

# Sucking cane and blowing whistle: dual anchors and a missing transmission mechanism

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## ABSTRACT

This paper illustrates that cross-country variations in liquid bank reserves indicate a monetary policy practice that allows a country to simultaneously pursue an exchange rate goal and monetary independence in light of the high degree of substitutability between domestic and foreign bank money. There are three core findings. (i) Floating exchange rate economies experience an increase in liquid commercial bank reserves when the central bank accumulates FX reserves, and vice versa. (ii) There is no statistical evidence indicating that central banks in pegged exchange rate economies allow bank reserves to be endogenous to FX market interventions. (iii) There is a strong negative association between liquid bank reserves and bank loans, thereby contravening the bank lending channel. While these results are inconsistent with the core predictions of the Trilemma, they are consistent with endogenous money theory of Post Keynesians.

**KEY WORDS:** Trilemma, dollar encroachment, monetary transmission mechanism, compensation, bank liquidity, endogenous money

## 1. INTRODUCTION

Most developing and emerging economies operate on the periphery of a global dollar standard. This implies their national currencies face the consistent threat of encroachment by the world's dominant reserve and vehicle currency: the United States dollar (McKinnon 2000). The dollar is also the world's primary hegemonic currency, providing a risk-free investment security that anchors global finance (Fields and Vernengo 2013). Although the euro has a far way to go before it becomes a substantial reserve, vehicle and invoice currency (Fields and Vernengo 2013), it still poses the threat of encroachment on the currencies of developing countries. The encroachment involves the erosion of the national currencies' traditional functions of money such as medium of exchange, store of value, unit of account and standard of deferred payments (McKinnon 2000). There are various reasons why the dollar and euro have often replaced totally or partially

national currencies. These include financial crises, recurring inflation problems, failure to tighten capital inflows, borrowing from international creditors on short term and other reasons. In periods of commodity booms and surplus capital inflows, emerging and developing countries often experience less trouble maintaining a target of the exchange rate. The latter is the case of the problem of plenty on which most researchers have focused<sup>1</sup>. However, in most instances developing and emerging economies do not get to operate with the fortuitous problem of plenty; instead, they face the consistent risk of dollar encroachment and capital flight. This requires a delicate balance to maintain hard currencies needed for the task of economic development and stability of the exchange rate.

This paper explores one unappreciated policy regime that has been in use among many countries on the periphery. It involves targeting the exchange rate while also maintaining a degree of monetary policy independence in spite of the difficulty of preventing foreign exchange from exiting, especially over the medium term. Monetary independence involves operating on the stock of domestic currency debt instead of the narrow money supply or interest rate. The policy involves maintaining a long-term intermediate target of foreign exchange reserves consistent with a desired level of import cover. It implies the stock of international reserves has an upward trend over time as the economy and import grow larger. Shocks occur around the trend, but over time the economy on the periphery has to maintain the intermediate target in line with the size of imports. Sometimes there might be a shift in the trend – a regime change – but the upward trend continues as necessitated by the international dollar standard.

Over time there will be a net injection of excess bank reserves as foreign reserves grow in proportion with the size of import and GDP. This enables the monetary authority to implement one-sided sales of government securities (or its own sterilization securities) to the private sector. The one-sided sales are necessary because of two reasons. Firstly, when the central bank pursues its intermediate target of international reserves it quarantines foreign exchange that the private sector wishes to use to buy foreign currency deposits and other assets. Secondly, the domestic securities allow the commercial banks to have an interest-earning asset instead of non-remunerated excess reserves. Often, the latter process is described in the media and by policy makers as ‘mopping up’ excess liquidity. However, it involves generating excess liquid assets

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<sup>1</sup> Researchers who examine the circumvention of the Trilemma tend to look at the issue when there is an opportunity for currency appreciation because of excessive capital inflows or current account surplus (Filardo and Grenville 2012; Ostry, Gosh and Chamon 2012; Aizenman, Chinn and Ito 2012).

that compensates for the non-interest excess reserves and the reality of the foreign exchange constraint. Why not just pay interest directly on excess reserves? That would be a non-market monetary policy tool. In the era of financial liberalization, policy makers tend to prefer market-based to non-market systems (Fry 1997, IMF 2001). Market-based monetary policy requires developing money and capital markets in developing countries.

This paper argues that this process is an unappreciated monetary transmission mechanism that involves simultaneously targeting the exchange rate and pursuing independent monetary policy, given that domestic money can easily be converted into a foreign deposit once the local foreign exchange market has enough hard currencies. This thesis does not require the substitution between a local and foreign bonds, rather it takes into account the reality that domestic bank money and foreign currency deposits are perfect substitutes. In other words, there is perfect substitution between domestic bank money and foreign bank money when sufficient foreign exchange is available for the private sector to make the substitution. In spite of this perfect substitution, the proposed monetary operation or missing transmission mechanism allows the policy maker to get around the imposition of the Trilemma or Impossible Trinity, at least in the short and medium term – in some cases even the long term as is the case with several pegged exchange rate economies in the Caribbean and elsewhere. The policy maker can have their cake and eat it too or in the words of the old Guyanese proverb: suck cane and blow whistle<sup>2</sup>. This is known as the dual nominal anchor hypothesis, since the Trilemma implies that money is neutral and there can only be a one nominal anchor in the long run. Moreover, for dual anchors to be possible there must be some form of a transmission mechanism at work.

The paper examines a cross section of countries classified into different exchange rate systems by the International Monetary Fund (IMF 2014). In particular, it estimates a model of liquid bank reserves and its determinants. The paper insists that liquid bank assets embed import information regarding the monetary system. In addition to supporting the dual anchor, the paper adds to the literature on the determinants of bank liquidity. The findings point to fundamental

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<sup>2</sup> The Guyanese proverb says one cannot suck cane and blow whistle, meaning it is impossible to suck on sugarcane and also blow a whistle at the same time.

determinants such as GDP growth, bank credit, foreign exchange interventions and exchange rate regime, instead of the short-term factors such as demand deposit volatility<sup>3</sup>.

## 2. NASCENT LITERATURE ON DUAL ANCHORS

Ostry, Gosh and Chamon (2012) emphasize that emerging-market countries could possibly pursue two targets or anchors – inflation and exchange rate target – if they possess an interest rate instrument and can also intervene successfully in the local foreign exchange market. These economies, according to the authors, could have their cake and eat it too, providing domestic and foreign securities are not perfect substitutes, and there are surplus inflows of foreign capital. However, although domestic and foreign bonds may not be perfectly substitutable, domestic bank money can be easily converted into foreign bank money when there is no shortage of foreign currency in the domestic foreign exchange (FX) market. Foreign currency bank deposits – whether at home or in foreign correspondent banks – are perfectly substitutable and the only variable impeding the substitution is the availability of foreign currency at the time an individual or bank tries to make the conversion. The idea of dual anchor identified by Ostry, Gosh and Chamon (2012) is applicable to situations of a surfeit of capital inflows. In such a situation, note the authors, the central bank can use sterilized intervention as it accumulates international reserves. Other researchers recognize the capacity for sustained periods of sterilization when there are surplus capital inflows (Filardo and Grenville 2012).

