

CENTRAL BANK CURRENCY  
SWAP LINES

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BANCO DE ESPAÑA

(\*) The opinions and analyses in this paper are the sole responsibility of the authors and, therefore, do not necessarily coincide with those of the Banco de España or of the Eurosystem.

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## **Abstract**

As the US dollar plays a pivotal role in international trade and financial markets, non-US banks' reliance on short-term wholesale funding markets (such as repo, commercial paper, certificate of deposit and swap markets) to finance their dollar assets makes them especially vulnerable to shocks in these markets, such as those arising from the global financial and COVID-19 crises. The crisis management mechanisms in place before the global financial crisis (the International Monetary Fund and international reserves) were overwhelmed by it. Only the rapid deployment of an international currency swap network, as a result of policy cooperation between the main global central banks, allowed equilibrium between dollar supply and demand to be restored and the severest consequences of the market strains for non-US banks to be avoided.

**Keywords:** central bank swap lines, IMF, International Monetary System, dollar funding, non-US banks, global financial crisis, COVID-19 crisis, cross-currency basis, international lender of last resort.

**JEL classification:** E41, E51, E58, F34.

## Resumen

El dólar continúa desempeñando un papel central en el comercio y los mercados financieros internacionales. La dependencia de los mercados mayoristas de corto plazo (*repos*, papel comercial, certificados de depósito, *swaps*) para obtener financiación en dólares hace especialmente vulnerables a los bancos de fuera de Estados Unidos ante *shocks* en estos mercados, como los de la crisis financiera global o la más reciente del coronavirus. Los mecanismos de gestión de crisis vigentes antes de la crisis internacional (el Fondo Monetario Internacional y las reservas internacionales) se vieron desbordados por esta. Solo la rápida creación de una red internacional de *swaps* de divisas, surgida gracias a la cooperación que hubo entre los mayores bancos centrales del mundo, consiguió restaurar el equilibrio entre demanda y oferta de dólares durante las últimas crisis, evitando así las graves consecuencias que podrían haber tenido en los bancos de fuera de Estados Unidos.

**Palabras clave:** *swaps* de divisas entre bancos centrales, FMI, Sistema Monetario Internacional, financiación en dólares, bancos de fuera de Estados Unidos, crisis financiera global, crisis del coronavirus, *cross-currency basis*, prestamista de última instancia internacional.

**Códigos JEL:** E41, E51, E58, F34.

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## 1 Introduction

As the US dollar plays a pivotal role in international trade and financial markets, many non-US banks, especially European and Japanese ones, hold large volumes of US dollar-denominated assets on their balance sheets. These are financed mainly on short-term wholesale funding markets (such as repo, commercial paper and certificate of deposit markets). Due to such markets' short-term nature, these banks face significant refinancing risk: at times of crisis, it is hard to obtain new financing or sell assets to repay liabilities as they mature. The danger of this type of risk reared its head during the global financial crisis and has once again shown itself to be a serious threat during the COVID-19 crisis. In both crises, the US dollar funding markets outside of the United States tightened considerably, making this financing expensive and limiting its availability.

The management systems for international monetary crises in place before the onset of the global financial crisis – the International Monetary Fund (IMF) and the central banks' international reserve holdings – were overwhelmed by it. Their resources proved to be insufficient and, in the case of the international arrangements, such as the IMF, the activation mechanisms were not sufficiently nimble to provide US dollars in time. Set against these solutions, the arrangements between the world's main central banks, which led to the creation of an international currency swap network, have proven to be a success. At the heart of this currency swap network is the US Federal Reserve System, which also acts as a de facto international lender of last resort of US dollars. This paper sets out the reasons behind the success of central bank swap lines as providers of US dollars to non-US banks at times of crisis. It also expounds some of this crisis management mechanism's weaknesses.

Following this introduction, the paper is structured as follows: Section 2 analyses the importance of the US dollar on non-US financial institutions' balance sheets and the attendant risk this poses in the face of international monetary crises; Section 3 describes those aspects of the IMF and the reserve holdings which have proven to be especially unsuitable in the face of the latest crises; Section 4 details the reasons behind the success of the central bank currency swap lines; and lastly, following the conclusions, various annexes are attached to this paper. These detail the functioning of the crisis management mechanisms analysed in this paper by depicting the simplified balance sheets of the institutions involved in each case (commercial banks, IMF, the Federal Reserve, other central banks, etc.).<sup>1</sup>

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<sup>1</sup> By depicting these mechanisms in stylised balance sheets the reality is being simplified in order to take a didactic approach to a rather complex subject. Simplified balance sheets have been widely used to understand monetary phenomena by Bindseil (2014) and Mehrling (2011), among others.



## 2 Non-US banks' US dollar funding

Non-US firms and governments have significant US dollar funding needs stemming from the currency's pivotal role in international trade<sup>2</sup> and the vigorous globalisation of global value chains and financial markets. Indeed, the volume of US dollar-denominated funding, either in the form of bank loans granted to non-US borrowers or debt issued outside the United States by non-banks, has doubled over the last decade, reaching \$12.2 trillion. By way of example, this triples the amount of euro- or yen-denominated funding extended outside their respective jurisdictions.<sup>3</sup> This situation is not exclusive to the most developed economies, where the world's major non-US banks are located, as emerging market countries account for one-third of the demand for this US dollar funding.

A large portion of the US dollar funding required by non-US firms and governments is granted by non-US global banks headquartered mainly in Europe or Japan. However, the assets on the balance sheets of Chinese and other emerging market banks are continuously gaining in size.<sup>4</sup> Furthermore, these non-US global banks also hold US assets on their balance sheets, for example, US Treasury securities. Owing to this US dollar funding activity, at end-2017 non-US banks held \$12.6 trillion in US dollar-denominated assets on their balance sheets,<sup>5</sup> i.e. a volume approaching that held by US banks.<sup>6</sup>

In addition, mainly to ward off foreign exchange risk by hedging the assets denominated in US dollars, a sizeable portion of the non-US banks' liabilities is also denominated in this currency. However, unlike their respective local-currency denominated liabilities, stable funding in the form of US dollar retail deposits is very limited.<sup>7</sup> This means that non-US banks cover most of their needs in this currency in the offshore dollar markets. Due to these markets' special characteristics, long-term liabilities – obtained mainly via the issuance of bonds – only account for one-quarter of their total US dollar liabilities. The remainder is short-term financing raised on repo, commercial paper and certificate of deposit markets.<sup>8</sup> Moreover, as the volume of US dollar assets of non-US banks (at least in the case of Japanese and euro area banks) exceeds the volume of their US dollar liabilities,<sup>9</sup> they typically cover this gap via recourse to foreign exchange swap markets. Thanks to these markets, they can swap funding denominated in the local currency for US dollar funding. However, this instrument is also commonly arranged with short maturities.

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2 At least 50% of cross-country transactions are billed in US dollars (Carney, 2019). Gopinath (2015) provides detailed data on the invoicing of international trade in US dollars by country.

3 [Global Liquidity Indicators](#), Bank of International Settlements, 2019 Q4. Bank loans and debt securities issued, borrowers outside the United States. Commentaries on the data in [BIS global liquidity indicators at end-December 2019](#).

4 See Aldasoro, Ehlers, McGuire and Peter (2020) for data on US dollar liabilities by country.

5 See IMF (2019), Aldasoro, Ehlers and Eren (2019) and Eren, Schrimpf and Sushko (2020b).

6 See Aldasoro, Ehlers and Eren (2019).

7 Non-US banks can obtain stable deposits through their US subsidiaries, but US regulations limit their use to funding activities in the United States (IMF (2019)).

8 Borio, McCauley and McGuire (2017) and Aldasoro, Ehlers and McCauley (2017) provide data on the breakdown of sources of financing based on BIS statistics.

