

Enhancing the Functioning and Resilience of Commercial Paper and Negotiable Certificates of Deposit Markets

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Table of Contents

Executive summary	1
1. Introduction	6
2. Market structure and functioning	7
2.1. Key aspects of CP and CD markets	7
2.2. Issuers of CP and CD	14
2.3. Investors in CP and CD markets	18
2.4. Dealer relationships with issuers and investors.....	21
2.5. Market microstructure	22
2.6. Transparency (reporting and disclosures)	25
3. Vulnerabilities	26
4. Potential market reforms.....	30
4.1. Potential market reforms and their assessment	30
4.2. Considerations from the high-level assessment of potential market reforms	32
Annex 1 – The CP and CD markets: Literature Review	37
References	44
Abbreviations	48

Executive summary

Key aspects of CP and CD markets

The focus of this report is commercial paper (CP) and negotiable certificates of deposit (CD) (henceforth referred to as CP and CD) in core funding jurisdictions (EU, Japan, UK, US). With a total of USD 4.7 trillion outstanding as of end-March 2023, the US CP and CD market is the largest globally. Europe has different market segments across issuer domicile and currency as well as two international markets – London-based Euro Commercial Paper (ECP) and Paris-based Negotiable European Commercial Paper (NEU CP). The ECP market is the second largest (estimated at USD 1 trillion outstanding as of March 2021), around 48% of which is denominated in US dollars. The NEU CP market has USD 315 billion outstanding as of end-March 2023, 85% of which is Euro-denominated. The Japanese market has USD 380 billion outstanding as of end-March 2023, with all issuance in JPY. The overall size of US and EU markets remains much smaller than its all-time high in 2007. By comparison, the Japanese market has grown since 2007. The microstructure, legal framework and existing transparency vary across jurisdictions and markets, highlighting the importance of tailoring potential market reforms to the characteristics of each market.

Vulnerabilities

The analysis has largely confirmed the findings of previous work – namely, that these markets, although subject to inefficiencies, tend to generally function well in normal times but are susceptible to illiquidity in times of stress. Investors tend to buy CP and CDs when they are first issued and usually hold them until maturity given the short-term nature of these instruments, which results in very limited secondary market activity in normal times. Dealers' activity and revenues are concentrated in primary markets. Investor requests to sell CP and CD in the secondary market pick up in times of stress, and whilst dealers may increase their intermediation in such episodes, this has proven insufficient to meet the spike in liquidity demand observed in, for example, the March 2020 market turmoil.

Concentrations of investor and dealer participation/activity also represent sources of vulnerability, especially during times of stress. The primary issuance market, where most activity takes place, is intermediated by a small number of core dealers that typically act as a single point of market entry. The limited number of intermediaries means that they may not be able to respond to spikes in liquidity demand in times of stress. Moreover, money market funds (MMFs) that are important CP and CD investors – particularly in European markets – can be susceptible to large and sudden redemption requests in times of stress, thereby exacerbating the demands on liquidity, while there do not currently appear to be many other investors that could act countercyclically.

The opacity of CP and CD markets may exacerbate illiquidity due to information asymmetry amongst market participants and could contribute to reliance on dealers. A lack of public data across CP and CD markets – especially on issuers' outstanding amounts, the profile of investors, and post-trade information, including pricing – presents a challenge for the monitoring of these markets, and may at the margin discourage broader investor participation.

Disclosures vary by market – for instance, there is no single comprehensive publication of all issuances in the ECP market. Whilst several commercial data providers offer subscription services, they do not cover all data gaps, and can be prohibitively expensive for smaller market participants.

With regards to market microstructure, the focus of FSB work had previously been on dealers, but this initiative shed light on the role of the electronic trading platforms. These platforms mainly facilitate CP and CD issuance in the primary market and are typically dealer intermediated. Platforms may also serve as ‘workflow tools’, but operational inefficiencies remain, while the variety and fragmentation of platforms may inhibit broader investor adoption. Moves towards electronification and digitisation in both primary and secondary CP and CD markets have not gained much traction, and little has changed in terms of enhancing liquidity and resilience in times of stress. In addition, digitisation of documentation is not currently widespread across markets – only the NEU CP and Japanese markets currently have market-wide digitisation – but pockets of digitisation exist within markets, for instance, on certain platforms.

The high interconnectedness of these markets with other global funding markets means that stress can be transmitted across the financial system and across borders. While issuers in general have diversified sources of funding, including contingency funding (a number of corporate issuers have backup lines of credit in place, and bank issuers have access to central bank facilities), losing access to CP and CD markets may put pressure on alternative sources of funding. A freeze of these markets can generate cross-border spillovers, especially for non-US banks issuing CP and CD for USD-denominated funding. Evidence of these vulnerabilities can be found in the March 2020 market turmoil when CP and CD market stress prompted public authorities to intervene to restore market functioning and access to this type of funding.

Potential market reforms and associated considerations

Since March 2020, some authorities have taken or are planning measures to improve the resilience of key investors in CP and CD markets, such as MMFs. As noted in the FSB’s MMF peer review, it is important that effective measures to enhance MMF resilience are implemented across jurisdictions. While these measures are expected to have a positive effect on overall market conditions, the susceptibility of CP and CD markets to illiquidity in times of stress remains. Hence, there is merit in exploring structural changes in CP and CD markets to complement reforms on the investor side and enhance the functioning and resilience of those markets.

Industry-led initiatives have been limited in scale and impact so far. Market participants have undertaken or are considering a number of initiatives to improve market functioning, particularly for primary CP and CD markets. However, such initiatives are often not market-wide, and market participants have not identified a comprehensive set of solutions to address identified vulnerabilities. Furthermore, potential enhancements to market functioning may not be a priority for market participants whose activity spans multiple asset classes, given the relatively low margins in this market.

Significant variation across jurisdictions presents a challenge for formulating a uniform policy response. One of the most important observations of this workstream is the diversity of

CP and CD markets across jurisdictions. This diversity provides an opportunity for authorities to guide the development in the direction that is most beneficial to the specific market's issuers and investors. However, it also presents a challenge for arriving at uniform policy responses.

Reforms by industry and national and regional authorities may improve the functioning and potentially the resilience of CP and negotiable CD markets, depending on the jurisdiction's characteristics. Potential market reforms outlined in this report include improving market microstructure, enhancing regulatory reporting and public disclosures, and expanding private repo markets for CP and CD collateral. These reforms may be interlinked. For example, increased automation of International Securities Identification Number (ISIN) generation processes might lead to increased electronic trading which in turn might allow platforms to collect more comprehensive data and potentially provide increased transparency. If used in combination, such reforms could have a positive impact on market functioning, and potentially on resilience, depending on the jurisdiction's characteristics.

Changes to market microstructure could include digitisation, shorter settlement conventions and streamlined ISIN generation processes although market microstructure needs vary greatly across jurisdictions. With the exception of Japan and the NEU CP market, there is limited digitisation of documentation across markets. Increased digitisation would enhance operational efficiency by allowing for faster sharing of, and access to, necessary documents. With regard to settlement conventions, market participants in the ECP and domestic European markets note that moving to T+0 settlement would bring benefits in terms of treasury operations, but that achieving these would be dependent on changes to settlement conventions in other markets such as the foreign exchange swap market. Finally, delays in obtaining an ISIN at issuance inhibit automation (i.e. straight-through processing) in some European markets. Developing best practice and standardising process in this area would most likely benefit market participants who are not already connected to E-PIM/eNEU CP technology (e.g. non-financial issuers, or less-sophisticated dealers and Issuing and Paying Agents (IPAs)), as well as participants in domestic European markets where such technologies may not be available.

Enhanced regulatory reporting and public disclosure in CP and CD markets could enable better monitoring by authorities and potentially encourage greater market participation through better market information for investors. Increased regulatory reporting – in areas such as amount outstanding per issuer, investor profiles on an aggregated basis, and post-trade information such as pricing – would enable national and regional authorities to better monitor the size of CP and CD markets, as well as any pertinent trends – for instance, issuance and investor concentration in particular sectors, ratings, and issuers, which over time may help in the assessment of vulnerabilities. Enhanced public disclosures may also reduce information asymmetry amongst (non-dealer) market participants and potentially result in their greater participation, compared to the current situation where dealers typically have sole access to most of this data given their role in the market. While increased transparency might be helpful for market functioning in normal times, it is less clear that it could mitigate the vulnerabilities in these markets during periods of stress.

International Central Securities Depositories (ICSDs) currently hold the most comprehensive data on CP and CD markets and in some cases make it available for purchase, but the cost can be prohibitive for smaller market participants. Further, to the extent electronic platforms can grow their footprint within CP and CD markets, they will likely

also expand their collection of transaction data and in turn be able to provide increased transparency to their users. At the same time, authorities may consider expanding the comprehensiveness of their data collection directly or by obtaining data from ICSDs or settlement systems. Authorities may also consider increasing the granularity and frequency of their data collection to improve monitoring of vulnerabilities. However, considerations around more granular and frequent public disclosures are nuanced, particularly about investor and post-trade information, including pricing. For instance, issuers – fearing misinterpretation of their data – may forgo using the CP markets in favour of private placements. Authorities may therefore consider public disclosures at aggregated levels, for instance publishing information on investor types, or generic pricing curves on a sector or ratings basis.

Private repo markets may provide a channel for investors and intermediaries to generate liquidity against CP and CD collateral, but expansion of these markets is subject to a number of challenges and risks. Expanded ability to finance CP and CD in the repo market may increase dealers' funding efficiency in normal times. Certain jurisdictions may want to consider whether repo markets might also potentially reduce selling pressure in times of stress. Well-functioning but modest sized repo markets for CP and CD collateral already exist in the US and to a much lesser extent in Europe. Nonetheless, overall activity in the US remains low in comparison to other collateral types, with current activity generally limited to dealers financing some of their CP and CD inventory. Principal challenges to the expansion of CP and CD repo activity in normal market conditions include the underlying economics, such as a mismatch of tenor preference between dealers and certain types of cash lenders, as well as lower profitability for dealers compared to other activities. There are also operational challenges, particularly in Europe where CP and CD are not typically accepted as eligible collateral in triparty platforms, as well as limited transparency on valuations, impacting the ability to price collateral, calibrate haircuts, and determine appropriate margin. Depending on jurisdictional specificities market participants could work together to mitigate some of these challenges, such as the eligibility of CP and CD in triparty collateral pools. However, financing CP and CD positions in the repo markets would entail additional risks, such as “wrong-way” risk for the cash lender to the extent that the credit risk of CP and CD collateral may be positively correlated with the credit risk of the lender's counterparty. Furthermore, leveraging up by the cash borrower (such as MMFs) to meet redemptions could increase run risk under stressed conditions. Financing CP and CD positions in the repo market may also potentially shift liquidity risks from CP and CD investors to other parts of the markets, including repo dealers who accept these instruments as collateral. In addition, certain CP and CD investors may be restricted in their ability to use portfolio assets as collateral for repo borrowing.

Conclusions on potential market reforms

The analysis conducted suggests that these potential market reforms may have a positive impact on CP and CD market functioning in normal times – particularly if used in combination and appropriately tailored to each jurisdiction – but they would likely not, on their own, significantly enhance the resilience of these markets. As noted above, the idiosyncratic nature of CP and CD markets means that not all of the potential reforms in this report may be appropriate or relevant for all jurisdictions. Accordingly, authorities are encouraged to explore the usefulness of these reforms for their own markets, as the relative merits and operational considerations will vary significantly across jurisdictions. Authorities can learn from the variety of market practices and policy approaches across jurisdictions and work

towards the identification and adoption of good practices that support market functioning and resilience.

Authorities may also want to consider how these potential market reforms could complement other policies, e.g. addressing vulnerabilities in MMFs. The findings in this report are broadly consistent with the 2021 FSB report on policy proposals to enhance MMF resilience, which noted that while measures that aim at improving the functioning of the underlying STFM may be useful, it is not clear that such measures would necessarily change the limited incentives of market participants to trade, or of dealers to intermediate, particularly during stress periods. The findings also suggest that market participants need to manage their liquidity risk accordingly. For example, CP and CD issuers should continue to adopt risk management practices that can protect them against a sudden deterioration of market liquidity or loss of market access in times of stress. In particular, issuers should continue to consider CP or CD as part of a broader funding mix within an appropriate asset-liability and liquidity management framework. Likewise, asset managers that offer their underlying investors immediate liquidity (e.g. MMFs) should consider the appropriate level of reliance on CP and CD instruments for generating liquidity under stressed conditions.

The potential market reforms also need time to be designed and implemented, with varying degrees of authority-industry engagement, given the jurisdiction-specific structure of CP and CD markets. As some measures involve changes in market conventions or contracts that can only be undertaken by, or in partnership with, the private sector, implementation would require cooperation between public authorities and market participants. The balance of responsibilities may vary by potential market reform and jurisdiction. For example, national and regional authorities may have greater responsibility in leading efforts to enhance transparency, while market participants may take responsibility for improving post-trade/downstream processes. Even in cases where market participants need to lead reform efforts, authorities may need to convene forums and workshops to bring together relevant industry stakeholders to support the overall development of potential market reforms.

1. Introduction

This report analyses the functioning and vulnerabilities of CP and CD markets and sets out an analytical framework to assess the relative merits of potential market reforms to address these vulnerabilities. The analysis focusses on primary and secondary CP and CD markets in core funding jurisdictions (EU, Japan, United Kingdom, United States), including instruments issued in non-local currencies such as Eurodollars.

The work forms part of the FSB’s work programme on enhancing the resilience of non-bank financial intermediation (NBFi),¹ and follows up on the 2021 FSB report with policy proposals to enhance money market fund (MMF) resilience.² The 2021 FSB report identified some structural vulnerabilities in STFMs, as well as a lack of granular data in parts of those markets. It also noted that policies aimed at enhancing the resilience of MMFs could be accompanied by, among other things, measures that aim at improving the functioning of the underlying STFMs, though it cautioned that such measures, while useful, might not change the limited incentives of market participants to trade or of dealers to intermediate, particularly during stress periods. This work can therefore be considered complementary to MMF policy reforms, which aim to address systemic risks and minimise the need for future extraordinary central bank interventions to support the sector in times of stress.³ It does not constitute, however, a replacement to necessary reforms of MMFs.

The report draws on a broad range of information sources and is based on various types of analyses. These include taking stock of the previous work in this area by the FSB and IOSCO; a review of the literature; responses to a member survey; and stakeholder outreach. These sources taken together form the basis for the conclusions in the report. In particular, this work has sought to identify and address data gaps and it is important to note upfront the challenges around data availability and consistency across jurisdictions.

