. However, in subsequent periods, and overall, currency boards had higher growth rates than non-currency boards and than the world average

Argentina provides an example that follows the trends just mentioned. In the ten years before the establishment of the currency board, its average growth in real GDP per person was -2.3 percent. For the eleven-year duration of the currency board, it was on average 2.1 percent. The currency board helped the country increase growth per person on average while stabilizing inflation. Three years before Argentina establishing the currency board exhibited economic shrinkage.

There are caveats to be discussed in relation to the data. For many countries, GDP data were not collected until after World War II, and even into the 1960 and 1970s some data may be retrospective estimates. Further, GDP is not directly observable like exchange rates, and it is a statistical concoction. Thus, the GDP data are subject to greater uncertainty than any of the other data discussed here except perhaps the data on classifying financial crises.

In small countries and commodity exporting countries, GDP tends to be more variable. The currency board countries disproportionally meet both criteria. A comparison of currency boards to all countries might show more variable growth in currency board countries, which might be smaller if corrected for size and commodity exporter status, but the procedure used in this paper of only focusing on countries that have at some point had a currency board eliminates this source of potential bias.

Government budget balance

Do currency boards tend to instill discipline in government finance, as their advocates often claim? The data suggest that they do.As with previous data, there are more non-currency board years than currency board years, so the surplus and deficit data are based on the total number of years for the respective monetary systems as the denominator. The data clearly show that currency boards have a higher percentage of surplus years and a lower number of years with budget deficits. On the other hand, the non-currency boards show the opposite patterns, having more years with deficits and fewer with surpluses.

Table 5. *Government Budget Balance*

	Currency Board	Non-Currency Board
Total Years of Data	784	2544
Deficit Years (% of Total)	458 (58%)	1928 (76%)
Surplus Years (% of Total)	326 (42%)	616 (24%)

Economists generally scale calculations involving budget balance by GDP to give comparability across countries and across time. However, no nominal GDP calculations exist for the majority of currency board episodes or for many non-currency board episodes in the data set. While a simple "surplus or deficit" classification is crude, it is still a useful measurement, because a country with persistent budget surpluses rarely experiences crises in government finances.

A reason why currency boards have more years with budget surpluses is that government borrowing is restricted to what can be financed from domestic saving and foreign lending. As Allan Meltzer (1983: 703) and other observers have discussed, the

currency board will not survive if there is too large of a budget deficit compared with the money in supply. In theory, such a phenomenon could bias the data in favor of currency boards, but in practice, Argentina's system of the 1990s seems to be the only case where there is a plausible argument that government budget deficits broke a currency board system.

Turning to some particular cases, African countries that have had currency boards show a greater share of currency board years having budget surpluses than non-currency board years. The ten years before Zambia's currency board had four years of a budget surplus, and the ten years after the currency board had only one year of a surplus. In the ten years during Zambia's currency board for which data are available, seven had a budget surplus. Uganda reveals more startling results, having a budget surplus in 23 out of its 45 years as a currency board, while the 50 years after the currency board only had six years with a budget surplus. Comparable results have occurred in Tanzania, where 29 percent of its 45 currency board years had a budget surplus and only 6 percent of the 50 years after the currency board yielded a surplus. Nigeria, Malawi, Ghana, Mauritius and Kenya all exhibited similar results; for instance, Kenya had 21 years of a budget surplus during the currency board from 1914 to 1965, and only one year in the following half-century of non-currency board years. Sierra Leone had 23 years of a budget surplus under the currency board and a budget deficit in every year after the currency board era.

In the Caribbean, Jamaica had twice as many years of a budget surplus in its 40 currency board years as in the 55 years afterwards. Barbados has not had a budget surplus since its currency board era, while its 26-year currency board had 11 years of budget surpluses. However, Trinidad and Tobago shows similar frequencies of budget surpluses during and after its currency board years.

Turning to other regions, Sri Lanka had budget surpluses for 19 years during its currency board period dating from 1914 to 1949, where it has had deficits in all but two years of the 66 years since. Argentina's 11-year currency board in the 1990s had three years of a budget surplus, while the previous 61 non-currency board years only had a single year of a budget surplus. Another interesting

example is that of the Philippines, where 54 percent of the 22-year currency board era from 1914 had a budget surplus, compared with 30 percent of the 67 years without a currency board. Additionally, the Eastern European countries of Bulgaria and Estonia have had budget surpluses in 37 percent and 50 percent of their currency board periods, respectively. Finally, Hong Kong has had much success with its currency board, evidenced by the 26 years of a budget surplus in the last 32 years of its currency board epoch.

Foreign reserves

One criticism of currency boards, dating back at least to the 1950s, is that the 100 percent foreign reserve ratio is too high and unnecessarily channels funds into foreign assets that could be used for domestic economic development (Schuler 1992: 113-116). Thus, it is worth analyzing the ratio to determine its average for non-currency boards. As the table shows, the average percentage of foreign reserves as a fraction of the monetary base is lower for non-currency boards, except for Middle Eastern countries. An orthodox currency board holds reserves equal to or slightly greater than the monetary base (its coins and notes in circulation plus deposits with it[2]), so the data for currency board periods will show ratios near 100 percent. The data for non-currency board periods are more variable because their monetary policies are less uniform.

Table 6. *Foreign Reserves as a Percentage of the Monetary Base*

	Currency Board	Non-Currency Board
Total Years of Data	852	2245
Average Reserves, All Countries (%)	118.1	88.9
Average, African Countries (%)	99.4	16.6
Average, Middle Eastern Countries (%)	105.1	165.6
Average, Caribbean Countries (%)	98.3	83.9

The average foreign reserve makeup of the money base for African countries after their currency board period is much lower

[2] Strictly speaking, a currency board may not issue all parts of the monetary base. In British colonies, coins were often issued by the local treasury, or there were no locally issued coins and colonies used British coins. A currency board is not responsible for parts of the monetary base it does not issue.

than the average for their currency board period. At 12.8 percent, most of these African countries have little foreign reserves, and have faced a myriad of other issues, among them excessive inflation and exchange rate depreciation. Ghana's average foreign reserve percentage is 0.6 percent and its average inflation rate in the post currency board era is 23.7 percent. Zambia and Zimbabwe had average foreign reserves of -124.7 percent and -21.0 percent, respectively, in their era following the currency board. (Negative foreign reserves mean that the monetary authorities had foreign currency liabilities exceeding their foreign currency assets.) Like Ghana, they also had high average inflation rates: 41.9 percent for Zambia and 367,658.2 percent for Zimbabwe since the end of their respective currency boards. Further, the median inflation for Zambia is 23.3 percent and 8.9 percent for Zimbabwe since their currency boards ended. While the foreign reserves requirement was lifted in the time after the currency board, inflation skyrocketed as foreign reserves dwindled.

While African countries exhibited much lower foreign reserves in the post currency board period, Middle Eastern countries had very high reserves in the following period, above the 100 percent threshold. Bahrain's average foreign reserve percentage is 239.5 percent, while the lowest average percentage in this group is Israel at 97.9 percent. This group includes oil-rich nations such as Kuwait and Oman, each above 200 percent average foreign reserves as a percentage of the monetary base. Not by coincidence, the Middle East oil exporters are also among the countries that have seen little or no exchange rate depreciation over the long run against their former or continuing anchor currencies.

Whereas the Middle Eastern countries have high foreign reserve ratios and the African states generally have low ratios, Caribbean nations' practices are varied. While the average for these islands is close to the currency board standard at 82.6 percent, some outliers must be mentioned. Trinidad and Tobago's average is a staggering 196.6 percent, while Jamaica's is only 7.9 percent. Trinidad and Tobago's membership in the British Caribbean Currency Board ended in 1964 and Jamaica's ended in mid 1961, so the two countries began their central banking experience within a close period. The ten years following Jamaica's

currency board had an average foreign reserve percentage of 109.2 percent, but the next ten years saw a decrease in foreign exchange percentage in seven out of ten years, averaging -14.5 percent during this period. Jamaica would not have a positive percentage of foreign reserves until 1994, increasing steadily for the next twenty years. Thus, this long period of a negative percentage for foreign reserves as a percent of the monetary base contributes to Jamaica's small figure in the overall average. While Jamaica experienced seventeen years of a negative percentage, Trinidad and Tobago never had a negative percentage in this value. At one point, their foreign reserve ratio to the monetary base was at 617.9 percent in 1978, the fourth highest out of all countries surveyed in their post-currency board eras.

The Bahamas and Barbados had higher percentages, 91.7 percent and 75.2 percent, respectively. All members of the Eastern Caribbean Central Bank—the successor to a regional currency board—had ratios above 70 percent except for Dominica. Dominica's average foreign reserve compared to the monetary base was 39.0 percent, mainly driven by a period of six years between 1981 and 1986 where the foreign reserve percentage was negative. The median for this tiny Caribbean nation is 63.0 percent, only sixteen percentage points away from the median of the next lowest ECCB country.

Singapore presents an interesting case study. While obeying the currency board requirements during its currency board era, during the post currency board period it has maintained a very high level of foreign reserves relative to the monetary base, averaging 516.9 percent, the highest mean out of every country surveyed. Singapore has enjoyed inflation of 2.6 percent a year during the post currency board period.

Financial crisis

The mainsource this paper uses for identifying financial crises is Reinhart & Rogoff's (2010) spreadsheets on financial crises, accompanying their book *This Time Is Different.* They cover currency crises, inflation crises, stock market crashes, domestic and external sovereign debt crises, and banking crises. Reinhart and

Rogoff's criterion for an inflation crisis is the inflation rate exceeding 20 percent.

Table 7. *Financial Crises Summary*

	Currency Board	Non-Currency Board
Total Years of Data	546	2,674
Total Years of Crises	53	432
Average Number of Crises Per Year	0.097	0.161
Countries with at least 10 Years of Crises	1	14

Their criterion for a currency crash is that the exchange rate depreciated at least 15 percent against the anchor currency, in the majority of cases the UK pound or the US dollar. Also, currency debasements are classified as a reduction in the metallic content of coins in circulation of at least 5 percent. They use two criteria to identify banking crises. One is bank runs that led to the public sector taking control of at least one financial institution. The other was that even if there were no runs, a public sector takeover of an important financial institution identifies a crisis. They define both external and domestic debt crises as failure to meet the payment on the due date. They also include episodes where external debt is renegotiated on less favorable terms to creditors than the original terms.

The second source of data on crises is a working paper by Miloni & Maki (2015) detailing the financial crises of currency boards in India, Singapore, Argentina, the Philippines, Palestine (Israel), Hong Kong, Bermuda, Estonia, Lithuania, and Bulgaria. They consider banking crises, in which banks failed or were bailed out by the government, and currency crises, in which the currency depreciated or the government took unusual action to prevent speculative attacks on the currency. They do not consider inflation, stock market, or sovereign debt crises, the implicit reason being that those other crises are not as closely related to the smooth operation of the monetary system.

The final source is Laeven & Valencia's (2012) update to their Systemic Banking Crises Database. To be denoted a banking crisis, two criteria must be met. First, there need to be momentous financial issues plaguing the banking system, such as bank runs, losses in the system, and bank liquidations. The second criterion is

that government intervention occurs in response to the losses as a result of the financial distress.

While the above sources, especially Reinhart and Rogoff, highlight the major and many minor crises, there are still many gaps in this field. As a result, additional episodes may come to light in some of the smaller countries after more research. There seem, however, to have been no sovereign defaults by currency board systems except Argentina, and not many currency board systems have had local stock markets that were important parts of the local financial system. Additionally, the sources understate the problems of these financial systems in centrally planned countries, albeit there were not many of these countries in the data set here. Centrally planned economies direct resources to inefficient uses, and rather than the bank going bankrupt, the consumer bears the brunt of these effects. Persistent shortages of consumer goods result and thus the overall problems are severely understated. Further research, then, may well find few additional crises among currency board systems and quite a few additional crises among non-currency board systems.

The data show that currency boards experienced crisesin 9.7 percent of all years, compared with 16.1 percent of all years for non-currency boards. Per the financial crises definitions of the sources, rampant inflation is considered a period of crisis. Thus, overall currency boards maintained lower inflation than their non-currency board counterparts. When a country would have inflation above 20 percent, such as Ghana's nine-year period between 1976 and 1984 of inflation not dipping below 22 percent, these nine years of high inflation were categorized as a financial crises period in the spirit of Reinhart and Rogoff's criteria. Many non-currency board countries experienced rampant inflation in the period preceding the currency board, such as Bulgaria, Estonia, and Lithuania, or excessive inflation in the subsequent period.

There are several countries that deserve mention as a result of their sheer number of crises. India and Argentina were the only two countries with over 50 years of crises. India only had five crisis years in its currency board era, while Argentina had 12. Argentina has the most number of crisis years out of any country in its currency board era, whereas 14 had ten or more years of crises

during their non-currency board eras. While Zimbabwe had over forty years of crises during the post currency board period, there were no crises during its currency board. Ghana and Burma (Myanmar) also had a significant number of crisis years in the post-currency board period, totaling 66 between the two. Yet, each country only had one crisis year in their respective currency board eras.

As an extreme example of how a country has gone off the rails since abandoning its currency board, consider Zimbabwe. By Reinhart and Rogoff's criteria, Zimbabwe experienced external debt crises from 1965-1974 as a result of an external default or restructuring. There was a stock market crash in all years from 1976-1986 except for 1979 and 1985. Further, the period from 1988 to today has been a very tumultuous period for the country. Every year between 1988 and 2009 has seen Zimbabwe meeting one of the criteria for a financial crisis that Reinhart and Rogoff havedefined. In this period, Zimbabwe experienced 16years of currency crises, 17 years of inflation crises, 12 years in which the stock market collapsed, one year of a domestic debt crisis, ten years of external debt crises, and 14 years of banking crises.

Table 8. *Financial Crises in Currency Board Systems, Multiple Sources*

Country	Crisis Years	Explanation
Argentina	1912-1914	Unsustainable growth, crop failure, World War I panic
	1929	U.S. Great Depression
	1991-1996	Aftermath of pre-reform currency crisis; banking and sovereign debt crisis (1995: contagion from Mexico)
	1998	Stock market crash
	2000-2001	Asian, Russian, and Brazilian financial crises
Philippines	1919-1922	End of World War I causing drop in demand for exports and mismanagement by government
Singapore	1920	Currency crisis (appreciation and crash of silver)
	1950	Currency and inflation crisis (devaluation of pound sterling)
Sri Lanka	1920	Currency crisis (appreciation and crash of silver)
	1931	Currency crisis (Britain abandoned gold standard)
	1939	Currency crisis (start of World War II)
	1942	Inflation crisis (wartime)
Ireland	1931	Currency crisis (Britain abandoned gold standard)
	1939	Currency crisis (start of World War II)
Palestine	1935-1936	Religious tensions and international political instability

	1940	Panic regarding start of World War II
Hong Kong	1961	Rapid expansion of banking sector,rising property prices
	1965	Falling property prices and Hang Seng Bank rumors
	1987	1987 stock market crash
	1991	Scrutiny of BCCI and false rumors
	1997-1998	Asian Financial Crisis
	2008	Global financial crisis
Malaysia	1948	Currency crisis
	1950	Inflation crisis
Mauritius	1948	Inflation crisis
Burma	1949	Inflation crisis
Ghana	1949	Currency crisis (devaluation of pound sterling)
Nigeria	1950	Currency crisis (devaluation of pound sterling)
Zambia	1950	Currency crisis (devaluation of pound sterling)
Estonia	1992-1994	Underdeveloped system and asset freezes from Moscow*
	1997	Asian Financial Crisis and speculative attack on kroon
	1998	Asian and Russian Financial Crises
Lithuania	1995-1996	Banking adjustment to capitalist economy **
	1998-2000	Asian and Russian Financial Crises
Bulgaria	2015	Rapid growth of fourth-largest bank

Notes: Countries are listed in order of their earliest crisis.
*Laevan has the ending date as 1994, Madan and Maki only had 1992 for the crisis.
**Laevan has the ending year as 1996, Madan Maki only have 1995 as the crisis year.

Table 9. *Additional Cases of Financial Crises under Currency Boards, from Madan and Maki*

Country	Crisis Years	Explanation
India	1907-1909	Crop failures and U.S. financial panic of 1907
	1912-1915	Banking crises
Straits Settlements (Singapore)	1907-1908	Unexpected rise of value of silver and general financial distress of period
Hong Kong	1941-1945	Japanese occupation; illegal note issues
Bermuda	1975	Regulators observed problems at Bermuda Provident Bank
	1979	Regulators observed problems at Rego Trust and Savings

Exchange rates

A currency board maintains a fixed exchange rate with an anchor currency. The most common anchor currencies have been the pound sterling and the U.S. dollar. Some non-currency board systems maintain rigid exchange rates, while others have floating

rates. If non-currency board systems on average maintain the external value of a currency as well as currency boards do, then over long periods we would expect to see that even though a number of currencies had depreciated against their former anchors, a roughly equal number would not have.

The exchange rate data start the calculations at the end of the last full year of the currency board period, and calculate the exchange rate every year since then as data permit. Some countries have data extending many decades since their currency board era, such as India at almost 100 years, while others have much shorter periods, such as Estonia and Lithuania at less than a decade each. The exchange rate of the first year calculated was set at 1, and each year was calculated as either above or below this figure for ease in comparisons of exchange rate depreciation and appreciations, and for uniformity. Therefore a factor of 3.5 after ten years would indicate substantial depreciation, because it would take 3.5 times as many units of the currency to buy one unit of the anchor currency as in the first year. On the other hand, a factor of 0.8 would indicate appreciation, because it would only take 0.8 times as many units of the currency to buy one unit of the anchor currency as in the first year. Per the above data table, the majority of countries experienced depreciation within the first ten years after the end of the currency board, and forty years later, there were only ten countries out of 48 with an exchange rate appreciation compared with the last year of the currency board's era.

Few countries experienced great depreciation by the end of the first ten years after their currency boards: only Argentina, Israel, and Swaziland's exchange rate depreciation exceeds a factor of 2.0. Over longer periods, great depreciation becomes more frequent. Twenty years after the currency board era, Uganda saw the biggest increase in exchange rate factor, increasing by a factor of 83.37 and increasing by factors in the tens of thousands for the next several decades. Thirty and forty years after the currency board era saw a majority of monumental exchange rate depreciations as a result of economic crises and rampant inflation. Only a handful of countries experienced appreciation, yet they are the outliers in this dataset of countries experiencing significant depreciation.

Table 10. *Exchange Rate Changes*

Exchange Rate Change of Former Currency Board Countries against Their Former Anchor Currencies	10 Years After End of Currency Board	40 Years After End of Currency Board
Total Number of Countries	53	48
Appreciated	11	10
Depreciated	28	38
Depreciated by More than a Factor of 10	0	16

African countries including Ghana, Nigeria, Sierra Leone, Somalia, Uganda, Zambia, and Zimbabwe experienced extremely high exchange rate depreciation from their last currency board year. These numbers at times numbered in the millions, a result of financial issues that have been plaguing these countries for the majority of their history. In contrast, Libya's respective exchange rate never increased above a factor of one, even fifty years later. While Ethiopia's exchange rate increased by a factor of five 70 years later, when compared with other African countries, the country maintained a much more stable exchange rate, as did Eritrea, never rising above a factor of six.

Middle Eastern countries fared much better than African nations. For the majority of the Middle Eastern countries' history, their exchange rates depreciated only slightly, rather than by factors of thousands. Bahrain's exchange rate actually appreciated. Fifty years after the end of Iraq's currency board period, the exchange rate depreciated by a factor of 2910, yet the Middle Eastern country's exchange rate appreciated in the previous forty years. The sudden and staggering rise could be attributed to the consequences of the 2000s Iraq War, bringing much instability to the region and consequently affecting exchange rates. As Jordan's exchange rate was depreciating since twenty years after the currency board's termination, Kuwait's figures appreciated. A potential result of appreciation could be the persistent low inflation coupled with numerous years of a budget surplus.

Jamaica fared the worst out of the Caribbean countries, its exchange rate continually depreciating. It would peak forty years after the currency board ended ata factor of 62.8. While Trinidad and Tobago did not fare nearly as worse, the country still reached an exchange rate depreciation factor of one. Countries using the

Eastern Caribbean dollar, including Antigua and Barbuda and Grenada, saw appreciation, along with Barbados.

Singapore presents an interesting case, as the country's exchange rate has been appreciating in each subsequent decade since the end of the currency board. Singapore focuses on a target exchange rate zone, adjusting the rate depending on target levels set in advance against an undisclosed weighted basket of currencies of important partner countries in trade and finance. As a result, Singapore's central bank does notsetinterest rates, unlike most of its peers, and the exchange rate target zonehas been relatively successful at keeping inflation low as a result.

See the Appendix for a table of appreciations and depreciations by the currency boards covered in this study.

Exchange control (Currency convertibility)

Exchange control, or currency convertibility, is the extent to which a government allows people to use a currency in foreign payments. Kurt Schuler has devised a table for the Historical Financial Statistics data set that attempts to cover all countries since 1931, when the Bank for International Settlements began making the first survey of convertibility in its annual report. Since 1949 the major source of data is the International Monetary Fund's *Annual Report on Exchange Arrangements,* now called the *Annual Report on Exchange Arrangements and Exchange Restrictions.* A third source, the long defunct *Pick's Currency Yearbook,* later called *World Currency Yearbook,* relied heavily on the IMF report but also included information for many countries that were not IMF members. These sources often did not explicitly cover colonies, but exchange controls were with rare exceptions the same as in the metropolitan country. The classifications are based on a large degree of judgment, and therefore any conclusions are to be viewed cautiously.

The typical division of convertibility is into current account and capital account convertibility. Current account convertibility means that a currency can be used with few restrictions for payments involving foreign goods and services. Capital account convertibility means that a currency can be used with few restrictions for foreign investment. Usually, a currency that has

capital account convertibility also has current account convertibility. Implicit in both kinds of convertibility is internal convertibility, that is, absence of exchange controls for domestic payments. In centrally planned economies, though, even internal convertibility is lacking, especially for enterprise-to-enterprise payments. Another wrinkle in convertibility is the existence of payments areas—zones in which member countries allow greater convertibility than they do for countries outside the zone. During World War II and for some years afterward, for instance, payments of all types could be made with few restrictions within the sterling area, which comprised Britain, many of its colonies, and some independent countries. For countries outside the sterling area, the pound sterling was not necessarily convertible even for current account transactions.

With those factors in mind, Schuler distinguishes among five degrees of convertibility:

- 0 = Repressed (inconvertible). All foreign payments are controlled, as in centrally planned economies, or in many belligerents and occupied countries during the world wars.
- 1 = Restricted. A limited group of foreign payments, typically connected with immediate payment for merchandise, has few restrictions.
- 2 = Payments area. Payments face few restrictions within the payments area, but significant restrictions on current and capital account outside the area. Whether a country belonging to a payments area is classified in this category rather than the "restricted" category depends on how significant the payments area is to its economy. If a large country and a small country are joined in a payments area, the area may be significant to the small country but not to the large one, in which case convertibility in the large country is still listed as restricted.
- 3 = Liberal. The currency is convertible on current account or (much less often) capital account, but not both for transactions with all foreign countries.
- 4 = Full. The currency is convertible on current account and capital account, though some restrictions on payments may exist connected with money laundering, international economic sanctions, and the like. The exchange rate is unified, whereas in the

lesser degrees of convertibility multiple exchange rates may exist, such as a black market where the exchange rate differs significantly from the official rate.

Table 11.*Currency Convertibility (from 0, Lowest, to 4, Highest)*

Years	Currency Board	Non-Currency Board
Years of Data	1255	3354
Years Equal to 4 (% of Total)	328 (26.1%)	797 (23.7%)
Years Equal to 3 (% of Total)	73 (5.8%)	826 (24.6%)
Years Equal to 2 (% of Total)	833 (66.4%)	693 (20.6%)
Years Equal to 1 (% of Total)	21 (1.6%)	877 (26.1%)
Years Equal to 0 (% of Total)	0 (0%)	161 (4.8%)

The above data reveal that the currency board countries never experienced years with fully repressed currency convertibility. Currency boards have much fewer years with years equal to 1 and 0, and slightly more years with full convertibility. While non-currency board data outnumbers that of the currency board by about three to one, the years equal to 0 or 1 are revealing. Over 30 percent of the non-currency board countries experienced repressed and restricted convertibility for their existence, compared to just 1.6 percent of currency board countries.

Conclusion

After surveying these 57 countries, the data show that by the criteria evaluated here, the majority of countries performed better during the currency board era than in the non-currency board periods. The most striking data are for inflation, where the average rates are significantly lower for currency boards. Currency boards have proved to be extremely effective for countering excessive inflation, as evidenced by Bulgaria, Estonia, Lithuania, and Argentina's bouts with inflation in the 1990s. Further, the currency board limits the potential for bouts of hyperinflation unlike central banks, where there were 13 years with inflation above 1,000 percent, compared with the currency board's single year of inflation above that level, which was simply a result of the transition to a currency board for Bulgaria in 1997.

Other data results indicate better economic measures during the currency board period as well. The majority of countries that replaced their currency board experienced periods of exchange

rate depreciation. Some reached factors of depreciation in the tens of thousands, figures that were never found in the currency board periods. Currency boards experienced a higher percentage of government budget surpluses, likely a result of the 100 percent foreign reserve requirement imposing greater budgetary discipline because the currency boards could not finance government spending. While the GDP per person results were similar for currency boards and non-currency boards, there were slightly fewer periods with negative growth in currency board eras. The data on foreign reserves as a percentage of the monetary base revealed that African countries suffering from excessive inflation and depreciating exchange rates also experienced low reserves, sometimes dipping into negative figure territory. Finally, financial crises occurred almost twice as frequently in non-currency board eras, as some countries having experienced over 50 years of crises in their non-currency board episodes. Per the data analyzed in this paper, the currency board leads to more positive economic outcomes that the central bank could likely cause.

Appendix

Appendix 1. *Exchange Rate Appreciations and Depreciations by Currency Boards*

Country / Date	Old Rate / New Rate	Effect	Remarks
Argentina 1914.08.09	1 peso = 0.63870849 gram gold Floating	Depreciation	Abandoned fixed exchange rate soon after World War I began
Argentina 1929.12.16	1 peso = 0.63870849 gram gold Floating	Depreciation	Abandoned fixed exchange rate soon after Great Depression began
Argentina 1992.01.01	10,000 australes = US$1 1 peso = US$1	Neutral redenomination	Redenomination, 10,000 australes = 1 peso
Argentina 2002.01.09	1 peso = US$1 Floating	Depreciation	Abandoned exchange rate during a financial crisis
Bahamas 1966.05.25	Bahamas £1 = £1 stg Bahamas $1 = £0.35	Neutral redenomination	Redenomination connected with introducing a decimalized currency almost equal to the US dollar
Bahamas 1967.11.18	Bahamas $1 = £0.35 stg Bahamian $2.44898 = £1 stg	Appreciation to preserve value	Revalued against sterling after it devalued against the US dollar; preserved previous cross rate with US dollar
Bahrain 1967.11.18	1 Bahrain dinar = £0.75 stg 1 Bahrain dinar = £0.875 stg	Appreciation to preserve value	Did not follow devaluation of pound sterling against US dollar and gold
Bahrain 1972.06.26	1 Bahrain dinar = £0.875 stg 1 Bahrain dinar = US$2.28	Appreciation and anchor switch to preserve value	After UK floated the pound sterling, switched to US dollar at the anchor at the pre-floating sterling/dollar rate
Bahrain 1973.02.13	1 Bahrain dinar = US$2.28 1 Bahrain dinar = US$2.53	Appreciation to preserve value	Did not follow US devaluation against gold
Belize 1949.12.31	Belize $1 = US$1 Belize $4 = £1 stg	Neutral anchor switch	Switched anchor to pound sterling at approximately the prevailing sterling/dollar cross rate
Belize 1976.05.11	Belize $4 = £1 stg Belize $2 = US$1	Appreciation and anchor switch	Switched anchor to US dollar and revalued about 10% during a period when sterling was weak
Bosnia 2002.01.01	1 marka = 1 German mark 1.95583 marka = 1 euro	Neutral anchor switch	With the final replacement of the German mark by the euro, switched to the euro asanchor currency at the fixed mark-euro rate
Bulgaria 1999.01.01	1,000 leva = 1 German mark 1.99583 leva = 1 euro	Neutral redenomination	With the initial replacement of the German mark by the euro, switched to the euro asanchor currency at the fixed mark-euro rate
Estonia 1999.01.01	8 kroons = 1 German mark 15.6466 = 1 euro	Neutral anchor switch	With the initial replacement of the German mark by the euro, switched to the euro asanchor currency at the fixed mark-euro rate
Fiji	Fijian £1 = £1 stg	Depreciation	De facto floating though still

1929.12.18	Fijian £1 = £1 stg; see Remarks		officially fixed
Fiji	Fijian £1 = £1 stg	Neutral	Returned to parity with sterling
1932.09.09	Fijian £1 = £1 stg; see Remarks		
Fiji	Fijian £1 = £1 stg	Depreciation	Temporarily switched to New
1932.12.14	Fijian £1 = New Zealand £1		Zealand pound as anchor currency during the Great Depression; market rate was New Zealand £1.11 = £1 sterling
Fiji	Fijian £1 = New Zealand £1	Appreciation to preserve value	Switched back to pound sterling as anchor currency
1933.03.29	Fijian £1.11 = £1 stg		
Fiji	Fijian £1.045 = £1 stg	Appreciation to	Did not fully follow pound
1967.11.27	Fijian £1.045 = £1 stg	preserve value	sterling's devaluation against gold and the US dollar
Fiji	Fijian £1.11 = £1 stg	Neutral	Adopted a new, decimalized
1969.01.13	Fijian $2.09 = £1 stg	redenomination	currency unit at Fijian $1 = Fijian £1
Fiji	Fijian $2.09 = £1 stg	Appreciation to	Revalued to offset the depreciation
1972.10.25	Fijian $1.98 = £1 stg	preserve value	of the pound sterling against the US dollar
Hong Kong	Hong Kong $16 = £1 stg	Appreciation to	Did not fully follow pound
1972.10.25	Hong Kong $14.5545 = £1 stg	preserve value	sterling's devaluation against gold and the US dollar
Hong Kong	Hong Kong $14.5545 = £1	Appreciation	Abandoned fixed rate during a
1972.07.06	stg		period of turmoil for the pound
	Floating		sterling
India	1 rupee = 10.6918 grams	Neutral in intent,	Floated the exchange rate in
1893.06.26	silver	depreciation in	transition to a sterling/gold
	Floating	fact	standard
India	15 rupees = £1 stg	Appreciation in	Introduced exchange controls
1916.12.20	15 rupees = £1; see Remarks	fact	during World War I that in effect ended the currency board system
Kenya	10 East African rupees =	Neutral	Replaced local currency board with
1916.12.20	£1 stg	redenomination	regional East African Currency
	20 East African shillings = £1 stg		Board and changed currency unit at 1 East African rupee = 2 East African shillings
Lithuania	4 litai = US$1	Neutral anchor	Switched to euro as anchor
2002.02.01	3.4538 litai =1 euro	switch	currency at prevailing euro/dollar cross rate
Mauritius	Mauritian $5 =£1 stg	Neutral	Changed currency units; 2
1877.01.01	1 local rupee = 1 Indian rupee	redenomination &anchor switch	Mauritian rupees = Mauritian $1; rate with Indian rupee was market rate
Mauritius	1 local rupee = 1 Indian	Neutral anchor	Switched to the pound sterling as
1934.08.23	rupee	switch	the anchor at the sterling-rupee
	13.33 local rupees = £1 stg		cross rate
Oman	1 rial Omani = £1 stg	Appreciation and	After the pound sterling floated,
1972.06.26	1 rial Omani = US$ 2.60571	anchor switch topreserve value	switched to a US dollar anchor at pre-floating dollar-sterling cross-rate
Oman	1 rial Omani = US$ 2.60571	Appreciation to	Did not follow the devaluation of
1973.02.20	1 rial Omani = US$ 2.89524	preserve value	the US dollar against gold
Philippines	2 Philippine pesos = US$1	Depreciation	In a deviation from currency board

1916.06.20	Floating		orthodoxy, the board lost foreign exchange reserves and floated
Qatar 1967.11.19	1 Qatar riyal = £0.075 stg 1 Qatar riyal = £0.0875 stg	Appreciation to preserve value	Did not follow the devaluation of the pound sterling against the US dollar
Qatar 1967.11.19	1 Qatar riyal = £0.0875 stg 1 Qatar riyal = US$0.228	Appreciation and anchor switch topreserve value	Switched to the US dollar as the anchor currency after pound sterling began to float and depreciate
Seychelles 1936.01.31	13.33 local rupees = £1 stg 1 local rupee = 1 Indian rupee	Neutral anchor switch	Switched to pound sterling at the rupee-sterling cross-rate
Singapore 1903.10.03	Straits $1 = 1 silver dollar Floating	Neutral in intent	Floated as part of a transition to a gold standard
Singapore 1967.11.19	Singapore $1 = £0.11667 stg Singapore $ 1 = £0.13336 stg	Appreciation to preserve value	Did not devalue with pound sterling
Tonga 1966.02.14	Tonga £1 = Australian £1 1 pa'anga = Australian $1	Neutral redenomination	Introduced new, decimalized currency at 2 pa'anga = £1

Notes: stg = sterling. Table excludes some currency board episodes that are not covered in the paper. Those cases are listed in the Excel workbook.

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3 How close to currency boards are gulf cooperation council central banks?

Chris **ZOU**

Introduction

The Gulf Cooperation Council (GCC) is comprised of six countries — Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates. All share a history of using the Indian rupee as their local currency (or in Saudi Arabia's case, as an unofficial but widely used currency) in the early and mid-20th century. In 1959, to make exchange controls more effective, the government of India established a separate currency, the Gulf rupee, for circulation exclusively outside the country (India, Reserve Bank of India [Amendment] Act, 1 May 1959, reprinted in Reserve Bank of India Bulletin, May 1959: 564; see also pp. 562-3). The Gulf rupee, though equivalent to the domestic Indian rupee, could not be used for trade in India. After India devalued the rupee on 6 June 1966, the countries using the Gulf rupee - Oman, Qatar and what would later become the United Arab Emirates - decided to replace the Gulf rupee with new national currencies. Kuwait and Bahrain had replaced the Gulf rupee in 1961 and 1965, respectively.

Eventually, all the GCC countries pegged their currencies to the U.S. dollar. Kuwait alternated between pegging to the dollar and pegging to an undisclosed basket of currencies, and ceased its most recent dollar peg in 2007. The other five countries remain pegged to the dollar. The long duration of their pegs and the high levels of external reserves that they hold have occasionally prompted comparison of their central banks to currency boards. How accurate is the comparison? One must review the monetary history of each country since establishing a national currency, and examine the laws governing the central banks of each country. Since central bank laws contain information about each country's extent of currency board orthodoxy, they are especially important.

Bahrain

Bahrain is formerly part of the Federation of Arab Emirates (most of which is now the United Arab Emirates) and it gainedindependence from the United Kingdom on 15 August 1971.

Bahrain established acurrency board and started issuingthe Bahrain dinar (BHD) in coins and notes in 1965,replacing the Gulf rupee at a rate of 10 rupees = 1 dinar (Bahrain, Bahrain Currency Decree, Decree No. 6 (Finance), 9 December 1964, reprinted in Bahrain Currency Board annual report, 31 March 1966: 13-19).In 1973, the currency board was replaced by the Bahrain Monetary Agency, which was renamed the Central Bank of Bahrain on September 7, 2006. Currently the Bahrain dinar is pegged to the U.S. dollar at 0.376 Bahrain dinar = US$1. The rate was made official in 2001 after existing in practice for a long period (Bahrain, Decree No. 48, 25 December 2001, reprinted in Bahrain Monetary Agency annual report 2001:61).

The Central Bank of Bahrain and Financial Institution Law (CBB Law) established the Central Bank of Bahrain as the successor organization of the Bahrain Monetary Agency. It was promulgated on September 6, 2006 with the issuance of Decree No.64 of 2006. Though the Bahrain dinar is pegged to the U.S. dollar, the CBB Law does not mention any peg, nor does it mention that the dinar should have a set exchange rate against any other currency or basket of currencies. Article 19 of the CBB Law states, "The amount of foreign exchange reserve permanently maintained by the

Central Bank shall not be less than 100% of the value of the currency in circulation." Article 19 also states: "In exceptional circumstances, the minimum amount of the Foreign Exchange Reserve may be changed by a resolution issued by the Board, provided that such minimum shall not be less than 75% of the value of the currency in circulation." It should be noted that an orthodox currency board requires the full backing of monetary base by foreign reserves, and the monetary base is defined as the sum of notes and coins in circulation and demand deposits of financial institutions at the monetary authority. The CBB Law, however, only mentions the backing of currency in circulation without giving a definition of it.

Article 25 of the CBB Law provides that the central bank may advance loans to the government and public bodies in exceptional circumstances. Except for this, the CBB Law does not mention other currency board-related topic.

Oman

Oman is an absolute monarchy and has been ruled by Sultan Qaboos bin Said Al Said since 1970. Oman has a diverse economy, a significant part of which is supported by tourism and agricultural trade. Its oil reserves are relatively small and expected to be depleted sooner than those of the other countries examined here, making economic diversification more urgent.

The Central Bank of Oman began operations in 1975, replacing the Oman Currency Board as the principal currency authority. Since 1972 the Omani rial has been fixed or pegged to the US dollar, though the exchange rate was changed several times in the early years by modest percentages. The current exchange rate of 1 Omani rial= US$2.60 has been in place since 1986.

The law regulating the Central Bank of Oman is a subsidiary part of the general Banking Law of the country. Article 31 of Chapter Three of the Banking Law mentions that the reserve of external assets should be related in value to the value of currency notes and coins in circulation, which, as discussed above, is not the same as monetary base. However, the exact ratio is not specified. The law also states that the value of the Omani rial should be declared in terms of gold, units of Special Drawing Rights, a

foreign currency, or a basket of currencies, butthe exact exchange rate is not specified. The Central Bank of Oman is allowed by law to provide loans to the government in respect to temporary deficiencies, but the amount of loans is restricted (Oman, Oman Banking Law, 2000).