9 See Romo González (2017) and Borio, McCauley and McGuire (2017).

Despite reducing non-US banks' foreign exchange risk, the shorter maturities of their US liabilities compared with the rest of their liabilities increases the refinancing risk they assume.<sup>10</sup> This risk, which is inherent in the banking business, consists of the bank being unable to find a counterparty willing to refinance its liabilities upon maturity, or that it only manages to do so at a much higher cost. Alternatively, banks can sell their assets, but if they need to sell them urgently, or in the midst of a crisis, they could incur heavy losses.<sup>11</sup> Although non-US banks assume greater refinancing risk than US banks, prior to the global financial crisis they managed to raise US dollar funding on international markets at rates similar to those of US banks. Yet this situation changed with the financial crisis, as obtaining US dollar funding became much more expensive for non-US banks than for their US counterparts, which in many cases have the added advantage of being able to turn to the Federal Reserve as a lender of last resort.

Strains in the markets on which non-US banks raised US dollar funding were triggered mainly by the dash for cash by the investors that provided financing in these markets.<sup>12</sup> Specifically, during the global financial crisis these markets' investors preferred to build up liquid assets in US dollars and to cease lending to other financial institutions, including non-US banks.<sup>13</sup> Non-US banks compensated for this decline in US dollar funding via greater recourse to foreign exchange swap markets.<sup>14</sup> This prompted the price of currency swaps to rise, which was reflected in the cross-currency basis<sup>15</sup> against some of the main currencies (see Chart 1). This indicator, which before the global financial crisis had always remained close to zero, reflects the difference between the cost of US dollar funding for US and non-US banks. Since it is calculated as the difference between the USD LIBOR interest rate and the implied cost of borrowing in a different currency and swapping it for US dollars, the more negative the indicator is, the more expensive it will be for non-US banks to raise US dollar funding on the swap market.

A similar pattern has been witnessed in the COVID-19 crisis: supply of US dollar funding has diminished owing to some US dollar funding market investors' increased preference for liquidity.<sup>16</sup> One of the main investors in these markets are money market funds (MMFs).<sup>17</sup> MMFs invest in short-term, low-risk assets. There are at least two types of MMF: those investing in US Treasury bills and the so-called prime MMFs, which invest in repo, commercial paper, certificate of deposit and swap markets, i.e. the markets on which non-US banks raise US dollar funding.<sup>18</sup> In March 2020, when the COVID-19 crisis began

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<sup>10</sup> See IMF (2019) and CGFS Working Group (2020).

<sup>11</sup> The liquidity of non-US banks' US dollar assets has improved significantly since the crisis, but they remain much less liquid than the rest of their assets. See IMF (2019).

<sup>12</sup> See IMF (2019).

<sup>13</sup> Borio, McCauley and McGuire (2017) calculate that in early 2017 more than 60% of the US funding on non-US banks' balance sheets was provided by non-banks.

<sup>14</sup> See IMF (2019).

<sup>15</sup> See Borio, McCauley, McGuire and Sushko (2016) for a detailed explanation of this indicator.

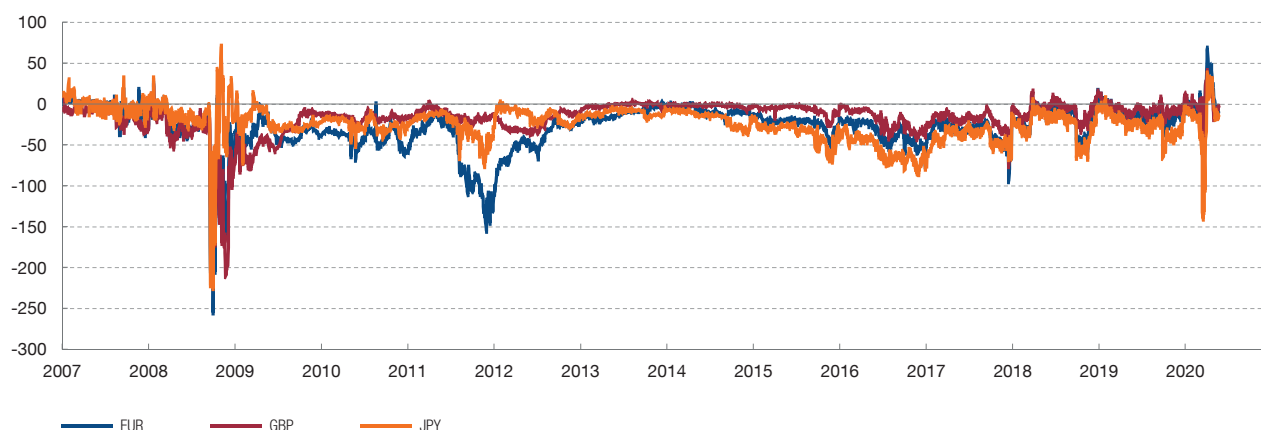
<sup>16</sup> See CGFS Working Group (2020) and Eren, Schrimpf and Sushko (2020a).

<sup>17</sup> See Aldasoro, Ehlers and Eren (2019).

<sup>18</sup> The 2016 US money market fund reform triggered a considerable shift from MMFs investing in debt issued by financial institutions and firms to MMFs investing in government and agency debt. This reduced the volume of funding provided by US MMFs to non-US banks (see IMF (2019) and Aldasoro, Ehlers and McCauley (2017)). Even so, MMFs continue to play a pivotal role in the financing of non-US banks (see CGFS Working Group (2020)).

Chart 1

**THREE-MONTH CROSS-CURRENCY BASIS AGAINST THE US DOLLAR (DAILY DATA IN BASIS POINTS)**



**SOURCES:** Bloomberg and own calculations (a).

**a** Cross-currency basis calculated using covered interest parity, with data on LIBOR and each currency's FX forwards.

to impact directly the international financial markets, there was a marked shift from US and non-US prime MMFs<sup>19</sup> towards MMFs investing in US Treasury bills.<sup>20</sup> This prompted the cost of US dollar funding for non-US banks to become much more expensive again.<sup>21</sup> As they had to contend with considerable fund redemptions, the prime MMFs were forced to realise a portion of their portfolio of certificates of deposit and commercial paper in a highly strained market. As a result of shifts in investor preferences, the cross-currency basis surged again, although it did not reach the values recorded at the onset of the global financial crisis (see Chart 1).

From the foregoing we can conclude that the markets in which non-US banks fund their dollar positions have a substantial structural vulnerability caused by their investors' tendency to shift towards more liquid assets when they detect the first signs of international crises. The following section describes the crisis management mechanisms that existed pre-global financial crisis to deal with this market vulnerability.

<sup>19</sup> Outflows amounting to \$200 billion, equal to 20% of their assets, in March 2020 (see Eren, Schrimpf and Sushko (2020a)).

<sup>20</sup> Inflows amounting to \$800 billion, equal to 30% of their assets, in March 2020 (see Eren, Schrimpf and Sushko (2020a)).

<sup>21</sup> See CGFS Working Group (2020) and Avdjiev, Eren and McGuire (2020).

### 3 The IMF and international reserves

There were two main mechanisms to deal with US dollar funding markets drying up at the onset of the global financial crisis: the IMF and the central banks' foreign reserve holdings. In this section we show why neither of them was suitable for coping with the tensions described in the preceding section.

According to Bagehot's classical definition (1873), a lender of last resort must satisfy two basic characteristics: firepower and speed when facing a liquidity crunch in the financial system.<sup>22</sup> Therefore, central banks' unlimited and instantaneous capacity to issue – in the respective central bank's currency – the most liquid financial asset (liquidity reserves) has historically led them to be chosen to perform the role of lender of last resort within a monetary area.<sup>23</sup> However, a central bank's capacity to provide funds to the banking system via the issuance mechanism is limited to the currency for which the central bank in question is responsible and to the institutions within its jurisdiction, whose financial soundness it is able to ensure. In other words, a central bank cannot use this mechanism when the banks in its monetary area undergo a liquidity crunch in a currency other than that of such area.<sup>24</sup> Obviously, this constraint becomes extremely important in a US dollar-based global financial system such as our own.