The rest of the report is structured as follows:

- Section 2 of the report covers market structure and functioning. It describes: (i) issuers of CP and CD; (ii) investors in CP and CD; (iii) dealer relationships with issuers and investors; (iv) market microstructure; and (v) transparency (reporting and disclosures).
- Section 3 summarises the main vulnerabilities in CP and CD markets, drawing on the analysis of market structure and functioning as well as recent cases of stress.
- Section 4 provides a high-level assessment of potential market reforms to address the identified vulnerabilities.
- In addition, Annex 1 provides a literature review and bibliography on CP and CD markets.

¹ See FSB (2023), *Enhancing the Resilience of Non-Bank Financial Intermediation: Progress report*, September.

² See FSB (2021), *Policy proposals to enhance money market fund resilience: Final report*, October.

³ The FSB has recently concluded a thematic peer review on MMF reforms – see FSB (2024), *Thematic Review on Money Market Fund Reforms: Peer review report*, February.

2. Market structure and functioning

2.1. Key aspects of CP and CD markets

CP and CD are instruments of short-term funding markets (STFMs).⁴ CP and CD can be broadly defined as follows:

- CP is an unsecured promise by the issuer to pay a certain amount on a stated maturity date.⁵ Asset Backed Commercial Paper (ABCP) is commercial paper that is secured (backed) by financial assets such as trade receivables and automobiles loans/leases.
- Negotiable CD is a form of a negotiable time deposit certificate issued by a bank for a specified period at a specified rate of interest. A negotiable CD, introduced for the first time in the US in the early 1960s, allows the depositor to sell the CD in the secondary market prior to the maturity date and is available to both retail and institutional investors.⁶ The extent of deposit insurance for CDs varies across jurisdictions.

CP and CD are also available in Eurodollar markets. A Eurodollar CD refers to a non-domestic currency CD, for instance a USD-denominated CD issued outside the US, while ECP enables offshore issuance in a number of currencies (mainly USD, followed by EUR, GBP and others).⁷ A Yankee CD is a USD-denominated CD issued in the US by a foreign bank's branch. Table 1 provides a summary of CP and CD instrument characteristics across markets.

CP and CD markets represent an important segment of STFMs. For most issuers, particularly large creditworthy corporations, these markets provide access to low-cost short-term financing in domestic and foreign currency. In particular, many non-US firms access USD funding by issuing CP and CDs. ABCP is mainly used by large financial corporations seeking to improve their liquidity and balance sheet structure. In the EU, ABCP is used to provide funding for medium-sized firms without direct access to capital markets.⁸ For investors, these markets provide short-term and typically high credit quality investment options.

⁴ Other instruments of STFMs may include government bills, medium-term notes, foreign exchange swaps, repurchase agreements, securities lending, and lines of credit. See, e.g. Aquilina et al. (2023), *CP and CDs markets: a primer*, *BIS Quarterly Review - International banking and financial market developments*, September.

⁵ IMF (2003), *External debt statistics. Guide for compilers and users (Appendices)*.

⁶ See Office of the Comptroller of the Currency, *The Negotiable CD: National Bank Innovation in the 1960s*, available [here](#).

⁷ See Stigum and Crescenzi (2007), *Stigum's Money Market*, 4th Edition, The McGraw-Hill Companies; and, Hill (2021), *The European Commercial Paper and Certificates of Deposit Market, A White Paper by the ICMA Commercial Paper Committee*, September. Currency split as of 31 March 2021, CMDPortal.

⁸ Hill (2021).

Table 1: Summary of key aspects of CP and negotiable CD markets

Market	CP	Negotiable CD
US	<p>Issuers: seasoned corporate entities, including bank holding companies.⁹</p> <p>Maturity: typically up to 9 months – as a maturity of up to 270 days is exempt from the registration provisions of the Securities Act by Section 3(a)(3) of the Act. Average is 30 days.</p> <p>Minimum issuance size: USD 100,000</p> <p>Currency: USD</p> <p>Investor type: institutional</p>	<p>Issuers: depository institutions. CD is a special type of deposit account at a bank or thrift institution which offers a higher rate of interest than a savings account.</p> <p>Maturity: generally within 5 years.</p> <p>Currency: USD</p> <p>CDs can be purchased directly or through intermediaries (dealers/brokers).</p> <p>Deposit insurance: typically insured up to USD 250,000.</p> <p>Investor type: retail and institutional</p>
ECP/ECD	<p>Maturity: within 1 year</p> <p>Minimum issuance size: USD 500,000</p> <p>Currency: Any currency</p> <p>Interest is usually calculated on an Actual/360 basis.</p> <p>Can receive the Short-Term European Paper (STEP) label.</p>	<p>Issuers may establish a combined Programme for the issuance of both ECP and ECD. CD may also be issued on a standalone basis with more limited documentation.</p> <p>Deposit insurance: Not covered by deposit insurance</p>
UK	<p>The UK CP market¹⁰ has been mostly subsumed by the London based ECP market.</p>	<p>Issuers: Banks and building societies</p> <p>Maturity: Market convention is up to 5 years, though majority of issuance is for up to 6 months</p> <p>Minimum deposit: GBP 100,000</p> <p>Similar to CP but have a coupon payment.</p> <p>Interest is usually calculated on an Actual/365 basis.</p> <p>Deposit insurance: Not covered by deposit insurance.</p>

⁹ U.S. G-SIB bank holding companies are prohibited from issuing short-term debt at the holding company level under Regulation YY. Subsidiaries of G-SIBs are allowed to issue short-term debt.

¹⁰ ICMA defines domestic CP markets as usually having ISINs that take the relevant local country code (e.g. GB for UK) while ECP tends to be issued with an 'XS' ISIN. See Hill (2021).

Market	CP	Negotiable CD
NEU CP	<p>Maturity: within 1 year</p> <p>Minimum issuance size: EUR 150,000 (or EUR 200,000 if documentation not written in French)</p> <p>Currency: Any currency, and country of domicile (subject to certain conditions regarding accounting standards and supervision).</p> <p>Process/documentation: Requires an IPA – to ensure compliance and submit information on the market for the issuer’s securities to the Banque de France. Documentation is standardised.</p> <p>Credit quality/ratings: Allows for guarantees. Requires publishing ratings as assigned to the issuance programmes by credit rating agencies (CRAs), unless the issuer has a guarantor that is itself rated, or has securities that are admitted for trading on a regulated market in the European Economic Area (EEA) (or outside of the EEA and that has an equivalent status in the eyes of the EC), or is a credit institution/investment company established in the EEA, or is a securitisation body that issues debt instruments all conferring pari passu rights (under certain conditions).</p> <p>Deposit insurance: Not covered by deposit insurance. Can receive the STEP label.</p>	
Euro Area domestic markets (STEP-labelled CP and CD)	<p>Maturity: 1 day - 1 year</p> <p>Minimum issuance size: EUR 100,000</p> <p>Process/documentation: The issuer needs to apply for the STEP label with the STEP Secretariat providing an information memorandum, the last two approved annual reports and financial accounts, the auditor’s opinion as well as applicable credit ratings or guarantees.</p> <p>Credit quality/ratings: Allows for guarantees; requires issuer to maintain an updated information memorandum with respect to the CP programme’s guarantor and guarantee – if applicable – as well as active hyperlinks to relevant credit ratings be provided to the STEP Secretariat.</p>	
Japan	<p>Maturity: within 1 year</p> <p>Minimum issuance size: JPY 100mn</p> <p>Currency: Japanese Yen</p>	<p>CDs issued by foreign banks are classified as securities, whereas CDs issued by domestic banks are classified as deposits.</p> <p>Maturity: no restriction on terms</p> <p>Deposits which are transferrable to a third party; no restrictions on amount issued, term, or rates; no deposit insurance.</p>

The size and structure of CP and CD markets vary significantly across jurisdictions.

With a total of USD 4.7 trillion outstanding across non-financial CP, financial CP, ABCP and CD, the US market is the largest globally (Graph 1).¹¹ Within Europe, there is no single market for CP or CD, but rather a number of different segments across issuer domicile and currency as well as two international markets (Figure 1). The London-based Euro Commercial Paper (ECP) market is the largest, estimated at around USD 1 trillion outstanding as of March 2021, around 48% of which is denominated in US dollars and 28% in Euros.¹² Issuers may establish a combined programme for the issuance of both ECP and Euro Certificates of Deposit (ECD). The NEU CP market, based in Paris, is the second largest market in Europe with USD 315 billion outstanding as of end-March 2023, 85% of which is Euro-denominated. The NEU CP market is unique in that, following the French authorities' reforms of 2016 (Box 1), there is no longer a distinction between CPs and CDs; the main distinction, for statistics and reporting purposes, is between financial and non-financial CPs. Besides the ECP and NEU CP markets, there are also domestic markets within Europe but many provisions under the EU financial rule book do not apply to CPs and CDs, and therefore lead to different legal frameworks for these instruments. While most GBP CP is issued in the ECP market, there is a domestic UK CD market which has an equivalent of USD 150 billion outstanding as of March 2023. Data for the EU is often in relation to the short-term securities (STS) segment of the euro money market, which includes the ECP and NEU CP markets, as well as domestic markets, and is therefore prone to double-counting. The Japanese market has a total of USD 380 billion outstanding, and all issuance is JPY-denominated.¹³

¹¹ Federal Reserve, Financial Accounts of the United States, L.209 Open Market Paper, available [here](#); L.205 Time and Savings Deposits, available [here](#) (deposit assets of households and nonprofits are excluded from the total).

¹² CMDPortal.

¹³ Data for amount outstanding for US, Japanese, and NEU CP markets, and holdings of GBP-denominated MMFs, all as of 31 March 2023, source: member submissions. Data for ECP market as of 31 March 2021, source: Hill (2021).

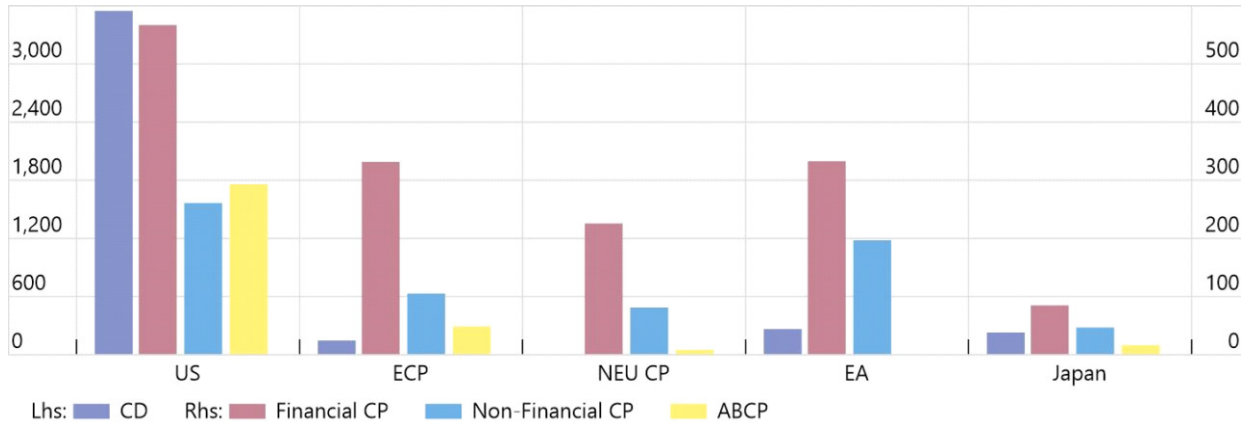
Size of CP and CD markets

Core funding markets

Graph 1

Amount outstanding as of 31 March 2023

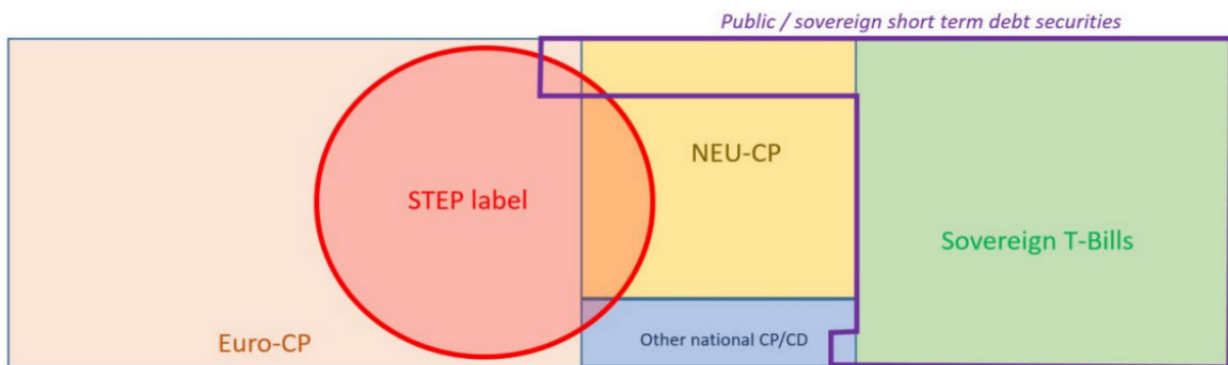
USD billion



For the EA market, ECB data is based on STEP labelling and therefore partially covers ECP and NEU CP markets, and may not fully cover the entire EU markets as it only covers euro area domiciled issuers. ECP market data covers UK resident issuers and some non-resident issuers. Data on ECP CD covers only GBP-denominated CD.

Source: For the US, Federal Reserve's Financial Accounts of the United States; otherwise, member jurisdictions' proprietary data including: for the UK statistical reporting from IPAs and deposit takers, and Refinitiv Eikon from LSEG; for NEU CP, Banque de France data; for the EU, STEP-labelled CP and CD issued solely by EA domiciled issues in the CSDB database; and for Japan, Bank of Japan flow of funds data and JASDEC.

Figure 1: Stylised diagram of European money markets relationship of supranational markets



Source: AMF.¹⁴

STEP (Short-Term European Paper) is a voluntary label that can be applied to ECP, NEU CP, and domestic CP of euro area countries. The ACI-Financial Market Association and the European Money Market Institute launched the initiative in 2006 to encourage standardisation and transparency in short-term securities markets.¹⁵ STEP label criteria pertain to the disclosure of information on the issuer or its potential guarantor for issuances higher than EUR 100,000, the format for disclosure documentation (i.e. a standard information memorandum template),

¹⁴ Darpeix (2022), *The market for short-term debt securities in Europe: what we know and what we do not know*, *European Systemic Risk Board Occasional Paper Series*, No 21 /October.

¹⁵ *ibid.*

settlement (via STEP-compliant securities settlement systems), and the provision of data to the ECB.¹⁶ Since 2007, STEP-labelled securities have been eligible collateral in Eurosystem monetary policy operations.¹⁷ As of August 2023, there was EUR 427 billion outstanding of STEP; EUR-denominated STEP accounted for approximately 71%, followed by USD-denominated STEP at 17%, and GBP-denominated STEP at 11%.¹⁸ For the ECP market the International Capital Market Association (ICMA) provides template issuance documentation and whilst there are no conditions linked to the use of this documentation, their members report little variation from the standard template, but will accommodate ad-hoc variations from issuers.

