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One size fits some:
analysing profitability, capital and
liquidity constraints of custodian
banks through the lens of the SREP
methodology

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Abstract

Custodians play a key but discrete role in the global financial market infrastructure. In Europe, they are licensed as “credit institutions¹”, a legal requirement for European deposit-taking institutions, and therefore they face the same prudential requirements as “traditional” banks. However, their business model and risk profile are different from those of traditional banks since the core of their activity does not encompass balance sheet transformation and the associated risks.

This paper examines how custodians differ from traditional banks with regard to (i) balance sheet structure, (ii) income generation, and (iii) risks faced; and how these differences should be incorporated in custodians’ internal risk measures and supervisory authorities’ risk assessment methodologies to prevent severe capital and liquidity misallocation by the credit institutions and inadequate decisions from supervisory authorities.

Keywords: bank, custodian, credit institution, prudential supervision

JEL classification: G15, G21, G28, L22

¹ Pursuant to Article 4(1)(1) of Regulation (EU) No 575/2013 of the European Parliament and of the Council of 26 June 2013 on prudential requirements for credit institutions and investment firms and amending Regulation (EU) No 648/2012, “credit institution” means “an undertaking the business of which is to take deposits or other repayable funds from the public and to grant credits for its own account”.

Non-technical summary

In Europe, custodians are licensed as credit institutions as per CRR² Article 4(1) as they collect deposits³ from their clients, **which means that custodians face the same prudential requirements as “traditional” banks**⁴. However, a custodian’s main business is to provide asset servicing solutions, rather than long-term lending to customers which means that they exhibit a different risk profile.

This paper explores the specificities of custodians’ business models, risks and balance sheet composition. We claim that a custodian is a safekeeper of financial information and a conduit ensuring smooth financial transactions. As a result, a custodian’s balance sheet is liability driven and they have a very limited risk appetite. By contrast, a banks’ role is to create credit and manage investment risk on behalf of other public and private sector actors.

Custodians are credit institutions but share common features with financial market infrastructures (FMIs) like central securities depositories, as their primary function is to serve as an interface between their clients and various central securities depositories. Supervisors should acknowledge these differences and pay particular attention to custodians’ internal capacity to identify, measure, and mitigate risks that are idiosyncratic to their business model. They can also leverage the growing literature on risks faced by FMIs.

In particular, we emphasise the following points:

- **The “passive, liquid and low-risk” structure of the asset side of the balance sheet of a custodian is a feature of its business model.** Nonetheless, balance sheet analysis alone does not tell us much about the resilience of a given custodian or its ability to recover from threats to its viability. The main risks mainly relate to operational risk, intraday credit risk and intraday liquidity risk, which are in essence not captured in the balance sheet of a credit institution. Custodians exhibit a lower RWA density than other financial institutions and in jurisdictions where central bank deposits are not excluded from leverage ratio, their leverage ratio is by far their primary capital constraint. Even when supervisory authorities impose additional weighted capital requirements, the primary capital constraint remains the leverage ratio
- **In a protracted low or negative interest rate environment, most custodian placements and instruments yield negative interest.** Custodians are not active loan makers and mainly generate revenue through fees and commissions charged to their clients. In a low or negative interest rate environment, most of their balance sheet yields negative interest, which acts as an incentive for them

² Regulation (EU) No 575/2013 of the European Parliament and of the Council ([Capital Requirement Regulation](#)).

³ And other repayable funds.

⁴ In this paper, a “bank” will be defined as “a credit institution that provides long-term credit funded by customer deposits and short-term wholesale funding”.

to (i) reduce the size of their balance sheet, (ii) pass on the negative rates to their clients, and/or (iii) increase their risk appetite.

- **Past operational losses are not an adequate estimate of capital needs to cover operational risk** because the operational risk threat to the capital position arises from low-frequency/high-severity (tail) events, whereas operational losses reported by custodians exhibit a high-frequency/low-severity loss profile. Therefore, custodians should be encouraged to develop innovative and comprehensive internal approaches to capture risks arising from their operational risk exposure.
- **The liquidity coverage ratio (LCR) has limited value as an indicator of custodians' short-term liquidity risk**, as it does not adequately capture the main type of liquidity risk they face, i.e. intraday liquidity risk. Furthermore, a bank run can ultimately improve their LCR position. Supervisors should acknowledge the specific nature of custodians' intraday liquidity risk exposure and ensure that custodians develop internal measures to adequately capture their intraday liquidity risk in the internal liquidity adequacy assessment process (ILAAP).

In the first part of the paper, the role and the business model of custodians will be explained in detail. In particular, we will show how they differ from other banks and from central securities depositories (CSDs).

The second part describes how banking supervision works, its objectives and tools and how it compares to other forms of regulatory supervision such as financial market infrastructure oversight.

In the third part, we analyse current and foreseen profitability challenges of custodian banks and how the main actors react to these constraints.

The fourth part provides a detailed analysis of how custodians' exposure to risks to capital (capital position, credit risk, operational risk, market risk and interest rate risk in the banking book) **differs from traditional banks' exposure to those risks.**

Finally, the last part analyses how custodians' liquidity risk profile differs from that of traditional banks.

1 Introduction – A different type of bank

1.1 Custodians as asset servicing providers

Custodians derive their name from their main activity, which is to hold their clients’ assets “in custody”. To understand what “keeping assets in custody” entails, we need to know where assets are located. That is not such a trivial question: we generally know where our money is (in our wallet or in our bank account) but few of us know where financial assets are physically held.

In reality, most financial assets⁵ are located in central securities depositories (CSDs)⁶. CSDs⁷ are financial institutions that ensure (i) issuance, (ii) settlement and (iii) safekeeping of financial securities. Generally speaking, there is one CSD in each country and securities issued in that country are held in that particular CSD in the name of asset owners (or of an intermediary). Most investors do not have a direct access to CSDs. Direct participation to a CSD entails financial, operational and legal constraints and investing in several markets would require an account in each of these CSDs. To alleviate these burdens, investors hold their financial assets in a custodian which acts as an intermediary between investors and the CSDs of the various markets in which they invest.

Today, custodians provide a vast range of services in addition to the custody business, all related to the life cycle of financial securities (Chan et al. 2007).

For example, on top of custody services, custodians typically process corporate actions linked to securities (e.g. collecting dividends on shares and acting as a proxy agent on behalf of clients). In particular, for investment funds, they provide an independent assessment of the funds’ net asset value. In addition, to provide access to different payments systems, custodians also provide multicurrency cash accounts for their clients. They may also provide several types of banking services to support their clients’ activities, such as intraday or very short-term liquidity lines.

Custodians’ clients are mainly financial institutions which hold their own assets (i.e. other banks, central banks, insurance companies, family offices) or hold assets on behalf of their clients (asset managers & investment funds).

