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An Economic Analysis of Bangladesh's Foreign Exchange Reserves

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Executive Summary

Following the rapid accumulation of foreign exchange reserves in recent months, there has been a growing interest in Bangladesh on the alternative uses of its reserves. However, different reserves adequacy measures based on global best practices confirm that its reserves holding is not markedly higher than what is required. The country's reserves stand higher than the adequate level only when one considers the current account aspects of reserves benchmark which is perhaps appropriate for the country as its financial system is still autarkic. The dynamics in its balance of payments account also supports the fact.

The paper highlights the fact that Bangladesh's reserves build-up is the result of an 'investment drought' in the country. This is partly due to its underdeveloped financial systems, and partly due to other structural problems in the economy – entailing difficulties in properly channelling national savings to investments.

As the Bangladesh central bank's sterilised intervention increases, so will its cost of reserves accumulation. The reason is the interest rate arbitrage between Bangladesh and the United States. The United States government securities market, that absorbs the lion's share of developing economies reserves, has been offering lower yields following the collapse in interest rate in the country in recent times. Nevertheless, the apparent spread between the United States Treasury and Bangladesh Treasury rates might be not that high in real terms if one weighs in Bangladesh's certain benefits of reserves holding, particularly on the perspectives of stability in its domestic market.

As the interest rate in the United States appears to remain low in the near term and the interest rate regime in Bangladesh is not very flexible to downward, the latter has two choices to make with its growing reserves. First, if one assumes that Bangladesh's financial sector will not undergo significant reform in years to come, it could channel part of its reserves to alternative investments. Second, the country can expedite its financial sector reform using reserves as insurance.

These two options emphasise the fundamental macroeconomic disequilibrium (gross national savings > gross national investment) in the country. The widening gap between savings and investment signals that Bangladesh either needs to adopt institutional reforms so that its economy finds a way to use the surplus savings or it must discover an alternative avenue to utilise them.

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The paper has a skewed preference for first option as it is the path that most developing countries historically adopted. Moreover, successful sterilisation requires a deep domestic financial market. As far as the second option is concerned, the country can encourage some local investment to “go global” that could ease the pressure on its domestic currency and price level. In the absence of an efficient bureaucracy and required managerial and other technical know-how, the setting up of a sovereign fund to acquire overseas assets may not be viable for the country. In the case of the development of infrastructure fund (or similar investment avenues), the paper recommends that such move should be supported by further research as it is a trade-off between low yield-high liquid assets and high yield-low liquid assets.

Introduction

In its latest monetary policy statement, the Bangladesh Bank, the central monetary authority of Bangladesh, stated that "the country will be better off with utilisation of the foreign exchange inflows in growth supportive investments than with accretion of ever reserves".[2] The call has been made in the wake of the country's burgeoning foreign exchange (forex) reserves that amounted to a record US$8.5 billion in August 2009. The central bank's major concern is the opportunity cost of reserves build-up.[3] However, the Bangladesh Bank has neither given any detailed account on the optimal level of reserves nor any roadmap on how to utilise the country's excess reserves, if any.

We noticed a similar euphoria in India, particularly after 2000 when it became one of the major forex reserves holders. However, the reversal of short-term capital flows and deterioration in its trade account following the financial crisis resulted in concomitant decline in India's forex reserves. Except for the developed and a handful of odd-underdeveloped countries, the reserves build-up has indeed become a norm in most emerging economies. For instance, China, the world's largest holder of forex reserves, has, by itself, accumulated over US$2 trillion reserves since 1990, with the accumulation accelerating in recent years.[4]

Open-economy macroeconomics has paid significant attention to this area in recent years, particularly following the East Asian and petro-dollar countries' massive reserves build-up which has added at least two interesting dimensions to the rapidly changing global economy. First, it has created huge global imbalances between the United States (US) and China.[5] Second, some of the reserves are being channelled to develop numerous Sovereign Wealth Funds (SWFs) that have been seen as new financial power brokers.[6]

For Bangladesh's economy, an unprecedented rise in remittances in recent years has resulted in reserves accumulation. It is perhaps unique in the sense that the trade balance of current account or capital flows components (including foreign direct investments [FDI]) of capital and financial accounts generally lead to a surplus in the balance of payments (BoP) which eventually end up in reserves build-up, as can be noticed in East Asia and other emerging markets. Nevertheless, the reserves accretion has both advantages and disadvantages. A country has to maintain a certain amount of forex reserves to meet its import bills and other short-term payments or debt obligations, *inter alia*. But reserves accumulation in excess of optimal level comes with significant costs (both fiscal and social). Furthermore, the alternative uses of reserves are not the panacea. Such moves have faced a huge setback in recent times following the capital loss of some of the key SWFs.[7] Hence, surplus in the BoP

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2 See Monetary Policy Statement, July-December 2009, Bangladesh Bank.

3 A large chunk of emerging markets and other developing economies' reserves are generally invested in the US treasury securities and its agency bonds, known as safe heaven investment, that yield a low return. Moreover, there is also a social cost of reserves accumulation. We will discuss the issue in some detail in Section II.

4 In April 2009, China's forex reserves crossed the astounding milestone of US$2 trillion.

5 Apart from China, the other stakeholders are the East Asian 'tiger' economies and the 'petro-dollar' economies. Much has been written on this issue. For details, see Roubini and Setser (2004), Hausmann and Sturzenegger (2005), and McKinnon and Schnabl (2009).

6 SWF's have replaced the combined financial muscle of hedge funds and private equity, and usurping central banks as the international capital providers of last resort (see Global Insights, 2008). There is also a geo-political implication of reserves accumulation.

7 Following the ongoing financial crisis some SWFs, particularly the Singaporean, Norwegian and Chinese SWFs, incurred substantive capital loss, notably the funds that were invested in the US toxic assets (or bailed the troubled US financial institutions out).

account and the consequent reserves build-up is a double-edged sword and poses a momentous challenge to the central bankers in moulding monetary policies.

Research on the different aspects of reserves accumulation is vast but little has been done in Bangladesh. Against this backdrop, the aim of the paper is to provide a simple analysis of Bangladesh's forex reserves, particularly focusing on the country's key macro variables including its external economy, and its reserves position vis-à-vis some conventional reserves adequacy criteria. The paper also attempts to evaluate the usefulness of these global benchmarks in the local circumstances. The rest of the paper is organised as follows. In Section II, we discuss the existing literature pertaining to reserves accumulation. The recent dynamics of some of Bangladesh's macro and financial variables, particularly the trends in its savings, investments, balance of payments (BoP) and exchange rate, that have direct association with reserves accumulation are analysed in Section III. Based on a back-of-the-envelope calculation, the reserves adequacy measure for Bangladesh is discussed in Section IV. In Section V, we look at the costs and benefits of reserves accumulation in the context of Bangladesh emphasising on its macroeconomic and financial sector dynamics. The question of alternative uses of the country's reserves, if any, will be discussed in Section VI. The final section concludes the paper.

II. Reserves Accumulation: The Literature

The International Monetary Fund (IMF) defines an economy's international reserves as "those external assets that are readily available to and controlled by monetary authorities for direct financing of payments imbalances through intervention in exchange markets to affect the currency exchange, and/or for other purposes.[8] Before we examine whether Bangladesh is in a position to use some of its forex reserves for infrastructure development or other productive purposes, it is essential to explore the literature on this issue. The literature on the various issues under this rubric is vast and burgeoning, so our discussion should be seen as nothing more than a 'helicopter tour'. We shall explore some key issues pertaining to forex reserves. These include motivations behind emerging markets and other developing countries' reserves accumulation, the optimal level of reserves, the opportunity costs of reserves build-up and their alternative uses.

It is rather puzzling that developing economies with severe constraints of capital have a tendency towards stock-piling low-yielding assets – foreign exchange reserves. Several studies have attempted to understand the puzzle but the general consensus is that countries accumulate reserves owing to two key motives- mercantilist and self-insurance.[9] Apparently, except for China, self-insurance trumps mercantilist motives.

Some studies show that much of the reserves accumulation in Asia can be attributed to an optimal insurance model that essentially means that reserves provide a steady source of liquidity[10] to mitigate the impact of a "sudden stop" in capital flows.[11] Indeed, the reserves have cushioned some Asian countries in the wake of capital outflows and global risk aversion during the ongoing financial crisis. However, Green and Torgerson (2007) found that the

[8] See the IMF Balance of Payment Manual (1993).

