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Cost of foreign reserve accumulation in emerging market and developing economies

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Abstract

Purpose – This paper aims to obtain a recent estimate of the cost of precautionary foreign reserve accumulation that emerging market and developing economies (EMDEs) had to endure to protect themselves against the risks of financial globalization. In addition, the study estimates the cost of excess reserves in emerging market economies (EMEs) using various reserve adequacy indicators that reflect potential sources of foreign exchange drains and vulnerability in EMEs' balance of payments.

Design/methodology/approach – This paper begins by explaining the accumulation of foreign reserves in EMDEs as a self-protection strategy against the risks of financial globalization. Next, it sheds light on the different types of economic costs of foreign reserve accumulation. Finally, it estimates the cost of foreign reserve accumulation in EMEs during the period (1990–2018) and in EMDEs during the period (1990–2015) due to data availability.

Findings – Results indicate that the cost of accumulating foreign reserves as a self-protection strategy in EMDEs and EMEs' was huge compared to their development financing needs. Applying various reserve adequacy measures demonstrates that many of the EMEs were holding inadequate precautionary reserves in 2018. Actually, this reflects the significant increase in external short term debt that many of the EMEs have witnessed since the eruption of the global financial crisis (2008). Thus increasing reserves in EMEs with weak reserve buffers and higher external debt is critical as they are more vulnerable to external shocks and capital flow reversals. Also given the estimated huge costs of accumulating foreign reserves, EMDEs should accompany it by other complementary self-protection policies and liquidity management policies to free up resources for productive investment.

Originality/value – The study contributes to the literature by estimating the cost of precautionary foreign reserve accumulation imposed on EMDEs during an extended period of time that covers a decade after the onset of the global financial crisis. Also to the authors' knowledge, this is the first study that estimates the cost of excess reserves in EMEs using various reserve adequacy indicators including the International Monetary Fund (IMF) assessing reserve adequacy (ARA) approach.

Keywords Foreign reserve accumulation, Risks of financial globalization, Self-protection strategy, Cost of precautionary reserves, Emerging market economies

Paper type Research paper

1. Introduction

Over the past two decades, financial globalization has been accompanied by frequent and painful financial crises. During such crises, including the global financial crisis, countries with larger foreign reserves were more successful in averting panic in financial markets, preventing sudden reversals in capital flows and mitigating the negative effects of financial crises (Fischer, 2001; Blanchard *et al.*, 2010; Rose and Spiegel, 2010; Llaudes *et al.*, 2010; Bussière *et al.*, 2015). Thus, foreign reserve accumulation was a popular self-protection strategy adopted by many emerging market and developing economies (EMDEs). Most

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EMDEs, especially after the East Asian crisis (1997), considered foreign reserves as a precautionary cushion against the risks of financial globalization.

However, the accumulation of foreign reserves in EMDEs involves considerable costs. Therefore, it is important that a decade after the onset of the global financial crisis to have an estimate of the cost of precautionary foreign reserves which EMDEs had to endure to self-protect themselves. Having a recent estimate of this cost can help policymakers in EMDEs to decide if they should continue accumulating more reserves or whether they should begin to adopt other complementary self-protection policies to free up resources for productive investment.

The purpose of this paper is twofold: (1) to provide insights into the relation between the risks of financial globalization and precautionary reserve accumulation in EMDEs and (2) to reach a recent estimate of the cost of precautionary reserves which financial globalization risks' imposed on EMDEs. We estimate this cost by following the methodology applied by Rodrik (2000) and Rodrik (2006) which uses the import coverage reserve adequacy indicator. In addition, we estimate the cost of excess reserves in emerging market economies (EMEs) using various reserve adequacy indicators that reflect potential sources of foreign exchange drains and vulnerability in EMEs' balance of payments. We estimate these costs during the period (1990–2015) for EMDEs and during the period (1990–2018) for EMEs, thus covering almost a decade after the global financial crisis.

It should be noted that literature defines different motives of reserve accumulation in EMDEs which include mainly: 1 – the precautionary motive (accumulating reserves to self-insure against risks of financial globalization), 2 – the mercantilist motive (accumulating reserves as a result of promoting export competitiveness through preventing or slowing currency appreciation), 3 — motives related to monetary and exchange rate policy (accumulating reserves to maintain price stability by lowering exchange rate volatility and accumulation as a result of applying a "Leaning against the wind (LAW)" policy. According to the LAW policy, reserves are accumulated to limit appreciation and to be sold in case of capital inflow sudden stops) (Arslan and Cantú, 2019).

But it is actually hard to draw a strict dividing line between the precautionary motive and other non-precautionary motives. As even the mercantilist motive can be arguably linked to the precautionary motive if it was assumed that having a positive stable current account contributes to averting the eruption of financial and economic crises (Rosero, 2015). In addition, although some studies argued that the mercantilist motive played an important role in EMEs' reserve accumulation acceleration since the 2000s (Ghosh *et al.*, 2012; Delatte and Fouquau, 2012; Durdu *et al.*, 2009). The empirical studies which tested the relative importance of the precautionary and mercantilist motives showed that the mercantilist motive played a very limited role in the accumulation of foreign reserves in EMDEs. According to these studies' results, foreign reserve accumulation in EMDEs was mainly explained by the precautionary motive and was significantly correlated with the level of financial integration (Aizenman and Lee, 2007; Delatte and Fouquau, 2012; Ghosh *et al.*, 2012, 2014). Therefore, the paper focuses on the precautionary motive of accumulating reserves, while other non-precautionary motives (such as the mercantilist motive which is related to the exchange rate policy) lie beyond the scope of the paper.

This paper is organized as follows: Section 2 analyzes the accumulation of precautionary reserves in EMDEs as a self-protection strategy necessitated by the risks of financial globalization and capital account liberalization in particular. In Section 3, we examine the different costs of accumulated foreign reserves. Section 4 indicates the methodology, data and results of calculating the cost of reserves in EMDEs and EMEs. Finally, the main findings of this paper are reported in Section 5.

2. Reserve accumulation as a self-protection strategy against financial globalization risks

By the end of the 1990s, most of the countries of the world realized the downside risks of financial globalization due to a number of reasons. *First*, financial globalization has been

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accompanied by frequent and painful financial crises (in terms of output, social and even political instability costs) [1]. Some of the most painful financial crises include Mexico (1995), East Asia (1997), Russia (1998), Turkey (1994) and (2001), Brazil (1999), Argentina (2002), and the global financial crisis (2008). Moreover, these crises occurred with an absence of an international lender of last resort (ILLR) and a lack of international regulatory structures and safeguards. Therefore, the recurrence of financial crises in recent years questioned the benefits of financial globalization and raised concerns about its risks [2].

Second, financial crises, especially the ones which hit EMDEs [3], cannot be avoided by just having sound macroeconomic fundamentals. As these crises can occur due to distortions which the international financial markets suffer from or as a result of what is called "Contagion Effect" (Rodrik, 2006; Aizenman *et al.*, 2007). In this context, we should also refer to Hyman Minsky's theory of "Financial Instability Hypothesis" (Minsky, 1986, 1992) which was largely ignored by mainstream economists but the occurrence of the global financial crisis in 2008 shed light on it.

Minsky's theory suggests that the financial system and financial capitalism are inherently unstable. According to his hypothesis, instability and business cycles in a capitalist economy do not depend upon exogenous shocks but are a result of the internal dynamics of the capitalist economies. He argued that instability and fragility basically stem from the unstoppable process of innovation of new financial products, practices and institutions. The huge amount of financial innovations makes it difficult, if not impossible, to monitor or control the financial system. Thus financial crises are an expected outcome of the forces at work in the modern capitalist economy as financial institutions grow in a way that increases the degree of instability. Accordingly, Minsky finally concluded that having a capitalist economy which depends on a completely free market is economically and politically impossible as this economy will be more prone to frequent financial crises and economic recessions (Minsky, 1986, 1992).