The ABCP market is relatively larger in the US than in other jurisdictions. In the US, ABCP accounts for approximately a quarter of the CP market. In the NEU CP market, less than 3% of the amount outstanding is from securitised vehicles. Industry sources show that in the US ABCP market, the underlying assets comprise automobile loans and leases, which account for almost 50%; trade receivables, which account for approximately 20%; and corporate and commercial loans account for the remaining balance.¹⁹ In Europe, available data suggests a split of underlying assets of approximately 50% trade receivables, 30% automobile loans/leases and 20% of credit cards, equipment leases and other assets.²⁰ All the ABCP conduits sponsored by European banks are backed by fully supported liquidity lines.²¹

Since 2020, CP market activity has increased in the US and EU as issuers shorten duration to manage interest rate risk, and there is a reduced demand for longer term funding since the initial months of the pandemic. In the US, there has been a gradual increase of CP notional outstanding (as of 31 March 2023) but not near the all-time highs of June 2007. In the EU, issuers' reliance on these markets fell following the large liquidity injections of 2020 in the form of Targeted Longer-Term Refinancing Operations (TLTROs).²² With the rising rate environment and changes to conditions for TLTROs, reliance on CP and CD markets increased significantly over 2022, but also remains below 2007 levels. By comparison, the Japanese market grew since 2007. However, since the pandemic, investor appetite for longer dated CP tenors has not returned (Graph 2): there has been a reduction in tenor to sub-3 months (albeit tenors were at sub-1 week during the height of the March 2020 market turmoil). The US CP market tends to have a higher concentration of shorter dated paper than the ECP market. In the US CP market approximately 45% has a remaining maturity of less than one month (as of March 2024),²³ while in the ECP market an estimated 30% of outstanding is sub-one month maturity (as of end-2022).

¹⁶ ACI Financial Markets Association and European Money Markets Institute (2015), *Market Convention on Short-Term European Paper (STEP)*.

¹⁷ Darpeix (2022). To be eligible as collateral for Eurosystem operations, notes issued under STEP-compliant programmes will also have to comply with all the eligibility criteria listed in Chapter 6 of "The implementation of monetary policy in the euro area: general documentation on Eurosystem monetary policy instruments and procedures" see ECB (2007), *First publication of Short-Term European Paper (STEP) yield statistics*, April.

¹⁸ Data as at 25 August 2023, across all STEP labelled issuance (i.e. may include sovereign Treasury bills). See ECB, *Short-Term European Paper (STEP)*.

¹⁹ Silicon Valley Bank (2023) *April 2023 Market Insights | Silicon Valley Bank (svb.com)*, April.

²⁰ Hill (2021).

²¹ Ibid.

²² TLTROs may provide an attractive source of funding, dependent on market conditions: TLTRO borrowing rates have been as low as 50bps below the average interest rate on the ECB's deposit facility over the period 24 June 2020 to 23 June 2022. See ECB, *Targeted longer-term refinancing operations (TLTROs)*.

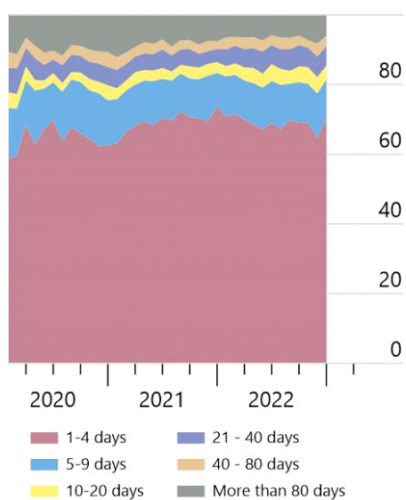
²³ Federal Reserve Board.

Issuance has shifted to shorter maturities

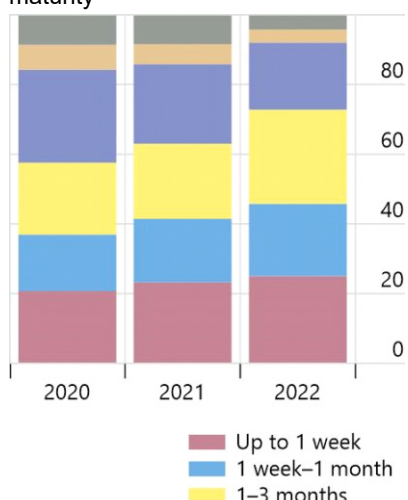
Maturity profiles for US, EA and ECP markets; in per cent

Graph 2

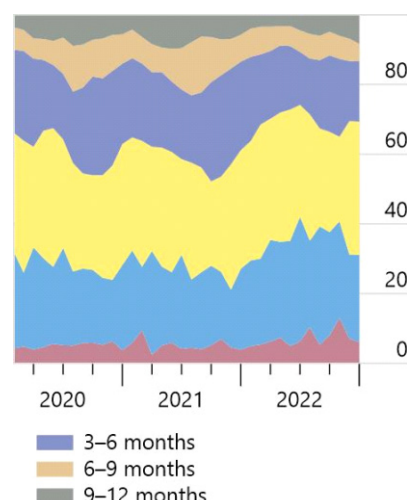
1. US CP issuance by maturity



2. EA STS daily average issuance by maturity¹



3. ECP outstanding by maturity²



¹ ECB data is based on STEP labelling and therefore partially covers ECP and NEU CP markets, and may not fully cover the entire EU markets as it only covers euro area domiciled issuers. ECP market data covers UK resident issuers and some non-resident issuers.

² Data covers UK domiciled issuance, non-UK domiciled GBP-denominated issuance as well as voluntary submissions of data on non-UK domiciled, non-GBP denominated issuance.

Sources: Bank of England; ECB [Euro money market study 2022 \(europa.eu\)](https://www.ecb.europa.eu/press/pr/euro_money_market_study_2022); Federal Reserve's Financial Accounts of the United States.

2.2. Issuers of CP and CD

The largest CP, and the sole CD issuers are banks. In the US CP market, as of Q1 2023 just over half of CP outstanding is issued by financial issuers, including domestic and foreign issuers (Graph 3, LHS), such as US subsidiaries or branches of Canadian, European and Japanese banks. CD issuers include domestic banks and US subsidiaries or branches of foreign banks. Within the euro area (across NEU CP and domestic EU CP markets) banks account for ~70% of the amount outstanding as of May 2023. In the Japanese market, as of March 2023 almost 60% of CP outstanding is issued by financial corporates (finance subsidiaries of nonfinancial corporations). CD is mostly issued by domestic banks. The main issuers in the US ABCP market are conduits sponsored by banks and non-banks; some auto firms (specifically their auto finance companies) are large issuers of ABCP.²⁴

Non-financial corporations, local governments, and public sector agencies issue CP to finance their working capital. Non-financial corporations represent a variety of sectors such as oil and gas, pharmaceuticals, technology, communications, utilities, and consumer sectors; utility firms are typically the largest issuers of CP in European markets.²⁵ In the NEU CP market public issuers (including social security funds and local governments) account for 6% of issuance. Most CP issuers are of high credit quality.

²⁴ Callahan et al. (2020), *Lessons from COVID-19: US Short Term Money Markets*, BlackRock ViewPoint, July; Berents (2022), *The ABCs of ABCP*, Public Trust Advisors, March.

²⁵ Callahan et al. (2020), *Lessons from COVID-19: The Experience of European MMFs in Short-Term Markets*, BlackRock ViewPoint, July.

Table 2: Key characteristics of CP and negotiable CD issuers across markets

Market	Issuer characteristics
Euro area	<p>As of May 2023, banks account for ~70% of the amount outstanding, with French banks being the most active.</p> <p>ABCP issued by euro area domiciled issuers is almost entirely issued by financial entities.</p>
NEU CP	<p>As of May 2023, 15% of the amount outstanding is from non-French issuers, of which 4% is from outside of the EU.</p> <p>Euro is the dominant issuance currency, the currency split of outstanding NEU CP is: 78% EUR, 11% USD, 7% GBP and 3% in CHF. The remainder are in AUD, CNY, HKD, JPY and SGD.</p>
ECP and Euro Certificates of Deposit (ECD)	<p>As of March 2023, financial issuers make up ~70% of the ECP market, with ABCP, non-financial corporations, and governments making up ~10% of the market each.</p> <p>Non-financial corporations issue almost exclusively in euros, a vast majority of government issuances are in dollars, and ABCP is issued mostly in euros. Financial CP is issued mainly in dollars and euros though there are some issuances in sterling.</p>
UK*	<p>This sterling financial ECP is primarily issued by foreign banks who issue sterling CP and CD to fund their sterling assets at UK subsidiaries and branches. Some foreign banks use sterling ECP issuance for cross-currency arbitrage. UK non-financial corporates who issue CP tend to have credit ratings below A1/P1 and primarily issue in euros (via the ECP market).</p> <p>Sterling CD is primarily issued by foreign banks who use CD similarly to CP, to fund sterling assets or for cross-currency arbitrage.</p>
Japan	<p>Financial corporates account for two thirds of CP issuance, this issuance is primarily from finance subsidiaries of non-financial corporates and leasing companies. The remaining third is issued by non-financial corporations such as resource and material industries. ABCP is issued by Special Purpose Companies (SPCs) sponsored by city banks and trust banks.</p> <p>CD issuance is from deposit taking banks, including city banks, local banks and trust banks.</p> <p>Both CP and CD issuance is primarily denominated in Japanese Yen.</p>
US**	<p>52% of the total CP outstanding is by financial issuers, both domestic and foreign, 25% of total outstanding is ABCP, and 23% of total outstanding is by non-financial corporations as of Q1 2023.</p> <p>CD is issued by depository institutions, both domestic banks and US subsidiaries or branches of foreign banks.</p>

* UK data refer to MMFs denominated in GBP rather than domiciled in the UK. To the extent that UK issuers issue in GBP via ECP and NEU CP programmes, data may be subject to double-counting. To the extent that UK issuers issue non-sterling CP via ECP programmes, that is not counted in 'UK market' data but is included in ECP market data.

** Source: Federal Reserve's Financial Accounts of the United States.

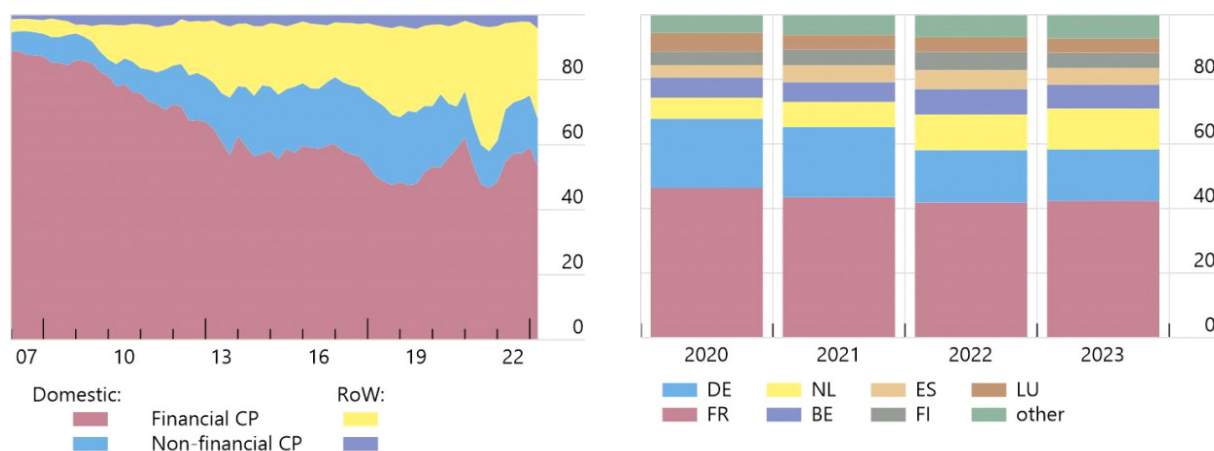
Non-resident issuers have grown in the US, in contrast to the euro area

Share of CP outstanding

Graph 3

US CP outstanding by issuer type¹

Euro area domiciled issuers' CP and CD outstanding by issuer domicile²



RoW = Rest of the World.

¹ Domestic financial CP includes ABCP of US chartered depository institutions and foreign banking offices in the US, as well as short-term tranches of ABS. ² ECB data is based on STEP labelling and therefore partially covers ECP and NEU CP markets, and may not fully cover the entire EU markets as it only covers euro area domiciled issuers.

Source: European Central Bank (CSDB database); Federal Reserve's Financial accounts of the United States.

Issuers may issue CP and CDs to access short-term funding in foreign currency. Available literature suggests that non-US financial issuers seek to access US dollar funding by issuing USD-denominated CP or CDs.²⁶ Based on portfolio holdings data of all USD-denominated MMFs, EU banks account for the largest share, followed by Canada, Japan, the UK, Australia and Switzerland.²⁷ This prevalence has increased since the 2008 global financial crisis (GFC); issuance by non-domestic borrowers now (as of Q1 2023) accounts for just over 30% of US CP (excluding ABCP) issuance (Graph 3, LHS). The size of the US CP market provides the more liquid means of accessing USD funding for these issuers as compared to a much smaller USD-denominated ECP segment. In the ECP market available data suggests an estimated 13% of outstanding amounts is from issuers domiciled in the UK (as of March 2023).²⁸ In other jurisdictions CP and CD issues generally tend to follow jurisdiction or regional lines. In the NEU CP market, approximately 15% of issuance by non-financial corporates and banks is from outside France (this has remained relatively stable over time), of which only 4% of issuance from outside France is from outside the EU (as of May 2023). The major issuers in the Japanese market are domestic. UK domiciled issuers typically issue CP across a variety of currencies depending on demand and the cross-currency basis.

²⁶ Aldasoro et al (2021), *Dollar funding of non-US banks through Covid-19*, *BIS Quarterly Review*, March

²⁷ Aquilina et al (2023).

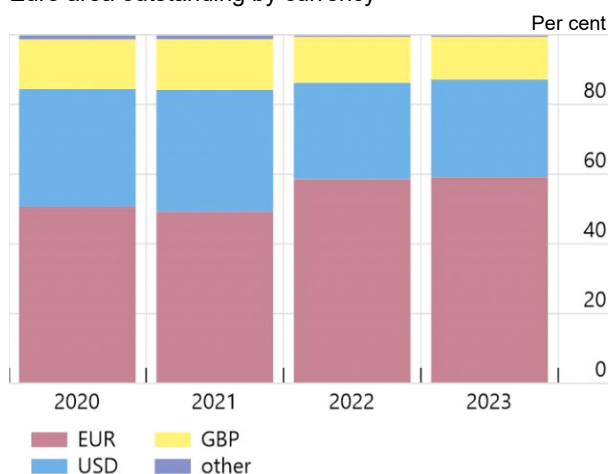
²⁸ Includes all CP and ABCP captured by BoE reporting (e.g. wider than ECP) and some but not all CD.

