

Economic Watch

China | Estimating the optimal level of China's foreign reserves

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Introduction

This note is dedicated to estimating China's optimal level of foreign reserves based on a number of extant researches. In our definition, the optimal level of foreign reserves corresponds to the one adequate to cushion the shocks of a country's Balance of Payment (BOP). In practice, a country's authorities could accumulate its foreign reserves beyond their optimal level for some reasons. For example, several East Asian economies, including China, Japan, South Korea etc., once held vast amounts of foreign reserves, resulting from their frequent interventions into the FX market for the purpose of keeping their currencies' value "competitive" relative to their trade partners. Some global crude oil exporters still hold enormous foreign reserves, stemming from their energy exports. To them, foreign reserves constitute an important form of national wealth, functioning to promote their people's living standard and social wellbeing.

In the past, China's authorities didn't pay much attention to the question of what is its optimal level of foreign reserves. The authorities are glad to keep more valuable assets in their own hands. Moreover, the frequent interventions into the FX market made it impossible to predict the trajectory of foreign reserve accumulation.

However, the authorities have to reassess the situation due to a couple of important changes. First, FX market interventions have become rare since 2018, due in part to the authorities' efforts to enhance the flexibility of the exchange rate. Second, the outbreak of the Russia-Ukraine war prompted the US and the EU to impose a large number of sanctions on Russia, including the unexpected foreign reserve frozen.

As the tension between China and Western countries continues to rise since the inception of China-US trade war in 2018, China's authorities are well aware of the risk that Western countries might apply similar financial sanctions to China as they did to Russia. In particular, it is imperative for China's authorities to reassess the optimal level of its foreign reserve holdings, so as to minimize the potential loss in case of Western countries' seizure under certain circumstances.

A review of China's foreign reserve development

Prior to 2014, China maintained a "twin surplus" under both current and capital account thanks to its strong exports and capital inflows. (Figure 1) As a result, the "twin surplus" has helped China to accumulate a large amount of foreign reserves, from USD 1,546 billion in 1999 to the peak of around USD 4,000 billion in 2014. Although the level of foreign reserves gradually declined after 2014, it has remained above USD 3 trillion from 2014 till now. (Figure 2)

Since 2006, China has held the largest amount of foreign reserves in the world. (Figure 2 and 3) China's current foreign reserves account for around 30% of global foreign reserves.

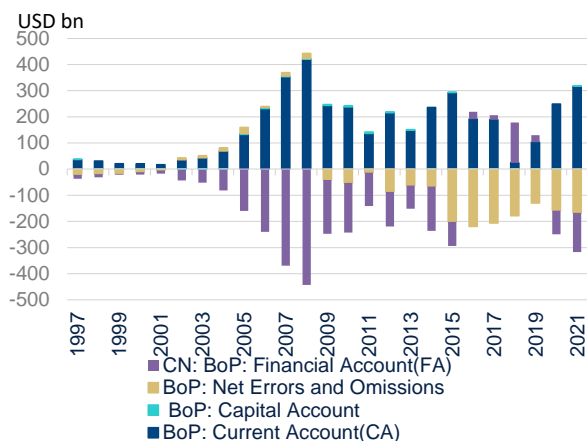
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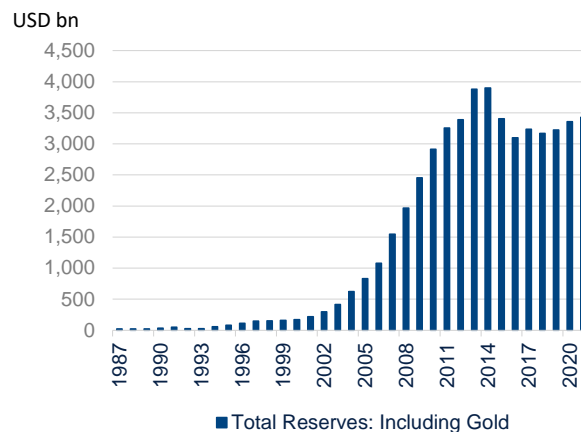
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Figure 1. **“TWIN SURPLUS” HAPPENED IN MOST YEARS IN THE PAST DECADE**