[9] There is a growing body of literature on the motivations of reserves accumulations. For details, see Aizenman, and Lee (2007), and Jeanne and Rancière (2006).

[10] There are three major sources of liquidity that countries can avail. They are reduction in short-term debt, creation of a collateralized credit facility and an increase in forex reserves.

[11] See Obstfeld et al (2008).

largest reserves holders in emerging markets far exceed the required precautionary levels and they are of the view that most reserves accumulation is an attempt to limit exchange rate flexibility, or what is known as mercantilist exchange rate policies. A recent IMF study, though, found that emerging Asia's, other than China, reserves build-up is not excessive.[12] It is widely believed (and empirically tested) that China's reserves build-up is the result of its mercantilist exchange rate policies as opposed to precautionary motives.

Nevertheless, whatever the intentions, the forex reserves build-up in most circumstances is a by-product of domestic currency undervaluation (or to resist currency appreciation) vis-à-vis its major trading partners that ultimately makes the concerned country's tradables relatively competitive in the international markets. However, a critical point here is that the success of this strategy depends on how open or closed an economy is.[13] In theory, a country cannot maintain a fixed exchange rate, free capital movement and an independent monetary policy, concurrently known as the "impossible trinity", a fundamental contribution of the Mundell-Fleming framework.[14]

However, the open-economy trilemma might break down under certain conditions, particularly when the central banks target exchange rate with an excess supply of foreign exchange.[15] The massive reserves accumulation in emerging markets indicate that countries can converge towards intermediate levels of the trilemma, banking on a managed float exchange rates while maintaining some degree of monetary autonomy and accelerating financial openness. In other words, many countries have achieved the intermediate level of this trilemma using forex reserves as a buffer.[16]

To sum up, irrespective of precautionary or mercantilist motives, reserves shield developing economies form financial distress, particularly when countries face a sudden stop in foreign capital flows or witness a reversal of flows. This is particularly important for countries that have institutional bottlenecks. A comfortable level of reserves minimises a country's sovereign default risk. Finally, a substantive stock of reserves could potentially lower the concerned country's borrowing costs.

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12 Ruiz-Arranz and Zavadjil (2009).

13 Mercantilist exchange rate policies worked very well for many East Asian countries when their economies were relatively closed. Now China is adopting the same strategy.

14 In other words, a country simultaneously may choose any two, but not all, of the following three goals: monetary independence, exchange rate stability and financial integration.

15 Some researchers argue that central bank can control exchange rate and interest rate even with an open capital market. Frenkel (2007), for instance, observed, "[t]hat the monetary authority can determine the exchange rate by buying the excess supply in the foreign exchange market; then, it can control the interest rate by sterilizing the monetary effects of the foreign exchange intervention, selling either Treasury bills or its own bills in the money market. The central bank has two instruments to accomplish its two objectives: the intervention in the foreign exchange market to fix the value of the exchange rate and the intervention in the monetary market to control the interest rate."

16 With a set of the "trilemma indexes" Aizenman et al (2009) showed that a) after the early 1990s, industrialized countries accelerated financial openness, but reduced the extent of monetary independence while sharply increasing exchange rate stability, all reflecting the introduction of the Euro; b) emerging market countries pursued exchange rate stability as their key priority up to the late 1980s while non-emerging market developing countries have pursued it throughout the period since 1970; c) among emerging market countries, the three dimensions of the trilemma configurations are converging towards a "middle ground" with managed exchange rate flexibility, which they seem to attempt to buffer by holding sizable international reserves, while maintaining medium levels of monetary independence and financial integration.

The literature has apparently allocated more space for the cost of reserves accumulation. When an economy receives inward capital flows, it could potentially destabilise its domestic monetary and macro stabilities – often by increasing monetary base, appreciating currency and raising prices. Faced with these situations, the central bank purchases foreign exchange by selling domestic currency (thus resulting in a reserves build-up) to resist currency appreciation that generally offsets by open market operations (issuing bonds, treasury bills, etc.) in the domestic market. The open market operation is one way to sterilise the capital flows.[17] Such actions, called sterilisation, neutralise its impact on domestic interest rates and inflation. The central banks invest the forex reserves in the foreign short-term securities, predominantly in the US Treasury securities and its agency bonds.

Nevertheless, such sterilisation mechanism is sometimes difficult to operate and can potentially be self-defeating.[18] Moreover, in the presence of an autarkic financial system, many developing countries do not have the available tools and market depth to sterilise capital flows. In extreme cases, mounting fiscal costs could prompt the central banks to abandon the sterilisation effort. Even a successful sterilisation (thus stability in the domestic economy) comes with a price. There is an associated fiscal cost (direct cost) of sterilisation which is increasing following the drastic fall in yields on the US Treasuries in recent months. This could worsen the central banks' operating losses and could expose the sterilisation instruments into credit risk. The key point here is that interest rate arbitrage,[19] which is performed during the sterilisation process when domestic currency interest rates are lower than the (the proxy for foreign currency) interest rate of US dollar. For instance, Japan and Hong Kong incur no or little opportunity costs in their forex reserves build-up – in the case of Japan where the interest rate is close to zero and in Hong Kong where ample inter-bank liquidity keeps market rates to levels well below the rates in the US.[20] Therefore, the lower yield curves of Japan and Hong Kong vis-à-vis the US could benefit these countries from sterilisation (thus reserves accumulation). On the other hand, countries such as China, India and Bangladesh have to weigh in such costs as their domestic interest rates are higher than that of the US (consequently higher yield curves).

Rodrik (2006) has analysed reserves accumulation from the perspective of social cost. According to Rodrik (2006), "each dollar of reserves that a country invests in these assets (that is, the US Treasuries) comes at an opportunity cost that equals the cost of external borrowing for that economy (or alternatively, the social rate of return to investment in that economy). The spread between the yield on liquid reserve assets and the external cost of funds – a difference of several percentage points in normal times – represents the social cost of self-insurance." The paper calculated that the social cost of reserves amount to around one percent of developing countries' gross domestic product (GDP). In this fashion, Bykere

[17] The stability in the domestic market could be attained through some other ways. They include, wider band exchange rate policies, foreign exchange swaps, non-market instruments such as transferring the deposits of government and public financial institutions from the commercial banking system to the central bank or selling forex reserves to the government. The cross-country studies show that the surge in capital flow coincided with faster financial liberalization where foreigners were allowed to acquire domestic stocks and bonds (South Korea and Spain, for instance). In Korea and Colombia, open market operations were accompanied by increase in reserves requirements or by tightened access to the central bank's refinancing facilities. Some countries have turned into so-called "belts and braces" policy that combines the indirect instruments of monetary policy with some capital controls (for details, see Lee, 1997).

[18] For instance, an apparent successful operation may raise domestic interest rate that eventually attracts even greater capital flows. This is particularly true for the countries that experience large scale capital inflows.

[19] Opportunities offered by differences in interest rates.

[20] See Hong Kong Trade Development Council (2004).

(2008) has calculated the social cost of reserves accumulation for India.[21] See Table 1 for the potential risk and cost, and underlying factors of reserves accumulation.

Table 1: The Potential Cost or Risk of Reserves Accumulation

	Potential risk or cost	Underlying factors
Risks	*a) Conflicts between exchange rate stability and inappropriate easing of monetary conditions, eventually resulting in inflation and/or overinvestment and/or bubbles.*	*Unsuccessful sterilisation due, for example to (i) underdeveloped financial markets and shortage of sterilisation instruments; (ii) snowball effects (that is, higher interest rates produced by sterilisation coupled with expectations of exchange rate appreciation produce massive capital inflows, thus forcing the central bank to intervene/sterilise even more).*
	b) Difficulties for central banks in managing the money market and, more generally, in implementing monetary policy.	*Excessive central bank dependence on liquidity-absorbing transactions, whereas the money market is more easily managed via liquidity-providing operations.*
	c) Segmentation of the public debt market, thus impairing its liquidity.	*Excessive sterilisation through issuance of central bank liabilities instead of government paper.*
	d) Market (that is, currency and interest rate) risk, resulting in potentially sizeable capital losses on the balance sheet of the monetary authority.	*Accumulation over time of a potential for currency revaluation/appreciation, which materialises when intervention ceases or is no longer effective; interest rate risk.*
Costs	*Sterilisation costs*	*The yields paid on domestic sterilisation instruments exceed those on foreign assets.*
	Concerns about bank profitability	*Particularly because of controls on lending, the banking sector might have hardly any alternatives to buying low-yield sterilisation instruments.*

Source: The European Central Bank (2006).