Qatar

Qatar was a British protectorate until it gained independence in 1971. Qatar has been ruled by the House of Thani since the 19th century. According to the International Monetary Fund, Qatar has the highest per capita income in the world and the highest Human Development Index score among the Gulf countries.

Qatar and Dubai had agreed to issue a joint currency but had not yet introduced it when India devalued the rupee in 1966. Qatar first briefly adopted the Saudi riyal as a temporary measure. Later in 1966, the Qatar and Dubai Currency Board started issuing coins and notes. Qatar started issuing an exclusivelynational currency, the Qatari riyal, on 19 May 1973. The issuing authority was the newly established Qatar Monetary Agency, which was renamed the Qatar Central Bank on 5 August 1993.

Currently the Qatari riyal is pegged to the U.S. dollar at 3.64riyals=US$1. This rate was written into law by Royal Decree No. 34 of 2001 (cited in Qatar Central Bank Annual Report 2001: 40). The degree states that the Qatari riyal shall be pegged to the US dollar at 3.64, and sets upper and lower limits of 3.6415 and 3.6385 riyals. It cancelsRoyal Decree No. 60 of 1975, which stated that the riyal was officially pegged to the International Monetary Fund's Special Drawing Right (SDR).

The current Central Bank Law of Qatar was promulgated in 2006. Though the law does not mention the exchange rate regime of the Qatari riyal, it states in Article 41 that the regime and the exchange rate shall be determined by a law-decree after coordination between the Minister of Finance and the Governor of the Central Bank. Article 24 of Chapter 5 states that the Central Bank shall maintain a foreign balance of assets as currency backing of the currency in circulation, and this balance shall be no less than 100 percent of the currency in circulation. Article 85 of Chapter 12 allows the Central Bank to grant loans and issue liabilities for

financial institutions not exceeding 50 percent of the capital and reserve of the bank (Qatar, Qatar Central Bank Law, No.33, 2006).

Saudi Arabia

Saudi Arabia is the world's largest oil producer and exporter, controlling the world's second-largest oil reserves. It is categorized by the World Bank as a high-income economy with a high human development index. Unlike the other countries surveyed, Saudi Arabia was never a British protectorate. Therefore, use of the Indian rupee was unofficial rather than official before it issued its own currency.

Saudi Arabia's de facto central bank, the Saudi Arabian Monetary Agency (SAMA), was established in 1952. At first little more than a currency issuer, over the years it has developed other common central banking functions, particularly powers of financial regulation.

In June 1986, the riyal started to be officially pegged to the IMF's SDR. In practice, it was pegged to the U.S. dollar at 3.745 riyals = US$1. This rate was made official on 1 January 2003 (SAMA annual report 2003: 87). In 2015, however, the fall of oil prices and a strengthening dollar depreciated the market rate of the riyal to 3.86 per dollar, and the Saudi Arabian Monetary Agency had to use foreign reserves to support the exchange rate.

Though in reality the Saudi riyal is pegged to the U.S. dollar, in Article 2 of the Currency Law the value of Saudi riyal is defined as 0.197482 grams of fine gold, known as the parity rate. Article 6 states that the Saudi Arabia Monetary Agency shall keep full cover in gold and foreign currencies convertible into gold equal to the value of currency it issues, but the exact definition of "currency issued" is not specified. Contrary to the case in Bahrain, Oman, and Qatar, Article 6 of SAMA's charterstates that the Agency shall not make advances to the government or private parties (Saudi Arabia, Currency Law issued by Royal Decree, 1959; Charterof The Saudi Arabian Monetary Agency Issued by Royal Decree, 1957).

United Arab Emirates

The United Arab Emirates, established in December 1971, is a federation of seven emirates. The UAE is a highly developed

economywith a high level of human development and is one of the wealthiest countries in the Middle East, with the seventh-largest oil reserves in the world.

Before 1966, all the emirates in the UAE used the Gulf rupee issued by India. In 1966, in all of the emirates except Abu Dhabi, the Qatar and Dubai riyal had started to circulate, and during this transition away from the Gulf rupee the Saudi riyal was used in the country as well. The UAE dirham was eventually introduced on 19 May 1973.On 28 January 1978, the dirham was officially pegged to the SDR. In practice, it was pegged to the U.S. dollar most of the time. Since 2002 the dirham has been officially pegged to the dollar at 3.6725 dirhams = US$1.

The UAE Currency Board was established on 19 May 1973. It was mandated to manage the currency and the country's gold and foreign exchange reserves, but did not have regulatory authority and was not empowered to manage the UAE's monetary policy. Despite its name, it was not a true currency board. Its minimum ratio of external reserves to the monetary base was 70 percent rather than 100 percent, and it acted as a lender of last resort to commercial banks (see Krus & Schuler 2014: 241-2 for a summary of its differences from a true currency board). On 10 December 1980, Union Law No. 10 was passed, which established the new Central Bank of the UAE, replacing the former Currency Board (United Arab Emirates, Union Law No. 10, 2 August 1980).

By Article 40 of the law, the Central Bank of UAE is allowed to grant interest-free loans to the Government in order to provide liquidity for the Treasury. Article 62 states that the official exchange rate of the UAE dirham shall be defined in a Union Decree issued on the proposal of the Board of Directors and the approval of the Council of Ministers, which means that the peg is not set by the central bank law itself. In Article 74, it is stressed that currency in circulation and demand deposits held with the Bank, together forming the monetary base, shall be covered by net foreign assets, gold coins, and bullions. Their ratio to the monetary base is required to be no less than 70 percent.

To what extent do these monetary systems operate like currency boards?

To repeat, the central banks just surveyed are sometimes thought of as being close to currency boardsbecause of their pegs to the U.S. dollar and their high levels of external reserves. To analyze the extent to which they behave like currency boards, it is useful to first define what characterizes a currency board. An orthodox currency board is a monetary system that has a fixed exchange rate between the local currency and the foreign currency, which is called an anchor currency, andprovides immediate and full convertibility between them. An orthodox board maintains net foreign reserves that are 100 percent or slightly more of its entire monetary base, to provide completely credible backing for the convertibility requirement. It does not lend to the government or hold government deposits, and does not issue interest-bearing securities for purposes of discretionary monetary policy. Some monetary authorities that follow currency board practice in other respects do not keep their foreign reserves slightly above its monetary base. Rather, they do not have an upper limit for it. It is better to call them quasi currency boards to distinguish them from orthodox currency boards (Hanke 2002, especially p. 202). Also, of the five institutions that we study,only Saudi Arabian Monetary Agency satisfies an essential condition of currency board orthodoxy: that the monetary authority not be allowed by law to lend to government or to other financial institutions. Therefore, we must examine to what extent the monetary systems of Saudi Arabia, UAE, Bahrain, Qatar and Oman fit othercriteria of a currency board, and thus determine if they could be classified as currency boards or quasi currency boards.

Criterion 1: Rigid exchange rate

To prepare for potential currency unification, the five countries examined in this paper have officially pegged their currencies to the U.S. dollar, as mentioned above. However, the strength and credibility of the pegs vary among the five countries. The exchange rate pegs have been written intolaw for Bahrain and Oman; for Kuwait, Saudi Arabia, and UAE, the pegs are determined by

central bank decrees. Therefore, Bahrain and Oman provide higher credibility and stability for their exchange rate regimes than the other countries. Nonetheless, all five countries fulfill the first criterion of an orthodox currency board: a rigid exchange rate. All have been officially linked to the dollar since at least 2003 (some were unofficially linked to the dollar, prior to 2003).

Criterion 2: Full convertibility with the anchor currency

The *Annual Report on Exchange Arrangements and Exchange Restrictions* issued by the International Monetary Fund records all the policy restrictions each country's exchange rate regime contains. From 2003 to 2015, the period this paper examines, all five countries had full convertibility with the anchor currency, as they had no capital account restrictions (International Monetary Fund 2003, 2015).

Criterion 3: Foreign reserves completely back monetary base (ratio≥100 percent)

The calculations and graphs in this paper are based on the IMF's International Financial Statistics database, since it attempts to standardize definitions across countries for greater comparability. After comparing IMF data with nationally published statistics on the central bank websites of the five countries, one can easily conclude that there were no substantial discrepancies.

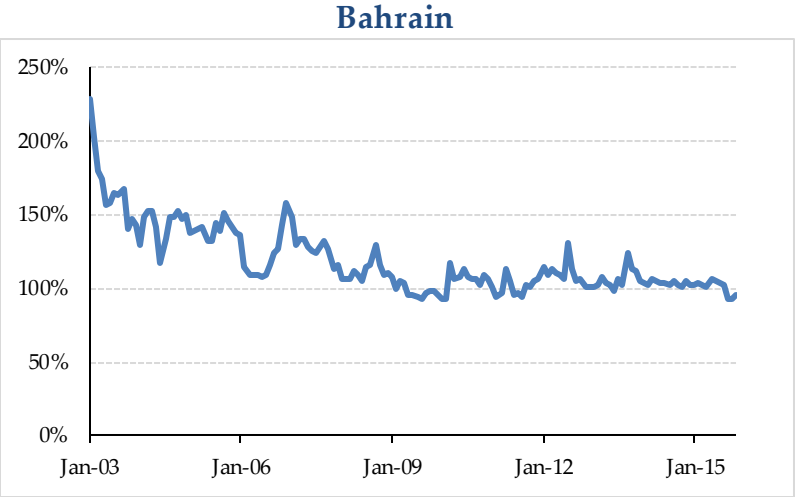

Figure 1. *Bahrain: Net Foreign Assets (% of Monetary Base)*
Sources: IMF International Financial Statistics and calculations

The central bank of Bahrain releases a monthly statistical report on its balance sheet, money supply and other major financial indicators, but the report does not give statistics on the monetary base of the country, or, as it is also called, "reserve money." We use the International Financial Statistics database of the IMF, whose monetary survey on Bahrain is based on Non-Standardized Report Forms (NonSRFs). Since the net foreign asset data in this survey are consistent with those released by the central bank of Bahrain, it is safe to analyze the reserve money (monetary base) statistics in this survey to calculate the net foreign assets/monetary base ratio.

We find that for most of the time since 2003, the ratio was above 100 percent. It started from a high of 240 percent, then fell within three years to somewhere around 100 percent. The ratio fell slightly below 100 percent in 2009Q3, 2011Q1 and 2015Q3, which may be the results of normal monetary fluctuations. We will examine more data later to see if Bahrain meets other criteria for a currency board.

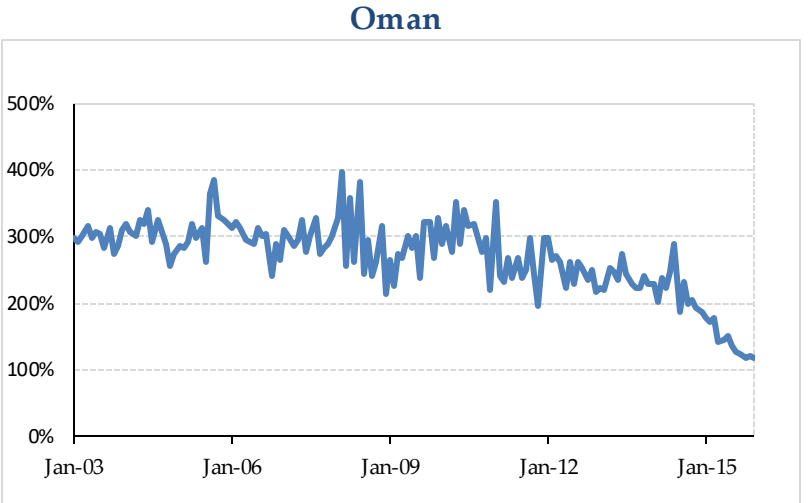

Figure 2. *Oman: Net Foreign Assets (% of Monetary Base)*
Sources: International Financial Statistics and calculations

Oman has had far larger reserves than an orthodox currency board needs to have until the last year or so. An orthodox currency board does not hold foreign reserves beyond 110 or 115 percent of the monetary base because doing so would enable it to conduct discretionary monetary policy with the excess reserves. However, for Oman and other countries where foreign reserves far exceed 100 percent, it is prudent to reserve judgment on the question of how close the monetary systems are to currency boards until other measure of performance are considered. This is because an upper limit of foreign reserves is sometimes not regarded as an essential condition for currency board orthodoxy.

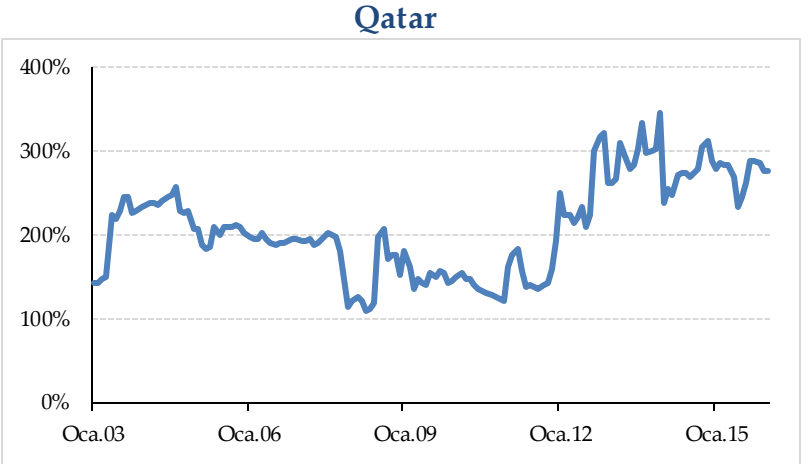

Figure 3. *Qatar: Net Foreign Assets (% of Monetary Base)*
Sources: International Financial Statistics and calculations

In the case of Qatar, the ratio of net foreign assets exhibits a more irregular pattern than in either Oman or Bahrain, yet foreign reserves always provide completely credible backing for the convertibility requirement since the ratio is always above 100 percent. The ratio is higher than 150 percent on most occasions since 2003.

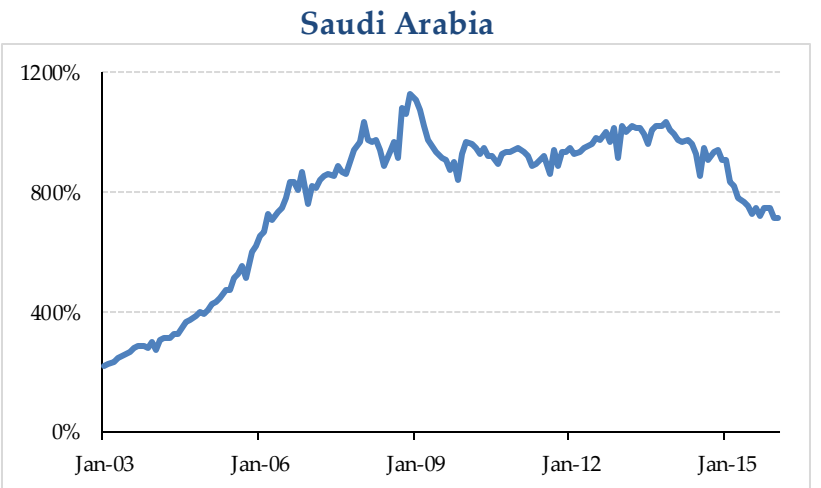

Figure 4. *Saudi Arabia: Net Foreign Assets (% of Monetary Base)*
Sources: International Financial Statistics and calculations

The net foreign assets of Saudi Arabia have long been more than its monetary base, and experienced significant growth from 2003 to 2008, reaching a peak figure of roughly 1100 percent. In other words, net foreign assets were 11 times Saudi Arabia's monetary base at that moment. Since 2009, the ratio has moderately declined to around 700 percent, still markedly higher than the requirement for an orthodox currency board.

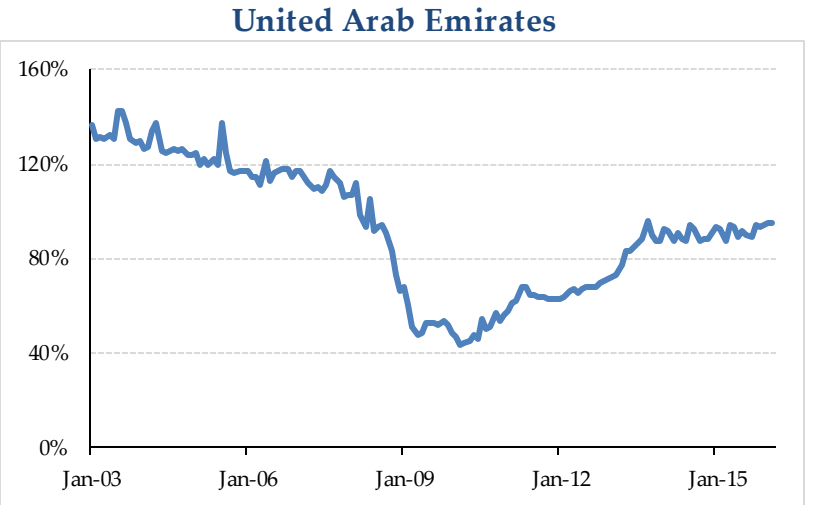

Figure 5. *UAE: Net Foreign Assets (% of Monetary Base)*
Sources: International Financial Statistics and calculations

Net foreign assets as a percentage of UAE's monetary base decreased from roughly 140 percent, meaning that the net foreign assets were 1.4 times the monetary base, to less than 50 percent from 2003 to 2009. This ratio rose back to around 90 percent in 2013, hovering aroundthat level for three years. Although the UAE has a pegged exchange rate, its monetary system does not meet the 100 percent external reserve criterion of an orthodox currency board except for two periods: 2003 to 2008 and 2013 until the writing of this report in late June 2016. Again, it is prudent to reservejudgment on how close the monetary system of UAEis to a currency board until other criteria havebeen considered.

In summary, four out of the five countrieswe survey meet the net foreign assetratio criterion of a currency board, while UAE

meets this criterion from 2003 to 2008 and from 2013 until June 2016. Further tests are needed to determine if the other four countries meet other criteria for a currency board during the period 2003 to 2015.

A further criterion: Year-over-year reserve pass-through ratio (percent)

A fixed exchange rate and a 100 percent foreign reserve ratio imply a further criterion of currency board orthodoxy. Year-over-year reserve pass-through, which measures the annual change in the monetary base as a percentage of the annual change in net foreign assets, should typically stay between 80 percent and 120 percentfor an orthodox currency board (Hanke 2008: 57), because any change in the monetary base must be accompanied by a change in the foreign reserves in order to maintain the aforementioned full backing. In practice, the accurate measurement of reserve pass-through may be clouded by capital gains or losses on the monetary authority's assets and by irregular variations in income and expenses. With these cautions in mind, let us examine the figures.

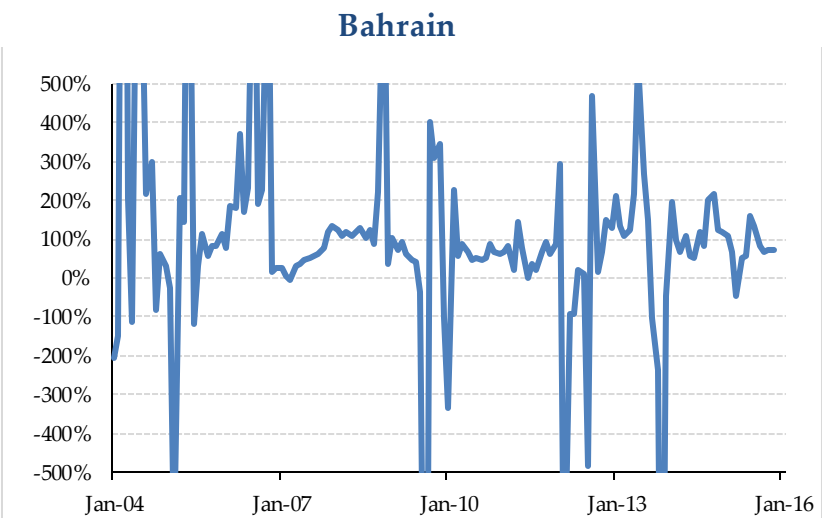

Figure 6. *Bahrain: Year-over-Year Reserve Pass-Through Ratio (%) (80-120% = Currency Board Orthodoxy)*
Sources: International Financial Statistics and calculations

Bahrain's reserve pass-through ratio has varied substantially since January 2004. It has rarelybeen close to 100 percent. The pattern of the pass-through ratio suggests the absence of currency board orthodoxy.

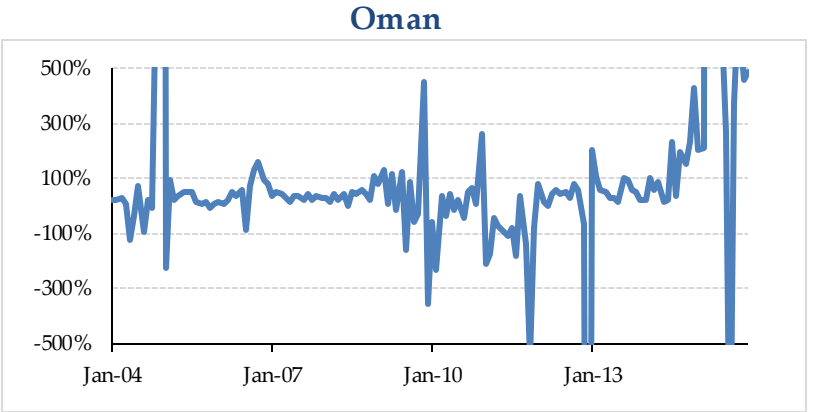

Figure 7. *Oman: Year-over-Year Reserve Pass-through Ratio (%) (80% - 120%= Currency Board Orthodoxy)*
Sources: International Financial Statistics and calculations

The reserve pass-through ratio of Oman was relatively stable from 2005 to early 2008. Since then, it experienced several dramatic upturns and downturns. It does not fulfill the reserve pass-through ratio requirement of currency board orthodoxy.

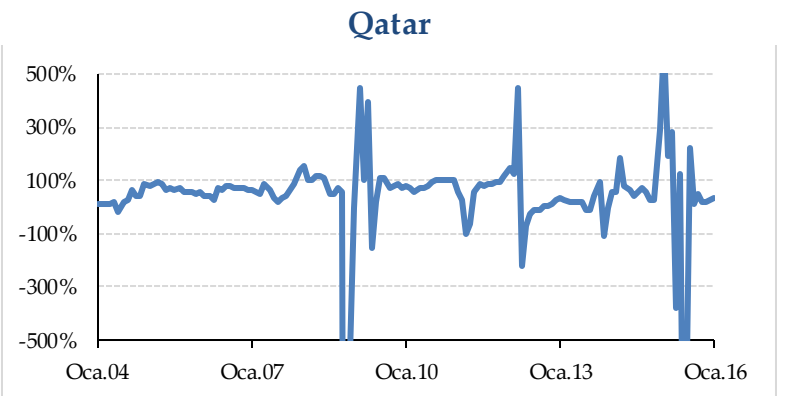

Figure 8. *Qatar: Year-over-Year Reserve Pass-through Ratio (%) (80% - 120%= Currency Board Orthodoxy)*
Sources: International Financial Statistics and calculations

From January 2004, the ratio only hovered around 100 percent from 2005 to early 2008 and from later 2009 to later 2010. The ratio went up and down substantially in all other quarters. Therefore, Qatar's monetary system does not satisfy the reserve pass-through ratio requirement for currency board orthodoxy as well, except for the aforementioned short periods of time.

Saudi Arabia

The reserve pass-through ratio was rather stable from 2004 to 2010 compared to the ratio for the other countries examined above. In early 2010 there was a large surge in the graph as the ratio's value exceeded 250 percent. A smaller surge occurred in early 2015, when the ratio value passed 100 percent and then dropped to -100 percent. Except for this, the ratio has been stablearound 10 to 20 percent. Consequently, the reserve pass-through ratio is not between 80 and 120 percent, preventing Saudi Arabia from meeting the criteria of a currency board.

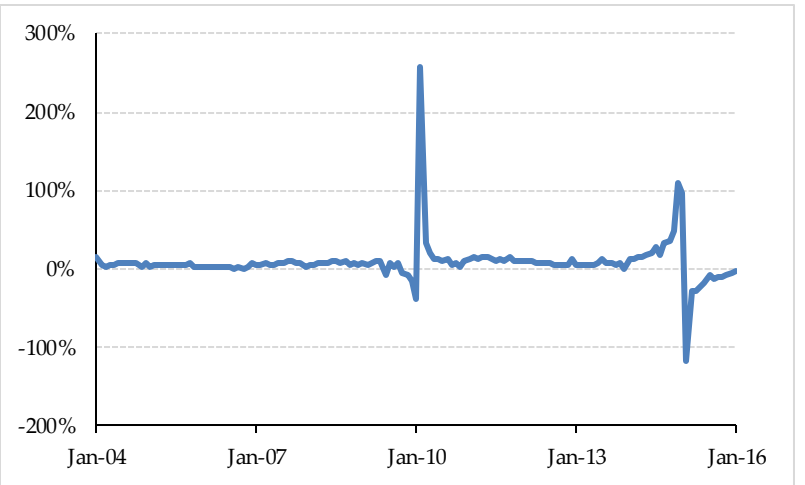

Figure 9. *Saudi Arabia: Year-Over-Year Reserve Pass-Through Ratio (%) (80% - 120%= Currency Board Orthodoxy)*
Sources: International Financial Statistics and calculations

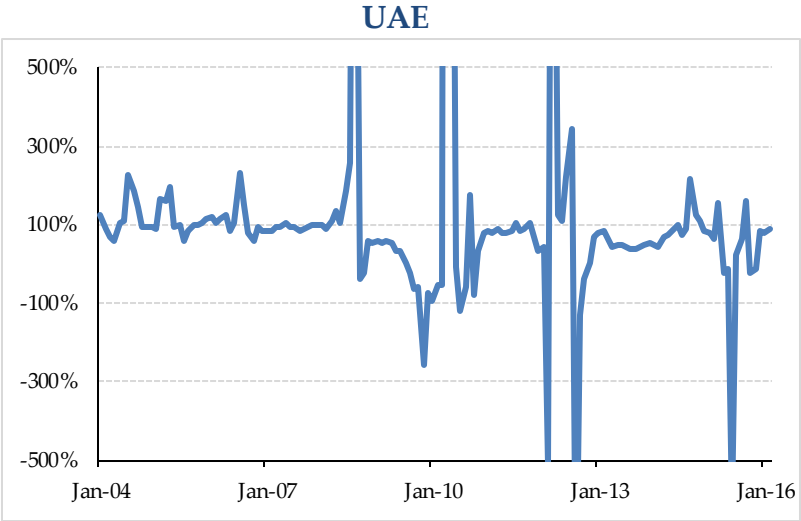

Figure 10. *UAE: Year-Over-Year Reserve Pass-Through Ratio (%)(80% - 120% = Currency Board Orthodoxy)*
Sources: International Financial Statistics and calculations

Recall that only from 2003 to 2008 and 2013 onward was the UAE's system close to a currency board based on the reserve ratio criterion. In examining the pass-through ratio in these two periods, it is evident that the ratio hasn't hovered between the 80 and 120 percent benchmarks. Therefore, the UAE does not meet the reserve pass-through criterion for a currency board.

The reserve pass-through ratio analysis further suggests that none of the five countries has an orthodox currency board system. Still, they may possess some characteristics of a currency board and their systems may be considered as quasi currency boards, so a further measure of orthodoxy must be considered.

Digging deeper: Changes in the monetary base and net foreign assets

The graphs below show the underlying changes in the monetary base and net foreign assets, as opposed to the ratio of change in one to change in the other.

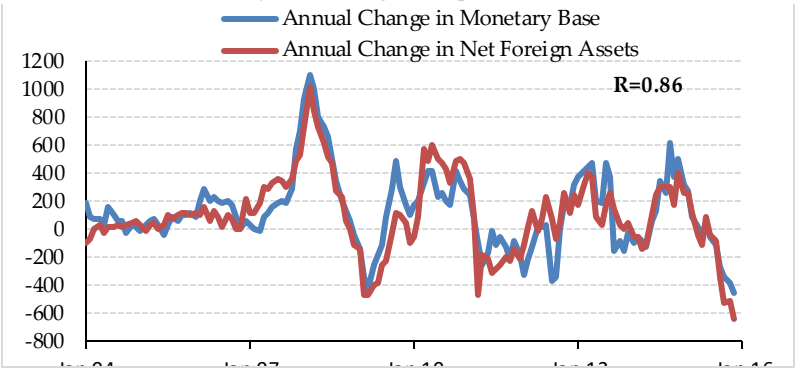

Figure 11. *Bahrain: Annual Change in Monetary Base & Net Foreign Assets (mn BHD)*

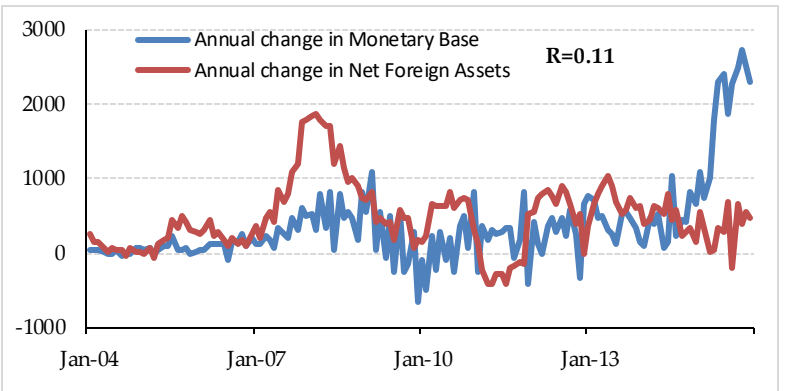

Figure 12. *Oman: Annual Change in Monetary Base & Net Foreign Assets (mn OMR)*

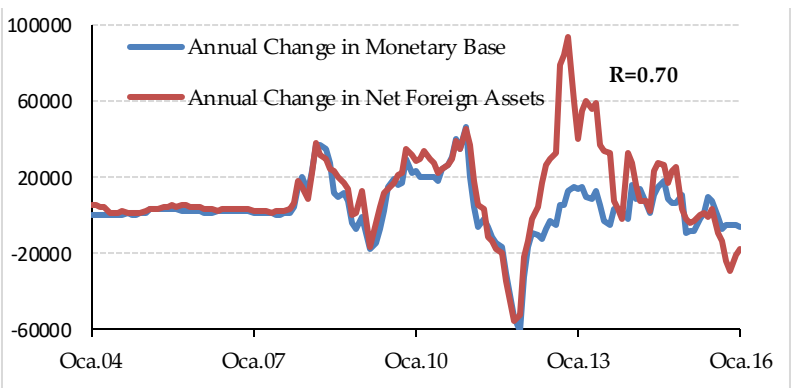

Figure 13. *Annual Change in Monetary Base & Net Foreign Assets (mn QAR)*

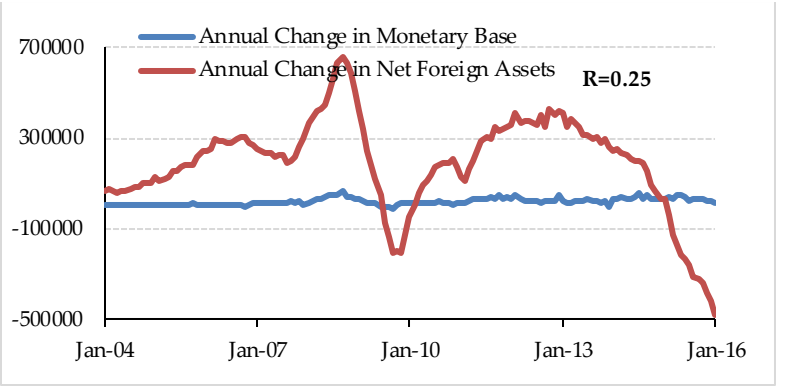

Figure 14. *Saudi Arabia: Annual Change in Monetary Base & Net Foreign Assets (mn SAR)*

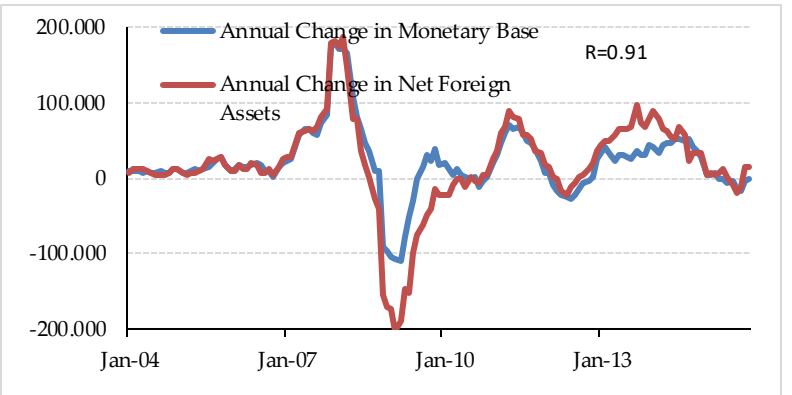

Figure 14. *UAE: Annual Changes in Monetary Base & Net Foreign Assets (mn AED)*

Sources: International Financial Statistics and calculations

These graphs may clarify the reason why the reserve pass-through ratio behaved in such a volatile way for all the five countries. One cannot ignore that, excluding some significant divergences, it is evident that net foreign assetsand the monetary base are moderately correlated, especially in the case of Bahrain, Qatar and UAE. In Qatar, foreign reserves have been tracking the monetary base tightly for more than a decade except for the period from 2012 to 2014, when annual change in foreign reserves surpassed annual change in monetary base by far. More interestingly, during the same period of time UAE also experienced a surge in foreign assets, as could be evidenced by its

graph. The correlation coefficient of these two variables, denoted "R" in the graphs, has been calculated for each country. UAE, Bahrain and Qatar have much higher coefficient figures, 0.91, 0.86 and 0.70 respectively, demonstrating a higher level of correlation between their monetary base and net foreign assets.

It should be noted that Saudi Arabia's graph is completely different from all the others in the sense that it has a much higher level of foreign reserves compared to the monetary base. This is the result of the government accumulating savings over the years. The foreign reserves have been decreasing since 2015, as oil prices have dived, and it is likely that the country used its foreign reserves to support its currency in 2015. One-year dollar/Saudi riyal forwards jumped as high as 305 points, its highest level since March 2003, because of the oil price slumpand the forecast that the U.S. interest rate would rise in the near future (Reuters, 2015).

Conclusion

This chapter examined five countries in the Gulf Cooperation Council—Bahrain, Oman, Qatar, Saudi Arabia and the United Arab Emirates—and evaluated the similarities between their monetary systems and an orthodox currency board. Several tests that measure currency board orthodoxy were applied to the five countries - the table summarizesthe results.

Country	Rigid exchange rate by law	Rigid exchange rate de facto	Full convertibility	Minimum foreign reserve ratio by law	Foreign reserves / monetary base >100%	Foreign reserves / monetary basenot greatly >100%	Reserve pass-through ratio ≈ 100%	Monetary authority not allowed by law to lend
Bahrain	Y	Y	Y	Y	Y	Y	N	N
Oman	Y	Y	Y	N	Y	N	N	N
Qatar	N	Y	Y	Y	Y	N	N	N
Saudi Arabia	N	Y	Y	N	Y	N	N	Y
UAE	N	Y	Y	Y	N	N	N	N

Though only Bahrain and Oman have central bank laws that specify rigid exchange rates, UAE and Qatar have Union or Royal Decrees that specify the exchange rates and more importantly, all five countries have rigid exchanges rate de facto against the U.S. dollar. Except for UAE, the remaining countries have foreign

reserves consistently equal to or exceeding the monetary base. However, none of the five countries fulfilled the pass-through ratio criterion and, with exception of the UAE, all are allowed to lend. Consequently, none of the monetary authorities demonstrate all the characteristics of an orthodox currency board, though they have some characteristics of quasi currency boards. The country that most closely resembles an orthodox currency board system is Bahrain, which fulfills six out of the eightrequirements for currency board orthodoxy listed in the table above. The United Arab Emirates, satisfying only three out of eight requirements, has the least currency board-like system among the five countries.

Appendix

Appendix 1. Spreadsheet workbook

The accompanying spreadsheet workbook contains all the data [for source], calculations, and graphs that were used in this chapter.

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4 Remembrances of a currency reformer: Some notes and sketches from the field

Steve H. **Hanke**

Introduction

What follows is a short sketch of some of my currency reform activities – brief notes from the field. For each country, I have included my positions, a brief commentary about my involvement, and citations for the key documents that contain my proposals and reform blueprints. For the most part, I have excluded references to my works that have appeared after a currency reform was adopted. In consequence, many of my articles and books are not included – the list for excluded Argentine articles, for example, exceeds 150 items. Many of my supplemental works can be found at The Johns Hopkins Institute for Applied Economics, Global Health, and the Study of Business Enterprise website and the Cato Institute website.

There have been 21 countries in which I have either anticipated or stopped hyperinflation: Argentina, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Republika Srpska, Russia, Tajikistan, Turkmenistan, Ukraine, Uzbekistan, Yugoslavia, and Zimbabwe. The 21 countries account for 29 of the 56 episodes of hyperinflation. Episodes in which I anticipated but

played no active role in stopping the hyperinflation do not warrant mention in this commentary and are thus omitted. For the documentation of the world's 56 hyperinflations, see: Hanke and Krus, "World Hyperinflations" (Hanke, Steve H. and Nicholas Krus. "World Hyperinflations", in: Randall Parker and Robert Whaples (eds.) The Handbook of Major Events in Economic History, London, UK: Routledge, 2013.)

To throw some light on what follows, allow me to mention five principles or rules that have influenced my research and reform activities.

1. The 95% Rule – My work in the currency reform field confirms an assertion I first heard the late Prof. Armen Alchian make during a lecture at the University of Virginia in the summer of 1967: 95% of the material in economics journals is either wrong or irrelevant. Accordingly, to be right and relevant, you have to think most things through by yourself.