However, the purpose of this study is to ask whether central banks in developing and emerging- market economies can have dual anchors in normal times and in less fortunate times. Understanding the argument herein requires appreciating the fact that emerging economies are facing a foreign exchange constraint of various degrees within the context of an international dollar standard. These countries do not possess a convertible, vehicle and a global reserve currency. It is this constraint which prevents the conversion of excess domestic money into foreign bank money; and even under capital control money will find a way around the restrictions. Central bank practitioners in many countries have known about this constraint and often pitch the operation as ‘mopping up’ excess bank reserves, which in most countries are non-

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<sup>3</sup>A non-exhaustive list of studies which emphasize short-term determinants of bank liquidity includes Morrison (1966), Baltensperger (1974) and Agénor, Aizenman and Hoffmaister (2004). On the other hand, Primus, Birchwood and Henry (2014) explore the effect of government spending, a long-run factor, on excess bank liquidity.

remunerated<sup>4</sup>. These mopping up operations are accomplished by one-sided sales of domestic sovereign securities – instead of the classic textbook two-sided open market operations – to commercial banks and the general private sector. These sales result in compensatory changes on the balance sheet of banks and local investors in which liquid reserves that could be invested in foreign currency deposits are replaced by an interest-earning domestic currency asset, namely a central government security or one specially created for this purpose by the central bank. Meanwhile, the central bank is able to meet its long-term target level of FX reserves to credibly defend its exchange rate goal.

The process of meeting its long-term goal of international reserves means the monetary authority has to exchange local currency for hard currencies, a process which quarantines foreign exchange that could be available to the private sector and at the same time inject non-remunerated bank reserves, often in excess of the amount required. This calls for opening another profit-making opportunity in local currency. This work argues that understanding the phenomenon of dual nominal anchors requires looking at the movements of commercial bank reserves – that there is significant information content in liquid bank reserves even if they do not have a causal role such as engendering a credit boom<sup>5</sup>. The central bank has two instruments and two targets. The instruments are (i) a credible level of international reserves and (ii) the one-sided sales of securities. The targets (goals) are (i) the exchange rate and (ii) output growth. FX market intervention per se is not the instrument since the central bank intervenes for different reasons such as: (i) in normal times to convert foreign money into local currency since the locals' domestic liabilities are in domestic currency; (ii) to meet its target level of foreign reserves to signal credibility; and (iii) to sell foreign exchange in times of pressure. The first two instances

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<sup>4</sup> This is true of most developing economies that for decades have been inundated with excess reserves and excess liquid assets. However, the Federal Reserve pays a low interest on excess reserves as a new tool of monetary policy. Several European countries pay negative interest rate on excess reserves. These are all related to post-2008 unconventional monetary policy. Excess reserves have always been part of the implementation of monetary policy in developing countries long before the discussions of unconventional monetary policy. If, for example, central banks in developing countries start charging negative interest rate on excess reserves, we could expect to see banks shifting from domestic assets to foreign securities, thus enhancing capital flight.

<sup>5</sup> Several authors view the study of excess reserves as unimportant because they may not engender a credit boom (Liu and Wray 2010). This work emphasizes that it is an important issue because excess reserves, more specifically liquid bank reserves, provide important information such as the operation of more than one nominal anchor. Another key finding of this work is the negative association between liquid reserves and loans, which by itself exclude the operation of the established bank lending monetary transmission channel.

often result in excess bank reserves and require a domestic interest-bearing security to take their place.

The situation of dual anchors, although not called as such, was observed by Lavoie and Wang (2012) for the case of China<sup>6</sup>. They used econometric methods to illustrate how the central bank is able to simultaneously have a short-term interest rate instrument and an exchange rate target – the classic dual anchor scenario which according to the Trilemma cannot occur in the long term. They showed that endogenous sterilization (compensation) makes this a possibility. There are automatic compensating changes within the private sector market system that would allow for adjustments to take place as the central bank accumulates FX reserves. For example, an inflow of foreign capital will add liquidity to the economy and commercial banks would find that they have excessive reserves. Instead of holding excess reserves, commercial banks will repay their indebtedness to the central bank. These are automatic compensating changes that take place in the economy. Lavoie and Wang also have a careful literature review outlining that this form of compensation was observed as early as 1944 by the famous economist Ragnar Nurkse. In addition, Aizenman, Chinn and Ito (2012) observe the tendency for several Asian economies to ‘lean against the Trilemma.’ They show that several Asian economies have been able to adopt intermediate exchange rate regimes such as a managed (or dirty) float, while simultaneously achieving some degree of monetary independence that involves setting a benchmark interest rate target. Of course, this situation of light dual anchors was achieved in a time of favorable capital inflows. As noted earlier, this work argues that it is a much more widespread policy adopted by open economies operating under the international dollar standard.

This paper seeks to extend the literature on compensation and positions the hypothesis within the context of foreign exchange constrained economies and dual anchors. Khemraj and Pasha (2012) illustrate the dual anchor scenario in the Caribbean by estimating sterilization coefficients. They note that if fixed exchange rate economies only focus on the exchange rate goal – meaning they have no monetary independence – their estimated sterilization coefficient should be smaller than that of flexible exchange rate economies. They found high sterilization coefficients for the soft peg regimes, thus indicating that the countries are not only targeting the exchange rate but also pursuing some form of monetary policy that involves neutralizing the

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<sup>6</sup> Godley and Lavoie (2007) examine the compensation principle using a theoretical framework. We are making the point in this paper that compensation allows for the possibility of dual anchors.

effect of FX interventions on reserve money. In addition, Khemraj (2006) explores compensating changes in commercial bank foreign assets when the foreign exchange constraint is non-binding. The study shows once there are non-remunerated excess reserves, commercial banks accumulate foreign currency assets when sufficient hard currencies are available.

This paper will extend the analysis in several directions. Firstly, non-remunerated excess reserves do not have to be extinguished. As a matter of fact, excess reserves occur because of the need to demand foreign reserves as the economy gets larger and imports grow proportionally. Even in the short term as central banks deplete foreign reserves to defend the exchange rate target, the decline in excess reserves is made up for when the situation stabilizes and the stock of foreign reserves are again on the increase. Secondly, following from the previous point, compensation is a fact of policy life when dollar encroachment is a real possibility. The political cost of dollar encroachment is very high for both the sitting government and the central bank. Thirdly, the fact that compensation is endogenous reflecting the constraints of the international system does not rule out the possibility of it being a conscious policy adopted by central banks in developing countries. Officials often speak of mopping up excess liquidity. This policy, more precisely, involves switching interest-earning assets for excess reserves for the purpose of minimizing the more problematic automatic substitution that would occur in its absence, namely the conversion of domestic currency deposits into foreign currency ones. Such an automatic substitution would entail a loss of scarce foreign exchange and financial capital for development.