Thus, reserves accumulation is a trade off between liquid assets (that reduces the probability of financial distress, lessen sovereign default risk, lowers real exchange rate volatility, etc. which in turn may induce potentially higher growth rate) and opportunity cost (sterilisation cost, social cost and difficulties in monetary policy operations, etc.).

The next question is what the optimal level of reserves is. There is no "*one-size-fits-all"* rule to measure the optimal reserves for all countries but there are some criteria that help gauge if a country has adequate reserves or holding an excess. The conventional recommendation is that a country's reserves should be ten percent of its GDP. It is an indicative measure of the

[21] Also see Bykere (2008) for the social cost of India's reserves accumulation.

relative size of reserves holding. The other conventional prescription is that reserves account for at least three months worth of a country's import bills, a widely accepted criterion derived from a trade-related approach to the BoP and reserves requirements which most countries follow when they calculate optimal reserves.[22]

The Baumol-Tobin inventory model with fixed costs of depleting and replenishing reserves had been the framework of reserve adequacy literature, particularly in the 1960s and 1970s when current accounts were the major focus.[23] However, the rapid spread of financial globalisation, particularly free flows of cross-border short-term capital, has been accompanied by contagions as was noticed during the East Asian financial crisis in 1997-98 and the numerous financial turmoils in Latin America, Eastern Europe or elsewhere in the world. And in most cases, countries that had been affected by the crisis have had large ratios of short-term foreign debt. Hence, if an economy has an open or semi-open capital market or its government borrows extensively from foreign sources, it needs to look at its capital account as well.[24] Taking this development into consideration, the Greenspan-Guidotti-Fischer rule recommends that a country's optimal reserves should be at least equal to its short-term debt.[25] This rule reflects the shifting focus from reserves adequacy measured in terms of trade flows of goods to the flows of assets.[26]

There are some other adequacy rules concerning optimal reserves, particularly from countries that are exposed to short-term debt. The most notable one is that adequacy of forex reserves should amount to 20 percent of money supply.[27] The additional measures practiced by the Reserve Bank of India are a) 100 percent of total external debt, and b) share of volatile inflows (short-term debt plus cumulative portfolio investment). However, it appears that these rules have not gained much currency in practice.

Nevertheless, these rules are not beyond criticism and in many instances are proven to not be a proper guide, particularly when countries face a "black swan" type of unpredictable economic crisis. For instance, the IMF study calculated that the cumulative output loss for six Asian economies most affected by the 1997-98 financial crisis was 19 percent of their GDP on average, and the GDP loss for Indonesia and Thailand amounted to around 30 percent of their GDP.[28] An estimation by Caprio and Klingebiel (2003) has shown that the fiscal costs of the banking crisis were as high as 55 percent of Indonesia's GDP, and as low as 16 percent of Malaysia's GDP.

The next issue to look at is alternative uses of reserves. High opportunity cost of reserves holding has prompted many countries to use a part of their reserves in alternative vehicles. In other words, countries that have reserves in excess of the optimal level are shifting them (or

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22 See Fischer (2001).

23 See Frenkel and Jovanovic (1981), and Flood and Marion (2002).

24 The East Asian and other financial crisis show that the reversal of foreign flows caused a collapsed in their asset prices and exchange rates, among others.

25 Short-term debt generally includes suppliers' credit up to 180 days, FII investments in government's treasury bills and other instruments, external debt liabilities of the banking system, and investments in government securities by foreign central banks and international institutions.

26 Aizenman et al (2007) estimated that the expected benefits of following a Guidotti-Greenspan rule is about one percent of GDP. This would be the case if a country holding reserves equal to its short-term debt reduces the annual probability of experiencing a sharp reversal in capital flows by 10 percent on average and if the output cost of a financial crisis is about 10 percent of GDP.

27 See Rodrik and Velasco (1999).

28 See Ruiz-Arranz, and Zavadjil (2009).

part of them) from the low-risk and low-yield investments (mostly treasuries) to high-risk and high-yield assets. The petro-dollar economies set the trend in the 1970s[29] by investing a portion of their reserves in the form of SWFs[30] or similar vehicles following the oil-boom (and the consequent surplus in their current accounts). Later, Singapore and some other East Asian economies, notably China, joined the league when non-oil trade generated the surpluses. A whopping US$3.22 trillion asset is now under management by numerous SWFs. IMF projects that sovereign funds may hit the US$6 trillion to US$10 trillion mark by 2013.[31] The SWFs can be broadly distinguished in five categories – stabilisation funds, savings funds for future generations, reserve investment corporations, development funds and contingent pension reserve funds. According to the IMF, these assets can be invested in a broad range of asset classes – government bonds, agency and asset-backed securities, corporate bonds, equities, real estate, infrastructure, derivatives markets, alternative investments, and FDI.

The key issue here is whether such sovereign funds are developed based on capital account or current account surpluses. The formation of SWFs with the aid of speculative short-term capital flows that are largely drawn by their macroeconomic fundamentals are liabilities for the recipient countries. Alternative sources of the funds are largely generated through export boom[32] or commodity boom.[33] SWFs based on capital account surplus are proven to be risky while the funds based on current account surplus are relatively less perilous.

Nevertheless, SWFs are not evaluated merely based on economic costs and benefits; these funds in some cases might have geo-strategic motivations.[34]

III. Recent Macroeconomic and Monetary Developments in Bangladesh Economy

How is this conventional wisdom of optimal reserves useful for Bangladesh, and where do its forex reserves stand vis-à-vis the reserves yardsticks we have discussed in the preceding section? Before we do a back-of-the-envelope calculation of Bangladesh's forex reserves, we need to look at some of its key macro variables that have implications for reserves build-up. The Bangladesh economy has demonstrated significant economic growth in the past one and a half decades, owing to marked improvements in its key macro variables including steady development in its external sectors. Its exports and imports are growing steadily, aid flows are waning, and remittances are skyrocketing. As a result, the country's major macro variables are relatively better than compared to that of a decade ago. But there are some pitfalls too.

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29 Albeit, Kuwait created the first modern fund in 1953.

30 According to the U.S. treasury, SWFs are government investment funds, funded by foreign currency reserves but managed separately from official currency reserves.

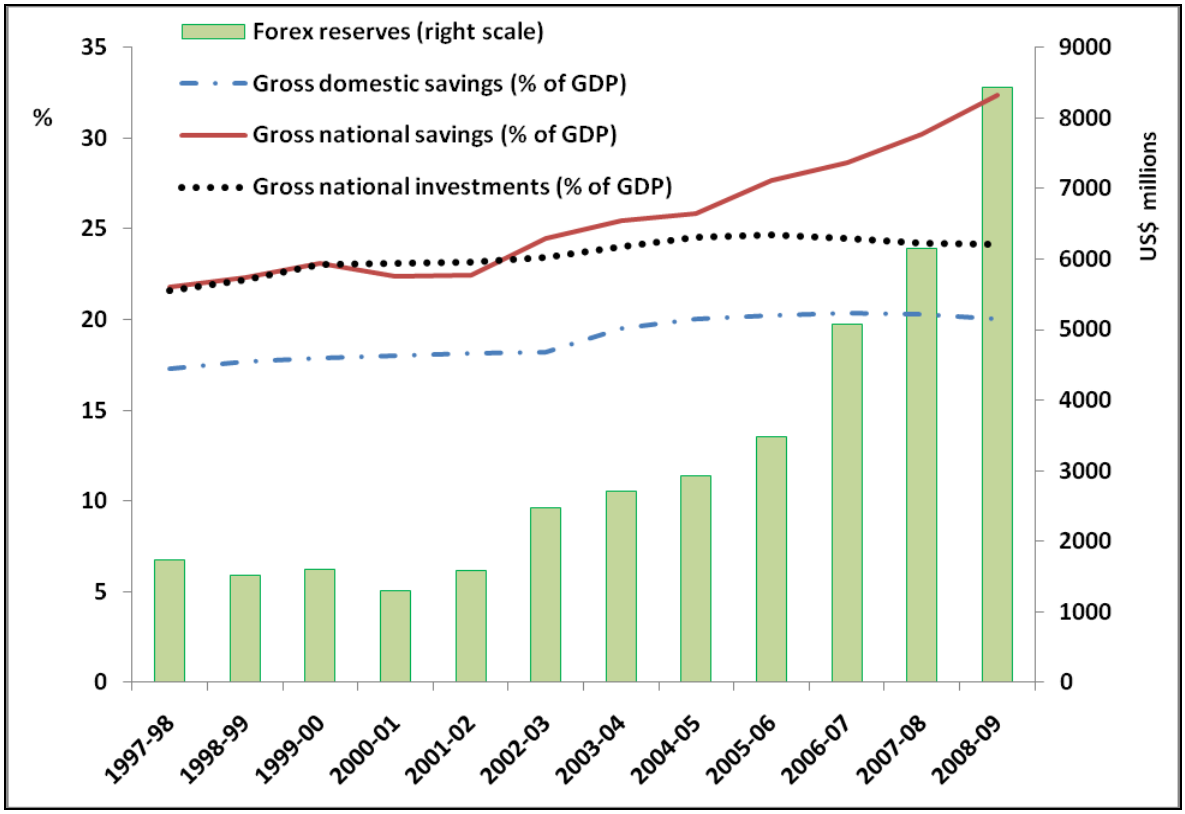
31 IMF (2008).