Central banks have traditionally attempted to overcome this shortcoming by building up foreign exchange reserves (see Annex 1). However, reserve holdings have generally proven to be insufficient when taking on the role of lender of last resort in another currency during severe crises where reserves may be depleted very quickly. In this case, an unlimited capacity for action would be required, yet the amount of reserves is limited. In addition, it is impossible to increase the amount if significant pressure is exerted on the local currency (logically, a country will be less likely to suffer these pressures the more reserves it builds up). Indeed, although international reserves have increased in recent decades (see Chart 2), in many countries they would have been insufficient to cover the US dollar funding needs unsatisfied by the financial markets during the global financial crisis.<sup>25</sup> Furthermore, while they can be used quickly, since they are typically invested in the government debt of the country issuing the currency, mass sales at times of global crises have an impact on the price of these reserve assets, with the attendant problem for both the issuer and the other holders. This has been the case during the COVID-19 crisis, where between the third week of February and 10 April 2020 central banks' US dollar reserves, held in custody by the Federal Reserve, fell by \$124 billion,<sup>26</sup> causing tensions in the US government debt market.<sup>27</sup>

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22 Bagehot (1873, 1999): "To avert panic, central banks should lend early and freely (i.e. without limit), to solvent firms, against good collateral, and at 'high rates'".

23 Liquidity injections by a central bank in its role as lender of last resort are not just confined to emergency liquidity assistance to individual banks (as often wrongly assumed), but are also made available to the financial system to the benefit of all banks under circumstances of a collective financial market liquidity crisis. See Bindseil (2014), pp. 235-236.

24 It may use its foreign exchange reserves until they are depleted and, as we will see in Section 4, it may also perform currency swaps with other central banks.

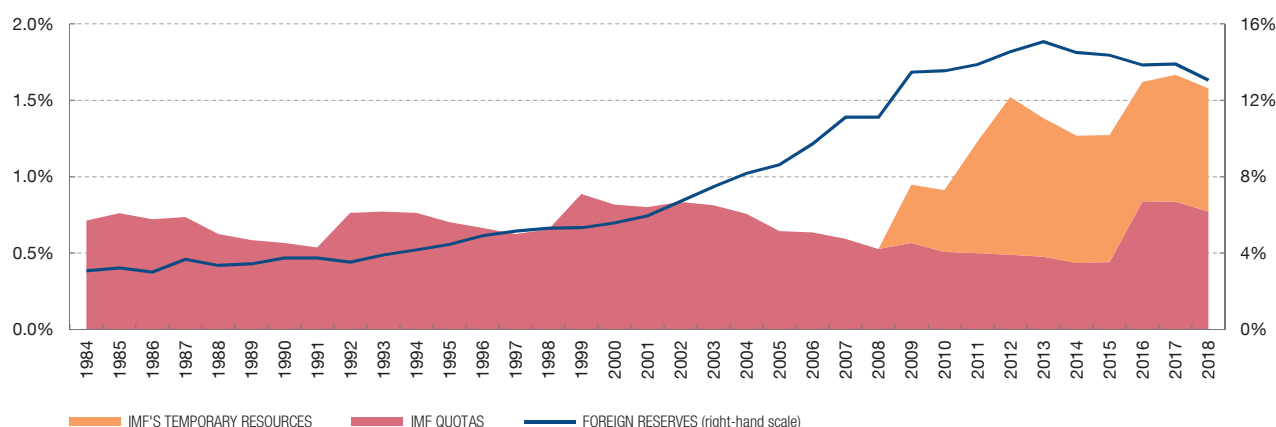
25 See Bourgeon and Sgard (2019) and Sheets, Truman and Lowery (2018).

26 *Financial Times*, 10 April 2020.

27 See Fleming (2020).

Chart 2

**THE IMF'S RESOURCES AND GLOBAL FOREIGN RESERVES. % OF WORLD GDP**



SOURCES: IMF and World Bank.

By holding reserves, countries seek an individual solution to external problems, but there are other solutions based on cross-country cooperation.<sup>28</sup> The Bretton Woods Agreement, where the major world economies agreed to create rules and institutions that would oversee the system's stability, represents the greatest cooperative effort to create international crisis management instruments.<sup>29</sup> The fruit of that agreement was the creation of the IMF, the main global crisis management institution. The IMF's primary mission is to ensure the stability of the international monetary system.<sup>30</sup> To achieve this mission, it carries out two core activities. First, it provides financial assistance to member countries that are experiencing actual or potential balance-of-payments problems. Second, it monitors member country policies as well as national, regional, and global economic and financial developments through a formal system known as surveillance, providing advice to member countries.

For decades, only emerging market countries with internal imbalances financed with foreign currency issuance had to combat foreign currency scarcity when they experienced internal crises bringing into question the sustainability of their debt. In these cases, the IMF intervened by providing financial assistance subject to conditionality that required internal adjustments to restore balance to the country's external position. In the aftermath of the global financial crisis some countries continue to have this type of balance-of-payments problem. However, an even larger global risk has emerged: liquidity shocks in international financial markets as a whole<sup>31</sup> triggered by the financial sector's – not the Treasuries' – US dollar exposures. This is a problem for which the IMF was not designed.

<sup>28</sup> Reserves, the IMF, currency swaps and regional arrangements tend to be encompassed in what is dubbed the global financial safety network.

<sup>29</sup> As a result of the 75th anniversary of the Bretton Woods Agreement, the Bretton Woods Committee revindicated the value of the international economic cooperation that emerged from the agreement by publishing "Revitalizing the Spirit of Bretton Woods: 50 Perspectives on the Future of the Global Economic System".

<sup>30</sup> See *IMF at Glance*.

<sup>31</sup> See Landau, 2014.

To contend with this new type of international financial crisis triggered by the global scarcity of US dollar funding, a mechanism is required that can securely assume the role of international lender of last resort in that currency. To do so, as stated above, the mechanism should satisfy two requirements: firepower and speed. Regrettably, while the IMF's design may be useful in crises affecting individually specific countries with internal imbalances, it is not sufficiently fast nor does it have sufficient firepower to manage international liquidity crunches such as the global financial crisis or that triggered by COVID-19.

With regard to the first characteristic, firepower, the main source of the IMF's financing is the quotas paid by its members.<sup>32</sup> Membership grants each member the right to request financial assistance should it be needed. It is therefore a risk-sharing system (see Annex 2), similar to an insurance policy in which the total amount available to the members is limited by the total of the quotas paid. This amount only changes when all members agree. This means that quotas have increased very rarely over the course of the IMF's history<sup>33</sup> (see Chart 2). While the balance sheet of a central bank can be expanded or reduced depending on the financial system's needs, the quota system limits the IMF's firepower to the stock deposited by the members. This reduces the IMF's role as a lender of last resort. Such constraint is particularly important where the crisis spreads from country to country, as in the case of the global financial crisis or the more recent COVID-19 crisis.

As stated above, the IMF also lacks the second traditional characteristic of a lender of last resort: speed when granting loans. This lack of speed is a result of the conditionality attached to any IMF loan,<sup>34</sup> materialising in the imposition of changes in the domestic economic policy of the countries requesting financial assistance. The associated conditionality promotes the correction of structural imbalances and prevents the moral hazard of taking credit imprudently. However, as a result, the negotiation tends to be a long and complex process. Due to the outbreak of the COVID-19 crisis,<sup>35</sup> the IMF has expanded its emergency facilities<sup>36</sup> and its external debt relief schemes<sup>37</sup> in order to be able to overcome this difficulty and thus be able to swiftly meet demand for assistance from the affected countries. In addition, the IMF has created a new tool, the Short-term Liquidity Line, designed to be a liquidity backstop for members with very strong policy frameworks and fundamentals, as an alternative to the central bank currency swap lines described in the following section. However, members have yet to make use of it.

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<sup>32</sup> Determined on the basis of the size of their economies and their openness.

