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Dollar funding costs during the Covid-19 crisis through the lens of the FX swap market

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## Dollar funding costs during the Covid-19 crisis through the lens of the FX swap market

### *Key takeaways*

- *Since the start of the Covid-19 pandemic, indicators of dollar funding costs in foreign exchange markets have risen sharply, reflecting both demand and supply factors.*
- *The demand for dollar funding has grown in recent years, reflecting the currency hedging needs of corporates and portfolio investors outside the United States.*
- *Against this backdrop, the financial turbulence of recent weeks has crimped the supply of dollar funding from financial intermediaries, sharply lifting indicators of dollar funding costs.*
- *These costs have narrowed after central banks deployed dollar swap lines, but broader policy challenges remain in ensuring that dollar funding markets remain resilient and that central bank liquidity is channelled beyond the banking system.*

Since the onset of the Covid-19 pandemic, indicators of dollar funding costs in foreign exchange markets have risen sharply, approaching levels last seen during the Great Financial Crisis (GFC). One such measure is the so-called FX swap basis (or “the basis”), which is the difference between the dollar interest rate in the money market and the implied dollar interest rate from the FX swap market where someone borrows dollars by pledging another currency as collateral.<sup>1</sup> A negative basis means that borrowing dollars through FX swaps is more expensive than borrowing in the dollar money market.

In tranquil times, the basis is close to zero, as an arbitrageur can exploit the basis and supply dollars in the FX swap market in order to pocket the difference. However, during periods when bank balance sheet capacity is scarce, the basis need not be squeezed to zero. In particular, a large negative basis reflects a scarcity of dollar funding. In recent weeks, the FX swap basis widened sharply, but then narrowed after the deployment of central bank swap lines, although it remains elevated for some currencies.

What is behind these moves? To understand recent events, it is important to consider both sides of the FX swap market – those wishing to obtain dollars and those willing to supply them. On the demand side, institutional investors (insurers, pension funds and other portfolio asset managers) play a key role. Such investors have obligations in domestic currency, but they hold a globally diversified portfolio, with a substantial portion denominated in the US dollar. To finance the purchase of dollar assets, they swap

<sup>1</sup> For example, an investor sells euros for dollars, while simultaneously entering into a forward agreement to buy back the euros at a pre-agreed exchange rate at a fixed date in the future. This pre-agreed exchange rate is called the “forward rate”, and defines an implicit interest rate on the dollar relative to that in euros given the current spot exchange rate.

domestic currency into dollars, thereby gaining access to dollar funding on a currency-hedged basis. Their portfolios have grown substantially since the GFC, giving rise to greater hedging needs.

On the supply side, dollars are provided by banks and other financial intermediaries, who source their dollars in global capital markets. However, in the decade following the GFC, banks that provide such hedging services have become a smaller part of the overall financial system, reflecting narrowing lending margins due to low interest rates, as well as tighter regulation (Erik et al (2020)).

Against this backdrop, the financial turbulence of recent weeks has led to a sharp decline in the supply of hedging services by banks as they retrench in the face of the shock. In addition, banks have experienced drawdowns of credit lines from corporate borrowers, which have crowded out other forms of lending by banks. Prime money market funds that traditionally supply dollar funding have experienced redemptions, leading to thinner supply. Together, the pullback in the supply of dollars from banks and market-based intermediaries (even as dollar demand has remained high) has resulted in the sharp increase in indicators of dollar funding costs.

This note reviews the recent events in FX swap markets in the context of the longer-term trends in the demand for dollars from institutional investors. We show in particular that the dollar exchange rate takes on the attributes of a risk capacity indicator for the banking sector. This reflects the tendency for an appreciating US dollar to dampen dealer banks' intermediation capacity. For this reason, the dollar exchange rate and dollar funding costs tend to move in lock-step, as they did during the recent bout of turbulence. The note concludes with a review of recent policy actions, in particular central bank swap lines aimed at quelling stresses in dollar funding markets, and discusses the broader policy challenges.