Third, the macroeconomic environment of free capital flows may suffer from what is called "Impossible Trinity or Trilemma"; as it is impossible to have free movement of capital, exchange rate stability and monetary autonomy (Mundell, 1963). In such an environment, free movement of capital, particularly, short-term foreign portfolio investment, may increase the tendency to trigger financial crises (Abdel-Khalek, 2004). It should also be noted that financial stability was added to the Trilemma policy goals as one of the unintended consequences of financial globalization is the growing exposure of EMDEs to sudden stops, capital flights and costly financial crises. This turned the Trilemma framework into a policy Quadrilemma (Aizenman, 2011).

Therefore, given EMDEs' limited and conditional access to capital markets and institutional swap lines available to advanced countries, they accumulated unprecedented stocks of foreign reserves to self-protect [4] themselves. In fact, the East Asian financial crisis was a turning point in the pattern of reserve accumulation in EMDEs (especially the Asian countries), as they concluded in the aftermath of the crisis that: (1) they cannot rely on the International Monetary Fund (IMF) or reforms in the "International Financial Architecture" to protect themselves against the different risks of financial globalization. EMDEs realized that getting loans from the IMF is not guaranteed, and even if they succeed in getting them they are associated with strict conditionality which in some cases resulted in high economic, social and political costs; (2) it is not enough to rely on sound macroeconomic policies since even well-managed countries can be hit by contagion from elsewhere (Rodrik, 2006; Aizenman *et al.*, 2007; Feldstein, 1999).

In addition, the IMF itself emphasized the importance of reserves as a means of crisis prevention and proposed new measures to evaluate their adequacy. As after the Asian financial crisis, it was realized that high mobility of capital is becoming increasingly important in evaluating the adequacy of reserves (Fischer, 2001).

Thus despite the greater exchange rate flexibility, which was thought to reduce the need for reserves, the stock of reserves has increased in most EMDEs. The accumulation of reserves has accelerated dramatically after the financial crises which many Asian and Latin American countries have witnessed in the late 1990s and the beginning of the 2000s.

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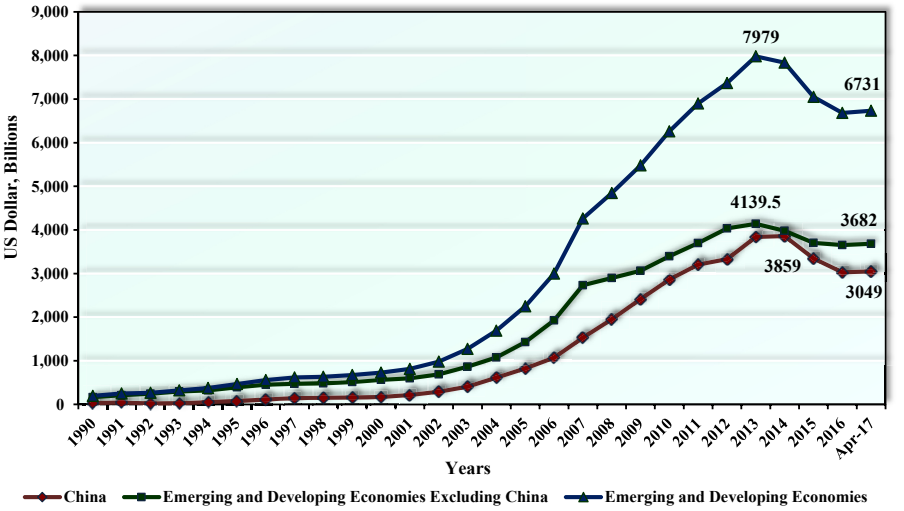
As EMDEs accumulated unprecedented stock of foreign reserves (excluding gold), that reached US $ 4.8tn in 2008 as shown in Figure 1. This stock of reserves represented 24.5% of EMDEs' gross domestic product (GDP) in 2008. Also for most EMEs, reserve coverage has risen to high levels relative to traditional norms, reaching almost 10 months of imports and 475% of short-term external debt in 2008 (IMF, 2010).

However, the growth of reserve accumulation in EMDEs slowed significantly in 2008–2009 due to the eruption of the global financial crisis (2008) as shown in Figure 1. In fact, this crisis first hit the advanced economies (AEs) by the end of 2007 then it became global by mid-2008 and thus was transmitted to EMDEs through trade and financial channels. Therefore, most export-oriented countries and those with high levels of debt were negatively affected by the crisis and have accordingly witnessed sharp declines in their GDP. In order to face the crisis, EMDEs had to either allow their currencies to depreciate or/and to draw down their foreign reserves which they continued to accumulate all through the first half of 2008 up till the point at which their GDP began to decline (Dominguez, 2012). But EMEs that endured large reserve losses during the second half of 2008 succeeded to restore most of their losses by the first quarter of 2009 "reserves bounce back". In addition, although some EMEs have witnessed large reserve depletion, many of the EMEs who owned large stocks of reserves choose not to deplete them and preferred to allow their currencies to depreciate. According to Aizenman and Sun (2009), the decision of these countries not to deplete reserves was constrained by their "fear of losing reserves rather than their fear of floating".

Then, the pace of reserve accumulation recovered after being affected by the global financial crisis (2008) in part reflecting the recovery of GDP in addition to trade and financial flows. Also, many of the EMDEs, which used its reserves during the crisis, accumulated more reserves to restore their pre-crisis reserve levels or even to increase it (such as South Korea, Mexico, India and Brazil). In fact, after the crisis, more countries were convinced that accumulating more reserves increases their flexibility in face of adverse external shocks and effectively mitigates the negative impacts of financial crises. EMEs with larger pre-crisis reserve levels had stronger and faster GDP growth recovery and were more resilient to the crisis than AEs (Dominguez, 2012; Didier *et al.*, 2011). Therefore, EMDEs' total foreign reserves excluding gold increased to



Note(s): IMF, International Financial Statistics (IFS)

Figure 1.
Total reserves (excluding gold) in emerging market and developing economies (EMDEs) and China (1990–April 2017), US dollar billions

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reach US $7.98tn in 2013, but it then declined to US $6.73tn in April 2017 mainly due to the recent decline in China's foreign reserves [5] as shown in Figure 1.

To sum up, EMDEs accumulated foreign reserves after the East Asian crisis (1997) to hedge against the increasing financial instability which resulted from their growing financial integration with the global financial system as shown in Figures 2 and 3 (Chinn and Ito, 2006; Lane and Milesi-Ferretti, 2006). Since foreign reserves are considered as a precautionary cushion against the risks of financial openness (sudden stops/flights of capital flows and contagious financial crises) through its effective role in both crisis prevention and crisis management/mitigation (Aizenman and Lee, 2007; Obstfeld *et al.*, 2010). Therefore, foreign reserve accumulation has increased in recent years although it has been stressed that it is a relatively costly self-protection strategy (Rodrik, 2006; Stiglitz, 2006; Cho, 2014).

3. Costs of foreign reserve accumulation

Like most economic policy measures, foreign reserve accumulation has its costs which come from many different sources that are difficult to quantify. Therefore, calculating the precise cost of excess reserves is a challenging exercise that faced many empirical difficulties. One of these difficulties is the lack of consensus regarding the optimum level of reserves; as most reserve adequacy rules are designed to rely on rules of thumb rather than precise criteria.

We can mainly identify three types of economic costs of foreign reserve accumulation: (1) *The quasi-fiscal cost of reserves*, in the form of the cost of sterilization and foreign exchange-related losses borne by the central bank; (2) *The opportunity cost of forgone consumption or investment* for the whole economy; and (3) *The cost of holding reserves based on the (Guidotti–Greenspan) rule*, which measures the difference between the cost of short-term external borrowing and the returns generated by reserve assets.