<sup>33</sup> Quotas are reviewed every five years. However, changes in quotas must be approved by an 85% majority of the total voting power. Consequently, quota reviews seldom lead to an increase therein and redistribution thereof due to a lack of political agreement. This was the case in the fifteenth review, concluded in December 2019.

<sup>34</sup> To speed up the loan application process and lessen the associated stigma, the IMF has designed schemes that are not subject to the traditional conditionality. These include the Flexible Credit Line and the Precautionary and Liquidity Line, designed for countries with very strong policy frameworks and fundamentals, with ex-ante conditionality. However, few countries have applied for these lines.

<sup>35</sup> See García-Herrero and Ribakova (2020) for a commentary on the IMF's COVID-19 crisis-related schemes.

<sup>36</sup> The Rapid Credit Facility (RCF) and the Rapid Financing Instrument (RFI). In mid-July 2020, agreements had been reached for more than \$80 billion under these schemes, mainly with South American countries. See the IMF's [website](#).

<sup>37</sup> The Catastrophe Containment and Relief Trust. In mid-July 2020, agreements had been reached for \$240 million, mainly with African countries. See the IMF's [website](#).

## 4 Central bank currency swap lines

A currency swap is a financial derivative whereby two parties agree to swap a set amount denominated in two different currencies, specifying at the same time a maturity date when the reverse transaction to unwind the positions will be performed. Swaps are traded bilaterally over the counter; therefore, the agreements are very flexible and can be adapted to the two parties' needs.

Using this extremely widespread instrument in private financial markets as a basis, at the onset of the global financial crisis,<sup>38</sup> the world's main central banks (the Federal Reserve, the European Central Bank,<sup>39</sup> the Bank of England, the Bank of Canada, the Bank of Japan and the Swiss National Bank) established currency swap lines to deal with US dollar shortages. These arrangements enabled them to provide liquidity in currencies other than their own to institutions within their respective monetary areas (see Annex 3). The bilateral arrangements quickly became widespread and other central banks established swap lines not only to swap their currencies, but also to lend US dollars where needed. Multilateral arrangements were also executed, most notably the Chiang Mai Initiative Multilateralization (CMIM).<sup>40</sup> In total, between 2008 and 2015 more than 80 arrangements were executed by more than 50 countries,<sup>41</sup> resulting in the creation of a large international network for currency swaps among central banks (see Figure 1). In 2013 the temporary arrangement between the six main central banks became a standing arrangement, thereby acknowledging its positive results during the crisis in providing US dollars outside the United States.<sup>42</sup>

Under the standing arrangement, the swaps operate as follows (see Annex 3): the Federal Reserve delivers US dollars to the requesting central bank in exchange for an equivalent amount in its currency, at the exchange rate prevailing on that day. The two central banks arrange that, after a period of time (typically between one week and three months), they will sell back to each other their respective currencies at the initial exchange rate. The Federal Reserve charges interest on the US dollars.<sup>43</sup> The recipient central bank lends the US dollars to financial institutions in its jurisdiction with the same maturity and at the same interest rate applicable to the transaction with the Federal Reserve, requiring from the financial institutions the same collateral as in local-currency transactions with the central bank. The recipient central bank assumes the risk in the swap, i.e. the central bank will have to repay the US dollars to the Federal Reserve by the established maturity date regardless of whether or not the financial institution repays the borrowed funds. Should it fail to do so,

<sup>38</sup> Central bank swap lines had been used since the 1960s. See McCauley and Schenk (2020).

<sup>39</sup> See ECB (2014) for a detailed description of the Eurosystem's experience with foreign currency liquidity-providing central bank swaps.

<sup>40</sup> A multilateral currency swap arrangement between China, Japan, Korea and the members of the Association of Southeast Asian Nations (ASEAN) executed in 2010, whereby participants swap their local currency with others for US dollars. The arrangement's envelope is limited to \$240 billion, which was established in 2012. Each member has an IMF de-linked portion of 30% of its quota; above that percentage, use of the swap line is linked to IMF conditionality.

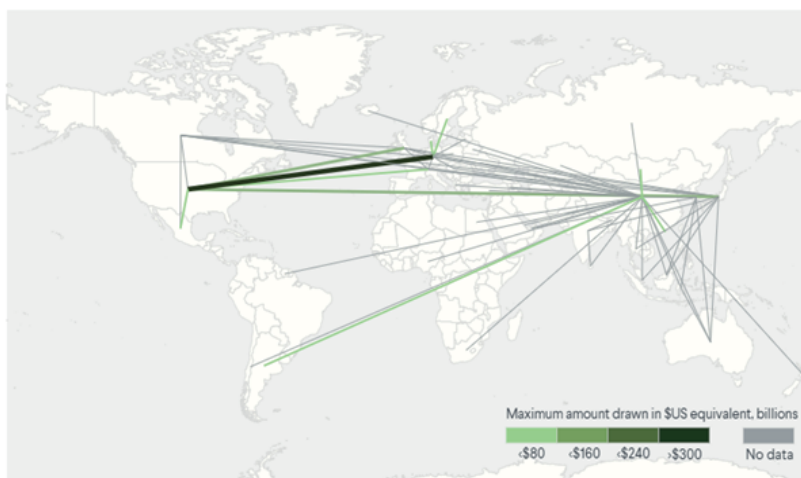
<sup>41</sup> See McDowell (2019) for a comprehensive list of these arrangements.

<sup>42</sup> Federal Reserve [press release](#) of 31 October 2013.

<sup>43</sup> Conversely, the other central banks do not charge interest to the Federal Reserve for the currencies they deliver in exchange for the US dollars.

Figure 1

**THE INTERNATIONAL CENTRAL BANK CURRENCY SWAP NETWORK IN 2017**



SOURCE: *Central Bank Currency Swaps Tracker*, Council on Foreign Relations.

the Federal Reserve would keep the currency delivered by the central bank that received the US dollars. Thus, the Federal Reserve does not assume risks posed by institutions whose financial soundness it may be unaware of.

Central bank swap lines bear the characteristics indicated in Section 3 for appropriately performing the role of international lender of last resort: firepower and speed.<sup>44</sup> As regards their firepower, the amounts they can provide is, in theory, unlimited.<sup>45</sup> Resort to currency swaps causes an increase in total international reserves globally, not a transfer of the existing reserves: as in domestic banking systems, where commercial banks create deposit liabilities in order to grant loans to their customers, central banks increase both sides of their balance sheets when extending loans to other central banks.<sup>46</sup> The balance sheet expansion mechanism means that the swap lines are rapidly activated; moreover, since there is no conditionality, the process does not slow down and is confined to restoring the balance between supply and demand in the money markets. Lastly, their interest rates are penalised,<sup>47</sup> as, despite being based on market rates, a spread – paid by the requesting institutions – must be included so that such institutions always turn to these transactions as a last resort. Moral hazard is thus reduced.

Beyond the theoretical questions that make currency swaps an appropriate tool for withstanding crises such as those described in Section 2, the success of central bank swap

<sup>44</sup> See Landau (2014) and Bourgeon and Sgard (2019).

<sup>45</sup> Some of the arrangements contain quantitative limits, but they could be modified quickly where necessary.

<sup>46</sup> See Mehrling (2015) and Annex 3.

<sup>47</sup> This is another of the characteristics that Bagehot considered important in a lender of last resort. See Footnote 22.



lines can be observed in two indicators. First, the volume reached under the swaps during the crises and, second, their ability to ease strains in swap markets. With regard to the former, in the global financial crisis the volume of US dollars required to cover the financing needs which arose outside the United States in the wake of the collapse of the Lehman Brothers could not have been satisfied by any other mechanism in existence up until then. The amount of US dollars provided through the currency swap lines established by the Federal Reserve reached \$583 billion in December 2008, while total IMF resources only amounted to around \$400 billion.<sup>48</sup> Neither would central banks' US dollar reserves have sufficed to meet many countries' overall demand for US dollars. As regards the second indicator, this impressive firepower and rapid response in the face of the crisis, unprecedented until then, meant that the cross-currency basis corrected almost the entire previous collapse that had taken it to below  $-250$  bp (see Chart 1). Currency swaps' efficiency was also evidenced by the fact that activating the swap arrangements was not even necessary in many emerging market economies which had formalised them since their mere existence limited the capital flight.<sup>49</sup> Thus, they were barely required to use their reserves, nor did they need to turn to the IMF or other regional arrangements for support.