Unless specified otherwise, in this paper the term “custody services” will be used as a generic term to cover a broad scope of safekeeping practices and

⁵ Equities, ETFs, government bonds, corporate bonds, T-bills, commercial paper, investment funds, rights and warrants.

⁶ See Annex 3 Table A.3.1 for a list of the largest CSDs in Europe

⁷ Issuance: CSDs are the first entry point for newly created securities. These securities issued by private or public issuers are usually stored in one place, the CSD. The CSD is in charge of “ensuring the integrity of the issue”, i.e. ensuring that the number of securities issued is equal to the number of securities in circulation (booked in investors’ accounts). Settlement: settlement means that a transaction is complete only when the buyer and seller have fulfilled their mutual obligations (e.g. paying cash for the buyer and delivering the securities for the seller). The CSD operates the platform allowing the settlement, usually through a “delivery versus payment” system that exchanges the cash for the security at the exact same time). Safekeeping: after the trade is concluded, the CSD is in charge of the post-trade lifecycle of the securities (collecting and distributing dividends, processing shareholders votes, etc. Source: [European Central Securities Depository Association](#)).

associated securities services provided by custodians. In practice, the type of safekeeping services provided depends on the type of asset. For instance, some commodities are kept in physical custody in vaults⁸, while domestic bonds are held in the custodian securities account of the local central securities depository⁹.

Table 1
Safekeeping services by asset type

Type of asset	Safekeeping services provided by the custodian	Example of assets
Domestic Financial securities	Asset is held in a securities account at local Central Securities Depository	Domestic bond/equity
Foreign Financial Securities	Asset is held in a Securities account in a foreign sub-custodian or a global custodian	Foreign bond/equity
Commodities	Physical custody	Gold
Other assets	Notary/record keeping	Real estate/private equity

As a result of providing these post-trade services, custodians play a crucial role in ensuring the smooth functioning of financial markets which would seem to make them equally close to financial market infrastructures (FMIs) and to traditional banks. In some jurisdictions like Belgium, they are de facto supervised by the same teams overseeing financial market infrastructures.

1.2 Custodians share many features with banks and FMIs

The business model of a custodian shares many features with both traditional banks and FMIs, two types of financial institutions that play very different roles in financial markets, generate their revenue in different ways and are exposed to different risks. Consequently, they are subject to different regulatory requirements. To appreciate the hybrid nature of custodians, understanding the services provided by both banks and FMIs is extremely important. What is a bank?

“Bank’ is a generic term associated to credit institutions that grant credits and collect deposits or other repayable funds from the public¹⁰. In practice, banks’ business models vary a lot depending on the type of **customers** they serve and there are countless¹¹ ways to classify their business based on their revenue-generating structure, risks faced or the size and complexity of their activity.

⁸ For example, Xetra-gold® has been issuing certificates backed by physical gold kept in vaults by Deutsche Börse Commodities GmbH. See Deutsche Börse Group Press Release 2 January 2020, “Xetra-Gold holdings rise to 203.2 tonnes at year-end”.

⁹ Those assets can be segregated from the custodian account depending on the type of local securities ownership structure (see Annex 3 for more details on asset segregation practices in Europe).

¹⁰ As per Article 4(1) no1) of CRR a credit institution’ means an undertaking the business of which is to take deposits or other repayable funds from the public and to grant credits for its own account. For the sake of simplicity, this paper will use a broad definition of ‘deposits’ to cover all liabilities due its customers.

¹¹ For example, the ECB breaks down credit institutions into peer groups by business model as follows: retail lenders, diversified lenders, universal banks, investment banks, sectoral lenders, corporate/wholesale lenders, G-SIBs and custodians and asset managers.

In this paper, we will use the term “banks” to refer to credit institutions that provide long-term credit funded by customer deposits and short-term wholesale funding. Banks are characterised by the following characteristics.

- **Banks’ main business is to grant credit to customers.** This is the case for both retail and commercial banks. As regards investment banks, while a large part of their business is to provide advisory services to corporate clients, a large part of their activity involves offering financing solutions (i.e. lending).
- **Banks run a mismatched book.** They grant a higher amount of credit compared to the amount of deposits they receive. Their loans are usually of longer maturity than the deposits they collect. Banks cover this funding mismatch with short-term funding.
- **Compared to custodians, banks are more assets driven, as the structure of their assets drives their need for funding.** When a bank grants a loan, it does not lend existing cash to the borrower but instead creates a swap of debt between the bank and the customer, which materialise in the balance sheet through the simultaneous creation of a loan (asset side) and of a deposit (liability). The bank’s need for cash arises from the customer using their deposit to make a payment to counterparties outside of the bank. The impact of monetary creation on a bank’s balance sheet is further illustrated in Annex 2.
- **Banks’ revenues are primarily interest rate-oriented.** Their main source of revenue comes from the active management of their balance sheet, i.e. by charging a higher interest rate on the loans they grant than they receive on the deposits they collect. On average, in Europe, net interest income accounts for 59%¹² of overall banks total net income and reaches 69%¹³ for the average of retail banking institutions. Most banks also earn fee and commission income on various products (such as account-related fees, investment banking advisory fees, securitisation, asset management, brokerage and insurance) but they tend to account for a smaller amount their revenue unless they specialise in these businesses.

1.2.1 What is a financial market infrastructure?

FMI are critically important financial institutions responsible for providing central clearing, recording or safekeeping of financial assets. The Bank for International Settlements¹⁴ defines an FMI as a “multilateral system among participating institutions, including the operator of the system, used for the purposes of clearing, settling, or recording payments, securities, derivatives, or other financial transactions.” This definition recognises five types of infrastructures that are managed by either central banks or private sector institutions: payment systems, central

¹² EBA dashboard as at Q4 2018.

¹³ Weighted average of net interest income / total operating income for SSM banks allocated to ‘retail lenders’ peer group as at Q4 2018 excluding La Banque Postale because of its particular role in collecting French regulated savings and associated revenues.

¹⁴ Bank for International Settlements – Principles for financial market infrastructures (2012).

securities depositories (CSDs), securities settlement services, central counterparties (CCPs) and trade repositories.

- **FMI do not grant loans to customers**, they fulfil the specific purpose aiming at reducing specific risks in the financial system. For example, a CCP's purpose is to sit between two parties trading standardised financial products (to reduce the counterparty risk between the two contracting parties). CSDs are financial institutions that issue, settle and safekeep financial securities
- **FMI do not run a “mismatched book” with high levels of maturity transformation.** For instance, CCPs receive collateral between transaction and settlement to limit their risk exposure and use margin calls¹⁵ and time-critical payments¹⁶ to reduce their exposures. Similarly, CSDs tend to mainly hold central bank reserves, bank deposits and some fixed-income securities on the asset side of their balance sheets¹⁷.
- **FMI revenues are primarily fee-driven**¹⁸. CCPs charge connectivity fees (allowing a party to become a counterparty of the CCP) and transaction fees (based on the volume of products traded). CSDs charge fees related to transaction settlement and asset servicing services.