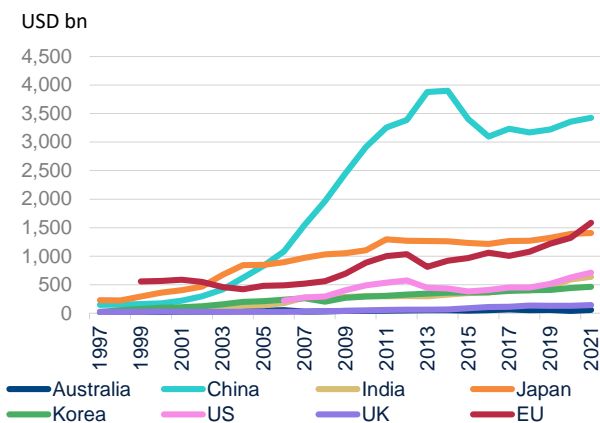
Source: CEIC and BBVA Research

Figure 2. **DUE TO THE “DUAL SURPLUS” IN CAPITAL AND CURRENT ACCOUNT, FOREIGN RESERVE ACCUMULATED FROM 0 IN 1980S TO AROUND USD 4 TRN AT THE PEAK**



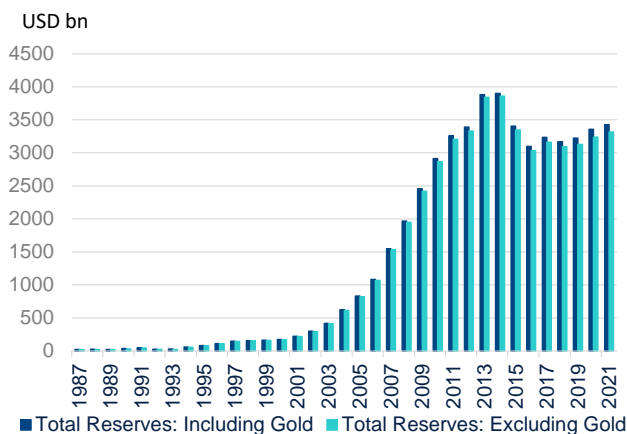
Source: CEIC and BBVA Research

Figure 3. **SINCE 2006, CHINA HAS HELD THE LARGEST AMOUNT OF FOREIGN RESERVE IN THE WORLD FOR 16 YEARS**



Source: CEIC and BBVA Research

Figure 4. **THE SHARE OF GOLD IN CHINA'S FOREIGN RESERVE HAS BEEN QUITE SMALL**



Source: CEIC and BBVA Research

Optimal foreign reserve theories: why countries accumulate foreign reserves?

Central banks in the world accumulate reserves for a wide variety of reasons. A typical explanation highlights both the payment demand and precautionary demand of holding foreign reserves. Moreover, in some countries foreign reserves are accumulated also as a by-product of their FX market inventions, in pursuit of financial stability or even the “competitiveness” of their currencies.

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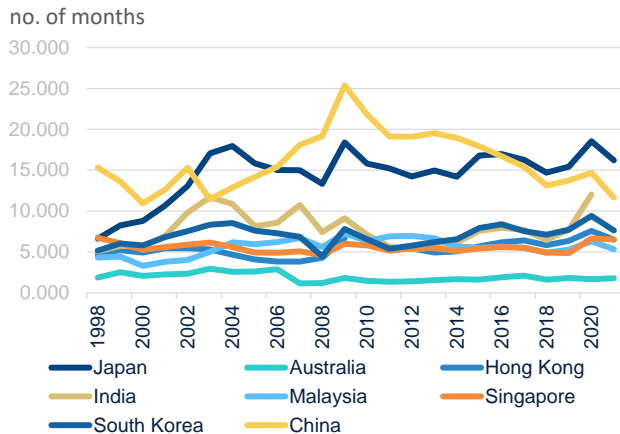
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In literature, there is no unified framework to assess the adequacy or the optimality of a country's foreign reserves. Central banks usually follow an array of measures that compare a country's foreign reserve position with proxies for a specific financial risk or vulnerability. These measures provide a practical starting point, but a complete assessment must take into account more country-specific factors such as the exchange rate regime and capital account openness as well as financial market depth and liquidity situation etc. (Yavuz Arslan and Carlos Cantú, 2018)

The traditional measures considering both payment demand and precautionary demand of foreign reserves could be summarized as follows:

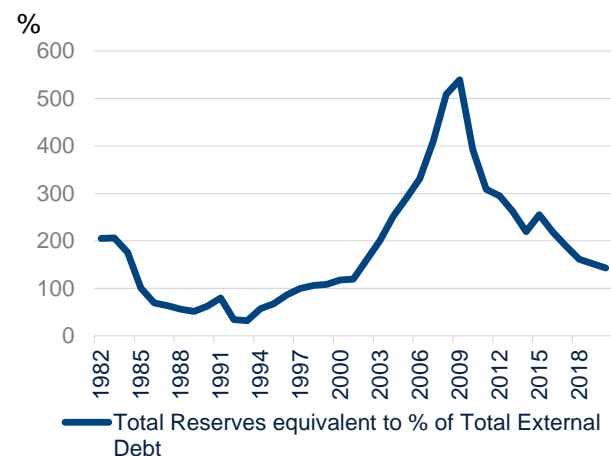
- (i) **Import coverage:** measures the number of months that reserves can sustain a country's imports. This indicator is considered relevant for countries with a comparatively closed capital account. The benchmark is normally three months of import coverage. (Figure 5)
- (ii) **Short-term external debt coverage:** measures the potential demand for repayments related to a country's short-term external foreign currency borrowing. The Guidotti-Greenspan rule proposes a 100% coverage. This rule can be extended to consider the full potential 12-month financing need, measured by short-term external debt minus the current account balance. (Figure 6)