2. The Plumbing Principle – To develop effective reforms, the late Lord Peter Bauer was fond of counseling me to avoid a curse that afflicts most economists: to float above the detail. I have taken his advice to heart. In consequence, my reform blueprints contain the details and institutional plumbing required to establish and operate new monetary regimes.

3. The Repetition Rule – At the 1997 Forbes CEO Forum in Los Angeles, the late Prof. Peter Drucker reminded me that the hallmark of great salesmanship is repetition enhanced by incremental product improvement. I have attempted to follow his wise counsel.

4. The Patience Principle – Over many enjoyable summer holidays at Palazzo Mundell in Tuscany, I learned an important principle from Nobelist Robert Mundell: the patience principle. Simply stated, a reformer must develop and circulate his ideas, but have the patience to refrain from striking until the iron is hot, namely in times of crisis and stress.

5. The Numero Uno Rule – If possible, listen carefully to counsel from a trusted advisor who is cultured and wise to the ways and art of statecraft. For me, following this rule has been both possible and pleasurable. I have relentlessly relied on sage counsel from Mrs. Hanke, or as Americans would say: my wife,

Liliane. An initial piece of advice has proven invaluable and merits mention: to retain my independence, as well as my speed and freedom of maneuver, Mrs. Hanke has advised me to conduct my affairs in the currency reform field on a *pro bono* basis, not as a paid consultant.

Successful reforms

Argentina's Convertibility System (Installed April 1, 1991)

A. Position – During the 1989-91 period, I worked closely with Congressman José María Ibarbia and his colleagues (the so-called Alsogaray faction) in the Argentine Congress to develop a blueprint for a currency board system (CBS). This blueprint – which was published in Buenos Aires as a book I co-authored with Dr. Kurt Schuler – was debated in congress and presented to President Carlos Menem. President Menem eventually implemented a convertibility system (a modified currency board system) in early 1991. I operated as an informal advisor to President Menem during the 1989-1999 period. During this decade, Mrs. Hanke and I met frequently with Menem. Some of Menem's views were published in *Forbes* magazine after an interview Mrs. Hanke and I conducted with Menem in the Casa Rosada in September 1995. In 1995, I also accepted a formal appointment as an advisor to Domingo Cavallo, the Minister of Economy, a post I held until Cavallo resigned in 1996.

B. Comment – The convertibility system accomplished what it was designed to do: put an immediate halt to Argentina's hyperinflation. However, the Convertibility Law allowed for major deviations from the currency board orthodoxy contained in my original blueprint. In late 1991, I expressed my concerns about the flaws in the convertibility system and predicted that the system would eventually encounter problems (Steve H. Hanke, "Argentina Should Abolish its Central Bank," *The Wall Street Journal*, October 25, 1991). As time passed, my critiques became more pointed – as can be seen in my paper, *Why Argentina did not have a Currency Board* – but these critiques were to no avail. In December 2001, Argentina suspended its debt payments and

trading of the peso. On January 6, 2002, Argentina abandoned the convertibility system and the Argentine peso was devalued.

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Estonia's Currency Board System (Installed June 20-24, 1992)

A. Position – I did not have an official position in Estonia. Nevertheless, I was able to accomplish a great deal in a short period of time. This result was obtained thanks to my collaborators (both inside and outside Estonia) and the unusual circumstances that faced Estonia in the early days of its newfound independence.

B. Comment – In the fall of 1991, Prof. Lars Jonung of the Stockholm School of Economics telephoned to inform me that there was an opportunity to put my currency board research and experience to use in Estonia. Following that initial conversation, we decided to develop a blueprint for an Estonian currency board. Dr. Kurt Schuler, who was a post-doctoral fellow at the Johns Hopkins University (1991-96), collaborated with us on this project. It resulted in a book published simultaneously in English and Estonian.

In March 1992, Prof. Jonung became the Chief Economic Advisor to the Prime Minister of Sweden, Carl Bildt. Prime Minister Bildt embraced the idea of a currency board for Estonia. On May 5, 1992, Mrs. Hanke and I travelled to Tallinn, where I presented our currency board blueprint to the members of

Estonia's Constituent Assembly. Little more than a month later, the Estonian CBS was up and running. Estonia illustrates how much can be accomplished in a short period of time.

Why was the CBS adopted so rapidly? The answer to this question became clear to me during my May 1992 meetings with the chairman of the Supreme Soviet of the Republic of Estonia, Arnold Rüütel, Prime Minister Tiit Vähi and other Estonian notables. These meetings were arranged and attended by my good friend from Caracas, Venezuela (an ex-pat from Estonia), the late Harry Mannil. The Estonian leadership thought (correctly, in my view) that a CBS would allow Estonia to reestablish monetary sovereignty with a strong, rule-bound currency regime – one that would allow for a safe, rapid Estonian exit from the ruble zone. This fact, more than anything else, provided the motivation for a rapid adoption of the Estonian CBS.

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Lithuania's Currency Board System (Installed April 1, 1994)

A. Position – I served as State Counselor on Monetary and Financial Issues, a position that carried Cabinet rank, for the Republic of Lithuania (1994-96), where I drafted the CBS law and assisted in installing the CBS.

B. Comment – Prime Minister Adolfas Šleževičius visited Estonia in 1993, was impressed by Estonia's CBS, and inquired as to who was the CBS's architect. As a result, he contacted me in Paris and invited Mrs. Hanke and me for a private lunch in Vilnius on January 26, 1994. Before the dessert was served, the Prime Minister had decided that Lithuania would install a CBS and that I

would serve as State Counselor. This rapid decision was based, in part, on the impressive performance of Estonia's CBS. In addition, Prime Minister Šleževičius was convinced that a rule-based CBS would put the Bank of Lithuania on a short leash and impose a hard budget constraint on the Lithuanian parliament.

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Bulgaria's Currency Board System (Installed July 1, 1997)

A. Position – I served as an advisor to the President of the Republic of Bulgaria (1997-2001), where I assisted in drafting the CBS law and installing the CBS.

B. Comment – My experience in Bulgaria illustrates the virtue of patience. In 1990, Mrs. Hanke and I traveled to Sofia. Our objective was to present the CBS idea to Bulgarian officials, intellectuals, and the general public. After our initial trip, we concluded that Bulgarian economists had never heard the words "currency board" and had no idea how such a monetary regime would work. In consequence, I developed a blueprint for a Bulgarian CBS.

Armed with that book, Mrs. Hanke and I made several visits to Bulgaria after its publication in 1991. Even though the CBS generated genuine interest in certain circles, the official response was negative. The oft-repeated refrain of the former Governor of the Bulgarian National Bank, Prof. Todor Valchev, was typical of government officials: thank you for your interest in Bulgaria and your proposal, but we know the realities of the local situation and have everything under control.

Once hyperinflation broke out in 1996, that refrain rang hollow and things began to change rapidly. In December 1997, the

Bulgarian Ambassador to the U.S. requested that I present my CBS ideas in Washington, D.C. In the same month, a pirated version of a book Dr. Kurt Schuler and I had co-authored in English was translated into Bulgarian and reached the top of the best-seller list in Sofia. In late February, Mrs. Hanke and I traveled to Sofia and President Petar Stoyanov invited me to become his advisor, to draft a CBS law for Bulgaria, and to explain to Bulgarian politicians and the public how such a system would halt hyperinflation.

The CBS was installed on July 1, 1997. Inflation and interest rates plunged immediately. I can recall the genuine pleasure (perhaps relief, too) President Stoyanov displayed when he congratulated me on the outstanding results produced during the first few months of the CBS. It was then that he confessed that he had hoped the CBS would kill inflation, but that he had reservations and was amazed when the CBS worked even more rapidly than I had predicted. Much later, President Stoyanov confided to Mrs. Hanke and me during one of our regular meetings that, without the stability created by the CBS, Bulgaria would have had much more difficulty entering the North Atlantic Treaty Organization (NATO) in 2004 and the European Union in 2007.

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Bosnia and Herzegovina's Currency Board System (Installed August 11, 1997)

A. Position – I served as special advisor to the U.S. Government in December 1996. The Dayton/Paris Peace Agreement (November 21, 1995) mandated that Bosnia and Herzegovina employ a CBS for at least six years. My assignment was to make certain that the new CBS law, which was being written by local government officials and staff members from the International Monetary Fund, was as orthodox as possible.

B. Comment – The most memorable part of the CBS episode was the flight Mrs. Hanke and I had from Zagreb to Sarajevo on December 11, 1996. We were packed with NATO-IFOR Troops into a very noisy Dutch military transport. This was the only safe means of passage into the war-torn city of Sarajevo.

During our stay in Bosnia and Herzegovina, we had heavy security, particularly when we traveled to Pale for meetings with officials from the Serb Republic. Those meetings with the Serbs struck me because the Serbs were quite fluent with my CBS ideas. The Serbs indicated that they had studied a book I had co-authored with Dr. Kurt Schuler. That book had been translated into Serbo-Croatian and published by the Ekonomski Institute Beograd in 1991.

I discovered another surprising connection to that book during a lunch with Mrs. Hanke, and other notables at the Grand Hyatt hotel in Hong Kong on March 27, 1998. In discussing the Dayton/Paris Peace Agreement with the late Ambassador Richard Holbrooke, he recounted how easy it was to deal with the late Slobodan Milosevic (head of the delegation representing the Federal Republic of Yugoslavia in Dayton) when it came to the issue of a new monetary system for Bosnia and Herzegovina. It turns out that Milosevic was familiar with my book in Serbo-Croatian and my CBS ideas because I had served as an advisor to the Deputy Prime Minister of the Socialist Federal Republic of Yugoslavia in the 1990-June 1991 period.

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Montenegro's adoption of the German Mark (Adopted November 2, 1999)

A. Position - I served as a State Counselor, a position that carried Cabinet rank, and Advisor to the President of the Republic of Montenegro (1999-2003), where I determined that the replacement of the Yugoslav dinar with the German mark was both feasible and desirable and where I developed the architecture for the official introduction of the German mark as legal tender in Montenegro.

B. Comment - During the summer and fall of 1999, I assisted President Milo Djukanovic in formulating an economic strategy designed to create the conditions for Montenegro to become a fully independent republic. (Independence was formally finalized by referendum on May 21, 2006.) Much of the basis for my early work with President Djukanovic was laid out in a book that I co-authored with Dr. Zeljko Bogetic, a Montenegrin who, at the time, was an economist at the International Monetary Fund in Washington, D.C.

In 1999, Montenegro was still part of the Federal Republic of Yugoslavia, along with Serbia. Strongman Slobodan Milosevic was the President of Yugoslavia and had control of the Yugoslav army. On November 2, 1999, President Djukanovic made a daring and decisive move that would set Montenegro on a course towards independence: Montenegro granted the mighty German mark legal tender status. This all but eliminated the hapless Yugoslav dinar from circulation in Montenegro. It also infuriated President Milosevic. Although he refrained from unleashing the Yugoslav

army on Montenegro, he was reported to have given serious consideration to the idea.

President Milosevic's operatives did engage in a great deal of mischief, however. For one thing, I became a marked man. The Yugoslav Information Minister, Goran Matic, produced a steady stream of bizarre stories about my alleged activities. These were disseminated via the Yugoslav state news agency, Tanjug. Among other allegations, I was accused of being the leader of a smuggling ring that was destabilizing the Serbian economy by flooding it with counterfeit Yugoslav dinars. The most spectacular accusation, however, was that I was a French secret agent who controlled a hit-team code-named "Pauk" ("Spider") and that this five-man team's mission was to assassinate President Milosevic. In addition to this comedy of the absurd, there was a serious side. I knew this was the case because, although we were kept in the dark about the specific nature of the threat, Mrs. Hanke and I were always supplied with proper security from the President's office when we traveled to Podgorica—a difficult destination that often required a flight from Zagreb to Dubrovnik, Croatia and then a long, but beautiful, trip through the mountains of Montenegro.

In any case, the adoption of the German mark was Montenegro's first secession step – a step that was eventually supported by the United States and its allies. On November 4, 1999, I, with the help of Senators Steve Symms and Trent Lott, arranged a meeting at the U.S. Capitol in which Djukanovic and I made a case for Montenegro's currency reform. The members of congress in attendance – Trent Lott, Steve Symms, Richard Lugar, John Warner, Harry Reid, Larry Craig, Kay Bailey Hutchison, among others – warmly received our message. The United States ended up supporting Montenegro's currency reform.

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Ecuador's adoption of the U.S. Dollar (Adopted March 13, 2000)

A. Position – Although I did not have an official position in Ecuador when they adopted the dollar, I had been very involved in the country's currency reform debate since 1996 and was later appointed as an advisor to assist in Ecuador's dollarization.

B. Comment – I first became involved in Ecuador's currency reform debate in May 1996, when I visited Guayaquil. At that time, Abdalá Bucaram was a candidate for the Presidency. After my visit, he became intrigued with the CBS idea. Although he won the election, he only served as President from August 1996 until February 1997.

The currency reform idea appeared again in 1999. The value of Ecuador's currency, the sucre, plummeted, losing 75 percent of its value against the U.S. dollar from the start of 1999 until the first week of January 2000. As a result, President Jamil Mahuad announced on January 9, 2000 that Ecuador would abandon the sucre and officially adopt the U.S. dollar. At that time, I was not serving in any official capacity. I accepted a formal appointment as an advisor to Carlos Julio Emanuel, the Minister of Economy and Finance of the Republic of Ecuador, in 2002.

Ecuador's dollarization is an outstanding example of "The 95% Rule" in action. At least 95% of what was written about the feasibility and prospects for dollarization was either wrong or irrelevant. The International Monetary Fund, the Banco Central del Ecuador, leading investment banks, and economic commentators — including Prof. Paul Krugman — all warned that dollarization would be a disaster. How wrong they were. After Ecuador officially adopted the dollar, economic indicators immediately switched from negative to positive.

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Other reform attempts

Yugoslavia (1990-91)

A. Position – I served as the Personal Economic Advisor to the Deputy Prime Minister of the Socialist Federal Republic of Yugoslavia from 1990 until June 1991, when the civil war broke out.

B. Comment – I first met Deputy Prime Minister Zivko Pregl in late 1989 at a dinner in Vienna, Austria. The dinner, which Mrs. Hanke and I attended, was arranged by our good friend, the late-great Daniel Swarovski from Wattens, Tyrol. The day following our most pleasurable dinner, Pregl – the person responsible for developing economic reforms for the Yugoslav government led by the late Ante Marković – requested a meeting. We discussed his reform ideas and he invited me to become his advisor. I indicated that I had reservations because I was a classical liberal, free-market economist and he was a leader of the Communist League of Yugoslavia. Pregl then surprised me when he said my qualifications were exactly why he invited me to be his advisor. He asserted that he wanted to implement free-market reforms and didn't want watered-down advice. Pregl persisted and, after I learned that he had a hand in the dissolution of the Communist League of Yugoslavia in January 1990 and was committed to real free-market reforms, I agreed to become his advisor.

I concluded that my first task should be the development of policies to stamp out Yugoslavia's inflation. After all, stability might not be everything, but everything is nothing without stability. I set out to design a CBS that would rid Yugoslavia of its endemic inflation problems. From 1971-91, Yugoslavia's annualized rate of inflation was 76 percent; only Zaire and Brazil recorded higher inflation rates during that period.

The Ekonomski Institute Beograd, a research institute that was headed by our good friend, Danko Djunic, published my blueprint as an attractive book in the Serbo-Croatian language. The book was also published in an English edition by the Centre for Research into Communist Economies, a London-based organization that was headed by a Yugoslav (Slovenian) expatriate, and another good friend, Prof. Ljubo Sirc. Mrs. Hanke and I spent a great deal of our time in 1990-91 in Belgrade, where we were in residence at the Intercontinental Hotel. We traveled extensively throughout Yugoslavia, educating the public about the virtues of sound money and the benefits of adopting a CBS. We attracted many supporters, but in June 1991, Yugoslavia's civil war began and currency reform was pushed to the sidelines.

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Albania (1991-92)

A. Position – I served as a Special Adviser on Currency Reform to the Deputy Prime Minister and Minister of the Economy (1991-92).

B. Comment – I had high hopes for an Albanian CBS. After all, the Deputy Prime Minister and Minster of Economy, the late Gramoz Pashko, was a trained economist and supported the CBS idea. Unfortunately, he was hopelessly disorganized and an ineffective advocate. I can recall the first time I entered his office in Tirana. He stood to greet me; a photo of Mother Teresa was on the wall behind him and a revolver was strapped to his belt. After that encounter, nothing struck me as strange in what, at the time, was a strange and beautiful country.

There were virtually no automobiles in Albania then. Fortunately, Mrs. Hanke and I had a driver and one of the few old Mercedes in the government fleet at our disposal. The government shut down early each afternoon. We took advantage of that custom to travel from Tirana to Durrës for a dip in the Adriatic. These trips were most enjoyable. Mrs. Hanke communicated with our driver via his daughter, who had studied French, but had never met anyone from France, let alone Paris. We had our pick of the beaches south of Durrës simply because there were absolutely no other bathers. Indeed, there were no other people – not even a cat or dog.

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Russia (1991-99)

A. Position – Although I was very much a part of the currency debates in Russia for most of the 1990's, I did not hold an official position.

B. Comment – Over an extended period of time, the CBS idea circulated in Russia, moving in cycles from hot to cold. Two of the first Russian politicians I discussed the CBS idea with were Sergei Krasavchenko, the Chairman of the Committee on Economic Reform and Ownership of the Russian Duma, and Vladimir Shumeyko, the Deputy Chairman of the Committee on Economic Reform and Ownership of the Russian Duma. He, and a delegation of ten Russian parliamentarians, paid me a visit at The Johns Hopkins University in Baltimore, where I conducted a one-day briefing on currency boards on one hot June day in 1991.

My next meeting with a delegation from Russia took place in Paris at a meeting Mrs. Hanke and I helped arrange in early November 1991. It lasted several days and was eventful. As the leader of the Russian delegation, Academician Dmitri S. Lvov opened the meetings with a press conference. By the time our meetings had concluded, there had been a coup. Dr. Yegor Gaidar, not Academician Lvov, held forth as the Russian's leader at the final press conference. Mrs. Hanke and I immediately knew something significant had happened in Paris. Sure enough, shortly after he returned to Moscow, Dr. Gaidar was appointed to his first major post, Minister of Economy and Finance, on November 11, 1991. For me, this was relevant because I was a member of the Scientific Advisory Council of the International Centre for Research into Economic Transformation (ICRET), a think tank that Dr. Gaidar had founded.

In 1992, I spent a considerable amount of time advocating for a Russian currency board. To that end, I met with the Mayor of St. Petersburg, an influential advocate of economic reforms, the late Anatoly Sobchak, during an early May 1992 visit to St. Petersburg. It was at a reception following our meetings that Mrs. Hanke and I met Vladimir Putin, who was one of Sobchak's advisers at the time.

Following our St. Petersburg trip, the late Jean-Bernard Raimond, former Ambassador from France to the Soviet Union, commissioned a private jet, and in late June 1992, we, along with Madame Raimond and Mrs. Hanke, departed from the Le Bourget Airport in Paris for a few days in Moscow. I thought things looked very promising when we met the newly installed Acting Prime

Minister Yegor Gaidar during that trip. Indeed, the evening in which Gaidar, Mrs. Hanke, and our friends from Paris christened the new brasserie at the Hotel Metropol, things couldn't have looked better.

During 1992, I also spent a great deal of time trying to beat back CBS objections coming from certain elements of the IMF's management. Their argument was, in short, that the IMF couldn't approve a Russian CBS because the U.S. Congress would be opposed to it. To ridicule this absurd anti-CBS argument, I worked with the leader of the U.S. Senate, Bob Dole, and Senators Steve Symms and Phil Gramm to draft U.S. legislation that would allow countries to use part of the U.S.'s quota contribution to the IMF for the establishment of currency boards. This legislation, (HR-5368, Law no. 102-391), was signed into law on October 6, 1992.

But, by then, the CBS idea had cooled down in Russia. It didn't heat up again until the ruble collapsed in 1998, as I had predicted it would. In the middle of the crisis (August 1998), IMF Managing Director Michel Camdessus rushed off to the Crimea for a meeting with the Prime Minister-designate, the late Viktor Chernomyrdin. It was then that Mr. Camdessus informed the Russian delegation that the IMF would back a Russian CBS. The CBS idea got hot again. But the type of discipline associated with a CBS wasn't agreeable to Moscow's power brokers, and the idea cooled down once again.

I made my last attempt to employ "The Repetition Rule" in March 1999, when Mrs. Hanke and I spent a weekend with Chernomyrdin at the Chateau de Divonne in Divonne-les-Bains, France. At that time, Chernomyrdin was not part of the government, but was serving as chairman of the Council of Directors of Gazprom. So, he still had plenty of clout. In any case, my arguments clearly did not carry the day, and I reluctantly concluded that, unless the state of affairs dramatically changed, the prospects for a Russian CBS were not worth pursuing any further.

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Kazakhstan (1994)

A. Position – I served as an Advisor to President Nursultan Nazarbayev (1994).

B. Comment – This episode began and ended in curious ways. It began on September 13, 1994, when I traveled from Paris to Vilnius, Lithuania for what I thought was going to be a meeting with Prime Minister Šleževičius about Lithuania's economic reforms. But when I arrived, the Prime Minister announced that we would travel the next day to Almaty, which was then the capital of Kazakhstan. Among other things, I would be meeting with President Nursultan Nazarbayev to discuss the possibility of installing a currency board in Kazakhstan.

How did this turn of events occur? Prime Minister Šleževičius explained that President Nazarbayev had recently visited Lithuania, was impressed with its new currency board, and wanted to meet the person who designed it.

Our delegation departed from Vilnius in high spirits on the morning of September 14, 1994 in a small jet and arrived in Almaty late in the afternoon. After a colorful ceremony at the airport, we drove at high speed (all intersections had been blocked by police for miles) in Zil limousines across a very sprawling city with low-slung buildings to our destination: the tomb of the Unknown Soldier. I thought I would stay in the limo, but as a Lithuanian State Counselor, Prime Minister Šleževičius insisted that I join him in laying a wreath at the tomb.

Our delegation was treated royally. I was assigned to official residence number two. As it turned out, Prime Minister Šleževičius and other members of the Lithuanian delegation had completed their graduate studies at Moscow State University back

in the days of the U.S.S.R. and knew several of their Kazakh counterparts from student days.

On September 15th, I made the rounds, meeting the Vice President and various ministers and central bank officials. President Nazarbayev and I met over tea and Turkish delights on September 16th. It was then that the President appointed me as his adviser and indicated that he wanted a currency board installed.

I was taken aback when the President indicated that he would like it installed during the following week. I informed him that, given the nature of data I had received from the central bank, the Ministry of Finance, and the Ministry of Economy and Budget Planning, I could not conduct my usual due diligence exercise and install a currency board in Kazakhstan in a week. My meetings the day before had convinced me that it was going to be difficult to conduct a due diligence exercise in Kazakhstan. Indeed, I thought it was going to be more akin to a "pulling teeth" exercise.

The President and I agreed that I would stay in Almaty a few extra days to prepare a data request and that I would return in late October for the completion of my currency board feasibility study. The rest of the Lithuanian delegation went to observe a rocket launch at Baikonur Cosmodrome, but I was quite content to proceed with my due diligence exercise in Almaty instead.

After I returned to the U.S., I continued work on the feasibility of a currency board for Kazakhstan and was preparing to depart with Mrs. Hanke for Almaty when I received a letter from the Cabinet of Ministers. It indicated that President Nazarbayev had given the order to the Cabinet of Ministers to prepare the "necessary information for your coming to Kazakhstan." The letter went on to say:

"It's noteworthy to mention that the volume of the required data is quite large and will need a long time for its collection and systemization. Additionally, issues raised by you involve strategically important aspects of this country (sic) actions and naturally that the answers to them can not be sent to you by fax."

In closing, the letter indicated that after the data I had requested were produced, the Cabinet of Ministers would analyze it and, based on its findings, would notify me concerning my planned trip to Almaty.

It was rather clear to me that there would not be another trip. Indeed, I had concluded during my September trip that the Russians had mounted an anti-Kazakhstan currency board campaign immediately after they had received word that I was in Almaty. Moscow did not want a sound tenge. At that time, the Russians preferred a weak, unstable tenge and a neighbor that was not sure-footed.

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Indonesia (1998)

Although the CBS was not adopted when I proposed it in 1998, the Indonesian CBS episode was most noteworthy. Indeed, it put the CBS issue at the center of the international radar screen.

A. Position – I was President Suharto's Advisor and Special Counselor to the Economic and Monetary Resilience Council of the Republic of Indonesia in 1998.

B. Comment – On August 14, 1997, shortly after the Thai baht collapsed on July 2nd, Indonesia floated the rupiah. This prompted Stanley Fischer, Deputy Managing Director of the International Monetary Fund, to proclaim that "the management of the IMF welcomes the timely decision of the Indonesian authorities. The floating of the rupiah, in combination with Indonesia's strong fundamentals, supported by prudent fiscal and monetary policies, will allow its economy to continue its impressive economic performance of the last several years."

Contrary to the IMF's expectations, the rupiah did not float on a sea of tranquility. It plunged from 2,700 rupiahs per U.S. dollar at the time of the float to a low of nearly 16,000 rupiahs per U.S. dollar in 1998. Indonesia was caught up in the maelstrom of the Asian crisis.

By late January 1998, President Suharto realized that the IMF medicine was not working and sought a second opinion. In February, I was invited to offer that opinion and began to operate as Suharto's Special Counselor. Although I did not have any opinions on the Suharto government, I did have definite ones on the matter at hand. After the usual daily discussions at the President's private residence, I proposed, as an antidote, an orthodox currency board in which the rupiah would be fully convertible into the U.S. dollar at a fixed exchange rate. On the day that news hit the street, the rupiah soared by 28 percent against the U.S. dollar on both the spot and one-year-forward markets. These developments infuriated the U.S. government and the IMF.

Ruthless attacks on the currency board idea and the Special Counselor ensued. Suharto was told in no uncertain terms – by both the President of the United States, Bill Clinton, and the Managing Director of the IMF, Michel Camdessus – that he would have to drop the currency board idea or forego $43 billion in foreign assistance. He was also aware that his days as President would be numbered if the rupiah was not stabilized.

Economists jumped on the bandwagon, too. Every half-truth and non-truth imaginable was trotted out against the currency board idea. In my opinion, those oft-repeated canards were outweighed by the full support for an Indonesian currency board (which received very little press) by four Nobel Laureates in Economics: Gary Becker, Milton Friedman, Merton Miller, and Robert Mundell. My colleague and collaborator – Margaret Thatcher's economic guru Sir Alan Walters – also went public with his support of the CBS idea for Indonesia.

As for the *ad hominem* attacks on me, they followed an unoriginal, standard formula, one that contained contradictory claims. On the one hand, I was depicted as an obscure economist who had played a minor, or no, role in the currency board reforms of the 1990s; on the other hand, I allegedly had an enormous and corrupting influence in the currency reform sphere.

Why all the fuss over a currency board for Indonesia? Merton Miller understood the great game immediately. As he wrote when Mrs. Hanke and I were in residence at the Shangri-La Hotel in

Jakarta, the Clinton administration's objection to the currency board was "not that it wouldn't work but that it would, and if it worked, they would be stuck with Suharto." A similar argument was articulated by Australia's former Prime Minister Paul Keating: "The United States Treasury quite deliberately used the economic collapse as a means of bringing about the ouster of President Suharto." Former U.S. Secretary of State Lawrence Eagleburger weighed in with a similar diagnosis: "We were fairly clever in that we supported the IMF as it overthrew (Suharto). Whether that was a wise way to proceed is another question. I'm not saying Mr. Suharto should have stayed, but I kind of wish he had left on terms other than because the IMF pushed him out." Even Michel Camdessus could not find fault with these assessments. On the occasion of his retirement, he proudly proclaimed: "We created the conditions that obliged President Suharto to leave his job."

To depose Suharto, two deceptions were necessary. The first involved forging an IMF public position of open hostility to currency boards. This deception was required to convince Suharto that he was acting heretically and that, if he continued, it would be costly. The IMF's hostility required a quick about-face**.** Less than a year before the Indonesian uproar, Bulgaria (where I was President Stoyanov's advisor) had installed a currency board on July 1, 1997 with the enthusiastic endorsement of the IMF, and Bosnia and Herzegovina (where I advised the government on currency board implementation) had followed suit under the mandate of the Dayton/Paris Peace Agreement and with IMF support on August 11, 1997.

Shortly after Suharto departed, the IMF's currency board deception became transparent. On August 28, 1998, Michel Camdessus announced that the IMF would give Russia the green light if it chose to adopt a currency board. This was followed on January 16, 1999 with a little-known meeting in Camdessus' office at the IMF headquarters in Washington, D.C. The assembled group included IMF top brass, Brazil's Finance Minister Pedro Malan, and the Banco Central de Brasil's Director of Monetary Policy Francisco Lopes. It was at that meeting that Camdessus suggested that Brazil adopt a currency board.

The second deception involved the widely-circulated story that I had proposed to set the rupiah's exchange rate at an overvalued level so that Suharto and his cronies could loot the central bank's reserves. This take-the-money-and-run scenario was the linchpin of the Clinton administration's campaign against Suharto. It was intended to "confirm" Suharto's devious intentions and rally international political support against the currency board idea and for Suharto's ouster.

The overvaluation story was enshrined by the *Wall Street Journal* on February 10, 1998. The Journal reported that Peter Gontha had summoned me to Jakarta and that I had prepared a working paper for the government recommending that the rupiah-U.S. dollar exchange rate be set at 5,500. This was news to me. I did not meet, nor know of, Peter Gontha, nor had I authored any reports about Indonesia or proposed an exchange rate for the rupiah.

I immediately attempted to have this fabrication corrected. It was a difficult, slow, and ultimately unsatisfactory process. Although the *Wall Street Journal* reluctantly published a half-baked correction on February 19th, the damage had been done.

The *Journal*'s original fabrication (or some variant of it) was repeated in virtually every major magazine and newspaper in the world, and it continues to reverberate to this day, even in so-called scholarly books and journals. For example, in his 2000 memoir, *From Third World to First, The Singapore Story: 1965-2000*, Lee Kuan Yew asserts that "in early February 1998, Bambang, the president's son, brought Steve Hanke, an American economics professor from The Johns Hopkins University, to meet Suharto to advise him that the simple answer to the low exchange value of the rupiah was to install a currency board." This bit of misinformation was a surprise, since I have never had any contact with Bambang Suharto. But it is not just politicians who fail to "fact check" their assertions. Theodore Friend's 2003 tome, *Indonesian Destinies*, misspells my name and then proceeds to say that I "counseled the [Suharto] family to peg the exchange rate at 5000."

Setting the record straight has been complicated by the official spinners at the IMF. Indeed, they have been busy as little bees rewriting monetary history to cover up the IMF's mistakes, and

Indonesia represents one of its biggest blunders. To this end, the IMF issued a 139-page working paper "Indonesia: Anatomy of a Banking Crisis: Two Years of Living Dangerously 1997–99" in 2001. The authors include a "politically correct" version of the currency board episode asserting, among other things, that I counseled President Suharto to set the rupiah-dollar exchange rate at 5000. This pseudo-scholarly account, which includes 115 footnotes, fails to document that assertion because it simply cannot be done. That official IMF version of events also noticeably avoids referencing any of my published works or interviews based on my Indonesian experience.

To add a bit of color to the Indonesian episode, it is worth noting that, early on and during one of our nightly meetings in his little den at his residence, Suharto surprised me by stating that he had good intelligence that I was a marked man. He informed me that two foreign services wanted me out of the picture. In consequence, Suharto assigned part of his personal security detail to look after Mrs. Hanke and me on a 24/7 basis. Two ladies were assigned to Mrs. Hanke and usually three or four young men watched after me. The next time we received this "marked man" treatment was in Montenegro in 1999.

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Argentina, Again (1999)

President Menem proposed dollarization in January 1999, as he had first done on my advice in 1995.

A. Position – Given my long association with President Menem, which included an official position as Advisor to the Minister of Economy in 1995-96, Menem invited me to prepare a dollarization blueprint after Brazil's January 1999 devaluation. I presented my blueprint to him later, on February 13th in Buenos Aires.

B. Comment – President Menem's advocacy of dollarization put the issue on the radar screen in Latin America, and in part, was responsible for the adoption of official dollarization in Ecuador (2000) and El Salvador (2001). I do not know why President Menem failed to pull the trigger on dollarization in 1999. I think, however, that he thought that just the threat of dollarization would do the trick, as it had done in 1995. Indeed, speculation against the peso subsided shortly after Menem made a credible dollarization threat in 1995. But, the political and economic situations were much different in 1999 than in 1995. That said, dollarization was feasible in 1999 and would have worked. It would have allowed Argentina to avoid the currency chaos and ensuing devaluation and default that resulted from Argentina's flouting of orthodox currency board rules, something that was allowed under the Convertibility Law.

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Venezuela (1995-96)

A. Position – I was an Advisor to the Fundo de Inversiones de Venezuela, where I operated as President Caldera's adviser on currency reform.

B. Comment – The debate in the Caracas press about the prospects for a Venezuelan currency board was surprisingly

emotional, if not nasty. The temperature of the discourse rose dramatically, and the quality became, quite frankly, below critique after the Venezuelan President, the late Rafael Caldera, indicated that he was leaning towards a currency-board reform along the lines that I had suggested. The feature that was unusual was that a great deal of the *ad hominem* came from the educated chattering classes. I think their problem was the simple fact that President Caldera was seriously considering a significant currency reform that had not been designed by a local.

This episode taught me that a currency reformer should always watch his backside, even when taking a Sunday stroll. During our first trip to Caracas, Mrs. Hanke and I decided that a good long walk through Caracas' city center at midday on Sunday, when there was no traffic, was a great idea. Any informed person would have known that this was a terrible idea – one fraught with danger. Sure enough, shortly after we began our Sunday stroll, we were mugged by two young thugs who worked me over a bit with a broken bottle. We made it back to the Hilton Hotel, where a first-rate plastic surgeon stitched me up.

This episode proved to be a great embarrassment for President Caldera. By the next morning, before I addressed the students and faculty of the Instituto de Estudios Superiores de Administración (IESA), I learned that all the usual suspects had been rounded up and were behind bars on the President's orders.

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Jamaica (1995-96)

A. Position – I had no official position. However, I was an advisor on currency reform to the Private Sector Organization of Jamaica in 1995-96. As a result, the CBS and dollarization options were hotly debated, and today dollarization remains in the picture.

B. Comment – To this day, I am a guest on Jamaican talk radio programs (a means of communication that has been quite popular in Jamaica for decades). I also occasionally contribute to the Jamaica Observer, a daily newspaper.

The most recent change in exchange-rate regimes in the Caribbean region occurred on January 1, 2011, when the Netherlands Antilles was dissolved. In consequence, the three small islands of Bonaire, Saba and Saint Eustatius adopted the U.S. dollar, while Curaçao continues to use the Netherlands Antilles guilder, which is pegged to the U.S. dollar. These events, if nothing else, have motivated, yet again, another dollarization discussion in Jamaica.

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5 The currency board monetary system: A survey of financial crises

Miloni **Madan**
& Alec **Maki**

Introduction

By asking a specific set of questions, we are able to best set a framework for analyzing these financial crises and look at them with a common eye. We asked the following questions when researching and investigating these accounts:

1. What fueled the crisis? What was the real trigger and root cause?
2. What was the nature of the crisis? What happened?
3. What aspects of society were affected by the crisis (financial institutions, government finance, etc.)?
4. What was society's perception of the crisis? Who or what was blamed?
5. What figures, if any, exist to quantify the extent of the crisis?
6. How and when was the crisis resolved?

We apply these questions to eight countries, which we investigate in chronological order. To find cases we examined Reinhart & Rogoff (2009) as well as a number of writings on currency boards. The eight countries we found seem to be the only

ones that have experienced serious financial crises under currency board or quasi currency board systems, although we welcome suggestions from other researchers of other possibilities to investigate. Some currency boards arose in the aftermath of crises that had affected the previous monetary systems, but here we only discuss episodes arising while the currency boards existed. We have omitted certain cases from this analysis that involve special circumstances; the World War II suspension of payments by the currency board of Malaya when the territory was occupied by Japanese forces is an example in which the currency board was not the subject of the crisis.

We also omit a number of cases in which small financial institutions failed but there was no contagion to other institutions. Typically, the small institutions were locally owned, as opposed to being branches of the large British or other international banks that have dominated the banking systems in most territories with currency boards.