32 China and other East Asian countries stockpiled huge reserves banking on their exports, largely thanks to favourable exchange rate and low labour-cost.

33 The run-up in the price of oil clearly had a direct impact on the size of petro-dollar economies reserves.

34 Chinese SWF's acquisitions of commodity resources in Africa and other resources in the US or elsewhere in the world, for instance, are widely seen as aligned with the country's strategic imperatives more than its economic needs. There have been even some calls to take measures to block SWF investment, comparing such steps to the Smoot-Hawley tariff. See, China fund shuns guns and gambling," *Financial Times*, 13 June 2008, Alan Tonelson, testimony before the U.S. China Economic and Security Review Commission hearing on the Implications of SWF Investments for National Security, 9 February 2008, and Stephen Schwarzman, "Reject sovereign wealth funds at your peril." *Financial Times*, 19 June 2008.

Figure 1: Savings-Investment Gap and Forex Reserves Accumulation in Bangladesh: 1997-98 to 2008-09



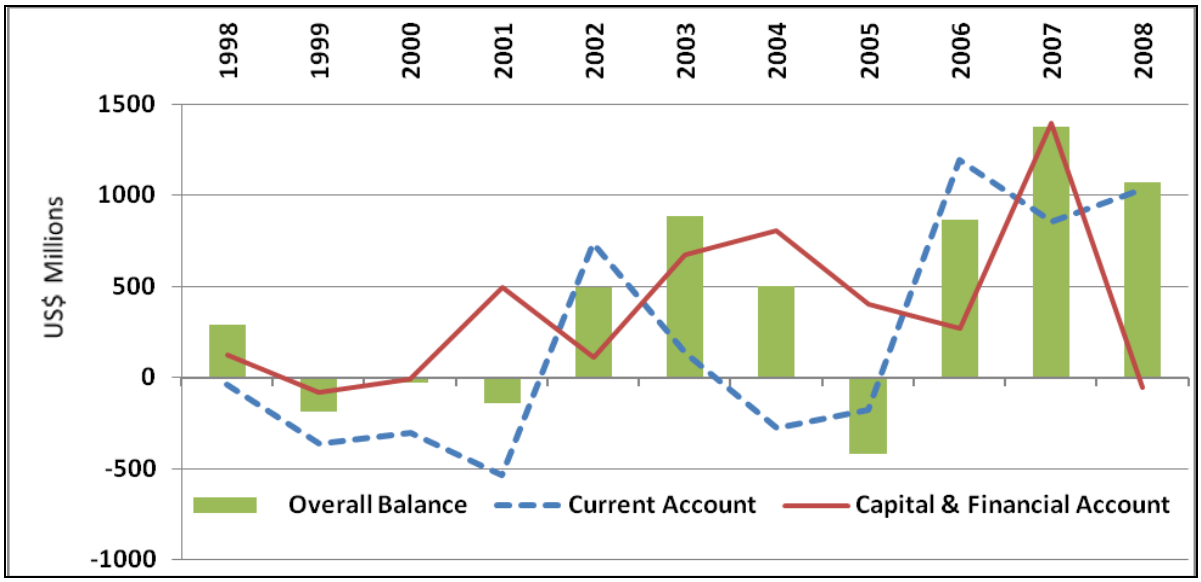
Source: Based on Bangladesh Bank.

As seen in Figure 1 (the left scale), there is a substantive gap between Bangladesh's gross domestic savings (GDS) and gross domestic investments (GDI). Generally, imported savings that are reflected in gross national savings (GNS) fill the gap. In the case of Bangladesh, the gap has been bridged historically by GNS but since 2005-06 one can see a growing divergence between GNS and GNI. From the macroeconomic perspective, this scenario is seen either as a 'savings glut'[35] (that one observes in China) or an 'investment drought' (other emerging Asian economies). As evident from the slope of GNI, Bangladesh falls into the latter group owing to its 'investment drought'. This is partly due to its underdeveloped financial systems,[36] and partly due to other structural problems in the economy – entailing difficulties in properly channeling national savings to investments. This development has led to a surplus in Bangladesh's current account (BoP) that eventually ends up in reserves accretion. The right scale of Figure 1 shows the trends in its forex reserves. One gets a relatively better picture of Bangladesh's forex reserves by assessing its BoP position, particularly dynamics in its current account. It is current account surpluses that led to the huge reserves accumulation in East Asian countries.

[35] The term, coined by Ben Bernanke, describes a situation in which there are too many savings with respect to investment opportunities worldwide. On a national level, a saving glut creates the tendency for savings to finance current account surpluses instead of investments. This can be observed, according to Bernanke (2005), in developing as well as in industrial countries. The most important receiving country of these export surpluses, financed by excess savings, is the United States who runs a current account deficit.

[36] For details on Bangladesh's financial system, see Nachane and Islam (2009).

Figure 2: Trends in Balance of Payments of Bangladesh: 1998-2008



Source: Based on International Financial Statistics, *International Monetray Fund*.

The BoP position of Bangladesh (see Figure 2) shows that the country ran a modest surplus in its capital and financial accounts until recently, whereas its current account had been volatile until 2005-06. So, a consistent surplus in its current account is a very recent development. The economy has been experiencing a steady trade deficit (both exports and imports are on the rise with import growths outpacing export growth) but the private transfer component of the current account has witnessed a steady growth largely owing to workers' remittances (see Table 2). Lately, Bangladesh has become one of the leading remittance recipient countries. Despite leakages in the country's capital and financial accounts[37] and trade account, remittances help maintain the overall surplus in its BoP.

Empirical studies on Bangladesh's equilibrium current account balance support this analysis. Theoretically, current account is positively correlated with fiscal balance, economic growth and private transfers and adversly with net foreign assets.

Table 2: Major Components of Bangladesh's Current Accounts (in million US$)

	2008-09*	**2007-08**	**2006-07**	**2005-06**	**2004-05**	**2003-04**
Exports	14190	13945	12053	10422	8573	7521
Imports	-18888	-19486	-15551	-13301	-11870	-9840
Remittances	8770	7915	5979	4802	3848	3372
Current Account Balances	1809	672	936	572	-557	176

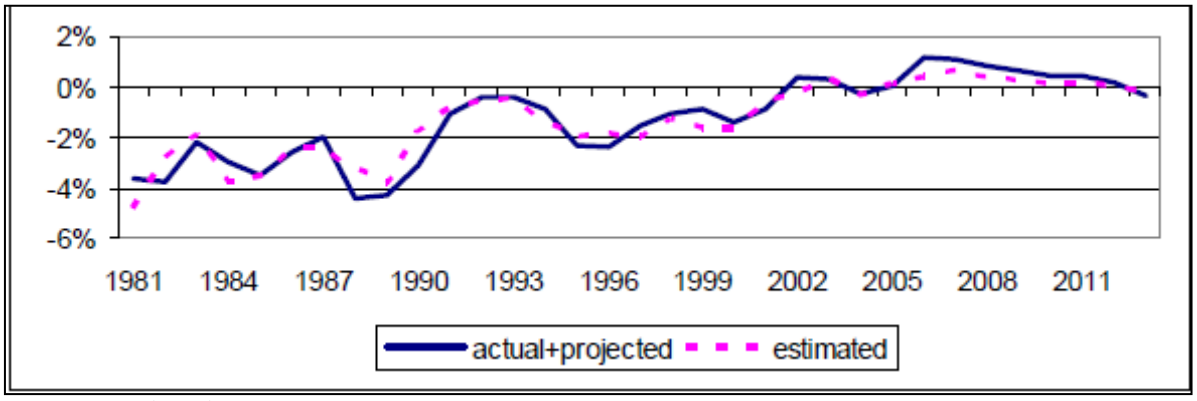
*Projected.
Source: Major Economic Indicator, Various Issues, *Bangladesh Bank*.