3.1 The quasi-fiscal cost of reserves

As a cost showing up in the balance sheet of the central bank, the *quasi-fiscal cost* [6] of reserves is incurred when the monetary authorities engage in open market operations to

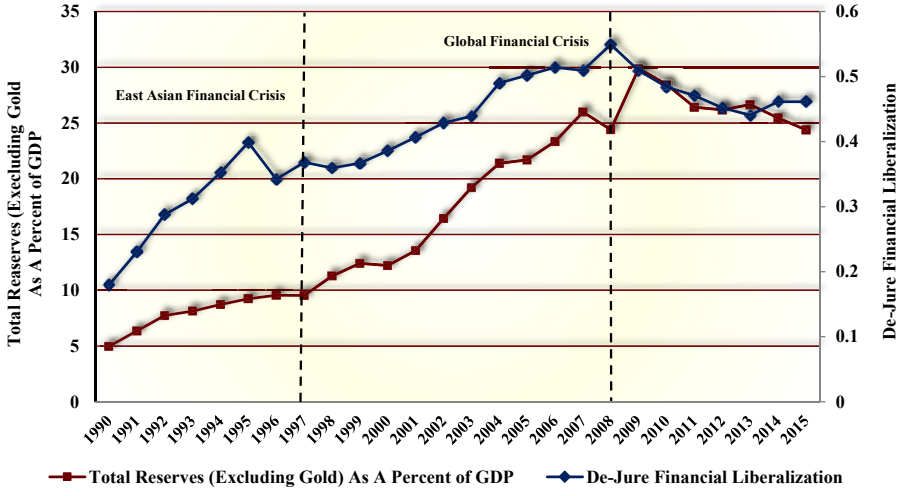

Figure 2.
Development of total reserves (excluding gold) as a percent of GDP and level of de-jure financial liberalization in emerging market economies (1990–2015)

Note(s): *De-Jure Financial Liberalization:* Chinn and Ito (2006)
Total Reserves (Excluding Gold) and GDP: IMF, International Financial Statistics (IFS)

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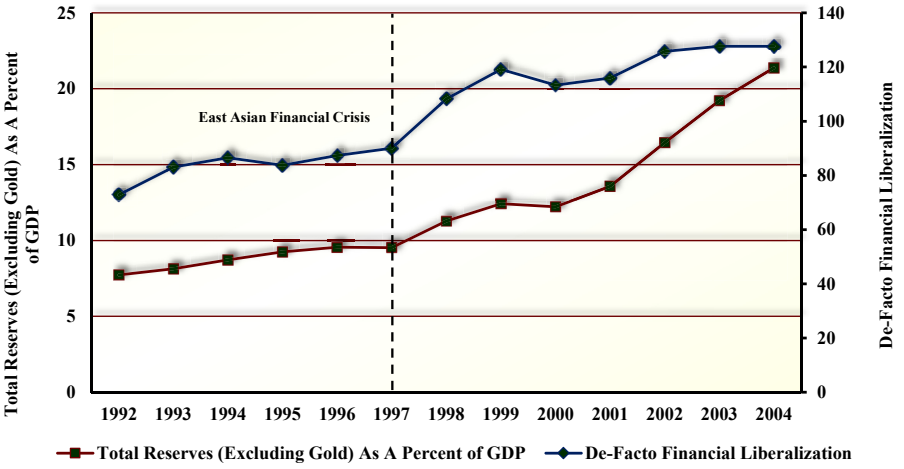

Note(s): *De-Facto Financial Liberalization:* Lane and Milesi-Ferretti (2006)
Total Reserves (Excluding Gold) and GDP: IMF, International Financial Statistics (IFS)
Source(s): Authors' calculations

Figure 3.
Development of total reserves (excluding gold) as a ratio of GDP and level of de-facto financial liberalization in emerging market economies (1992–2004)

sterilize the expansionary impact of reserve accumulation on the money supply (Cho, 2014). In general, sterilization operations can be defined as any set of policies designed to mitigate the impact of reserve accumulation on domestic inflation and interest rates. Authorities frequently resort to sterilization operations to deal with the undesirable effects on domestic monetary conditions that may result from sustained unsterilized intervention. These undesirable side effects mainly include rising inflationary pressures, conflict between exchange rate and domestic monetary policy objectives, asset-price bubbles and growing foreign exchange exposure of the public sector (Lavigne, 2008).

Sterilization process involves, in particular, central bank purchase of relatively low-yield foreign assets while issuing or selling relatively high-yield domestic assets (by selling domestic government securities out of their portfolio). This results in absorbing the addition to the domestic money supply injected into the economy by the purchases of foreign exchange, leaving the monetary base unchanged and effectively neutralizing its impact on domestic interest rates and inflation (Higgins and Klitgaard, 2004). In most EMDEs, the primary purchasers of the government bonds sold in open market operations are the residents. Therefore, any cost borne by the central bank is equivalent to a transfer of income from the public to the private sector (Rodrik, 2006).

Sterilization intervention results mainly in two kinds of costs; first, the *direct fiscal cost* to the monetary authorities, which represents the difference between what the central bank earns on international reserves and what it pays on the domestic debt issued to sterilize the reserves. Second, the *indirect systemic cost* of preventing current account adjustment; as prolonged and one-sided sterilized intervention can delay real exchange rate adjustment. The *direct cost* is the one being the most commonly considered as although exchange rate-related losses can and have been large, they are not realized until the underlying reserve assets are sold. Albeit, poor data on the full extent and composition of sterilization makes it difficult to measure the quasi-fiscal costs of sterilization, evidence indicates that sterilization rates have increased in Asia during the recent period of persistent accumulation of foreign exchange reserves (Mohanty and Turner, 2005, 2006; Green and Torgerson, 2007; Bleaney and Devadas, 2017).

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Actually, estimates indicate that the cost of sterilizing a reserve accumulation of 10% of GDP can range from zero to 1% of GDP, depending on the interest spread and the expected exchange rate depreciation (Edison, 2003). But whereas the quasi-fiscal cost has been large in some EMDEs, to the extent that it generated concerns and debates about the excessive reserve accumulation, it is not the most relevant measure of cost from a Macro national perspective (Rodrik, 2006; Wijnholds and Søndergaard, 2007).

3.2 The opportunity cost of forgone consumption or investment

From a macro perspective, the most relevant cost is *the opportunity cost of holding reserves*, the broadest of which is forgone consumption or investment [7] borne by the whole economy. The opportunity cost of holding reserves stems from the fact that the monetary authorities could invest in higher return assets instead of safe and liquid investments and this is what a number of central banks have started to do. Evaluation of the opportunity cost would involve comparing the returns on reserves with the returns from investing national savings into domestic projects, public or private (Wyplosz, 2007).

In fact, the financial resources used to purchase reserve assets are a potential source for increasing economic growth in EMDEs. In addition to investing in higher returns projects, these resources can be either spent on consumption of urgent needs faced by these countries or invested in infrastructure projects and domestic development projects (Cruz and Walters, 2008; Green and Torgerson, 2007). It is also argued that the use of these resources in investments and stimulating economic activity will increase aggregate demand and this will eventually increase world economic activity and trade. This actually indicates that accumulating large amounts of foreign reserves has a substantial opportunity cost (Dominguez, 2009). In addition, most high-reserve countries have lower capital-to-labor ratios than the industrial countries in whose bond reserves are held. Thus, the returns from a public investment may be significantly higher than the current earnings on reserves as long as they are allocated efficiently.

It should be noted that various methods of approximating these forgone returns have been applied. Some methods used market interest rates while others derived the return from an assumed national production function (Green and Torgerson, 2007). However, calculating the opportunity cost of holding reserves is difficult to implement empirically with any degree of precision (Hauner, 2006).