Country	Crisis Dates	Cause	Brief Description	Resolution
India	1907-1908	Crop failures; U.S. financial panic of 1907	Bank runs but no failures; coincided with political turbulence	Government withdrew gold and sold securities; railroad construction fundraising
The Strait Settlements	1907-1909	Unexpected rise of value of silver; general financial distress of period	Run on gold; issuance of less valuable coins	Remain on sterling exchange rather than pure gold-standard
Argentina	1912-1914	Unsustainable growth; crop failure; panic surrounding start of WWII	Decreased production and trade; closing of international exchanges; runs on private banks	Abandonment of gold-standard exchange; institutional policy changes
	1929	U.S. Great Depression	Capital/gold outflow,	Use of gold to service debt obligations; established floating currency
	1995	Mexico's Tequila Crisis	Deposit withdrawals; high interest rates	Government closed/privatized poorly managed banks
	2001-2002	Asian, Russian, and Brazilian financial crises; prolonged recession	Falling prices; decrease in trade; more aggressive and involved government; debt trap	New government regime; general international economic improvement
The Philippines	1919-1922	End of WWI caused drop in demand for exports; mismanagement by	Loan defaults; reserves depletion; volatile exchange premiums; draft sale suspensions	Return of exchange rates to parity; revival of export trade

		government		
Palestine	1935-1936	Religious tensions; international political instability	Bank runs; riots and violence	Government instilled confidence; diffusion of anxiety over time
	1940	Panic regarding start of WWII	Bank runs; failure of small financial institutions	Improved economic conditions and demand from WWII; liquidity of banks

Country	Crisis Dates	Cause	Brief Description	Resolution
Hong Kong	1941-1945	Japanese occupation	"Duress notes" issued by Japanese	End of WWII; reinstitution of currency board by British
	1961	Rapid expansion of banking sector; rising property prices	Near failure of Liu Chong Hing Bank	Support from HSBC and Chartered Bank
	1965	Falling property prices; Hang Seng Bank rumors	Runs and bank failures	Support from HSBC and Chartered Bank; HSBC took control of Hang Seng
	1987	Stock market crash of 1987	Collapse of Hang Seng Index; suspension of trading	Support from HSBC and Chartered Bank; quick international recovery
	1991	Scrutiny of BCCI; false rumors	Closing of BCCI in Hong Kong; runs on major banks	Dissipation of rumors; government reform
	1997-1998	Asian Financial Crisis	Movements in HK$; bank and business runs; collapse of Hang Seng Index	Government active on Hang Seng Index; limitations on interbank liquidity
Estonia	1992	Underdeveloped system; asset freezes from Moscow	High inflation; falling GDP per capita; failure of three major banks	Eesti Pank rescued and reorganized banks; other banks filledmarket gaps
	1997	Asian Financial Crisis; speculative attack on kroon	Decreased investment; banking panic	Liquidity dried up; widened forward interest rate spreads
	1998	Asian Financial Crisis; Russian financial crisis	Decreased exports; high interest rates	Eesti Pank purchased and consolidated banks; general growth of European economy
Lithuania	1995	Adjustment of banking system to capitalist economy	Failure of six banks; bank mergers	Bank of Lithuania provided some liquidity; government reform
	1998-2000	Asian Financial Crisis; Russian financial crisis	Decreased trade; volatile interest rates; general economic recession	Dissipation of crisis; lower reserve requirements

India

The British colonial administration established the Paper Currency Department in India on March 1, 1862 to be the monopoly issuer of the notes for British India (today India,

Pakistan, Bangladesh, and Myanmar [Burma]). The Paper Currency Department existed until April 1, 1935, when the Reserve Bank of India replaced it. During most of the existence of the Paper Currency Department, coins, notably the silver rupee, far exceeded notes in circulation. India had a number of banks, but they only served a small and relatively wealthy portion of the population.

The Paper Currency Department operated as a quasi-currency board during two periods. From January 1872 to June 25, 1893 the value of the rupee was fixed at 1 rupee = 165 fine troy grains of silver. After an interlude of floating, from January 1898 to December 19, 1916 the value of the rupee was fixed at 1 rupee = 1 shilling 4 pence sterling, or 1 rupee = 7.53344 troy grains gold (Weintraub & Schuler, 2013, pp.5, 7, 14, 17). During the latter period India experienced a financial crisis.

1907-1908. In mid-1907, prices of jute, an Indian fiber used to produce rope and other threads, collapsed, negatively impacting the sale of Council bills (short-term Indian government securities) in London and pulling India into a recession (Conant, 1909, p.710). In October 1907, the United States experienced a three-week long financial crisis, aggravating a recession that had begun earlier in the year. During the crisis period, the New York Stock Exchange was down almost 50 percent from the prior year resulting in several runs on banks and trust companies (Conant, 1909, p.711). American depositors panicked, withdrew their money in gold, and hoarded it. During this same period, the Bank of England increased its discount rate to 7 percent, a very high level for the era, which made it nearly impossible to meet the exchange demands of the Indian government (*Supplement to the Gazette of India*, March, 21, 1908, p. 709, cited by Conant, 1909, p.710). The aggregation of these adverse changes made Council bills almost impossible to sell, causing a sharp depreciation of the exchange rate. In response, the government ceased paying out gold in exchange for silver rupees (Weintraub & Schuler, 2013, p.7). Furthermore, to support the exchange rate, the government released significant amounts of gold held in London on several occasions: the value of the Indian Branch of the Gold Standard Reserve fell from 24 crores of rupees (240 million) in October of 1907 to 17.5 crores of rupees (175 million) in March of 1908

(Abrahams, 1914, p.40). (The Gold Standard Reserve was a fund to assure convertibility into gold, including for silver rupee coins; it was separate from the reserves of the Paper Currency Department.) Though these actions did absorb the effects of the temporary crisis, India met further distress in the following months.

In April of 1908, India experienced a full-blown crisis resulting from a large wheat crop failure, which greatly reduced exports, lowered India's creditworthiness, and caused a degree of famine. As a result, Indian merchants incurred an excess of debt resulting from purchases in Europe that they could not afford to pay off. Additionally, during this period, India was not only placed under economic stress, but experienced political turbulence as the Indian Nationalist Party displayed resistance to the British government; for example, several British citizens were killed in the bombing of the northern city of Muzaffarpur in April of 1908 (Chopra, 1979). The combination of political and economic uncertainty only served to exacerbate the situation. Although there were no bank failures during this period, these circumstances caused significant panic among the Indian people, whose actions severely threatened financial institutions: deposit withdrawals amounted to £1.1 million, which represented a large proportion of total deposits (Abrahams, 1914, p.40).

To counteract the crisis and increase its ability to pay its financial obligations, the government withdrew £2 million of gold in London and parted with £2 million in securities (Statist, 1908, p.1105, cited by Conant, 1909, p.711). Furthermore, the government established a fundraising program for railroad construction to stimulate the economy, improve domestic infrastructure, and prevent further outflow of capital. Under this program, the government issued one-year Council bills and added half of the profits on coinage and the interest on securities to the railroad construction funds until the gold reserve reached a comfortable level of £20 million (Economist, June 6, 1908, p.1188, cited by Conant, 1909, p.711). Although these actions were criticized and economists feared they would damage the gold reserve, the program served to strengthen the economy and help resolve the crisis by late autumn of 1908. On an annual basis no slowdown is

evident in bank deposits in the aggregate, as can be seen in Chart 2.

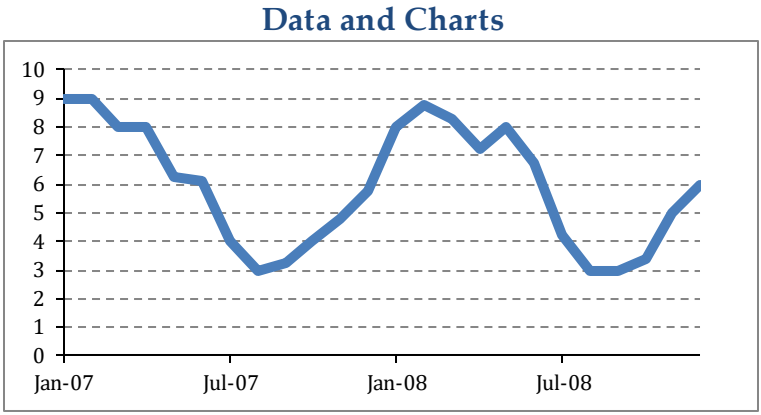

Figure 1. *India: Average Daily Market Interest Rates (%), 1907-1908*
Source: Historical Financial Statistics.

Table 1.

Year.	Capital.	Reserve and Rest.	Deposits.				Cash Balances at Head Offices and Branches.
			Presidency Banks.		Other Banks.	Total.	
			Public.	Private.			
1902	Rupees. 4,51,03,750	Rupees. 2,80,42,651	Rupees. 3,44,31,209	Rupees. 17,66,09,177	Rupees. 10,43,89,857	Rupees. 31,54,30,243	Rupees. 10,38,67,187
1903	4,38,73,030	2,97,16,983	2,93,41,405	17,78,43,131	11,11,98,868	31,83,83,404	7,96,84,339
1904	4,41,49,436	3,14,27,596	3,17,84,448	21,96,66,537	11,51,11,798	36,65,62,783	11,65,47,194
1905	4,44,56,564	3,41,19,263	3,11,91,011	22,26,36,961	11,98,91,936	37,37,19,908	9,96,50,490
1906	4,93,94,033	3,36,25,035	3,07,85,221	27,45,08,390	11,55,49,023	42,08,42,634	12,44,57,692
1907	5,89,60,850	3,58,19,971	3,35,78,497	28,11,26,321	14,00,28,842	45,47,33,660	11,41,89,672
1908	5,99,71,551	3,78,32,450	3,25,78,678	28,61,53,143	16,26,09,264	48,13,41,085	12,83,82,059
1909	6,26,06,682	4,06,19,164	3,19,76,168	32,65,03,420	20,49,10,078	56,38,89,666	14,44,70,172
1910	6,35,66,437	4,31,57,922	4,23,62,820	32,34,38,210	25,65,84,761	62,23,85,791	14,15,37,009
1911	6,45,60,071	4,66,93,939	4,38,29,873	34,19,98,885	25,29,11,059	63,87,39,817	17,20,24,904
1912	6,66,64,289	4,98,19,045	4,27,00,997	35,84,47,051	27,25,97,559	67,37,45,607	15,77,48,732

Source: Great Britain, India Office (1915).

The Straits Settlements (1907-1908)

Like several other British colonies of the time, the Straits Settlements had a currency board, established on 1 May 1899. The Straits dollar was fixed to the Spanish silver peso at a rate of one-to-one.

Under Ordinance No. 4 of 1899, the government established many of the specifications of the currency board arrangement. The

Note-Guarantee Fund comprised three parts: the Coin Section, which consisted of legal tender coins, not less than one-half (originally two-thirds) of the value of currency in circulation; the Investment Fund, which consisted of United Kingdom, Indian, and other sterling securities up to one-half (originally one-third)of the value of currency in circulation; and the Depreciation Fund, which being zero at the start was to receive annually from the income of the securities of the Investment Fund an amount equal to one percent of the cost price of the securities. Furthermore, the backing of issued notes was about 100 percent to 105 percent to ensure notes were fully convertible into silver coins (Lee, 1990 p.11). Any further income was to be paid to the government. If reserves fell below 100 percent the government had to replenish the shortfall (King, 1957, pp.17-19, cited by Schuler, 1992, p.164).

1903-1906: Not a crisis period. In the late 1890s, several East Asian countries switched from silver standards to gold exchange standards as trade with European became more important. Following a recommendation from a British committee of economists, the Straits Settlements began issuing its own silver dollars in 1903. (Previously the colony had issued only smaller coins and had used foreign silver dollars.) By limiting the supply of Straits dollar coins, it intended to divorce the Straits dollar from silver. As a transitional measure for moving from the silver standard to the gold standard, the Board of Commissioners of Currency established a managed float. The monetary system of the Straits Settlements we not a currency board during the period of floating.

Beyond the introduction of the silver dollar, 1903 was a noteworthy year because the first local bank, Kwong Yik Bank, was established; before this, the Straits Settlements banking system was dominated by foreign banks (Lee, 1986, p.43).

Ordinance No. 3 of 1905 provided that the currency board could issue notes in exchange for gold received in London or Singapore at such rate of exchange as it might set in agreement with the Straits government and the British Secretary of State for the Colonies.

On February 29, 1906, the government of the Straits Settlements fixed the rate of exchange at S$60 per £7, thereby reestablishing the

currency board arrangement. Since sterling was on the gold standard, the Straits Settlements were effectively on the gold-exchange standard (Lee, 1986, p.13). The board redeemed notes in gold in Singapore (King, 1957, p. 17 cited by Schuler, 1992, p.165-166).

1907-1908. However, the rising price of silversince the introduction of silver coins was problematic for the currency board. The plan for switching from silver to gold after a period of managed floating had assumed that the gold price of silver would continue to fall as it had done in the recent past. Instead, the rising price, as depicted in Chart 2.1, nearly wrecked the reform because the Straits dollar's value as metal exceeded its face value. In response, the government introduced newly minted coins with decreased metal content in 1907 (Lee, 1986, p.13).

In large part due to the general financial crisis in Eastern countries throughout 1907 and 1908, there was a run for gold on the Currency Commissioners in Singapore, which exhausted the local gold reserve. In fact, the gold assets fell by $12 million, or about 65 percent, from September 1907 to January 1909. During this same period, the silver reserve in the Currency vaults increased by almost $11 million, or more than 100 percent (Anthonisz, 1913, p.112).

The gross circulation of notes and dollars contracted by approximately 22 percent throughout 1907 and 1908. However, this value is relatively low given the strength and breadth of the run; this in large part due to the expansion of currency caused by the demonetization of the Straits dollars in Sumatra and Siam and the payment of the Tanjong pagar award (Anthonisz, 1913, p.119).

In response to this powerful run, the government enacted Ordinance No. 27 in November 1908, which allowed the currency board to hold gold coin, rather than just silver coin as was previously permitted. The Straits Settlements abandoned its original scheme to implement a pure gold standard and instead remained a sterling exchange standard due to the problems that faced local banks after the run of 1907-1908 (Lee, 1986, p.15). The currency board responded by selling pound sterling assets in London, which proved to be satisfactory for all parties involved. In principle, note holders could redeem notes in gold in London, but

in practice few wanted gold rather than the sterling (Schuler & Krus, 1970, p.221).

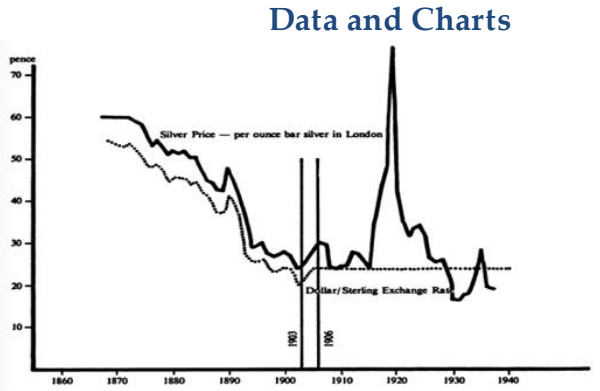

Chart 2.1. *Straits Settlements: GDP per capita (Geary-Khamis 1990 international dollars), 1910-1915*
Source: Lee (1986, p.9).

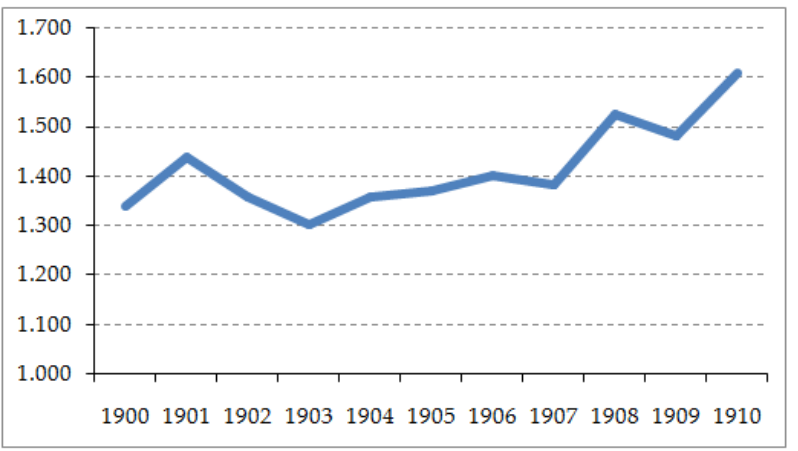

Chart 2.2. *Movement of Silver Price and Dollar/Sterling Exchange Rate 1867-1938*
Source: Bolt & van Zanden (2014).

Argentina (1912-1914, 1929, 1995, 2001-2002)

Argentina established the Conversion Office (Caja de Conversión) in 1890 with the intention of restoring convertibility of the Argentine peso into gold. However, through the 1890s the office merely served as a conduit for issues of fiat money (Schuler, 1992, p. 73). Argentina's Conversion Office operated as a currency board from late January 1903 to August 1914, during which 2.27 paper pesos were equivalent to one gold peso. After a period of non-convertibility, the Conversion Office returned to a currency board arrangement from August 1927 to December 1929. Six years later the Central Bank of Argentina was established, operating as a quasi currency board decades afterwards, from April 1991 to January 2002. Argentina experienced four notable episodes of financial distress during these periods: pressure on select banks leading up to the Conversion Office's suspension of convertibility into gold at the start of World War I; another suspension by the Conversion Office soon after the Wall Street crash signaled the start of the worldwide Great Depression; the so-called Tequila Crisis of 1995; and the crisis leading to the end of the quasi currency board.

1912-1914. With the institution of a fixed exchange rate with gold, the Argentine economy grew steadily, and deposits grew rapidly through 1912. In fact, deposits and loans of private banks grew much faster than GDP: the ratio of deposits and loans to GDP roughly doubled throughout this period. However, such rapid growth was not necessarily healthy for the banks, whose reserves slowly shrank relative to deposits. Much of Argentina's growth during this period can be attributed to its connection with Great Britain; much of the capital accumulation came from Great Britain, whose investors were interested in the resource-rich region (Taylor, 1992, p.919). Furthermore, Argentina benefitted from rising prices: export prices rose faster than import prices--a trend that had favorable effect on the country's trade balance.

The international environment was favorable during this period, known today as the *Belle Époque*. The international economy was characterized by high financial and monetary liquidity in international markets due to a sustained increase in the world stock of gold. This expansion reached 3.5 percent annually

between 1890 and 1914, well above the 1.5 percent annual average growth between 1866 and 1890 (Friedman & Schwartz, 1963, p.137, cited by della Paolera & Taylor, 2001, p.125).

Beginning in 1912, disturbances in the domestic economy led to substantial withdrawals of cash from the private banks. Some of this worked to the advantage of the majority government-owned Banco de la Nación, which was viewed as a safer option for depositing money due to its size and significance to the government. While panic generally subsided quickly, the Bank of England interest rate was raised in late 1912 (della Paolera & Taylor, 2003, p.317).

The crisis was triggered when the 1913-1914 crop did extremely poorly. Cereal exports, a driving staple of the Argentine economy, fell from 322 million gold pesos in 1912-1913 to 182 million gold pesos in 1914. By June 1914, the poor crop had triggered a generalized depression. The non-agricultural sector's production fell 15 percent from 1913 to 1914, and another 10 percent from 1914 to 1915. During the period from 1912 to 1917 overall, Argentina's real GDP slid 19 percent despite population growth of nearly 14 percent (della Paolera & Taylor, 2003, p.317). In the first quarter of 1913, gold continued to be imported into Argentina at an increased rate of 35 million gold pesos; in the second quarter 10 million, gold was still being imported at the rate of the period year. However, in the second half of the year 42 million gold pesos were exported. In 1913 as a whole, the money supply fell by 5.3 percent while bank deposits decreased by 6.9 percent (della Paolera & Taylor 2001, p.131).

Meanwhile, strife began affecting other parts of the world. On 27 June 1914, Archduke Franz Ferdinand was assassinated in Sarajevo, sparking the start of World War I. This event caused widespread panic and there was a flight to liquidity as foreign investors sold securities at exchanges around the world. The result was the collapse of asset prices as securities were dumped on the markets. In late July, the advancing threat of war caused the closing of most stock exchanges worldwide. The London Stock Exchange closed on Friday, 31 July 1914. Not only did this mark the end of the *Belle Époque*, but it also marked the shift of international financial leadership from London, on which

Argentina was financially dependent, to New York (della Paolera & Taylor, 2003, p.318); this would have lasting impacts on Argentina's continued development in the future.

The turbulence in the international markets created a period of distress in Argentina, whose immigrant communities maintained strong ties with their European homelands. In early August 1914, there was a run on deposits of unexpected dimensions (della Paolera & Taylor, 2001, p.134). Private banks were particularly affected by the demand for liquidity, the largest and most important being Banco Español, Banco Italia, Banco Frances, and Nuevo Banco Italiano. As can be seen in Chart 3.3, total deposits fell by nearly 20 percent from 1912 to 1914; deposits of private banks fell over 45 percent. One important exception is that the Banco de la Nación, which actually witnessed an increase in deposits, likely because consumers saw the large bank as a safe place to keep their deposits, especially in comparison with private banks.

Throughout the period of uncertainty between 1912 and 1914, the stock prices of private banks, large and small, were volatile. For example, the stock of Banco Español performed strongly throughout 1912 and 1913 when the crisis started, and only began to fall in 1914. The stock price fell from 180 in January 1914 to 100 in October 1914. It was later revealed that Banco Español had begun cannibalizing its cash to issue dividends in 1914 (*The Economist*, 24 March 1924, cited by della Paolera & Taylor, 2003, p. 320). Banco Español never truly recovered and ultimately failed in 1935.

1914-1927: Not a crisis period. The gold standard regime ended in 1914: external shocks and domestic policy choices made gradual, seemingly innocuous, changes in the institutional framework. From 1914 to 1927, Argentina's currency was inconvertible; the window of the Conversion Office was, so to speak, closed (della Paolera & Taylor, 2001, p.165). Throughout this period, though, Argentina unilaterally did what it could to adhere to orthodoxy—suspension of convertibility in 1914 was seen as a temporary measure. There was a strict fidelity to the rigid association of the nominal quantity of money to the gold stock at the Conversion Office (della Paolera & Taylor, 2001, p.197).

Nonetheless, while the Argentine economy exited the 1912-1914 crisis period of uncertainty in the post-war period, it never quite returned to its pre-war levels of growth. The U.S., as the new international financial leader showed little interest in Argentina, which exposed the level of dependency the country maintained on Great Britain. According to Alan Taylor, this dependency caused low savings rates among consumers, which played a major role in Argentina's stagnant, and often insufficient, GDP per capita, an important indicator for emerging countries (Taylor, 1992, p.924). Over the next few years, Argentina exhibited dismal growth: from 1915 to 1930, the growth rate of GDP per capita fluctuated in the low single digits, with several years exhibiting negative values (Bolt & van Zanden, 2014). From 1913 to 1935, the value of the banking industry declined by more than 50 percent (della Paolera & Taylor, 1997, p.8).

In December 1927, the gold exchange standard was reinstituted with the goal of the resumption at parity. On the surface, the system that now existed did look, for all intents and purposes, very much like the one that had worked so well up to 1913. Yet, certain crucial elements had been allowed to change, and the banking sector--including the state bank--had fallen into poor shape (della Paolera & Taylor, 2001, p. 186).

1929. The start of Great Depression in the United Stateswas an obstacle for Argentina's goal of preservingcurrency board orthodoxy. Rising interest rates in the United States drew investment capital out of Argentina. From July 1928 to the end of 1929, Argentina suffered a gold outflow of 426 million pesos, which was roughly 40 percent of the combined reserves of the Conversion Office and the banks (Schuler, 1992, p.75). By December 1929, the balance-of-payments crisis was severe and the exchange rate was left to float after a mere two-year resumption of the gold standard. However, the Argentine Great Depression was mild and short-lived by international standards. From peak to trough (1929 to 1932), the domestic real output fell by "only" 14 percent and already surpassed its 1929 level by 1935 (della Paolera & Taylor, 2001, p.190).

Argentina's persistence in achieving economic stability throughout the Great Depression is notable. In 1930, almost 80

percent of the money base was backed with gold--a backing ratio much higher than in any other gold standard country. In the subsequent years, Argentina used the gold to service external debt obligations, relieving stress on the economy and allowing the government to maintain orthodox fiscal policy (della Paolera & Taylor, 2001, p.192).

Argentina's response constituted the decisive regime change in Argentina as it pursued a stable, long-term economic system (della Paolera & Taylor, 2001, p.200). The Conversion Office was officially replaced by the Central Bank of Argentina in May 1935.

1991: Not a crisis period. Argentina faced significant economic and political instability during the late 1980s. With negative GDP growth and hyperinflation, the country was on a dangerous path. It was in deep need of ameliorating actions to counteract these growing problems. In 1989, newly elected president Carlos Menem, though he had campaigned as a populist, responded by initiating a period of political and economic reform intended to wrench economic policy from its longstanding interventionist orientation to a free market approach. Menem encouraged privatization and deregulation and cut tax rates. Furthermore, under minister of the economy Domingo Cavallo, Argentina established a quasi currency board arrangement that redenominated the local currency, the Argentine peso, and tied it to the U.S. dollar at a rate of one-to-one.

These actions helped pull Argentina out of its slump, with price levels falling from 2,314 percent in 1990 to 29 percent in 1991; inflation continued to gradually decline as reform became fully implemented, falling below 4 percent in 1994 (Schuler, 2003, p.1, from Argentine government figures; IMF WEO figures differ but show similar trends). Furthermore, GDP rebounded more than 10 percent during the first two years after currency reform, and growth stayed strong, exceeding 5 percent in 1993 and 1994.

1995. The rapid expansion of the economy in the early 1990s met a roadblock in 1995. In late 1994, Mexican suffered the so-called Tequila crisis, which arose from mistakes in Mexican government finance and monetary policy. On December 20 the Mexican central bank devalued the peso by about 15 percent and on December 22, in response to further pressure, it let the peso

float, resulting in a further depreciation of roughly 15 percent. Investor confidence was shaken, Mexico asked for an international financial rescue, and the economy shrank 5.8 percent in 1995 (*Economist* 2004, n.p.). The situation in Mexico caused widespread concern that the Argentine peso would also be devalued. Although this fear was arguably irrational due to the limited economic linkage between the two countries, Argentina suffered large hits to its economy. Consumers withdrew 18 percent of deposits from Argentine banks and GDP fell 2.8 percent in 1995 (Blustein, 2005, p.28). Interest rates climbed until the government attempted to ease fears by securing financial packages from international financial institutions and private local investors (Hanke, 1999, pp.348-61). Further, the government strengthened the financial systems by closing or privatizing many poorly managed banks owned by provincial governments (Schuler, 2003, p.7). As a result, Argentina pulled out of this brief recession period and the country returned to its growth track in in 1996 and 1997.

2001-2002. However, in 1998, the effects of another, more intense financial crisis began to make ripples across the Argentinian economy. The Asian financial crisis that began in mid 1997 created a strong wave of panic during which Russia and Brazil (Argentina's largest trading partner) experienced currency crises of their own in 1998 (Schuler, 2003, p.2). Commodity prices, including prices for some of Argentina's major exports, fell sharply. Argentina's international trade stagnated in 1998 and shrank in 1999. Beyond feeling the effects of the widespread Asian crisis, the election of a new president in December 1999 created a different set of issues. When Fernando De la Rúa entered office in December 1999, he reversed many of the policies that had strengthened the Argentine economy under Menem (Rabobank 2013, n.p.). De la Rúa increased government involvement, tightening regulation and raised taxes with the intention of cutting the budget deficit (Schuler 2003, p. 8). A top personal income tax rate of 35 percent, combined with payroll taxes totaling 32.9 percent and a value added tax of 21 percent, harmed consumer confidence and discouraged growth in the private sector (Schuler, 2003, p.10). In August of 2000, Professor Steve Hanke delivered a keynote speech at the annual meeting of the Institute of Financial

Executives in Bariloche, concluding that the tax increase was impeding recovery and severely undermining investor confidence (Hanke, 2002, p.211).

As the economy contracted in 2000 and 2001, the governing coalition fractured in March 2001. This marked the beginning of what would be the crisis phase. Interest rates spiked and remained at high levels in response to the turning tables within Argentina's political segment.

On April 17, 2001, the new finance minister, Domingo Cavallo (Menem's former minister of the economy), proposed to change the anchor of the Argentine peso from the U.S. dollar to a dollar-euro basket when the euro appreciated from its level at the time. On June 15 he announced a preferential exchange rate for exporters. These deviations from currency board orthodoxy, along with other changes in monetary policy, reduced the public's confidence in the system. Furthermore, a shrinking private sector meant a shrinking tax base, suggesting that the state's debt was not on a strong path. Throughout 2001, the premium on Argentine government securities compared to U.S. Treasury securities was rising quickly, from 3 percent to 13 percent in April and 20 percent by October (IMF, 2003, p.40). Not only did these climbing rates incite fear of default, but they also placed Argentina in a "debt trap," wherein the high interest rates paid on loans would cause a dangerously quick and steep rise in government debt. Additionally the monetary base fell from 15 billion pesos in 2000 to 11.9 billion pesos in 2001, showing a clear drop of currency in circulation and reserve balances (BCRA annual report, 2001, p.2).Year-over-year tax revenues for the final quarter of 2001 plummeted by 17 percent, causing an overall deficit of 4.5 percent of the GDP in 2001 (IMF, 2003, p.62). By the end of 2001, both the economy and the public finances were in a deep crisis. By December 2001, economic activity collapsed, with year-over-year industrial production falling 18 percent, construction falling 36 percent, and imports falling by more than 50 percent.

As general fears of government default and economic uncertainty continued and compounded, interest rates skyrocketed and the spread between U.S. Treasury bonds and Argentine government bonds increased up to 5,000 basis points. From

November 28-30, there was a powerful run on private sector deposits, which fell by more than US$3.6 billion, 6 percent of the deposit base (IMF, 2003, p.62). In response, the government initiated a freeze on bank deposits on December 1, crimping private sector activity. Monthly economic activity suffered a year-over-year fall of 15.5 percent for December.

The public responded to the political and economic turmoil with riots, which led to the resignation of Domingo Cavallo on December 19 and President De la Rúa on December 20. On December 23, new president Adolfo Rodríguez Saá declared a default on external government debt as well as an array of other policy changes. His administration came to end when he resigned after only a week in office, but the default remained in place.

Eduardo Duhalde became the next president on January 1, 2002 and took powerful measures to shore up the political and economic situation that had been pounding Argentina. He devalued the peso, forcibly converted all U.S. dollar deposits and loans into pesos ("pesofication") and voided various contracts (Schuler, 2003, p.5). In the short run, the economy fell further, with year-over-year monthly economic activity shrinking 16.9 percent in January and 16.6 percent in March; this value only turned positive in December 2002. GDP shrank 10.9 percent in 2002, as compared to 4.4 percent in 2001 (IMF WEO). The unemployment rate rose to 25 percent and 53 percent of the population fell below the poverty line (Cibils *et al.*, 2002). Average annual income per capita sank to $2,800 in 2002 from $8,500 in the early 1990s, a large part of which was attributable to the decline in the exchange rate of the peso against the dollar (Blustein, 2005).

The poor statistics the full year 2002 exhibited hide that by August 2002, the economy showed signs of improvement, with the exchange rate stabilizing and even appreciating, and inflation staying within a relatively reasonable range. The production and export sectors stopped shrinking and industries began to finally expand. International commodity prices were rising, helping some of Argentina's key exports. With economy finally witnessing significant recovery, the government gradually lifted the freeze on bank deposits between December 2002 and April 2003 as the economy returned to normalcy.

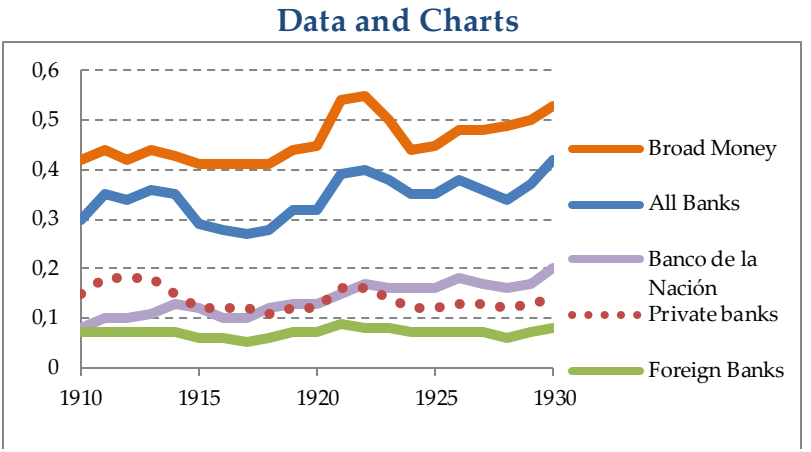

Chart 3.1. *Argentina: Credit Supply and Money Supply (ratio to GDP), 1910-1930*
Source: Della Paolera & Taylor (2003, p.314), from multiple underlying sources.

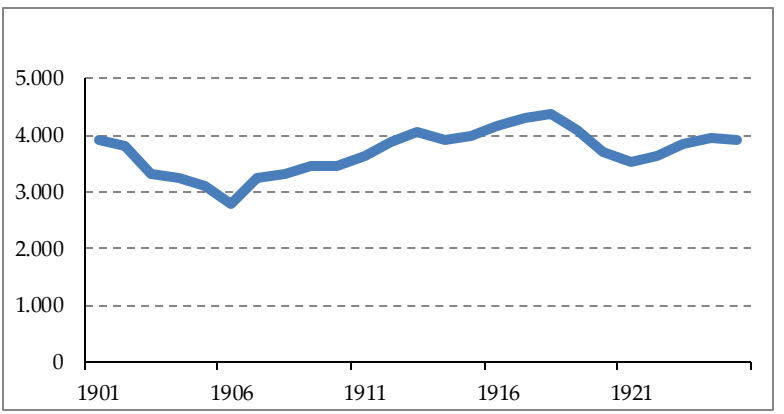

Chart 3.2. *Argentina: GDP per capita (Geary-Khamis 1990 international dollars), 1900-1936*
Source: Bolt & van Zanden (2014).

Table 4. *Argentine: Bank Deposits (millions of paper pesos) 1912 and 1914*

	1912	1914	Percent Change
Total	1,480.9	1,189.3	-19.7
Private Domestic Banks	674.3	365.4	-45.8
Banco Español	229.9	126.9	-44.8
Banco Italia	101.5	62.4	-38.5
Banco Frances	84.7	55.0	-35.1
Nuevo Banco Italiano	41.0	27.2	-33.7
Banco Popular Argentina	20.4	17.4	-14.7
Other Private Banks	196.8	76.5	-61.1
Banco de la Nación	478.3	552.7	15.6
Foreign Banks	328.3	271.2	-17.4

Source: Della Paolera & Taylor (2003, p.319), from multiple underlying sources.

Table 5. *Argentina: Various Nominal Variables 1928-1933*

	Monetary Base	Gold Stock	Money Supply
1928	1,406	1,113	4,717
1929	1,247	954	4,652
1930	1,261	968	4,660
1931	1,245	593	4,149
1932	1,339	584	4,115
1933	1,214	561	4,061

Source: Della Paolera (2001, p.191), from multiple underlying sources.

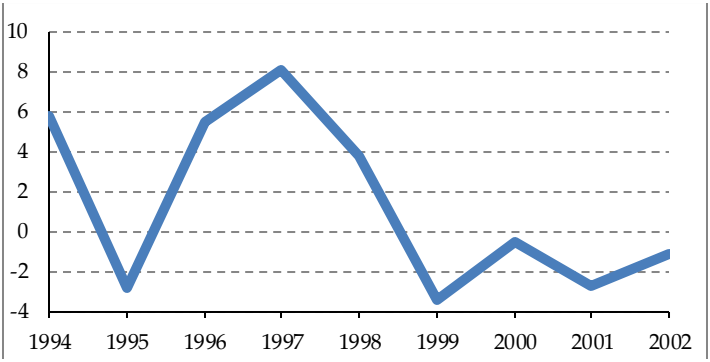

Chart 5. *Argentina: Real GDP Growth (%), 1994-2002*
Source: International Financial Statistics.

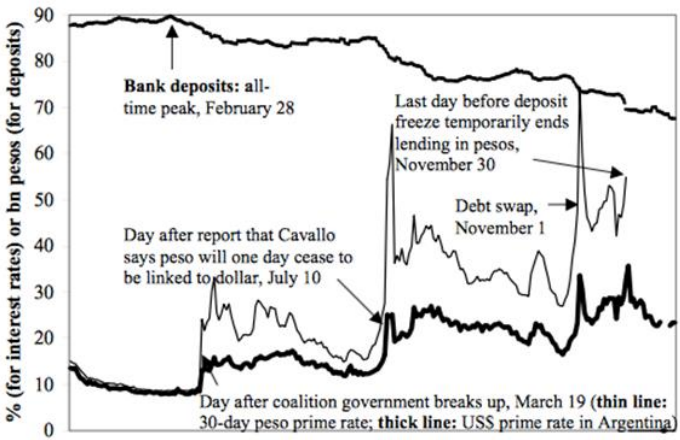

Chart 6. *Prime rates and bank deposits in 2001*
Source: Schuler (2003), short version, p.4); underlying data come from Banco Central de la República Argentina (interest rates, deposits) and news reports (events).

The Philippines (1919-1922)

After the United States took control of the Philippines in 1898 following the Spanish-American War, the monetary system underwent several major changes. The American colonial government introduced a gold-exchange system to replace the previous silver standard. As in the United States, the government issued silver certificates that were 100 percent backed by a silver coin and bullion reserve (Luthringer, 1934, p.44). (Silver certificates helped to promote the interests of the silver lobby that was

powerful in American politics at the time.) The two major commercial banks, the Spanish colonial era Bank of the Philippine Islands and the recently established Philippine National Bank, also issued notes. The Philippine government owned a majority of the shares of the Philippine National Bank (Philippines, Act No. 2612, 4 February 1916).

In order for the peso to be convertible into gold, a Gold Standard Fund was additionally established. Because of the Philippines' colonial relationship with the United States, this fund primarily comprised U.S. dollar deposits in New York; the reserves also included U.S. gold coins and silver pesos kept in Manila. The primarypurpose of these funds, which began operation in 1903, was to maintain reserves near 100 percent of the face value of coins and silver certificates in circulation (Luthringer, 1934, p.37). However, over the next decade, the government began to deviate from the original intent of the arrangement; it responded to rising silver prices by introducing new peso coins with less silver content. The government also invested significant portions of the Gold Standard Fund in local government and railroad loans, continuing to dilute the original intent (Philippines, Act No. 2083, 8 December 1911).

World War I transiently benefitted the Philippine economy in a significantly manner. During the war, exports tied to the country's three primary industries, Manila hemp, coconut oil, and processed sugar, surged to unprecedented levels. In the last few years of the war, exports grew rapidly to significantly outweigh imports and, as a result, price levels increased (Luthringer, 1934, p.127).

