

## The global foreign exchange market in a higher-volatility environment<sup>1</sup>

*Turnover in global foreign exchange (FX) averaged more than \$7.5 trillion per day in April 2022 amid a volatile market environment. Compared with the previous BIS Triennial survey in 2019, trading volumes were higher because of greater activity in short-maturity FX derivatives and more inter-dealer trading. By contrast, trading with customers stagnated, mirroring a slowdown in international investment in 2022. A greater share of trading was executed via various bilateral methods, rather than via multilateral platforms that make prices available to all participants, implying that the transparency of the FX market may have decreased further.*

*JEL classification: C42, C82, F31, G12, G15.*

Turnover in global foreign exchange (FX) markets reached \$7.5 trillion per day in April 2022 (Graph 1, panel A),<sup>2</sup> a volume that is 30 times greater than daily global GDP.<sup>3</sup> The Triennial Central Bank Survey of over-the-counter (OTC) foreign exchange turnover (“Triennial Survey”) offers a glimpse into this vast FX market. This year in April, data collection coincided with heightened FX volatility due to a confluence of factors, such as changing expectations about the paths of future interest rates in major advanced economies, rising commodity prices and geopolitical tensions after Russia’s invasion of Ukraine.

Global FX volumes were higher compared with the previous Triennial Survey in 2019, owing to two main drivers. First, more trading in short maturity FX derivatives, which mechanically increases turnover, under the assumption that many contracts are rolled over. And the greater use of short maturity derivatives may reflect market participants’ aversion to taking on term risk in a more volatile environment. Second, more inter-dealer trading, which tends to rise with volatility. In fact, the rise in inter-dealer turnover was big enough to reverse the long-term trend of a declining inter-dealer share in global FX trading. By contrast, dealers’ trading with financial customers stagnated, mirroring the slowdown in international financial investment activity.

<sup>1</sup> We thank Ryan Banerjee, Claudio Borio, Alain Chaboud, Stijn Claessens, Philippe Lintern, Benoît Mojon, James O’Connor, Frank Packer, Andreas Schrimpf, Hyun Song Shin, Nikola Tarashev and Goetz von Peter for useful comments. Jose Maria Vidal Pastor provided excellent research assistance. All errors are our own. The views expressed in this article are those of the authors and not necessarily those of the Bank for International Settlements.

<sup>2</sup> See Bank for International Settlements (2022a) for detailed survey results.

<sup>3</sup> Global GDP amounted to \$96.1 trillion in 2021 or \$0.26 trillion per day; see World Bank, World Development Indicators database, 1 July 2022.

## Key takeaways

- Turnover in global foreign exchange markets reached \$7.5 trillion per day in April 2022, in a market that was more volatile than during the previous survey in 2019.
- Inter-dealer trading increased, reversing a long-run trend. By contrast, trading by dealers with customers stagnated, partly reflecting a slowdown in international investment activity.
- Trading moved further away from multilateral platforms towards bilateral methods, where information remains private, suggesting that the transparency of the FX market may have decreased further.

Trading with hedge funds and principal trading firms (PTFs), and the associated prime-brokered turnover, also declined, suggesting some reduction in activity by non-bank financial intermediaries in the FX market.

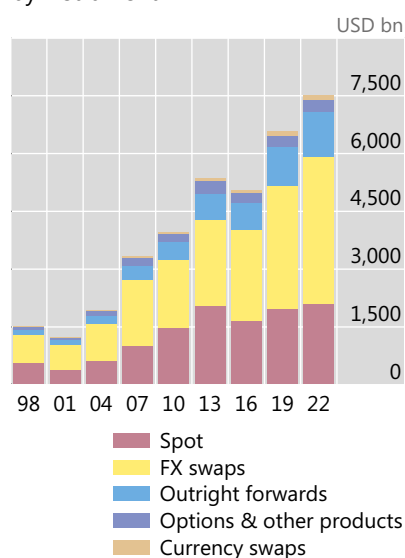
The share of FX trading using various bilateral methods, where information about the trade remains private, has increased. This reflects both inter-dealer and dealer-customer trading shifting away from multilateral platforms. In the inter-dealer market, trading volumes executed via electronic brokers, where trade attributes such as prices can be seen by all participants, have thus continued to decline. The notable shift towards bilateral forms of trading in 2022 implies a continued reduction of “visible” trading and increased market fragmentation, suggesting that the transparency of the FX market may have decreased further.

The remainder of the feature starts with a bird’s eye view of long-run trends. This forms the backdrop for discussing the Triennial results obtained this year amid more volatile markets than during previous surveys. The last two sections delve deeper into the dealer-customer and inter-dealer market segments.

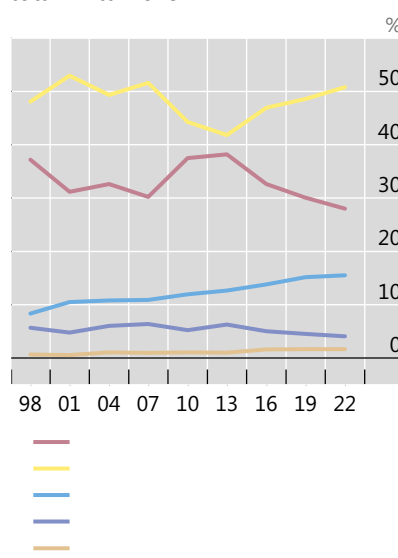
## Global FX trading volumes grow and some longer run trends reverse<sup>1</sup>

Graph 1

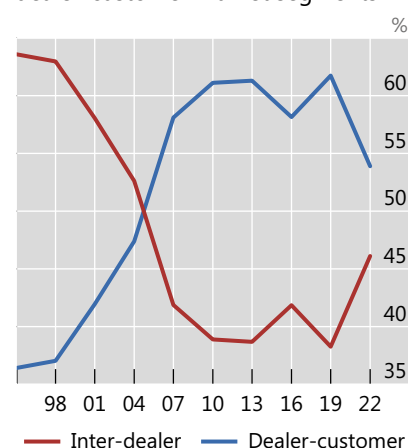
A. Foreign exchange market turnover by instrument



B. Share of different instruments in total FX turnover



C. Relative size of inter-dealer vs dealer-customer market segments



<sup>1</sup> See technical annex for details.

Sources: BIS Triennial Central Bank Survey; BIS.

## The global FX market – a bird’s eye view of long-run trends

While more than 50 currencies trade globally, FX trading activity is concentrated in a few trading hubs and major currencies. The Triennial captures sales desk activity in 52 jurisdictions for 56 currencies. Yet, close to 80% of all FX trading takes place in the five FX trading hubs that are major financial centres. Furthermore, as the pre-eminent vehicle currency, the US dollar was on one side of around 90% of all FX trades in April 2022 (see Box A), a share virtually unchanged for decades.

FX trading involves both spot and derivatives, with the share of spot having been on a gradual decline over the last 10 years (Graph 1, panel B). FX swaps are the most traded FX instrument and their share increased from around 40% in 2013 to more than 50% in 2022. They are typically used by market participants to take positions, manage funding liquidity in different currencies and hedge currency risk.<sup>4</sup> Forwards are the third most traded instrument,<sup>5</sup> used mainly to hedge currency risk or to bet on future currency movements. Their market share has edged up gradually over time.