An IMF estimation on Bangladesh's equilibrium current account shows that the country's current account balance has improved markedly thanks to its economic growth and

[37] The segregated data on capital and financial account shows that Bangladesh's capital account maintains a surplus but its financial account runs persistent deficits.

remittance inflows (private transfer).[38] Figure 3 illustrates Bangladesh's current account norm along with the projected medium-term current account which is based on medium-term projection values for fiscal balance, GDP growth, private trasfers and NFA.

Figure 3: Bangladesh's Equilibrium Current Account (% of GDP)



Source: IMF (2008).

Despite this positive scenario, one needs to assess Bangladesh's current BoP balances (thus forex reserves) with some caution. Bangladesh's imports bills were marginally lower in 2008-09 than the previous fiscal year, thanks partly to a bust in global commodity prices, although exports witnessed a modest growth. The excessive inflows of remittances could possibly be due to the repatriation of savings by overseas Bangladeshis who lost their jobs in different parts of the world during the financial crisis or their savings found limited investment opportunities in overseas capital markets. These two developments could slightly overstate the BoP positions of Bangladesh vis-à-vis its recent past.

The next point to address is Bangladesh's monetary policy, particularly its exchange rate that has wider implications for reserves build-up, as can be noted in many East Asian economies, most noticeably in the case of China. The detailed theoretical underpinnings of open-economy trilemma and other issues related to reserves accumulation are discussed in the earlier section, and fairly convincingly show that reserve accumulation is the result of intervention in the forex market. The official position pertaining to Bangladesh's exchange rate is that the country's "exchange rate is largely market-determined but the central bank will intervene in the market, if needed".[39] This is what known as a "managed float" exchange rate.

[38] The estimate shows that a one-percentage point higher growth rate of real GDP per capita (relative to trading partners) improves the current account balance (relative to GDP) by around 0.4 percentage point and a coefficient of 0.444 on private transfer confirms that workers' remittances have contributed significantly. See IMF (2008).

[39] Under the existing floating exchange rate regime (that started from 31 May 2003), the interbank foreign exchange market sets the exchange rates for customer transactions and interbank transactions based on demand-supply interplay; while the exchange rates for the Bangladesh Bank's spot purchase and sales transactions of US dollars with Authorised Dealers (AD) is decided on a case to case basis. Bangladesh Bank does not undertake any forward transaction with ADs. The ADs are free to quote their own spot and forward exchange rates for interbank transactions and for transactions with non-bank customers. However, along with intervention in the Taka money market, the US dollar purchase or sale transactions take place by the Bangladesh Bank as needed, to maintain orderly market conditions (Bangladesh Bank Website, http://www.bangladesh-bank.org/)

Nevertheless, one can test whether the Bangladesh Bank intervenes in the foreign exchange market (sterilisation). If so, the degree of intervention can be measured running a simple regression and plotting a sterilisation index subsequently. The simple regression results (in line with IMF)[40] shows that the central bank of Bangladesh intervenes in the forex market substantially (see Box 1). Moreover, one can get the same impression if we see the country's bilateral exchange rate that has virtually witnessed no volatility in recent years. This is also another account (though loosely speaking) of intervention in its forex market. The Bangladesh Bank's recent monetary policy statement also acknowledges that it purchased US$1.48 billion from the inter-bank market in 2008-09.

Box 1: Bangladesh's Forex Market: The Degree of Sterilisation

The World Economic outlook (2007) of International Monetary Fund suggested a measure of sterilisation given by:

$$\Delta M2_{i,t,m} = \alpha_{i,t} + \delta_{i,t}\ \Delta NFA_{i,t,m} + u_{i,t,m} \ldots\ldots\ldots\ldots (1)$$

Where, $\Delta M2_{i,t,m}$ is the monthly changes in the country I money supply (defined as M2), in year t and month m, $\delta_{i,t}$ is a constant and $\Delta NFA_{i,t,m}$ are the changes in the net foreign assets of country I, at time t and month m, and $u_{i,t,m}$ is the error term. In this case, a value of δ equal to 0 implies full monetary sterilisation, whereas a value of 1 represents no sterilisation.

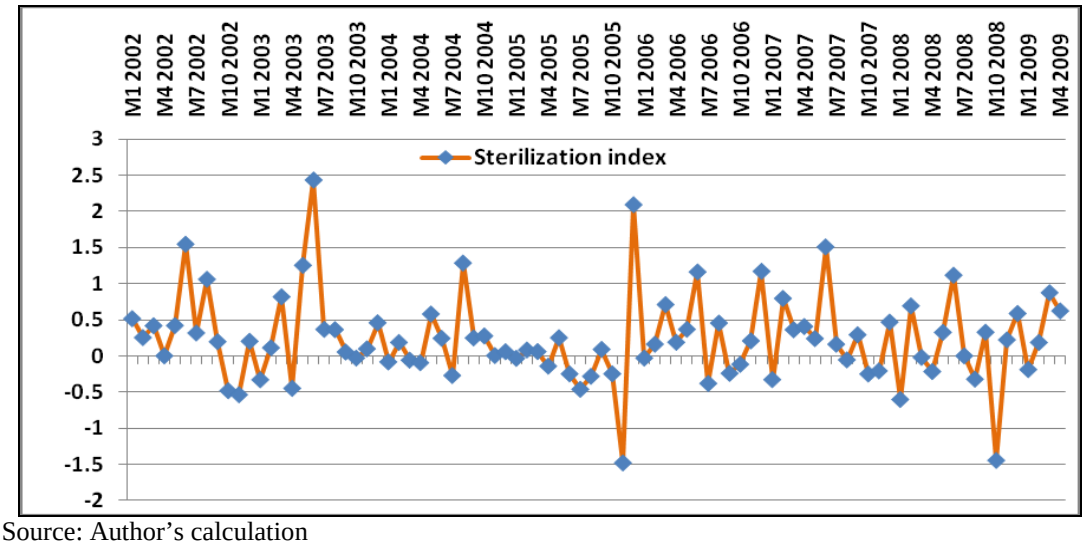
Following the above methodology (equation 1) we get the following OLS results for Bangladesh over the period of M1:2002-M4:2009:

$$\Delta M2 = \underset{(7.07)}{1.03} + \underset{(4.46)}{0.12}\ \Delta NFA + u \ \ldots\ldots\ldots (2)$$

The OLS is statistically significant and the sign are expected. Now we substitute the parameter δ (0.12) in the ΔNFA data that gives us a picture of the degree of sterilisation (see Figure 4).

[40] IMF (2007).