FMI may hold a banking licence, depending on local requirements and their business (a banking licence enables them to perform additional services). In the United States, the largest CSDs¹⁹ and CCPs^{20,21} do not have a banking licence. By contrast, in the euro area, five financial market infrastructure providers do (two CCPs²² and three CSDs²³). FMI are subject to specific regulations²⁴. In Europe, CCPs are subject to the European Market Infrastructure Regulation and accompanying technical standards while CSDs are subject to the Central Securities Depositories Regulation (CSDR), which aims to harmonise the differences between settlement practices and increase settlement efficiency.

¹⁵ CCPs regularly assess the value of collateral received and run regular margin calls to ask participants to cover potential gaps between the actual value of collateral received and its expected value.

¹⁶ Time-critical payment is a key aspect of a CCP's risk management. Failure to meet financial obligations on time is a breach of normal contract law, which can lead to a legal dispute and penalties, whereas failure by a CCP participant to meet time-critical payments can lead to an immediate unilateral decision by the CCP to declare the participant in default and sell its collateral.

¹⁷ See, for example, [Euroclear Annual report 2018](#).

¹⁸ For a CSD, see, for example, [Euroclear SA/NV Annual report 2017](#) and, for a CCP (Eurex), see [Deutsche Börse Annual report 2018](#).

¹⁹ Depository Trust & Clearing Corporation (DTCC).

²⁰ CME Group, ICE Clear Credit, and NSCC.

²¹ Office of the Comptroller of the Currency, [National Banks Active as of 9/30/2020](#).

²² LCH Clearnet in France and Eurex Clearing AG in Germany.

²³ Clearstream Banking in Luxembourg, Euroclear Bank in Belgium and Clearstream Banking Frankfurt in Germany.

²⁴ In particular Regulation (EU) No 909/2014 of the European Parliament and of the Council of 23 July 2014 on improving securities settlement in the European Union and on central securities depositories and amending Directives 98/26/EC and 2014/65/EU (CSDR) Regulation (EU) No 236/2012.

1.2.2 Custodians share similarities with both banks and CSDs

From an economic perspective, custodians can be likened to back-office suppliers. They safekeep their clients' assets and facilitate the settlement of securities transactions by maintaining a securities account at CSDs and by acting as the recipient of securities or seller of securities. Custodians operate clients' (multicurrency) cash accounts) and securities accounts. It is important to understand the following points:

- **Custodians do not generally grant credit as part of their core business.** Their lending activity is limited to short-term overdrafts (generally intraday or exceptionally overnight) to support their core business of asset safekeeping and securities settlement. Those overdrafts facilitate the processing of client securities or payment transactions across different payment and settlement systems and time zones.
- **Custodians are not asset managers²⁵ and do not make investment decisions on behalf of their clients.** In other words, they do not manage their clients' assets held in custody.
- **Custodians differ from investment banks in that they do not provide investment advice or financing solutions to their clients.** Their main business is to facilitate the processing of transactions after investment/payment decisions have been made by their clients.

Based on all of the above, banks and custodians exhibit very different balance sheet structures.

Table 2
Simplified view of the balance sheet of a bank compared with that of a custodian

Simplified bank balance sheet			
Assets		Liabilities	
Cash	5	20	Money market funding
Securities portfolio	10	25	Corporate deposits
Loans to customers	85	50	Retail deposits
		5	Capital
Total assets	100	100	Total liabilities + equities

Simplified custodian balance sheet			
Assets		Liabilities	
Cash	45	90	Financial sector deposits
Securities portfolio	47		
Less liquid securities	5		
Overdrafts to clients	3	10	Capital
Total assets	100	100	Total liabilities + equities

Note: The figures shown are for illustration purposes only, and are in EUR billions. Trading book has been excluded for simplicity.

²⁵ At least asset management is not part of their core business. In reality, some custodians like State Street may have a subsidiary dedicated to asset management activities.

Banks grant loans to customers by creating commercial bank money which takes the form of customer loans on the asset side of its balance sheet and customer deposits on the liability side. They are mostly subject to (i) credit risk (when their customers do not repay their loans); (ii) liquidity risk (because the amount of central bank money and other liquid assets they hold is significantly lower than their customer deposits and are thus vulnerable to bank runs, i.e. unexpectedly high outflows from customer deposits); and (iii) interest rate risk (which materialises when a bank's revenue from the net interest margin decreases as interest rates change).

Custodians generate revenue by charging servicing fees rather than by taking principal risk on their balance sheets. Net interest income tends to represent a limited component of their total revenue (usually between 10% and 30%) whereas fees for services related to assets under custody and under administration, and transaction volume, are their main source of income. Custodians' deposit base can be quite volatile and client activity effectively determines the size of the institution's balance sheet. They receive deposits from their clients which are reinvested in liquid and safe assets (cash and highly rated governments bonds). Given that their business consists of, inter alia, facilitating payments, custodians have limited capacity and appetite to lend or invest in non-liquid assets, as their clients' deposits need to be available at a short notice to make payments. This volatility is especially high at certain points of the year, namely (i) during dividend payment season (March to May) where custodians collect dividends on behalf of their clients, (ii) around reporting dates (end of quarters) where clients window dress their balance sheets to show better ratios to the market, or (iii) during crisis situations. For example, deposits at State Street Corporation (the second largest custodian in the world) increased by 57% (+USD 93 billion.) between the fourth quarter of 2019 and the first quarter of 2020 as a result of the "dash for cash" during the coronavirus (COVID-19) crisis²⁶. As a result, its balance sheet also increased by that magnitude.

Consequently, custodians must maintain a very liquid balance sheet. Of course, they can decide to invest a portion of their assets in less liquid securities to improve their earnings, but this usually represents a small portion of their total assets. Therefore, in the event of sudden large outflows, custodians may face short-term liquidity risks if they do not manage to liquidate their securities (usually in the event of market disruptions, since most of their assets are extremely liquid). On the liability side, custodians do not need to seek funding on the market because they do not create a funding gap²⁷ by lending to customers.

From a credit risk perspective, custodians are not exposed to credit risk to the same extent as other credit institutions because they do not grant long-term loans to their clients. However, custodians might be more exposed to credit spread risk than traditional banks because of the large share of securities on their balance sheet.

²⁶ State Street financial results Q1 2020.

²⁷ Traditional banks face a funding gap because they make loans which are generally larger than the amount of deposits collected by the bank.

1.2.3 Custodians and CSDs are, at the same time, clients, competitors and providers of complementary services

The activities of custodians and CSDs are closely related. They (i) both provide safekeeping services and corporate action processing as core services; (ii) both generate revenue through fee and commission income and manage their balance sheet with limited risk appetite; and (iii) are both connected to securities settlement systems (e.g. TARGET2-Securities in Europe).