The FX market can be broadly characterised as consisting of a dealer-customer and an inter-dealer segment. Such a two-tier structure is typical of OTC markets, where dealers warehouse risk and serve as counterparties, ie provide liquidity, to end users. Inter-dealer trading volumes used to exceed trading volumes with customers until about two decades ago due to inter-dealer trading of inventory imbalances.<sup>6</sup> Thereafter, various structural changes resulted in relatively less inter-dealer trading (Graph 1, panel C). Examples include more efficient inventory risk management and “internalisation”, whereby dealers match customer flows on their own books.

But the distinction between the core inter-dealer and dealer-customer market segments has become somewhat blurred over time. This reflects a proliferation of multilateral trading venues, a growing variety of execution methods, and some non-bank actors emerging as liquidity providers alongside dealers. Especially in spot markets, principal trading firms (PTFs) have become important. PTFs rely mostly on speed and automated trading strategies rather than balance sheet capacity to support their market intermediation activities. As they have morphed into liquidity providers to customers, PTFs have become an integral part of FX intermediation and a key determinant of liquidity conditions.

<sup>4</sup> Borio et al (in this issue) discuss the use of FX swaps as funding instrument in greater detail.

<sup>5</sup> Outright forwards include deliverable forwards and as well non-deliverable forwards (NDFs).

<sup>6</sup> Lyons (1996) coined the term “hot potato trading” in reference to the repeated passing of inventory imbalances among dealers. A single customer trade could generate a cascade of inter-dealer trades until the inter-dealer market would settle at a new equilibrium price.

## Revisiting the international role of the US dollar

*Bafundi Maronoti* <sup>①</sup>

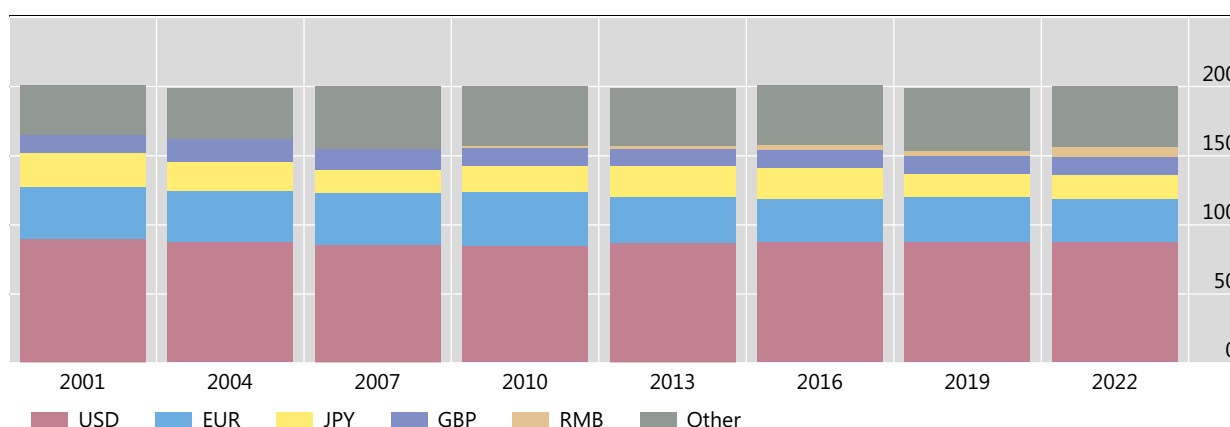
The international role of the US dollar (USD) is unrivalled. However, there is at times speculation that its role may be challenged. The reasons cited include China's growing role in the global economy, developments in technology (eg cryptoassets) or geopolitical considerations.<sup>②</sup> This box provides an updated view of the international role of the USD, focusing mostly on its role in global financial markets.

The global FX market remains concentrated in a few currencies, with the USD dominating. The average turnover per day with the USD on one side of the transaction was \$6.6 trillion – up 14% from \$5.8 trillion in 2019 – in line with the change in total turnover. The USD was involved in nearly 90% of global FX transactions, making it the single most traded currency in the FX market (Graph A1). The dominance of the USD is evident across all FX instruments and counterparties. At least 85% of trading in the spot, forward and swap markets features the USD in one leg of the transactions.

### Foreign exchange turnover by currency<sup>1</sup>

In per cent

Graph A1



<sup>1</sup> As two currencies are involved in each transaction, the sum of shares in individual currencies will total 200%. Adjusted for local and cross-border inter-dealer double-counting, ie "net-net" basis; daily averages in April.

Source: BIS Triennial Central Bank Survey.

Other currencies lag well behind (Graph A1). The euro – the second most traded currency – has a share of only 31%, down from its peak of 39% in 2010. A similar trend can be observed for the Japanese yen, while the British pound has maintained a largely constant share. The shift from these major currencies has been matched by a rise in the role of emerging market economy currencies such as the renminbi. The latter's share in global FX turnover has increased from less than 1% 20 years ago to more than 7% now (see Box A in Caballero et al, in this issue).

The USD's dominance in global FX markets is linked to several factors. First, its use as a vehicle currency for FX transactions, meaning that non-US dollar currency pairs are not exchanged directly but via the dollar. According to some estimates, this role of the USD drives just under 40% of its turnover in FX markets.<sup>③</sup>

Second is the dollar's footprint in offshore funding markets, where financial market participants raise debt or obtain loans in foreign currency. About half of all international debt securities and cross-border loans issued in these offshore funding markets are denominated in USD (Graph A2, panel A). As of the second quarter of 2022, the amount of debt and loans denominated in USD where neither the issuer/borrower nor the lender is a US resident is estimated to be 88% of total international USD-denominated debt and 65% of total international USD bank loans (Graph A2, panel A).

Third is the currency's popularity in international trade and global payments. Approximately half of global trade is invoiced in USD, although this share varies widely across regions (Graph A2, panel A).<sup>④</sup>

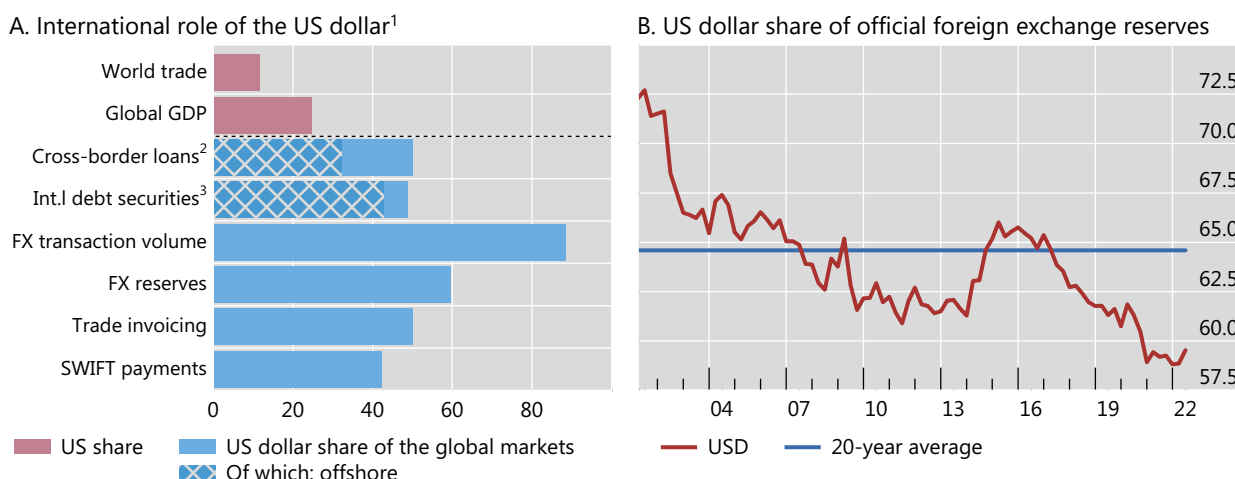
This disproportionately large reliance on the USD is in spite of the United States accounting for just over a 10th of global trade. These shares have hardly changed since 2019 (see CGFS (2020)).<sup>⑤</sup>

One area where the role of the USD has been shrinking to some degree is official foreign exchange reserves, even though it remains the foremost reserve currency. As of the second quarter of 2022, the USD accounted for less than 60% of official foreign exchange reserves (Graph A2, panel B). This is one of the lowest shares in the past 20 years and is well below the average of 65% for the period.