Figure 5. **COMPARED WITH ASIAN ECONOMIES, CHINA'S FOREIGN RESERVE EQUIVALENT TO NO. OF MONTHS OF IMPORTS HAS BEEN THE HIGHEST FOR LONG TIME**



Source: CEIC and BBVA Research

Figure 6. **CHINA'S TOTAL FOREIGN RESERVE EQUIVALENT TO % OF FOREIGN DEBT IS HIGH COMPARED WITH INTERNATIONAL STANDARD**



Source: CEIC and BBVA Research

- (iii) **Ratio of reserves to broad money (M2):** measures the potential demand for foreign assets from domestic sources. This indicator is considered relevant for countries with financially developed markets and an open capital account. The benchmark is typically set at 20%.
- (iv) **Wijnholds and Kapteyn (2001):** measures both the potential drain on reserves that results from the non-rollover of short-term external debt and that from residents' capital flight. It is the sum of short-term external debt plus an adjusted M2. The adjustment to the second component depends on the exchange rate regime and country risk. The authors propose a 100% reserve cover.

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- (i) **Precautionary demand:** Having experienced financial crisis in different phases, emerging economies have naturally become more cautious. The main characteristic of these crises has been sudden stops in capital inflows and accelerating capital outflows, which have disrupted the financial system and caused large and mostly permanent output losses. Given the absence of a fully adequate global safety net, emerging markets accumulated reserves in part as a form of self-insurance (Carstens (2018)).

In practice, the rapid increase in financial and portfolio flows, the resulting external stocks in relation to GDP have all strengthened this precautionary motive, leading the foreign reserve accumulation much higher than the traditional reserve adequacy measures, such as the three-month import payment or 100% coverage of short-term debt as stated above. (Figure 5 and 6)

In the past decades, particularly during the Global Financial Crisis in 2008-2009, European sovereign debt crisis in 2009-2010, 2013 taper tantrum, and pandemic shocks in 2020-2021, it seems that the precautionary motive for accumulating foreign reserve surpasses the payment demand to be the main driver of the optimal level of foreign reserve. Moreover, large stocks of reserves could be deployed under stress scenario to provide liquidity of foreign currency to domestic financial and non-financial institutions, thereby preventing or mitigating a credit crunch or a sharp currency depreciation etc.

Empirically, the countries with a high level of foreign reserves indeed suffer less from major global shocks in the past decades. In particular, during the Global Financial Crisis, the emerging economies that held relatively more foreign reserves experienced smaller currency depreciations or milder credit crunch. This was also the case during the Taper Tantrum in 2013, European sovereign debt crisis and the recent turmoil of Covid-19 pandemic shock.

Last but not least, a comprehensive evaluation of reserve adequacy or its optimal level should consider the consolidated position of a country's domestic banking sector and the availability of additional external buffers of non-reserve assets. That means, reserve adequacy or optimal foreign reserve level should be used as a reference but not as an explicit goal for central banks around the world.

What should be China's optimal foreign reserve level?

We construct our own framework on gauging China's optimal level of foreign reserve based on the theoretical measures provided by Bank for International Settlements stated above and link it to China's macroeconomic data.

First, regarding the payment demand of foreign reserves, there are several metrics which could help to evaluate China's optimal level of foreign reserves:

- (i) Traditional "rules of thumb" method that has been used to guide foreign reserve adequacy assessment suggests that countries should hold reserves covering the equivalent of 3 months' worth of imports. In 2021, this figure amounts to USD 772.9 billion.
- (ii) The traditional method also suggests foreign reserve should cover 100% short-term foreign debt. In the theoretical literature, it indicates this rule can be extended to consider the full potential 12-month financing need, measured by short-term external debt minus the current account. For China, the recent short-term foreign debt stock in 2021 is USD 1,446.2 billion.
- (iii) Foreign reserve should also cover the profits of FDI to be remitted to foreign countries. We assume that the growth rate of profits of FDI to foreign countries is equivalent to the annual growth of total utilized FDI. At the same time, we assume that all of these FDI profits would be remitted back to foreign countries in our estimation of optimal foreign reserve. Thus, we could calculate the 2021 FDI profits to be remitted to

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foreign countries was around USD 102.2 billion, based on IFS Balance of Payments Statistics database and the estimation method of Ba (2013).