EUR- and USD-denominated CP and CD account for ~80% of the outstanding in euro area and ECP/UK markets

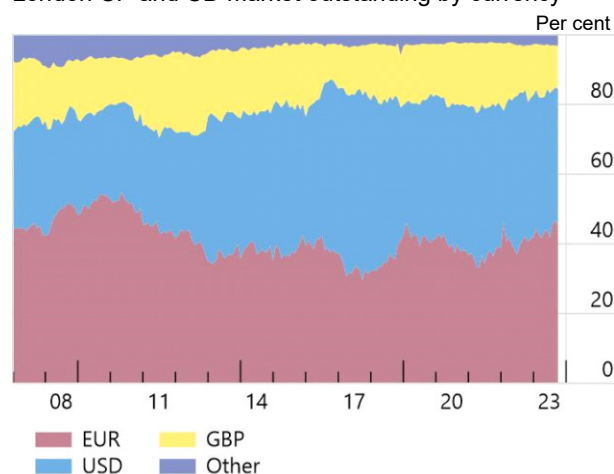
Share of CP outstanding in per cent

Graph 4

Euro area outstanding by currency¹



London CP and CD market outstanding by currency²



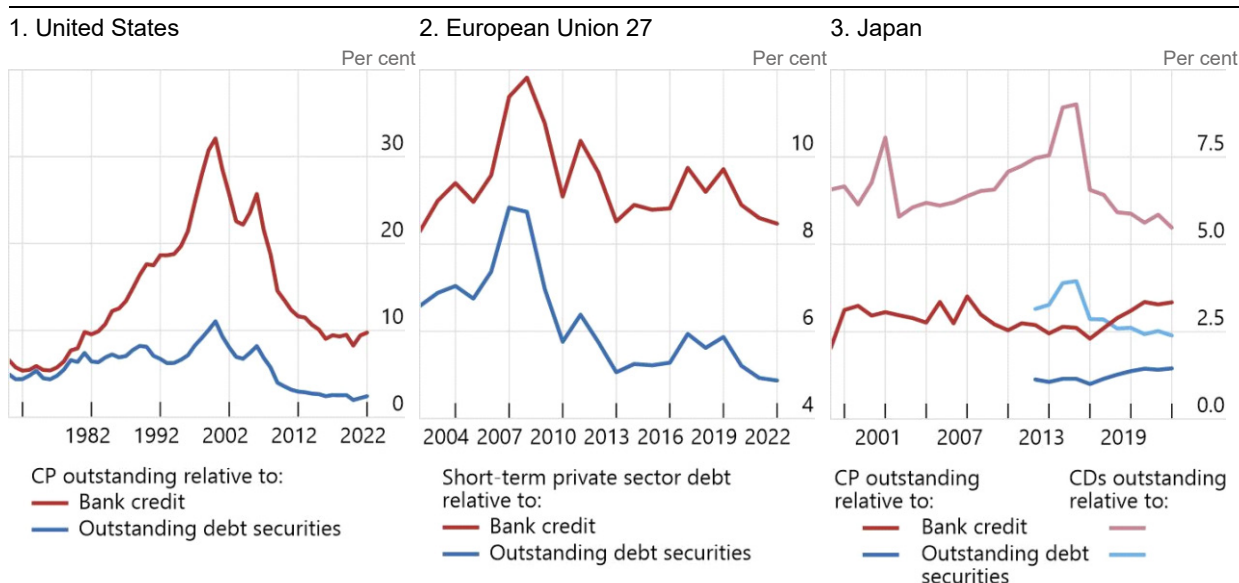
¹ ECB data is based on STEP labelling and therefore partially covers ECP and NEU CP markets, and may not fully cover the entire EU markets, as it only covers euro area domiciled issuers. ² Includes all ECP captured by BoE statistical reporting as well as CP issued by London based IPAs from domestic and non-domestic issuers.

Sources: European Central Bank (CSDB database); Bank of England

There is no aggregated information on the importance of CP and CD as part of issuers' funding mix. As Graph 5 shows, CP outstanding relative to bank credit and outstanding debt securities has been stable or marginally increasing in recent years in the US and Japan. This is in contrast to the EU where it has been falling by 1-2 percentage points since 2019 after a first significant wave of decline in the wake of the GFC since 2007.²⁹ Issuers consider CP and CD as flexible and competitive sources of funding, but the use of this market depends on a number of factors including the interest rate environment, and the availability/cost of other financing sources.³⁰ As noted in section 3, changes in market conditions – and especially liquidity stress – could impair an issuer's ability to roll over its CP and CD issuance. CP issuers normally establish lines of credit from banks as one of their liquidity risk management tools, and this is particularly the case for US issuance.

²⁹ Aquilina et al. (2023).

³⁰ Since the sovereign debt crisis, banks broadly tended to de-leverage in Europe and reduced dependency on wholesale funding through a reduction of loan-to-deposit ratios. Also, in view of the increased sensitivity of rating agencies to wholesale funding dependency and associated costs in terms of LCR, banks generally lowered recourse to CP and CD issuance, turning to retail deposits to the extent possible.



Source: Bank of Japan, Federal Reserve's Financial Accounts of the United States; European Central Bank; Bloomberg; BIS

2.3. Investors in CP and CD markets

Investors are typically financial institutions such as MMFs, pension funds and insurance companies, as well as cash rich non-financial corporations. It has been noted that within the asset management sector the majority of demand is from MMFs, but there is also demand from some firms involved in securities lending for cash collateral reinvestment purposes. The importance of MMFs as investors in CP and CD markets is well documented in the literature review in Annex 1 and previous official sector reports.³¹ For Euro area STS markets MMFs are the largest investors, accounting for 71%, holdings are concentrated in French (50%) and Irish and Luxembourgish (20%) MMFs (as of March 2023). In the US, financial firms (including banks, insurance companies, security brokers and dealers, and government-sponsored enterprises) account for the largest share of CP holdings (61% of the total outstanding), while non-financial firms such as cash-rich corporations are the largest CD investors at 49% of outstanding (as of end-Q1 2023). US MMFs' share of CP investments has fallen from ~25% of CP outstanding at end-2020 to ~18% at end-Q1 2023.³² US MMFs' share of CD outstanding has remained fairly stable at ~4-6% of the total over the period. With respect to Japanese CP and CD markets, qualitative information suggests that most investors are domestic; the main investors in CP are comprised of dealers, banks and securities investment trusts, while the main investors in CD are non-financial corporates, local governments and the Japanese government.

The demand for CP and CD instruments comes from investors looking for short-term, credit-sensitive assets. Typically, the yield of these assets is higher than the yield of short-term government securities and non-negotiable bank deposits given incremental credit and liquidity risks. Investors tend to purchase these products, hold them to maturity, and, often, reinvest, or roll over, proceeds at maturity in similar instruments of the same issuer. For

³¹ See FSB (2021), *Policy proposals to enhance money market fund resilience: Final report*, October.

³² Baklanova et al. (2020), *Primer: Money Market Funds and the Commercial Paper Market*, November.

European markets, eligibility as central bank collateral for refinancing purposes is an important consideration for some investors, and has been cited as positively impacting liquidity in the March 2020 market turmoil. Stakeholder outreach participants were broadly in consensus that the rising rate environment has made these instruments a relatively more attractive investment than in recent years.

Investor mandates also play a role in determining the market's capacity to attract new issuers. Investors in CP may require programmes to carry a credit rating assigned by an accredited or licenced credit rating agency.³³ In addition, in the UK and EU MMFs are limited to holding no more than 10% of an issuer's total CP issuance.³⁴ In the US, a non-government MMF cannot hold more than 5% of the fund's total assets in securities of the same issuer.³⁵ For the NEU CP, ECP and Japanese CP markets, at least around 80% of issuance is comprised of A1 to A1+ rated (or equivalent) issuers (Graph 6). In the case of the UK, because GBP-denominated MMFs require A1/P1 rated issuance, and as many UK corporates have ratings below A1/P1, these firms primarily issue in Euros as EUR-denominated MMFs (notably French MMFs) are able to invest in below A1/P1 corporate CP.³⁶

³³ Hill (2021).

³⁴ [Regulation \(EU\) 2017/1131 of the European Parliament and of the Council of 14 June 2017 on money market funds and Regulation \(EU\) 2017/1131 of the European Parliament and of the Council of 14 June 2017 on money market funds.](#)

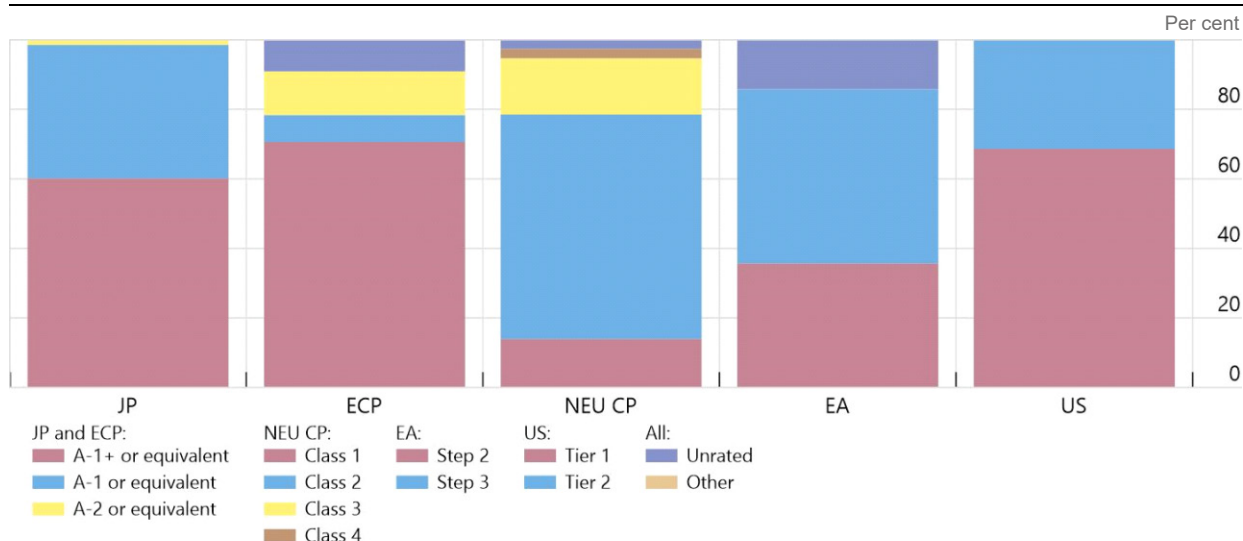
³⁵ Rule 2a-7(d)(3)(i) under the Investment Company Act of 1940, as amended.

³⁶ GBP-denominated MMFs typically have a Low Volatility Net Asset Value (LVNAV) structure, EUR-denominated MMFs typically have a Variable Net Asset Value (VNAV) structure. With regards to the NEU CP market, issuers are required to publish the ratings assigned to their issuance programmes by credit rating agencies (CRAs), unless they either have a guarantor that is itself rated, or have securities that are admitted for trading on a regulated market in the European Economic Area (EEA) or on a market outside of the EEA that has an equivalent status in the eyes of the European Commission, or are credit institutions/investment companies established in the EEA. Some securitisation vehicles are also exempt from this requirement.

CP outstanding by credit rating

Percentage split of amount outstanding by credit rating¹

Graph 6



¹ ECP, NEU CP and EA data as of 31 March 2023, Japan data as of June 2023

For Japan and ECP the highest rating available for each note is used, and mapped to the equivalent S&P rating. For NEU CP classification, Class 1 for example is equivalent to: A-1+/F1+/P-1/R-1Hi, R-1Mi.S-1+ (for full details see [Bank of France website](#)). For EA classification, Step 2 for example is equivalent to A-1+,A-1/F1+/P-1/R-1H,R-1M/S-1+,S-1 (for full details see [Eurosysteem credit assessment framework \(ECAAF\)](#)). For US classification, Tier 1 CP must receive at least two top short-term ratings (A-1+ or A-1 from S&P, F1+ or F-1 from Fitch, P-1 from Moody's; for full details see: [Federal Reserve website](#)).

Source: for the US, Federal Reserve's Financial Accounts of the United States; otherwise survey respondents' proprietary data including: for ECP, statistical reporting from IPAs and Refinitiv Eikon from LSEG; for NEU CP, Banque de France data; for the EU, STEP-labelled CP and CD by euro area domiciled issuers in the CSDB database; and for Japan, JASDEC and issuers' websites.

Lack of data impedes a comprehensive understanding of the role of non-MMF investors in the CP and CD markets. Data granularity varies across jurisdictions, as highlighted in Table 3. Some information about investors is available for the US and Japanese markets. However, in other jurisdictions, very little data is available on non-MMF CP investors and there is no information on CD investors. A more detailed picture of non-financial corporate investors can be constructed using data from financial statements contained in the periodic reports that public companies are required to file.

Consequently, there is limited clarity regarding the willingness of non-MMF investors to intervene during crisis periods. Anecdotal evidence from stakeholder participants suggests that certain fixed income investors that do not normally invest in CP and CD markets may be willing to step-in to buy these instruments in times of stress, for instance if the yields on CP and CD are judged attractive relative to short-dated bonds.

Table 3: Key characteristics of investors³⁷

	EA ³⁸	NEU CP	Japan		ECP	UK sterling market		US	
	CP & CD		CP	CD		CP	CD	CP	CD
MMFs	71%		23%	0%				18%	6%
Banks and Other financial institutions	23%	No data ³⁹	73%	22%	No data	No data beyond MMF holdings	No data beyond MMF holdings	61%	35%
Non-financial firms	4%		4%	47%				15%	49%
State & local govt.			0%	30%				6%	10%

Source: CSDB (EA); Bank of Japan flow of funds data (Japan); Federal Reserve's Financial Accounts of the United States [here](#) (US).

2.4. Dealer relationships with issuers and investors

Dealers play an important role in supporting the CP and CD primary markets while their role in secondary markets is far more limited. The role of dealers in CP and CD markets has been largely covered in previous policy work, with more analysis from academic research and policy reports further elaborated in the literature review (see Annex 1).⁴⁰ Dealer participants in the stakeholder outreach estimated that more than 80% of their trading volume is in primary CP market activity in normal times, though the small amount of secondary market activity can double in periods of stress.