In some markets, CSDs and custodians compete to provide asset servicing to external clients, as clients may be directly connected to a CSD without needing to go through a custodian. This option may be less costly for clients: indeed, custodians cannot provide safekeeping services at a lower cost than the one charged by the CSD to the custodian for the same service.

However, custodians can also provide additional services that a CSD would not be able or willing to provide.

- **The largest custodians operate global custody networks in over 100 markets** and can allow their clients to operate in all these markets with a single point of entry. CSDs, on the other hand, tend to operate locally.
- **Direct access to CSDs may involve costly operational requirements** that smaller clients may not be willing to invest in.
- **Since custodians are credit institutions, they can also provide additional services** that may not fall within the risk appetite of a CSD, such as granting intraday credits.

The figure below provides a high-level comparison between different aspects of banks, CSDs and custodians.

Table 3High-level comparison between banks, CSDs and custodians²⁸

	Banks	CSDs	ICSDs²⁹	Custodians
Balance sheet structure	Asset driven	Liability driven	Liability driven	Liability driven
Main source of revenues	Net interest income	Fees and commissions	Fees and commissions	Fees and commissions
Need for a banking licence	Yes	No	Yes	Yes
Credit risk	High/long-term	/	Intraday	Intraday
Operational risk	Medium	High	High	High
Market risk	Yes	Very limited	limited	limited
IRRBB	Yes	Very limited	limited	limited
Liquidity risk	Short-term and long-term	negligible	Intraday	Intraday
Restitution risk	/	Yes	Yes	Yes

²⁸ The authors are aware that some financial institutions may have a different risk profile to the one presented above (e.g. a custodian which acquired a portfolio of high-risk securities to improve its earnings could face greater credit risk and liquidity risk).

²⁹ In Europe, two CSDs (Euroclear and Clearstream) have set up a banking subsidiary. Historically, these institutions were established to allow the settlement of European bonds denominated in USD. As demonstrated by this table, ICSDs have risk profiles closer to those of custodians than “non-banking CSDs”.

2 Prudential supervision of custodian banks

2.1 Introduction to the objectives and tools of banking supervision

Banks provide essential services to a well-functioning economy. They hold deposits, process payments and grant loans, enabling the growth of economic activity. They act as an intermediary between funding needs and savings, but require public trust to adequately perform their role. The failure of one bank could undermine public trust in the banking sector and result in a local or even generalised bank run. The fall of one bank could lead to the collapse of other banks by domino effect.

The primary objectives of prudential supervision are to ensure the safety and soundness of individual credit institutions, and in particular to protect customers savings & or other repayable funds from the public, and ensure they can adequately perform their lending role. Supervisors ensure that banks have a robust framework in place, limiting the risk of disruption to payments and transactions and they ultimately protect the stability of the financial system as a whole, given the interconnectedness between banks and other institutions.

In performing these tasks, supervisors help maintain the public confidence required to ensure the health of the financial system. Prudential supervision is not the only form of regulatory watch that banks are subject to. Depending on jurisdictions, supervisory authorities also supervise other aspects, including business practices, anti-money laundering activities, and investment services.

2.2 How do the prudential constraints faced by banks differ from those faced by FMIs?

Banks and FMIs both face risks to their capital and to their liquidity and these risks are looked at by different regulators. These regulators have different objectives, approaches and tools.

Central banks oversee FMIs to ensure that they operate smoothly and have the operational and financial resilience to mitigate and recover from potential disruptions. The ultimate objective of this oversight is to safeguard financial stability, as frequent or long-standing incidents affecting FMIs could disturb financial markets, prevent payment flows, and ultimately weaken financial stability and public confidence in money. This mission is always part of the central bank's functions.

The table below illustrates the different risks faced by banks and FMIs and how the difference in risk profile shapes the approach of prudential supervisors and

FMI overseers, with examples taken from the National Bank of Belgium’s 2019 Financial Market Infrastructures and Payment Services Report³⁰:

Table 4

Illustrative difference of approach* between prudential supervision and FMI oversight, adapted from National Bank of Belgium

	Main risks faced by banks	focus of Banking supervisors	Main risks faced by FMIs	focus of FMIs overseers
Credit risk	Credit risk in the balance sheet	Quality of credit portfolio and robustness of capital position	intraday credit risk	Level of intraday credit system granted to facilitate clients’ transactions
Operational risk	high severity financial loss	Adequacy of capital position to absorb severe but credible operational losses	operational incident affecting business continuity	Ability to recover from an operational incident (e.g. capacity to resume services within two hours)
Liquidity risk	Short-term and long-term liquidity risks	holding sufficient reserves to cover stressed customer outflows without relying on market funding, and funding sustainability	Intraday liquidity risk	capacity of the institution to operate despite failure of its two largest liquidity exposures

2.3 Prudential supervision under the Single Supervisory Mechanism (SSM)

In the euro area³¹, the responsibility for prudential supervision of financial institutions is split between several bodies.

- **The ECB directly supervises the banks assessed as significant** (117 in 2020³²) in cooperation with the national competent authorities (NCAs) of the countries of the jurisdictions in which these banks are established. In practice, this takes the form of Joint Supervisory Teams (JSTs) which are formed of supervisors from the ECB and from the NCAs.
- **NCAs directly supervise most financial service providers in the euro area** (non-significant credit institutions, payment services providers, and branches of banks from third countries). They also contribute to the supervision of significant credit institutions and are in charge of prudential supervision aspects not conferred to the ECB (anti-money laundering). They also fulfil various additional form of non-prudential regulatory watch (e.g. consumer protection)
- **The European Banking Authority (EBA)** fosters consistency in the supervisory practices among all Europeans countries. The EBA is among others responsible for providing guidelines for the supervisory review and evaluation process (SREP) with which the ECB and NCAs comply.