3.3 The cost of holding reserves based on the (Guidotti–Greenspan) rule

This method is considered a narrower way to estimate the financial cost of reserves and it is based on the (Guidotti–Greenspan) rule of thumb. According to the (Guidotti–Greenspan) rule [8], countries would match every dollar of short-term external liabilities with a dollar in reserves. The narrowest opportunity cost of each dollar a country accumulates to abide by the (Guidotti-Greenspan) rule is equal to the spread between the privately incurred costs of short-term borrowing on the one hand, and the yields on publicly held reserve assets on the other. This method provides a conceptually clearer and more logically grounded measure than the quasi-fiscal cost of reserves. It is also less slippery than the broad opportunity cost of reserves measured as forgone consumption or investment and it can be calculated with fewer empirical difficulties. So, calculating the financial cost of holding reserves using the (Guidotti–Greenspan) rule offers the best proxy of their cost.

But most short-term private foreign borrowing takes the form of commercial bank lending at rates which are not publicly available and there is no reliable systematic way to obtain its cost. While sovereign spreads can be derived from benchmark indices of sovereign bonds issued by major emerging markets such as the Emerging Markets Bond Index (EMBI) [9]. Therefore, most existing studies rely on sovereign spreads as a proxy for the private sector's cost of external borrowing (Rodrik, 2006).

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Nevertheless, it is sometimes argued that estimating the cost of reserves based on sovereign spreads such as the EMBI significantly underestimates the true cost and that the estimated cost should be considered as the minimum cost of holding reserves in EMDEs. This can be explained by a number of reasons: *First*, the cost of government bonds is much lower than that of the private banks and firms' liabilities as its risk premium is much lower. *Second*, the EMBI covers only a limited number of EMEs. All the countries included in the index are considered more creditworthy and, therefore, face significantly lower costs of borrowing compared to the cost facing the remaining EMDEs excluded from the index. *Third*, short-term external liabilities are not the only source of capital drain as foreign portfolio investments should be taken into consideration in the (Guidotti–Greenspan) rule when determining the adequate reserve level due to its high volatility and propensity to flight. Therefore, returns on foreign portfolio investments which are typically much higher than returns on government bonds should be used when calculating the cost of reserves (Cho, 2014).

This method was applied by a limited number of studies (Rodrik, 2000, 2006; Bird and Rajan, 2003; Stiglitz, 2006; Gallagher and Shrestha, 2012; Mezui *et al.*, 2013; Cho, 2014). These studies concluded that the accumulation of reserves is a relatively costly self-protection strategy.

4. Calculating the cost of precautionary reserve accumulation

4.1 Methodology

To estimate the cost of precautionary reserves accumulated in EMDEs based on the (Guidotti–Greenspan) rule of thumb, we follow the approach applied by Rodrik (2000) and Rodrik (2006). This approach allows us to get an estimate of the cost which was imposed on EMDE by financial globalization and its risks. According to this approach, an adequate reserve level is determined using the three-months of imports rule of thumb [10]. As prior to the growing financial globalization and the recent escalation of financial crises, foreign exchange reserves were mainly used for managing the current account which was the only source of vulnerability in the balance-of-payments. Consequently, countries had to have enough foreign reserves to meet unexpected external disturbances which can cause a sudden stop in essential imports (Fischer, 2001; Wyplosz, 2007; Aizenman and Pinto, 2013). Using the imports rule allows us to distinguish the cost of current account-related reserve accumulation from the cost of precautionary capital account-related reserve accumulation. In other words, the cost of reserves in excess of three months of imports is the cost of additional reserve accumulation required by capital account liberalization and the risks of financial globalization, which has been borne almost exclusively by EMDEs. In addition, based on this approach, the EMBI is used as a proxy for estimating the private sector's cost of external borrowing.

Based on the above-mentioned methodology, we calculated the cost of precautionary reserves accumulated in EMEs during the period (1990–2018) and EMDEs during the period (1990–2015) due to data availability. The cost is estimated as follows: *First*, all reserves beyond three months' worth of imports are considered to be "Excess Reserves." *Second*, the average EMBI spreads witnessed lots of ups and downs during the period of study (1990–2018) as shown in Table 1. Therefore, the paper sides with caution and uses three spreads (3%, 5% and 7%) to calculate the cost of precautionary reserves.

In addition to the above-mentioned methodology, we recalculated the cost of excess reserves in *EMEs only* during the period (1990–2018) by applying three different reserve adequacy indicators other than the traditional import cover because (1) EMEs had the largest contribution in foreign reserve growth since the eruption of the East Asian crisis, (2) the capital account is the main source of balance of payments shocks in EMEs and (3) using these different reserve adequacy rules can indicate whether EMEs had adequate precautionary reserves and hence can guide EMEs policymakers' decisions on future reserve levels.

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To calculate adequate reserves in EMEs, we used the three following measures: (1)100% of short-term debt (STD) + three months of imports, (2) 100% of STD + three months of imports + 5% of Broad money (M2) and (3) IMF assessing reserve adequacy (ARA) approach (IMF, 2014). According to this approach, the ARA metric for countries with the fixed exchange rate is 10% Exports +10% M2 + 30% STD + 20% other liabilities. While the ARA metric for countries with the flexible exchange rate is 5% Exports +5% M2 + 30% STD + 15% other liabilities. We also used a 5% EMBI spread to calculate the cost of excess reserves as it is the closest value to the average of EMBI spreads during the period (1990–2018).

Using these indicators of reserve adequacy allows us to get an estimate of the opportunity cost of excess reserves taking into account potential sources of foreign exchange drains and vulnerability in EMEs' balance of payments. These indicators consider potential shocks and vulnerability in capital account as STD reflects external drain that could result from capital outflow/stop by foreigners and M2 reflects internal drain that could result from capital outflow by residents. While the traditional import cover rule reflects the vulnerability in the current account.

4.2 Data sources and key variables

Our primary source of annual foreign reserves (excluding gold), short-term external debt, Broad money (M2) and the GDP at current prices is the International Financial Statistics database. The data on the imports of goods and services are retrieved from the World Development Indicators.

4.3 Database countries

Our database of *EMDEs* (according to the IMF classification) covers 120 countries. While our database of *EMEs* covers 26 countries, 24 countries classified as EMEs by the IMF in addition to 2 other countries (Czech Republic, South Korea) as they are classified as EMEs by many other institutions (Morgan Stanley Capital International [MSCI], Standard and Poor's [S&P], Dow Jones and Russel) and are also included in the vast majority of emerging markets' indices. It should be noted that the data from the IMF (ARA) is not available for South Korea and Venezuela.

4.4 Estimation results and discussion

4.4.1 First: Cost of reserve accumulation as a self-protection strategy in EMDEs and EMEs (1990–2015). As shown in Figure 4, the amount of excess reserves in EMDEs has increased significantly during the period of study. The amount of excess reserves in EMDEs jumped from *0.95%* of these countries' GDP (*$48.69bn* in absolute terms) in *1990* to *17.87%* of GDP (*$5237.35bn*) in *2015*. While the amount of excess reserves in EMEs increased from *0.59%* of

Table 1. Average emerging markets bond index (EMBI) spreads during the period (1992–2018) (basis points)

Year	(January 1992–July 2001)	2002	2003	2004	2005	2006	2007	2008	2009	(2010–2018)	(2016–2018)
Average (EMBI) Spreads	700	844	558	469	309	171	255	825	306	414	443.69

Data: IMF, Global Financial Stability Report (GFSR) and World Bank, Global Economic Monitor (GEM)
Source(s): Average (EMBI) during the period (January 1992 – July 2001): Kamin (2004), Authors' calculations