Most primary CP issuance is dealer intermediated, but the extent of intermediation varies between bank and non-bank issuance. For the US CP market, direct issuance averaged only 20% (with a range of 10-40%) of primary market transactions for the period April 2013 to August 2022.⁴¹ Bank CP is usually self-issued (financial issuers in the US CP market account for ~80% of direct CP issuance over the same time period).⁴² Whilst direct issuance remains a low proportion overall - given operational and investor network requirements - industry sources highlight how the market has become more disintermediated over time with issuers increasingly focussed on understanding their investor base and trading directly with investors.⁴³ Research by

³⁷ Figures may not sum to 100 due to rounding. Data as of March 2023.

³⁸ Based on CSDB. This column covers part of the ECP and NEU CP markets.

³⁹ Banque de France has no data collection in place on investors in NEU CP.

⁴⁰ Vaughan et al. (1998) *The Commercial Paper Market: Who's Minding the Shop?*, St. Louis Fed, April.

⁴¹ Gross et al. (2022), *Dealer Intermediation in the Primary Market of Commercial Paper*, FEDS Notes, October.

⁴² Ibid.

⁴³ Ibid; Callahan et al. (2020), *Lessons from COVID-19: The Experience of European MMFs in Short-Term Markets*, BlackRock ViewPoint, July.

the Federal Reserve found that investors in the US primary CP market receive approximately 2 basis points (bps) yield advantage (annualised) by transacting directly with the issuer.⁴⁴

Primary market intermediation is concentrated in a small number of bank dealers that typically act as a single point of market entry for issuers. Industry data suggests that in the ECP and US markets, the top 3 dealers account for ~40-50% of market share.⁴⁵ In the NEU CP market, intermediation is largely undertaken by fewer than 20 bank dealers or brokers, which are mostly domiciled in France. Such concentration may exacerbate illiquidity by limiting issuers' choice of options to access the primary market, even more so in periods of stress when dealers may be facing potentially larger and contemporaneous liquidity demands from investors.

Low profit margins drive higher dealer concentration and promote a relationship focused business model for dealers. The intermediation margin on primary issuance is reported by market participants to be very low. Given the limited secondary market activity, this helps explain the limited number of dealers involved in these markets and the focus on their own clients' issuances with the aim of providing ancillary services. Revenue is higher for those banks that also provide other services to issuers along the intermediation chain (e.g. as arrangers, IPAs, back-up credit facility providers, guarantors) or more broadly (e.g. payments and cash management, loan commitments, investment banking). Research by the Federal Reserve found that CP dealers earn between 1-6 bps intermediating primary issuance between CP issuers and investors, with higher spreads earned by intermediating issuers with less access to private placements, such as non-financial corporates and ABCP.⁴⁶ The lack of profit margin makes dealers more likely to act as brokers, which can exacerbate illiquidity in both primary and secondary markets.

2.5. Market microstructure

There are different degrees of standardisation of CP and CD markets across jurisdictions. These markets have a wide range of instrument parameters, including issuance and maturity dates and minimum denominations. Most CP markets have a high degree of standardisation regarding settlement systems. In Japan, since 2002 issuance and settlement has been via the centralised system, Japan Securities Depository Center (JASDEC). In Europe, the STEP label adds a layer of standardisation, with regards to settlement system, which becomes important for use as collateral in central bank operations. The label has however not reached widespread adoption (it accounts for only about 25-30% of the euro-denominated short-term market as at August 2023). The EU also has standardisation surrounding issuance size and attributes as well as documentation. In Japan, CD is not as standardised and is more specific to investors' needs. In the US, the Depository Trust Company (DTC) provides settlement services for CP and Institutional CD, including primary and secondary market trading activity. The two ICSDs in Europe are Clearstream and Euroclear, while domestic markets typically settle via domestic branches.⁴⁷

⁴⁴ Gross et al. (2022).

⁴⁵ For ECP market data see CMDPortal (2024), *Leaders in debt capital markets 2024 future forum*, April; for US market data see Callahan et al. (2020), *Lessons from COVID-19: US Short Term Money Markets*, BlackRock ViewPoint, July.

⁴⁶ Gross et al. (2022)

⁴⁷ Hill (2021).

CP and CD instruments are traded over-the-counter (OTC) across all jurisdictions. Participants in stakeholder outreach have highlighted that the market is often conducted over the phone or chat messages and relies on dealer relationships.

Electronic platforms primarily facilitate CP and CD issuance in the primary market, given the limited secondary market activity, but their use remains limited. These platforms are used to automate the negotiation and issuance processes for the primary market and often display indicative prices ('dealer quotes'). Some platforms for new issuance are also capable of linking to firms' order or execution management systems (OMS/EMS) and enable straight-through processing (STP) but this varies by market as well as the use of technology infrastructure for ISIN generation and by platform (i.e. whether the platform interfaces the clearing and settlement system).⁴⁸ Such platforms support price discovery to the extent that they stream offered prices.

Platforms for primary issuance may also serve as a 'workflow tools' in that they support efficiencies in the process around new issuance. For instance, some platforms enable issuers to set up debt programmes, add selected counterparties, and provide issuer information. Such platforms emphasise having digitised information in one place, and advocate electrification and digitisation, rather than alteration, of the existing structure of the market.

However, operational inefficiencies remain, while the variety and fragmentation of platforms may inhibit broader investor adoption. Operational inefficiencies were cited as contributing to the limited primary market activity on trading platforms, such as the difficulty with which issuers can refresh their prices on such platforms (which makes it difficult for the aforementioned fixed income investors who do not typically trade in these markets to assess relative value) as well as receive ISIN codes. The extent of the inefficiencies varies by market and market participant. In the case of the ECP market where dealers and IPAs make use of the E-PIM product, ISIN generation can take a matter of minutes. However, such technology does not overcome issues of inefficiency stemming from the fragmentation of domestic European markets where, for example, each domestic market uses a different branch of a central securities depository (CSD). This structure can lead to a range of times to obtain an ISIN as all IPAs must manually authorise the creation of an ISIN (in some markets, this task can be delegated by IPAs to dealers, in which case the creation of ISINs can be almost instantaneous). Stakeholders also cited the proliferation of platforms as a reason for limited take-up, given that adopting several platforms to gain sufficient market coverage would be associated with extra costs (financial and operational). Offering more products per platform (for example to cover both CP and foreign exchange (FX) management) could be more efficient from issuers' perspectives. According to ICMA's primary market technology directory, there are 12 different trading platforms for CP and CD trading/issuance/pricing in Europe, 8 of which are also active in the US.⁴⁹ European corporate issuers have noted that platform trading (in combination with a single homogenous EU-wide CP market) would increase resilience. There are no electronic trading platforms in use in the Japanese markets.

⁴⁸ Hill (2021).

⁴⁹ Hill (2021).

All-to-all platforms that connect issuers, dealers and investors for secondary market trading are not prevalent in CP and CD markets. As with other markets, concerns about all-to-all trading platforms in CP and CD markets relate to anonymity, availability of currencies, and the fact that platforms themselves do not provide liquidity which is still reliant on dealer intermediation. The literature on all-to-all platforms and trading in other markets highlights that some market participants believe they receive better pricing from a direct counterparty relationship with a dealer than through an anonymous trade.⁵⁰ Furthermore, such platforms are unlikely to see widespread adoption in normal times given the buy-and-hold nature of investors, the heterogenous nature of the products, and the limited transparency of the market.

Moreover, market participants note that in times of stress, dealer interaction is preferred across both primary and secondary markets, particularly in the case of block trades. This preference is perhaps unsurprising given the information asymmetries in this market (see below). In fact, platform providers have emphasised that platforms should be seen as complementary to dealers, allowing dealers to focus on where they most add value (i.e. trading and advising clients) with the platform serving to improve efficiencies.

An attempt to introduce a centralised electronic trading platform in the EU in 2015 failed largely because participants did not expect unsecured funding markets to become significantly more active. In 2015 the ACI Financial Market Association promoted the so-called STEP+ initiative aiming at improving secondary market liquidity in short-term securities markets. The aim was to make price discovery easier for investors through the use of one centralised electronic trading platform (or several interconnected ones) that would provide investors, central banks and regulators with reliable and real-time price information. The STEP+ would have also benefitted from collateral eligibility at the ECB and preferential LCR treatment. However, the project was unsuccessful due to a combination of factors: (i) general perception that unsecured markets are not expected to become significantly active again due to the safer alternatives offered by secured products (i.e. repo) while (ii) in some countries, and in particular in France, it was considered that the existence of a well-functioning short-term securities market (at the time the TCN market, now called NEU CP) did not require structural reforms and (iii) in some other countries the fear prevailed that issuers not participating in the initiative would face difficulties in raising funds. Such limited traction has continued: in the NEU CP market, the launch of electronic platforms in 2018 gained little traction, with under 5% of transactions on the primary market, equivalent to 1% of volume, conducted on the two main electronic platforms.

Alongside barriers to a consolidated trading platform, there may be barriers to standardisation of the underlying instruments themselves. For example, as covered in section 2.1, the legal frameworks for issuing CP vary between European countries: the international, multi-currency euro commercial paper (ECP) market is mainly governed by English Law (this market is quite flexible on this matter, as the use of other legal systems is permitted), while the NEU CP market is governed by French law. National regulation determines which types of entities are eligible to issue CP, the amount of CP that can be issued, as well as any limitations on the duration of the CP.⁵¹ Clearing and settlement of CP is also domestic, with the exception of ECP. And settlement standards differ between markets, with T+0 more common in the US

⁵⁰ Chaboud et al. (2022) *All-to-All Trading in the U.S. Treasury Market*, *Staff Reports* No. 1036, October; and Jukartis et al. (2022), *Relationship Discounts in Corporate Bond Trading*, December.

⁵¹ Hill (2021).

(which also leads to efficiencies for issuers' cash management) whilst T+2 remains the standard in Europe (with some exceptions, T+0 settlement being possible in the NEU CP market).⁵²

Box 1: A summary of the 2016 reforms to create the NEU CP market

The aims of the 2016 reform were to open up the French negotiable debt securities market – both to a larger number of domestic issuers as well as overseas issuers, including mid-sized companies – and to modernise the market, aligning it with international standards.

It was not the first time that the French market for short term programmes - created in 1985 - had been reformed. Reform in 1992 allowed the use of languages other than French for issuers domiciled overseas, the use was subject to approval by the supervisory authority and was not widely used.⁵³ Further reform followed in 1998, and in 2004 reform enabled issuers (including domestic ones) to produce documentation in languages usually used in financial matters, under certain conditions (mainly pertaining to investor base), and as long as a French summary was provided.

In order to meet its aims, the 2016 reform featured a number of aspects, it:

- Introduced one instrument for short-term programmes, NEU CP, thereby removing the distinction between CP and CD;
- Allowed information memorandums to be written in a language commonly used in financial matters, other than French, with no requirement to provide a summary in French;
- Enabled use of foreign accounting standards, to include use of accounting standards of countries in the EEA, and of accounting and auditing standards that the European Commission (EC) recognises as equivalent to European standards in the case of third-country issues;
- Provided more efficient post-market infrastructure that enable dealers to have ISINs generated in real-time;
- Expanded the list of acceptable Credit Rating Agencies (CRAs) to include all the CRAs registered with the European Securities and Markets Authority (ESMA), subject to certain requirements (methodology, three years of historical statistical data); and
- Simplified regulatory texts (reducing them from four to one).⁵⁴

Following the reform, the total amount outstanding has remained fairly stable, whilst there has been a reduction in the average amount outstanding per issuer - consistent with the aim to expand the market to mid-sized issuers. The number of issuers increased by 12% between end-2015 and end-2019, this was driven by corporate issuers (increasing from 76 to 111) including overseas corporates (increasing from 8 to 14), as well as public entities (from 15 to 21). There has been no significant change in credit rating composition.

2.6. Transparency (reporting and disclosures)

CP and CD market data coverage varies across jurisdictions. All jurisdictional authorities publish some data on the amount outstanding, while US, Japanese and some euro area authorities also publish data on aggregated investor holdings and prices. However, there may be inconsistencies in the data between jurisdictions, for instance in terms of issuance currency vs issuer domicile. The frequency of publication also varies between jurisdictions, for instance

⁵² In this regard ESMA's recent call for evidence on shortening the settlement cycle is pertinent. See [ESMA announcement](#) (2023).

⁵³ Hill (2021).

⁵⁴ Banque de France (2016), *Reform of the negotiable debt securities market (TCN)*, May.

most authorities publish amounts outstanding on a monthly basis, while others – such as the Federal Reserve Board and Banque de France – publish, on a daily basis, several CP- and NEU CP-related data points.⁵⁵

There are gaps in disclosures for certain market segments, in particular with regards to the secondary market and investors (Table 3). For example, the ECP market is subject to data gaps as well as potential double-counting. For several markets (e.g. ECP, UK sterling and NEU CP), systems do not provide as extensive and consistent data on investors. There are also gaps regarding consolidated post-trade information – for example, in Europe and the UK, CP and CD are not included in Markets in financial instruments regulation (MiFIR) transaction reporting as they are not typically admitted to trading on a trading venue.

There are also a number of commercial data providers that publish information on these markets, including on price and investor types. Such providers may also publish an industry sector split of issuance by non-financial corporates (in contrast to the aggregated data published by some authorities). Subscription-based data are available for trade counterparties and other industry participants, for example in the US, including access to a daily feed of anonymised CP and CD secondary transactions, as well as intraday data.

There is work underway to enhance transparency on certain aspects of these markets. In the UK the Bank of England debt issuance data collection from IPAs is being expanded to include CD in 2024. In the US, the Securities and Exchange Commission (SEC) adopted MMF reforms in July 2023 which, among other things, amend the monthly reporting for US MMFs to include information about secondary market sales of CP and CDs. These reforms, effective June 2024, will help enhance the transparency of CP and CD markets with respect to certain types of MMFs' trading activity.⁵⁶

3. Vulnerabilities

The structure of CP and CD markets makes them susceptible to illiquidity in times of stress. Investors often buy CP and CDs at issuance and hold them until maturity given the short-term nature of these instruments, meaning that there is very little activity in the secondary market. Dealers have limited incentives to intermediate in CP and CD markets, particularly in times of stress when faced with one-sided flows. Low trading margins may also limit trading activities, which could also be constrained by the cost of capital for carrying inventory. In addition, CP and CDs can lack standardised features in most markets, with regards to documentation and terms as well as interest rate conventions, and dealer workflow processes including ISIN creation can be fragmented and inefficient. This fragmentation is typically reflective of the broader market, for example, in European markets where each domestic market uses a different branch of a CSD.

Concentrations on the investor and dealer sides also represent sources of vulnerability. The primary issuance market, where most activity takes place, is concentrated in a small number

⁵⁵ Federal Reserve, available [here](#). Data are derived from CP settlement data provided by DTCC. Banque de France, available [here](#).