For supervisory authorities directly supervising credit institutions, one of core activity is the Supervisory Review and Evaluation Process (SREP) which

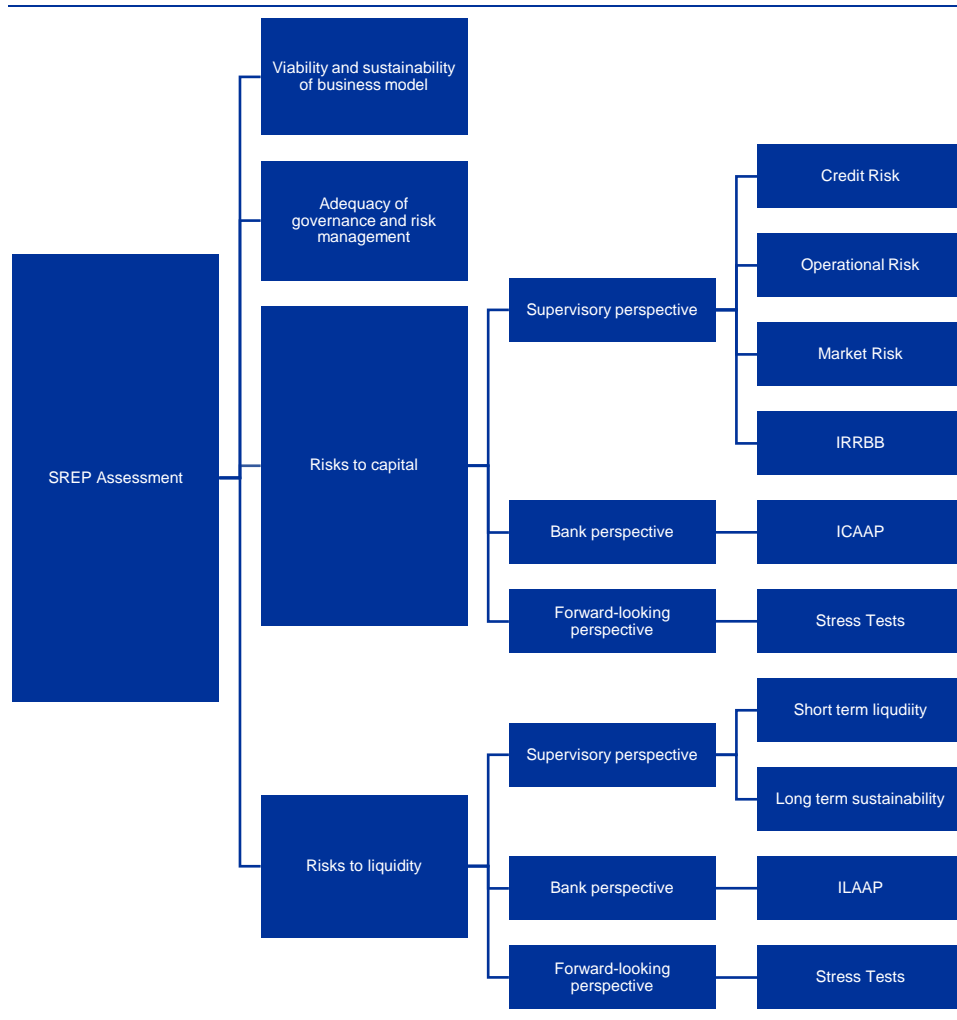
³⁰ National Bank of Belgium (2019), “Financial Market Infrastructures and Payment Services Report 2019”.

³¹ With Bulgaria and Croatia not yet member states of the euro area, participating in the SSM.

³² See [ECB Press Release 4 December 2019](#).

consists in an annual assessment of risks faced by the credit institution. ECB carries out the SREP assessment using a one-size-fits-all methodology for all SSM banks regardless of their business model or corporate governance principle with only minor adjustments for business models. The figure below shows a stylised view of the SREP methodology.

Figure 1
Stylised view of the SSM supervisory assessment methodology (SREP)³³



A credit institution’s supervisory assessment comprises four elements.

- **Viability and sustainability of profitability and business model**, over the short, medium and long term using automated scores based on indicators calculated on audited figures and the JST’s qualitative assessment.
- **Governance and risk management** (including key control functions, remuneration policies, risk management practices, and regulatory reporting)

³³ The Supervisory Review and Evaluation Process (SREP) is the methodology used within the Single Supervisory Mechanism (SSM) to supervise significant European credit institutions – for a comprehensive view over of the process please consult the [latest official SSM SREP Methodology](#).

assessed through compliance checks against provisions of national law implementing the Capital Requirements Directive, EBA guidelines, and the JST's qualitative assessment.

- **Risks to capital** (credit risk, operational risk, market risk and interest rate risk in the banking book). These risks are assessed from three different perspectives.
 - (a) **Supervisory perspective:** supervisory authorities assess a bank's exposure to each risk category (risk level) and its capacity to control these risks (risk control).
 - (b) **Bank perspective:** supervisory authorities assess the quality of the institution's internal capital adequacy assessment process (ICAAP) (e.g. governance of the process, robustness of capital planning, adequacy of internal stress tests, quality of internal controls, comprehensive risk identification and quantification, soundness of data quality).
 - (c) **Forward-looking perspective:** supervisory authorities conduct stress tests aimed at testing banks' resilience to adverse conditions.
- **Risks to liquidity** (over both the short and long term). Similar to risks to capital, risks to liquidity are also assessed from three different perspectives, a supervisory perspective, a bank perspective and a forward-looking perspective.

2.3.1 Challenges in supervising custodian banks

Supervisors face several challenges in supervising custodians because custodians have to comply with the same requirements as traditional banks, despite there being significant differences in their business model and risk profile.

The following three sections develop the main unique features of custodians with regard to (i) their profitability and business model structure; (ii) their risks to capital; and (iii) risks to liquidity.

- **The section on profitability and business models** presents (i) a description of the custody business landscape; (ii) the main drivers of current and prospective challenges to profitability faced by custodians in Europe and around the world, and how custodians adapt to these challenges; and (iii) how supervisors can incorporate and assess these challenges in their assessment of the profitability and business model.
- **The section on risks to capital** presents the following for each risk to capital (credit risk, operational risk, market risk and interest rate risk in the banking book): (i) how material these risks are for custodians, and how custodians' exposure to these risks differs in scale and in substance to banks' exposure to these same risks; (ii) the challenges faced by supervisors when assessing these risks and what their main areas of attention should be.

- **The section on risks to liquidity** presents: (i) how the risks to liquidity faced by custodians differ in scale and substance from the liquidity risks faced by traditional credit institutions; (ii) why the regulatory tools to assess bank liquidity risk are not relevant for custodians; and (iii) the challenges faced by supervisors when assessing these risks and what their main areas of attention should be.

3 Business model and profitability analysis

3.1 Custody business landscape

At global level, the custody business landscape is dominated by financial institutions headquartered in the United States. The two largest, BNY Mellon (with €33 trillion of assets under custody (AuC)), and State Street (with €30.6 trillion in AuC), have a global business that mainly revolves around investor services, while the third and fourth largest, JP Morgan (€23.9 trillion AuC) and Citigroup (€18.1 trillion AuC) respectively, offer diversified financial services beyond asset servicing.

The three largest EU custodians, with over €1 trillion of assets under custody, are all subsidiaries of French G-SIBs. The European market is perceived as relatively fragmented, with the biggest domestic banks playing a major role in their local market alongside the largest EU and US firms (e.g. Intesa and Unicredit in Italy; Banco Santander³⁴ and BBVA in Spain; and Commerzbank, Landesbank Baden-Württemberg and DekaBank in Germany). The market is increasingly concentrated and several mergers have occurred over the last few years. Ireland and Luxembourg are specific markets with strong competition and international presence since they are the two primary locations of the European investment funds industry, followed by Germany and France.