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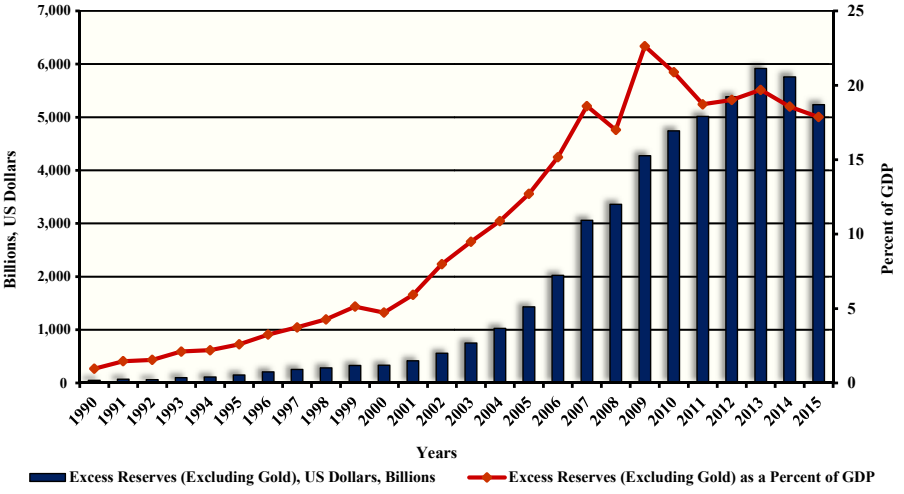

Note(s): IMF, International Financial Statistics (IFS) and World Bank, World Development Indicators

Source(s): Authors' calculations

Figure 4.
Excess reserves (excluding gold) in emerging market and developing economies in billions of US dollars and as a percent of GDP (1990–2015)

these countries' GDP (*$17.89bn*) in *1990* to *17.30%* of GDP (*$4421.52bn*) in *2015*. In 2015, EMEs held *84.42%* (or *30.11%* after excluding China) of the total amount of excess reserves in EMDEs while they only held *36.74%* in 1990.

As reported in Table 2 and as shown in Figure 5, the annual cost of precautionary reserve accumulation in EMDEs was large and increasing since the 2000s. While the annual costs of the precautionary foreign reserve accumulation in EMDEs in *1990* was only *0.03%* of the GDP of these countries (*$1.460bn*) at the *3%* spread, *0.05%* of GDP (*$2.434bn*) at the *5%* spread and *0.07%* of GDP (*$3.408bn*) at the *7%* spread. The estimated cost in *2015* increased to *0.54%* of EMDEs' GDP (*$157.121bn*) at the *3%* spread, *0.89%* of GDP (*$261.868bn*) at the *5%* spread and *1.25%* of GDP (*$366.615bn*) at the *7%* spread. While the annual cost of the precautionary foreign reserve accumulation in EMEs at the *3%* spread was *0.52%* of EMEs' GDP (*$132.972bn*), *0.86%* of GDP (*$221.620bn*) at the *5%* spread and *1.21%* of GDP (*$310.267bn*) at the *7%* spread in *2015*.

Actually, the estimated annual costs indicate the high cost which EMDEs had to suffer in order to protect themselves from the risks of financial globalization. The estimated annual cost at the 7% spread has increased from (*$3.408bn*) in *1990* to (*$366.615bn*) in *2015*, jumping from *0.07%* of GDP to *1.25%*. The estimated cost is huge by any standard. Even the lower-end cost estimate (*$157.121bn*) is far from being a negligible cost. It is worth noting also that the estimated cost exceeds the financing requirements of achieving the Millennium Development Goals (MDGs) in EMDEs as these countries needed around US$40–70bn a year from 2000 to 2015 to accomplish these goals (Devarajan *et al.*, 2002). In fact, the estimated excess reserves in EMDEs (*$5237.35bn*) and EMEs (*$4432.39bn*) in 2015 are enormous compared to these countries' financing development needs. Moreover, a portion of these excess reserves can narrow the "2030 sustainable Development Goals (SDGs)" financing gap in these countries (Hutton and Varughese, 2016).

These results indicate that the strategy of foreign reserve accumulation adopted by most EMDEs as a strategy of self-protection against the risks of financial globalization is rather costly. But on the other hand, the benefits of the accumulated foreign reserves in these

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Country	Total reserves excluding gold, US dollars, millions	Reserves in months of imports*	Excess reserves, US dollars, millions	Excess reserves (percent of GDP)	Annual cost of precautionary reserves (percent of GDP)		
					Assuming a 3% spread	Assuming a 5% spread	Assuming a 7% spread
Emerging and Developing Economies	7,049,43	11.67	5,237,36	17.87	0.54	0.89	1.25
Emerging Market Economies	5,937,05	11.75	4,421,52	17.30	0.52	0.86	1.21
China, P.R.: Mainland	3,345,19	20.05	2,844,62	25.34	0.76	1.27	1.77
Korea, Republic of	363,15	8.15	229,42	16.59	0.50	0.83	1.16
Brazil	354,18	17.48	293,40	16.29	0.49	0.81	1.14
India	334,31	8.16	211,34	10.11	0.30	0.51	0.71
Russia	319,84	13.63	249,39	18.26	0.55	0.91	1.28
Mexico	173,46	4.87	66,55	5.78	0.17	0.29	0.40
Thailand	151,27	7.90	93,83	23.50	0.71	1.18	1.65
Indonesia	103,27	7.47	61,77	7.17	0.22	0.36	0.50
Malaysia	93,98	6.01	47,06	15.88	0.48	0.79	1.11
Turkey	92,92	5.01	37,23	4.33	0.13	0.22	0.30
Poland	91,40	4.95	36,01	7.54	0.23	0.38	0.53
Peru	60,41	16.12	49,17	25.57	0.77	1.28	1.79
South Africa	41,62	4.99	16,59	5.22	0.16	0.26	0.37
Chile	38,63	6.46	20,69	8.53	0.26	0.43	0.60
Hungary	33,02	3.97	8,04	6.61	0.20	0.33	0.46
Nigeria	30,61	5.00	12,24	2.48	0.07	0.12	0.17
Argentina	23,42	3.75	4,66	0.74	0.02	0.04	0.05
Egypt	13,28	2.36	−3,60	−1.08	−0.03	−0.05	−0.08
Venezuela	6,32	1.49	−6,37	−2.62	−0.08	−0.13	−0.18

Table 2.
Annual cost of reserve accumulation as a self-protection strategy (percent of GDP) in some emerging market and developing economies in 2015

Note(s): The value of the imports of goods and services of all the Emerging and Developing Economies (according to the IMF classification) was calculated by the authors as it was not available in the World Bank data, IMF, International Financial Statistics (IFS) and World Bank, World Development Indicators
Source(s): Authors' calculations. **Data:** IMF, International Financial Statistics (IFS) and World Bank, World Development Indicators

countries in averting or at least mitigating the occurrence of financial crises and preserving economic and financial stability had been proven as was demonstrated recently during the global financial crisis (2008). Therefore, it is rational for EMDEs to self-protect their economies paying an annual cost in the range of (0.54–1.25%, according to our estimations) of their GDP since financial crises impose higher costs. The output loss from currency (banking) crises was estimated in a range of 5–8% (8–10%) over a two-four year period, while the cumulative output loss of both types of crises occurring at the same time was estimated to be around 13–18% (Hutchison and Noy, 2005). Also, capital flow reversals and sudden stops were estimated to cause on average a decrease in output by 4.5% in the year which witnessed the capital reversal and by almost 2.2% in the next year (Jeanne and Ranciere, 2011).