An important question at hand is whether the buildup of liquid assets on the asset side of the balance sheet of commercial banks would crowd out credit to the private sector. It should not for several reasons. First, the liquid assets provide a source of stability for the balance sheet of the banking system as a whole (Moore 2007). Credit intermediation is much more likely to occur under stability than instability and currency devaluations. Second, credit allocation is demand-determined after the oligopolistic banks set their mark-up lending rate (Khemraj 2006). The banks would supply credit to those who can pay the markup rate, which in most cases is above the interest rate on domestic Treasury bills. After determining their allocation of loans, commercial banks prefer to invest in foreign currency assets, even deposits in foreign correspondent banks given that most developing countries do not have a risk-free interest rate at home. Third, this policy has nothing to do with creating a captive market for government securities. Central government cannot continue to run persistent fiscal deficits when the economy

faces a foreign currency constraint. The central bank itself could create its own sterilization securities.

### 3. DESCRIPTIVE STATISTICS

This section uses the classification system of the International Monetary Fund for exchange rate and monetary policy systems (IMF 2014). In 2014 and several reports in previous years, the IMF classified economies into different exchange rate and monetary policy systems. The 2014 report has a total of 178 countries. Relevant data on liquid bank reserves and other variables were available for 107 countries, thus representing a large enough sample relative to the population of 178. The averages of seven broad economic variables are presented in order to study the descriptive features of different exchange rate and monetary policy regimes. These variables are: (i) liquid reserves to total bank assets, (ii) bank credit to the private sector, (iii) the percent of trade to GDP, (iv) gross domestic savings, (v) GDP growth rate, (vi) inflation rate and (vii) constant per capita GDP. Of particular interest is the level of total liquid reserves relative to bank assets. The ideal variable would be excess reserves which are not readily available to give us a large enough sample of 107 countries. The literature, however, documents that there is a prevalence of excess reserves in most of the economies included in the analysis. In this circumstance, total liquid reserves as a percent of total bank asset is a suitable proxy. Appendix 1 outlines in detail how the sample was selected and the list of all the countries included in the analysis.

The table indicates that the average and coefficient of variation (CV) for the variables under different exchange rate systems. Countries classified as a hard peg – comprising dollarized economies and those under a currency board – have the lowest average percentage of liquid reserves amounting to 14.1 percent. This category also has the lowest CV, thereby indicating less variation around the mean as it relates to this variable. Soft-peg countries, on the other hand, have the highest percentage of bank assets in the form of liquid reserves at 26.4 percent. The CV for this category is the highest indicating relatively substantial variation in this sub-group. The average for the floating exchange rate system is 16.9 with a CV of 0.65. The category, other managed arrangements (AMA), has the second highest percentage of 26.0 percent and the second lowest CV of 0.54. On balance, therefore, it seems as though countries with a soft peg



and a managed exchange rate system have a more liquid banking systems. Exactly why this pattern exists is examined later using econometric tools.

Table 1 Key variables by exchange rate regime classifications

	Hard Peg		Soft Peg		Floating		Residual: Other Managed Arrangements	
	Average	CV	Average	CV	Average	CV	Average	CV
Liquid reserves to total bank assets - %	14.1	0.39	26.4	0.76	16.9	0.65	26.0	0.54
Bank credit to private sector - % of GDP	60.7	0.31	37.3	0.54	60.6	0.67	42.4	0.73
Trade to GDP - %	94.3	0.20	90	0.39	80.7	0.44	82.4	0.55
Gross domestic savings - % of GDP	16.2	1.68	18.9	1.28	18.0	0.58	19.7	0.79
GDP growth - %	2.3	0.90	3.9	0.65	3.9	0.49	4.1	0.48
Inflation - %	0.8	2.18	5.3	2.03	4.5	0.95	6.3	1.10
GDP per capita in constant 2010 US\$	14301	1.01	7385	1.63	13262	1.22	5123	1.11

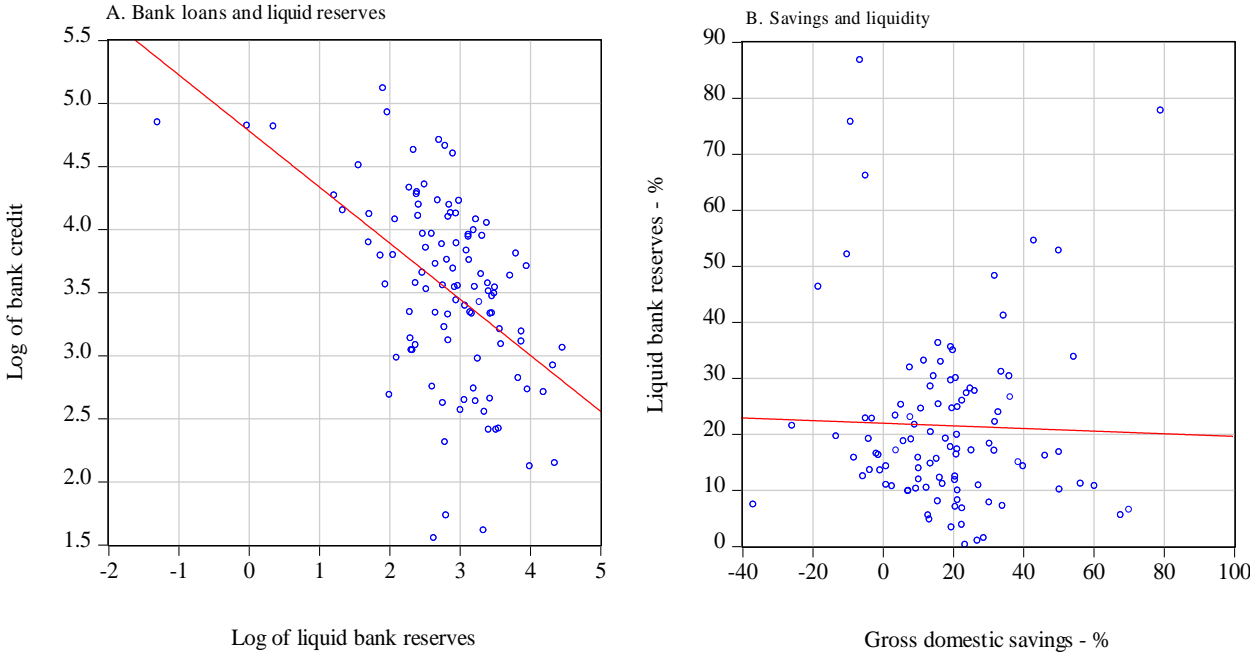
*Source:* Author's calculations using data from *World Development Indicators*.  
CV means coefficient of variation.