Silver prices climbed during the war and the government took advantage, passing. Act No. 2776 in March of 1918 combined the Gold Standard Fund and the Silver Certificate Reserve into the Currency Reserve Fund--an actionthat Yoshiko Nagano argues was the ultimate cause of the future financial crisis. The combination of these two funds compensated for the depletion of the Gold Standard Fund and kept sufficient funds available (Nagano, 2015, p.137). In addition, the act allowed the government to deposit up to 25 percent of the Currency Reserve Fund within the New York branch of the Philippine National Bank.

At the end of the war in November 1918, the economic activity the war had generated began to dwindle and the Philippines' main exports fell off sharply; exports fell from 270.4 million pesos in 1918 to 226.2 million pesos in 1919 (*Annual Report of the Insular Collector of Customs* 1932, p. 66, cited by Luthringer, 1934, p.266). By the end of 1918, most of the reserves in New York had been transferred to back to the Manila office of the Philippine National Bank to augment loans for the suffering export businesses (Nagano, 2015, p.120). In the first half of 1918, G. Martini, Ltd., a major producer of Manila hemp, received one of these loans. By November 1919, Martini owed 8.5 million pesos to the Bank, which included overdrafts of 2 million pesos and un-matured foreign bills amounting to 4 million pesos (Nagano, 2015, p.146). In order to mitigate the huge losses that one of the country's biggest firms was facing, the government got inextricably involved in the business. As a way to disguise its involvement in the markets, the Bank gave loans to trading companies V. Madrigal & Co. and Fernandez Hermanos, which were both managed by executives of the bank; this money was to be used to purchase Manila hemp, thus increasing revenues for Martini and propping up prices (*The Coates Report* 1920, cited by Nagano, 2015, p.146). The Bank was essentially loaning out more money to the troubled company but in a way such that the general public could not see it. G Martini, Ltd. was only one such company receiving the Bank's ill-advised loans. By 1919, 39 million out of the 46 million pesos in the Currency Reserve Fund were lost due to loan defaults; as an indication of the severity of the crisis the Philippines found itself in, the government lost or had to divert almost 80 percent of the country's annual revenue from taxes and tariffs to replenish the depleted reserve (Nagano, 2015, p.4). This also caused severe inflation.

1919-1922. It was clear by early 1919 that the Philippines was in the midst of a serious financial crisis. George Luthringer, whose study of the episode remains authoritative, states "that the currency reserves deposited with the Philippine National Bank were dissipated in such a manner is indicative of inefficiency and crass ignorance of the principles of the currency system on the part

of both the officials of the Bank and the responsible officials of the Insular Government" (Luthringer, 1934, p.121).

The government deviated from the intended rules of the currency board arrangement in other respects, as well. With the exchange fund in New York distressed, the Philippine government attempted to relieve economic stress by refusingto sell drafts on the New York balance of the Currency Reserve Fund as required by law on March 23, 1919. When the government resumed selling drafts in May 1919, they were sold at premiums, above the former rates established by law. (A premium in this context means that the exchange rate was depreciated from its official parity.) Premiums rose from 1.5 percent for demand drafts and 2.5 percent on telegraphic transfers in early May to 3 percent and 4 percent in late May, respectively (*Manila Times*, May 18, 1919: n.p.; Luthringer, 1934 p.132). By the end of 1919, the commodity balance of trade was 11 million pesos against the Islands, and the government had sold 11.8 million dollars of exchange on New York as against 1.1 million dollars in 1918. In the same period, U.S. Army and Navy transfers declined from 46 million pesos to 10 million pesos as war gave way to peace, emphasizing the danger of relying on these transfers as a source of gold in New York instead of maintaining adequate currency reserves (Philippines, Bureau of the Treasury, *Annual Report* 1919, pp.24, 27; Luthringer, 1934, p.133). Furthermore, there was an increase of 2.9 million circulating pesos in 1919, a time when in an orthodox currency board system there should have been a contraction in response to the economic contraction. In trying to stop the drain on the dollar reserve by advances in the rate on drafts, and, when this had failed, by selling drafts without effecting any contraction, the government failed entirely insofar as correcting the underlying factors of disequilibrium was concerned (Luthringer, 1934, p.135).

During the first few months of 1920, Philippine exports skyrocketed. One of the main exports, sugar, was selling at nearly six times its price in 1913 (*Statistical Bulletin* 1920, p. 93, cited by Luthringer, 1934, p.138). This had a favorable effect on the exchange rate. However, the worldwide crisis and depression which broke in the middle part of 1920 reacted violently upon the Philippines. (The United States, the Philippines' largest trading

partner, was among the countries hit by the depression.) The prices of the Philippine raw materials that drove export figures collapsed and a sharp decline in trade occurred.

These developments were reflected in exchange rates by a steady depreciation of the peso. Going forward, the government continued to disregard the principles of the gold-exchange standard and sold drafts in New York at premiums that neared as high as 14 percent (Luthringer, 1934, p.141).

The following years were marked by massive volatility on many fronts, including trade figures, the price level, and the exchange rate. The government was constantly responding to small adjustments in the economic conditions by changing its policy as the gold-exchange standard and deposits in New York were concerned. In 1921, beyond wide fluctuations in the depreciated peso, disorderly deflation, liquidation, severe business depression and stagnation, there were widespread failures, strikes, and unemployment (Luthringer, 1934, p.160). Imports fell from 27.8 million pesos in January of 1921 to 11.4 million in December. At this point, the Philippine National Bank and the Bank of the Philippine Islands were both in poor condition. The legal reserves of the Philippine National Bank were deficient by approximately 29 million pesos and the Bank of the Philippine Islands was unable to meet further withdrawals of deposits, redeem its notes, or pay balances due to other banks (*Manila Times*, March 8, 1922, n.p., cited by Luthringer, 1934, p.163).

In late 1921, it appeared that conditions were beginning to improve; the Philippines had increased its gold resources, exchange rates in the U.S. again began to rise, and it seemed like the restoration of the peso to par was near. However, in November 1921, in fear of a drain on its newly acquired gold balance, the government suspended the sale of exchange, and kept the suspension in force for the remainder of 1921 and the entire year 1922, essentially leaving the peso to its own devices (Philippines, Governor General, *Report of the Governor General* 1922, p.111; Luthringer, 1934, p.166).

The suspension of draft sales was a potentially disastrous decision by the Philippine government and almost completely suspended the operation of the gold-exchange standard. A *Manila*

Times article titled "The Truth About the Financial Situation in the Philippines" from March 6, 1921 evidenced a complete misunderstanding by Philippine government officials, as well as bankers and businessmen, regarding the currency board arrangement and the gold-exchange standard (cited by Luthringer, 1934, p.175). This was characteristic of the entire crisis period, during which the government exacerbated matters at times when it had the ability to take corrective actions. Luckily, the events of 1922 served to counteract the government's poor decision making. A net decline in currency circulation, the revival of export trade, and a drastic curtailment of imports in 1922, ensured the eventual return of the peso to near par in late 1922. After the return out par, the government resumed the buying and selling of exchange under a more strictly regulated system.

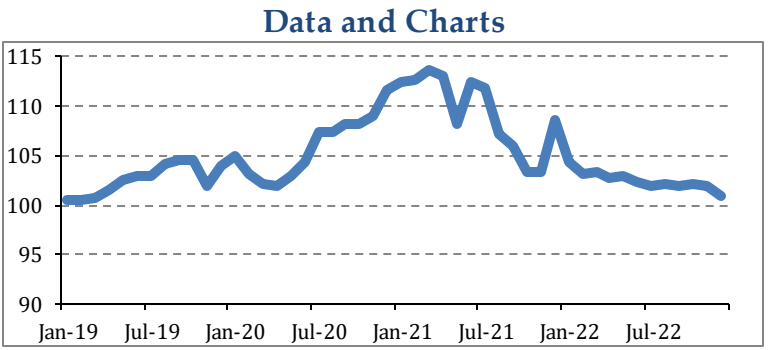

Chart 4.1. *Philippines: Price of Dollar Exchange in Manila (parity = 100; > 100 = depreciation)*

Note: 100 is equal to the legal parity of two pesos per dolar. **Source:** Diesen (1922, p.50).

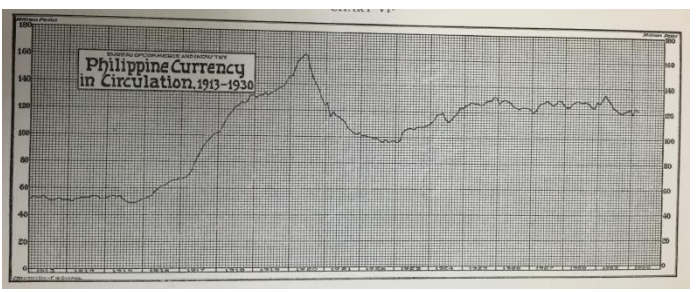

Chart 4.2. Philippine currency in circulatşon 1913-1930

Source: Luthringer (1934, Appendix A); underlying data are from *Statistical Bulletin of the Philippine Islands* (1929).

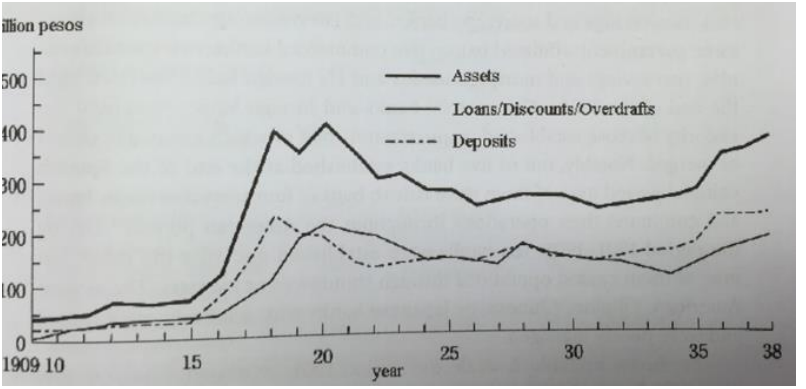

Chart 4.3. *Philippine currencies in circulation, 1910-1940*
Source: Nagano (2015, p. 53); underlying data are from Philippine (Commonwealth), Bureau of Banking, *Annual Report of the Bank Commissioners of the Philippine Islands* (1938, p.1).

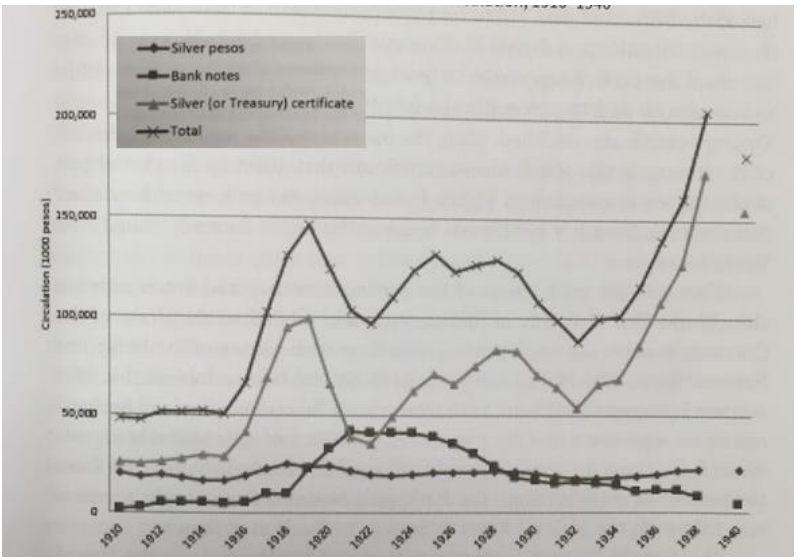

Chart 4.4. *Aggregate amount of assets, loans/discounts/overdrafts and deposits in bank of the Philippines, 1909-1938*
Source: Nagano (2015, p. 33); underlying data are from Philippine Islands and Philippines (Commonwealth), Bureau of the Treasury, *Annual Report of the Treasurer of the Philippine Islands*, various years.

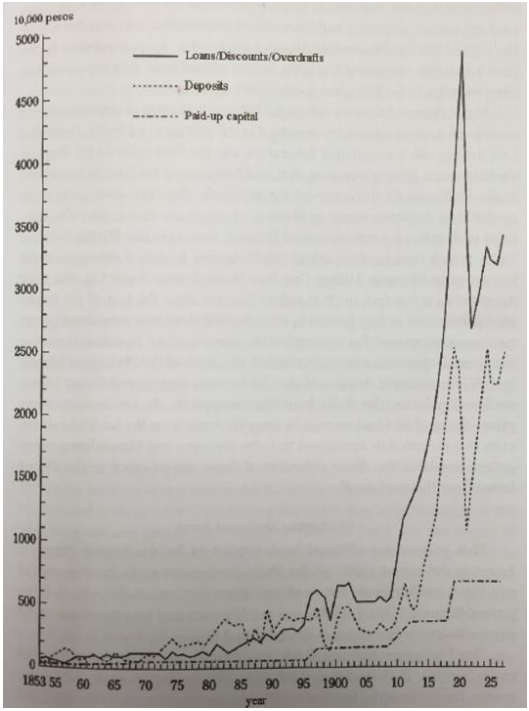

Chart 4.5. *Paid-up capital loans/discounts/overdrafts and deposits in bank of the Philippines, 1853-1927*

Source: Nagano (2015, p.63); underlying data are from Banco de las Islas Filipinas (1928).

Palestine (1935-1936, 1940)

British military forces tookPalestine from the ruling Ottoman Empire in 1917-18, during World War I. After the war the League of Nations made Palestine a British mandate. Initially the British replaced Ottoman currency with the currency of Egypt, a British protectorate. Under the ultimate control of the British Colonial Office, the Palestine Currency Board was then established in late 1927, fixing the Palestine pound (P£) to the pound sterling at a one-to-one ratio.

1935-1936. In the late 1920s and early 1930s, the Palestinian economy witnessed strong economic growth. During this period, the country was not subject to any capital controls or trade restrictions, experiencing near-free market conditions. Production and sales of the main Palestinian product, citrus, were surging.

Furthermore, there was a massive influx of Jewish immigrants, coupled with a substantial influx of capital. The immigrants brought with them manpower, new skills, and most significantly, an increased demand for goods and services. These factors combined to create a period of rapid economic growth in Palestine (Ottensooser, 1955, p.51). It is estimated that construction investments in new buildings represented roughly 50 percent of overall investment activity during this period (Horowitz 1954, p.70, cited by Ottensooser, 1955, p.49). Despite strong economic growth, there were several short episodes of social unrest between the new Jewish immigrants and the Arabs. For example, there was a series of riots in 1929 between the two parties over access to the Western Wall in Jerusalem, leading to many deaths and significant property damage (Ottensooser, 1955, p.47). Although unrest lasted only a few days, it foreshadowed further unrest moving forward.

The period brought a banking boom. Three main groups of institutions catered to the needs of a steadily growing clientele: foreign banks, local banks, and credit cooperative societies. Foreign banks, the most important of which was Barclays Bank (Dominion, Colonial & Overseas), had the bulk of the country's deposits (Ottensooser, 1955, p.57). In addition to providing usual commercial banking facilities for Palestinians, Barclays also acted as the government's banker, and was thereby often referred to as the Agent of the Currency Board. While Barclays served the main needs of the Palestinians, the Anglo-Palestine Bank, Ltd., established in 1912, served as the most important bank for the Jewish population of Palestine, extending loans to Jewish enterprises and helping establish the strong economic structure of the area (*Palestine Post*, 7 July 1940, p.3). Local banks grew extremely quickly in response to the large immigration and capital inflows. Between 1932 and 1935, 46 were established, many with meager capital and reserve funds, which would eventually cause some problems later (Government of Palestine, *Bulletin of Banking Statistics* 1937, cited by Ottensooser, 1955, p.59-60). Despite the potentially harmful presence of many small banks, the general view was that Palestine's largest banks were strong and secure enough to ensure the safety of the currency; after a Chamber of Commerce meeting in late September, the membersagreed that

both Barclays and the Anglo-Palestine Bank, as well as the London-based Ottoman Bank, the Palestine Mercantile Bank, and the Belgian-based Banque Belge pour l'Industrie, could safely protect the banking interests of Palestine (*Palestine Post*, 1 October 1935, p.1).

In 1935 domestic and international political tensions dampened Palestine's development and initiated a crisis. Hostility between the Arab Palestinians and Jewish immigrants spilled over into the economy. Influenced by Arab nationalist movements in neighboring regions, Arabs rallied for the government to draft laws preventing further immigration. As the two sides failed to reach agreements, Arabs turned to boycotts, work stoppages, and violence. The Port of Jaffa, which was usually operated by Arab labor, ceased to function. From October 1935 to October 1936, Jewish property losses included 142,000 citrus and other fruit trees, 64,000 forest trees, and 16,500 dunams, or 4,077 acres, of crop and P£250,000 worth of industrial and commercial premises (Great Britain, Palestine Royal Commission, *Report* 1937, pp.105-106, cited by Ottensooser, 1955, p.53).

In late 1935 the Italian Invasion of Ethiopia created further economic uncertainty in Palestine. In the months leading up to the Italian invasion, Palestine suffered a brief banking crisis as a result of fear that the invasion could mean further political unrest in Northeast Africa and the Middle East. In August and September, there were several instances of bank runs. Italian forces officially moved into Ethiopia in early October. Palestine entered a state of chaos as people responded to the uncertainty with violence. In response to the invasion, the government was quick to address the situation and attempt to ease concerns of the general population. On October 11, 1935, only days after the first offensive by Italian forces, J. Hathorn Hall, the Officer Administering the Government, the second-ranking government official, made a general announcement that the events in Ethiopia were "no cause for anxiety," and suggested that "nervousness and apprehension from which some people in Palestine had recently been sufferings, were unfounded and unjustified" (*Palestine Post*, 11 October 1935, p.1). Such statements helped ease concerns and halted the bank runs effectively ending the crisis in 1936.

1940. Bank runs also occurred towards the beginning of World War II in July 1940 after Holland and Belgium had been invaded and Italy entered the war. Depositors began withdrawing significant amounts. Cash withdrawals were so heavy that some local banks saw their cash reserves depleted. Small financial institutions such as King Solomon Bank (P£100,000 in debt) were liquidated, and the Belgo-Palestine Bank (P£73,000 in debt) failed during this period of panic (*Palestine Post*, 8 July 1940, p. 2). The aggregate deposits of foreign and local banks and of credit cooperative societies declined from £P20.2 million to £P14.7 million between June 1939 and June 1940 (Ottensooser, 1955, p. 63). Beyond this, farmers were struggling; in July 1940, citrus growers were receiving advances on cultivation loans, putting further stress on the overextended government (*Palestine Post*, 13 July 1940, p.2).

As the war continued, though, the Palestinian economy witnessed strong growth. British troops' demand for consumer goods and military construction contributed to real GNP growing at an annual average rate of 11 percent (Barkai & Liviatan, 2007, ch.1). Furthermore, Palestinian goods came to replace products that had previously been imported from Europe. Additionally, Jewish capital imports continued unabated through the war, totaling approximately P£45.2 million from 1940-45 (Horowitz, 1954, p.117, cited by Ottensooser, 1955, p.55). Net savings had been negative in Palestine prior to the war, but during the war period, the booming economy led to individual and corporate savings in 1942-44 amounting to P£48 million, which was also reflected in rising bank deposits.The increased economic activity brought with it a surge in the cost of living, which rose threefold between the outbreak and end of the war (*Statistical Abstract of Palestine*, cited by Ottensooser, 1955, p.55). Throughout the war period, banks maintained high degrees of liquidity after the warningsigns of 1935 and 1936 presented themselves; this allowed for Palestine to generally remain economically sound through the end of the war in 1945.

1948: Not a crisis period. The British mandate in Palestine ended in May 1948 with the declaration of independence of the State of Israel and the First Arab-Israeli War. Israel replaced the Palestine Currency Board with the Anglo-Palestine Bank as a quasi

central bank. In the politically troubled period leading up to the end of the mandate, there was no financial crisis, although there were some banking and currency problems related to the political situation. For example, the Israeli authorities thought that the Palestine Currency Board ceased its operations in Israel in a way that made the transition to the Anglo-Palestine Bank as the monetary authority more difficult than it should have been (Ottensooser, 1955, p.111).

Data and Charts

Table 10. *Palestine: Local and Foreign Banks, Cash Ratios, 1940-1944 (P£ 1,000)*

	1940	1941	1942	1943	1944	1945
Cash and External bank balances	6,183	11,031	13,323	22,607	32,464	38,866
deposits	17,356	18,701	24,014	37,028	57,775	71,525
ratio (percent)	35.6	59.0	55.5	61.1	52.2	54.3

Source: Statistical Abstract of Palestine (1940-44, p. 89); Ottensooser (1955, p. 66)

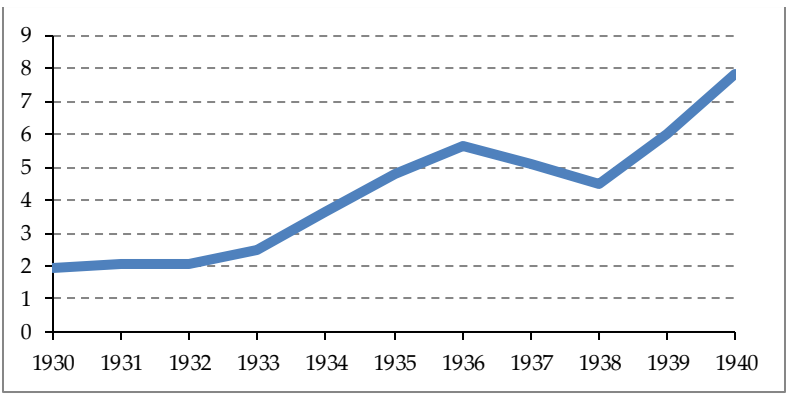

Chart 5.1 *Palestine: Monetary Base: Notes in Circulation (million Palestine pounds)*
Source: Historical Financial Statistics.

Hong Kong (1941, 1960s, 1987/91, 1997-1998)

Hong Kong established a currency board in December 1935 when China abandoned the silver standard and pegged its currency to the pound sterling. Hong Kong followed suit, fixing

the Hong Kong dollar to the pound sterling at HK$16 = £1. Hong Kong's currency board, the Exchange Fund, differed from all other British colonial currency boards in that the board itself has issued no notes directly until recently. Instead, the banks that had issued notes before the advent of the currency board continued to do so, but now as agents for the Exchange Fund and subject to currency board restrictions rather as free agents. With some changes, this arrangement persists today.

1941. The new system was tested only a few years after the World War II Battle of Hong Kong in December 1941.[1] Japanese forces captured the territory and continued to occupy Hong Kong through the end of the war. The Japanese found and put unissued banknotes into circulation. These notes were later referred to as "duress notes." The assets of the Exchange Fund were invested in British Empire securities and were out of reach of the Japanese, but the issue of the duress notes made the outstanding note issue greater than the Exchange Fund's reserves. Later in their occupation of Hong Kong, the Japanese introduced a new currency, the military yen, and declared it the only legal form of currency (Schuler, 1992, pp.138-139). Many people stockpiled Hong Kong dollar banknotes in anticipation of an eventual Allied victory (Jao, 1974, pp.16-17, cited by Schuler, 1992, p.139). After the Allied victory and Japan's withdrawal from Hong Kong in September 1945, the British administration re-established the Hong Kong dollar, offered exchanges for military yen (albeit at low rates), and decided to honor the duress notes (Ordinance No. 13 of 1946). Though it took time, by 1953 the Exchange Fund's foreign reserves had returned to normalcy under orthodox currency board standards, reaching 100 percent of its currency in circulation.

1961. Hong Kong became one of the economic miracles of the postwar era and experienced great growth in its financial sector. Bank deposits as a proportion of GDP increased from about 41

[1]Like other British colonies, Hong Kong imposed exchange controls when World War II broke out in Europe and retained them after the war. To facilitate Hong Kong's role as an entrepôt, the British colonial administration did not impose controls as tight as those elsewhere. Hong Kong had a free currency market in which it was possible to buy U.S. dollars at their more expensive market rates rather than risk not being able to obtain dollars while waiting in the queue to buy them at the cheaper official rate.

percent to 70 percent between 1959 and 1964 (Schenk, 2001, p.58). The banking boom was caused by mass inflows of capital, increased prosperity, and immigration (mainly of Chinese fleeing communism, but also some other groups seeking economic opportunity). It was further characterized by aggressive marketing by banks as they sought liquidity in order to participate in the economic development of the colony, as well as to speculate in shares and property. A distinguishing aspect of the period was that depositors were predominantly foreigners from who faced uncertainty in the volatile political and economic climates of their countries in Southeast Asia. The low taxes, price stability, and related relaxed exchange control all made Hong Kong attractive for depositors. The competitive atmosphere of the late 1950s also led to rising interest rates that attracted depositors from overseas and at home (Schenk, 2001, p.59).

Increased deposits caused a rapid extension of bank offices, thereby spreading the "banking habit" in Hong Kong. Starting in 1960, the government's Banking Advisory Committee became concerned by this rapid growth and felt that limiting bank licensing would prevent potential instability. Despite increased restrictions on applicants, the Committee had little to no power in regulating the activities of alreadylicensed banks. A report by a Bank of England official sent to study the situation claimed that there were already too many banks in operation and that excessive competition had driven the smaller, less experienced banks to overextend and offer unsupportable rates to attract deposits (Tomkins, 1962, pp.13-14, cited by Schenk, 2001, p.60). The Hongkong and Shanghai Banking Corporation (HSBC) was the leading bank in the colony, with 49 branches, 41 of which were opened after 1959. The other major bank, Standard Chartered Bank, operated 17 branches by 1966, only one of which was opened after 1959.

During this period, there was also an extraordinary growth of small banks, contributing to booms in shares and property from 1959 to 1961. This in turn contributed to the banking crisis of 1961, of which Liu Chong Hing Bank was the primary victim. Established in 1948 in Hong Kong to collect savings and small deposits in China, Liu Chong Hing Bank was incorporated in 1955

with a registered share capital of HK$5 million, of which HK$4 million was fully paid up. Three years later, the registered share capital was expanded to HK$20 million, of which HK$10 million was paid up, and the bank opened its first branch. In June 1961 there was a run on the bank after it ran into difficulties as a result of property speculation and the liquidity squeeze that accompanied the stock market boom (Kwok-Leung, 1962, p.67, cited by Schenk, 2001, p.63). The government asked HSBC and Standard Chartered to support Liu Chong Hing, and in the end, Liu Chong Hing offered specific collateral to obtain a loan from them. The run ended after the press and radio announced that the two leading banks were offering support (Minutes of the London Consultative Committee, 13 July 1961, cited by Schenk, 2001, p.63).

1965. The events of the Liu Chong Hing Bank served as a warning to strengthen banking regulation. Under the supervision of a team of representatives from the Bank of England, the Banking Ordinance of 1964 was announced in April of that year. The ordinance established interest rate ceilings, with "basic" interest rates offered by foreign banks and the leading Hong Kong banks and a graduated scale for other categories of banks up to 0.5 percent above the basic rate. The system was designed to enable smaller banks to compete for deposits with the larger banks, but at the same time to constrain such competition to avoid upward drift in interest rates. However, there was still significant disagreement over the terms of the new legislation, especially from a large Hong Kong Chinese bank, Hang Seng Bank.

Before the 1964 Banking Ordinance could be fully implemented, a second banking crisis occurred in early 1965. Going into 1965, property prices were falling quickly and the market was depressed by banks' sale of property assets to conform to the new Banking Ordinance, thus leaving many banks overexposed (Jao, 1974, pp.253-254, cited by Schenk, 2001, p.68). Ming Tak Bank was found to be insolvent and closed in late January 1965 (Ghose, 1987, pp.73-74, cited by Schenk, 2001, p. 68). Only weeks later, there was a two-day run on deposits of the Canton Trust and the Commercial Bank, which were both heavily involved in the property market. Despite support from HSBC and Standard Chartered, the Canton Trust suspended business on February 8, 1965 (Jao, 1974, p.248, cited by

Schenk, 2001, p.69). News reports about the support offered by these two banks temporarily lulled public concerns, but when rumors spread that the police were questioning the Chairman of Hang Seng Bank in April, runs resumed. One day later, on April 9, HSBC took a majority share in Hang Seng, which was later found to have been extremely illiquid (Jao, 1974, pp.249-250, cited by Schenk, 2001, p.69). This action represented the end to the crisis period of the 1960s. As a result, Hang Seng reported an absolute decline of HK$150 million deposits.

1972-1983: Not a crisis period. Hong Kong abandoned the currency board arrangement for about a decade starting in 1972. From 1974 onward the exchange rate floated. During that period there were no banking crises. There was however a currency crisis in October of 1983, in response to concern regarding the future of the territory stemming from Sino-British negotiations. To end the currency crisis, Hong Kong returned to the currency board system, with the Hong Kong dollar fixed to the U.S. dollar at HK$7.80 = US$1, where it remains today (Chiu, 2000, p. 4; Greenwood, 2008, pp.137-167).

1987. Hong Kong faced a number of shocks that put its economy to the test in the late 1980s and early 1990s. In October 1987, the world faced a significant and widespread stock market crash that affected economies across the globe. The Hang Seng Index of the stock market, which had risen to new heights throughout 1987, was among the first affected and fell by more than 40 percent. In response, the government suspended trading for four days because of concerns regarding the possibility of panic selling, confusion and disorder in the market, the liquidity of members, the possibility of bank runs, and the uncertainty caused by the settlement backlog (Davison 1988, p.29). As the Hang Seng Index continued to be pounded, the government introduced multiple multi-billion dollar rescue plans in conjunction with important domestic and international financial institutions. HSBC and Standard Chartered were among the supporting institutions. The banking system suffered no crisis (Davison, 1988, p.33). Despite the massive plunge and extensive reach of the October crash, worldwide markets recovered quickly and growth returned in 1988.

1991. In 1991, the Bank of Credit and Commerce International (BCCI), the seventh largest private bank globally, came under scrutiny for committing various financial crimes and for its involvement in an extensive money laundering scheme. This international scandal caused the closing of several branches of the bank including the Hong Kong branch, the Bank of Credit and Commerce Hong Kong Ltd. (BCCHK). The BCCHK was closed on July 8 1991 at a time when it maintained 26 branches and had 40,000 depositors who had entrusted with it US$1.4 billion (Holley, 1991).

Several other banks dealt with brief runs resulting from false rumors. There was a run on Standard Chartered after the circulation of unfounded rumors that Britain, the bank's home base, had stripped the bank of its license (Holley, 1991). Local branches of Citibank suffered a run after U.S. Congressman John Dingell falsely claimed that the bank was "technically insolvent" at a Congressional hearing (Schuler, 1992, p. 155-156).The Standard Chartered Bank suffered a run following unfounded rumors that Britain, the bank's home base, had stripped the bank of its license.Citibank suffered net withdrawals of up to HK$500 million and Standard Chartered suffered net withdrawals of more than HK$3 billion (*South China Morning Post,* August 10, 1991, p. 2; *Financial Times,* August 10-11, 1991, p. 1, cited by Schuler, 1992, p. 156). Though withdrawals represented only a small percentage of the banks' total assets and the runs subsided after two days, it caused the Hong Kong government to tighten supervision and regulation on financial institutions--a move that would prove important for Hong Kong's future.

1993: Not a crisis period. On April 1, 1993, the government established the Hong Kong Monetary Authority (HKMA), which merged the Office of the Exchange Fund with the Office of the Commissioner of Banking (HKMA n.d., p.1). The HKMA was set up with the goal of strengthening the institutional arrangements for ensuring monetary and banking stability and of promoting the further development of the financial system (IMF, 2000, p.8). Its wide range of powers made it in certain respects somewhat like a central bank, and its creation marked a step away from currency board orthodoxy.

1997-1998. The Asian financial crisis of the late 1990s slammed Hong Kong and threatened the economy as well as the HKMA on many fronts. By 1997, high demand and low supply drove the real estate sector to become the largest in the Hong Kong economy, contributing about 26.8 percent to GDP, followed by trade at 20.7 percent, and finance at 10.3 percent (HKMA annual report 1997, n.p.). A large influx of foreign capital and the rising dominance of the property sector in Hong Kong fueled an unprecedented boom in the stock and property markets, with the Hang Seng Index closing at a peak of 16,673 points on August 7, 1997 (Sheng, 2009, p.263)--a major increase from the 10,000 point mark just a year prior, and the 7,000 range in early 1995.

The Asian crisis first affected Hong Kong during the summer of 1997, when there was a small string of brief but threatening economic effects. First, small movements took place in the Hong Kong dollar in the aftermath of the Thai baht devaluation on July 2, 1997 (Financial Services Review, 1998, p.1). In mid-August, overnight interest rates rose to an intraday high of 10 percent; although the currency board arrangement served to stabilize markets, interest rates remained high between 6 and 7 percent for the rest of the third quarter. The first serious attack on the U.S. dollar link occurred on 23 October 1997, when overnight interest rates shot up to nearly 300 percent concurrent with the floating Taiwan dollar (IMF, 2000, p.9). Banks sold substantial amounts of Hong Kong dollars to the HKMA for U.S. dollars, which was required to accept these transactions, and a Hong Kong dollar liquidity crunch arose. Interbank interest rates shot up from around 9 percent to as high as 280 percent (Financial Services Review, 1998, p.1). At the end of the day, interest rates closed at 100 percent, as banks sold U.S. dollars back to the HKMA in exchange for Hong Kong dollars as hedges against high interest rates (HKMA took this passively as required). The Hang Seng index suffered severely and affected global markets. On October 28, the Hang Seng Index closed at 9,060 points (Sheng, 2009, p.264).

In November, the Asian financial crisis continued to claim victims, when Japan and South Korea began to falter, which substantially harmed confidence in Hong Kong. The lack of confidence caused an array of "quirky" runs, including those on St.

Honore Cake Shop and Whimsey Amusement Arcades, as people rushed to redeem tickets or credits issued by those firms. This level of speculative fear continued through the end of 1997 and into 1998 (Sheng, 2009, pp. 265-6). On November 10, there was a run on the locally based International Bank of Asia (IBA), though the bank was able to manage its liquidity quickly and efficiently to avoid any real problems (Financial Services Review, 1998, p.9). On January 12, 1998, Hong Kong's largest domestic investment bank, Peregrine, failed because of miscalculated funding for an Indonesian taxi company. The Hang Seng Index fell by 8.7 percent that day, closing at 8,121 points. Further, CA Pacific Securities, a midsized stockbroker with more than 10,000 retail accounts, voluntarily suspended operations on January 19 (Financial Services Review, 1998, p.10).

Volatility leveled off from February to May of 1998, as interest rates fell and the Hang Seng Index recovered approximately 20 percent of its value as compared to its January levels. However, the "Asian premium," or the spread between the interest rates in the Hong Kong dollar and the U.S. dollar, widened to as high as five percentage points (Sheng, 2009, p.266).

The economy started suffering harshly again in August of 1998, when Russia's currency devaluation and default shook world financial markets. High interest rates were hurting consumers and as the economy sharply contracted. Hong Kong faced a threat of the breaking of the link with the U.S. dollar under speculative pressure, made possible in part by certain technical features of the working of the currency board system that deviated from simple orthodoxy (Greenwood, 2008, pp.274-276). Hedge funds took advantage of the stock, futures, and swap markets to speculate against the Hong Kong dollar, causing rises in the interest rates and shock waves on the stock market. The Hang Seng Index hit a trough on August 13, 1998 when it reached 6,660 points after a series of strong speculative attacks. Over the next few weeks, the government intervened to stop the vicious cycle created by hedge funds and speculators, spending about US$15 billion in official reserves to buy the 33 stocks that made up the Hang Seng Index (Sheng, 2009 p.271). Furthermore, the government put limitations on the amount of interbank liquidity the HKMA could create and

also assumed a greater role in liquidity assistance. The actions represented the resilience of the Hong Kong government and the displayed the government's intention to maintain the link to the U.S. dollar. Though this risky decision met significant criticism from bankers and economists across the globe, the intervention stabilized the stock market, ended the campaigns of speculators, and restored confidence. Interest rates fell from 12 percent to about 5 percent. Over the next few months, the economy showed it was on a solid path to recovery as the government followed through with various measures to strengthen the monetary and financial systems post-crisis (Sheng, 2009, p.276).

Although Hong Kong was severely affected by the Asian crisis, the economy did not collapse like many of its peer countries. This was in large part due to the strength of the territory's banking sector and the low debt level of the corporate sector. Through all of the volatility and chaos characterized by the economy during the crisis period, foreign reserves stood high at US$96.5 billion, which served to secure the economy. After the crisis the HKMA took steps that restored elements of currency board automaticity that had had been weakened in the first several years of the HKMA (Greenwood, 2008, pp.278-283).