- (iv) The optimal foreign reserve should also cover individual and household demand for foreign currency exchange for paying for outbound tourism and education etc. In 2021, due to the Covid-19 pandemic, this figure only stands around USD 94.4 billion based on China's 2021 annual Balance of Payments data. Apparently, this type of household demand was suppressed by the Covid-19 pandemic. However, under a scenario of financial turmoil, the authorities must put more restrictions on foreign currency exchange of the household sector, slowing the pace of foreign reserve depletion. Therefore, we think it appropriate to use the 2021 figure for estimation. It certainly implies the authorities' restrictions under the risk scenario.
- (v) Foreign reserves should cover the total amount of ODI. The most recent ODI figure is USD 34.3 billion in 2021.

In addition to the above items, we also need to take into account the precautionary demand of accumulating foreign reserves in order to dampen exchange rate volatility during financial turmoil. Based on the international experience, adequate foreign reserves not only function to safeguard the stability of the exchange rate but also cushion capital outflows and ensure the financial stability (Aizenman and Marion, 2003; Stiglitz, 2006).

- (vi) The precautionary demand of foreign reserves are directly associated with the authorities' FX market interventions during the financial crisis, as evidenced by the Russian central bank's recent move to stall Ruble's sharp depreciation recently, or the Hong Kong Monetary Authority (HKMA)'s move to defend the linked exchange rate regime of the Hong Kong Dollar back to 1998 during the Asian Financial Crisis. China experienced a quite similar episode in the aftermath of its currency devaluation in August 2015. At that time, the unexpected RMB devaluation has led to market panic and massive capital exodus. The authorities had to intervene into the FX market to slow the pace of currency depreciation. As a result, China's foreign reserves declined from USD 3,725.5 billion at end-July to USD 3,406.1 billion at end-December. The decline of such a magnitude (USD 319.3 billion) can be used by us to proxy the precautionary demand of foreign reserves.

Based on the above metrics, by adding them together, we could get the conclusion that China's optimal foreign reserve level as of end-2021 is around USD 2,769.3 billion, which is around USD 454.5 billion lower than the actual foreign reserve level at USD 3,223.8 billion in August 2022.

Diversifying foreign reserves asset allocation is a must

Our estimation in the previous section shows that the optimal level of China's foreign reserves doesn't deviate from the current level much, USD 454.5 billion or 14.1%. Given the currently volatile environment, it might be necessary keep certain margin for the safety reason. That being said, the room for proactively lowering foreign reserves is not very large.

However, another important direction for China to optimize its foreign reserve holdings is to diversify their asset allocation, in particular, to reduce the share of US bond holdings and accordingly to shift the allocation towards non-USD denominated financial securities.

Chinese authorities are fully aware of the risk as China's foreign reserves largely depend on USD denominated assets and have already gradually tried to reduce the exposure on USD. In particular, the USD-denominated assets' share to China's total foreign reserve has declined significantly from 79% in 1995 (compared with global

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average of 59% in 1995), to lower than 60% in 2014-2016 (compared with 65% global average during this period). More importantly, based on the recent data in the US Treasury International Capital (TIC) released by the US Department of the Treasury, till end-June 2022, the holding of US bonds by China's foreign reserves has been decelerating for 7 consecutive months, to USD 967.8 billion, the lowest amount for the past 12 years. That means, the US bond only counts for around 26.9% of China's total foreign reserves.

However, it is noteworthy that to diversify China's foreign reserve allocation highly depends on global monetary system and the progress of RMB internationalization. In the past decades, USD is the dominant currency in the global monetary system, thus naturally has become the largest share of foreign reserve not only in China but also countries around the world. (USD accounts for 58% of global foreign reserves) However, together with the foreign reserve currency diversification among most economies in the world amid the trend of global monetary system de-dollarization, we foresee a more diversified foreign reserve composition in China going forward.

Conclusion

In this note, we review some previous studies of optimal foreign reserve theory based on the extant literature and then construct our own framework to estimate China's optimal level of foreign reserves. We estimate that China's optimal foreign reserve level is around USD 2,769.3 billion, which is around USD 454.5 billion lower than the current level of USD 3,223.8 billion. That means, there is still some buffer to reduce the foreign reserve accumulation in the face of rising risks associated with western countries' potential sanctions.

The other important direction is to diversify the foreign reserve asset allocation, in particular, to reduce the US bond purchase and to diversify the currency composition. China has already reduce its US bond holding to around 26.9% of China's total foreign reserves. In future, it is set to shift the currency composition of foreign reserves further to Euro and other global currencies.

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