## The international role of the US dollar

In per cent

Graph A2



<sup>1</sup> Data refer to latest available value. <sup>2</sup> USD-denominated cross-border loans by banks to counterparties in all countries (excluding inter-office claims but including interbank claims on account of loans and deposits). Offshore refers to cross-border loans excluding loans from United States and on United States. <sup>3</sup> USD-denominated international debt securities by all issuers; these securities are issued outside the local market of the country where the borrower resides (eg eurobonds or foreign bonds). Offshore refers to USD-denominated loans/debt issued outside United States.

Sources: G Gopinath, "The international price system", *NBER Working Papers*, no 2164, 2015; IMF; Bloomberg; CPB World Trade Monitor; SWIFT; BIS debt securities statistics; BIS locational banking statistics; BIS Triennial Central Bank Survey.

① The views expressed are those of the authors and do not necessarily reflect those of the Bank for International Settlements. ② Congressional Research Service, 15 September 2022. For the US dollar as the world's dominant reserve currency, see L Goldberg, R Lerman and D Reichgott, "The U.S. dollar's global roles: revisiting where things stand", Federal Reserve Bank of New York, *Liberty Street Economics*, 5 July 2022. ③ F Somogyi, "Dollar dominance in FX trading", University of St. Gallen, School of Finance Research Paper, no 2021/15. ④ The share of USD in trade invoicing is estimated to be higher in the Americas, but lower in Europe where trade invoicing is predominantly done in euros: see C Bertaut, C von Beschwitz and S Curcuru, "The international role of the U.S. dollar", Washington: Board of Governors of the Federal Reserve System, *FEDS Notes*, 6 October 2021. ⑤ Committee on the Global Financial System, "US dollar funding: an international perspective", *CGFS Papers*, no 65, June 2020.

## Aggregate FX turnover in a higher-volatility environment

Comparing the results of the 2022 Triennial with the 2019 Survey is complicated by very different market environments. The 2019 Triennial covered a month in a period of subdued and falling volatility in FX markets. And ultra-low interest rates supported intermediation and liquidity provision in FX markets. The 2022 environment looks very different. Especially important for the FX market this year was the high and uncertain inflation path, driving rapid but globally diverging monetary tightening. The Russian invasion of Ukraine led to further uncertainty and market turbulence. These

developments had a profound effect on international capital flows and financial market volatility, including that in currency markets.

To get a better sense of the relationship of volatility and turnover in FX markets, we benchmark the Triennial with higher-frequency series.<sup>7</sup> This allows us to compare changes in turnover not only over three years but also on a month-by-month basis.

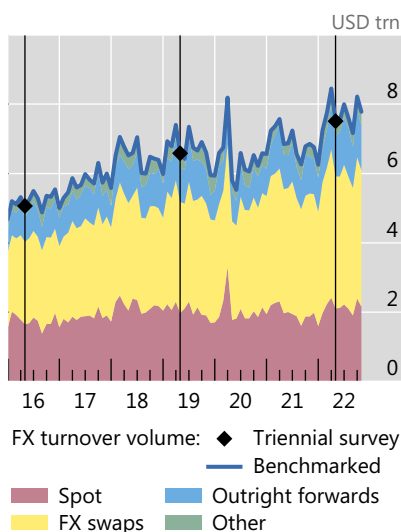
The higher-frequency benchmark shows that turnover increased in tandem with FX volatility in the early part of 2022 (Graph 2). At close to \$8.5 trillion per day, turnover in March 2022 is estimated to have exceeded even the prior peak during the Covid-19 financial market turmoil in March 2020. In July and August this year, some divergence between volatility and turnover emerged when exchange rate volatility continued to rise while turnover did not.

The positive relationship between turnover and volatility is in line with historical relationships and not too surprising (Graph 2, panel C). In a higher-risk environment, market participants tend to adjust positions, shift towards hedging currency risk, or take more speculative positions – activities that all drive up turnover. A dispersion of beliefs about the future among investors will also drive trading volumes higher.<sup>8</sup>

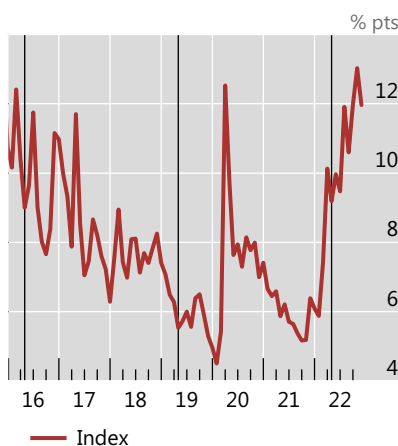
## FX trading volumes at a higher frequency follow volatility<sup>1</sup>

Graph 2

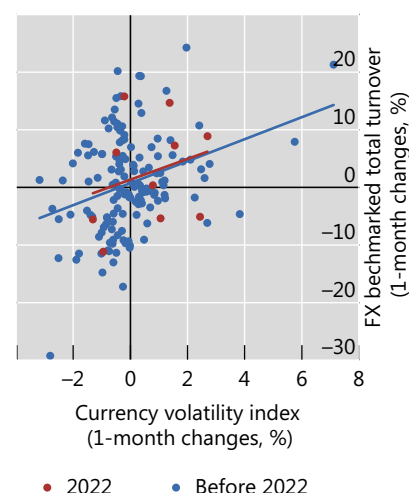
A. Benchmarked FX trading volumes



B. Currency volatility



C. Currency volatility and FX turnover<sup>2</sup>



<sup>1</sup> See technical annex for details. <sup>2</sup> R-squared = 0.1; the fitted line remains upwards-sloping and significant when outliers are excluded.

Sources: Bech (2012); Semiannual FX Committee Surveys; CBOE; CLS; Refinitiv; BIS.

<sup>7</sup> The benchmarking follows Bech (2012) and complements the Triennial mainly with semiannual surveys of local FX committees and monthly data from the Continuous Linked Settlement Group.