Data and Charts

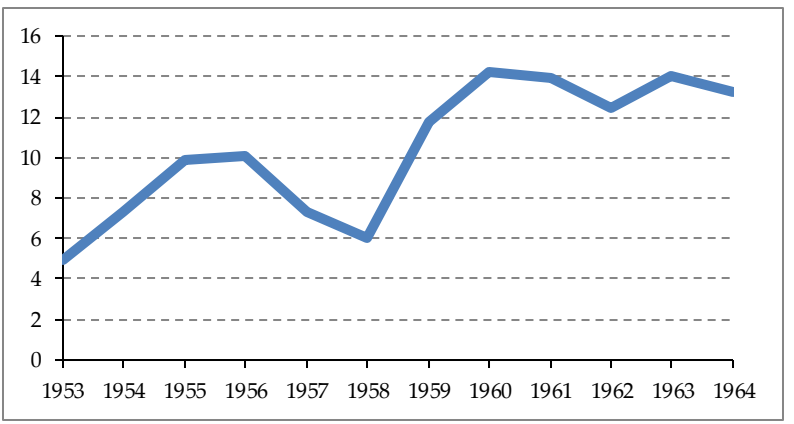

Chart 6.1. *Hong Kong: Real GDP Growth (%), 1953-1964*
Source: Historical Financial Statistics

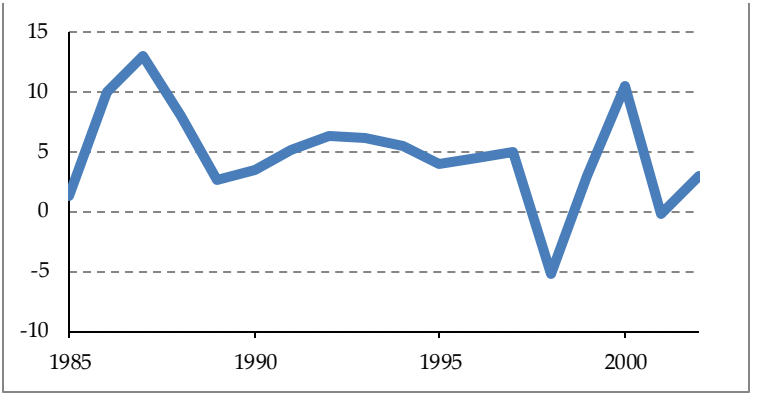

Chart 6.2. *Hong Kong: Real GDP Growth (%), 1985-2002*
Source: International Financial Statistics

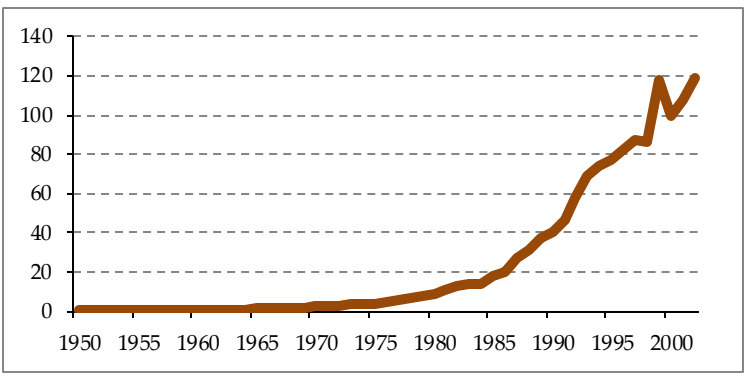

Chart 6.3. *Hong Kong: Monetary Base: Notes in Circulation (billion HK$), 1950-1966*
Source: Historical Financial Statistics.

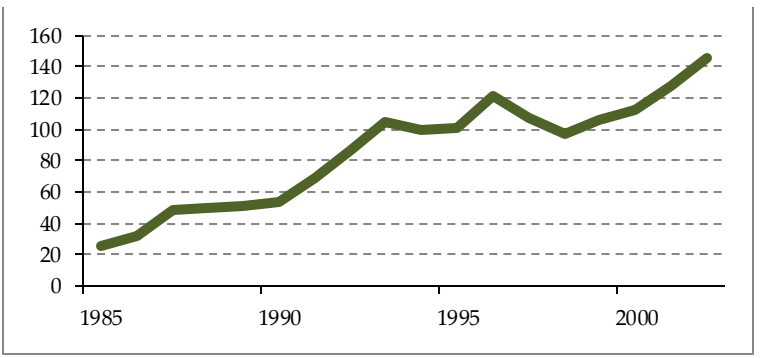

Chart 6.4. *Hong Kong: Demand Deposits (billion HK$), 1985-2002*
Source: International Financial Statistics.

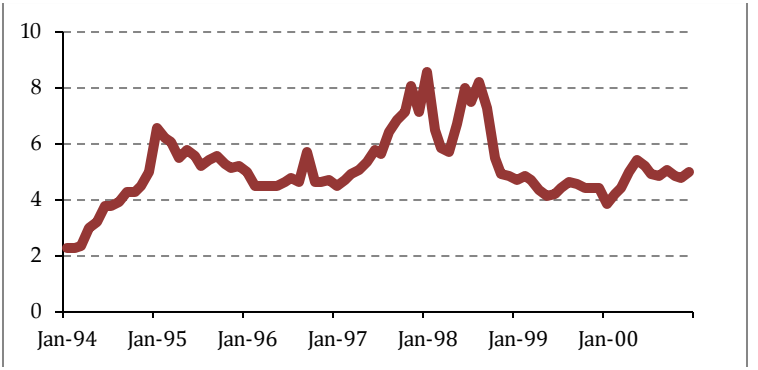

Chart 6.5. *Hong Kong: Annual Interest Rates on Deposits (%), 1994-2000*
Source: International Financial Statistics.

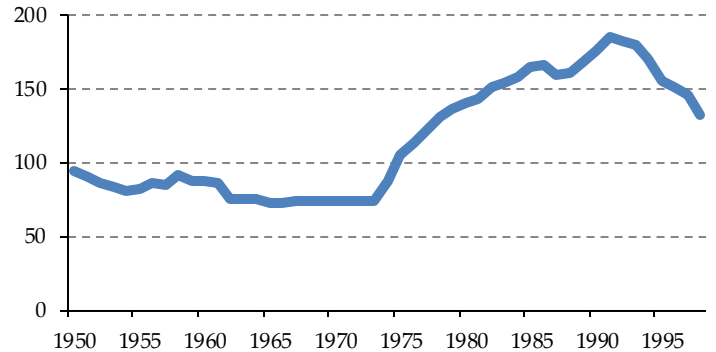

Chart 6.6. *Hong Kong: Number of Licensened Banks, 1954-2002*
Source: International Financial Statistics.

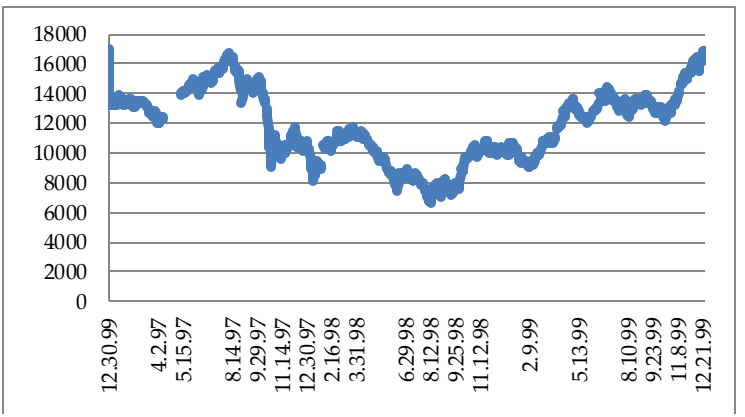

Chart 6.7. *Hong Kong: Hang Seng Index 1997-1999*
Source: Bloomberg L.P.

Estonia (1992, 1997, 1998)

Estonia became independent again in late 1991 with the collapse of the Soviet Union. It was the first former Soviet republic to replace the ruble with its own currency, the kroon. The kroon was issued by a reborn Bank of Estonia (Eesti Panki), which had issued the national currency during Estonia's previous period of independence between the world wars. In early 1992, Estonia suffered inflation that reached a height of 1,076 percent due to the economic disruption associated with breakup of the Soviet Union (Erixon 2010, p. 10). The government resolved to introduce a new currency quickly. The option of a currency board had been proposed and was known to government officials (Hanke, Jonung, & Schuler 1992; Kallas & Sörg 1994). In June 1992, Estonia officially introduced the kroon, which was fixed to the deutsche mark at a rate of eight-to-one under a currency board arrangement (Korhonen, 1999, p.16). Under the currency board arrangement, Estonia moved away from a Soviet-style "monobank" system to a two-tiered system, comprising Eesti Pank on one hand and commercial banks (initially, mainly former Soviet state banks, now owned by the Estonian government) on the other hand. It was the aim of the Estonian government to move to a Western-style banking system dominated by privately owned banks (*Fleming et al.*, 1996, p.42).

1992. The currency board was put to the test early in its existence. In early 1992, Moscow's Vnesheconombank (successor to the Soviet bank that dealt with foreign trade and foreign-currency transactions) imposed freezes on all assets belonging to non-Russian banks, resulting in financial difficulties throughout the former Soviet Union (Fleming *et. al.* 1996, p.42). This dried up cheap credit that provided Estonian banks with significant profits and liquidity. Furthermore, exceedingly high levels of inflation and a general economic slump internationally caused GDP in Estonia to decline 21.2 percent throughout 1992 (Erixon, 2010, p. 10). Gross national income per capita fell from approximately $7,500 in 1990 to less than $6,000 by 1992, the peak of the crisis (Erixon, 2010, p.10). The conglomeration of these economic uncertainties created problems for banks. In December 1992, three major Estonian banks failed: Tartu Commercial Bank due to severe

mismanagement, and Revalia Bank and Narva Bank due to liquidity complications (Hirvensalo 1994, p.82); this ultimately involved 40 percent of the broad money supply (Knobl *et. al.* 2002, p.19). The situation was further exacerbated by the plethora of poorly capitalized small private banks, vulnerable due to their insubstantial capital, disabling these banks from reaping the benefits of significant portfolio diversification (Fleming *et. al.* 1996, p.44). The government decided against a bailout by Eeesti Pank, which would have been legally possible, concluding that this action would be inflationary and harmful to the recently fixed exchange rate (Fleming *et. al.* 1996, p.43). However, Eesti Pank did rescue two banks, Union Baltic Bank and North Estonian Bank, that had been severely affected by the actions taken by Moscow's Vnesheconombank. Eesti Pank merged and recapitalized them by issuing government bonds equivalent to their frozen assets (Hirvensalo, 1994, p.82). At this point, Estonia was still engaged in the regime change transition period; the collapse of the banks was not as significant as it would have been in a full-fledged market economy, because the banks were specialized by sector, after the Soviet fashion, and did not serve households. Aggressive government intervention was not needed because of this peculiarity, and the gap left by the failed banks was simply created a vacuum filled by the expansion of several other operating banks.

1997. The Asian financial crisis of 1997 created unstable economic conditions in Estonia, as in many other emerging market economies. The uncertainty arising from the crisis made investors and banks cautious, subsequently decreasing the availability of capital (Erixon, 2010, p.40). As the Asian crisis worsened, there was a powerful attack on the kroon in late 1997. On October 16, 1997, *The Economist* published an article speculating that Eastern Europe, six years after the collapse of the Soviet Union, was poised to suffer a major economic crisis. The article theorized that the rapid growth of the Eastern European economies and the conglomeration of various warning signs that mirrored those of past crises would soon cause major exchange-rate turmoil. In analyzing Estonia, *The Economist* suggested that Estonia's D-Mark exchange rate link "encouraged a huge increase in bank lending" and that "the kroon could come under pressure if investors suspect that the banking

system is developing" symptoms suffered by other crises in the past (*Economist,* 1997). The article, along with concerns about the high current account deficit (11 percent of GDP) and a possibly overvalued real exchange rate, caused a brief period of panic in Estonia (Pilinkus *et al.,* 2011, p.395). Foreign banks responded by taking action to limit their exposure to a potential collapse of the kroon. Within days of the speculative attack, liquidity dried up and Estonian banks widened forward interest rate spreads, causing speculators to cease and the temporary crisis to dissolve (Pilinkus *et al.,* 2011, p.395).

1998. In 1998, Russia, which was still a significant trading partner with Estonia, faced a major crisis of its own. The Russian ruble was devalued in August, which decreased Russian consumers' purchasing power and harmed Estonian exports. In May 1998, goods had been exported to Russia in the value of 647 million kroons, but in September this figure had diminished to only 269 million kroons. The most severely affected Estonian sector was the food industry, which was extremely reliant on imports by Russia, which decreased by 44 percent in 1998 (Rei 2009, p.18). Beyond these direct effects, the crisis also harmed consumer confidence, as speculators were again busy betting against the kroon in early 1998. During this period, interbank interest rates climbed as high as 17 percent (Pilinkus *et. al.* 2011, p.395). Doubts over the two biggest Estonian banks, Hansapank and Eetsi Uhispank, were rampant. However, after about six months, the two banks were acquired by larger Scandinavian ones, eliminating the ultimate source of the speculative scare. Additionally, in 1998, in order to stabilize the banking system, the Bank of Estonia purchased shares of two commercial banks, Eesti Investeerimispank and Eesti Forekspank, in connection with a merger agreement that would consolidate the two banks into Optiva Spank (Bank of Estoniaannual Report, 1998). Estonia was also pulled out of its economic slump over the next few years by its progress toward accession to the European Union. The European economy grew fairly strongly in 2000, which benefitted Estonian exports. Estonian exports of the machinery and equipment sector grew from 9.6 billion kroons in 1999 to 21.6 billion kroons on 2000, and commodities exports increasing from 35 billion to 54 billion

kroons (Rei, 2009, p.19). The economy underwent significant restructuring and the gap in exports left by Russia's problems was filled by stronger trade relations with the European Union and a growing internal economy, pulling the economy out of the slump.

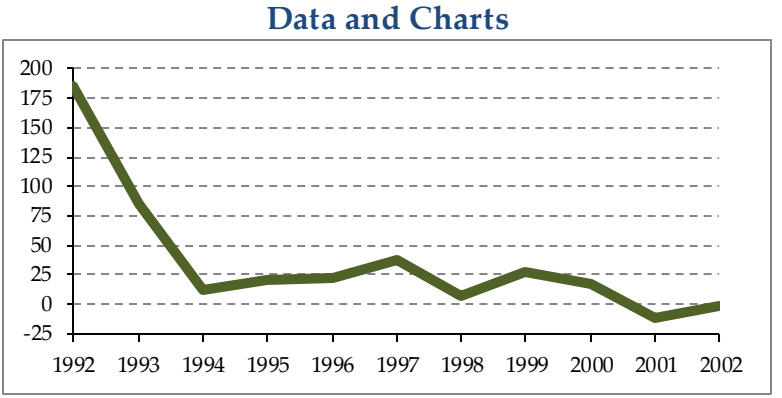

Chart 7.1. *Estonia: Monetary Base (YOY % Change), 1992-2002*
Source: International Financial Statistics.

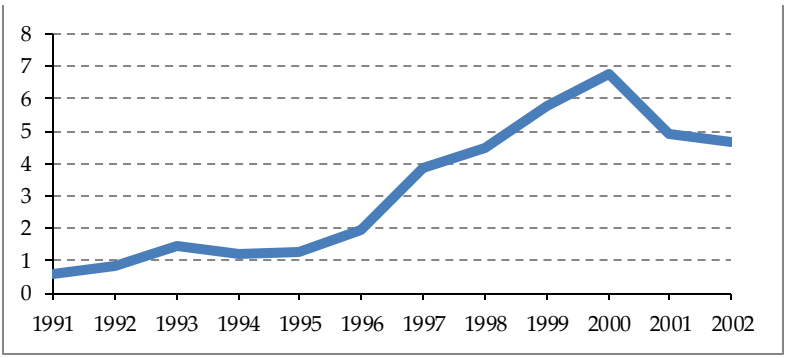

Chart 7.2. *Estonia: Deposit Money Banking Reserves (billion kroons), 1991-2002*
Source: International Financial Statistics.

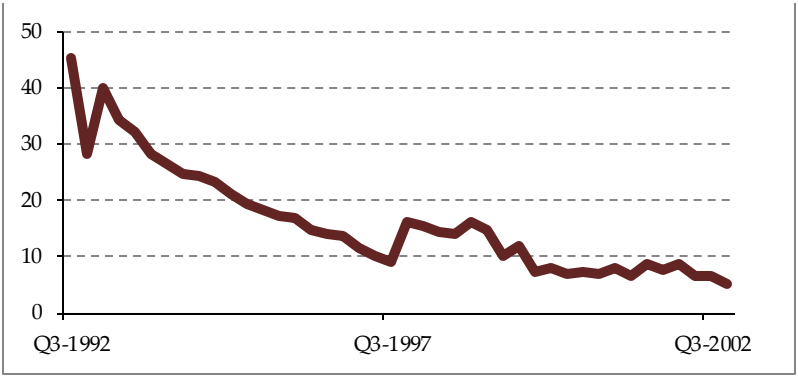

Chart 7.3. *Estonia: Annual Lending Interest Rate (%), 1992-2002*
Source: International Financial Statistics.

Lithuania (1995, 1998, 1999)

Lithuania became independent again in late 1991 following the breakup of the Soviet Union. Initially, there was debate as to the monetary regime that the government should establish. Proposals that the bank should operate as a currency board were rejected and the Bank of Lithuania began this period of independence operating as a central bank (Schuler, Selgin, & Sinkey, 1991). However, the central bank failed to reduce inflation in an efficient manner and hampered economic growth, in contrast with Estonia's quasi currency board system (Korhonen, 1999, p.19). Consequently, the government converted the Bank of Lithuania into a quasi currency board system starting on April 1, 1994 (as proposed by Hanke & Schuler, 1994). The local currency, the litas, was initially fixed to the United States dollar at a rate of 4 to 1 (Law on the Credibility of the Litas, March 17, 1994). On February 1, 2002, Lithuania changed the anchor to the euro, at 3.4538 litai per euro, reflecting the prevailing cross rate of the euro with the dollar (Bank of Lithuania, Resolution "On the Approbation of the Bank of Lithuania Regarding the Anchor Currency and the Litas Official Exchange Rate," No. 157, February 1, 2002). The rationale for the switch was Lithuania's increasing trade and financial ties to the recently established euro area. The exchange rate with the euro continued until Lithuania joined the euro area on January 1, 2015 and completely replaced litas currency with the euro at the fixed rate.

1995. The financial crisis of autumn 1995 can be largely attributed to the adjustment of the banking system to a new capitalist economy and to the diminution of the Bank of Lithuania's ability to act as a lender to commercial banks. To stimulate economic activity, the government pushed banks to increase public sector lending in spite of low interest return opportunities (Kiyak & Reichenbachas 2010, p. 98). Many of the ventures were risky, volatile, and often not profitable, thereby depressing bank profits significantly. With dwindling profits and a troubled state budget as a result of tax collection failures, banks began freezing corporate funds. Liquidity quickly began drying up and general insolvency caused panic among depositors, bringing about a large run on banks in December 1995 (Fleming *et at.* 1997, p. 44). These depressed cash inflows and a massive rise in cash outflows presented severe problems for the banking sector.

In 1995, six banks—27 percent of those operating—failed (Korhonen, 1999, p.26). Additionally, the market witnessed a high number of mergers within the banking industry, involving the absorption of financial institutions that would otherwise have failed. The government did intervene to ease the crisis; however, the scope of its abilities to do so was limited. The Bank of Lithuania had finite resources and could only provide liquidity and further measures of safety to a limited set of smaller banking institutions, such as Aura Bank (Korhonen, 1999, p.27). The larger private banks, including the Lithuanian Joint-Stock Innovation Bank (LAIB) and Litimpeks Bank, were less fortunate, and required liquidity in excess of what could be provided to prevent imminent failure (Leonard, 2005, p.964). LAIB accounted for 16 percent of all private residents' deposits and 13 percent of the banking system's total assets; experts estimate that LAID lost between 207 and 420 million litai, while Litimpeks Bank lost between 87 and 142 million litai (Baltic News Service, 9 January 1996). The effects of these losses on the state of the economy is difficult to quantify. GDP was generally expanding as Lithuania and other former Soviet republics climbed out of the recession that had accompanied the breakup of the Soviet Union. GDP in US dollars grew from $6.959 billion in 1994 to $8.427 billion in 1996 (World Bank). Further effects of the crisis included the sharp decline in interest rates,

from 88 percent in 1993, to 16 percent in 1996 (Bank of Lithuania, 1993-1996).

In December 1995, LAIB and Litimpeks announced a plan to merge into a new entity, United Bank, which would have controlled about 20 percent of the banking system's total assets. However, the Bank of Lithuania halted both banks' operations just ten days later. Upon the closing of the banks, it was revealed that several high-ranking officials had deposits in the banks that were receiving interest rates double those of normal deposits. Furthermore, it came to light that the Bank of Lithuania had been neglecting many of its most important responsibilities, including acting as the supervisor of commercial banks; the bank did not conduct any audits between 1992 and late 1995 (Baltic News Service, 29 December 1995).

In response to the problemsthat ensued, the government passed a law "On the Measures for Maintaining the Liquidity of Commercial Banks (No. I-1155, December 21, 1995), which allowed the government to extend up to litai 300 million in guarantees for interbank borrowing to address liquidity problems in other banks (Fleming *et at*. 1997, p.43). The lending scheme acted as substitute for the lender-of-last-resort function that the Bank of Lithuania lacked under the currency board arrangement. Parliament also adopted a law requiring the government to provide compensation retroactively to individual depositors in all small-scale, bankrupt banks in quantities up to 2,000 litai per person. Beyond this, the Lithuanian government worked with the World Bank and IMF to draw up detailed reform plans to address the problems of the financial sector (Fleming *et al* 1997, p.44). The intended actions included recapitalization and nationalization of major state-owned banks, liquidation or a combination of existing shareholder and government support for private banks, and the transfer of bad loans to a newly created government-owned asset-management institution (Fleming *et al* 1997, p.44). These plans, which took time for full implementation, gradually strengthened the economy back to a normal state over the next few years.

1998-1999. While the banking crisis of 1995 was largely internal, later in the decade Lithuania felt the effects of the Asian financial crisis. Emerging markets in general experienced a reduction or

reversal of foreign investment. Russia, one of Lithuania's largest trade partners, entered a deep recession and the ruble was devalued in August 1998, causing a sharp reduction in Lithuanian imports and exports (Jungmann & Sagemann, 2011, p.259). As a result, the government faced major budgeting issues, and government debt increased by 19 percent in 1998 and 25.5 percent in 1999 (Bank of Lithuania annual report 1998, p. 33; 1999, p.20). Contagion from the Russian crisis made Vilnius interbank interest rates volatile; the rate rose from 6.13 percent in December 1998 to 11.65 percent in October of 1999, and then fell back down to 4.64 percent by December 1999 (Bank of Lithuania annual report 1999, p.46). Beyond this, many Lithuanian banks were heavily invested in Russian government bonds, which experienced significant loss in value during this period as the Russian government defaulted in conjunction with its devaluation of the ruble. In the year 1999, 20 percent of companies reported losses and GDP fell by 1.6 percent--a stark difference from the near 6 percent growth rates of the prior years (Jungmann & Sagemann 2011, p.259).

Lithuania's current account deficit widened from 13.5 percent of GDP during the first quarter of 1998 to more than 15 percent for the full year (Kairis, Jr. & Sabunas 1999). Economicgrowth slowed with the export reduction; in fact, 20 percent of companies reported losses for the year 1999 (Jungmann & Sagemann 2011, p.259). GDP decreased by 4.1 percent in 1999 (Bank of Lithuania annual report 1999, p.15). The monetary base contracted by 9.3 percent and net foreign assets declined by 853.8 million litai. The economy was clearly stuckin a recession.

By 2000, the financial crises that had stricken Asian economies dissipated and Lithuania benefitted. With Russia and other formerly afflicted emerging markets growing again, foreign trade increased. Beyond this, the Lithuanian government began to lower reserve requirements from 10 percent to 8 percent, and increased transparency by reporting daily information on compliance with reserve requirements and liquidity within the banking system. Lithuania's plan to switch the litas' anchor from the U.S. dollar to the euro increased confidence and market activity. In 2000, GDP increased by 3.3 percent and inflation returned at a healthy 1.4 percent (Bank of Lithuania annual report 2000, p. 4).

Data and Charts

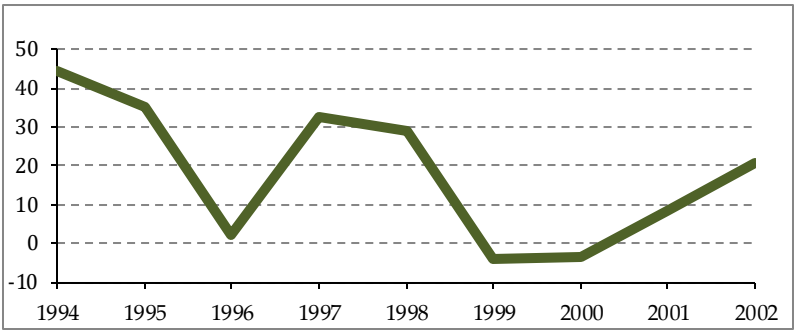

Chart 8.1. *Lithuania: Monetary Base (YOY % change), 1994-2002*
Source: International Financial Statistics.

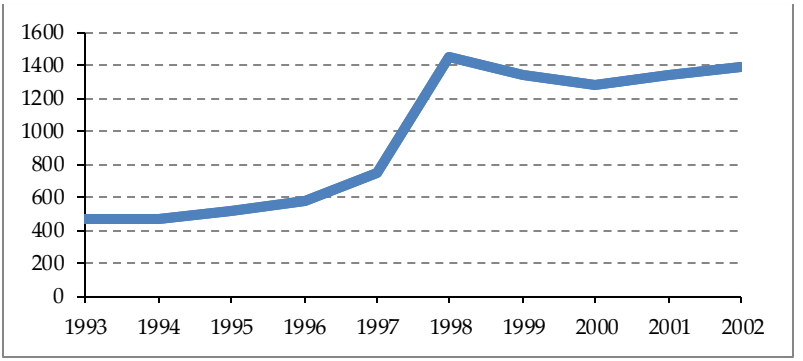

Chart 8.2. *Lithuania: Deposit Money Banking Reserves (millions of Lithuanian litai), 1993-2002*
Source: International Financial Statistics.

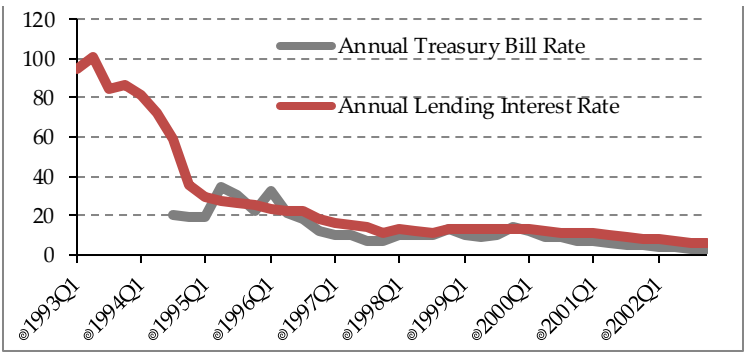

Chart 8.3. *Lithuania: Annual Treasury Bill Rate and Annual Lending Interest Rate (%)*
Source: International Financial Statistics.

Conclusion

A successful currency board regime requires strict attention to the rules and contributes to promises a generally stable and efficient economy. However, external shocks and internal deficiencies have put some currency board systems under stress. The external shocks included the U.S. panic of 1907, World War II, and the Asian financial crisis. Internal deficiencies included unusually rapid growth of the financial system and severe mismanagement by government officials. However, similar situations have also ravaged the economies of countries operating under different monetary regimes. If anything, the paucity of financial crises in currency board systems is a point in their favor.

In certain cases, deviation from what is considered "orthodox" currency board standards exacerbated the issues presented by these external shocks. However, the fact is, the reason the currency board worsened the situation is because of that *deviation*. For example, in the case of the Philippines, the Philippine National Bank made risky loans, which created a currency crisis; however, it is the Bank and its officials itself which are to blame—*not* the currency board arrangement. Beyond this, the political instability greatly undermined the deemed stability of the financial system—another factor not attributable to the monetary regime.

Our research was extensive but may not have been exhaustive. We welcome suggestions of other case studies to further examine crises in currency board arrangements.

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6 How central bank's policies undermine a troubled currency and exacerbate recession: the case of Ukraine

Yuri **Poluneev**

Introduction

In the last two years, ongoing military conflict in the East, deep economic recession and the downfall of national currency have become biggest shocks to Ukraine, its households and business enterprise. As a result, the country, one of the largest in Europe's geographical centre, has quickly evolved into a geopolitical spot of extreme instability where internal and external shocks can trigger "snow slide" effects.

Stakes are rather high. If Ukraine overcomes, both politically and economically, it may become a kind of Europe's «Mannerheim» wall and possibly another European "tiger". If it fails, already weakened dramatically by the undeclared war, domestic economic strife and persisting political corruption, the country could become, for many decades onwards, Europe's only "hot spot" and biggest political and financial liability for the West.

At this "bifurcation point", half-measure action is even more damaging than no action at all. In such a critical situation, the only wayout would be a proper implementation of genuine economic rescue and reform measures underpinned by a consolidated and

well coordinated external assistance. And yet such prospects have recently been thrown into great doubt, mainly due to a continuing state capture by oligarchs and regional "elites", growing domestic instability and rampaging political corruption.

Figure 1. Real GDP and inflation in 1997-2015,
percent over the relevant quarter of the previous year

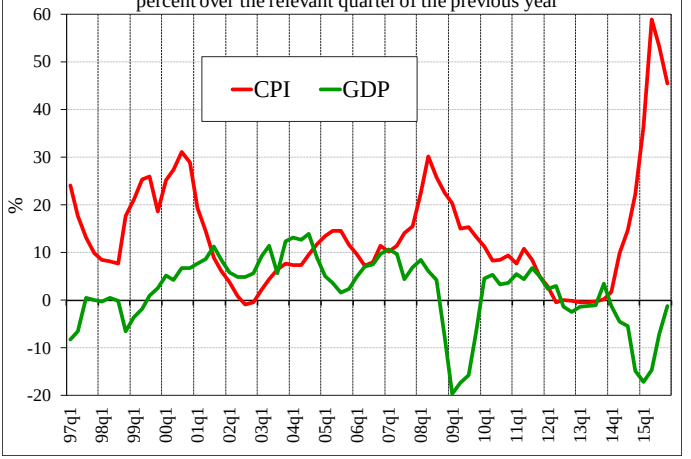
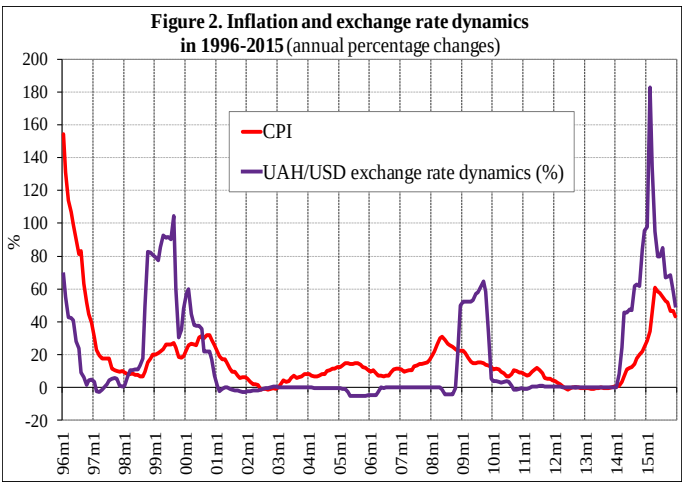
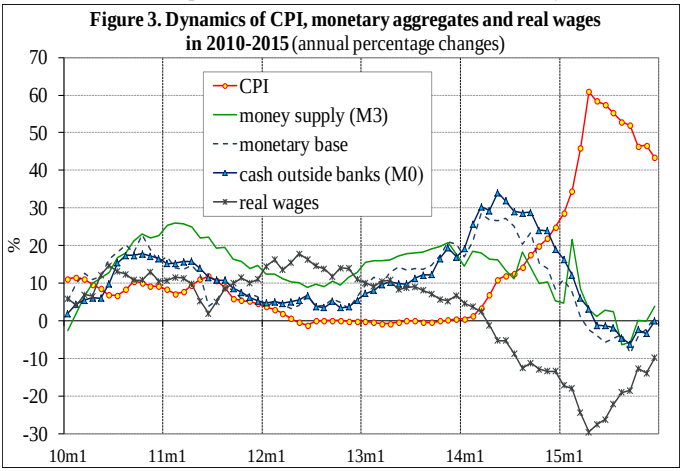


Figure 2. Inflation and exchange rate dynamics in 1996-2015 (annual percentage changes)





Whereas a well coordinated and internationally supported implementation of comprehensive and genuine market reforms, including complete "de-oligarchization" and eradication of corruption, profound fiscal consolidation, streamlining of government expenditures and bureaucracy, complete overhaul of legal and judicial systems, strengthening private sector competitiveness, should be the right answer to Ukraine's economic woes, important role in this process would have to be played by adequate and balanced monetary policy, effective foreign exchange regulation and transparent commercial bank supervision.

Resulting financial stability, including predictability of foreign exchange movements in export- and import-dependent economy is a main pre-requisite for any sustained economic recovery.

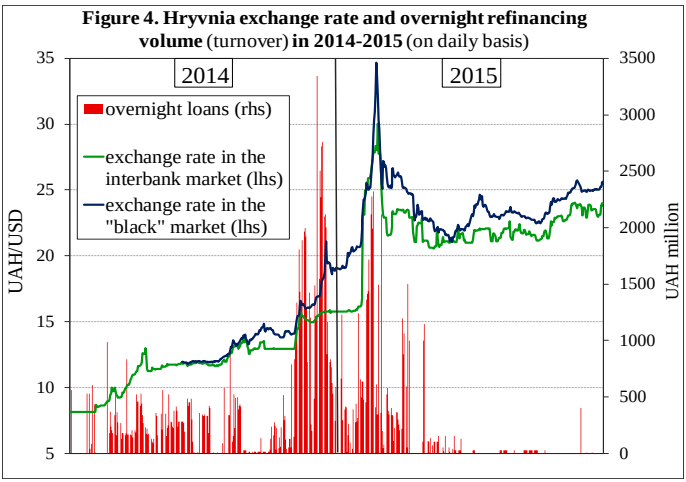
As these functions in Ukraine are vested with its central bank, National Bank of Ukraine, the logical questions arise: *Has the institution been up the standard and performed these functions well in the recent years? And if not, what were the policy miscalculations and implementation deficiencies? What other emerging market central banks can learn from these mistakes in order not to aggravate performance of troubled currencies and affect economic growth?*

This chapter aims to explore these issues in proper detail.

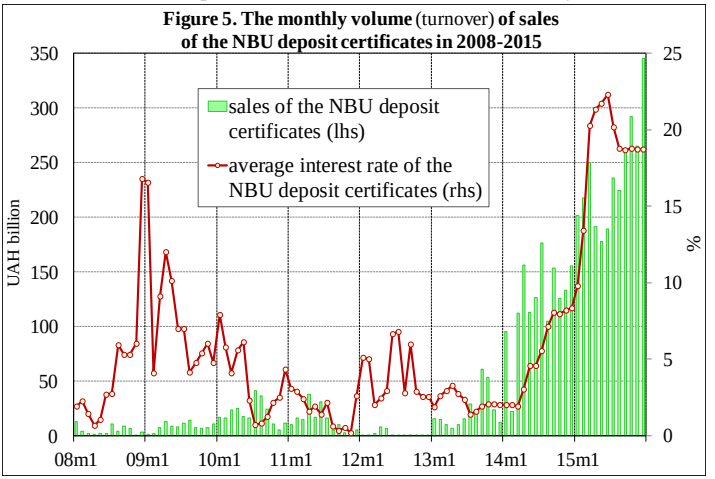
Mixed track record

Ukraine's central bank has had a mixed track record, of both commendable successes and regretful failures. In 1996, it attracted international acclaim for the «textbook» currency reform and exemplary introduction of Hryvna, for efficient conduct of hyper-inflation policy and resulting sustained financial stability.

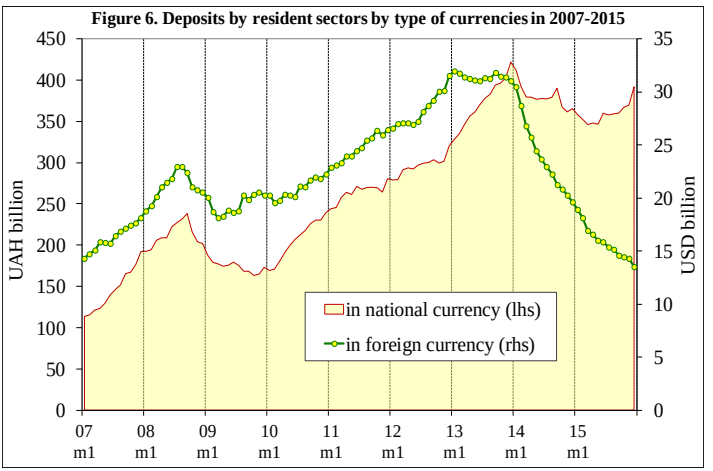
Figure 4. Hryvnia exchange rate and overnight refinancing volume (turnover) **in 2014-2015** (on daily basis)



By early 2000s, the NBU had in place a well-developed, even by European standards, infrastructure for monetary policy and bank supervision. The Bank, again, coped well with financial instability during the 2004 "Orange revolution" and paved the way for subsequent 12% annual economic growth.



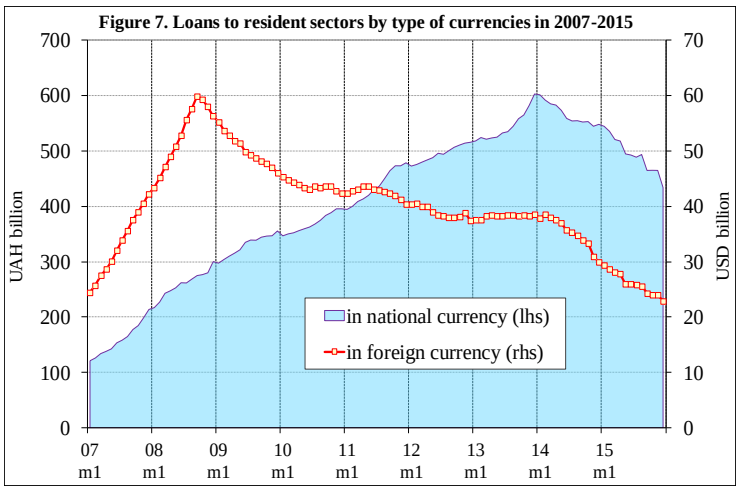
Against these successes, the NBU top management team appointed in 2014 presided over serious policy miscalculations and misjudgements that dramatically undermined already troubled national currency, allowed for double digit galloping inflation, aggravated systemic bank sector crisis, undercut economic recovery prospects and completely destroyed public trust towards this important institution.