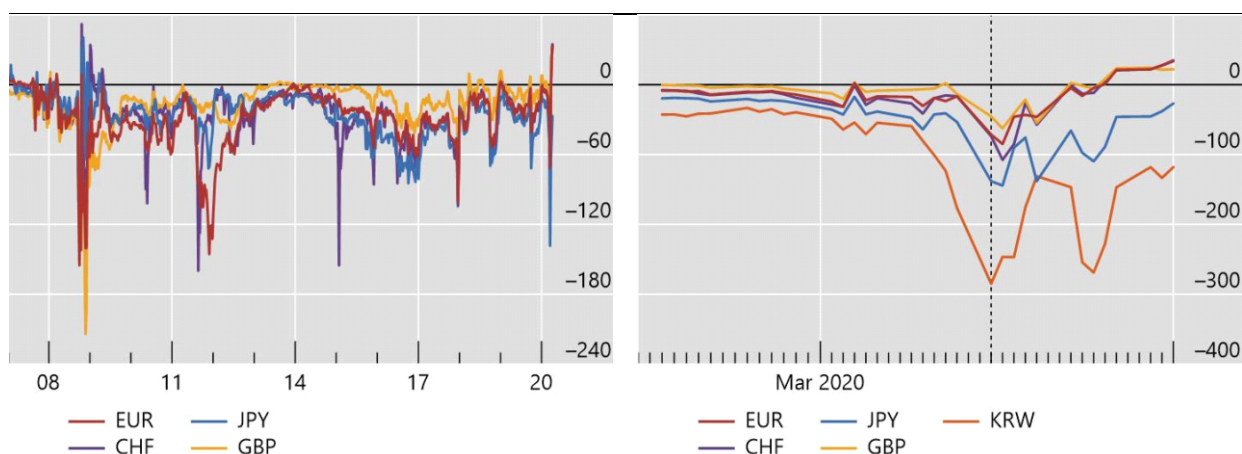
## Recent movements in the FX swap basis

Across major currencies, the basis vis-à-vis the US dollar has widened recently since the start of the Covid-19 pandemic. The widening of the basis has been evident especially at short maturities. The three-month basis has widened to as much as –144 bp for the Japanese yen, –85 bp for the euro, –107 bp for the Swiss franc and –62 bp for the pound sterling (Graph 1, left-hand panel).

### Three-month FX swap basis against the US dollar<sup>1</sup>

In basis points

Graph 1



<sup>1</sup> Calculated exploiting the covered interest parity condition as the spread between three-month US dollar Libor and three-month FX swap-implied US dollar rates. The vertical dashed line in the right-hand panel indicates 15 March 2020 (the announcement of the enhancement of swap lines between the Federal Reserve and five central banks).

Sources: Bloomberg; BIS calculations.

The basis for other Asian currencies has also widened, notably for the Korean won, although it has remained below the levels reached during the GFC for most currencies (Graph 1, right-hand panel). As discussed below, the growing foreign currency portfolios of Asian institutional investors (mostly dollar-denominated) have been an important component of the growth in the demand for dollar funding. Even where long-term dollar funding markets are underdeveloped, a common practice is to hedge the currency risk of long-term dollar assets by rolling-over short-term FX swaps.

Market stresses have abated somewhat following announcements that the standing swap lines of five central banks would be enhanced, and that temporary US dollar liquidity arrangements would be established with nine others. The basis has declined across the board and has even turned positive for the euro, the pound sterling and the Swiss franc (Graph 1, right-hand panel)