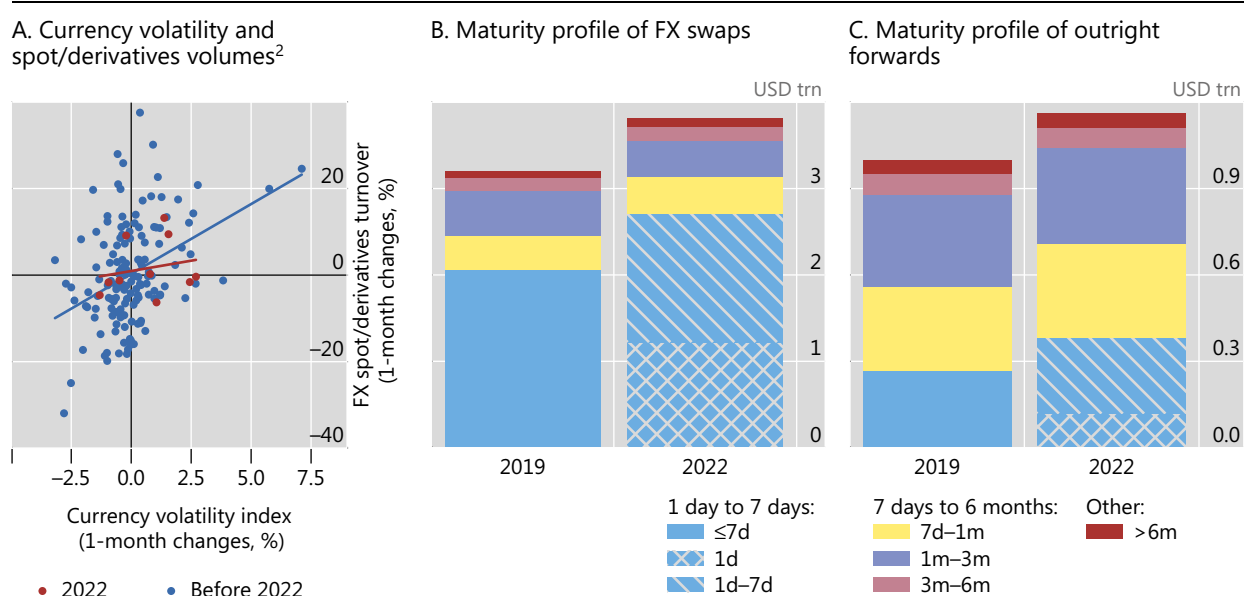
<sup>8</sup> The impact of disagreement on trading volume has been appreciated at least since Varian (1985).

That said, trading in spot did not outpace that in derivatives, as it did in previous high-volatility episodes. The monthly benchmark series spot and derivatives volumes show that, historically, it was spot trading that increased faster with volatility than derivatives trading. This is especially visible during the Covid-19 crisis in March 2020. Hence, the positive relationship of changes in volatility with changes in the ratio of spot to derivative turnover (Graph 3, panel A). This year, however, both spot and derivatives trading grew in tandem so that their ratio remained unchanged (red dots). This may reflect that in early 2022 market participants adjusted to changing expectations of a prolonged period of uncertainty.

The higher turnover in FX derivatives may reflect the increasing use of short maturities. A shift towards shorter maturities increases turnover mechanically, under the assumption that many contracts are rolled over. The more granular but lower-frequency data from the Triennial shows that the growth of turnover in FX swaps and forwards between 2019 and 2022 was due entirely to more trading in shorter tenors with maturities of one week or less (Graph 3, panels B and C). And the overnight segment, first split out in 2022, accounted for close to half of short-maturity swaps and almost a third of short-maturity forwards. As inter-dealer FX swap trading is predominantly in very short tenors, the higher inter-dealer share in 2022 is one factor behind the overall shortening of maturities.

### Short-maturity FX derivatives turnover grows strongly<sup>1</sup>

Graph 3



<sup>1</sup> See technical annex for details. <sup>2</sup> Derivatives include outright forwards and FX swaps. R-squared = 0.146; the fitted line remains upwards-sloping and significant when outliers are excluded.

Sources: CBOE; CLS; BIS Triennial Central Bank Survey; BIS.

## Dealers' trading with customers stagnates

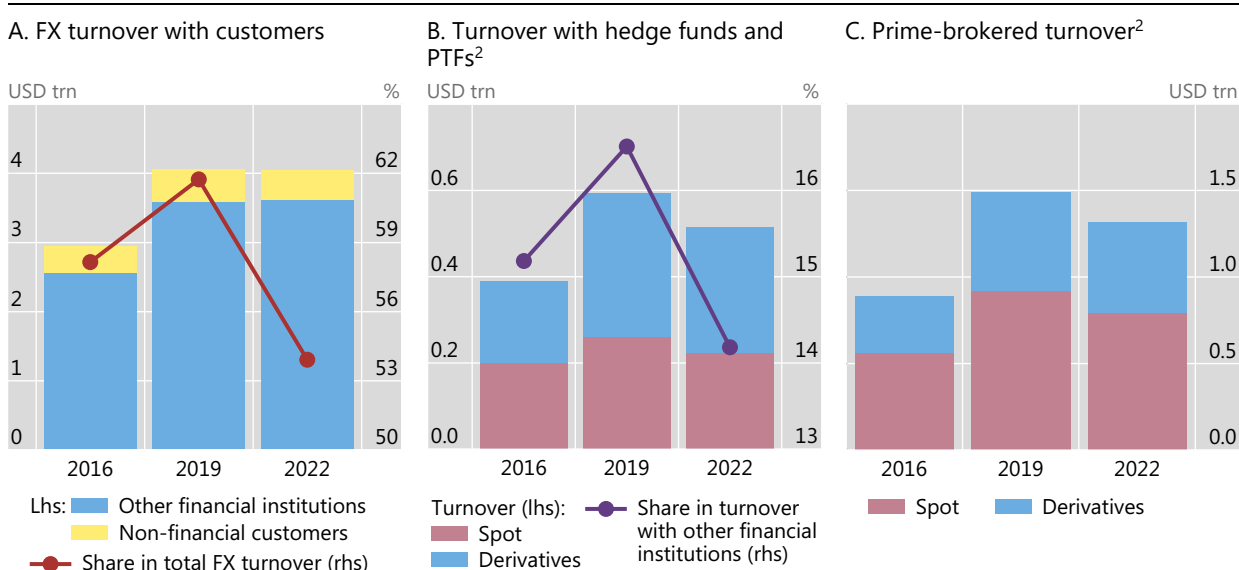
At the broadest level, customers to reporting dealers are categorised into two groups. First, non-financial customers, such as global corporates, which make up only a small and shrinking fraction of dealer-customer turnover.<sup>9</sup> Second, other financial institutions – a customer group that includes non-reporting banks, hedge funds and PTFs, institutional investors, and official sector financial institutions.

Dealers' trading with customers has stagnated in dollar terms compared with three years ago (Graph 4, panel A). Given the overall growth of the market, the share of dealer-customer turnover therefore fell from 62% to 54%. Stagnant customer trading may partly reflect the risk-off environment. Contraction in international investment in early 2022 likely played a role as gross external portfolio positions contracted sharply in the first quarter of 2022.<sup>10</sup> And whenever international investment positions have fallen historically, FX market turnover with other financial institutions has fallen too.<sup>11</sup>

Across customer segments, there was a small shift away from trading with hedge funds and PTFs. Turnover with this segment declined both in spot and derivatives. Hence, the share of hedge funds and PTFs in total turnover with other financial

Customer trading volumes stagnate<sup>1</sup>

Graph 4



<sup>1</sup> See technical annex for details. <sup>2</sup> Derivatives include currency swaps, FX swaps, outright forwards and options.

Sources: BIS Triennial Central Bank Survey; BIS.