³⁴ Merged with Cacéis in 2019.

Table 5

Financial institutions with more than €1 trillion of assets under custody in the EU as of Q4 2019

Ultimate parent company	EU custody legal entity	AuC ³⁵ of the custodian (EUR trillion)	AuC of the non-EU parent (EUR trillion)*	Nationality (nationality of parent in brackets, if different)
BNP Paribas ³⁶	BNPP Securities Services	10.5		France
Société Générale ³⁷	Société Générale Securities Services	4.2		France
Groupe Crédit Agricole ³⁸	CACÉIS	3.9 **		France
The Bank of New York Mellon ³⁹	The Bank of New York Mellon SA/NV	2.9	33	Belgium (USA)
State Street ^{40 41}	State Street GmbH	***	30.8	Germany (USA)
JP Morgan ⁴²	JP Morgan Luxembourg	***	23.9	Luxembourg (USA)
Citi ⁴³	Citibank Holding Ireland Limited	***	18.1	Ireland (USA)

Notes: *Conversion rate USD to EUR 0.890.

** Includes AuC of Santander Securities Services and KAS BANK from the 2019 acquisition.

***Authors did not find public information on the custodian's AuC in the euro area for Q4 2019.

The asset servicing business has some to oligopolistic features. A few major players run large parts of the custodian business around the world through a global custody model (which consists of providing custody services around the globe via a network of sub-custodians⁴⁴ providing access to up to more than 100 markets). This oligopolistic nature can be explained by several factors.

- **The business relies on economies of scale**⁴⁵, because it requires a costly and high-quality infrastructure that is capable of processing a high volume of transactions and corporate actions with minimal operational incidents.
- **Custodians' reputation matter a lot.** Clients need the reassurance of dealing with large and well-established financial institutions, and, therefore, are conservative when selecting their custodians and sub-custodians (White, 2011).

³⁵ Some institutions merge “assets under custody” and “assets under administration” in their disclosure. “Assets under custody” refers to assets for which the custodian provides safekeeping and corporate actions processing services, and possible additional services such as fund accounting (pricing and valuation). “Assets under administration” refers to assets for which the custodian provides the above-mentioned services as well as financial reporting, tax, compliance, and legal services. The decision to disclose one or the other seems to be primarily driven by marketing.

³⁶ BNP Paribas (2019) “[BNP Paribas Integrated Annual Report 2019](#)”.

³⁷ Société Générale (2019), “[Société Générale Group results 4th quarter and full year 2019](#)”.

³⁸ Crédit Agricole SA (2019) “[Crédit Agricole SA Results for the 4th quarter and full year 2019](#)”.

³⁹ Bank of New York Mellon (2019) “[The Bank of New York Mellon SA/NV Annual Accounts 2019](#)”.

⁴⁰ State Street, (2019) “[State Street Europe Holdings Germany S.à r.l. & Co. KG Consolidated Disclosure Report as of December 31 2019](#)”.

⁴¹ State Street (2020) “[State Street Annual Report to Shareholders 2019](#)”.

⁴² JP Morgan Chase & Co. (2020) “[JP Morgan Chase & Co. Annual Report 2019](#)”.

⁴³ Citigroup, (2020) “[Citigroup Annual Report 2019](#)”.

⁴⁴ If a custodian's client wants to acquire securities on a foreign market, it needs to appoint a sub-custodian, which will be the local custodian of the foreign assets acquired by the client. A global custodian is a custodian which maintains a network of sub-custodians in most national markets.

⁴⁵ The Economist, “[The custodian-bank business](#)”, 2 February 2017.

- **The entry cost for new players is high, due to complex regulatory frameworks.** De facto low margins limit the capacity of new entrants to compete with well-established custodians.
- **Over the long run, the custody business model is expected to face changes.** These will be characterised by the deployment of new technologies and increased automation to further reduce operating costs, increase transparency and traceability, and improve regulatory oversight. In addition, the competitive environment is expected to become tougher with (i) the potential consolidation of current players who will benefit from increased scalability, and (ii) the potential entry of new entrants into the market⁴⁶.

3.2 High-level analysis of the challenges faced by the custody industry

Table 6
SWOT⁴⁷ analysis of the custody market

Strengths	Weaknesses	Opportunities	Threats
Fee-based business	Price-based competition lower margins	[LT] New technologies could decrease costs and improve services provider	[ST] Increase in compliance costs due to tougher regulatory requirements
Stable client market	Cost of balances at central banks due to low interest rate environment	[MT] Growth of market-based finance	[LT] Increased competition
High entry costs for new competitors	High number of competitors in a market that favour oligopolistic concentration	[MT] leverage in-house data to generate revenues as data provider	[ST] Decreasing margins for asset managers

Notes: ST refers to short-term challenges (current or expected to arise within a one-year horizon). MT refers to medium-term challenges (+/- three-year horizon), which are already integrated in the business plans of custodians. LT refers to long-term challenges (up to a five-year-horizon), which are being monitored.

3.2.1 Margin compression in an environment characterised by price-based competition

The most pressing challenge to custodians' profitability is that they operate in a high-price pressure environment. There are several reasons for this.

- **Their business relies on economies of scale:** the marginal cost associated with servicing more units of the same assets is minimal, while the fixed cost of developing and maintaining their infrastructure is high.
- **Basic asset servicing products (i.e. asset safekeeping and corporate action processing) are perceived as interchangeable by clients.** This does not mean that clients often change their custodians. The relationships between a custodian and its clients tend to be long-standing because changing custodians

⁴⁶ Funds Europe, "Fintech in Custody Banking: Threat of extinction", February 2017.

⁴⁷ A SWOT analysis is a strategic planning technique used to determine a business' strengths, weaknesses, opportunities and threats.

is a lengthy and complex operational process⁴⁸. However, custody costs are a considerable expense for the client over a couple of years and therefore affect client's own competitiveness during this period. As a result, clients will carefully consider custody costs when seeking a service provider.

- **Custodians serve clients who operate in an increasingly competitive landscape.** Asset management companies compete to capture the growth of market-based finance, which now represents more than half of the assets of the financial sector industry⁴⁹. A healthy fund market is beneficial for custodians, as it means more assets under custody (which drives fee incomes). However, they are also affected by the strong pressure on asset managers to provide services at minimal cost⁵⁰, which in turn implies an increased pressure to reduce custody costs.
- **Custodians are looking for way to manage this cost pressure. One can observe a trend towards increased automation** and strong investment in information and communications technology (ICT)⁵¹, staff reductions, and business offshoring⁵² of functions in countries with lower labour costs. Offshoring is eased by the fact that global custodians adopt a “follow-the-sun” model⁵³. Custodians also make ICT investments to “climb the value chain” of services provided to their clients (new and/or more timely information) and closely monitor the trend of asset management and asset owner markets to grow in the exchange-traded funds⁵⁴ segment, which is also the area that their clients are seeking to move into.