Figure 4: Bangladesh's Sterilisation Index: M1:2002-M4:2009

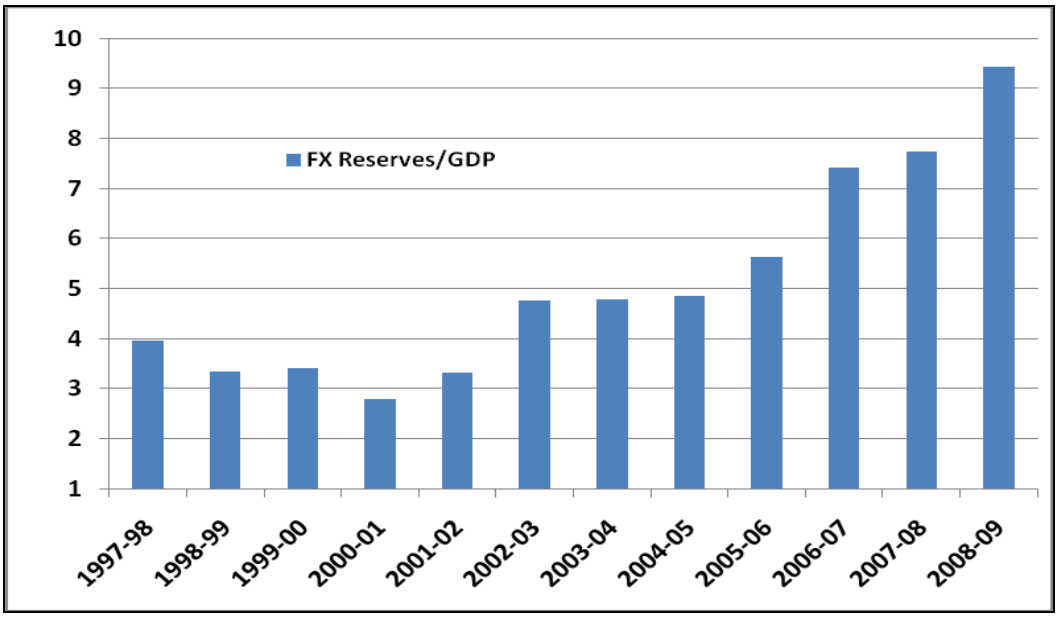


Source: Author's calculation

IV. Reserves Adequacy Measure for Bangladesh

Having discussed the recent trends in Bangladesh's BoP and its exchange rate (and sterilisation) policies we now measure the different reserves adequacy benchmarks for the country based on some international criteria. As discussed in section II, adequacy of forex reserves is an important parameter in gauging an economy's ability to absorb external shocks. The natural starting point is the reserves to GDP ratio. In Bangladesh's case, the ratio shows that, since the fiscal year 2005-06, there has been a significant rise of reserves to GDP, but it still falls short, albeit marginally, of the standard 10 percent benchmark (see Figure 5).

Figure 5: Bangladesh's Forex Reserves to GDP Ratio: 1997-98 to 2008-09



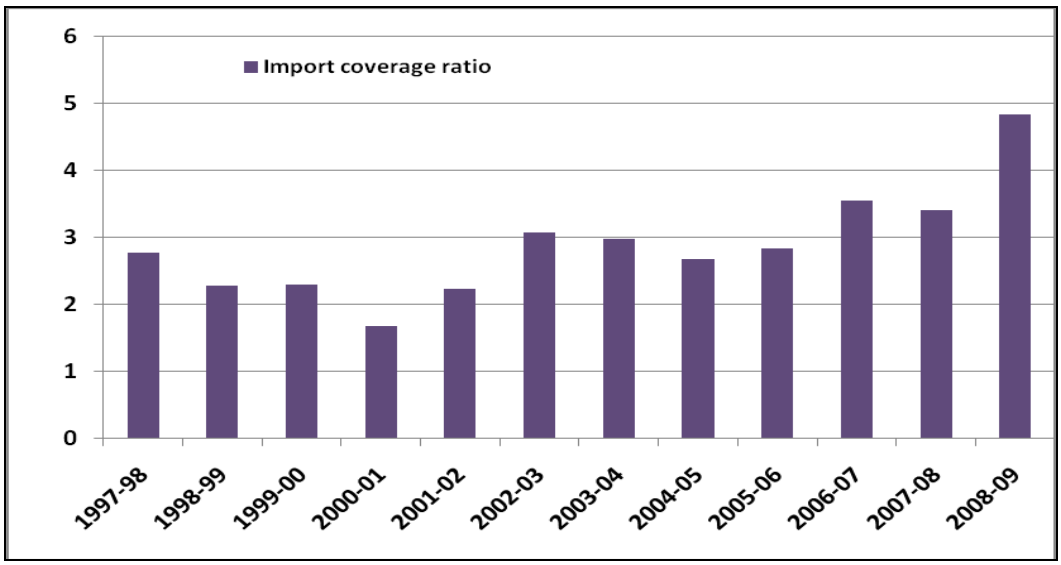
Source: Based on Bangladesh Bank.

The other conventional measure is the reserves to import coverage ratio, which is critical for countries like Bangladesh that have limited capital account openness. As depicted in Figure

6, the country is now in a position to finance approximately four and half months of import bills in the event of any unwanted crisis. This fulfills the benchmark requirements.

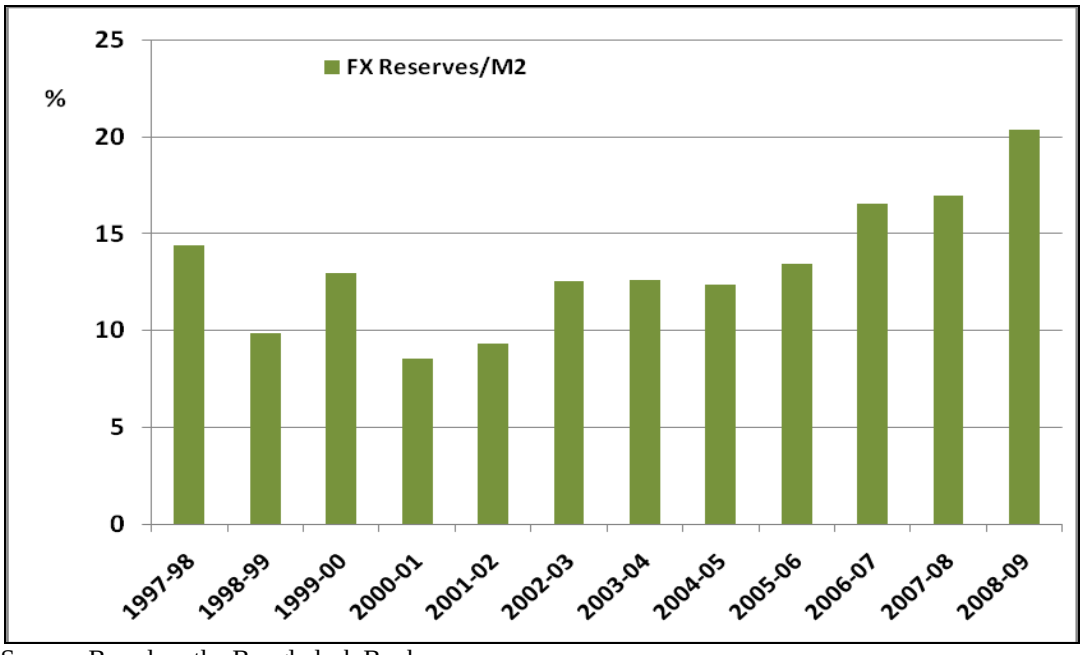
In terms of reserves to money supply criteria, Bangladesh has the required level of reserves. In recent years, the ratio has increased significantly and, of late, it touched the benchmark 20 percent (see Figure 7). However, its reserves position is faring well when it comes to reserves to short-term debt ratio which has gained much currency in reserves literature, particularly countries with a convertible capital account. Bangladesh's short-term debt has fluctuated between 25 to 30 percent in recent years which is much lower than the standard yardstick of 100 percent (see Figure 8).

Figure 6: Bangladesh's FX Reserves-Imports Coverage Ratio: 1997-98 to 2008-09



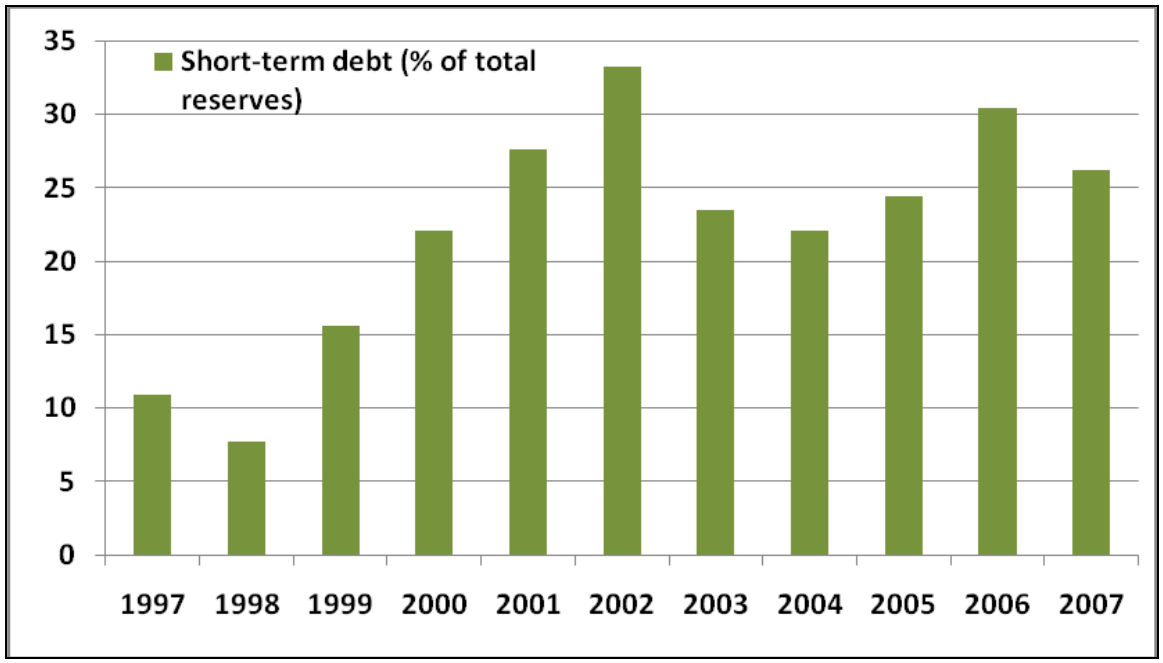
Source: Based on the Bangladesh Bank.