<sup>9</sup> The share of non-financial customers in total FX turnover fell from 7% to 6% between 2019 and 2022.

<sup>10</sup> Data from the IMF Coordinated Portfolio Investment Survey (CPIS) show that gross (assets plus liabilities) international portfolio positions of residents in a sample of 25 advanced and emerging market economies contracted by \$7 trillion between Q4 2021 and Q1 2022.

<sup>11</sup> Combining the IMF CPIS data with the BIS Triennial, we find a significant positive relationship between international investment portfolios and FX turnover, when regressing the three-year changes in FX turnover with other financial institutions in a currency of a specific jurisdiction on three-year changes in gross external portfolios (assets plus liabilities) of residents in that jurisdiction. Retrenchment of foreign portfolio investment also explains a lower level of turnover in EME currencies (Caballero et al (2022), in this issue).



institutions declined from 17% to 14% (Graph 4, panel B). The associated prime-brokered turnover declined as well (Graph 4, panel C). Given high volatility, market sources suggest that hedge funds have been very active in April this year. Hence, the decline is most likely to reflect less turnover with PTFs. The *Euromoney* magazine rankings also show that the PTF share in (direct electronic) spot liquidity provision to clients has declined, from 32% to 28% between 2019 and 2022. The relatively more muted PTF activity could reflect a range of factors such as a reported shift by some PTFs from highly competitive and efficient FX markets to less efficient asset classes with greater arbitrage opportunities, such as crypto, dealers catching up technologically or the factors underpinning the resurgent inter-dealer market as discussed next.

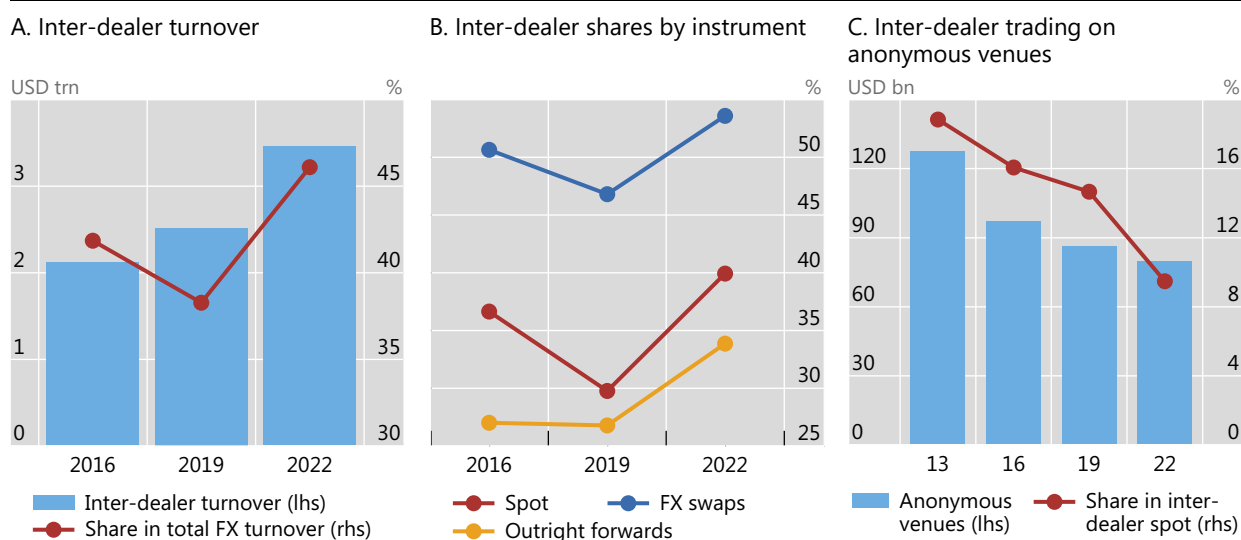
## A resurgent inter-dealer market

Reversing the long-run trend decline, the share of inter-dealer trading has grown significantly over the last three years, to account for more than 45% of all FX trading volumes in April 2022 (Graph 5, panel A). Such a share was last seen in the mid-2000s (see Graph 1, panel B). Inter-dealer activity gained relative ground across all three major instruments, to 40% in spot, 54% in FX swaps and 34% in outright forwards (Graph 5, panel B).

The relative rise in inter-dealer trading volumes may partly reflect the more volatile environment. Higher-volatility means greater need to offset inventory imbalances with other dealers and to engage in other risk management trades.

Inter-dealer trading rises across all major instruments<sup>1</sup>

Graph 5



<sup>1</sup> See technical annex for details.

Sources: BIS Triennial Central Bank Survey; BIS.

## Less inter-dealer trading is public

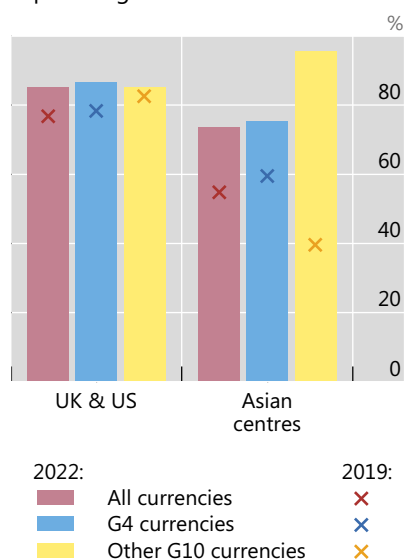
The inter-dealer market provides crucial information for ascertaining market conditions and obtaining reference prices for the wider FX market. The centralised structure of the electronic inter-dealer spot market has meant that this core activity and information was contained within two main inter-dealer electronic brokers (see Box B). These are organised as central limit order books (CLOBs), where information such as quantities and prices is visible to traders on the platform. And analogous to an exchange, trading on these multilateral venues is anonymous, ie the counterparty is unknown (hence they are classified as “anonymous venues” in the Triennial).<sup>12</sup> This contrasts with many other venues in the FX market, which trade by “direct” means. In these cases, dealers, for instance, respond bilaterally to requests from customers or stream prices electronically to specific customers. Hence, conditions of trades executed by direct means are known only to the two counterparties (see Box C).

The 2022 Triennial shows a further decline of trading on inter-dealer electronic brokers – a continuation of a long-run trend (Graph 5, panel C). Even as inter-dealer spot trading increased by 43% compared with 2019, the share of inter-dealer spot turnover traded via electronic brokers declined further, from 15% to 9%. Lower spot volumes on inter-dealer electronic brokers also go hand in hand with lower PTF trading activity, as PTFs account for a significant amount of trading activity on inter-dealer brokers.<sup>13</sup>

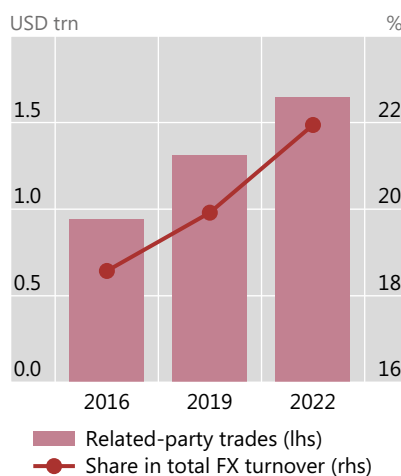
### Internalisation and related party trading increase further<sup>1</sup>

Graph 6

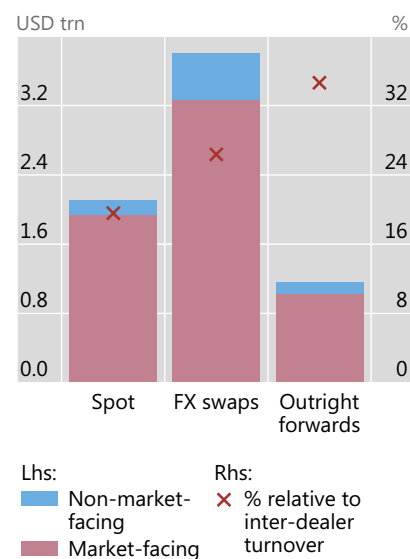
A. Internalisation ratios for spot in top trading centres



B. Related-party trades



C. Non-market-facing trades



<sup>1</sup> See technical annex for details.