4.4.2 Second: Cost of holding foreign reserves in EMEs (1990–2018). The results of applying different reserve adequacy indicators reported in Table 3 demonstrates that the amount of excess reserves in EMEs in 2018 was much lower after taking into consideration

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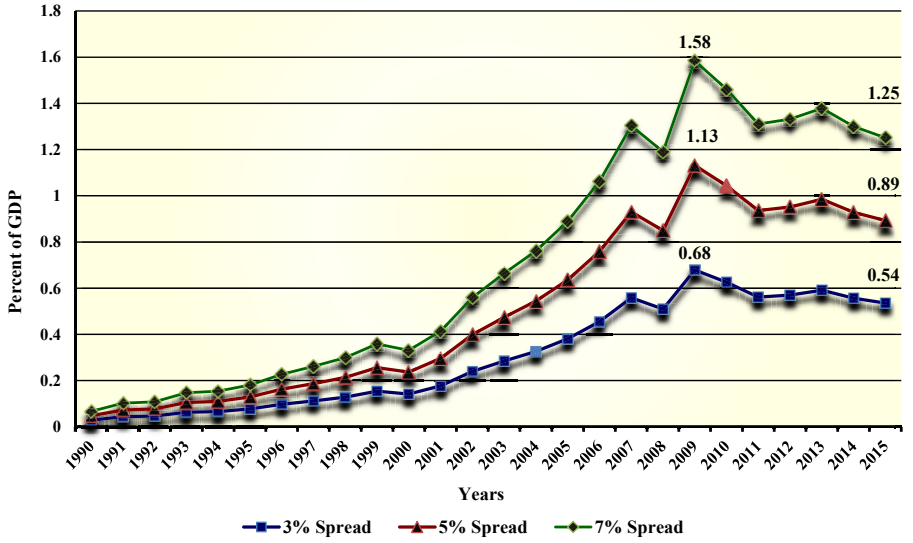

Note(s): IMF, International Financial Statistics (IFS) and World Bank, World Development Indicators

Source(s): Authors' calculations

Figure 5.
Annual cost of precautionary reserves in emerging market and developing economies as a percent of GDP (1990–2015)

the different sources of vulnerability in capital account. As shown in Figure 6, excess reserves in EMEs in 2018 using the three months of imports rule of thumb was (*16.37%*) of their GDP (*$4183.49bn in absolute terms*) while it became only (*6.93%*) (*$1771.62bn*), assuming adequate reserves to cover three months of imports and 100% of STD. Excess reserves in EMEs were even negative calculating adequate reserves using the rule (100% of (STD) + three months of imports + 5% of Broad money (M2)) as it was estimated to be (*−0.75%*) of their GDP (actually this showed a shortage in the amount of adequate reserves by *$192.78bn*). Finally, excess reserves were estimated to be (*4.51%*) of EMEs' GDP (*$1151.66bn*) applying the IMF (ARA) approach.

Accordingly, the annual cost of excess reserves declines the more sources of vulnerability are taken into consideration while calculating adequate reserves. So as reported in Table 4, the annual cost of precautionary reserves in EMEs in 2018 at the 5% spread was estimated to be (*0.82%*) of these countries' GDP using the three months of imports adequacy rule of thumb. Annual cost declines to (*0.35%*) when the (three months of imports + 100% (STD)) adequacy rule is applied. Finally, the annual cost was estimated to be *0.06%* of these countries GDP using the IMF (ARA) approach.

Using the rules of reserve adequacy which reflect the different sources of capital account vulnerability showed that many of the EMEs included in our sample have inadequate foreign reserves as demonstrated in Table 3. When adequate reserves are assumed to cover (three months of imports and 100% (STD)) many countries (such as Turkey, Argentina, Venezuela, Malaysia, South Africa, Poland, Romania, Chile, Hungary and Mexico) turned out to have inadequate reserves in 2018. Also, when the IMF (ARA) approach is used, some countries (such as Egypt, South Africa, Chile and Turkey) were not having adequate precautionary reserves in 2018.

Actually, this reflects the significant increase in external STD that many of the EMEs have witnessed since the eruption of the global financial crisis (2008) as shown in Figure 7.

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Country	Excess reserves (US dollars, billions) and (percent of GDP)							
	Three months of imports (M)		(M) + (STD)		(M) + (STD) + 5% of broad money (M2)		IMF assessing reserve adequacy (ARA) approach	
	US dollars, billions	% GDP	US dollars, billions	% GDP	US dollars, billions	% GDP	US dollars, billions	% GDP
Emerging Market Economies	4183.49	16.37	1771.62	6.93	−192.78	−0.75	328.20	1.28
China, P.R.: Mainland	2454.86	18.04	1235.96	9.08	−90.55	−0.67	−451.67	−3.32
Brazil	307.518	16.31	240.67	12.76	161.55	8.57	148.63	7.88
Russia	295.759	17.84	247.46	14.93	202.41	12.21	222.79	13.44
Korea, Republic of	236.473	14.60	131.74	8.14	−38.54	−2.38	–	–
India	213.685	7.86	109.51	4.03	−1.53	−0.06	102.83	3.78
Thailand	128.382	25.42	68.08	13.48	36.96	7.32	101.78	20.15
Indonesia	62.763	6.02	14.80	1.42	−5.76	−0.55	12.75	1.22
Peru	46.04	20.73	36.04	16.23	31.45	14.16	34.41	15.50
Mexico	45.810	3.75	−15.29	−1.25	−37.86	−3.10	22.65	1.86
Malaysia	44.516	12.41	−74.87	−20.88	−96.77	−26.99	10.79	3.01
Argentina	42.280	8.13	−25.30	−4.87	−27.17	−5.23	5.50	1.06
Poland	35.317	6.03	−15.26	−2.61	−34.61	−5.91	12.42	2.12
Egypt	19.527	7.78	9.19	3.66	−0.46	−0.18	−10.55	−4.21
South Africa	19.251	5.23	−17.38	−4.72	−29.72	−8.07	−25.38	−6.89
Chile	18.586	6.23	−1.52	−0.51	−11.26	−3.78	−4.51	−1.51
Bulgaria	16.671	25.60	6.98	10.71	4.26	6.54	10.19	15.64
Turkey	10.965	1.42	−104.46	−13.54	−123.40	−16	−50.68	−6.57
Romania	10.699	4.47	−5.16	−2.16	−9.84	−4.11	8.73	3.65
Venezuela	−1.508	−0.79	−47.73	−24.94	−47.98	−25.07	–	–
Hungary	−1.73	−1.10	−23.38	−14.81	−27.94	−17.70	0.37	0.23

Table 3.
Excess reserves (US dollars, billions) and (percent of GDP) in some emerging market economies in 2018

Data: IMF, International Financial Statistics (IFS) World Bank, World Development Indicators and Assessing Reserve Adequacy (ARA) approach data is available online at: https://www.imf.org/external/datamapper/ARA/index.html

Source(s): Authors' calculations

External foreign currency debt levels have risen across many EMEs as a result of the easing financial conditions applied in AEs to support economic recovery after the crisis. This increase in external debt levels actually reflects the buildup of financial and external vulnerabilities in some EMEs during recent years and these vulnerabilities are expected to increase further as a result of the COVID-19 pandemic.

5. Conclusion and policy implications

We found that EMDEs and EMEs have been keeping huge amounts of excess reserves to self-protect their economies. The amount of excess reserves in EMDEs, using the three months rule of thumb, had been estimated to be ($*5237.35bn*) in EMDEs and ($*4432.39bn*) EMEs in 2015. Actually, a portion of the excess reserves in EMDEs could have been used to achieve some of the investment and development goals of these countries. Moreover, these excess reserves can narrow the "2030 SDGs" financing gap in these countries. Results also showed that the estimated annual cost of precautionary foreign reserves in EMDEs was 0.89% of EMDEs' GDP ($*261.8608bn*) at the 5% spread and 1.25% of GDP ($*366.615bn*) at the 7%