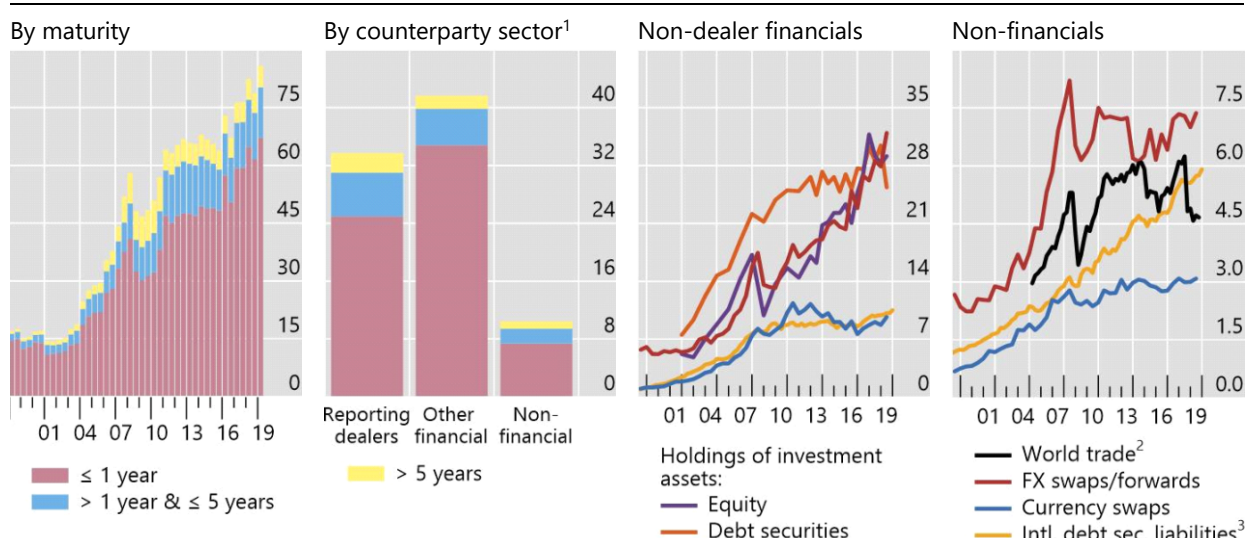
## Demand for dollars via FX swaps

Aggregate data on the use FX swaps and FX forwards can be obtained from the BIS derivatives statistics.<sup>2</sup> The BIS OTC derivatives data (OTC data) show that the total amount outstanding at end-June 2019 neared \$86 trillion (Graph 2, first panel), with FX swaps accounting for an estimated three quarters of this total. Not surprisingly, the US dollar is almost always one of the two currencies exchanged (89%). Roughly three quarters of outstanding positions had a maturity of less than one year, but turnover data show that the modal swap matures in a week or less.

### FX swaps/forwards and currency swaps hedge trade, bond debt and portfolios

Amounts outstanding, in USD trillions

Graph 2



<sup>1</sup> At end-June 2019. <sup>2</sup> Exports of goods and services. <sup>3</sup> All instruments, all maturities, all countries. Immediate issuer basis.

Sources: Dealogic; Euroclear; Thomson Reuters; Xtrakter; IMF CPIS; WTO; BIS OTC derivatives statistics; BIS calculations.

To see banks' demand for dollars in the FX swap market, we turn to the BIS international banking statistics (IBS). Banks generally avoid taking significant FX exposures, largely reflecting prudential regulations and risk management practices. Thus, we can infer their use of FX swaps from the gap in their

<sup>2</sup> The quantitative estimates in this Bulletin are an aggregate of FX swaps, FX forwards, non-deliverable forwards and currency swaps, since separate statistics are generally not available. The estimate of outstanding FX swaps (separate from outright forwards and NDFs) is derived from the Triennial Central Bank Survey of Foreign Exchange and OTC Derivatives Markets, where turnover figures for these instruments are reported separately.

on-balance sheet dollar assets and liabilities. Recent estimates show that Canadian, Japanese, and Swiss banks are net dollar borrowers in FX swap markets.

For non-banks, we use the BIS OTC derivatives data. Institutional investors use FX forwards to hedge their portfolio holdings (Graph 2, second and third panels). And non-dealer banks and hedge funds (also included in this group), use currency swaps (blue line) to hedge their own foreign currency debt securities liabilities (gold line) back into their home currency. For their part, non-financials (fourth panel) use FX forwards to hedge international trade (red and black lines), which is mainly based on short-term contracts, and currency swaps to hedge their debt securities liabilities.

The recent outsized moves in the JPY/USD basis (Graph 1) suggest that the demand of Japanese investors for dollars remains strong. Borio et al (2016) shows that an estimate which combined Japanese banks' (including their trustee positions) dollar funding gaps with Japanese insurance companies' dollar asset portfolios was highly (inversely) correlated with the three-year JPY/USD basis through at least 2016. There is nothing to suggest that this demand for dollars has waned.

Insurers and pension funds from elsewhere in the region also have large and, until recently at least, growing foreign currency portfolios. Setser (2020) notes that Asia's life insurers (including in Japan) hold somewhere between \$1.5 trillion and \$2 trillion in foreign currency bonds (mostly dollar-denominated). Ongoing analysis conducted by the CGFS highlights the same issue and finds that the bulk of the FX hedging instruments used in such portfolios have short maturities. Hedging a \$2 trillion dollar portfolio that is, say, 80% dollar-denominated with a 60% hedge ratio using three month swaps would require rolling \$960 billion in dollar swaps every three months, or \$320 billion every month.

## Supply of hedging services by global banks

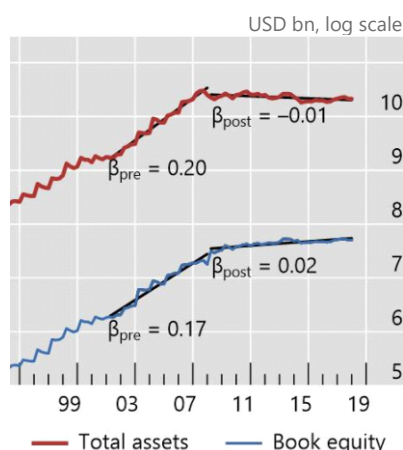
Against the backdrop of strong demand for dollars, the supply of hedging services has fluctuated with the risk capacity of financial intermediaries. After the GFC, banking sector assets have grown noticeably more slowly (Graph 3, left-hand panel), reflecting the increase in the cost of bank balance sheet capacity (Erik et al (2020)). In the meantime, banking activity became more sensitive to the strength of the US dollar (Graph 3, centre panel).