Bank credit to the private sector is lowest under the soft peg at 37.3 percent of GDP followed by the residual system, other managed arrangements, at 42.4 percent. Those under hard peg have an average bank credit intermediation percentage of 60.7, which is the highest for this category and comes just above the 60.6 percent of economies under the floating system. The lowest CV of 0.31 occurs for the hard peg system followed by the soft peg system, which has the second lowest CV of 0.54. In general, it can be said that the countries under study are very open economies as measured by the percent of trade to GDP. No regime has a trade percentage of below 80 percent. For context, the World Development Indicators indicates that the trade openness of United States is 28 percent in 2015. The openness measure of the hard peg and soft peg systems is 94.3 percent and 90 percent, respectively. They also show the least variability in this measure as can be seen by their respective CV of 0.2 and 0.39. Gross domestic savings is approximately similar in the soft peg, hard peg and OMA at 18.9 percent, 18 percent and 19.7

percent, respectively. However, it is lower under the hard peg at 16.2 per cent. There is significant variability of gross domestic savings as indicated by the CV for the four regimes.

The average rate of GDP growth is approximately the same at 3.9 percent for the countries under a soft peg and floating systems. There is however more variability in growth rate under the soft peg. The other managed arrangement recorded the highest economic growth rate of 4.1 percent and the lowest of 2.3 percent by the hard-peg countries. The lowest average inflation rate of 0.8 percent was recorded by the economies under a hard peg while those under OMA recorded the highest of 6.3 percent. There is however less variation in the latter economies compared with the former. There is less than a one percentage point difference in the average rate of inflation for countries under a soft peg and floating regimes. The coefficient of variation is however substantially higher for countries under a soft peg. Per capita GDP of US\$ 14, 301 is highest under a system of hard peg followed by that of US\$ 13, 262 for the floating rate system<sup>7</sup>.

Figure 1 Bank liquid assets, loans to private sector and domestic savings



<sup>7</sup> Using the more holistic HDI measure of economic development, Moore, Beckles and Worrell (2015) show that countries with less exchange rate volatility have a higher measure of development or prosperity.

There is the view that excess reserves could result in expansion of bank lending. If this is the case, we should expect a positive relationship between bank reserves and bank credit to the private sector. Indeed, both the bank lending and the balance sheet channels of the transmission mechanism postulate a positive relationship between bank reserves and bank loans (Mishkin 1995). Figure 1 (panel A) indicates a negative cross-country relationship between these two variables. It suggests greater bank liquidity is associated with less bank lending; or it means greater bank lending reduces liquid reserves. In addition, there is the view that excess savings result in excess liquidity and money. Panel B of the figure illustrates no discernible relationship between gross domestic savings and liquid bank assets. The chart is consistent with the argument of Liu and Wray (2010) that excess reserves do not engender lending to consumers and businesses.

#### 4. ANOTHER TRANSMISSION MECHANISM

The persistence of excess liquid assets and excess reserves in many countries point to a transmission mechanism that is not appreciated. This transmission channel allows for central banks to have two goals: (i) an exchange rate anchor and (ii) output growth through price stabilization. The instruments are (i) one-sided sales of securities and (ii) a credible level of foreign exchange reserves. Both instruments form the basis for independent monetary policy. The one-sided sales involve operating on outstanding domestic sovereign debt instead of the money supply, which is endogenous in the open economy<sup>8</sup>. Here the monetary authority determines the quantity of securities it will sell. It might involve an interest rate instrument, but in many countries this rate is impeded by oligopolistic interest rate determination. In theory, however, the monetary authority cannot both determine the rate of interest and the quantity. It

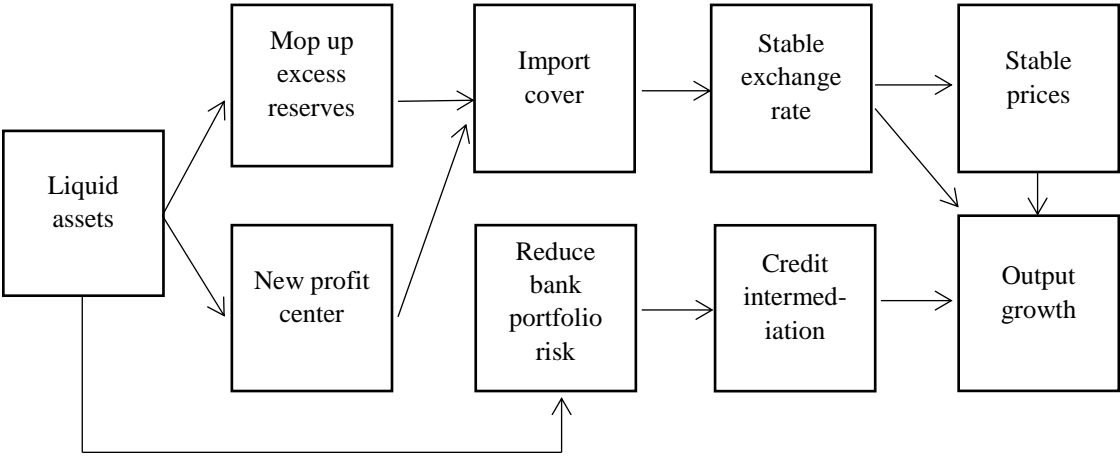
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<sup>8</sup> Money is clearly endogenous as long insisted by Post Keynesians. Demand determines bank loans, which in turn create deposits or bank money. This hypothesized compensation hypothesis is in no way inconsistent with the post-Keynesian theory of endogenous money, which is well established by Fontana (2004), Pollin (1991), Moore (1988) and other notable authors. Godley and Lavoie (2007, p. 198 – 200) distinguish the supply-led Mundell-Fleming view of endogenous money in the open economy from the demand-led post-Keynesian endogenous money. We believe, however, that the endogenous money thesis has to be extended to take into consideration several realistic stylized facts of many developing countries such as the persistence of excess reserves, oligopolistic mark-up lending rate and the perpetual foreign exchange constraint. That excess reserves exist in the system is largely the result of a foreign exchange constraint and mark-up lending by oligopolistic banks (Khemraj 2006). Banks extend loans, which determine deposits, once borrowers are willing to pay the mark-up interest rate. It is clear from Figure 1 (panel A) that excess reserves do not determine loans. Later the econometric exercise shows that liquidity is determined by loans as are evidenced by the negative coefficient between liquidity and loans and between liquidity and economic growth.

can determine the quantity and let the buyers decide the rate; or it can set the interest rate and let the buyers determine how much they are willing to hold. It does this to create a new profit center in light of the excess reserves that are created from the central bank’s long-term accumulation of FX reserves and other sources such as central government deposits in the private banking sector, as well as the payment of salaries of government workers.

Excess reserves do not engender bank lending, but they make it easier to convert the funds into a foreign currency bank deposit and earn a rate of interest plus the expected rate of depreciation of the domestic currency versus the primary global currency. Compensation, therefore, becomes a necessary policy because the central bank has to purchase foreign exchange from the banks and private sector (or from state-owned export earners) in order to accomplish its target months of import cover. As the monetary authority meets its foreign exchange target, it quarantines foreign currency that would otherwise be available to the private sector while also injecting excess reserves in local currency. This form of monetary policy that involves one-sided sales of debt, ostensibly to mop up excess reserves, is a short-term operation intended to buy time until the central government gets its fiscal house in order.