Source: BIS Triennial Central Bank Survey.

<sup>12</sup> The inter-dealer FX swap market is organised differently from spot. It has been highly fragmented for a long time; there is no anonymous trading in FX swaps, with electronic trading executed mainly via a “request-for-quote” trading protocol (see Ranaldo (2022)).

<sup>13</sup> Chaboud et al (2022) show that non-bank (eg PTF) trading volumes, executed algorithmically, accounted for more than 40% of all trading on EBS in mid-2021.

Several drivers are behind the trend decline in inter-dealer electronic brokers. First, more inter-dealer trading via disclosed and direct means, as, for example, in the fact that smaller dealers increasingly source liquidity from big dealers for their own customers in this form. Second, internalisation, whereby dealers match customer flows on their own books, continues to substitute for inter-dealer trading (Butz and Oomen (2018)). While major FX dealers have been internalising most of their customer flows for a long time, the recent Triennial shows a further increase in internalisation ratios, particularly on the part of dealers in Asian financial centres (Graph 6, panel A).<sup>14</sup> Third, related-party trades, ie trades between different organisational units of a single dealer, which have continued to rise to 22% of total turnover (Graph 6, panel B).<sup>15</sup> Relatedly, the 2022 Triennial first broke out “non-market-facing” trades. These amounted to \$895 billion, and their shares in the different instruments ranged between 20 and 35% of inter-dealer turnover (Graph 6, panel C).<sup>16</sup> While internalisation and non-market-facing trades seem rather technical factors, in many cases they represent alternative choices to “going to the market”, where they would have affected market conditions.

While less “visible” trading and greater market fragmentation have so far not hampered market functioning, this development may not be without downsides. Market participants have successfully used technologies to navigate a more fragmented market. For example, customers rely on smart order routing and execution algorithms to spread large orders over time and across multiple electronic venues (Markets Committee (2020)). Yet, less visibility for trades could harm price discovery for the market as a whole. It also hinders policymakers from appropriately monitoring FX markets (see Markets Committee (2018)).

<sup>14</sup> Data on internalisation ratios are likely to be less precise than the turnover figures as they are collected as a supplementary question.

<sup>15</sup> A variety of transactions can be related-party trades, such as an FX desk of a dealer bank conducting a risk transfer trade with its headquarters, which does consolidated risk management globally; a derivatives desk hedging risk resulting from a trade with a spot desk of the same institution; or a local affiliate raising foreign currency funding by entering an FX swaps transaction with its headquarters

<sup>16</sup> The Survey collected back-to-back and compression trades as part of non-market-facing trades. Back-to-back trades are deals that automatically follow trades with customers to shift risk across the sales desks of a dealer. Compression trades refer to portfolio optimisation by replacing existing contracts with new ones to reduce notional amounts while keeping net exposures unchanged.

## Dealer-customer and inter-dealer trading in a fragmented spot market

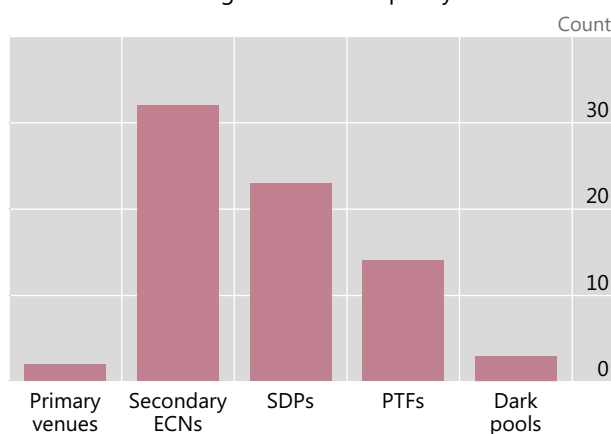
Mathias Drehmann and Vladyslav Sushko <sup>①</sup>

Trading activity in the FX markets is fragmented across a range of venues and liquidity providers (Markets Committee (2018)).<sup>②</sup> Before the turn of the millennium, the FX market was a “plain vanilla” OTC market, with trading dominated by major dealers. While still retaining its OTC structure, a multitude of other venues and providers has emerged since then (see eg Chaboud et al (2022)).<sup>③</sup> For three decades, two electronic brokers, Reuters (now Refinitiv) Matching and Electronic Broking Services (EBS) Market, have been especially important for the inter-dealer spot market. Often referred to as the “primary venues”, they are organised as central limit order books (CLOBs). They have been the main sources of reference prices for the entire spot market.<sup>④</sup> But there are also more than 30 secondary venues in the dealer-customer market segment, which has grown strongly in recent years, especially when compared with primary market activity (Graph B1). Customers can also trade directly with more than 20 dealers via proprietary single-dealer platforms (SDPs) or obtain direct price streams from more than a dozen PTFs.

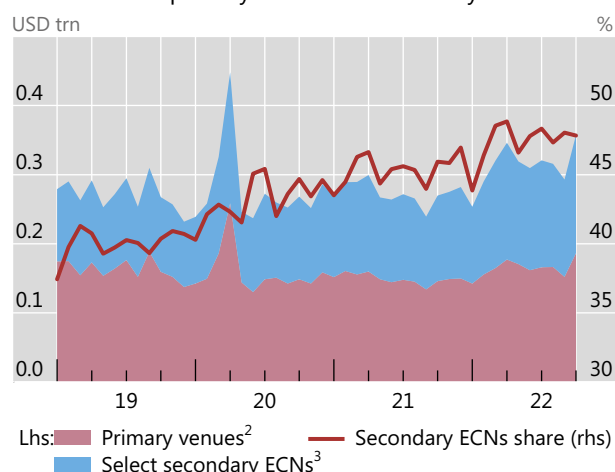
### With further FX market fragmentation, volumes across platforms diverge

Graph B1

A. Number of trading venues and liquidity sources<sup>1</sup>



B. Volumes on primary and select secondary venues



<sup>1</sup> Primary venues: CME/NEX EBS Market and Refinitiv/Reuters Matching; Secondary ECNs: a variety of anonymous and disclosed multi-dealer platforms; SDPs: proprietary single-dealer platforms of FX dealer banks; PTFs: principal trading firms. Dark pools: electronic venues where information about traders' orders is not revealed to other participants. <sup>2</sup> CME/NEX EBS and Refinitiv spot turnover (a proxy for trading volumes on EBS Market and Refinitiv/Reuters CLOBs). <sup>3</sup> 360T, Cboe FX (Hotspot); Euronext FX (Fastmatch); FXSpotStream.