⁵⁶ See SEC, *Final Rule: Money Market Fund Reforms: Form PF Reporting Requirements for Large Liquidity Fund Advisers: Technical Amendments to Form N-CSR and Form N-1A*.

of core dealers that typically act as a single point of market entry. Non-bank intermediaries, such as principal trading and high frequency firms, are not known to be active in these markets, given the limited transparency and electronification as well as the lack of activity on the secondary market. The limited number of intermediaries means that they may not be able to respond to spikes in liquidity demand that take place in times of stress, as they can become quickly overwhelmed by sizeable, one-sided flows in a systemic liquidity event. Moreover, lack of investor diversity in some jurisdictions and the fact that a large portion of the investor base comprises entities that are subject to large, correlated and sudden redemption requests – such as MMFs – may exacerbate one-directional behaviour in times of stress because of the lack of investors that could act countercyclically.

In most cases dealer activity in the secondary market is limited to buying back their own institution’s paper or the paper they were responsible for placing with investors (either to maintain an ongoing relationship or if they have been authorised by the issuer). Dealers are often reluctant to hold overnight positions given the capital and liquidity charges associated with having these instruments (when compared to their profitability). Feedback from the stakeholder outreach highlighted the importance investors place on dealers committing to buying back paper, although these are typically non-legally binding commitments. One investor noted that it now allocates less business to dealers that had been unwilling to buy back paper in March 2020. In the sterling market, dealers perform more of an ‘agent’ role by holding only intraday positions or placing with clients directly. Dealers are somewhat more active in intermediating CP than CD, with GBP-denominated CD being more of a brokered market. However, there is no obligation on any dealer to make a two-way market in GBP-denominated CP and CDs. Dealers in NEU CP may – in relatively rare cases – keep issuance they have not been able to place with end-investors on their balance sheet overnight, but brokers do not do that. The recent trend of issuers seeking to better understand their investor base resulting in decreased intermediation has also been cited as reducing dealer incentives to provide liquidity.⁵⁷ The absence of an active secondary market has contributed to the illiquidity of CP and CD and the unwillingness of investors to roll over CP and CD in times of crisis.

The opacity of CP and CD markets may exacerbate illiquidity due to information asymmetry amongst market participants and could contribute to reliance on dealers. The lack of transparency impedes price discovery and prevents assessment of liquidity conditions in normal times and in stress. Potential new investors may not be willing to step-in to support market liquidity in stress. On the other hand, information asymmetry may be considered preferable for issuers who otherwise – fearing misinterpretation of their data – may forgo using the CP markets in favour of private placements, but this hypothesis is untested.

The high interconnectedness of these markets means that stress can be transmitted across a large part of the financial system and economy.⁵⁸ Because CP and CDs are a source of short-term funding, any stress in these markets can have immediate impact on borrowers’ ability to roll over their debt, as illustrated by the market stress in March 2020 (when maturities were constrained to 1 week maximum). To limit liquidity risk, issuers often establish

⁵⁷ Callahan et al. (2020), *Lessons from COVID-19: The Experience of European MMFs in Short-Term Markets*, BlackRock ViewPoint, July.

⁵⁸ Aquilina et al (2023).

bank lines of credit, particularly for US CP programmes. Financial issuers that are banks or credit institutions may have access to central bank facilities.

Stress in CP and CD markets can also propagate across borders. Foreign entities rely on US dollar funding through CP issuances in the US markets. Freezes of these markets can generate spillovers if borrowers need to make large repayments in a currency that they cannot source elsewhere.

Evidence of some of these vulnerabilities can be found in the CP and CD market stress in March 2020. The stress was unprecedented in size and scale, but the behaviour of investors was expected given MMFs offer same day liquidity and investors treat these as cash equivalents. In contrast during the March 2023 period of banking sector stress, which CP and CD markets were not at the centre of, these markets were considered much more resilient, with investors willing to step in and bid on paper in the secondary market.

The stress in these markets prompted public authorities in several countries to intervene to support financial stability and channel liquidity to the corporate sector. The policy response to the market stress in March 2020 was speedy, sizeable and sweeping. Following cuts to policy rates and an expansion in government bond purchases, the intensifying pressures in markets, including in short-term funding markets (STFMs), led to the rollout of a wider set of policy measures. These measures were aimed at preventing a further intensification of the market shock, mitigating the tightening in financial conditions, avoiding knock-on effects from markets to the economy and ensuring the smooth transmission of monetary policy. These measures alleviated stress in STFMs, directly and indirectly, through various channels. These included central bank asset purchases, which in some cases involved risk assets including CP; liquidity operations, which provided broad-based liquidity support and helped anchor funding rates (including by widening the pool of eligible collateral); backstop facilities to provide targeted liquidity to specific financial entities; and regulatory measures.

Given the relatively smaller proportion of MMF investors in the US CP market, and its more diversified investor base, a wider range of investors may be able to step into the US market in times of stress. Participants in the stakeholder outreach highlighted that besides MMFs, demand can come from other fixed income investors, who may compare yields of CP and CD instruments with those of short-dated corporate bonds. This includes hedge funds, which would not typically invest in CP, but have stepped in to buy CP in periods of stress, as well as large and sophisticated asset managers. However, operational or infrastructure limitations may impede investor participation in these markets. For example, investors who do not use electronic platforms that support CP and CD trading may find it more difficult to conduct relative value comparisons across instruments or operations on the platform could be inefficient. Moreover, the limited market transparency impacts investor incentives to participate in times of stress when pricing dislocations and information asymmetry are most likely. Investors' willingness to step-in in times of stress cannot be considered in isolation from their expectations of dealers' market making capacity. As discussed above, dealers provide very limited secondary market intermediation in normal times and thus are unlikely to intermediate one-sided flows during stress periods. Investors' ability to - and the speed at which they - step-in may also be limited by their respective investment mandates.

Since the March 2020 market turmoil, financial authorities in several jurisdictions have taken important steps to improve the resilience of key investors in CP and CD markets

(such as MMFs) as well as overall functioning and resilience of short-term funding markets. It is important that effective measures to build liquidity resilience in non-banks, such as MMFs, are implemented across jurisdictions. This will support the functioning and resilience of CP and CD markets, but their susceptibility to illiquidity in times of severe stress remains. Hence, there is merit in exploring structural changes in CP and CD markets to complement reforms on the investor side to enhance their resilience. The FSB's MMF peer review states that some FSB member jurisdictions have introduced new policy tools or recalibrated existing ones to address identified MMF vulnerabilities, while others are still in the process of developing or finalising their reforms.⁵⁹

- In the US, the Federal Reserve established two standing repo facilities – one available to financial institutions, and one available to foreign central banks or monetary authorities – to support USD money market functioning and effective implementation of monetary policy.⁶⁰ While these facilities do not directly support CP and CD markets, liquidity available through these facilities is expected to have a positive effect on the overall market conditions. In July 2023, the SEC adopted MMF reforms that, among other things, addressed the factors that precipitated the run on certain MMFs in March 2020. In addition, certain types of US MMFs will be required to report their secondary market sales of CP and CDs, among other assets.⁶¹
- In the UK, the Financial Conduct Authority published a consultation paper on MMF resilience in December 2023. The consultation paper contains several proposals to strengthen the resilience of MMFs and reduce the likelihood of future extraordinary central bank interventions of the kind that occurred in March 2020, ensuring that the financial system provides cash management financial services even during times of stress.⁶²
- In the EU, the European Commission published its report on the functioning of Money Market Fund Regulation (MMFR) in July 2023.⁶³ The report did not make proposals to address this vulnerability at the current stage. It mentioned that the representative FSB policy options are to some degree reflected in the existing rules under the MMFR. These include rules on eligible assets and liquidity requirements, which both reduce liquidity transformation. The report also mentioned several vulnerabilities that merit further exploration, notably the link with underlying STFM. That said, there has been a wide range of work carried out in the EU related to MMF vulnerabilities following the March 2020 episode. Both the European Systemic Risk Board (ESRB) recommendations and the European Securities and Markets Authority (ESMA) policy proposals, cited in the EC report, included the increase of MMF minimum daily and weekly liquidity requirements as an option.

⁵⁹ FSB (2024), *Thematic Review on Money Market Fund Reforms: Peer review report*, February.

⁶⁰ Federal Reserve Bank of New York (2021), *Statement Regarding Repurchase Agreements*, July.

⁶¹ SEC, *Final Rule: Money Market Fund Reforms: Form PF Reporting Requirements for Large Liquidity Fund Advisers; Technical Amendments to Form N-CSR and Form N-1A*.

⁶² Financial Conduct Authority (2023), *CP23/28: Updating the regime for Money Market Funds*, December.

⁶³ European Commission (2023), *Commission adopts report on the functioning of the Money Market Funds Regulation (MMF)*, July.

- In Japan, the Investment Trusts Association, a self-regulatory body, amended its rule in January 2023 to make MMFs and Money Reserve Funds (MRFs) more resilient and functional in a constantly changing macroeconomic environment and monetary policy. The Japan Financial Services Agency (JFSA) also amended the Guidelines for Supervision in March 2023 in order to encourage asset managers to take appropriate actions regarding contingency plans that are prepared and submitted to the JFSA under the rule. The impact of the market turmoil in 2020 on Japan's CP and CD markets was relatively limited and temporary, primarily due to the Bank of Japan's (BOJ) policy actions, including an increase in CP purchases with a higher ceiling on the amount outstanding.

4. Potential market reforms

4.1. Potential market reforms and their assessment

This report identifies certain measures that could potentially be considered to enhance the liquidity and resilience of CP and CD markets. These involve:

- Enhancing regulatory reporting in respect of completed transactions (e.g. to have more information on investor types, so that their behaviour can be better monitored and related risks assessed), potentially including secondary market transactions;
- Publicly available databases in certain jurisdictions could be improved by publishing CP and CD outstanding amounts broken down by types of issuers and investors, yields, maturity distribution, and other characteristics on a frequent basis; and
- Encouraging market microstructure adjustments such as standardisation of documentation; encouraging further development of platforms to facilitate more efficient primary and secondary market activity.
- In addition, this report explores ways to enhance liquidity through private repo markets. In particular, the ability of market participants to repo CP and CD to raise cash could potentially reduce illiquidity in times of stress.

Potential market reforms were grouped into: market microstructure; transparency (covering both regulatory reporting and public disclosures); and repo using CP and CD as collateral. Each potential market reform was assessed against a high-level framework (set out in Box 2) to determine how it can address identified vulnerabilities in CP and CD markets, and its impact on different investors, intermediaries and issuers as well as on overall market functioning.

Box 2: Analytical framework for assessment of potential market reforms

Description of the potential market reform and how it could be implemented:

- 1) How would the potential market reform address structural vulnerabilities of STFM's? For example:
 - Likelihood of illiquidity in times of stress?
 - Concentration/diversity on the investors and dealers' sides?
 - Information asymmetry among market participants?
 - Interconnectedness?
- 2) Is the potential market reform currently in place in any jurisdiction, and if so, has it been helpful? How would it represent a change from current rules or practices in other jurisdictions? Has the potential market reform been previously considered and, if so, what were the main findings?

Potential effects in the below sections are assessed relative to the baseline of the status quo, as reflected in both normal and stress periods, without unusual government interventions.

Questions about the **effects of the potential market reform on investor behaviour**:

- 3) How would it affect the incentives of different types of investors to monetise their holdings during stress events? Does it shift risks to certain types of other investors?
- 4) What are the likely effects on the size and composition of investors in STFM's? Does it incentivise new entrants or increase diversification of the types of investors?
- 5) From a macro perspective, how would it affect aggregate investor behaviour in a liquidity and/or credit shock?

Questions about the **effects of the potential market reform on intermediaries** include:

- 6) How would it impact the ability or willingness of intermediaries to participate in both primary and secondary markets? And in both normal and stress times?
- 7) What are the likely effects on the size and composition of intermediaries in STFM's?

Questions about the **effects of the potential market reform on CP and CD issuers** include:

- 8) How would it impact issuers' access to funding in normal times and in times of stress (including its flexibility in terms of size, term, and frequency of issuance)?
- 9) How would it impact cross-border funding? Would it have different effects on domestic and foreign currency issuance?

Questions about the **overall market stability and functioning** include:

- 10) What is the impact on market resiliency in normal times and periods of stress?
- 11) To what extent does the potential market reform shift activities and risks to other parts of the financial system?
- 12) To what extent does the potential market reform affect the likelihood/efficacy of extraordinary central bank and other official sector interventions in times of stress?

4.2. Considerations from the high-level assessment of potential market reforms

4.2.1. *Market microstructure*

Changes to market microstructure that may enhance market functioning and market resilience are focused on standardisation and operational processes. The aspects of standardisation considered likely to bring potential benefits are digitisation of documentation (e.g. information memoranda) and shorter settlement conventions in certain jurisdictions (e.g. enabling T+0 settlement more widely). With regard to operational processes, significant impact would likely arise from increased automation of post-trade/downstream processes (e.g. obtaining an ISIN).

Digitisation of documentation is not currently widespread across markets – only the NEU CP and Japanese markets currently have market-wide digitisation – but pockets of digitisation exist within markets, for instance on certain platforms. Expanding digitisation would lead to faster sharing of, and access to, the necessary documents for finalising a transaction, resulting in a faster and more efficient issuance process. By speeding up the issuance process, digitisation of documentation may also be conducive to faster settlement times, making T+0 settlement more feasible.

T+0 settlement is currently more common in the US than in other jurisdictions, but is available in the NEU CP market and debated by European market participants and authorities. For example, ESMA has conducted a call for evidence on shortening the settlement cycle across various markets.⁶⁴ Standardising the settlement convention across markets from T+2 to T+0 would benefit issuers domiciled outside of the US, not only by enabling faster access to funding, but by simplifying their current treasury operations – for instance some European domiciled issuers issue in the US CP market and then swap their funding into Euros. The benefits of faster settlement times may be dependent on increased automation, as otherwise some European market participants caution on the potential for increased operational risks as a number of processes are condensed into a shorter timeframe. However, materialisation of such operational risks has not been cited by US market participants.

Widespread adoption of T+0 settlement may be restricted by current variations in post-trade/downstream processes, which result in a range of times taken for parties to a new issuance to obtain the ISIN. The extent of the inefficiencies varies by market and market participant. In the case of the ECP and NEU CP markets, where dealers and IPAs make use of the E-PIM/eNEU CP product, ISIN generation can take a matter of minutes. And in the NEU CP market for example, the process to request the creation of an ISIN can be delegated by IPAs to dealers, in which case the creation of ISINs can be almost instantaneous (this requires an ex-ante agreement between IPAs and dealers). However, such technology and processes do not overcome issues of inefficiency stemming from the fragmentation of domestic European markets where, for example, each domestic market uses a different branch of a CSD. This structure can lead to a range of times to obtain an ISIN as all IPAs must manually authorise its creation.