Figure 2 The liquidity compensation transmission mechanism



The compensation transmission mechanism is illustrated by Figure 2. Liquid assets – often held in excess of requirement – contribute towards absorbing excess reserves and creating an opportunity for commercial banks to make profits in place of foreign securities. This allows the monetary authority to meet its target or desired level of import cover in terms of foreign

currency reserves. A sufficient level of import cover is needed to creditably target the exchange rate. Liquid assets also have the favorable effect of reducing the volatility associated with the portfolio of bank assets, allowing for less episode of banking crises (Moore 2007). A stable commercial banking system is good for credit intermediation to the private sector. In general, a stable banking system will help to promote, instead of curtailing, loan intermediation to the private sector. Credit intermediation, in turn, enables the sustainability and security of existing levels of GDP growth. In addition, a stable exchange rate promotes price stability by diminishing the pass-through often associated with devaluation or rapid market depreciation. Stable prices also serve to promote economic growth and/or secure existing growth.

In concluding this section, the compensation transmission mechanism proposes that the central bank can simultaneously target the exchange rate and attain monetary policy independence by selling securities to the private sector to replace their desired holdings of foreign assets. This operation occurs when there is perfect substitutability between domestic currency bank deposit money and foreign bank deposit money. The foreign exchange constraint in normal times creates a temporary friction between the public's desire to demand foreign assets and the availability of hard currencies in the local FX market<sup>9</sup>. Moreover, the commercial banks – often one of the major players in the local FX market – also have to fulfil their role of supplying foreign exchange to long-established customers, many of whom still need to repay their local currency loans. It is this short-run friction in typical market conditions that allows the central bank to operate on two anchors. Note, this is a short-term friction and failure to prompt compensating changes would likely result in the private sector seeking investment opportunities overseas, particularly since developing economies lack a risk-free benchmark interest rate<sup>10</sup>. A benchmark interest rate may or may not be the instrument of monetary policy. In highly oligopolistic financial systems the benchmark interest rate would be ineffective. However, the quantity of securities sold is still effective in oligopolistic situations.

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<sup>9</sup>The idea of the foreign exchange constraint shows up in previous research focusing on balance of payments constrained growth (Thirlwall 1982, 1979), growth forecasting (Worrell, Lowe and Nairam 2012), determination of non-remunerated excess reserves (Khemraj 2006), adjustment problems (Sepethri, Moshiri and Doudongee 2000), and gap models (Taylor 1993).

<sup>10</sup> The United States is the only source of an international risk-free security by virtue of the dollar hegemony (Fields and Vernengo 2013).

## 5. ECONOMETRIC ANALYSIS

In addition to the descriptive patterns presented earlier, it is helpful to examine cross-country variations in bank liquid reserves while also controlling for other determinants such as GDP growth, per capita GDP, lending interest rate, inflation, central bank FX reserves as a percent of GDP, trade openness, savings as a percent of GDP and other variables. This section seeks to address three questions. Firstly, what are the determinants of cross-country variations in liquid bank reserves? Secondly, to what extent this liquidity relates to different exchange rate systems, while controlling for other determinants? Thirdly, is there evidence of dual nominal anchors?

Since control on capital outflows in the long term is futile, there are two outcomes for which we can test using standard econometric tools. These outcomes are based on the standard predictions of the Trilemma. First, if the country is singularly concerned with pursuing an inflation or monetary anchor (monetary independence), then any change in central banks' FX reserves should not be reflected in commercial banks' reserves. Accompanying monetary independence is a floating exchange rate that allows enough autonomy to neutralize these foreign-induced influences on the domestic narrow money supply or interest-rate instrument. Therefore, the coefficient on a binary variable (floating regime) interacting with central bank FX reserves should be statistically insignificant. Second, if the country is concerned with pursuing an exchange rate target – such as a conventional peg, stabilized arrangement, crawling peg, etc. – then changes in the central bank's FX reserves should be fully reflected in bank liquid reserves since money supply is said to be endogenous to foreign-induced effects. In this instance, a coefficient testing the interaction between central bank FX reserves and a soft-peg binary variable should be statistically significant.

However, if in the first case the coefficient is statistically significant and in the second statistically insignificant, there is evidence that is consistent with dual anchors. In other words, if we find exactly the opposite to what the Trilemma predicts, there is evidence of dual anchors. This dual nominal anchor implies something else is going on behind the scenes. It implies, regardless of the exchange rate system in operation, the monetary authority is neutralizing the effects of money injections by selling an interest-earning security to the private sector. This is the process of facilitating compensating changes in the asset holdings of the private sector, so as to shift demand away from foreign currency assets to domestic securities. The reason this is

necessary is because countries are operating in a dollar standard, causing them to be foreign exchange constrained that could result in dollar encroachment.

To answer these questions, let us estimate the following regression using two-stage least squares (TSLS). The variable  $LQ_i$  means liquid bank reserves as a percent of total asset.

$$LQ_i = \beta_0 + \beta_j D_j + \beta_4 FX_i + \beta_5 LN_i + \beta_6 GR_i + \theta_j D_j FX_i + e_i \quad (1)$$

The instrumental variable technique is clearly needed because bank loans to the private sector as a percent of GDP ( $LN_i$ ) is correlated with the error term; that is  $Cov(LN, e) \neq 0$ . This variable is instrumented by real per capita GDP ( $PC_i$ ) and  $PC_i^2$ . The latter variable is used to illustrate the idea that bank intermediation rises when average income increases but reaches an upper threshold as new financial markets replace bank financing, at least to some extent. Since the variable is nonlinear, the GMM estimates of equation 1 are also provided as a robustness check.

The binary variable  $SP$  represents soft peg, which according to IMF (2014), includes conventional peg, pegged rate within horizontal bands, stabilized arrangements, crawling-peg and crawl-like arrangement. The other binary variables,  $OM$  and  $FL$ , respectively denote other managed arrangement and floating exchange rate. This can be expressed as

$$D_j = \begin{cases} 1 & \text{for } SP, OM, FL \\ 0 & \text{otherwise} \end{cases}$$

$FX_i$  denotes central bank foreign exchange reserves as a percent of GDP. The variable  $GR_i$  represents GDP growth. There were other control variables such as number of bank branches per 100,000 people, lending interest rate, government consumption as a percent of GDP, volatility as measured by the standard deviation of bank deposits over a three-year period. None of these was found to be statistically significant and often possessed the wrong coefficient sign. Therefore, the results that show economic and statistical significance are presented. The sample size is 107 out of a total of 178 countries classified under an exchange rate system by the IMF. A panel regression could not be estimated because of the need to align the time period with the IMF classifications of 2014. Since the IMF survey was conducted in 2013 and the report still holds for 2015, each variable is averaged over these three years. More detail regarding data matters is outlined in Appendix 1.