Confirmation of these conclusions has been recently provided in various international publications, including Global Finance

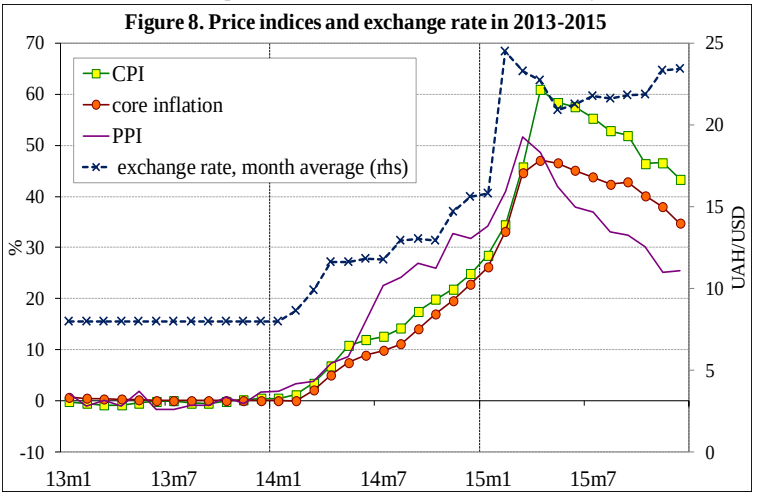
magazine, and by important country competitiveness ratings [Retrieved from]. The WEF's Global Competitiveness Report 2014-2015 ranks soundness of Ukraine's banks as the worst in the world (140/140) and quality of public institutions in general as one of the worst (130/140) [Retrieved from]. Obvious institutional weakness in monetary and bank supervision policies has been accompanied by numerous mass media allegations about corruption and misuse of power among the regulator's top officials [Retrieved from].

The diagnostics of problems

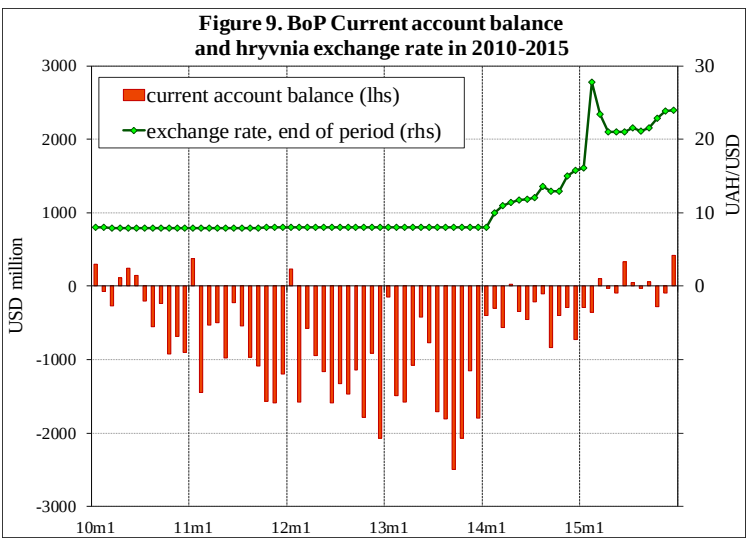


Ukraine's economy has been continuing its downslide in the stagflation mode (fig.1[1]): GDP has been shrinking against the background of galloping inflation (year-on-year inflation in December 2015 was 43.3%). For the transition economy plagued by deeply entrenched vested interests and top level political corruption, change of "elites" in power has been permanently accompanied by the infighting for asset re-capture. However, the present economic crisis is unprecedented by its pure scale and, in a way, unique since introduction of Hryvna in 1996.

[1]All figures in the article are based on official statistics from the National Bank of Ukraine.

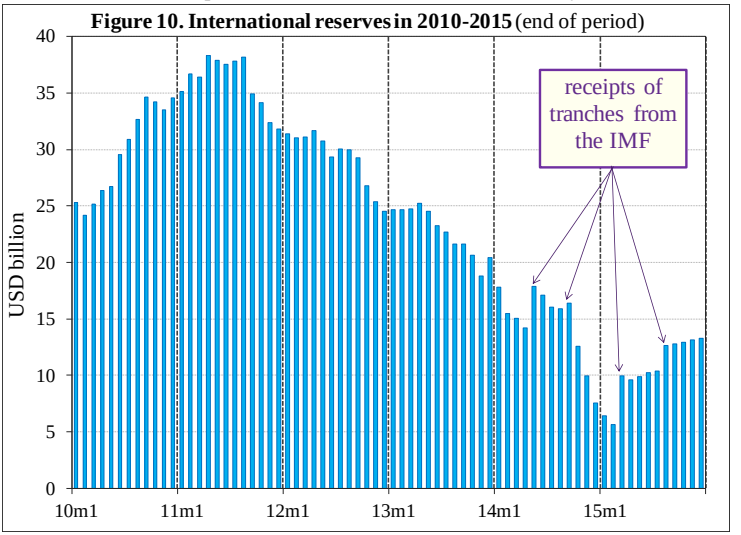


During 2014-2015, Ukrainian currency had been massively hit by devaluation that reached almost 300%, which, due to a pass-through effect, gave strong momentum to so-called devaluation-inflationary spiral. Sharp increases in household utilities tariffs served as additional boost to accelerating inflation. In April 2015, year-on-year inflation topped 60%, the highest level since 1996 (fig. 2).



The start to unprecedented freefall of Hryvna and galloping inflation was given in early 2014, when the country's central bank, under informal "advise" of the IMF that was preparing a decision on providing EFF loan to post-Yanukovich government, fully liberalised UAH exchange rate regime and committed to keep its refinancing facility fully open for commercial banks. In fact, these two policy actions were conditions precedent for the loan approval in March that year. There would be nothing wrong in these IMF conditions in normal circumstances as fixed exchange rate, against the background of continuous current account deficit, led to depletion of forex reserves and weak competitiveness for the exporters. But those policy decisions were being made at the time when it was already evident that annexation of Crimea, spreading violence and military tensions in Donbas were creating unmanageable risks for economic and financial stability and that liberalisation of exchange rate and free access for banks to central bank liquidity would enormously intensify those risks and inflationary pressures rather than stabilise the banking system. This happened mainly due to the fact that free access to liquidity was used by poorly governed banks not so much to stop the run on their deposits as to increase speculative demand for hard currency on the forex market and thereby contribute to faster depreciation.

When it was clear, by autumn of 2014, that either complete bank holidays with freeze on deposits or massive forex interventions would save quickly depreciating national currency, the central bank, continued to act in the business-as-usual manner and, guided by the EFF conditionality, compounded devaluation pressures by regularly acting as a buyer on already speculative domestic forex market. The regulator's lack of independent judgement and anti-crisis strategy were contributing to problems rather than addressing them.

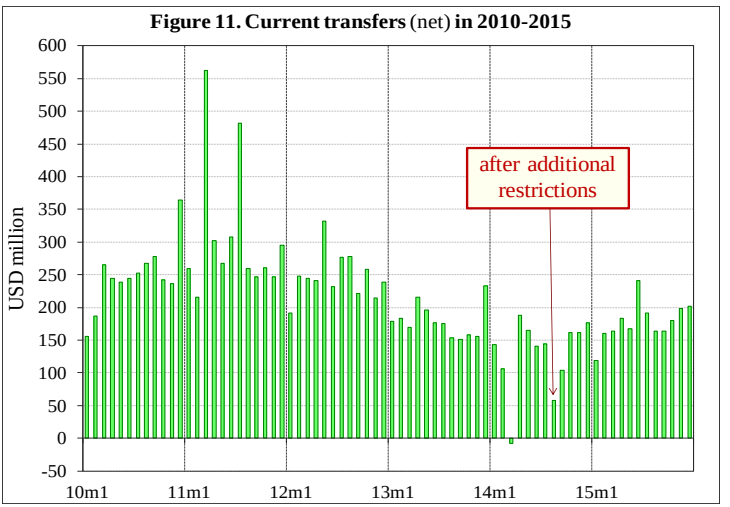


Deep and sustained devaluation triggered a sharp increase in Hryvna-denominated external debt, enhanced real risk of the country's default, caused a massive deposit flight from the banks, worsened banks' toxic asset problems and distorted radically bank balance sheets. All this provoked a full scale banking crisis accompanied by a sharp drop in household real incomes (by more than 30%) as well as increased social and political tensions.

It's worth to mention that devaluation and inflation unravelled against the background of downward trends in monetary aggregates and real wages (fig. 3). In 2015, negative rates of growth of all monetary aggregates, underpinned by restrictive fiscal policies, reached a historic maximum. In other words, galloping inflation was accompanied by acute "money hunger" in the real sector. This type of inflation has atypical cost inflation nature. So classical anti-inflationary methods of cooling down demand wouldn't be effective to meet the challenge.

A key problem in this case wouldn't be so much excessive money supply but rather deficient management of monetary emission, i.e. wrong choice of channels, instruments as well as parameters of interventions. The core of the problem was that *productive emission* (the one with positive spill-over effects for the real sector) was highly insufficient while *non-productive emission* (the one that contributed to growth in asset bubbles) – too

excessive. On one hand, unjustified expansion by the regulator of its overnighter financing loans(standing facility) led to surge in forex arbitrage and additional speculative pressures on Hryvna (fig. 4). On the other hand, the NBU with its hands stimulated "financial bubble" by unwinding unprecedented sales of its own deposit certificates with high yields funded by surplus emission (fig. 5). These certificates, being rather profitable and risk free instruments, further demotivated commercial banks in their lending activity.



Funds on commercial banks' correspondent accounts shrank: from UAH 29.2 billion in 2014 to 26.2 billion on average in 2015. Normative level of mandatory reserves at this time (UAH 40.6 billion on average in 2015) substantially exceeded the banks' balances on correspondent accounts. Bank deposits in national currency dropped by UAH 30 billion during 2014-2015, while in foreign currencies they decreased by more than USD 17.5 billion reaching the 2006 level (fig. 6). Bank loans in national currency dropped by UAH 169 billion (by 28%), while in foreign currencies – by 17.5 billion (41%) (fig. 7).

Hryvna devaluation had also a detrimental effect on producer price dynamics: they surged from 31.8% to 51.7% annual growth during the 1Q 2015 but later in the year decreased to 25.4% (fig. 8), and the slower growth rates were caused by temporary

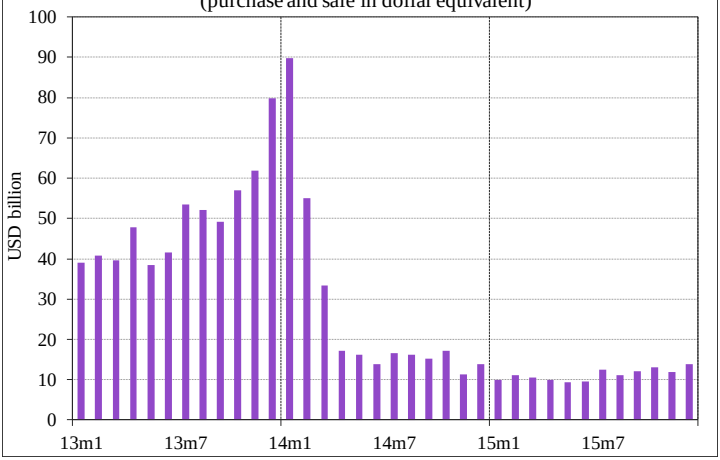
strengthening of Hryvna, drop in investment demand and lower world prices on oil and ferrous metals.

Therefore, it becomes obvious that in 2014-2015 unprecedented devaluation of already troubled national currency, Hryvna, became a powerful factor in exacerbating systemic crisis of Ukraine's economy triggered by combination of many shocks and factors and that still persists despite domestic efforts and sizeable international assistance [Retrieved from].

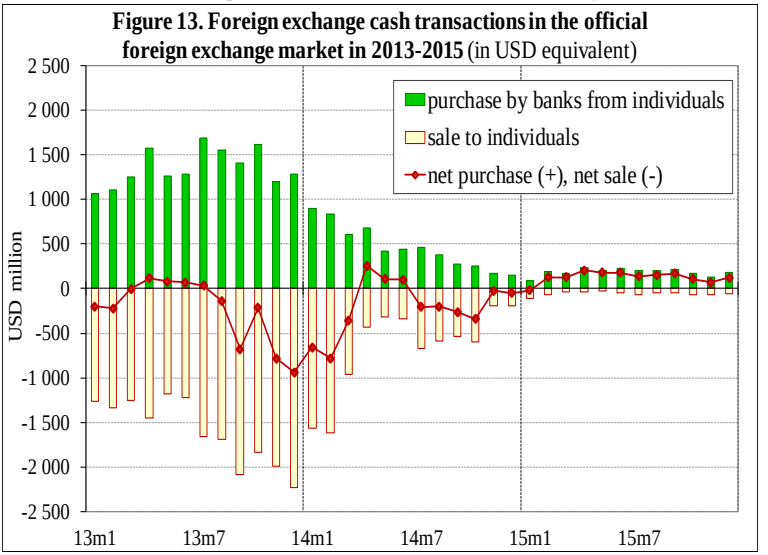
From a troubled to a "failed currency": how Ukraine's central bank performed?

A number of external and domestic shocks merged in the unfortunate "constellation" over Ukraine's economy back in 2014 to cause unprecedented currency devaluation crisis.

Figure 12. Total turnover of foreign exchange transactions in the interbank foreign exchange market of Ukraine
(purchase and sale in dollar equivalent)



Balance of payments disproportions accumulated over a long period of time, insufficient level of international reserves, excessive political and social risks forced the country's central bank to publicly depart on 07.02.2014 from a fixed rate regime in favour of a free float. Prior to that, Hryvna had been pegged to USD at 7.99 for almost four years.



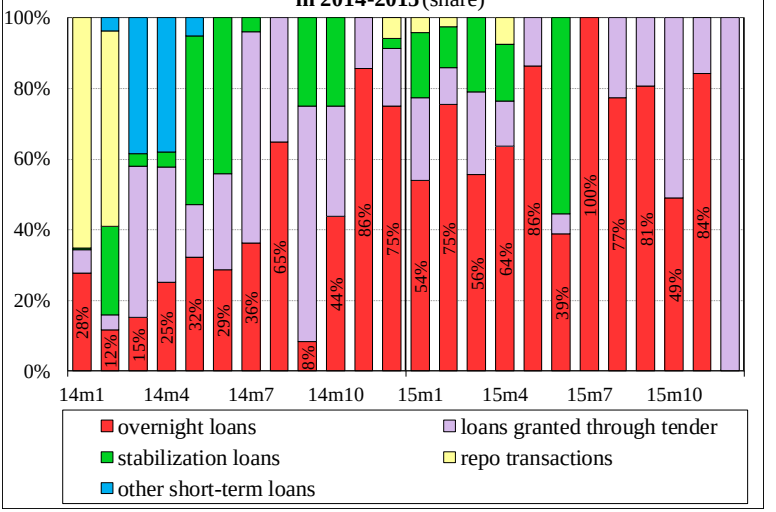
Hryvna's weakening against US dollar in April 2014 when UAH devalued by more than 50% and started to fluctuate within the UAH 11.11 – 12.98 range (fig. 9) led subsequently to current account adjustment and equilibrium: even a small surplus of USD 31 million was achieved. By May 2014, Ukrainian government also managed to mobilise some USD 5.4 billion of external and domestic debt financing: from IMF - USD 3.2 billion, World bank – 0.9 billion, euro currency market – 1.0 billion (backed by US Treasury guarantee), domestic borrowing – 0.3 billion. This allowed to temporarily stabilise situation with Hryvna, at least until August of that year.

In August 2014, foreign exchange restrictions and capital account controls were substantially strengthened by the regulator, including introduction of 100% mandatory sale of export foreign currency receipts and forced conversion of foreign currency transfers to the households from abroad. The NBU's rationale for introduction of further restrictive policies, which was to increase supply of foreign exchange and stabilize exchange rate, didn't materialize.

On the contrary, the measures, accompanied by unacceptably poor public communications, led to a whole new range of negative effects: dramatic fall in export receipts(as exporters reacted to

restrictions by hiding revenues offshore), surge in devaluation expectations, squeeze in official forex market activities, growth in shadow forex operations and general loss of confidence towards the regulator's agenda. Balance of unrequited transfers, positive for many proceeding years, had dramatically fallen (fig. 11), official inter-bank and cash foreign exchange markets came to a standstill (fig. 12 &13), while shadow market operations, so characteristic of early and mid-1990s, returned and abounded.

Figure 14. The structure of the NBU refinancing operations in 2014-2015 (share)



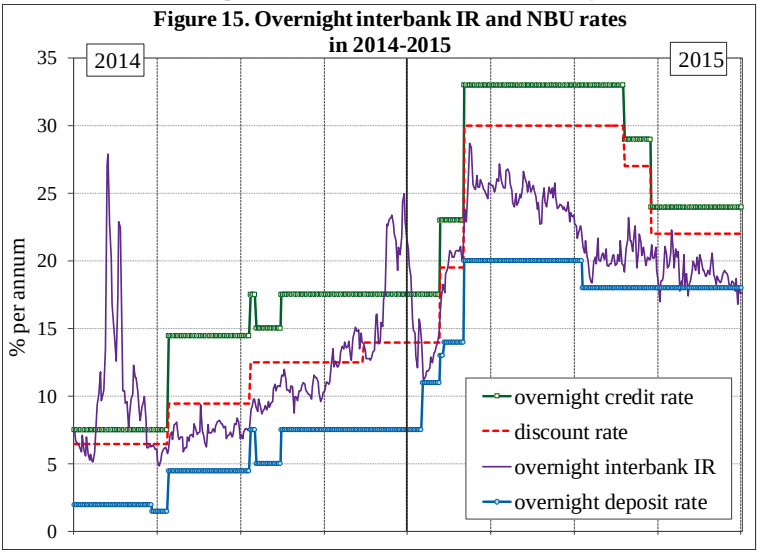
"Puzzled" by such market reaction, the NBU reversed a few months later: lowered mandatory sale requirement to 75% and cancelled mandatory sale of currency transfers to households. But this policy correction failed to restore public trust and diminish inflationary and devaluation expectations.

As statistics show (fig. 9), current account deficit reached its all-year bottom of USD 0.8 billion in September 2014 accompanied by the UAH/USD 12.53 – 13.53 rate range. The subsequent improvement in current account balance wasn't used by the NBU to stabilize national currency. On the contrary and incidentally, the NBU tried its best to keep the exchange rate stable ("fixed") in the run-up towards the parliamentary elections in October 2014 and let

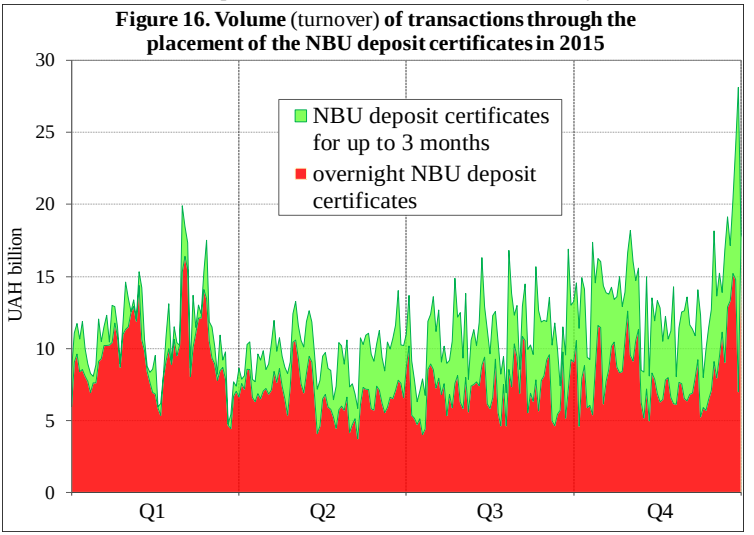
it fully go afterwards, which led to another landslide devaluation and another round of inflationary spiral.

The "miscalculations" in the NBU policy mix at that period of time stand out very clearly:

- on one hand, controversial massive refinancing credit lines to selected banks, some of which later were declared insolvent and liquidated by the State Deposit Insurance Fund, contributed to further fragmentation of the inter-bank market and irreversibly undermined household and business confidence;
- on the other hand, the focus of monetary policy (standing facilities) had eventually shifted towards providing shorter term maturities (fig. 14) and towards unprecedented expansion, from November 2014 to March 2015, of overnight refinancing loans to banks (graph 4). Obviously, such "super" short refinancing instrument couldn't address the growing problem of the run on bank deposit. On the contrary, it created conditions for frequent speculative attacks against national currency;
- very chaotic and illogical interest rate policy also encouraged the banks to lean heavily in favour of open-access standing facility operations (overnight refinancing). In this context, a characteristic episode took place in July 2014 when a "routine" NBU discount rate increase triggered increase in overnight interest rate (from 14.5 to 17.5%) that in a few days was lowered to 15%, then stayed at this level for 30 days and again shot up to 17.5%. This level of overnight rate was supported by NBU for almost six months (?!) despite growing devaluation and inflationary pressures as well as NBU discount rate increase. In December 2014, NBU overnight refinancing rate dropped below the level of inter-bank overnight interest rates, and that was a clear departure from principles of optimal liquidity policy management. A very dangerous financial destabilizer under the conditions of uncontrollable devaluation and huge inflationary expectations!



In other words, *the central bank had willingly transformed itself into a massive last resort supplier of super short-term money* that could not by definition address the problem of bank deposit flight. Such interest policy led to unprecedented growth (500%) in volume of overnight refinancing in just one month at the end of 2014. Moreover, the regulator provided free access to high volumes of super short-term liquidity at negative real interest rates to those banks whose instant liquidity coefficients exceeded the normative levels by more than 6-7 times. Such prudential "oversight" encouraged above banks to use the central bank funds as a "cushion" for speculative arbitrage against failing national currency. As fig. 4 shows, devaluation pressures grew exponentially in such periods.



In December 2014, volume of overnight refinancing loans continued to grow, while inter-bank interest reacted not so much to NBU discount rate but rather to foreign exchange rate fluctuations, which highlighted deficiency of central bank rate policy. To further complicate growing financial instability, foreign exchange black market returned for the first time after 1990s and pushed UAH/USD exchange rate to 30% above the central bank official rate. In view of the financial crisis, the central bank supervisory board recommended the management board to undertake urgent action for "streamlining" monetary policy and working out coordinated policy response.

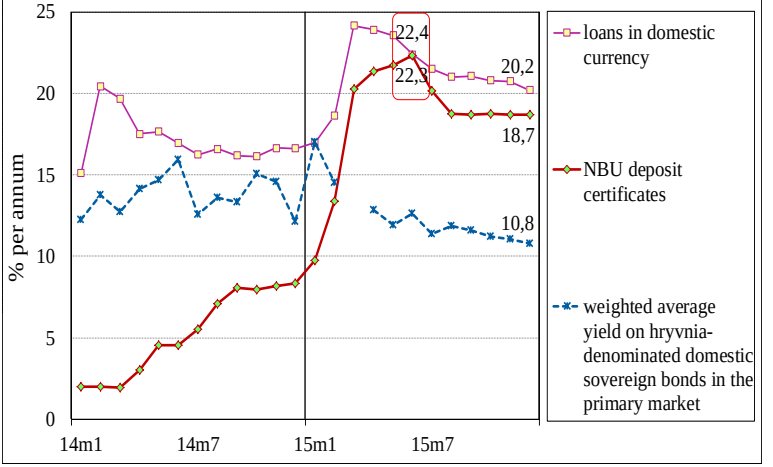
However, policy reaction was delayed until February 2015 when interest rate was increased from 14.0 to 19.5% whereas overnight rate – from 17.5 to 23.0%. At the same time, inflation rate at 28.5% on year-to-year basis in January continued its upward trend.

Parallel to interest rate increase, the central bank dramatically changed the foreign exchange trade rules – by suspending long-standing practice of daily forex auctions and refusing to further use so called indicative foreign exchange rate. NBU management thus declared that exchange rate would be set on the basis of market demand and supply. As a result, the official exchange rate dropped down to par the "black market" rate. Therefore, potential

stabilisation effect from interest rate increase was completed wiped out. Combination within the same period of those two policy measures could hardly be characterised as logical.

Moreover, when on 12 February 2015 the UAH/USD exchange rate reached a psychological level of 25:1 the central bank management approved a policy measure whereby maximum single-bank overnight refinancing limit collateralized by Ukraine's T-bills was raised from 70 to 100% of mandatory reserve level, which led to upsurge in daily refinancing volumes but only a group of 8-11 banks selected on subjective and non-transparent basis had exclusive access to this instrument. In other words, limits for NBU overnight refinancing were substantially lifted up in the period when inflation rates were accelerating beyond control!

Figure 17. Weighted average interest rates on loans in domestic currency, the NBU deposit certificates and domestic sovereign bonds in 2014-2015



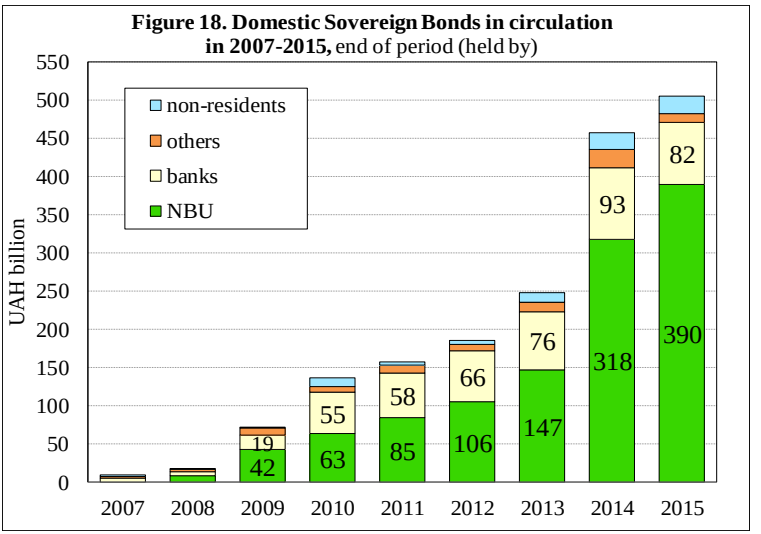
When, on 24.02.2015, devaluation peaked in the "black market" at UAH/USD 40:1 while the official exchange rate, on 26.02.15, exceeded 30:1, the NBU's decree completely banned the banks from purchasing foreign exchange on behalf of their clients. Next day, this decree was cancelled. Such inconsistency in the regulator's actions completely undermined the market and household confidence.

Devaluation trend was halted only after the sharp reduction in the volumes of overnight open market operations by NBU as well

as introduction of further dramatic foreign exchange restrictions that particularly affected importers and businesses by substantially undercutting imports of goods, services and business inputs.

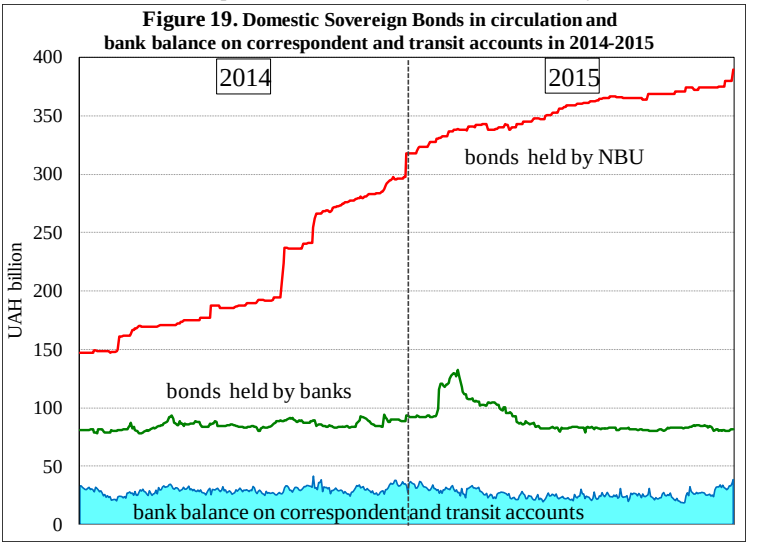
And, despite the obvious logic of higher interest rates as one of anti-devaluation measures, the central bank kept its interest rates on open market interventions unchanged during the peak pressures on the forex markets. And only three months later, in early March 2015, when Hryvna appreciation trend became visible, the Bank management approved a decision to raise a discount rate to 30% and overnight rate – to 33%. Again, timeliness and adequacy of the regulator's policy reaction comes into question.

Figure 18. Domestic Sovereign Bonds in circulation in 2007-2015, end of period (held by)



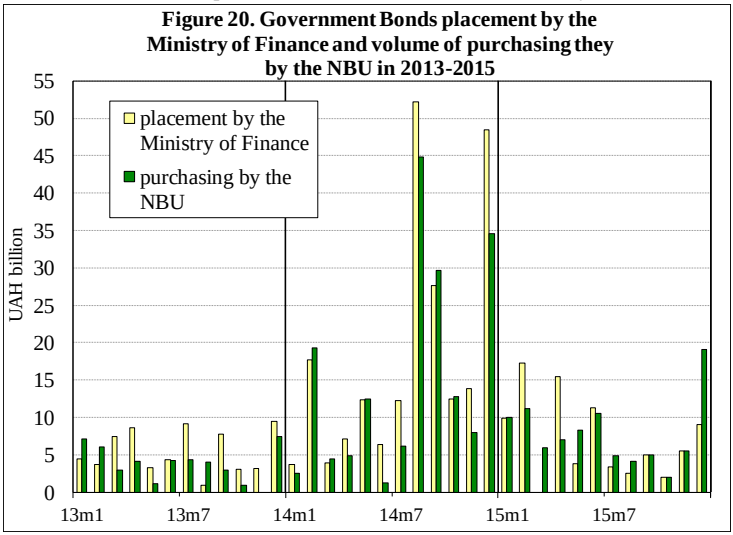
On top of all this, such late and inadequate interest rate measures have been accompanied by active expansion of central bank's liquidity sterilisation (mobilisation) operations conducted through the sale of NBU high-yield deposit certificates (fig. 16). In 2015, average monthly interest rate for this instrument reached the level of bank lending rates (fig. 17) and thus demotivated banking sector for lending to the real sector.

Figure 19. Domestic Sovereign Bonds in circulation and bank balance on correspondent and transit accounts in 2014-2015



During 2014, volumes of liquidity sterilisation operations by the NBU amounted in volume to the country's GDP – an unprecedented record in the history of Ukraine's monetary policy! And all this was against the background of massive flight of bank deposits and bank liquidity crisis. These disproportions are also characteristic for 2015:the NBU deposit certificate sales had exceeded the GDP level, while the central bank's interest expenses exceeded, by our estimate, the UAH 8.0 billion threshold by end of last year.

In other words, instead of facilitating the consolidation of inter-bank market and its "business-as-usual" operation, instead of stimulating bank lending to corporate sector, the central bank with its own hands has created and inflated a risk-free high-yield instrument (overnight NBU deposit certificate) that created for the state a super costly "financial bubble"– a spiral of structural liquidity surplus propped by obstacles for the banks to expand credit operations. In fact, instead of monetary regulator role Ukraine's central bank assumed the role of a financial broker in the inter-bank market thus distorting competition and liquidity allocation in the banking system.



Main "deficiencies" in the NBU monetary policy have been not only in a highly arguable levels of nominal rates set for the Bank's active and passive operations but in profound departure from the logic of liquidity management and in the inconsistency of monetary and foreign exchange regulation, which in turn contributed during 2014-2015 to the depth of financial crisis. These deficiencies, in one form or the other, continue to persist at present creating additional risks for financial stability and further transforming a troubled currency into a failed one.

Monetization of state budget deficit by the central bank

The country's central bank has been an active investor into the state's T-bills (bonds). In 2014, the scope of budget deficit monetisation grew exponentially and exceeded in volume the monetisation for all proceeding years altogether. Despite evident and substantial bank liquidity disproportions, this instrument was used by central bank to predominantly finance deficits of the public sector enterprises, mainly the state-owned oil and gas holding NAK "Naftogaz". On the whole, this practice had continued in 2015 when holdings of T-bills on the central bank's balance sheet grew by almost UAH 72 billion exceeding the total of

UAH 390 billion. [2]By the end of 2015, the share of T-bills in the central bank's asset portfolio reached a historical 75 per cent level (fig. 18).

In parallel, the banks' T-bill portfolio decreased by UAH 12 billion – down to UAH 82 billion (fig. 19) while their balances on correspondent accounts with the central bank also fell during 2015 – from UAH 32.6 to 24.6 billion (November 2015). This decrease was connected not with the sale of T-bills to the NBU but with their redemption by the ministry of finance with further sterilisation of funds through the issuance of the NBU deposit certificates.

Central bank's T-bill monetisation operations were mainly caused by the needs to close the gap in budget deficit financing. Characteristically, in 2015, the NBU investment into Hryvna-denominated T-bills covered the primary emission of these securities by 110% (UAH 93.7 out of 85 billion). This is nothing else but monetisation of the increase in domestic debt through the use of money print by the central bank.

This departure from prudent monetary policy could, in part, be justified by Ukraine's extremely complex geopolitical and macroeconomic situation in 2015. Plus, the NBU operations with government T-bills had insignificant impact on bank liquidity. Operations, technical in nature, were conducted through a few state-controlled banks without creating a spill-over effect for the system in general.

Lessons that can be drawn for other emerging market economies from Ukraine's central bank behaviour during crisis?

First and foremost: genuine and true independence of the central bank's top management from domestic politics and control of "big money" as well as proper corporate governance are an absolute must foremerging economies plagued by institutional corruption, profound state capture by corporate "moneybags" and deeply vested political interests [Retrieved from].

[2] In comparison, the monetary base at the end of 2015 was estimated at UAH 336 billion.

In Ukraine's case, the obvious institutional deficiency lies in the constitutional and legal framework governing the NBU top appointment, who, as a rule, is chosen among loyalists, former business partners or associates. And such a system creates a fertile ground for using central bank as an instrument for insider windfall profits through foreign exchange arbitrage, huge volumes of proprietary T-bill operations, for using bank supervision as anti-competition tool or bank asset stripping facilitator, saying nothing about ample opportunities for illegal profiteering from in-house procurement schemes. In Ukraine, non-transparent, biased and allegedly corrupt central bank supervision, on the one hand, «cleaned up» more than a third of banking system (63 banks) but, on the other, contributed to much deeper mistrust towards the regulator, further financial instability and fast deleveraging in the real sector economy.

Most recent events in Ukraine's parliament when no-confidence vote to discredited and highly unpopular government was torpedoed by MPs loyal to the head of state and to most powerful oligarchs led to gruesome conclusions made in the Foreign Policy magazine: "…after two years of empty promises, neither Ukrainians nor their foreign partners should be satisfied. In Ukraine, it doesn't matter who runs the government or the General Prosecutor's office. …the alliance of oligarchs and corrupt officials will stand strong…" [Retrieved from] And it is, indeed, the alliance of top office holders with oligarchs that in reality shapes the hidden agenda of the central bank. Something that is incompatible with the whole idea of central bank as an independent regulator and credible monetary policy maker.

> A logical question arises: why the corporate governance (i.e. supervisory board, the Council of the National Bank of Ukraine) that has existed at Ukraine's central bank almost since its establishment failed to improve the situation and make its own contribution to improved policy making capacity of a regulator?

The answer to this question is rather simple. Despite formal existence, the supervisory board has not been vested, until very recent amendment to the Law on the National Bank, with any real power to control the NBU top management or its policies. The mentioned amendment, approved at the insistence of the

international donors, fundamentally reshapes the regulator's supervisory board on a more professional and politically neutral basis. But the main channel of the Bank's political dependence, a direct linkage to the political institution of the country's president, remains intact.

Similar situations might create for any emerging economy irreparable financial and reputation risks, especially when a weak national currency fully reflects a country's institutional immaturity and dwindling international competitiveness.

Second: importance of highly professional judgement on domestic economic situation as well as of independent and well-grounded position vis-à-vis international official lenders. The latter, as was Ukraine's case in early 2014, "recommended" a very arguable action to the country's central bank (full float of the currency and unlimited access to refinancing for commercial banks against the rise in military operations and related instability and risks), which later led to bank deposit flight, deep devaluation and outburst of inflation, highest since hyper inflationin 1992-1994 [Retrieved from].

In this respect, it is difficult to disregard two arguments: one put forward by Nobel prize winner Joseph Stiglitz that Bretton Woods institutions provide loans to developing countries to force them open domestic markets and public wealth for looting by multinationals, [Retrieved from] and the other made by prof. Richard Werner who argues that in some cases "central banks intentionally impoverish their host countries to justify economic and legal changes which allow looting by foreign interests" [Retrieved from]. One could argue with such a bold conclusion made by the renowned author of the quantitative easing but Ukrainian central bank's case provides a very strong argument in its favour: intentional actions and/or unintentional policy blunders by the country's regulator in 2014-2015, which resulted in unprecedented devaluation-inflationary spiral, wiped out, by modest estimates, more than 30% of households' real incomes and savings as well as most of corporate profits in the enterprise sector and thus contributed to further impoverishment of the host country.

As former chief economist of Ukraine's central bank recently pointed out: "In expert and business communities, more and more popular is a point of view that authorities themselves (in particular, representatives of certain financial and political groups with access to state financial resources and levers of regulation and pressure upon business) are interested in preserving uncertainty and lack of confidence. And, therefore, in preserving high devaluation and inflationary expectations and in further depreciation of Ukrainian assets [Retrieved from].

Third: consistency of banking sector laws and regulations. The central bank's main mandate should be clear and unequivocal. The laws should be consistent in setting the CB main policy anchor - whether it be a stability and purchasing power of national currency (exchange rate) or inflation targeting. Ukraine's example should be avoided at all costs whereby the country's Constitution defines stability of the national currency(stability of its exchange rate) as the main NBU function while the Law on the National Bank of Ukraine adds up another three priorities (in the order of importance) to the central bank mandate: price stability (inflation targeting), financial stability, including stability of the banking sector, as well as a support to the government's policy aimed to achieve sustainable economic growth. Such legal ambiguity exposes central bank to political speculations and manipulations, public relation failures, policy indecisiveness and useless internal debates. A lot of frictions that hampered effective anti-crisis response by the NBU were due to heated and futile arguments over interpretation of the NBU mandate between its management and supervisory board.