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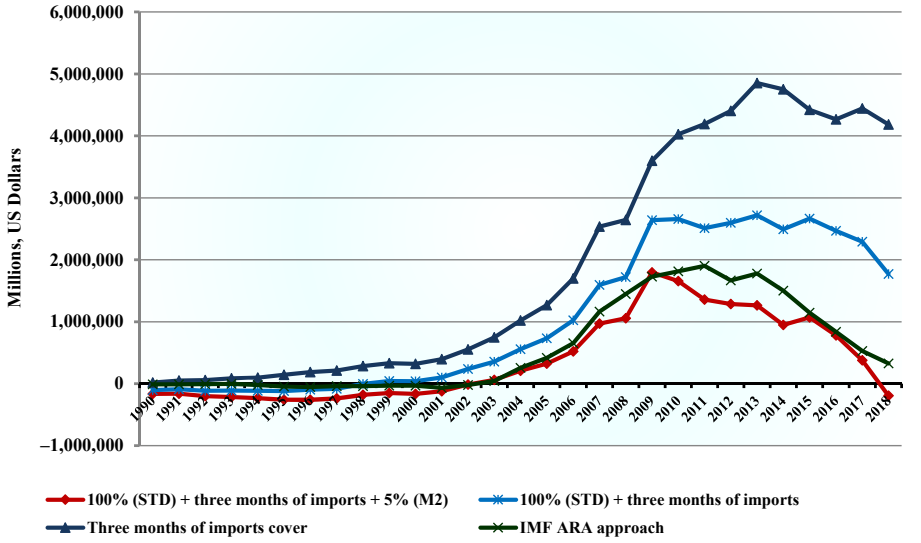

Figure 6.
Excess foreign reserves in EMEs using different indicators of reserve adequacy during the period (1990–2018)

Note(s): IMF, International Financial Statistics (IFS) World Bank, World Development Indicators and Assessing Reserve Adequacy (ARA) approach data is available online at: https://www.imf.org/external/datamapper/ARA/index.html
Source(s): Authors' calculations

spread in 2015. In fact, the estimated annual cost of EMDEs exceeded the financing requirements that were needed to enable these countries to achieve the (MDGs). While the annual cost of precautionary foreign reserves in EMEs' was estimated to be 0.86% of EMEs' GDP ($*221.620bn*) at the 5% spread and 1.21% of GDP ($*310.267bn*) at the 7% spread in 2015. The annual cost of EMEs decreased in 2018 to 0.82% of GDP ($*209.174bn*) at the 5% spread and 1.15% of GDP ($*292.844bn*) at the 7% spread.

In addition, using the rules of reserve adequacy which reflect the different sources of capital account vulnerability showed that many of the EMEs had inadequate foreign reserves in 2018. Actually, this reflects the significant increase in external STD that many of the EMEs had witnessed since the eruption of the global financial crisis (2008). The increase in external debt levels reflects the buildup of financial and external vulnerabilities in some EMEs and these vulnerabilities are expected to increase significantly as a result of the COVID-19 pandemic. Finally, the annual cost of holding reserves in EMEs in 2018 at the 5% spread was estimated to be *0.35%* of EMEs' GDP when the (three months of imports + 100% STD) adequacy rule is applied and only *0.06%* of EMEs' GDP using the IMF (ARA) approach.

We conclude that the strategy of foreign reserve accumulation adopted by most EMDEs as a strategy of self-protection against the risks of financial globalization is rather costly. But on the other hand, the benefits of the accumulated foreign reserves in these countries in averting or at least mitigating the occurrence of financial crises and preserving economic and financial stability had been proven as was demonstrated recently during the global financial crisis (2008). Therefore, it is rational for EMDEs to self-protect their economies paying an annual cost in the range of (0.54–1.25%, according to our estimations) of their GDP since financial crises impose higher costs.

Given the existing international financial architecture and its distortions, we can expect the occurrence of more financial crises in the future with the continued absence of an ILLR. Hence,

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Country	Annual cost of excess reserves (percent of GDP) assuming a 5% spread			
	Three months of imports (M)	(M) + (STD)	(M) + (STD) + 5% of broad money (M2)	IMF assessing reserve adequacy (ARA) approach
Emerging Market Economies	0.82	0.35	−0.04	0.06
China, P.R.: Mainland	0.90	0.45	−0.03	−0.17
Brazil	0.82	0.64	0.43	0.39
Russia	0.89	0.75	0.61	0.67
Korea, Republic of	0.73	0.41	−0.12	–
India	0.39	0.20	−0.003	0.19
Thailand	1.27	0.67	0.37	1.01
Indonesia	0.30	0.07	−0.03	0.06
Peru	1.04	0.81	0.71	0.77
Mexico	0.19	−0.06	−0.16	0.09
Malaysia	0.62	−1.04	−1.35	0.15
Argentina	0.41	−0.24	−0.26	0.05
Poland	0.30	−0.13	−0.30	0.11
Egypt	0.39	0.18	−0.01	−0.21
South Africa	0.26	−0.24	−0.40	−0.34
Chile	0.31	−0.03	−0.19	−0.08
Bulgaria	1.28	0.54	0.33	0.78
Turkey	0.07	−0.68	−0.80	−0.33
Romania	0.22	−0.11	−0.21	0.18
Venezuela	−0.04	−1.25	−1.25	–
Hungary	−0.05	−0.74	−0.88	0.01

Table 4.
The annual cost of holding reserves (percent of GDP) in some emerging market economies in 2018

Data: IMF, International Financial Statistics (IFS) World Bank, World Development Indicators and Assessing Reserve Adequacy (ARA) approach data is available online at: https://www.imf.org/external/datamapper/ARA/index.html
Source(s): Authors' calculations

EMDEs would have to continue self-protecting their economies against the risks of financial globalization by accumulating more foreign reserves. Furthermore, EMEs characterized by high external debt levels and relatively low reserve coverage levels are more vulnerable to external shocks and negative economic and political developments. Therefore, decreasing foreign external debt and having adequate foreign reserves in many EMEs become even more critical to increase their resilience to external shocks and potential foreign liquidity drains.

Simultaneously, EMDEs should accompany the reserve accumulation strategy with other less costly ways of self-protection and managing liquidity such as (1) using effective prudential capital controls to manage short-term foreign liabilities. Imposing these controls should be selective and interactive in a way that distinguishes short-term speculative flows from foreign direct investment flows. As many studies have shown that imposing capital control in addition to having adequate precautionary reserves can be less costly and allows countries to use these resources for more productive uses and thus increasing growth. Moreover, the IMF after the global financial crisis (2008) adopted a new policy that encourages the suitable use of capital controls to prevent and mitigate financial instability and vulnerability (Gallagher and Tian, 2017; Gallagher and Ocampo, 2013; Eichengreen and Gupta, 2016; IMF, 2012). In addition, many studies have found that EMEs which were imposing capital controls before the global financial crisis (2008) have suffered less from growth deterioration (Ostry *et al.*, 2011; Ocampo, 2009). (2) Managing the accumulated foreign reserves through the establishment of commodity stabilization funds, sovereign wealth funds (SWFs) and/or national development banks. In fact, many newly industrialized

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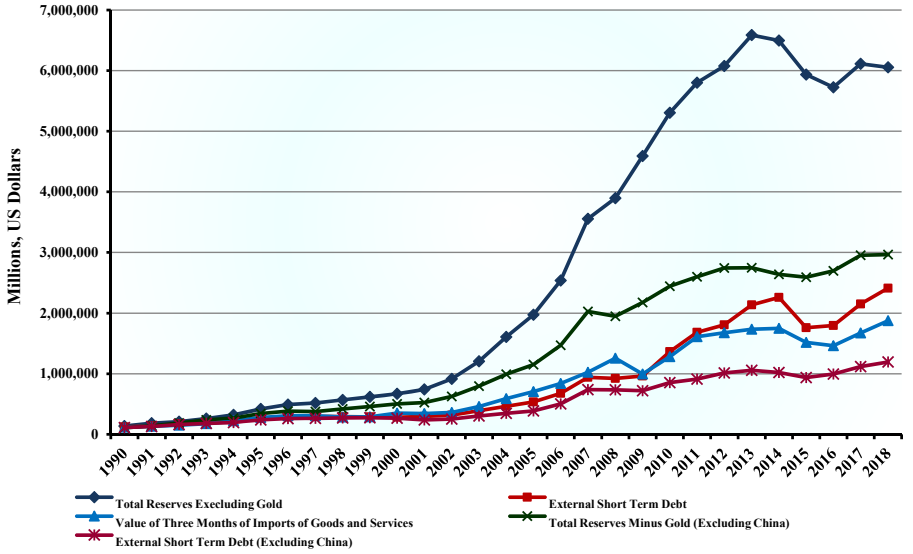