Sources: CBOE; CME; Deutsche Borse; Euronext; FXSpotStream; MarketFactory; Refinitiv; BIS.

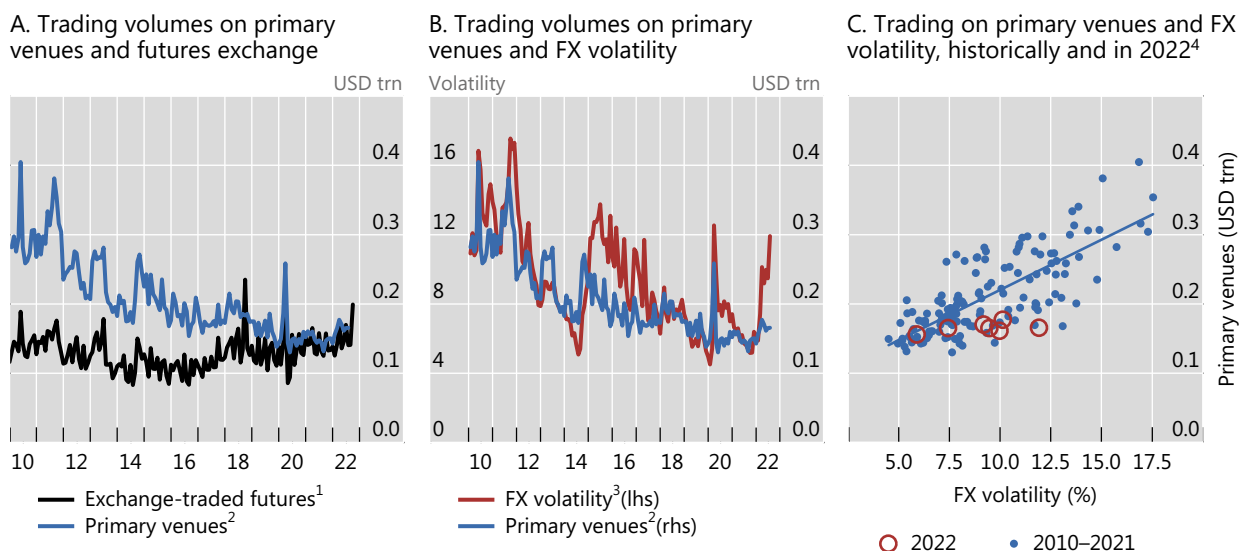
Trading volumes on the primary venues have been declining for over a decade (Graph B2, panel A).<sup>④</sup> One reason is more internalisation. Another is that dealers were weary of adverse selection by PTFs engaging in high-frequency trading strategies (HFTs) after PTFs gained access to these venues in mid-2000s. In an attempt to insulate bank dealers from what were perceived as “toxic” HFT strategies, primary venues have subsequently introduced “speed bumps” to level the playing field. A third reason is the greater use of execution algorithms that help users, including dealers, to slice orders into smaller pieces and to distribute these efficiently across different venues. In 2020, execution algorithms were estimated to account for 10–20% of global FX spot trading (Markets Committee (2020)).<sup>⑤</sup> Last, PTFs often hedge the risk arising from liquidity provision to customers using futures rather than going to the primary venues. In part for this reason, futures markets have emerged as another locus for price discovery in currency markets alongside the primary venues (Chaboud et al (2021)).<sup>⑥</sup>

Despite their downward trend, volumes on primary venues have typically jumped with volatility but not so this year. Some inter-dealer trading volumes have typically gravitated back to primary venues during volatile conditions (Moore et al (2016)),<sup>⑦</sup> so that volumes rose as volatility increased (Graph B2, panels B and C).<sup>④</sup> After an initial rise of trading on primary venues in early 2022, trading volumes remained flat as volatility continued to rise. This divergence may reflect several factors, including stagnating customer volumes, some decline in PTF activity, including on primary venues, higher internalisation ratios, more risk management with related parties, and a greater share of direct electronic execution even among dealers.<sup>③</sup>

## Volumes do not return to primary electronic brokers even as volatility spikes

In per cent

Graph B2



<sup>1</sup> Exchanged-traded currency futures turnover, all exchanges. <sup>2</sup> CME/NEX EBS and Refinitiv spot turnover (a proxy for trading volumes on EBS Market and Refinitiv/Reuters CLOBs). <sup>3</sup> Deutsche Bank USD volatility index (DBCVIX) average mid-price. <sup>4</sup> R-squared = 0.6.

Sources: Refinitiv; BIS exchange-traded derivatives statistics; BIS.

① The views expressed are those of the authors and do not necessarily reflect those of the Bank for International Settlements. ② Markets Committee, "Monitoring fast-paced electronic markets", report submitted by a Study Group, *Markets Committee Papers*, no 10, 2018. ③ A Chaboud, D Rime and V Sushko, "The foreign exchange market", in R Gurkaynak and J Wright (eds), *The Research Handbook of Financial Markets*, available on SSRN, 2022. ④ The time series shown in the graph overstate the turnover on primary venues because the publicly available data from EBS (CME/NEX Group) and Refinitiv include volumes traded on some of their other platforms. ⑤ Markets Committee, "FX execution algorithms and market functioning", report submitted by a Study Group, *Markets Committee Papers*, no 13, 2022. ⑥ A Chaboud, A Dao and C Vega, "What makes HFT tick? Tick size changes and information advantage in a market with fast and slow traders", available on SSRN, 2021. ⑦ A Moore, A Schimpf and V Sushko, "Downsized FX markets: causes and implications", *BIS Quarterly Review*, December, 2016, pp 35–51.

## FX trade execution through the lens of the Triennial

Mathias Drehmann and Vladyslav Sushko <sup>①</sup>

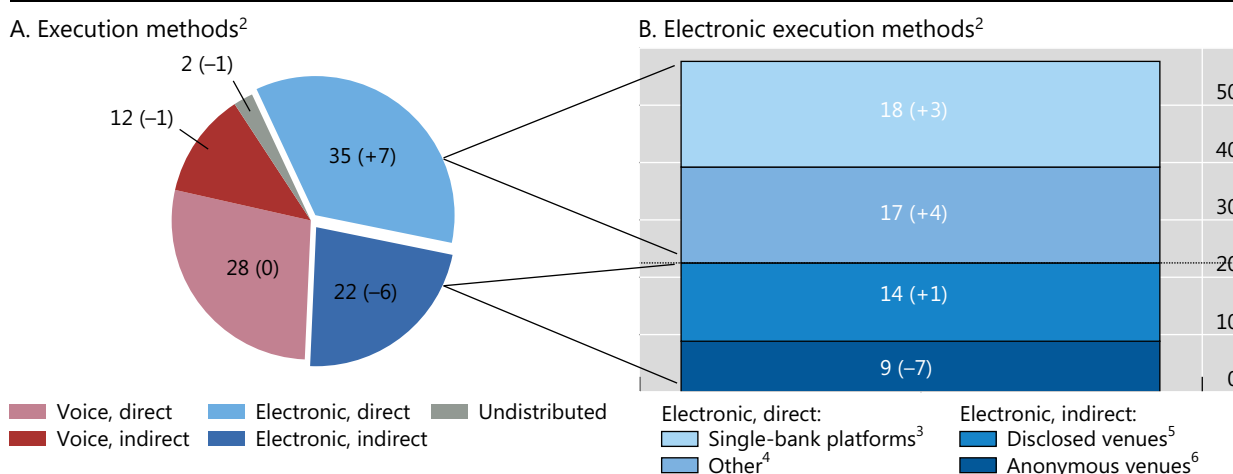
The landscape of trade execution in the FX market is highly complex.<sup>②</sup> Market participants can execute trades directly with dealers but also on multiple venues that are organised very differently (eg anonymous central limit order books, such as the primary venues, or disclosed platforms where participants submit and respond to “requests for quotes”) and with different counterparty segments (eg just inter-dealer platforms, platforms that are open to many dealers and customers, or dealer-owned platforms to match customer trades). Trades can also be executed by voice (which includes messaging platforms) or electronically.