A key mechanism through which the US dollar exchange rate can affect the risk-taking capacity of banks is the financial channel of exchange rates (Bruno and Shin (2015)). For a global bank that holds a diversified portfolio of loans to borrowers, some of whom have currency mismatches, a broad dollar appreciation tends to increase the credit risk of the portfolio of loans. This drives up the tail risk in dealer banks' global portfolios, which in turn reduces their risk-taking capacity if the bank adjusts total lending so that total risk is managed down to match the bank's economic capital.

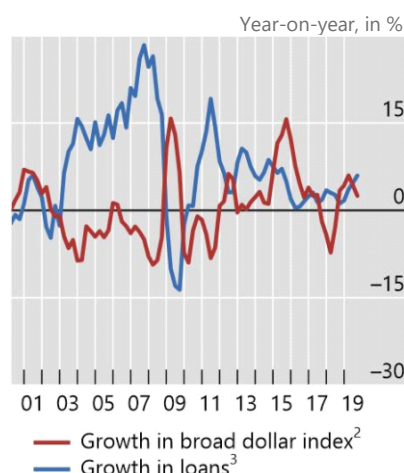
A manifestation of this channel has been the negative relationship between the broad US dollar index and the basis for number of currencies. Intuitively, global banks' willingness to supply FX hedging services has fluctuated with the strength of the US dollar (Avdjiev et al (2019)). And as a consequence, periods of broad dollar strength have coincided with a large (negative) basis for most major currencies. This relationship has been especially strong during the recent period of pandemic-induced stress in global financial markets (Graph 3, right-hand panel). The sharp appreciation of the dollar in recent weeks (red line) is mirrored by the sharp widening of the FX basis (blue line).



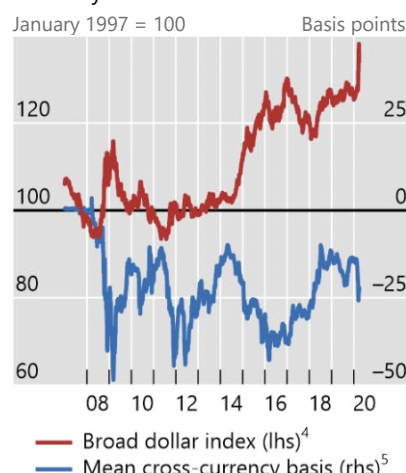
Total assets and book equity of euro area and US banks



US dollar index and USD credit to non-banks outside the United States



US dollar index and the cross-currency basis



<sup>1</sup> The beta coefficient shows the trend growth rate in natural logarithm. For instance, a 0.15 value corresponds to around 15% growth rate per annum. <sup>2</sup> Annual growth of the Federal Reserve Board trade-weighted nominal dollar index, broad. <sup>3</sup> Annual growth of US dollar-denominated loans to non-banks outside the United States. <sup>4</sup> Federal Reserve Board trade-weighted nominal dollar index, broad. <sup>5</sup> Average five-year cross currency basis across pound sterling, Canadian dollar, Danish krone, euro, Japanese yen, Norwegian krone, Swedish krona and Swiss franc vis-à-vis the US dollar (for the difference between FX swaps and cross-currency swaps, see [www.bis.org/publ/qtrpdf/r\\_qt0803z.htm](http://www.bis.org/publ/qtrpdf/r_qt0803z.htm)).

Sources: Bloomberg; Datastream; Dealogic; Euroclear; FRED; Thomson Reuters; Xtrakter Ltd; national data; BIS locational banking statistics; BIS calculations.

## Drivers of recent developments and policy challenges

The shift of money market investors away from prime money market funds into government money market funds has tightened bank funding conditions further, through two channels. First, banks receive less funding directly from them. Second, corporate borrowers who would normally issue commercial paper bought by money market funds have rushed to draw down their credit lines with banks, thereby crowding out other forms of bank lending (Graph 4, left-hand panel). Credit line drawdowns are reported to have reached \$124 billion since 1 March.<sup>3</sup> Furthermore, a wider LIBOR-OIS spread indicates greater funding costs for banks to undertake arbitrage activities (Graph 4, centre panel).