⁶⁴ ESMA (2023), *Call for evidence: On shortening the settlement cycle*, October.

Therefore, developing best practice and standardising process in this area would most likely benefit participants in the ECP and NEU CP markets where the dealer bank or IPA is not connected to E-PIM/eNEU CP technology (for instance non-financial issuers, or less-sophisticated dealers and IPAs) as well as participants in domestic European markets.

More efficient trade processing might improve transparency and support expansion of private repo markets. Where there are inefficient post-trade/downstream processes, platforms may be limited in the extent to which they can offer straight-through processing (STP) and therefore there is little benefit to market participants executing transactions directly on a platform, as opposed to off-platform. Where trades are executed on-platform, the platform provider has access to a more comprehensive data set. Similarly, increased automation of operational process would likely lead to increased electronic trading which in turn would lead to more comprehensive data sets per platform and potential increased transparency, with improved workflow and increased transparency conducive to the development of a repo market.

The various industry initiatives underway across each of these aspects of market microstructure may demonstrate a demand from market participants to improve operational processes. However, while improvements in these areas (i.e. digitisation of documentation, faster settlement, and post-trade/downstream efficiencies) – alone or in tandem – would enhance efficiency, especially in primary markets, they are unlikely to significantly increase the number or diversity of market participants or alter issuance characteristics. It is therefore not clear that any such improvements by themselves would significantly enhance market resilience in times of stress.

4.2.2. Transparency

Three data categories were considered as part of the analysis: amount outstanding; investor profile; and post-trade transparency, including pricing. Consideration was given to both regulatory reporting (i.e. authorities' collection of data) and public disclosure (i.e. authorities' or commercial data providers' publication of data). The data category 'amount outstanding' pertains to the aggregate nominal amount outstanding per issuer. 'Investor profile' pertains to the profile of the investor base, aggregated at the level of certain CP and CD market segments, i.e. individual investors and transactions are not identified. 'Post-trade transparency, including pricing' covers any post-trade data including generic or aggregate (not issuer-specific) pricing curves for certain CP and CD market segments (e.g. by currency, rating and maturity).

National authorities' access to the most comprehensive data sets for the three data categories varies. The most comprehensive data sets are those held by ICSDs followed by regulatory reporting received by authorities. There is variation among national authorities in both their access to either of these sources and on which data categories they are able to access information (i.e. the extent of the coverage). As a result, there are gaps in the information collected and published by authorities on CP and CD markets.

Where gaps in national authorities' publications exist, a number of commercial data providers have sought to fill some of them. These providers may be solely data providers or may also offer a platform for the execution of transactions. However, such commercial data is not comprehensive in its coverage and, depending on the ultimate source (e.g. self-reporting), may at times be inaccurate. A number of market participants therefore use a variety of sources

to estimate the three data categories in focus. Access to such sources varies by participant type and their level of sophistication.

There are some potential advantages and considerations in respect of increased transparency for all data categories. Increased regulatory reporting for each of the three data categories would enable national authorities to better monitor the size of CP and CD markets, as well as any pertinent trends – for instance issuance and investor concentration in particular sectors, ratings, issuers etc, which over time may help in the monitoring of vulnerabilities.

Enhanced public disclosures may reduce information asymmetry amongst market participants. It may also result in greater participation and increased disintermediation as dealers typically have access to most of this data given their role in the market. However, some intermediaries state that they do not expect more intermediaries to enter the market as a result of any increase in public disclosure as the business lines are generally run as services to clients. While increased transparency might be helpful for market functioning in normal times, it is less clear that it could mitigate the vulnerabilities in these markets during periods of stress.

Additional benefits from public disclosure of the amount outstanding are largely related to risk management. The publication of such information would enable (current and potential) investors to estimate their concentration in a single issuer and form a view on the liquidity profile of their holdings. Market participants also note that current MMFR has already led to increased demand for such data in Europe (including the UK), given the aforementioned point on concentration limits for MMFs.

Considerations around increased public disclosure of investor profile are more nuanced. Aggregated information would mostly benefit authorities in their monitoring activities. The publication of investor information on an aggregated basis to all market participants may enable issuers to better plan and tailor their funding, and may also contribute to the potential for increased disintermediation. It may also support investors' liquidity management as they would have greater information on investor concentration. The extent of the potential benefit of public disclosure will vary by issuer type, and will likely be greatest for non-financial issuers whereas financial issuers, such as banks who may issue directly or have contact with their institution's dealing desk and sales team, already have fairly developed knowledge of their investor base. Publication of aggregated investor information may also be of only partial benefit to issuers as the greatest benefit to issuers – e.g. of being able to engage directly with investors, for instance to alter the size of the issuance, or to understand why a trade has not been rolled over – would require investor-specific information rather than aggregated profiles.⁶⁵ Similarly, public disclosure of investor profiles may help intermediaries identify potential investor types, but they are likely to have richer information from their own sources.

As for post-trade transparency, including pricing, some authorities note that additional public disclosure regarding deal-specific issuance rates may have destabilising effects in times of market stress, but market participant views on the topic are mixed. An ICMA survey conducted last year concluded that such transparency could improve the valuation process, and thereby improve price formation and discovery and increase investors' and issuers'

⁶⁵ Callahan et al. (2020), *Lessons from COVID-19: US Short Term Money Markets*, BlackRock ViewPoint, July

participation by supporting greater confidence in price levels. Some authorities already publish some aggregated pricing information and have not experienced any problems, as the information is aggregated at a sector level. For example, for primary markets, JASDEC publishes daily CP rates⁶⁶, and Banque de France publishes weekly aggregated average yields on NEU CP split by sector, maturity, and rating. Similarly, Euroclear publishes (for free) a trade volume-weighted average yield based on the primary market transactions executed in the ECP market on the books of Euroclear Bank. Market participants highlight that increased transparency regarding individual issuances would make it possible to construct pricing curves, thereby supporting repo activity. However, issuers – fearing misinterpretation of their data – may forgo using the CP markets in favour of private placements. This is because the frequency of CP issuance supports a more continuous flow of pricing information, potentially signalling adverse changes in an issuer’s creditworthiness. That said, pricing quotes are typically available to those participating in trading platforms, but dealers have the most complete pricing information. And increased public disclosure may enable greater certainty of pricing for issuers, particularly where there is variation in fee schedules.

4.2.3. Private repo markets for CP and CD

Expanded ability to finance CP and CD in the repo market could improve market functioning in normal times and potentially reduce selling pressure in times of stress, but there are material challenges and risks associated with this proposal. Certain jurisdictions may want to consider whether repo markets can be used as a channel for investors and intermediaries to generate liquidity against CP and CD collateral. Intermediaries can use private repo markets to finance their trading inventory and raise cash rather than funding on an unsecured basis in normal times. In certain jurisdictions, investors, particularly MMFs, may also be able to use repo markets to raise liquidity during times of stress rather than sell their CP and CD holdings at a significant discount on the secondary market. However, repo borrowing may not align with MMF risk management practices and regulations, and such a practice could increase vulnerabilities by leveraging up MMFs and in some cases contributing to a perception of first mover advantage.⁶⁷ Furthermore, repo borrowing in stressed conditions may shift liquidity risks from CP and CD investors to other parts of the markets (i.e. the repo dealers who accept CP and CD as collateral).

Repo against CP and CD collateral currently exists to a limited extent in the US and European markets. CP and CD repo activity is significantly more prevalent in US than in European markets, but even in the US, overall activity remains low in comparison to other collateral types. Existing repo of CP and CD in the US and Europe is generally limited to dealers financing their inventory in normal market conditions rather than investors borrowing against their portfolio collateral, and the financing amounts remain limited due to the smaller size of dealer CP and CD portfolios relative to other asset classes. The mismatch in tenor preference

⁶⁶ Categories with less than three issuers are not published, otherwise no minimum threshold is applied in publishing the issuance rates and the new issuance information reported to JASDEC is utilised for issuance rate calculation with a weighted average.

⁶⁷ UK and EU MMFs structured as UCITS vehicles are allowed to repo out no more than 10% of their assets under UCITS regulations. In the US, MMFs are not permitted to rely on rule 18f-4 under the Investment Company Act of 1940 to enter into reverse repo transactions. Rule 18f-4 establishes a framework for funds’ use of derivatives and certain other transactions, including reverse repo agreements. In addition, US MMFs seek to maintain a stable share price or limit principal volatility by limiting their investments to short-term, high-quality debt securities that fluctuate very little in value under normal market conditions. In Japan, MMFs/MRFs have similar liquidity management requirements.

between dealers, who strongly prefer 3-month or longer funding, and cash lenders who prefer much shorter tenors may also impede the growth of the CP and CD repo market. In Europe, market participants reported only very occasional use of CP repo, usually backed by high-quality sovereigns, supnationals and agencies (SSA) paper, and that most tri-party schedules do not accept CP and CD; existing agreements are highly bespoke and non-standardised.

Developing a private repo market for CP and CD collateral should be carefully weighed against the existing limitations, potential risk management challenges, and feasibility considerations. One of the most significant challenges for cash lenders is “wrong-way” risk to the extent that the credit risk of CP and CD collateral may be positively correlated with the credit risk of the lender’s counterparty. For cash borrowers like MMFs, leveraging up to meet redemptions could increase run risks under stressed conditions. Moreover, regulatory frameworks on liquidity management designed to mitigate risks for certain institutional investors, particularly MMFs, may restrict or prevent their use of portfolio assets as collateral for repo borrowing. Other challenges include the underlying economics (the aforementioned mismatch of tenor preference, and lower profitability for dealers compared to other activities),⁶⁸ operational hurdles (particularly a lack of CP and CD collateral acceptance in triparty platforms in Europe), and opaqueness, which strongly impacts ability to price collateral, calibrate haircuts, and determine appropriate margin. Another limitation is the lack of credit ratings for CP issuance at the tranche-level (CP is often rated at the programme level), as ratings are typically required at the security level for eligibility within triparty collateral schedules and under Global Master Repurchase Agreements.

⁶⁸ Current CP and CD spreads generally make repo activity uneconomical once haircuts are factored in (some intermediaries estimate a spread of SONIA + 20bps to repo CP and CD, whereas the assets themselves yield SONIA + ~10bps, so that financing with repo would generate a negative carry). For comparison, intermediaries highlighted that government bills are not accepted in most repo collateral schedules due to their short maturities and limited yield pick-up opportunities. However, in stress, the discount on selling CP and CD outright may be higher than the cost of conducting a repo transaction.

Annex 1 – The CP and CD markets: Literature Review

The commercial paper (CP) and certificates of deposit (CD) markets allow financial and non-financial firms to access capital markets for short-term financing purposes. They have become integral to the daily operations of financial markets and the broader economy. This note will review academic, industry, and policy related literature on the structure and vulnerabilities of the CP and CD markets.

Literature related to characteristics of CP and CD markets

According to the IMF (2003), CP is an “unsecured promise to pay a certain amount on a stated maturity date, issued in bearer form”, while a CD is “a certificate issued by a bank acknowledging a deposit in that bank for a specified period of time at a specified rate of interest”, essentially in the form of “negotiable time deposit”. However, these definitions can vary between jurisdictions.⁶⁹

A number of academic and industry studies as well as regulatory reports have analysed characteristics of CP and CD markets. CP is typically issued by large financial and non-financial firms as well as public entities. Normally, CP issuers use the proceeds to finance their day-to-day activities such as the payment of salaries or suppliers’ invoices (e.g. FRB 2020).

Stigum and Crescenzi (2007) documented the main features and institutional design of the US CP market, including that CP can (i) be sold to investors either directly by the issuer raising capital or through a dealer; and (ii) be issued pursuant to certain exemptions from registration with the US Securities and Exchange Commission (SEC) under the US federal securities laws. Kacperczyk and Schnabl (2010) discussed regulatory exemptions available to CP issuers in the US and the conditions attached to these exemptions such as CP maturity, the types of investors, and the use of proceeds.

ICMA (2021) and Darpeix (2022) noted that the legal frameworks for issuing CP vary between European countries, which results in a landscape characterised by a relatively large, mostly UK-based ECP market, complemented by a number of other markets, of which France’s negotiable European (NEU) CP market is the most prominent. Darpeix (2022) described four main blocks of the European short-term securities market: the market for NEU CP, the market for ECP, the other national CP and CD markets, and the market for sovereign short-term bills, which is out of the scope of the report, highlighting a high degree of market fragmentation.⁷⁰

Kacperczyk and Schnabl (2010) also analysed asset-backed CP (ABCP) issuance prior to the financial crisis of 2009, which utilized a “bankruptcy remote special purpose entity,” often referred to as off-balance sheet conduits, of large financial institutions and was secured by a pool of

⁶⁹ For example, in France, the distinction between CP and CD was removed following the 2016 reform of negotiable short-term debt securities (Banque de France, 2016). Whereas in the US, Murdeshwar (1970) has defined a Negotiable CD as a certificate issued by a bank evidencing the deposit of funds payable at a future date and which can be legally transferred from one party to another. As CDs are evidence of a deposit, they can only be issued by banks.

⁷⁰ European CP and CDs programmes can apply to receive a Short-Term European Paper (STEP) label. The conditions for obtaining the STEP label are enumerated by the and include restrictions on settlement, disclosure of information, a standardised format for documentation, and the provision of information to the ECB for the production of STEP statistics.

underlying assets.⁷¹ Academic literature studying the ABCP market is still developing 15 years after the financial crisis. For example, Lysandrou et al. (2022) provided an integrated empirical analysis of the demand-pull and supply-push factors that drove the pre-crisis growth of the ABCP market in the US and European market.

In the US, CDs were introduced in 1961 by First National City Bank of New York (now Citibank), to recapture funds that were exiting banks and being invested in higher yielding instruments such as CP and Treasury securities. The Office of the Comptroller of the Currency (OCC, 2023) indicated that the bank lent \$10 million to a New York broker in government securities, which agreed to accept trades in CDs. Murdeshwar (1970) stated that because of the control that a bank would have over its total volume of CDs, the negotiable instrument may be employed in the management of a bank's reserves position.⁷²

Development of the short-term funding market, including CP and CDs is often attributed to the cost advantage relative to other means of accessing the public market. For example, with respect to European CP and CDs, ICMA (2021) stated that the negotiable nature of these securities, which are transferable and tradeable, facilitates cheaper funding levels and opens this market to a deeper and broader pool of investors. However, only large, creditworthy firms typically issue CP. Covitz and Downing (2007), using a comprehensive database on transactions of CP issued by non-financial corporations, showed that credit quality of the issuer is the most important determinant of spreads, while liquidity also plays a role. On the demand side, Allen et al. (2023) showed that short-term rates increased following the introduction of the US MMF reforms in 2016 across issuers of various sizes due to expected decreases in demand from MMFs. Furthermore, financial firms paid higher rates than non-financial firms for access to MMF funding during that period.