The coefficients on the interaction term  $D_j FX_i$  test the dual nominal anchor hypothesis. A coefficient should be positive, but more importantly should be statistically insignificant when  $FL$  is interacted with  $FX_i$  and significant when  $OM$  and  $SP$  are interacted with  $FX_i$  (as given by the Trilemma). As noted earlier, a floating exchange rate economy should have monetary independence that implies changes in  $FX$  would not be reflected in  $LQ_i$  as the central bank seeks to cover its interest rate or monetary instrument. On the other hand, the monetary base – of which liquid bank reserves are part – should be endogenous in the cross-country variations in  $FX_i$  under a fixed or managed exchange rate system as the conventional wisdom says. This implies that  $LQ_i$  should reflect changes in  $FX_i$  and moreover the relationship is positive and statistically significant.

A positive relationship between  $LN_i$  and  $LQ_i$  ( $\beta_5 > 0$ ) would be taken as being consistent with the bank lending channel of the transmission mechanism. Filardo and Grenville (2012) note that these liquid assets could allow the commercial banks to ‘leverage up’ on the safe assets to expand credit to the private sector. A negative coefficient ( $\beta_5 < 0$ ), however, indicates some other transmission mechanism is at work. Firstly, it implies an expansion of credit to the private sector decreases liquid reserves. Secondly, it could imply an increase of liquid reserves reduces the emphasis on lending and increases the focus on other investment channels such as purchasing foreign currency assets. A negative coefficient is more consistent with the thesis of this work, which proposes the notion that excess reserves generated by a foreign exchange constraint has to be mopped up by selling a domestic security to the private sector in order to prevent dollar encroachment. GDP growth could have either a negative or positive effect on bank liquidity. The coefficient could be positive ( $\beta_6 > 0$ ) if economic growth increases the money supply more than the demand for credit, resulting in the injection of more liquid reserves. On the other hand, the coefficient would be negative ( $\beta_6 < 0$ ) if economic growth makes the demand for loans more responsive than the supply of money. Therefore, a negative coefficient is more consistent with the endogenous money hypothesis of Post Keynesians.

Table 2 summarizes the main findings from the TSLS and GMM estimates. The results do not change substantially across TSLS and GMM estimates. All standard errors are robust or White heteroskedastic-consistent standard errors. Model 2 is exactly identified, while models 1



and 3 have more instruments than parameter estimated. Therefore, the J-statistic is submitted for these two models, indicating that the null hypothesis of exogenous instruments cannot be rejected as the very high p-values of 0.849 and 0.785 indicate. In addition, the very high first-stage Cragg-Donald F-statistics indicates there is not a problem of weak instrument, as these are substantially higher than the Stock-Yogo critical values.

Without controlling for exchange rate regimes, model 1 indicates that foreign exchange intervention ( $FX$ ), bank credit to the private sector ( $LN$ ) and GDP growth ( $GR$ ) are statistically significant determinants of liquid bank assets. Unlike previous studies, the results indicate no evidence that government spending and inflation determine liquid assets. These variables were not reported, as noted above. That  $FX$  strongly influences  $LQ$  suggests that not all the countries are completely sterilizing the influence of foreign exchange intervention. In other words, some foreign exchange interventions are being reflected in the monetary base.  $LN$  exerts a negative effect on  $LQ$  thereby being inconsistent with the bank lending channel.  $GR$  also influences  $LQ$  negatively, possibly suggesting a reinforcing mechanism in which growth generates demand for loans, which in turn reduces liquid bank reserves. This finding is consistent with the theory of endogenous money, as explained in footnote 7. Growth generates the demand for bank loans.

Model 2 addresses the issue of exchange rate classification, but without the interaction terms. This model controls for three exchange rate systems using the IMF classification terms. For the obvious reason of the dummy variable trap, we cannot also control for the regime known as a hard peg. The results of this model are consistent with the previous one. The variables are statistically significant both for the TSLS and GMM methods. The soft peg regime has on average 10.64 percentage points above the average while also controlling for other regimes and variables. The floating regime has on average 7.12 above the mean while other managed arrangements have 6.63 points over the mean. They are all statistically significant and indicate that exchange rate regime is important in explaining variations in bank liquid assets.

Model 3 includes interaction variables to figure out the cross-country variations in  $LQ$ . The interactions change the conclusion relating to the effect of  $FX$  on  $LQ$ .  $FX$  is no longer statistically significant as a stand-alone variable. It becomes statistically significant when interacted with floating regime dummy, significant at the 10 percent level for the other managed

Table 2 Estimation results (dependent variable is liquid bank assets - LQ)

TSLS estimates	Model 1		Model 2		Model 3	
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Constant	33.49	5.52***	24.16	5.66***	29.31	6.63***
Floating regime (D <sub>1</sub> )			7.12	2.48**	-5.15	-0.84
Soft peg regime (D <sub>2</sub> )			10.64	3.25***	3.93	0.53
Other managed arrang. (D <sub>3</sub> )			6.63	1.79*	-0.54	-0.68
FX to GDP - % (FX)	0.321	3.17***	0.32	3.08***	0.02	0.10
Bank credit to GDP - % (LN)	-0.293	-4.32***	-0.261	-5.06***	-0.235	-3.96***
GDP growth - % (GR)	-1.436	-2.01**	-1.507	-1.85*	-1.209	-1.58
D <sub>1</sub> × FX					0.555	2.35***
D <sub>2</sub> × FX					0.290	1.02
D <sub>3</sub> × FX					0.304	1.66*
Cragg-Donald F-stat.		33.6		16.5		28.0
J-stat. and p-value	0.032 (p-val. = 0.857)		NA	NA	0.036 (p-val. = 0.849)	
Adj. R <sup>2</sup>		0.297		0.301		0.293
<b>GMM estimates</b>						
Constant	32.821	6.66***	24.16	5.66***	29.11	7.09***
Floating regime (D <sub>1</sub> )			7.12	2.48**	-5.64	-0.93
Soft peg regime (D <sub>2</sub> )			10.64	3.25***	3.10	0.68
Other managed arrang. (D <sub>3</sub> )			6.63	1.79*	-1.19	-0.18
FX to GDP - % (FX)	0.320	3.17***	0.33	3.08***	0.02	0.01
Bank credit to GDP - % (LN)	-0.286	-5.23***	-0.261	-5.06***	-0.230	-4.35***
GDP growth - % (GR)	-1.359	-2.32**	-1.507	-1.85*	-1.097	-1.51
D <sub>1</sub> × FX					0.568	2.45***
D <sub>2</sub> × FX					0.319	1.09
D <sub>3</sub> × FX					0.32	1.77*
Cragg-Donald F-stat.		33.6		16.5		28.0
J-stat. and p-value	0.036 (p-val. = 0.849)		NA	NA	0.074 (p-val. = 0.785)	
Adj. R <sup>2</sup>		0.276		0.301		0.292

Notes:

\*\*\*significant at 1%, \*\*significant at 5%, \*significant at 10%

NA means model is exactly identified, therefore no J-statistic. Standard errors are robust standard errors.

arrangements, and statistically insignificant for the interaction with the soft peg dummy variable. This result is consistent with the core hypothesis of this work. Moreover, it contravenes the canonical interpretation of the Trilemma, which holds that a floating exchange rate economy, operating under de facto capital mobility, cannot also have a target for international reserves in the long run.