In the COVID-19 crisis, central banks have once again resorted to currency swaps. The Federal Reserve has reactivated the five swap lines with the world's main central banks and established a further nine temporary swap lines<sup>50</sup> with countries such as Mexico and Brazil. Furthermore, it has increased the maturities of the swaps (before only a 1-week maturity operation was offered, while now 1-week maturity and 84-day maturity operations are offered,<sup>51</sup> increased the frequency of 7-day maturity operations from weekly to daily<sup>52</sup> and reduced the rate applied by 25 bp (before it was OIS + 50 bp).<sup>53</sup> Other central banks have also reactivated swap lines with various central banks or have established new lines.

Analysing the aforementioned indicators (the volume reached and the ability to ease strains in the markets) proves once again the currency swaps' success. First, in early April 2020, less than one month after the crisis began to directly impact the international US dollar funding markets, the volume that the Federal Reserve had provided via swaps stood at close to \$400 billion, reaching a peak of approximately \$450 billion at the end of that month (see Chart 3). The Bank of Japan and the European Central Bank were the biggest users of this line, taking up liquidity in US dollars totalling as much as \$225 billion and \$145 billion, respectively. The reason why these two banks are the major demanders of US dollars is because they are the two regions where banks are most active in US dollar funding markets (see Section 2). Second, the forceful and swift action of central banks through currency swaps has once again helped ease strains in the US dollar funding markets by restoring

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48 This amount included all the membership quotas and the temporary loan agreements, although the amount actually available at that time was considerably lower, since we would have to deduct the resources already earmarked and the quotas disbursed in currencies other than reserve currencies.

49 See Mehrling (2015).

50 Federal Reserve [press release](#) of 19 March 2020.

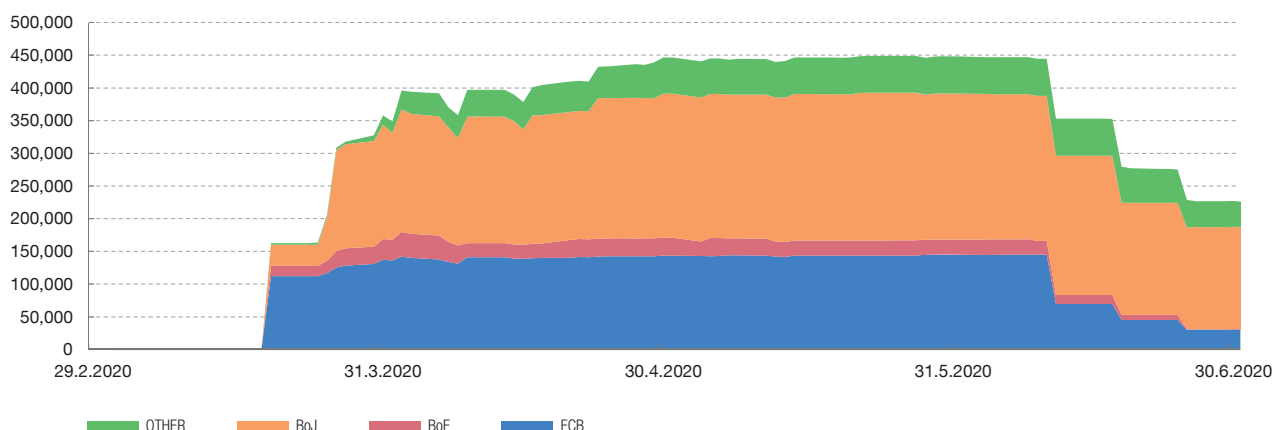
51 Federal Reserve [press release](#) of 15 March 2020.

52 Federal Reserve [press release](#) of 20 March 2020.

53 See Footnote 51.

Chart 3

**THE FEDERAL RESERVE'S US DOLLAR SWAP OPERATIONS WITH OTHER CENTRAL BANKS (\$ BILLION)**



SOURCE: Federal Reserve Bank of New York.

their smooth functioning<sup>54</sup> and reducing the cost of US dollar funding for non-US banks, as further reflected by the sharp adjustment to the cross-currency basis. Thus, while in mid-March 2020 strains in the US dollar funding markets led the cross-currency basis against the dollar to plummet to  $-140$  bp in the case of the yen and to  $-79$  bp in the case of the euro, at end-March 2020 these steep drops had already been corrected in their entirety, with the cross-currency basis against the dollar approaching zero and even entering positive territory in April (see Chart 1).

<sup>54</sup> See Eren, Schrimpf and Sushko (2020a) and Federal Reserve System (2020).

## 5 Conclusion

There is a broad consensus when classifying cooperation between central banks in the management of the global financial crisis via the use of currency swaps as a success.<sup>55</sup> Thanks to the swift collaboration between the world's main central banks when establishing currency swap lines, the consequences of the global financial crisis for non-US banks were not as severe as they could have been. The creation of a large international currency swap network reflects their enormous effectiveness in the face of international liquidity crunches and proves that this new central bank tool is here to stay. Central banks that are part of the network are now not only able to provide unlimited liquidity to their counterparties in their own currency, but are also able to do so in US dollars or in other currencies.

However, the emergence of currency swaps between central banks, as a new mechanism available for managing international financial crises, has had two relevant effects on the international financial architecture.

First, there are many countries with weak currencies and low volumes of US dollar reserves which are excluded from the protection afforded by the central bank currency swap network. Thus, a kind of hierarchy<sup>56</sup> has been established based on the type of access countries have to the crisis management systems. The United States would be at the top of the pyramid as the new currency swap system is supported by the Federal Reserve. Below the United States we find the five jurisdictions whose central banks are part of the standing arrangement granting them direct and unlimited access to the Federal Reserve's US dollars. At the foot of the pyramid are the other countries without direct access, those with direct, but temporary and limited, access, and those that have access to US dollars but under bilateral arrangements with other central banks and always for limited amounts. Therefore, to a greater or lesser degree, these countries remain dependent on the IMF<sup>57</sup> or on regional arrangements<sup>58</sup> as providers of US dollars in the event that their reserves are insufficient to cover their needs. These reserves can be used either by selling them or providing them as collateral under the FIMA Repo Facility.<sup>59</sup>

Second, this mechanism is based on a set of bilateral agreements that, owing to the US dollar's preponderance in international markets, revolve around the US Federal Reserve.

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55 See McCauley and Schenk (2020) for references to academic and political assessments of currency swaps between central banks.

56 See Bourgeon and Sgard (2019) and Mehrling (2015).

57 In the COVID-19 crisis, the IMF, despite increasing its resources in the wake of the global financial crisis, has again "specialised" in countries without access to the currency swaps which have low volumes of reserves.

58 The existing crisis management mechanisms tend to also include regional financing arrangements, such as the European Stability Mechanism (ESM) and the Chiang Mai Initiative Multilateralization (CMIM), whose aggregate volume is similar to the IMF's resources. See Gallego, L'Hotelleire-Fallois and López-Vicente (2018).

59 A new facility established by the Federal Reserve at the end of March 2020 called FIMA (Foreign and International Monetary Authorities Repo Facility), whereby liquidity is provided by entering into repurchase agreements using their US Treasury securities held with the Federal Reserve as collateral. With the prior authorisation of the Federal Reserve, this facility enables all central banks with US dollar reserves held with the Federal Reserve to obtain US dollar liquidity. This set of countries is much broader than that of countries with currency swap arrangements. To date (June 2020), use of this instrument has been limited, although it is early to make an assessment.