⁴⁸ Process duration depends vastly on amount and complexity of services provided; for largest deals, negotiating a contract can take between six and nine months and another six to nine months from client signature to asset on boarding.

⁴⁹ Market-based finance – as opposed to bank-based finance – refers to assets owned by non-banking financial institutions (i.e. asset managers). See Cunliffe (2017), “[Market-based finance: a macroprudential view](#)”. This shift can be partly explained by increased capital charges and liquidity constraints imposed on banks, which limit their ability to lend to certain risky projects (investment funds do not face similar capital constraints), and by long-standing interest rates that push investors to decrease their deposits and invest in new asset classes.

⁵⁰ See for example, Fidelity and Vanguard that offer index funds without administration fee. See CNBC (2018), “[Fidelity one-ups Vanguard, Schwab and iShares, becoming first company to offer a no-fee index fund](#)”.

⁵¹ Custodians see distributed ledger technologies (DLTs), such as blockchain, as promising technologies that, when sufficiently mature, could have a positive impact on several aspects of custody industries (e.g. reducing costs or increasing traceability of corporate action processing). However, at present the time horizon for massive adoption of DLT protocols is not clear. See for example, BNP Paribas Securities Services (2019) “[Blockchain innovation in the post trade world](#)”. On a side note, with regard to custody services provided to crypto-assets (i.e. providing cold and/or hot storage for clients' wallets), there is currently a limited appetite from major custody players to provide this type of service due to: (i) limited professional client demand, and (ii) regulatory uncertainties related to this activity (i.e. prudential treatment of these assets and restitution liabilities). Consequently, large custodians tend to monitor policy developments and potential clients' appetite for these services and could theoretically be well-placed to enter the market as their current activity already consists of providing similar services.

⁵² See for example, plans to reduce payrolls in BNPP Securities Services in France and offshoring in Portugal (Bloomberg (2019) “[BNP Paribas Custody Unit Wants to Reduce French Staff by 20%](#)”) and plans to reduce payrolls in State Street in Boston and offshoring in Poland and India (Boston business Journal (2019) “[State Street to lay off 1,500 in turn toward automation](#)”).

⁵³ See for example, Cacéis, which offers 24-hour middle-office coverage with offices in APAC, EMEA and Americas. (Cacéis Investore Services(2019) “[Outsourcing the middle-office is a strategic decision for companies](#)”).

⁵⁴ See Blackrock (2018) on [ETF growth](#).

- **Large custodians work on solutions to leverage the tremendous volume of client financial information that they have.** These solutions aim at providing additional services or easing access to these data for their clients through acquisition of technology companies⁵⁵ or partnerships with existing data services providers⁵⁶. Providing additional services to clients leveraging in-house data is perceived as the way to grow revenue in a very competitive market dominated by large players, but also as a way to maintain an edge over smaller actors.

3.2.2 Net interest income pressure as a consequence of the low interest rate environment

Despite the fact that custodians' revenues are primarily driven by fee and commission income, a low or negative interest rate environment presents a challenge that custodians address differently to traditional banks.

Traditional banks' main source of revenue is NII from their loan activity. In a negative interest rate environment, loans generate lower yields but banks have to continue or even extend their loan activity. By contrast, for custodians, in a negative interest rate environment, most of their financial assets start yielding negative rates.

Table 7

Yield from some of the most commonly found financial instruments in a custodian's balance sheet

Instrument	Yield as of 31/03/2020
EUR deposit at an EU central bank	-0.40% to -0.50%
EUR deposits at correspondent banks	-0.40% to -0.50% + negative spread
EUR deposits at major EU CSD	-0.80% to -0.90% ⁵⁷
USD deposits at major EU ICSD	-0.30%
GBP deposits at major EU ICSD	-0.30%
German 10Y sovereign bond	-0.54% ⁵⁸
French 10Y sovereign bond	-0.006% ⁵⁹

- **Custodians' primary action to safeguard their profit and loss is to reduce the size of their balance sheet by overcharging excess clients deposits**

⁵⁵ See for example [State Street acquisition of Charles River to provide enhanced data aggregation and analytics BusinessWire](#) (2018).

⁵⁶ See for example BNY Mellon partnership with Bloomberg to feed Bloomberg AIM with BNYM data (Seeking Alpha (2019), "[BNY Mellon, Bloomberg team up for front-to-back integration](#)") and BNY Mellon partnership with Blackrock to feed BlackRock Aladdin with BNYM data (BNY Mellon (2019) "BNY Mellon and BlackRock Partner to Deliver Integrated Technology and Servicing Capabilities across the Investment Lifecycle").

⁵⁷ Clearstream (2020), "[Interest on long cash balances](#)".

⁵⁸ Federal Reserve Bank of St. Louis, "[Long-Term Government Bond Yields: 10-year: Main \(Including Benchmark\) for Germany](#)".

⁵⁹ Banque de France, "[Interbank Rates 31 Mar 2020](#)"

when the relationship allows it⁶⁰. This situation is made possible by the fact that non-banking clients (e.g. insurance companies and asset managers) have no central bank access and must hold their deposits in a credit institution. At the same time, custodians generally benefit from high ratings by credit agencies, giving them “safe haven” status in crisis periods (if they are not themselves affected by the crisis), during which they can see their deposit base grow as a result of clients shifting their deposits from other market participants or selling securities to increase their cash balance.

- **Like other financial institutions, some custodians also search for yield in a low interest environment by increasing the risk appetite in their balance sheet.** This translates to acquiring securities of lower credit quality and/or in engaging in additional activities that are more capital demanding than pure custody services.

3.3 How these challenges translate into a supervisory assessment of custodian banks

To assess the viability and sustainability of a credit institution’s business model, supervisors use both quantitative indicators, calculated using data from audited financial statements, **and their qualitative supervisory judgement** based on their supervisory activities (thematic reviews, meetings, deep dives, on-site inspections), and other internal (credit institution business and strategic plan) and external sources (rating agency reports, specialised press articles, specialised papers).

3.3.1 Using the right indicators to measure custodians’ profitability, efficiency and sustainability

- **From a profitability perspective.** The two main indicators used by industry analysts to measure a credit institutions profitability, namely the return on equity⁶¹ (RoE) and the return on assets (RoA)⁶² should be analysed with caution by supervisors overseeing custodians.
- **In general, supervisory authorities tend to be careful when looking at the RoE⁶³.** This indicator may have the undesirable effect of rewarding a low level of equity and could incentivise credit institutions to improve their score by decreasing their capital.