Beginning on 17 March, four central banks – the Bank of Japan, the ECB, the Bank of England and the Swiss National Bank – that had established swap lines with the Federal Reserve started dollar liquidity operations. The take-up has been large, but has been declining in recent days. While dollar funding stress in FX swap markets has abated somewhat, it remains evident in commercial paper markets (Graph 4, centre panel), despite other policies introduced by the Federal Reserve (eg commercial paper funding facility, primary dealer credit facility and the money market liquidity facility). With significant foreign participation in the CP market, stress in this market might spill over to the FX swap markets if firms tap these markets to obtain dollars (Graph 4, right-hand panel).

Away from short-term liquidity operations, broader policy challenges remain. First, many economies do not have swap lines with the Federal Reserve. In the past, when faced with dollar shortages, the main options for these economies have been to sell dollar assets or seek funds from the IMF. However, sales of FX reserve portfolios could disrupt markets and tapping IMF resources takes time. On 31 March, the

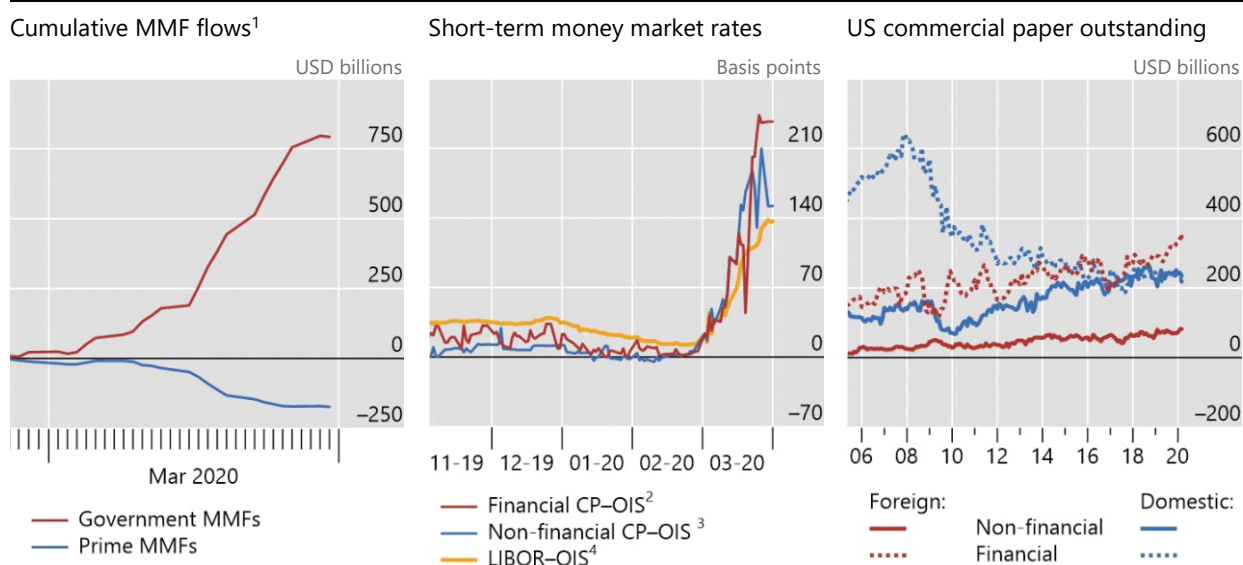
<sup>3</sup> See [www.ft.com/content/6b299c42-6c66-11ea-89df-41bea055720b](http://www.ft.com/content/6b299c42-6c66-11ea-89df-41bea055720b).

Federal Reserve announced the establishment of a new temporary repo facility for foreign and international monetary authorities that would allow them to enter into repurchase agreements with the Federal Reserve. This facility creates another option for central banks with US Treasury holdings to obtain dollar liquidity without potential market disruptions.

Second, today's crisis differs from the 2008 GFC, and requires policies that reach beyond the banking sector to final users. These businesses, particularly those enmeshed in global supply chains, are in constant need of working capital, much of it in dollars. Preserving the flow of payments along these chains is essential if we are to avoid further economic meltdown.

## Money market fund flows, short-term rates, and commercial paper markets

Graph 4



<sup>1</sup> As of 25 February 2020. <sup>2</sup> Difference between interest rates paid by United States Commercial Paper (AA) Financial and OIS three-month. <sup>3</sup> Difference between interest rates paid by United States Commercial Paper (AA) Non-financial and OIS three-month. <sup>4</sup> Difference between LIBOR USD and OIS three-month.

Sources: Crane Data; Federal Reserve; Bloomberg; BIS calculations.

Channelling dollars to non-banks is not straightforward. Allowing non-banks to transact with the central bank is one option, but there are attendant difficulties, both in principle and in practice. Other options include policies that encourage banks to fill the void left by market based finance, for example funding for lending schemes that extend dollars to non-banks indirectly via banks.

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