Accordingly, the entire system depends on the latter's willingness to carry out this type of transaction; the Federal Reserve thus becomes a de facto international lender of last resort. Indeed, the arrangements are only formally symmetric, given that the Federal Reserve does not use the currency it obtains in exchange for its dollars.<sup>60</sup>

Given the importance of having appropriate crisis management mechanisms at the international level, it makes sense to explore possible alternatives to adjust the current system for providing US dollars so that it reaches a larger number of countries and to lessen the current model's high asymmetry.

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<sup>60</sup> See Bourgeon and Sgard (2019).

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## Annex 1 Accumulation of reserves via trade surpluses and their subsequent use

Where a country runs a balance-of-payments surplus (either through the current account, the capital account or the financial account), its firms receive more dollars than they disburse, which are ultimately amassed in US dollar-denominated accounts at US banks. These firms will need to exchange the dollars for their local currency, if the latter is the currency used to pay their costs, salaries, rent, etc. This increase in demand for local currency in exchange for US dollars will lead to an appreciation of the local currency and the country will become less competitive.

To nullify the local currency's appreciation or to accumulate reserves that can be used in the future, the central bank of the country running the surplus may decide to buy those dollars in exchange for its local currency. Moreover, if its functions include control of the exchange rate it must do so in order to attain its goal. Thus, the dollars will end up on the central bank's balance sheet. In order to be able to buy them, the central bank will have to increase the issuance of local currency, which will result in inflation. To avoid this, it must sterilise the US dollar purchase via money draining operations in the internal market, by reducing, for example, the volume of the pre-existing liquidity-providing operations.

Lastly, in order to harness the US dollars acquired, it will purchase US dollar assets (mainly US government debt), thereby building up reserves on its balance sheet.

A simplified<sup>1</sup> explanation of the mechanism whereby reserves are accumulated on the balance sheets of the various participants can be found below. The example refers to a purchase, by the United States, of goods in a country running a balance-of-payments surplus, such as China, and the accumulation of reserves at the People's Bank of China.

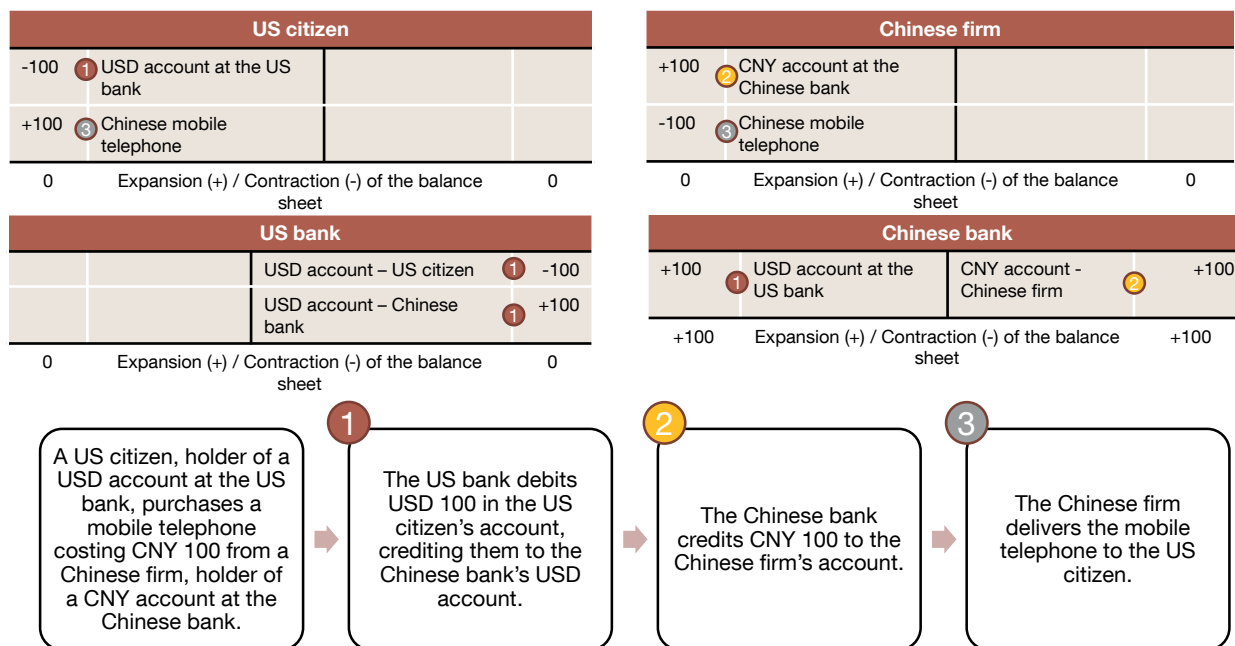
This operation is divided into three phases: 1) A US citizen buys a mobile phone in China, paying into a Chinese commercial bank's account at a US institution. 2) The People's Bank of China purchases the US dollars from the Chinese commercial bank and sterilises the operation by reducing prior liquidity-providing transactions. 3) The People's Bank of China purchases US government debt using the acquired US dollars. To simplify, we will assume that USD 1 = CNY 1.

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<sup>1</sup> Portraying this mechanism on balance sheets involves decisions that simplify complex processes by excluding some of the subsequent transactions that may be conducted following those depicted. For instance, this example does not take into account possible restrictions stemming from minimum reserves requirements or effects arising due to exchange rate fluctuations.

## Cross-border goods purchase

Figure A1.1

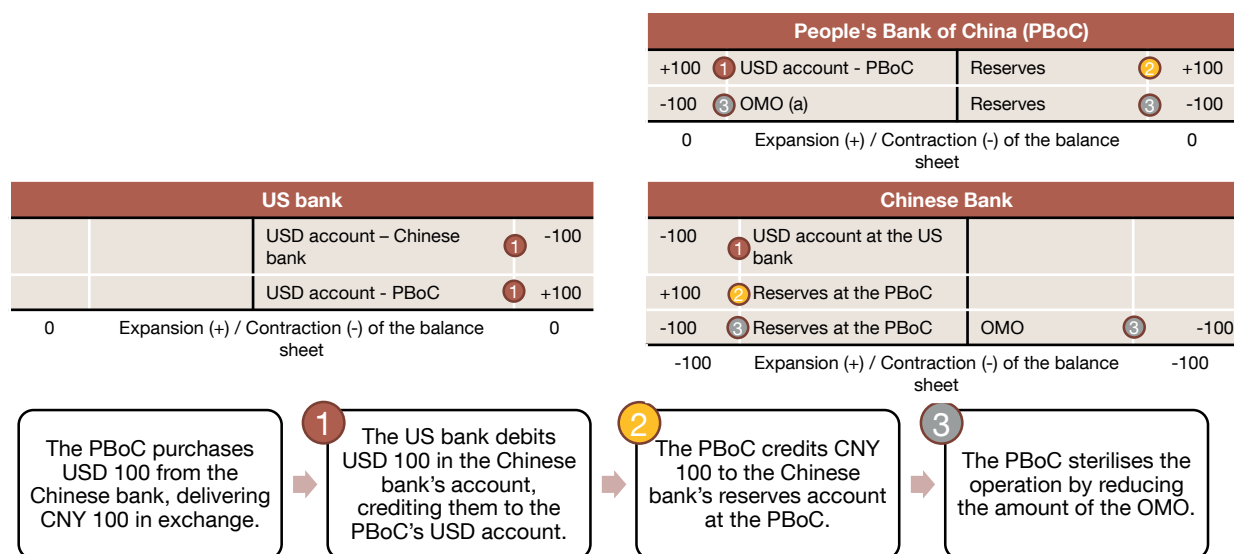


SOURCE: Devised by authors.