Figure 7: Bangladesh FX Reserves to Broad Money Ratio: 1997-98 to 2008-09



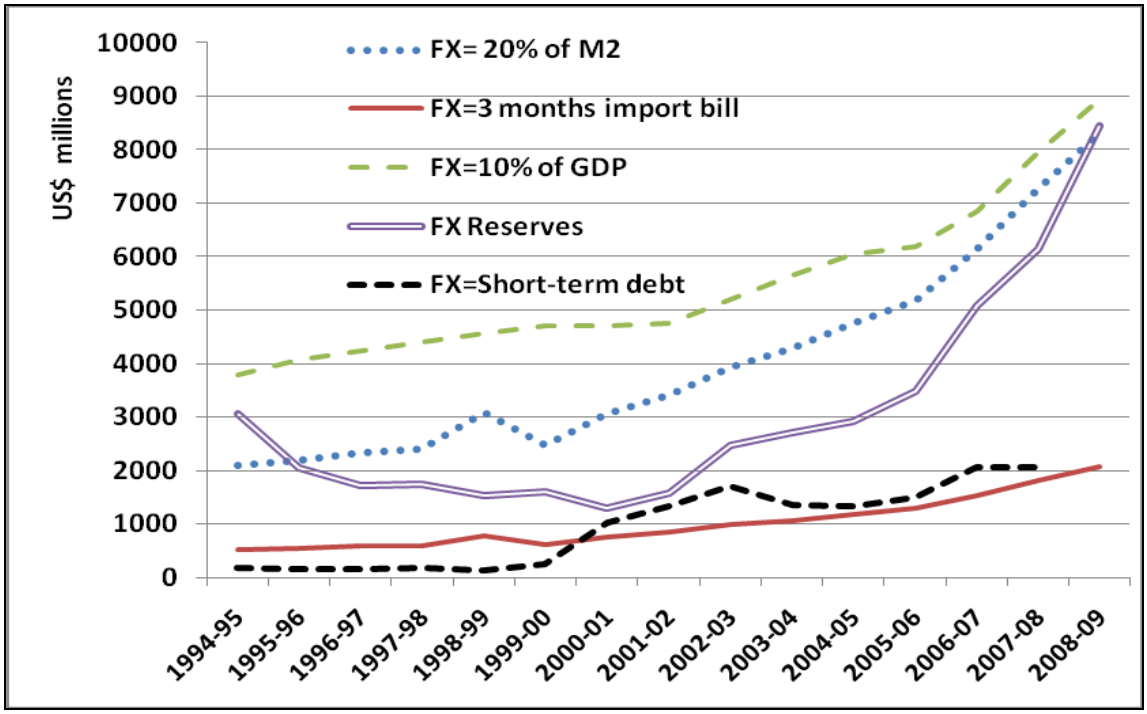
Source: Based on the Bangladesh Bank

Figure 8: Bangladesh's Shortterm Debt as Percentage of FX Reserves: 1997-2007



Source: Based on World Development Indicators, *The World Bank.*

Figure 9: Reserves Adequacy Measures for Bangladesh and Its Excess Reserves



Source: Author's calculation based on Bangladesh Bank and World Development Indicators, *The World Bank.*

Bangladesh's forex reserves position vis-à-vis the aforementioned criteria are summarised in Figure 9. It shows that the country's reserves are higher than the required level based on reserves to short-term debt and reserves to import coverage ratio, and fall short as per as reserves to GDP ratio is concerned. Its BoP position can be a guide in this regard. Bangladesh does not receive a significant level of FDI or portfolio investment but trade and net transfers

are dominant parts of its BoP. Therefore, it is the current account-related factors of reserves criteria that are largely relevant for Bangladesh, and based on reserves to import bills, the country's reserves level is marginally higher than what it requires.

In summary, Bangladesh's forex reserves are not substantially higher than adequate if one considers all the reserves adequacy measures. Hence, based on these reserves adequacy measures and its BoP position, there is little room to conclude that Bangladesh's reserves holding is much higher than adequate or vice-versa. We will discuss the issue in a holistic framework in the next section.

V. The Cost and Benefits of Bangladesh's Reserves Accumulation

In this section, we discuss the costs and benefits of Bangladesh's reserves accumulation. The direct cost of reserves holding is the spread between one-year US Treasury and Bangladesh Bank Treasury rates.[41] The returns from Treasury bonds in Bangladesh are much lower than the yields it receives from forex reserves, (invested predominantly in the US Treasury), due to the interest rate arbitrage. As can be seen from Figure 10, the collapse of interest rates in the US, particularly following the financial crisis, augmented the gap between the two treasury rates. In recent months, the interest rate on Bangladesh bank Treasuries has also declined but the spread remained at four to five percentage points. In crude economic measures, this gap is substantive. If we take Bangladesh's reserves to import coverage ratio[42] as an example of the cost of reserves build-up, it appears that the country has roughly US$3 billion reserves (equivalent to over its -1.8 months imports bills) in excess, and its cost of holding excess reserves is roughly US$150 million annually, based on the interest rate arbitrage between Bangladesh and the US. In a similar fashion, the total cost of its reserves build-up would be approximately US$400 to 450 million.[43]

Nevertheless, this cost has to be weighed with benefits of holding reserves. First, sterilisation reduces prices and exchange rate volatilities. Second, sizeable reserves reduce sovereign default risk, which is very crucial for Bangladesh considering the fact that the country is poorly graded for its political uncertainties. Third, all these factors may in turn induce potentially higher economic growth. More importantly, reserves could possibly work as a form of insurance when financially less-integrated economies (like Bangladesh) expedite their financial sector reforms.

The other fundamental issue is Bangladesh's exchange rate policy which is applied to accumulate reserves. As can be observed in some East Asian economies in 1960s and 1970s and now in China, virtually every instance of sustained high growth has been accompanied by a significantly depreciated real exchange rate.[44] Rodrik (2007) perceived "undervaluation as a second-best mechanism for alleviating institutional weakness and market failures that tax the tradables." However, to maintain the advantage of a competitive (undervalued) currency, central banks need support from fiscal authorities.[45] If one considers all the benefits of

[41] As discussed in section II, the central bank intervenes in the forex market and buys foreign currency by releasing domestic currency that eventually sucked out from market through treasury bonds.

[42] That shows Bangladesh holding excess reserves.