With respect to investor base, available sources suggest the CP and CD markets attract a broad range of asset managers including pension funds, insurance funds, and MMFs, as well as cash-rich financial and non-financial corporations (see e.g. Baklanova et al, 2020; Blackrock 2020, SEC Staff Report 2020). Baklanova et al. (2020) studied US MMFs' participation in the CP market and noted a growing trend of non-financial firms investing their surplus cash in the CP market. The same study noted that prior to the financial crisis, US prime MMFs held a significant portion of CP outstanding. However, the importance of US prime MMFs in this market has significantly declined in recent years, particularly in response to the MMF reforms introduced in 2014. In late 2020, prime MMFs held about 22% of US CP outstanding. In Europe, available data suggests that the largest investors are MMFs, which held around 45%-50% of the outstanding in Q1 2021 although the accuracy of data on investors remains a concern highlighted by the official sector reports (Darpeix, 2022; ESMA, 2021).

There is a large and growing body of academic literature focused on the behaviour of MMFs in CP and CD markets. Li et al. (2021), Breckenfelder and Schepens (2022), Kacperczyk and Schnabl (2010) have shown that MMFs tend to disinvest from CP and CD during liquidity crises. For example, US and European MMFs reduced their CP and CD holdings during the liquidity

⁷¹ Post-crisis financial reforms strengthened ABCP regulation and now generally require the liabilities associated with the ABCP issuance to be accounted for on the balance sheet of the sponsoring entity (Pan, 2017).

⁷² Such management consists of action taken by a bank to increase or decrease primary reserves in response to changes in the need for reserves, mainly as a result of fluctuations in deposits or as a result of rise or fall in loan demand.

stress event in March 2020. Aldasoro et al. (2021) documented a shift away from MMFs as providers of US dollar (USD) funding during the Covid-19 pandemic. The authors showed that non-US banks' on-balance-sheet USD liabilities rose in 2020, while US and European MMF investments in USD-denominated CP and CD declined. The study concluded that other non-bank sources of USD emerged and were able to substitute investments from MMFs that were no longer available. However, the evidential picture around the demand-side activities and market impact of non-MMF investors remains opaque mainly due to data gaps related to non-MMF investors, their behaviours and their expectations. Overall, there is little data available about the investor activities in the CP and CD markets beyond MMFs.

The cross-border nature of CP and CD markets is reflected in several studies. Aldasoro et al. (2021) noted a prevalence of non-US issuers, particularly financial corporate issuers, seeking to access short-term USD funding through these means. Correa et al. (2016) showed that such funding can be unstable by using evidence from the European sovereign crisis in 2011, when many European banks suffered a liquidity shock in the form of reduced access to the CD market. In June 2020, the Committee on the Global Financial System (CGFS) conducted an in-depth analysis of the USD funding market from the international standpoint and concluded that interconnections observed in this market can generate significant cost benefits for international flow of capital and the distribution of risk, but also give rise to vulnerabilities in terms of the transmission and amplification of financial shocks across the globe (CGFS, 2020).

The role of intermediaries and the incentives of dealers

Dealers play a central role in the CP and CD markets. Stigum and Crescenzi (2007) reported that dealers are central to the marketing and sale of CP and CDs to investors in the primary markets and often make markets in the securities they sell. The same research also found that relationship management is a key feature of dealing in CP and CDs. Similar to other short-term markets such as the repo markets, CP markets typically offer low profit margin and dealers often rely on high volumes to maintain profitability. This business line helps dealers generate more lucrative capital markets business from their corporate clients across all parts of their investment banking franchises. However, a lack of profit margin makes dealers more reluctant to buy CP from the issuer on a principal basis. In crisis periods, this can exacerbate illiquidity in both primary and secondary markets.

A more recent industry study (Blackrock, 2020a) provided insights about participants in US CP trading activity. About two thirds of this activity is intermediated by large international banks,⁷³ around 13% is attributed to smaller banks, and the rest of the activity is conducted by other entities. In the NEU CP market, according to CMDportal (2023), two French banks hold 51% of dealer activity, which suggests the market is highly concentrated. Aside from limited industry studies, the effect of relationships among dealers, their CP issuer clients, and CP investors are largely under-researched.

Stigum and Crescenzi (2007) discussed evidence of high concentration in the CP market among relatively few dealers prior to the great financial crisis, when the CP market was at its peak. While concentration relates to relationship management and the need to scale up issuance

⁷³ For example: JP Morgan, Bank of America, Citigroup, Barclays and Goldman Sachs.

volumes, with higher concentration, dealers may be facing potentially larger and contemporaneous redemption requests from investors, further exacerbating illiquidity. Aldasoro, Ehlers and Eren (2022) provided evidence of rising concentration and growing bargaining power also among MMFs, which are important CP and CD investors. The authors argued that this can lead to higher funding costs for issuers amidst a more concentrated investor base.

Blackrock (2020) suggested that dealer incentives to provide secondary market liquidity may be declining in recent years due to CP issuers building direct relationship with investors such as MMF managers, particularly in the European CP market. Until the early 2010s, dealer banks did not communicate to issuers the identity of the buyers of their CP, while issuers expected dealer banks to provide secondary market liquidity in their CP programmes. However, in recent years, issuers have become much more focused on understanding their investor base and bypassing the dealer. Arguably, this has further reduced the incentive for dealers to provide liquidity in the secondary market for CP. Blackrock (2020a) highlighted similar liquidity constraints in the US related to limited incentives for dealers to intermediate in the CP market.

According to ICMA (2021), trading platforms could improve liquidity for CP and CD under normal market conditions. For example, Chaboud et al. (2022) suggested that all-to-all trading, a system that allows any market participant to trade directly with any other market participant, in the US Treasury market could help improve resilience, and lower transaction costs. While it could increase liquidity if new participants were to enter the market to take advantage of the new trading ecosystem, they also warned that changes in market structure could reduce liquidity if some dealers were to reduce their involvement. However, in the CP and CD markets, the potential impact of these platforms remains under-researched.

Literature related to CP and CD market dynamics during market crises

Brunnermeier and Pedersen (2009) developed a model that showed linkages of market liquidity (i.e. the ease with which an asset is traded) and funding liquidity (i.e. the ease with which a trader can obtain funding) in asset markets. The model illustrated the ease with which traders of a specific asset can obtain funding and provided a number of stylised facts which are relevant to the CP and CD markets. First, market liquidity can suddenly dry up due to a reduction in funding liquidity. Second, market liquidity in different assets co-moves because funding liquidity determines liquidity provision across assets. Third, market liquidity is correlated with volatility. Fourth, flight to quality can arise as dealers cut back on more volatile assets first when funding becomes more difficult. Finally, overall market liquidity moves with the market as a whole, since funding conditions do. Macchiavelli and Zhou (2019) empirically tested this model linking dealers' funding liquidity conditions with their liquidity provision using data about the repo markets. However, similar empirical studies about CP and CD markets are lacking.

Kacperczyk and Schnabl (2010) documented a number of liquidity stresses during which the CP market experienced sudden reductions in issuance triggered by an unexpected increase in perceived riskiness of CP. In addition to the episodes described therein, liquidity stress events took place during the European sovereign debt crisis in 2011 and especially in March 2020 at the outset of the Covid-19 pandemic.

Short-term funding markets and dealer behaviour in March 2020

In March 2020, the global banking system was substantially more robust than it was pre-financial crisis. Banks had more capital, a higher level of liquidity, and less leverage due to implementation of the G20 financial reforms. Therefore, banks did not experience a liquidity stress associated with concerns about bank creditworthiness (FSB, 2020). However, market liquidity deteriorated rapidly and funding stress grew considerably in short-term credit markets.

Several official sector reports and research articles documented that the MMF sector, a large supplier of CP liquidity, was reluctant to fund new CP issuance, especially for longer maturities, for fear of increased redemptions in mid-March 2020. While in normal times MMFs could have raised cash to meet redemptions from maturing assets and the liquid positions they held, in March 2020, the substantial size of the cash needs prompted MMF managers to increase their cash holdings to meet rising liquidity withdrawals (e.g. ECB 2020, FSB 2020, and SEC Staff Report 2020). In the US, prime institutional MMFs saw sustained outflows as investors were worried about the possibility of redemption gates which would have further exacerbated stress. MMFs lost around 11% of their net assets in March 2020 (e.g. Baklanova et al., 2021; Baklanova et al., 2022; Yi et al., 2022).

In the EU, many USD and Euro-denominated MMFs experienced large redemptions: IOSCO (2020) reported that USD-denominated Low Volatility Net Asset Value (LVNAV) MMFs lost close to 25% of their net assets, while Euro-denominated Variable NAV (VNAV) MMFs lost 15% of net assets. MMF liquidity needs were amplified by dealers' redemptions in order to meet margin calls on derivatives exposures. MMFs attempted to sell back their CP to issuing banks to meet these liquidity needs. These requests were met either with particularly aggressive pricing or, in some cases, with a simple refusal to buy CP back at any price. These problems were exacerbated by dealers' unwillingness to purchase CP that they previously sold. Indeed, bank dealers were initially able to accommodate the increased demand for liquidity in short-term funding markets, but did not subsequently absorb the sizable one-sided flows. Dealer activity and inventory levels were generally higher during the period of market stress in March 2020 than in normal times, but still unable to satisfy liquidity demands (e.g. IOSCO, 2020; FSB, 2020; Breckenfelder and Schepens, 2022).

Schrimpf et al. (2020) also illustrated that in March 2020, dealers faced difficulties absorbing large asset sales given the size of the shock, amplifying turmoil in short-term funding markets. It appears that dealers' intermediation capacity was limited with the holdings of large amounts of other securities contributing to constraints on their balance sheets. Banks became less willing or able to supply hedging services and faced increased credit drawdowns by corporates. Some intermediaries' balance sheets may have been particularly inflexible given the looming March quarter-end. Additionally, Darpeix (2022) noted that despite their need for cash in March 2020, treasurers of non-financial corporations were not willing to issue CP at yields above 4 to 5 basis points (i.e. paying a few cents on every €100), implying that price adjustments on the primary market for CP were limited.

Central banks across the globe stepped in to support domestic economies and market functioning during the Covid-19 pandemic (e.g. BOJ, 2020; BOJ, 2021; Martin and McLaughlin, 2020; Boyarchenko et al., 2020; Cipriani et al., 2020; de Guindos and Schnabel, 2020). Central banks' interventions across multiple market segments and the use of monetary policy instruments were crucial in the market recovery.

Chen et al. (2021) provided evidence on the behaviour of dealers in a number of asset markets in the US. They found that at the height of the turmoil dealers reduced their inventory of CP and corporate bonds, and only increased their inventories after the substantial interventions from the Federal Reserve. However, such changes did not appear particularly large compared to previous months. During the same period, dealers increased or maintained their inventory of US Treasury bonds and residential mortgage-backed securities (RMBS). The authors also observed limited changes in long and short CP positions while changes in long and short positions were larger in US Treasury and RMBS markets. The authors interpreted these findings as evidence that dealers continued to make markets across a number of asset classes, but were simply overwhelmed by the volumes in the largest markets such as the US Treasury market.

Blackrock (2020a) argued that the different responses of US and European CP markets to central bank intervention supports an argument that dealers' balance sheet constraints were the most important contributor to the stress in short-term secondary markets. In the US, the Federal Reserve intervened directly in primary and secondary short-term markets, while in Europe, interventions focused mainly on non-financial corporate issuance. Despite the interventions, banks in Europe did not restart market making until well after the most acute phase of the turmoil passed, not even for CP with very short residual maturity.

Main vulnerabilities of the CP and CD markets

The following aspects are cited as key vulnerabilities of CP and CD markets:

- The absence of an active secondary market, coupled with a limited number of active dealers providing liquidity, results in these dealers becoming quickly overwhelmed by sizable, one-sided flows in a systemic liquidity event (ICMA, 2021).
- The limited capacity of dealers' balance sheet to buffer liquidity shocks, coupled with the growing level of debt outstanding in recent decades, could disincentivise dealers to intermediate in the CP and CD markets, which typically offer lower profitability than other debt markets.
- A lack of understanding of the investor base in the CP and CD markets outside of MMFs and whether other alternative buyers would step-in during times of stress to provide liquidity creates uncertainty, particularly in Europe. In particular, ICMA (2021) stated that the investor base in the European market is not diverse enough.
- The strong interconnectedness with other money market segments could transmit fragility in times of crisis (SEC Staff Report, 2020).
- Limited transparency, particularly in Europe, within both the primary and secondary markets complicates market monitoring and risk management. Regulators and market participants face challenges (i) assessing market liquidity and market functioning and (ii) understanding investor perceptions of additional market risks (ICMA, 2021). EC (2023) also highlighted data gaps and regulatory uncertainties related to European short-term funding markets.
- The lack of electronification and trading standardisation (for example including, documentation, legal frameworks, issuance terms), which could play a useful role in

facilitating liquidity at least under normal market conditions, both through consolidating multiple sources of liquidity and improving price discovery.

- Known vulnerabilities stemming from financing long-term assets with short-term liabilities. For example, Darpeix (2022) reiterated that issuers exposed to maturity transformation can be particularly vulnerable to a sudden freeze of the CP and CD markets.

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Abbreviations

ABCP	Asset-backed commercial paper
BoJ	Bank of Japan
bp	Basis point
CD	Certificate of deposit
CGFS	Committee on the Global Financial System
CP	Commercial paper
CRA	Credit rating agency
CSD	Central securities depository
DTC	Depository Trust Company
EA	Euro area
EC	European Commission
ECD	Euro certificates of deposit
ECP	Euro commercial paper
EEA	European Economic Area
EMS	Execution management system
ESMA	European Securities and Markets Authority
ESRB	European Systemic Risk Board
EU	European Union
EUR	Euro
FSB	Financial Stability Board
GBP	British pound sterling
ICMA	International Capital Market Association
ICSD	International central securities depository
IPA	Issuing and paying agent
ISIN	International securities identification number
JASDEC	Japan Securities Depository Center
JFSA	Japan Financial Services Agency
JPY	Japanese yen
LVNAV	Low volatility net asset value
MiFIR	Markets in financial instruments regulation
MMF	Money market fund
MMFR	Money market fund regulation (EU)
OMS	Order management system
OTC	Over-the-counter
Q	Quarter
NEU CP	Negotiable European commercial paper
RMBS	Residential mortgage-backed securities
SEC	Securities and Exchange Commission

SSA	Sovereign, supranational and agency
STEP	Short-term European paper
STS	Short-term securities
UK	United Kingdom
US	United States
USD	United States dollar
VNAV	Variable net asset value