Conclusion: the balance sheet of the Chinese bank has increased while that of the US bank has held steady. Should the People's Bank of China have established a minimum reserves requirement, the Chinese bank would have to obtain reserves at the central bank to satisfy that requirement. In this case it is assumed that the Chinese firm has arranged for the bank to translate the US dollars obtained in the sale of the mobile telephone into Chinese renminbi, but it could also be the case that the Chinese firm prefers to keep the US dollars and not exchange them for Chinese renminbi.

## Purchase of US dollars by the central bank

Figure A1.2

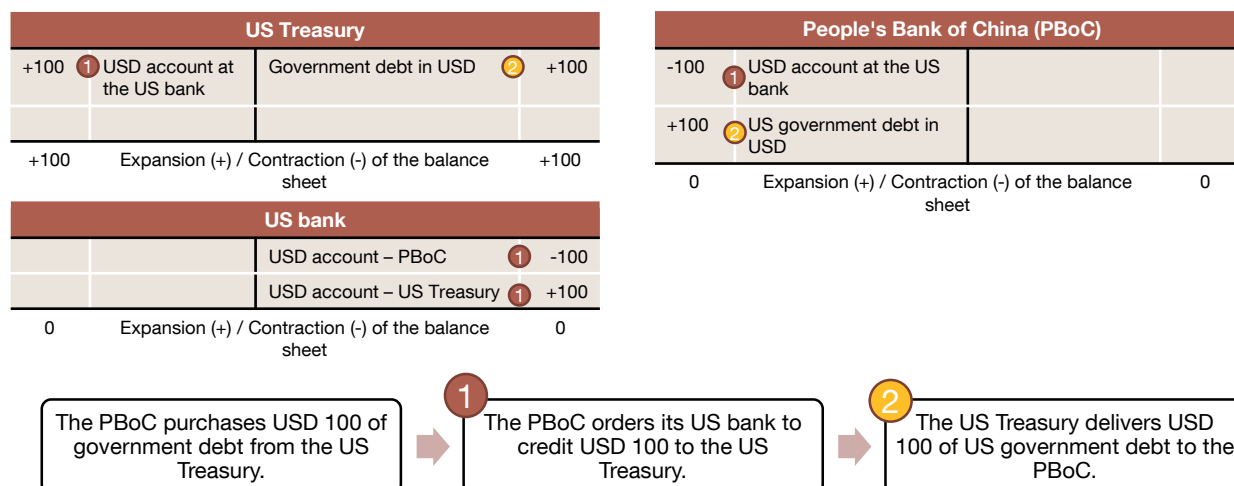


SOURCE: Devised by authors.

a OMO: Open Market Operation.

## Purchase of government debt using the purchased US dollars

Figure A1.3

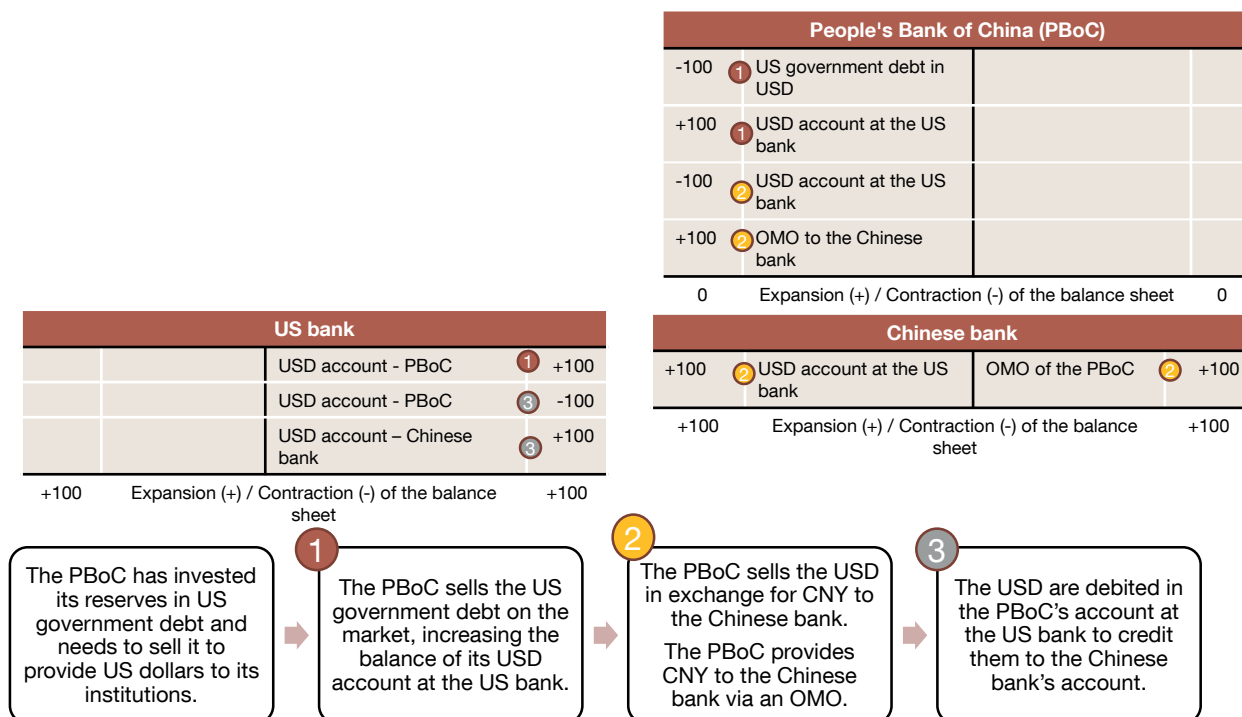


SOURCE: Devised by authors.



## Use of the accumulated US dollar reserve holdings

Figure A1.4



SOURCE: Devised by authors.

Conclusion: The sale of reserves by the People's Bank of China results in a redistribution of the items on the asset side of its balance sheet rather than a reduction therein.

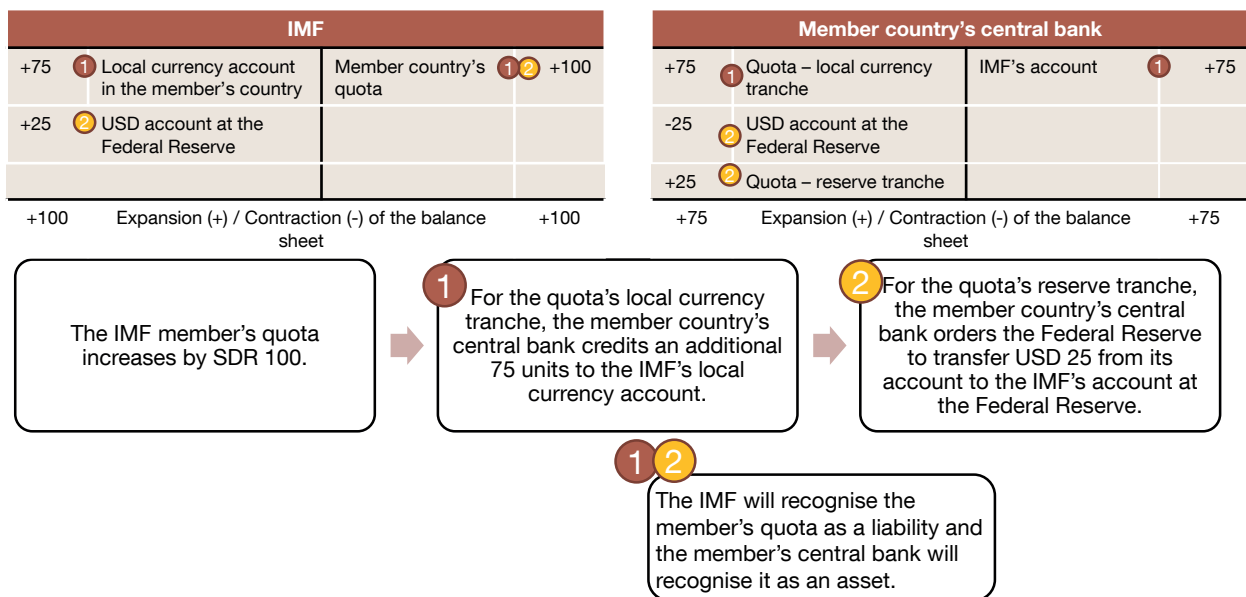
## Annex 2 IMF quotas

The initial quota subscription that a country must contribute to become a member of the IMF (equal to the quota that it will have to pay in the institution) and the subsequent disbursements due to possible increases in total quotas are paid partly in special drawing rights (SDRs) or member countries' foreign currencies acceptable to the IMF (for example, in US dollars) and partly in the country's local currency. 25% of the total quota (or 10% of the country's total reserves, if lower) is paid in SDRs or in a currency acceptable to the IMF. This is called the "reserve tranche". The remainder is called the "local currency tranche".