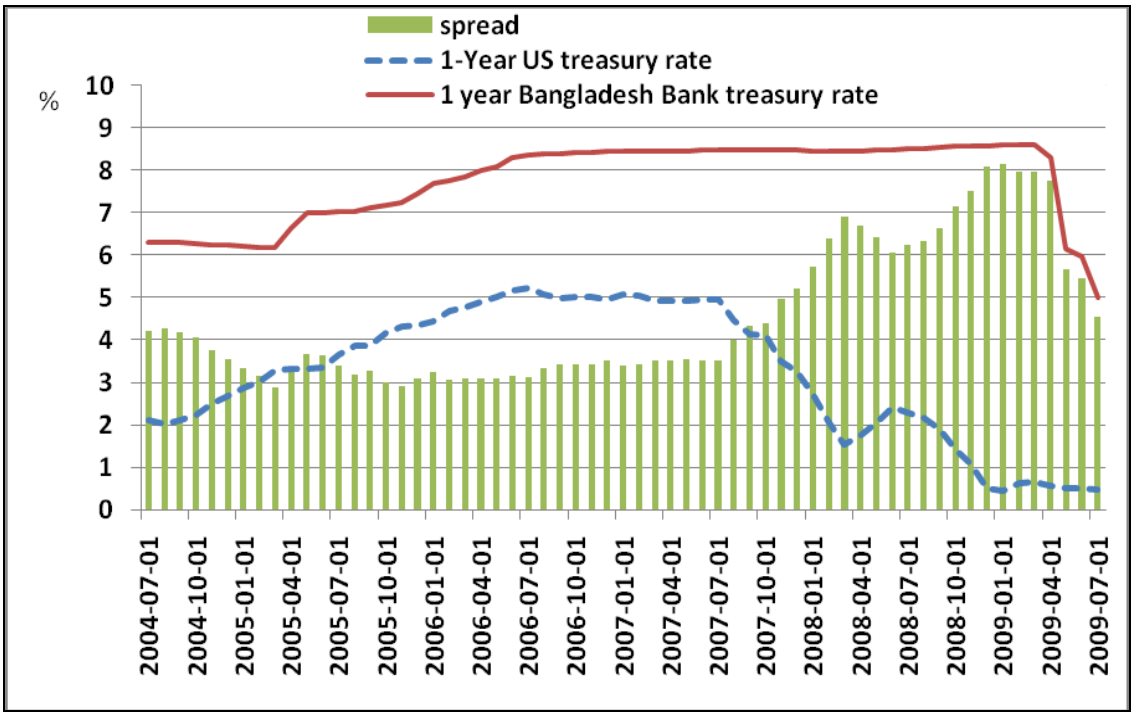
[43] Assuming that the reserves vary from US$8 billion to US$8.5 billion.

[44] Rodrik (2007).

[45] Rodrik (2007) observed, "maintaining a competitive currency requires a rise in domestic saving relative to investment, or a reduction in national expenditure relative to income. Otherwise, the competitiveness gains would be offset by rising inflation. This means that the fiscal authorities have a big responsibility: to target a

holding adequate or reserves marginally in excess, the spread between the two curves in Figure 10 will be substantially lower than it appears.

Figure 10: Trends in the one-year US Treasury and Bangladesh Bank Treasury Rates: 2004-2009



Source: Based on the Federal Reserves Bank of St Louis and the Bangladesh Bank.

VI. The Question of Alternative Uses of Bangladesh's Forex Reserves

As discussed, Bangladesh's reserves do not far exceed what it requires. Having said this, it has two choices to make with these reserves. First, if one assumes that Bangladesh's financial sector will not undergo significant reform in years to come, it could channel part of its reserves to alternative investments. Second, the country can expedite its financial sector reform using reserves as insurance. Its integration with the rest of the world in terms of trade is substantive but financial integration remains very shallow. These two options bring us back to the fundamental macro disequilibrium (savings > investment) we have explored in Section III (refer to Figure 1). The widening gap between GNS and GNI signals that Bangladesh either needs to adopt institutional reforms so that its economy finds a way to use the surplus savings or it must discover an alternative avenue to utilise them.

Bangladesh's saving-investment (S-I) gap (thus reserves accumulation) experience largely coincides with emerging Asia (largely East Asian) which has been a centre of focus for the last two decades. For instance, from 1996 to 2004, part of the rise in emerging economies current account surplus was due to the collapse in investment in Southeast Asia and partly because of the rise in Chinese savings. The saving-investment gap owing to a drought in investment in Southeast Asia is well crafted. However, the Chinese case where savings were rising faster than its investment, remains an open debate as some analysts think the rise in its savings is tied to the policies China adopted to support its dollar peg but others highlight the

structural fiscal surplus that is high enough to generate the space needed for real exchange rate depreciation."

weakness in China's financial sector and the lack of a modern social safety net.[46] Nevertheless, the difference between major emerging market economies and Bangladesh is that the former comprises mostly middle income economies, and marginal productivity of capital should ideally be higher in the latter, which is still a low-income country.[47]

Having said this, the first option would be the path that most countries have adopted historically but it demands a long-term political commitment. Cross-country experiences show that countries have achieved the intermediate level of trilemma – staying in the mid-way of independent monetary policy and limiting exchange rate flexibility, while at the same time facing large and growing international capital flows – using forex reserves as a buffer, as discussed in Section II. Bangladesh should follow the path by expediting its financial sector and other institutional reforms.

The second option is the alternative use of its excess reserves. The question is where to invest the funds. The yield from the US Treasury is likely to remain low largely because of the rapid growth in reserves in China and elsewhere in the world that were partly, if not largely, invested in the US government securities market. This means that Bangladesh has to invest its surplus reserves to high yield (and high risk) avenues. China and some other countries that have huge reserves allow outward FDI and acquire overseas resources through SWFs that help reduce the excessive pressure on their domestic currencies and price levels. The development of a SWF to acquire foreign assets or similar purposes is not a viable option for Bangladesh. The reason was not due to its size of excess reserves. Instead, the country's bureaucracy does not have adequate managerial skills to manage such funds.[48] However, it can liberalise the rules concerning outward FDI, and allow some of its local companies to invest overseas.

Among other alternatives, one option could possibly be the development of infrastructure funds that should include private sector – either local or foreign – stakeholders whereby the government provides funds and the private sectors offer their technical knowhow. In a similar mechanism, some reserves can be used to develop a manpower exports fund that deserves some attention considering the fact that Bangladesh has a huge potential to be a leading manpower-exporting country in the world. However, such initiatives should be supported by further research, as the alternative uses of reserves are a tradeoff between high risk and high return.

VII. Conclusions

Of late, there has been a growing interest in Bangladesh on the alternative uses of its reserves. The country's reserves are adequate if one considers all the reserves adequacy measures but not markedly higher than what is required. Nevertheless, some of the reserves adequacy measures may not be useful for Bangladesh considering the fact that it does not receive a significant amount of short-term capital flows, and it is not vulnerable to the "sudden stop" of

[46] See Setser (2007) and Bernanke (2007).

[47] Based on heroic assumptions, the marginal productivity of capital is much higher on average in poor countries. However, the financial rate of return from investing in physical capital is not much higher. See Caselli and Feyrer (2007), Chirinko and Mallick (2008), and Lucas (1990).

[48] On Bangladesh's position vis-à-vis various global indicators on governance, corruption and others, see WBI Governance & Anti-Corruption (http://web.worldbank.org/WBSITE/EXTERNAL/WBI/EXTWBIGOVANTCOR/0,menuPK:1740542~pagePK:64168427~piPK:64168435~theSitePK:1740530,00.html). Also see The Cost of Doing Business Report by World Bank (http://www.doingbusiness.org/)

such flows. The current account aspect of reserves adequacy benchmark, which is most appropriate for Bangladesh, indicates it is holding excess reserves.

While the paper does not underestimate both the role and cost of reserves accumulation, the associated benefits of sterilisation should be analysed carefully so that the spread between cost and benefit does not misalign markedly in real terms. The downside risk pertaining to sterilisation is that, while the interest rate is collapsing in the US or other developed markets where most of the reserves are absorbed, the interest rate regime in Bangladesh is not flexible downward. This interest rate arbitrage and lack of diverse financial market devices, particularly debt instruments, could possibly countervail the very objectives of sterilisation if the current net transfer flows sustain and the existing gap between import and export growths persists. In this case, the Bangladesh Bank would have little choice but to allow exchange rate appreciation unless it disturbs the price levels.

The central bank's statement on alternative uses of reserves is perhaps not a forward-looking one in the sense that it undermines an important aspect of the Bangladesh economy. It has not been able to utilise its surplus national savings due to an 'investment drought'. This, in turn, shows bottlenecks in its financial sector and other institutions. The discussion of the paper highlights the point that Bangladesh should gradually move from autarkic to a relatively open financial system using its growing reserves as buffer. Such a move could possibly address some macroeconomic disequilibrium concerning its savings and investment. Furthermore, as evident in many emerging markets, successful sterilisation needs a deep financial market.

If the authorities in Bangladesh do not want to markedly disturb its reform equilibrium, the country could possibly use some of its reserves (in excess of three month import bills) in the infrastructure or similar sectors, although such an initiative should include local or foreign private sectors that have sound managerial skills and technical knowhow. What exactly should be done is beyond the scope of this paper but it recommends that such moves need further research as it is a trade-off between low yield-high liquid assets and high yield-low liquid assets. However, the country can encourage some local investment to "go global" which could ease the pressure on its domestic currency and price level.

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