However, it is clear from this finding that changes in central bank foreign reserves are reflected in the liquid reserves of the commercial banks for flexible rate economies. For these changes to be reflected, the monetary authority in these economies must have a target for foreign reserves in addition to independent monetary policy. Moreover, given that the changes are reflected in base money, it must mean the economies are not always concerned with defending their benchmark interest rate or the base money instrument. The intermediate target is essentially the amount of foreign exchange reserves. The result implies that countries can maintain independent monetary policy while also focusing on the exchange rate by targeting the level of foreign reserves. The way independent monetary policy is exercised is by selling securities to the private sector. The implication here is independent monetary policy does not always have to be associated with an interest rate or base money instrument. It could also involve the one-sided sales of securities – Treasury bills, central bank sterilization assets or some other sovereign security.

The interaction between soft peg and foreign exchange market intervention reveals exactly the opposite prediction of the Trilemma. The monetary base and  $LQ$  should be endogenous to variations in  $FX$ . In other words, the coefficient on the interaction variable should be statistically significant. However, the coefficient is insignificant, implying that the countries are not only targeting the exchange rate but are also insulating the monetary base from foreign exchange interventions. In other words, this is evidence consistent with the idea of independent monetary policy for fixed exchange rate economies. It appears as though economies with a soft peg are much more interested in neutralizing the effect of central banks' foreign currency interventions. This result is also consistent with Khemraj and Pasha (2012) who estimate sterilization coefficients for Caribbean economies to illustrate a similar insight into dual anchors.

The interaction coefficient is statistically significant at the 10 percent level for economies categorized under other managed arrangements. This finding is interesting because it suggests

that they are operating more in line with the prediction of the Trilemma. In the sample of 107 countries, 13 were classified as OMAs. We should expect that, on average, the degree of sterilization of these countries should be between that of the soft peg regimes and floating system. In model 3,  $LN$  continues to be statistically significant. However, GDP growth just barely failed the 10 percent significance test. It should be noted that the p-value – not reported in Table 2 – equals 0.117. However, the coefficient of  $-1.21$  for the TSLS estimate and  $-1.10$  for the GMM estimate are economically significant showing a strong sign consistent with the theory of endogenous money.

## 6. CONCLUSION

At the center of the analysis is the idea that liquid bank reserves embody important information regarding the degree of monetary policy independence and its relationship to the de facto exchange rate system. Studying cross-country variations in liquid bank reserves not only provides insights into the determinants of liquid assets, but also the operation of monetary policy and its relationship to the Impossible Trinity or Trilemma. The research indicates that the liquid bank reserves – which encompasses excess reserves – are determined negatively by GDP growth and credit to the private sector. The latter finding is inconsistent with the bank lending transmission mechanism, which posits a positive relationship between liquid reserves and bank loans. This indicates there is some other transmission mechanism at work in developing and emerging economies. The missing transmission process involves the endogenous one-sided sales of domestic securities to the private sector given that countries are operating under a dollar standard, which presents the constant threat of dollar encroachment. Regardless of exchange rate system, central banks have as intermediate target the level of international reserves.

The act of maintaining a suitable level of import cover in foreign currencies quarantines foreign exchange that would otherwise be available to the private sector. This usually worsens the foreign exchange constraint of developing and emerging countries. However, not maintaining a credible level of foreign reserves implies the monetary authority risks losing control over the exchange rate target and its price stability mandate. Therefore, central banks accommodate compensating changes on the balance sheet of commercial banks by selling them an official security instead of having them hold only excess reserves. The domestic security replaces the desired holdings of foreign currency assets. This process involves selling an existing government

debt instead of creating new ones. However, if the central bank issues its own sterilization securities it would be creating a new debt that comes about because of the reality of operating in a global dollar standard.

## REFERENCES

Agénor, P., J. Aizenman and A. Hoffmaister (2004) ‘The credit crunch in East Asia: what can bank excess liquid assets tell us?’ *Journal of International Money and Finance*, 23 (1), 27 – 49.

Aizenman, J., M. Chinn and H. Ito (2012) ‘The financial crisis, rethinking of the global financial architecture and the Trilemma,’ in M. Kawai, P. Morgan and S. Takagi (eds.) *Monetary and Currency Policy Management in Asia* (Cheltenham, UK and Northampton, MA: Edward Elgar Publishing).

Baltensperger, E. (1974) ‘The precautionary demand for reserves,’ *American Economic Review*, 64 (1), 205 – 210.

Fields, D. and M. Vernengo (2013) ‘Hegemonic currencies during the crisis: the dollar versus the euro in a Chartalist perspective,’ *Review of International Political Economy*, 20 (4), 740 – 759.

Fry, M. (1997) *Emancipating the Banking System and Developing Markets for Government Debt* (New York and London: Routledge).

Fontana, G. (2004) ‘Rethinking endogenous money: a constructive interpretation of the debate between horizontalists and structuralists,’ *Metroeconomica*, 55 (4), 367 – 385.

Godley, W. and M. Lavoie (2007) *Monetary Economics: An Integrated Approach to Credit, Money, Income, Production and Wealth* (New York: Palgrave Macmillan).

IMF (2014) *Annual Report on Exchange Arrangements and Exchange Restrictions*, Washington, DC: International Monetary Fund.

IMF (2001) *Developing Government Bond Markets: A Handbook* (Washington, DC: International Monetary Fund and World Bank).

Khemraj, T. (2006) *Excess Liquidity, Oligopoly Banking and Monetary Policy in a Small Open Economy, PhD Dissertation* (New York: New School for Social Research).

Khemraj, T. and S. Pasha (2012) ‘Dual nominal anchors in the Caribbean,’ *Journal of Economic Studies*, 39 (4), 420 – 439.

Lavoie, M. (2001) ‘The reflux mechanism and the open economy,’ in L. Rochan and M. Vernengo (eds.), *Credit, Interest Rate and the Open Economy: Essays on Horizontalism* (Cheltenham, UK and Northampton, MA: Edward Elgar Publishing).

Lavoie, M. and P. Wang (2012) ‘The “compensation” thesis, as exemplified by the case of the Chinese central bank,’ *International Review of Applied Economics*, 26 (3), 287 – 301.