The mechanism whereby a country increases its quota at the IMF (or pays the contribution for the first time) is explained below. To simplify, we consider USD 1 = SDR 1 = 1 unit of local currency.

### Initial disbursement or increase of the quota

Figure A2.1



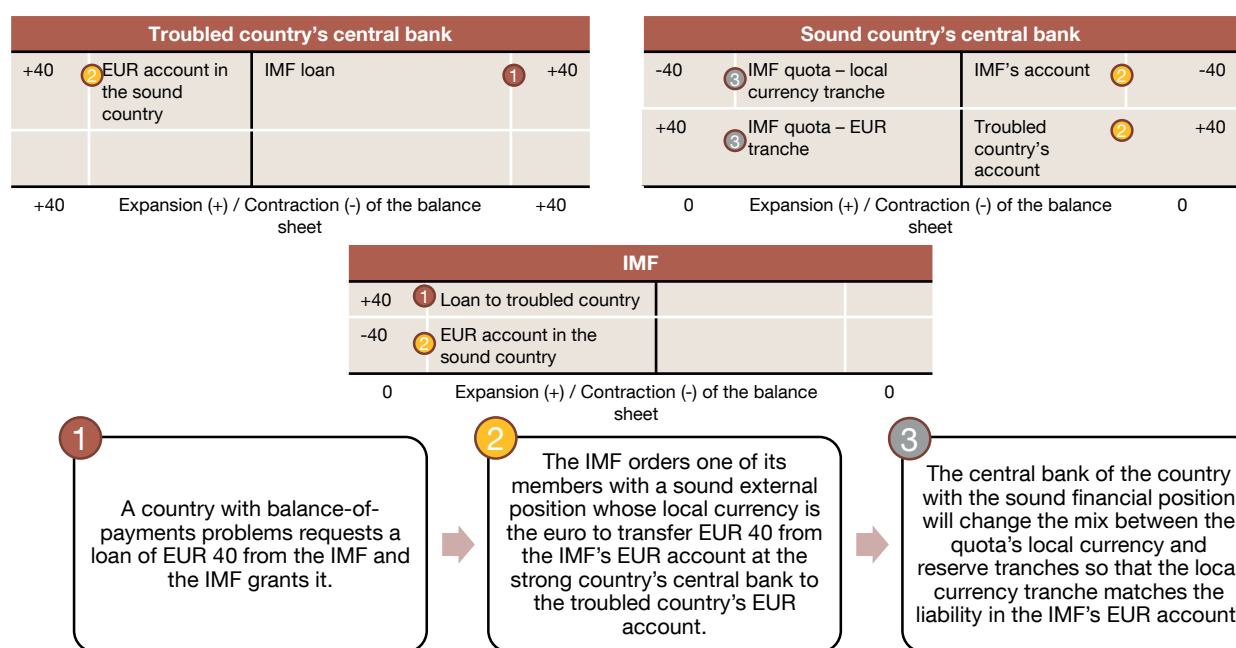
SOURCE: Devised by authors.

Conclusion: The IMF's balance sheet expands by the total quota, whereas the balance sheet of the member country's central bank only expands by the local currency tranche, which it has contributed by creating its reserves.

## Use of the quota

A non-euro area country with balance-of-payments problems applies to the IMF for a loan of €40. If the IMF grants the loan, it will order a member country with a sound external position whose currency is the euro to transfer €40 from the IMF's euro account at its central bank to the euro account selected by the country with balance-of-payments problems (to avoid complications we will assume that the country's account is at the central bank itself, although it could also be at a commercial bank). This use of the funds, which the IMF has deposited at the central bank of the country with a sound financial position to lend to the other country, is called a quota purchase (the reverse transaction is called a quota repurchase).

Figure A2.2



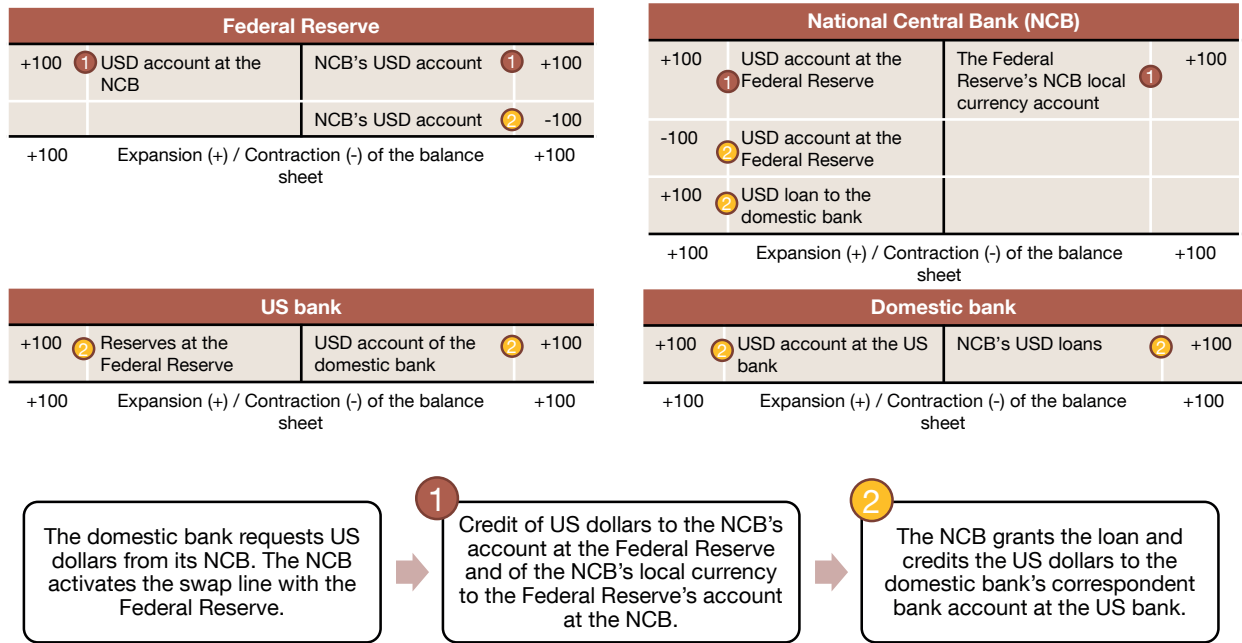
SOURCE: Devised by authors.

Conclusion: The IMF's balance sheet neither increases nor decreases, rather the structure of its assets changes. Only the balance sheet of the country experiencing balance-of-payments problems increases.

### Annex 3 Central bank currency swap lines

The functioning of a currency swap between the Federal Reserve and another central bank, so that the latter can lend US dollars to an institution in its jurisdiction that needs them, is described below. We assume that a non-US bank (domestic bank) requires \$100 and is unable to raise them on the market; it therefore requests them from its central bank (NCB). To simplify, we assume that USD 1 = 1 unit of local currency.

Figure A3.1



SOURCE: Devised by authors.

Conclusion: Thanks to the unlimited access to the Federal Reserve's US dollars, the national central bank's balance sheet can expand indefinitely until it meets the US dollar funding needs of its banking sector.

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