A key trend over recent decades has been increased “electronification”, ie deeper penetration of the market by electronic and automated trade execution. The latest Triennial data suggest that the process of “electronification” may have steadied. The relative shares of voice and electronic execution in the FX market have not changed over the past three years (Graph C1, panel A). And around 60% of trades continue to be executed electronically.

### Trade execution methods in April 2022<sup>1</sup>

As a percentage of the total turnover

Graph C1



<sup>1</sup> In brackets: change in percentage points since the 2019 Triennial. <sup>2</sup> Direct: trades not intermediated by a third party. Indirect: trades intermediated by a third party – either a voice broker or a third-party electronic platform. <sup>3</sup> Single-bank trading systems (eg Barclays BARX, Citi Velocity, Deutsche Bank Autobahn, UBS Neo). <sup>4</sup> Other direct electronic trading systems (eg direct electronic price streams). <sup>5</sup> Multibank dealing systems that facilitate trading on a disclosed basis or that allow for liquidity partitioning using customised tags (eg 360T, EBS Direct, Currenex FXTrades, Fastmatch, FXall OrderBook, Hotspot Link). <sup>6</sup> Electronic trading platforms geared to the non-disclosed interdealer market (eg EBS Market, Hotspot FX ECN, Reuters (Refinitiv) Matching).

Sources: BIS Triennial Central Bank Survey; BIS.

The 2022 Survey shows a marked shift towards direct forms of electronic trading, away from anonymous venues, including the primary venues (Graph C1, panel B). Specifically, there was a significant growth of direct electronic methods (+7% share), such as single-dealer platforms (SDPs) or direct price streams. This occurred mainly at the expense of indirect electronic trading on anonymous venues (–7%). Anonymous venues are trading platforms that are closest to an exchange, with counterparties not knowing who they are executing a trade with, but with the relevant information, such as prices, displayed to all the participants on the venue.

These developments imply that FX trading has gravitated further away from resembling trading on an exchange and more towards execution methods where counterparties know each other’s identity, but with the trade information remaining private.

<sup>①</sup> The views expressed are those of the authors and do not necessarily reflect those of the Bank for International Settlements. <sup>②</sup> A Schrimpf and V Sushko, “FX trade execution: complex and highly fragmented”, *BIS Quarterly Review*, December 2019, pp 39–51.

## References

- Bank for International Settlements (2022): "Triennial Central Bank Survey of Foreign Exchange and Over-the-counter (OTC) Derivatives Markets in 2022", October.
- Bech, M (2012): "FX volume during the financial crisis and now", *BIS Quarterly Review*, March, pp 33–43.
- Borio, C, R McCauley and P McGuire (2022): "Dollar debt in FX swaps: huge, missing and growing", *BIS Quarterly Review*, December, pp 67–73.
- Butz, M and R Oomen (2019): "Internalisation by electronic FX spot dealers", *Quantitative Finance*, vol 19, no 1, pp 35–56.
- Caballero, J, P Wooldridge and D Xia (2022): "FX trading of EME currencies", *BIS Quarterly Review*, December, pp 49–65.
- Chaboud, A, D Rime and V Sushko (2022): "The foreign exchange market", in R Gurkaynak and J Wright (eds), *The Research Handbook of Financial Markets*, available on SSRN.
- Euromoney (2022): *Foreign Exchange Survey 2022*.
- Gopinath, G (2015): "The international price system", *NBER Working Papers*, no 21646.
- Lyons, R (1996): "Foreign exchange volume: Sound and fury signifying nothing?", in J Frankel, G Galli and A Giovannini (eds), *The Microstructure of Foreign Exchange Markets*, University of Chicago Press.
- Markets Committee (2018): "Monitoring fast-paced electronic markets", report submitted by a Study Group, *Markets Committee Papers*, no 10.
- (2020): "FX execution algorithms and market functioning", report submitted by a Study Group, *Markets Committee Papers*, no 13.
- Moore, M, A Schrimpf and V Sushko (2016): "Downsized FX markets: causes and implications", *BIS Quarterly Review*, December, pp 35–51.
- Rinaldo, A (2022): "Foreign exchange swaps and cross-currency swaps", *Swiss Finance Institute Research Papers*, no 22-51.
- Schrimpf, A and V Sushko (2019): "Sizing up global foreign exchange markets", *BIS Quarterly Review*, December, pp 21–38.
- Varian, H (1985): "Divergence of opinion in complete markets: a note", *Journal of Finance*, vol 40, no 1, pp 309–17.

## Technical annex

Graph 1: Adjusted for local and cross-border inter-dealer double-counting, ie “net-net” basis; daily averages in April.

Graph 2.A: Triennial Survey data are adjusted for local and cross-border inter-dealer double-counting, ie “net-net” basis; daily averages in April. See Bech (2012) for a methodological description of the benchmarking technique. Vertical lines indicate the BIS Triennial Surveys in April of 2016, 2019 and 2022.

Graph 2.B: Options price based Deutsche Bank US dollar currency volatility index (DBCVIX) average mid-price. Vertical lines indicate the BIS Triennial Surveys in April 2016, 2019 and 2022.

Graph 2.C: Triennial Survey data are adjusted for local and cross-border inter-dealer double-counting, ie “net-net” basis; daily averages in April. See Bech (2012) for a methodological description of the benchmarking technique.

Graph 3A: FX spot/derivatives based on volumes settled via CLS.

Graph 3.B: Adjusted for local and cross-border inter-dealer double-counting, ie “net-net” basis. One-day data were not collected in previous Triennial surveys.

Graph 3.C: Adjusted for local and cross-border inter-dealer double-counting, ie “net-net” basis. One-day data were not collected in previous Triennial surveys.

Graph 4: FX turnover adjusted for local and cross-border inter-dealer double-counting, ie “net-net” basis; daily averages in April.

Graph 4.C: Prime-brokered turnover includes both (i) the transactions between prime brokers and their customers as well as (ii) the resulting “give-up” trades with reporting dealers. The associated customer turnover is anywhere between a half and two thirds of the total prime-brokered turnover. See Box A in Schrimpf and Sushko (2019a).

Graph 5: Adjusted for local and cross-border inter-dealer double-counting, ie “net-net” basis; daily averages in April.

Graph 6: Adjusted for local and cross-border inter-dealer double-counting.

Graph 6.A: Volume-weighted averages using total customer spot turnover (for countries that did not report the underlying customer spot turnover, their share in total spot turnover was applied). Asian centres include Hong Kong SAR, Japan and Singapore.

Graph 6.C: Based on back-to-back and compression trades.