- Liu, X. and L. Randall Wray (2010) 'Excessive liquidity and bank lending in China: a modern perspective,' *International Journal of Political Economy*, 39 (3), 45 – 63.
- McKinnon, R. (2000) 'On the periphery of the international dollar standard: Canada, Latin America, and East Asia,' *North American Journal of Economics and Finance*, 11 (2), 105 – 121.
- Mishkin, F. (1995) 'Symposium on the monetary transmission mechanism,' *Journal of Economic Perspectives*, 9 (1), 3 – 10.
- Moore, B. (1988) *Horizontalists and Verticalists: The Macroeconomics of Credit Money* (Cambridge and New York: Cambridge University Press).
- Moore, W. (2007) 'Forecasting domestic liquidity during a crisis: what works best?' *Journal of Forecasting*, 26 (9), 445 – 455.
- Moore, W., J. Beckles and D. Worrell (2015) 'Prosperity and the exchange rate regime in small open economies,' *CBB Working Paper No. 15/19*, Central Bank of Barbados.
- Morrison, G. (1966) *Liquidity Preference of Commercial Banks* (Chicago: University of Chicago Press).
- Ostry, J., A. Gosh and M. Chamon (2012) 'On inflation targeting and forex intervention: are two targets better than one?' VOX, CEPR Policy Portal. <http://voxeu.org/article/inflation-targeting-and-forex-intervention-are-two-targets-better-one>
- Pollin, R. (1991) 'Two theories of money supply endogeneity: some empirical evidence,' *Journal of Post Keynesian Economics*, 13 (3), 366 – 396.
- Primus, K. A. Birchwood and L. Henry (2014) 'The dynamics of involuntary commercial banks' reserves in Trinidad and Tobago,' *Journal of Developing Areas*, 48 (2), 63 – 84.
- Sepehri, A., S. Moshiri and M. Doudongee (2000) 'The foreign exchange constraints to economic adjustment: the case of Iran,' *International Review of Applied Economics*, 14 (2), 235 – 251.
- Taylor, L. (1993), 'A three-gap analysis of foreign resource inflows and developing country growth,' in L. Taylor (ed.) *The Rocky Road to Reform: Adjustment, Income Distribution and Economic Growth in Developing World* (Cambridge, MA: MIT Press).
- Thirlwall, A. P. (1979) 'The balance of payment constraint as an explanation of growth rate differences,' *Banca Nazionale del Lavoro Quarterly Review*, 32 (March), 45 – 53.
- Thirlwall, A. P. and M. N. Hussain (1982) 'The balance of payments constraint, capital flows and growth rate differences between developing countries,' *Oxford Economic Papers*, 34 (3), 498 – 510.
- Worrell, D., S. Lowe and S. Naitram (2012) 'Growth forecast for foreign exchange constrained economies,' *CBB Working Paper*, Central Bank of Barbados.

## APPENDIX 1

The statistics for 178 countries were downloaded from the World Bank's *World Development Indicators* for 178 countries that are classified under one of four exchange rate system by the International Monetary Fund (IMF 2014). A sample of 107 countries was eventually settled upon. Availability of data, particularly liquid bank reserves as a percent of total assets, is the primary reason for reducing the number of countries from 178 to 107, which still is a large sample relative to the population of countries classified by the IMF. The liquid reserves ratio for The Bahamas and Barbados was calculated using data on their respective central bank website.

Careful classification of exchange rate system is crucial to the analysis. Therefore, the IMF's classification system for 2014 was very useful. The four exchange rate classifications are (i) Hard pegs (dollarized economies and currency boards), (ii) Soft pegs (which includes conventional peg, pegged exchange rate within horizontal bands, stabilized arrangement, crawling peg and crawl-like peg), (iii) Floating or market determined regimes, and (iv) other managed arrangements. Making up the sample are 11 hard pegs, 13 other managed arrangements, 34 floating and 49 soft pegs. These are the ones for which data are available in the World Development Indicators for 2013, 2014 and 2015. All variables are averaged over those three years. Just a few countries there were statistics for the said three years. In this case, the average for the most recent period was chosen, making sure the country did not change classification.

The two tables below present the list of countries used in the analysis along with their exchange rate classification.

<b>Country Name</b>	<b>Exchange Rate Classification</b>	<b>Country Name</b>	<b>Exchange Rate Classification</b>
Barbados	CP	Armenia	CRP
Bahamas, The	CP	Belarus	CRP
Belize	CP	Botswana	CRP
Bhutan	CP	Croatia	CRP
Cabo Verde	CP	Dominican Republic	CRP
Cameroon	CP	Guatemala	CRP
Central African Republic	CP	Haiti	CRP
Chad	CP	Jamaica	CRP
Comoros	CP	Nicaragua	CRP
Congo, Rep.	CP	Kosovo	HP
Equatorial Guinea	CP	Antigua and Barbuda	HP
Eritrea	CP	Bosnia and Herzegovina	HP
Fiji	CP	Brunei Darussalam	HP
Gabon	CP	Bulgaria	HP
Kuwait	CP	Dominica	HP
Lesotho	CP	Grenada	HP
Morocco	CP	Macao SAR, China	HP
Namibia	CP	St. Kitts and Nevis	HP
Nepal	CP	St. Lucia	HP
Oman	CP	St. Vincent and the Grenadines	HP
Qatar	CP		
Samoa	CP		
Sao Tome and Principe	CP		
Solomon Islands	CP		
Swaziland	CP		
Venezuela, RB	CP		

Note: CP = conventional peg, CRP = crawling and crawl-like peg, HP = hard peg



<b>Country Name</b>	<b>Exchange Rate Classification</b>	<b>Country Name</b>	<b>Exchange Rate Classification</b>
Albania	FL	Algeria	OMA
Australia	FL	Cambodia	OMA
Brazil	FL	Costa Rica	OMA
Canada	FL	Czech Republic	OMA
Chile	FL	Gambia, The	OMA
Colombia	FL	Kyrgyz Republic	OMA
Georgia	FL	Malaysia	OMA
Ghana	FL	Myanmar	OMA
Hungary	FL	Nigeria	OMA
Iceland	FL	Pakistan	OMA
Indonesia	FL	Russian Federation	OMA
Israel	FL	Sudan	OMA
Japan	FL	Vanuatu	OMA
Kenya	FL	Tonga	PHB
Korea, Rep.	FL	Azerbaijan	SA
Mauritius	FL	Bangladesh	SA
Mexico	FL	Bolivia	SA
Moldova	FL	Burundi	SA
Mozambique	FL	Congo, Dem. Rep.	SA
Papua New Guinea	FL	Egypt, Arab Rep.	SA
Paraguay	FL	Guyana	SA
Philippines	FL	Kazakhstan	SA
Poland	FL	Macedonia, FYR	SA
Romania	FL	Maldives	SA
Seychelles	FL	Suriname	SA
Sierra Leone	FL	Tajikistan	SA
South Africa	FL	Trinidad and Tobago	SA
Sweden	FL		
Thailand	FL		
Turkey	FL		
Uganda	FL		
Ukraine	FL		
Uruguay	FL		
Zambia	FL		

Note: FL = floating, OMA = other managed arrangements,  
SA =stabilized arrangement, PHB = peg within horizontal band