Fourth: a lack of a balanced and well thought-over central bank's crisis management strategy may lead to regulatory inconsistencies and action gaps, which, in turn, further weaken national currency, accelerate inflation and undermine public trust. Sometimes, it is better not to act (or react) at all then to act in a chaotic and non-systemic manner and be held hostage by the brutal market sentiment and political populism. Consistency of policy measures and their implementation, the regulator's strategic confidence is often a much more valuable asset then actions that imitate activity. In Ukraine's case, lack of a coherent strategy in the

conduct of monetary policy led to regulatory inconsistencies and costly mistakes, which in turn exacerbated devaluation and inflation pressures.

Fifth: importance of consistency in foreign exchange regulations. If a regulator formally declares introduction of a certain currency regime (fixed or floating rate or other) it should do its utmost to genuinely support declared objective and create most favourable framework for its implementation. Central bank's duality vis-à-vis a currency regime sends mixed signals to the market, stimulates currency arbitrage and informal forex market. In Ukraine's case, the dualism was obvious: despite the fact that a floating rate regime was formally announced in 2014 due to current account sustained deficit, in reality the regime turned out to be more rigid than a classic fixed rate one, the situation that eventually erased any perceived advantages of both regimes and enhanced all risks against the background of falling forex reserves, rampant black market activities and "awkward" interest rate policy.

Sixth: key role that has to be played by competent and efficient interest rate policy. The latter should contribute to improved market liquidity on a sustainable basis and NOT result, like in the case of Ukraine, in huge market liquidity disproportions. During the 2014-2015 currency crisis, unprecedented expansion of refinancing operations at low rates to selected banks created additional speculative demand for foreign exchange. This had led to a landslide Hryvna devaluation in early 2015 – from UAH 7.99/$ 1.00 to UAH 30.00 (and even 40.00 on the black market). Data on a few banks that benefitted from such cheap liquidity «waterfall» has not been so far officially disclosed. On the other hand, liquidity mobilization operations with other banks have been characterised by excessively high interest rates that led to frequent disruptions in inter-bank market, surplus liquidity spiral between central bank and regulated banks. All that, in the end, almost completely paralyzed real sector lending.

Responsible authorities in any emerging country should make sure that mistakes and misjudgements in monetary and foreign exchange policies by a central bank during the crisis do NOT become one of the key factors in conserving or even aggravating

economic recession at the grass roots level. A lot of success in central bank's activities depend upon such intangible public capital as trust. The latter is extremely difficult to accumulate but very easy to lose. Without trust, implementation costs of any central bank's monetary policy quickly escalate resulting in additional inflationary expectations and financial instability.

It may sound as a paradox but central banks, at least in some of the emerging market economies, can be more detrimental to financial stability than any exogenous or indigenous shocks altogether. "The Achilles' heels of these countries are their crummy little central banks," stated a while ago Prof. Hanke, a leading international authority on monetary policy and troubled currencies. He believed that the central banks' poor track record made clear that they could not be trusted to make prudent decisions, that they were susceptible to political pressures and poor judgment and tended to do more harm than good [Retrieved from].

And as this article demonstrates, Ukraine's central bank seems to be one of most recent eloquent examples that prove the above argument.

So, what are the ways out of this paradox? The obvious solution is to turn the central bank into a truly professional, efficient, highly reputable and politically independent market regulator, which, provided the current circumstance in Ukraine, seems a rather unlikely scenario. Or, according to Hanke, to enforce more radical solutions: either to introduce a currency board, which would take control over the exchange rate and money supply away from corrupt politicians (i.e. introduce de facto hard budget constraint), or implement full "dollarization" of the financial system, which would abolish the need for a central bank and replace a troubled national currency with a strong foreign one, for instance US dollar [Retrieved from].

Whatever is the outcome, but it is increasingly important that central bank's policiesbecome a part of overall solution within a package of reforms rather than a part of the overall problem.

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7 Estimating percentage changes in nominal GDP for select currency board episodes, 1929-1950

Joshua **Hong**

Introduction

It is relatively easy to find data on national income, or gross domestic product, for most countries since about 1950. The leading databases for doing so are the International Monetary Fund's *International Financial Statistics,* the Penn World Table (PWT 7.1), the Maddison Project (building on the work of the late Angus Maddison) and Brian R. Mitchell's *International Historical Statistics* volumes. These databases, however, omit a large amount of data on national income for numerouscurrency board episodes, especially during the period before the late 1940s. In this paper, I will attempt to address the currency board episodes for the years between 1928 and 1950. To keepmy approach simple and direct, I will not be calculating figures for the level of *real* national income, but instead the estimates of year-over-year percentage changes in *nominal* gross domestic product.

Other scholars in the pasthave touched on the issue of using monetary data to calculate national income for various economies. This paper integrates their arguments, further applying their methods to the monetary dataset I have collected. Milton Friedman

argued that monetary data could be used to calculate the gross domestic product of a country assuming a constant income velocity. Friedman (1961) acknowledged that income velocity is never perfectly stable, but argued that it generally changes little from year to year. Bordoand Jonung (1990) extended Friedman's argument to assert that the income velocities of industrialized countries failed to vary much during the 20th century. Bordo & Jonung (1990: 1-5) noted that the income velocities of those countries were particularly stable during the years of the Great Depression.[1] In an apparently pioneering contribution, Doblin (1951) argued thateconomic indicators such as foreign trade, in addition to monetary data,could be used to indirectly estimate the gross domestic product of a country or region as well, assuming a stable velocity. Leff (1972) asserted that the rate of real income growth of a country is equal to the rate of monetary expansion plus the change in velocity minus the rate of price inflation, and to calculate the rate of nominal growth, inflation can simply be subtracted from the equation. While Bordo and Jonung focused largely on industrialized nations, Leffcovered lesser-developed economies as well. To wrap everything up, Greasley & Oxley (2000) used the quantity equation, MV=PT, to calculate the gross domestic product of New Zealand. (M is the money supply, V is velocity, P is price, and T is the number of transactions within an economy.) Their logic was that price multiplied by the number of transactions within the economy would roughly equal national income, and assuming a constant velocity, the yearly values in gross domestic product would be captured entirely by fluctuations in the money supply.

Given the arguments for a stable income velocity, especially during the Great Depression, I will by analogy argue that the income velocitiesfor my list of currency board episodes during the years 1928-1950 were relatively stable as well. Continuing in the same vein as Greasley and Oxley, I will use the quantity theory of money, MV=PT, assuming a constant velocity, to estimate the yearly changes in the nominal gross domestic products of my list

[1] These are arguments about empirical regularities for particular periods, not about theoretical certainties for all time. In the 21st century, velocity in a number of advanced economies plunged during the Great Recession.

of currency boards. To back my calculations, I run statistical correlations for the years that I do have national income data on with monetary data to understand the extent of how well the two variables correspond. Furthermore, I analyze existing data on the balance of trade[2] for the currency board episodes as well. The intuition for doing so is that for an expanding economy, imports and exports should expand, with the amount of imports generally outweighing the number of exports. Countries tend to import more during an expansion to provide price competition, which limits inflation, while increasing supply to meet a surging domestic demand. For a shrinking economy, imports should shrink and if the balance of trade had been in deficit, it should turn to surplus or at least show less of a deficit. If the economy of the rest of the world is also shrinking or if the price of a major commodity export is falling, though, exports may also shrink as well. Although this use of trade data may seem rather subjective, it is not central to my analysis and will simply be used as a confirming piece of evidence.

Ideally, the money supply in the quantity equation should be a broad measure—M2 or M3. Many currency board systems did not publish information on bank deposits. One reason was that macroeconomic statistics were still in their infancy, and the statistics were not as highly prized as they are today. Another reason was that banks in many currency board systems were branches of banks with their headquarters in London. For supervisory purposes it was considered adequate that the banks should publish their global results, without giving country-by-country details. Rather than M2 or M3, all that we have for most currency board systems is the monetary base, M0. With that being said, even it is not available for all years in all currency board episodes. Given the experimental nature of the research here, it is a caveat, not a fatal flaw.

[2] The original data for both currency in circulation and balance of trade can be found in the appendix.

Methodology

Correlations

I used online database resources to gather existing data on national income for my list of currency board episodes. The databases containing the relevant data were Mitchell's *International Historical Statistics*, the Penn World Table, and the World Bank database.

I then ran a correlation function between the existing national income values found within the databases and the currency in circulation for the currency boards. Although currency in circulation in this case is the narrowest measure of money supply in regards to the quantity theory of money, it is possible to use it nonetheless for my calculations assuming a stable relation between narrow and broader measures, which is made possible through a constant income velocity. Where the databases gave conflicting values, priority was given to the Penn World Table because it contained continuous data for the greatest number of years, allowing for greater consistency. *International Historical Statistics* was used if the Penn World Table lacked data and the World Bank database was used if both other databases lacked data. In addition, gross domestic product values from each of the different databases were never run in conjunction with one another due to the different methods and criteria employed in calculating the values for national income. It is important to take note that these databases contained national income data for individual countries rather than regional currency boards, although countries and national currency boards tend to overlap in most cases. I have summarized the results below:

Table 1. *Correlation Data*

Country (Former Name, If Any)	Years	Correlation
Bahamas	1960 – 1968	0.93249
Bermuda period 1	1976 – 1979	0.97603
Bermuda period 2	1990 – 2011	0.95777
Ghana	1950 – 1957	0.96381
Hong Kong	1990 – 2011	0.97052
Jamaica period 1	1931 – 1934	-0.40776
Jamaica period 2	1953 – 1959	0.97911
Jordan (Transjordan)	1954 – 1964	0.91886
Kenya	1950 – 1966	0.76638

Malawi (Nyasaland)	1954 – 1964	0.95496
Mauritius	1950 – 1967	0.91979
Myanmar (Burma)	1948 – 1952	0.94718
Nigeria	1950 – 1959	0.61343
Sierra Leone	1961 – 1964	-0.96174
Singapore	1967 – 1970	0.99848
Seychelles period 1	1960 – 1970	0.84111
Seychelles period 2	1972 – 1974	0.99314
Zambia (Northern Rhodesia)	1955 – 1958	1
Zimbabwe (Southern Rhodesia)	1954 – 1956	0.98473

Notes: Countries above within the West African Currency Board included Ghana, Nigeria, and Sierra Leone; the East African Currency Board included Kenya; the Palestine Currency Board included Jordan; and the Southern Rhodesian Currency Board included Malawi, Zambia, and Zimbabwe.

National income data from the Penn World Table include the years 1967-1970 for Singapore, 1950-1967 for Mauritius, 1953-1959 for Jamaica, 1950-1966 for Kenya, 1990-2011 for Hong Kong, 1976-1979 and 1990-2011 for Bermuda, 1954-1964 for Jordan, 1954-1956 for Malawi, 1955-1958 for Zambia, 1954-1956 for Zimbabwe, 1950-1959 for Nigeria, and 1961-1964 for Sierra Leone; national income data from Mitchell's *International Historical Statistics* include the years 1948-1952 for Myanmar, 1931-1934 for Jamaica, and 1950-1957 for Ghana; national income data from the World Bank include the years 1960-1968 for the Bahamas, and 1960-1970 and 1972-1974 for Seychelles.

Because these databases contain national income measures for individual countries rather than regional currency boards, some of the values for the nations that were affiliated within a larger currency board region may show skewed correlations. Nevertheless, judging from the overall calculations, the national income data and currency in circulation for the currency board episodes correlate well, with the minor exceptions being Jamaica from 1931-1934 and Sierra Leone from 1961-1964. These exceptions, however, are relatively few, and as a result, a relatively stable income velocity for the currency board episodes can be implied. With these arguments for a fairly stable velocity, I now continue to the calculations.

I use existing monetary data to calculate the year-over-yearchanges in national income for my list of currency boards. Furthermore, I break up the period 1928-1950 into two separate

timeframes, the first covering the years 1928-1938, or the Great Depression and the pre-World War II era, and the second covering the years 1939-1950, or World War II and after. The reason for the separate time frames is to recognize the possibility that velocity may have been more stable during the Great Depression era than during the wartime era.

1928-1938

The years 1928-1938 covered significant world events such as the Great Depression, while also serving as the prelude to World War II. As mentioned earlier, analyzing the timeframe separately makes sense due to theseunique events. I now proceed to calculate the year-over-year percentage changes in national income for my list of currency board episodes for the period. The quantity equation is

$$MV=PT$$

Where M represents money supply, or in our case, the amount of currency in circulation within aregion, V the velocity of circulation, P the price level, and T the volume of transactions taking place within an economy. Multiplying P, the price level with T, the volume of transactions within the regional economy will give us Y, or national income. Assuming a constant velocity, the yearly percent changes in velocity equals zero, effectively canceling out. What we are then left with is the year-over-year percent change of the money supply M, which in our case is the currency in circulation, which we can thenequate to equal the year-over-year change in gross domestic product.

$$MV=Y$$
$$\Delta V=0$$
$$\Delta M=\Delta Y$$

A table summarizing the year-over-year changes in national income during the period, along with an index usinga base value of 100 for the year 1928,is shown below.

Table 2. *Year-over-Year Changes in Nominal GDP, 1929-1938, Estimatedfrom Currency Board Circulation (%)*

Currency Board	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Bahamas	0.0	0.0	0.0	0.0	0.0	-33.3	0.0	0.0	0.0	8.2
Bermuda	107.5	58.1	68.6	-12.0	-11.7	-8.7	6.5	22.2	-6.4	5.2
British Guiana	0.0	0.0	0.0	0.0	0.0	0.0	5.0	9.5	8.3	7.7
Burma										
East African	-4.4	0.6	-8.1	-14.4	-10.6	7.1	8.6	2.8	19.7	17.6
Hong Kong									19.5	4.5
Iraq						37.2	16.9	4.3	29.5	-0.6
Jamaica	-6.9			20.0	-14.5	6.3	10.1	3.7	14.1	7.5
Mauritius	4.5	-0.2	-49.2	-2.7	7.8	0.9	3.3	12.8	2.1	-9.2
Palestine	-5.3	22.9	7.8	1.6	17.1	44.2	30.9	17.1	-9.8	-11.0
Seychelles									26.8	
Singapore	-7.4	-17.4	-22.7	7.6	-2.0	7.4	3.9	4.0	23.2	
Solomon Islands	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		
Southern Rhodesian										
West African	-2.4	-8.1	-30.8	-4.1	5.5	-15.1	23.0	25.5	53.7	-6.3

Notes: Burma's currency board did not begin until 1947; Hong Kong's currency board began so late in 1935 that the first representative year is 1936; Iraq's currency board began in 1932; the Solomon Islands currency board ended in 1937; and the Southern Rhodesian currency board did not begin until 1940.

Table 3. *Index of Estimated Nominal GDP (1928 or first available year = 100)*

Currency Board	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Bahamas	100.0	100.0	100.0	100.0	100.0	100.0	66.7	66.7	66.7	66.7	72.2
Bermuda	100.0	207.5	328.1	553.2	486.7	429.5	392.0	417.4	509.9	477.4	502.4
British Guiana	100.0	100.0	100.0	100.0	100.0	100.0	100.0	105.0	115.0	124.6	134.2
Burma											
East African	100.0	95.6	96.2	88.4	75.7	67.7	72.5	78.7	80.9	96.8	113.9
Hong Kong									100.0	119.5	124.8
Iraq						100.0	137.2	160.3	167.3	216.5	215.2
Jamaica	100.0	93.1	93.1	87.7	105.2	89.9	95.6	105.3	109.2	124.6	133.9
Mauritius	100.0	104.5	104.3	53.0	51.6	55.6	56.1	57.9	65.3	66.6	60.5
Palestine	100.0	94.7	116.4	125.6	127.6	149.5	215.6	282.2	330.4	298.1	265.4
Seychelles									100.0	126.8	
Singapore	100.0	92.6	76.5	59.2	63.6	62.3	66.9	69.5	72.3	89.1	
Solomon Islands	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0		
Southern Rhodesian											
West African	100.0	97.6	89.0	61.6	59.1	62.4	53.0	65.1	81.7	125.6	117.7

It is important to note that some of the smaller currency boards held their currency in circulation constant for years at a time, notably the Bahamas from 1928-1933 and 1935-1937 along with the Solomon Islands from 1928-1936. For these smaller episodes, using year-over-year changes in the circulation of currency to approximatethe yearly changes is almost certainly not reliable. Having addressed these possibilities, I will now move on to analyze the balance of trade for the currency boards to confirm the validity of my calculations. To briefly recap, for an expanding economy, imports and exports should expand, with the amount of imports generally outweighing the number of exports. This is

because countries tend to import more during an expansion to provide price competition and toincrease supply to meet higher internal demands. For a shrinking economy, imports should generally shrink and if the balance of trade was in deficit it should turn to a surplus or at least less of a deficit. If the rest of the world is shrinking as well or if the price of a major export is falling however, exports may also shrink. A table summarizing the year-over-year changes in balance of trade for the currency boards followed by a table comparing the increase and decrease in both the balance of trade and yearly changes in currency in circulation are shown below. I have color-coded the results for greater clarity.

1928-1938

See the next pages for the tables.

Table 3. *Year-over-Year Changes in Balance of Trade (%)*

Currency Board	1928	1929	1930	1931	1932	1933	1934	1935	1936	1937	1938
Bahamas	0.1	-11.9	15.9	26.4	31.1	-5.7	21.0	2.4	-39.3	-44.0	6.2
Bermuda	-9.8	-8.5	-16.1	88.7	-777.6	25.8	3.4	-6.0	-34.8	-16.9	13.2
British Guiana											
Burma											
East African											
Hong Kong											
Iraq											
Jamaica	-84.2	-8.4	14.8	19.6	2.6	-21.9	13.8	22.3	-4.2	4.1	-13.6
Mauritius	-384.3	181.7	-507.6	35.0	93.1	372.5	-393.5	52.0	138.8	10.5	-213.1
Palestine											
Seychelles	122.2	-5833.3	28.0	-90.6	733.3	-84.0	200.0	-33.3	312.5	-45.5	-177.8
Singapore											
Solomon Islands											
Southern Rhodesian											
West African	157.4	1563.5	-204.5	137.1	-186.6	112.0	751.0	-214.9	261.4	-102.5	-8524.1

Note: Data were not readily available in many cases.

Table 4. *Comparison of Currency and Trade Changes, 1928-1938*

Currency Board	1928		1929		1930		1931		1932		1933		1934		1935		1936		1937		1938	
	C	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B
Bahamas													-	+							+	+
Bermuda	+	-	+	-	+	-	+	+	-	-	-	+	-	+	+	-	+	-	-	-	+	+
British Guiana																						
Burma																						
East African																						
Hong Kong																						
Iraq																						
Jamaica	+	-	-	-					+	+	-	-	+	+	+	+	+	-	+	+	+	-
Mauritius	-	-	+	+	-	-	-	+	-	+	+	+	+	-	+	+	+	+	+	+	-	-
Palestine																						
Seychelles																			+	-		
Singapore																						
Solomon Islands																						
Southern																						

Rhodesian																						
West African	+	+	-	+	-	-	-	+	-	-	+	+	-	+	+	-	+	+	+	-	-	-

Note: The column "C" represents figures for the year-over-year changes in currency in circulation, while the column "B" represents figures for the year-over-year changes in balance of trade.

In general, we can observe that for most currency boards the currency in circulation, theproxy here for national income, fell from around 1928-1932, then in most cases rose from around 1933-1938. Judging from the common trend of growth and decline in national incomes that we see for the majority of the currency boards, and given the history of the global economy during the period, we can infer that common macroeconomic shocks hit these economies. The common trend is reassuring. The exception to this trend is Bermuda, which saw growth in the circulation of its currency from 1928-1931 and a fluctuation between growth and decline for the years thereafter. Narrative evidence such as the annual reports that British colonies issued confirms that thedecline in national income for the majority of currency board systems from 1928 to 1932 was linked to the Great Depression and its global effects.

From 1933-1938, we see growth in currency circulation, and by extension for national income, in currency board systems. The United Kingdom abandoned the gold standard in September 1931 and its economy began growing again soon afterwards. Most British colonial currency boards used the pound sterling as their anchor currency. In the United States the depression deepened until hitting bottom in 1933. In the currency board systems here, examining the trends in currency circulationand the balance of trade, we can observe healthy fluctuations and adjustments in trade deficits and the economies overall.

After calculating the year-over-year percent changes in nominal gross domestic product for the currency board episodes and looking at the annual fluctuations in the balance of trades as well, it can be concluded that my calculationsmake much sense in light of the quantity theory of money and the assumption of a stable income velocity. I will now proceed to calculate and analyze the yearly percent changes in national income for the remaining years 1939-1950.

1939-1950

The years 1939-1950 cover the onset of World War II and its aftermath, and once again due to its distinct characteristics, treating it as a separate period makes for a clearer analysis. I will employ the same techniques I used before to calculate the year-over-yearpercent changes in national income.

A table summarizing the yearly percentage changes in national income during this period, along with an index continuing on from the previous period with the year 1928 serving as the base year with a value of 100 are shown below. Also shown is a table summarizing the year-over-year changes in the balance of trade along with a table comparing the increase and decrease in both the balance of trade and yearly changes in currency in circulation. Results are color-coded for greater clarity.

Table 5. *Year-over-Year Changes in Nominal GDP, 1939-1950, Estimated from Currency Board Circulation (%)*

Currency Board	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Bahamas	15.9	48.1	29.7	42.7	39.0	7.0	-5.3	35.9	23.6	1.4	5.4	4.1
Bermuda	-100.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-3.3	20.4	-3.1	2.5
British Guiana												
Burma											48.3	-14.1
East African	8.2	0.0	6.6	18.7	70.9	50.3	15.5	14.3	-15.8	2.4	-6.6	15.4
Hong Kong	-6.5	3.4						67.7*	51.0	19.2	3.0	0.4
Iraq	-1.3	29.5	7.1	92.7	106.0	48.2	7.5	-1.0	-5.7	-10.8	1.7	0.0
Jamaica	32.9		70.6*	257.4	45.1	40.6	26.6	19.5	-3.1	-0.5	1.2	10.2
Mauritius	0.0	0.0	0.0	0.0	0.0	0.0	14.7	3.5	3.6	5.6	2.6	11.2
Palestine	31.2	29.9	29.3	28.8	86.3	39.8	19.6	4.3	1.5	12.5		
Seychelles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	7.1	-0.7	0.6	0.0
Singapore	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.0
Solomon Islands												
Southern Rhodesian			57.8	26.2	25.0	23.1	10.0	14.0	20.6	5.2	1.7	10.0
West African	-35.2	8.1	6.6	31.7	34.9	10.2	12.5	13.9	23.5	14.4	42.1	-2.4

Notes: Data for British Guiana were not readily available in this period; Burma's currency board did not begin until 1947; Hong Kong's currency board was in suspension during Japanese occupation from 1941 to 1945, so the 1946 figure is for the whole period 1940-1946; the Solomon Islands currency board ended in 1937; and the Southern Rhodesian currency board did not begin until 1940. The Palestine Currency Board ceased to include Israel after 1948, so its 1949 and 1950 figures are excluded because they do not accurately reflect conditions in its remaining area of operation on account of redemptions from Israel. Jamaica's figure for 1941 is for the period 1940-1941.

Table 6. *Index of Estimated Nominal GDP, 1939-1950 (1928 or first available year = 100)*

Currency Board	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Bahamas	83.6	123.8	160.6	229.1	318.5	340.9	322.9	438.9	542.3	550.0	579.5	603.5
Bermuda	0.0							1958.6	1893.4	2280.2	2210.2	2264.6
British Guiana												
Burma										100.0	148.3	127.4
East African	123.2	123.2	131.3	155.9	266.4	400.3	462.3	528.3	444.6	455.3	425.2	490.9
Hong Kong	116.8	120.8					157.7	264.4	399.3	475.8	489.9	491.9
Iraq	212.3	275.0	294.6	567.6	1169.4	1733.2	1864.0	1846.2	1741.2	1552.3	1578.1	
Jamaica	177.9		303.5	1084.9	1574.6	2213.9	2802.9	3348.4	3244.0	3226.1	3265.3	3598.8
Mauritius						165.8	190.2	196.9	204.0	215.3	221.0	245.7
Palestine	348.3	452.6	585.0	753.3	1403.4	1962.5	2346.5	2447.3	2484.3	2793.9		
Seychelles								581.5	622.8	618.1	621.6	
Singapore										325.2	327.1	
Solomon Islands												
Southern Rhodesian		100.0	157.8	199.1	248.8	306.4	336.9	384.1	463.1	487.3	495.5	544.9
West African	76.3	82.5	87.9	115.7	156.1	172.1	193.5	220.5	272.4	311.5	442.7	432.0

Table 7. *Year-over-Year Changes in Balance of Trade (%)*

Currency Board	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950
Bahamas	6.8	-20.5	-17.4	11.7	-15.1	-13.8	-4.0				0.0	-26.8
Bermuda	10.2	13.9	-64.8	-82.9	41.6	4.3	1.1				-3.0	-14.7
British Guiana												
Burma												
East African												
Hong Kong											14.4	87.0
Iraq												
Jamaica	-23.9	-67.0	14.8	39.8	-99.2	-46.0	-3.8				13.1	-4.1
Mauritius	353.7	-343.2	295.6	-85.3	-50.9	-1947.0	-58.6				16.7	171.4
Palestine												
Seychelles	171.4	-30.0	-357.1	272.2	-193.5	69.0	-177.8					
Singapore												
Solomon Islands												
Southern Rhodesian												
West African	162.0	-115.6	418.2	-583.5	85.5	46.0	1689.9					237.0

Table 8. *Comparison of Currency and Trade Changes, 1939-1950*

Currency	1939		1940		1941		1942		1943		1944		1945		1946		1947		1948		1949		1950	
Board	C	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B	C	B
Bahamas	+	+	+	-	+	-	+	+	+	-	+	-	-	-									+	-
Bermuda	-	+																			-	-	+	-
Burma																								
Brit. Guiana																								
E. African																								
Hong Kong																					+	+	+	+
Iraq																								
Palestine																								
Jamaica	+	-					+	+	+	-	+	-	+	-	+	+					+	+	+	-
Mauritius													+	-	+	+					+	+	+	+
Seychelles																								
Singapore																								
Solomon Is.																								
S. Rhodesian																								
W. African	-	+	+	-	+	+	+	-	+	+	+	+	+	+									-	+

Note: The column "C" represents figures for the year-over-year changes in currency in circulation, while the column "B" represents figures for the year-over-year changes in balance of trade

For the most part, currency in circulation, or national income, grew year-over-year for all currency board episodes during this period. The common trend is once again reassuring, serving to greater validatemy data and approach. The minor exceptions to the trend of positive year-over-year growth are the Bahamas in 1945, Bermuda in 1939 and 1949, and the West African Currency Board in 1939 and1950. Overall, the trend of positive year-over-year growth in national income for the currency boards can be interpreted as a sign of economicrecoverysince the onset of the Great Depression that began in the early 1930s. For the years where we can observe a positive growth in both national income and balance of trade, heavily concentrated from around1945 onwards, a positive growth in both regional and the global economy as a whole can be seen. For the rest of the years, we can observe a healthy leveling of the balance of trade deficits for both positive and negative year-over-year changes in national income coupled with both positive and negative year-over-year changes in the balance of trades. The only outliers where the data can seem questionable are the Bahamas in 1945 and Bermuda in 1949 where a negative year-over-year change in national income coupled with a negative year-over-year change in the balance of trade can be seen. Although the negative changes in both national incomeand the balance of trade may seem out of place in a period marked with such economic prosperity, it is worth noting that the actual percentage declines during these years for both variables are relatively small. In addition, following years of continued economic expansion and prosperity, it may not be too surprising to see a momentary stall in the growth of the economies as well.

Judging from the data during this period, overall, a relatively stable income velocity can be observed – and in light of a stable income velocity, my calculations for the timeframe seem to be comparably valid as well.

Conclusion

Using the quantity theory of money as inspiration, I attempted to produce rough estimates of year-over-year changes in national income for currency board episodes that neither the Maddison Project nor Mitchell's *International Historical Statistics*covered for

the years 1928-1950. According to my data and calculations, it is reasonably safe to conclude that monetary data showed a correspondence to gross domestic product, and that currency in circulationcould be used to roughly estimate year-over-year percentage changes in national income. Judging from the correlation between currency in circulation and gross domestic product and year-over-year percent changes in national income and balance of trade, an overall stable velocity can be hypothesized for the currency boards between the years 1928-1950 as well.

The numbers from this exercise should be taken with a large grain of salt. They rest on simplifying assumptions that seem plausible but may be disproved by deeper research. They are valuable, though, as "top-down" first estimates of nominal GDP growth for cases where the data necessary for building "bottom-up" estimates sector by sector are missing or have not yet been mined from archives.

Appendix

Table A1. *Monetary Base, 1928-1938 (local currency units, typically equal to pounds sterling)*

Currency Board	1928	1929	1930	1931	1932	1933
Bahamas	110,000	110,000	110,000	110,000	110,000	110,000
Bermuda	40,000	83,000	131,223	221,289	194,690	171,817
British Guiana	104,166	104,166	104,166	104,166	104,166	104,166
Burma						
East African	5,275,063	5,043,041	5,073,937	4,664,405	3,993,274	3,569,171
Hong Kong (millions)						
Iraq						2,248,185
Jamaica	87,042	81,044		76,293	91,572	78,294
Mauritius	14,132,970	14,770,750	14,747,250	7,489,290	7,287,300	7,854,365
Palestine	1,887,348	1,787,664	2,197,664	2,369,664	2,408,664	2,821,664
Seychelles						
Singapore	136,050,161	126,012,323	104,044,756	80,477,188	86,564,993	84,790,745
Solomon Islands	4,637	4,637	4,637	4,637	4,637	4,637
Southern Rhodesian						
West African	15,228,639	14,862,137	13,661,864	9,456,456	9,072,037	9,572,014

Currency Board	1934	1935	1936	1937	1938
Bahamas	73,400	73,400	73,400	73,400	79,400
Bermuda	156,816	166,943	203,943	190,943	200,943
British Guiana	104,166	109,375	119,792	129,791	139,791
Burma					
East African	3,822,433	4,151,668	4,265,914	5,107,126	6,005,930
Hong Kong (millions)			149	178	186
Iraq	3,084,365	3,604,321	3,760,313	4,868,312	4,838,301
Jamaica	83,214	91,643	95,014	108,458	116,550
Mauritius	7,922,045	8,182,500	9,227,500	9,417,485	8,547,485
Palestine	4,069,664	5,326,228	6,236,135	5,626,134	5,009,134
Seychelles			392,602	497,976	
Singapore	91,048,841	94,614,029	98,375,227	121,236,424	
Solomon Islands	4,637	4,637	4,637		
Southern Rhodesian					
West African	8,128,380	9,995,246	12,540,159	19,269,111	18,056,741

Notes: Burma's currency board did not begin until 1947; Hong Kong's currency board began so late in 1935 that the first representative year is 1936; Iraq's currency board began in 1932; the Solomon Islands currency board ended in 1937; and the Southern Rhodesian currency board did not begin until 1940.

Sources (also Table A2): Mainly data from Krus and Schuler (2014), which at the time this paper was being written was still unissued and missing certain data. Krus and Schuler take their data from currency board annual reports.

Table A2. *Monetary Base, 1939-1950 (local currency units, typically equal to pounds sterling)*

Currency Board	1939	1940	1941	1942	1943	1944
Bahamas	92,000	136,220	176,620	252,020	350,370	374,970
Bermuda	NA	NA	NA	NA	NA	NA
British Guiana						
Burma						
East African	6,500,377	6,499,776	6,927,203	8,223,676	14,055,375	21,118,518
Hong Kong (millions)	174	180	NA	NA	NA	NA
Iraq	4,773,297	6,183,293	6,623,291	12,760,789	26,290,808	38,965,831
Jamaica	154,843		264,193	944,338	1,370,581	1,927,000
Mauritius						23,437,180
Palestine	6,574,134	8,541,635	11,040,635	14,216,635	26,487,675	37,038,700
Seychelles						
Singapore						
Solomon Islands						
Southern Rhodesian		1,820,401	2,871,901	3,624,449	4,530,008	5,578,319
West African	11,705,395	12,651,418	13,483,382	17,753,438	23,950,869	26,401,717

Currency Board	1945	1946	1947	1948	1949	1950
Bahamas	355,150	482,800	596,500	605,000	637,400	663,800
Bermuda	NA	783,422	757,346	912,096	884,096	905,846
British Guiana				1,874,166	1,909,583	1,964,791
Burma				16,210,333	24,038,001	20,644,894
East African	24,384,463	27,869,680	23,455,417	24,016,043	22,431,984	25,895,474
Hong Kong (millions)	235	394	595	709	730	733
Iraq	41,905,602	41,505,588	39,145,722	34,899,272	35,478,035	
Jamaica	2,439,702	2,914,505	2,823,608	2,808,099	2,842,163	3,132,457
Mauritius	26,887,180	27,827,063	28,826,835	30,426,835	31,226,835	34,726,235
Palestine	44,287,193	46,188,142	46,887,894	52,730,105	25,954,034	16,360,573
Seychelles		2,282,796	2,444,931	2,426,696	2,440,297	
Singapore				442,450,647	445,066,615	
Solomon Islands						
Southern Rhodesian	6,133,539	6,991,257	8,430,147	8,870,147	9,020,147	9,920,183
West African	29,692,788	33,825,406	41,787,243	47,786,412	67,927,141	66,276,841

Notes: Data for British Guiana were not readily available in this period; Burma's currency board did not begin until 1947; Hong Kong's currency board was in suspension during Japanese occupation from 1941 to 1945, so the 1946 figure is for the whole period 1940-1946; the Solomon Islands currency board ended in 1937; and the Southern Rhodesian currency board did not begin until 1940. The Palestine Currency Board ceased to include Israel after 1948, so its 1949 and 1950 figures are excluded because they do not accurately reflect conditions in its remaining area of operation on account of redemptions from Israel. Jamaica's figure for 1941 is for the period 1940-1941.

Table A3. *Balance of Trade 1928-1938 (typically pounds sterling)*

Currency Board	1928	1929	1930	1931	1932	1933
Bahamas	-1,557,000	-1,743,000	-1,465,000	-1,078,000	-743,000	-785,000
Bermuda	-1,440,000	-1,563,000	-1,815,000	-205,000	-1,799,000	-1,334,000
British Guiana						
Burma						
East African						
Hong Kong						
Iraq						
Jamaica	-2,231,000	-2,418,000	-2,060,000	-1,657,000	-1,614,000	-1,968,000
Mauritius	-339,000	277,000	-1,129,000	-734,000	-51,000	139,000
Palestine						
Seychelles	60,000	25,000	32,000	3,000	25,000	4,000
Singapore						
Solomon Islands						
Southern Rhodesian						
West African	219,000	3,643,000	-3,808,000	1,413,000	-1,224,000	147,000

Currency Board	1934	1935	1936	1937	1938
Bahamas	-620,000	-605,000	-843,000	-1,214,000	-1,139,000
Bermuda	-1,288,000	-1,365,000	-1,840,000	-2,151,000	-1,868,000
British Guiana					
Burma					
East African					
Hong Kong					
Iraq					
Jamaica	-1,697,000	-1,318,000	-1,374,000	-1,318,000	-1,497,000
Mauritius	-408,000	-196,000	76,000	84,000	-95,000
Palestine					
Seychelles	12,000	8,000	33,000	18,000	-14,000
Singapore					
Solomon Islands					
Southern Rhodesian					
West African	1,251,000	-1,438,000	2,321,000	-58,000	-5,002,000

Sources (also Table A4): Mainly Haimann and Yasin (2012), who take data from the British Board of Trade's annual statistical abstract for the British Empire / Commonwealth.

Table A4. *Balance of Trade 1939-1950 (typically pounds sterling)*

Currency Board	1939	1940	1941	1942	1943	1944
Bahamas	-1,061,000	-1,278,000	-1,501,000	-1,326,000	-1,526,000	-1,736,000
Bermuda	-1,677,000	-1,444,000	-2,379,000	-4,352,000	-2,542,000	-2,432,000
British Guiana						
Burma						
East African						
Hong Kong						
Iraq						
Jamaica	-1,855,000	-3,098,000	-2,641,000	-1,591,000	-3,169,000	-4,626,000
Mauritius	241,000	-586,000	1,146,000	169,000	83,000	-1,533,000
Palestine						
Seychelles	10,000	7,000	-18,000	31,000	-29,000	-9,000
Singapore						
Solomon Islands						
Southern Rhodesian						
West African	3,103,000	-483,000	1,537,000	-7,432,000	-1,079,000	-583,000

Currency Board	**1945**	**1946**	**1947**	**1948**	**1949**	**1950**
Bahamas	-1,806,000	NA	NA	-4,100,000	-4,100,000	-5,200,000
Bermuda	-2,405,000	NA	NA	-6,600,000	-6,800,000	-7,800,000
British Guiana						
Burma						
East African						
Hong Kong				-30,600,000	-26,200,000	-3,400,000
Iraq						
Jamaica	-4,800,000	NA	NA	-8,400,000	-7,300,000	-7,600,000
Mauritius	-2,432,000	NA	NA	600,000	700,000	1,900,000
Palestine						
Seychelles	-25,000	NA	NA			200,000
Singapore						
Solomon Islands						
Southern Rhodesian						
West African	9,269,000				-18,100,000	24,800,000

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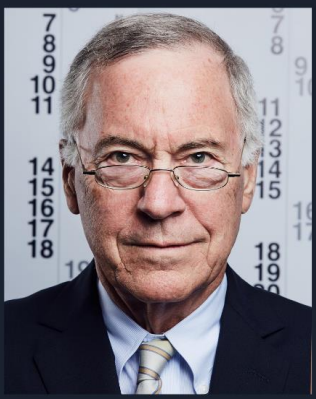

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