Note(s): IMF, International Financial Statistics (IFS) and World Bank, World Development Indicators

Figure 7. Development of total reserves, external short term debt and imports of goods and services in emerging market economies (1990–2018)

countries (such as Korea and Singapore), oil exporting countries (such as the United Arab Emirates and Kuwait) and countries characterized by large stocks of foreign reserves and high growth rates tried to maximize the return of their accumulated reserves through investing excess precautionary reserves in investment funds (mainly SWFs) (Cruz and Kriesler, 2010). (3) Creation of regional agreements of cooperation through the establishment of reserve pooling (such as the Latin American Reserve Fund [FLAR]) and foreign exchange swap agreements (such as the Chiang Mai Initiative in South East Asia). These regional agreements can play a complementary role that supports the international financial institutions' efforts. As these agreements can prevent and respond to regional financial crises in a way that decreases regional contagion risk and hence decreases the precautionary reserve accumulation and its associated costs (Rosero, 2015).

So in order to self-protect themselves and also accelerate their economic growth process, EMDEs should accompany the reserve accumulation strategy with a mix of these complementary policies. In fact, choosing the right mix of these policies depends on the special characteristics of each economy and the prevailing international conditions. A better understanding of the effectiveness and design of these complementary policies is left for future investigation and research.

Notes

1. The financial crises that struck Mexico in 1994 and the East Asian countries in 1997 led to a fall in the growth rate of GDP by 10 percentage points. The financial crises that hit Russia in 1998 and Ecuador in 1999 also led to a similar decline in the level of real output. In fact, these crises not result only in a sharp increase in poverty levels, but in political instability in addition (Mishkin, 2001).
2. In theory, there are a number of direct channels (augmentation of domestic savings–lower cost of capital due to better risk allocation-transfer of technology-development of financial sector) and indirect channels (promotion of specialization–inducement of better policies–enhancement of

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capital inflows by signaling better policies) through which embracing financial globalization can help enhance growth in developing countries. However, most empirical studies could not prove the existence of a strong and statistically robust causal relationship between financial globalization and economic growth (Prasad *et al.*, 2004).

3. The country classification in the World Economic Outlook divides the world into two major groups: AEs and EMDEs. The group of EMDEs includes all countries that are not classified as AEs. EMEs are considered to be countries in a transitional phase between developing and developed status. They are also a group of countries that had a high economic performance for the past several decades given their diversified exports and financial openness. However, EMEs' fast-growing economic performance had been interrupted by a number of financial crises. In the aftermath of the 1990s crises, the configuration of EMEs has been growing in managed exchange rate flexibility, greater monetary independence and deeper financial integration (Aizenman and Lee, 2007).

4. Self-protection can be accomplished by increasing liquidity through one of the following three strategies: decreasing STD, creating a collateralized credit facility and accumulating foreign exchange reserves (Feldstein, 1999).

5. Actually, one of the structural changes witnessed by the global economy in the early 2000s can be largely attributed to the massive increase in foreign reserve accumulation in China; making China the world's largest holder of foreign exchange reserves. China's total foreign reserves (excluding gold), has increased from US $29.6bn in 1990 to its highest level in 2014 reaching US $3.9tn and then declining to US $3.049tn in April 2017. The decrease in Chinese foreign reserves can be explained by the decline in Chinese exports and imports after peaking in 2008. Also by 2012, analysts were reducing their estimates of Chinese growth. The decline in forecasted real growth naturally reduced forecasts for interest rates and demand for the renminbi (CNY). This decline in reserves, therefore, means that, since 2014, the central bank of China has been selling dollars and buying renminbi (CNY) to maintain the domestic currency's value. These foreign exchange sales have reduced China's foreign exchange reserves substantially (Neely, 2017).

6. The term "*Quasi*" reflects the fact that, often, these costs may be borne by the central bank as well as by the treasury (Lavigne, 2008).

7. The resources used to purchase reserves could also be used by the government to pay down its sovereign short-term external debt, since the interest cost of a given amount of short-term external debt – though difficult to measure – likely exceeds the earnings on an equivalent amount of reserves. Therefore, reducing sovereign short-term external debt has an equal vulnerability reduction effect, but with a lower net cost (Green and Torgerson, 2007).

8. The (Guidotti-Greenspan) rule suggests the maintenance of reserves equivalent to 12 months of a country's total foreign obligation, which includes but is not limited to imports. The rule states that holding reserves enough to meet financial obligations due within one year's time without having to depend on external sources should be sufficient to withstand significant external shocks (Greenspan, 1999; Wijnholds and Kapteyn, 2001).

9. The EMBI spread measures the difference between the total return of international government bonds issued by EMEs and the total return of bonds issued by the USA with the same currency and maturity. So it measures the interest rate spread that EMEs pay to borrow from the international financial markets over the interest rate it gets as a return on its reserves' assets (US treasury bonds and securities). This index does not only measure the borrowing cost that EMEs endure but also reflects the degree of their financial fragility and vulnerability (Kennedy and Palerm, 2014).

10. The ratio of international reserves to imports (R/M) indicates the number of months of imports that could be financed from the reserves. An adequate level of reserves was conventionally established as a level of reserves which covers at least three or four months of imports. It is important to notice that this criterion lacked any theoretical underpinning; it was a rule of thumb, based on a conventional, discretionary view of what was considered adequate (Bird and Rajan, 2003; Cruz and Kriesler, 2010).

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Data Appendix

Emerging and Developing Country List (120 Countries)

Emerging and Developing Asia (22 Countries)
Bangladesh, Bhutan, Cambodia, China, P.R.: Mainland, Fiji, India, Indonesia, Lao People's Democratic Republic, Malaysia, Maldives, Mongolia, Myanmar, Nepal, Papua New Guinea, Philippines, Samoa, Solomon Islands, Sri Lanka, Thailand, Tonga, Vanuatu and Vietnam.

Emerging and Developing Europe (18 Countries)
Albania, Bulgaria, Croatia, Hungary, Macedonia, Poland, Romania, Republic of Serbia, Turkey, Armenia, Azerbaijan, Belarus, Georgia, Kazakhstan, Kyrgyz Republic, Moldova, Russia and Ukraine.

Middle East, North Africa, Afghanistan, and Pakistan (19 Countries)
Islamic Republic of Afghanistan, Algeria, Kingdom of Bahrain, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Pakistan, Qatar, Saudi Arabia, Sudan, Syrian Arab Republic, Tunisia and the Republic of Yemen.

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Sub-Saharan Africa (6 Countries)
Cameroon, Central African Republic, Chad, Republic of Congo, Equatorial Guinea and Gabon.

West African Economic and Monetary Union (WAEMU) (27 Countries)
Botswana, Burundi, Cape Verde, Comoros, Democratic Republic of Congo, Ethiopia, The Gambia, Ghana, Guinea, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Nigeria, Rwanda, Sao Tome and Principe, Seychelles, Sierra Leone, South Africa, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe.

Latin America and Caribbean (28 Countries)
Dominica, Grenada, Argentina, Aruba, The Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay and Venezuela.

Emerging Markets Country List (26 Countries)
Argentina, Bangladesh, Brazil, Bulgaria, Chile, China, Colombia, Czech Republic, Egypt, Hungary, India, Indonesia, Malaysia, Mexico, Pakistan, Peru, Philippines, Poland, Romania, Russia, South Africa, South Korea, Thailand, Turkey, Ukraine and Venezuela.

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