⁶⁰ The extent to which they charge their clients depends on the contractual and firm-wide relationship they have with the client, its volume of deposits, and local market practices.

⁶¹ RoE compares the net income of a credit institution to the capital used to generate this income. It is an “investment view” in the sense that it answers the question, “how much investment is needed to generate this income?”

⁶² RoA compares the net income of a credit institution to the assets held by the bank to generate this income. It is an “investment view” in the sense that it answers the question, “how much investment is needed to generate this income?”

⁶³ European Central Bank (2010) “Beyond ROE – How to measure Bank performance”.

- **The RoA can be a satisfactory indicator for benchmarking traditional banks' profitability, as banks generate earnings through their lending activity.** However, it is hardly useful for custodians since their main source of revenue is fee-based, collected from assets under custody and transaction volume, which are not related to their own assets. Furthermore, custodians' balance sheets are very volatile, and client activity around reporting dates could blur the RoA⁶⁴
- **Supervisors should consider using profitability ratios that are tailored to custodians. In particular, net fee income and net interest income should be assessed separately.** In relation to net fee income, custodians generate asset servicing fees as well as transaction fees that are a function of the volume of client activity. These fees are independent from a custodian's risk appetite activity and solely based on its capacity to service its clients. On the other hand, custodians generate NII from their active investment decisions and from charging a negative interest rate to clients. Distinguishing these two profitability indicators would allow supervisors to better understand how reliant a given custodian is on active risk-taking decisions to maintain its competitiveness with peers. Indeed, a custodian that derives relatively more revenue from NII would be more reliant on active risk-taking decisions. An example of such metrics would be (Net fee income)/(Assets under custody) and (Net interest income)/(Total assets), as the first would capture revenues from the core asset servicing activity and the second would capture revenues from the active risk-taking activity.

From an efficiency perspective. As the custody business encompasses a high level of fixed costs that are hard to fundamentally restructure without affecting the client relationship, traditional efficiency indicators, such as profit margins and the cost/income ratio⁶⁵, can be used to show custodian efficiency. A high cost/income ratio could mean that the entity struggles to generate sufficient margins to be competitive. Supervisors should ensure that this indicator is compared against a relevant peer group of credit institutions, as a custodian cost structure is different from that of a bank.

From a sustainability perspective. As custodians are highly dependent on fee income and operate in a market with high client onboarding costs, the stability of net fee income provides an adequate view of the custodian's sustainability and of its capacity to retain its client base at a sustainable price.

3.3.2 Assessing custodians' viability and sustainability from a qualitative perspective

Supervisory assessment aims at being forward-looking. Supervisors assess the immediate threats to credit institutions' viability and sustainability over both the medium term (up to three years) and the business cycle. When it comes to assessing custodians' business model assumptions, they should ensure that institutions have

⁶⁴ To mitigate this issue, some custodians publish a large number of average ratios over a long time period, see for example "[BNY Mellon Corporation 2018 Annual Report](#)".

⁶⁵ Cost/income ratio: operating expenses/operating income.

properly assessed and measured strategic plans and that financial forecasts adequately incorporate all the relevant aspects of their current and foreseeable future business environment (that includes competition, product, regulatory, geographic, and technological considerations).

In particular, supervisors should adequately challenge the following types of strategic initiatives.

- **From a cost perspective:** a custodian who is growing its client base by contracting clients at a cost that would be prohibitively low for competitors should not assume that it would be able to generate higher revenues from clients in the medium term, as the trend is towards reducing fees over time. Supervisors should look at whether such a custodian has a sufficiently efficient cost structure to be able to afford to charge lower fees than its peers.
- **From an acquisition perspective:** when acquiring a competing business, custodians should consider their capacity to retain newly acquired clients after the merger is completed. During an acquisition, the custodian often wants to migrate the accounts of its new clients to its primary platform to reduce functioning and development costs. In this situation, clients tend to use this opportunity to look at competitors offers, as contracts and services would have to be reviewed anyway.
- **From a product development perspective:** to ensure that they are able to keep their customer base and attract additional clients, custodians should monitor trends in their clients' business area and regularly discuss their medium-term strategy⁶⁶ with clients, so as to have the capacity to enable the clients to implement their strategy
- **From a risk appetite perspective:** if custodians decide to increase their financial risk appetite to mitigate low NII revenues, they should properly assess how much room for manoeuvre they have, without affecting either their capital and liquidity position, or their client's risk appetite.

⁶⁶ As an example, if a custodian knows that its clients need financial reporting on specific standards or plan to invest in frontier markets over the next few years, it should assess the opportunity of developing such capabilities.

4 Risks related to capital

4.1 Capital position and RWA density

4.1.1 Introduction to capital requirements

Credit institutions are subject to minimum solvency requirements. Under Basel III, credit institutions must comply with two types of solvency requirements.

- **Risk-weighted capital requirements** require a minimum level of own funds relative to the risk-weighted assets (RWA) generated by the activity of the bank. There are three prudential risk-weighted capital requirements⁶⁷, the capital ratio⁶⁸, the Tier 1 ratio and the Common Equity Tier 1 (CET1) ratio. These ratios have the same denominator but use different definitions of own funds in their numerator. In Europe, credit institutions must have a minimum CET1 of 4.5%, a minimum Tier 1 of 6% and a minimum total capital ratio of 8%.

In addition, credit institutions are subject to additional capital requirement and capital buffers.

- **The Pillar 2 requirement (P2R) is imposed by supervisors following their regulatory assessment. It is mandatory and goes on top of minimum capital requirements. In addition, supervisors communicate a Pillar II Guidance (P2G)** which is a non-legally binding capital add-on to withstand stressed situations that is only communicated to the credit institution. Contrary to minimum capital requirements described above, the following buffers can be eaten up for some time periods under certain conditions:
 - **A G-SIB buffer** for identified global systemically important banks.
 - **An O-SII buffer** set at national level for other systemically important institutions.
 - **A systemic risk buffer** set at national level and aimed at preventing and mitigating the non-cyclical dimension of risk linked to the structural characteristics of the banking sector.
 - **A countercyclical buffer** set at national level and in accordance with the economic situation to limit pro-cyclicality.
 - **A capital conservation buffer** that the bank can temporarily use when facing losses, in which case the bank is not allowed to distribute dividends until the buffer is replenished.

⁶⁷ The resolution metrics (TLAC, and MREL) will not be discussed in this paper.

⁶⁸ Art 92(1)(c) CRR.

- **The leverage ratio** is, a non-weighted capital ratio that is intended to limit credit institutions' leverage. This ratio uses the same numerator as the Tier 1 capital ratio and is set at 3% for banks subject to European banking supervision.

4.1.2 Effective capital constraint and RWA density

For most banks, their primary capital constraint comes from their risk-weighted capital requirements. The primary capital constraint for a given financial institution is determined by its capital requirements and the items on its balance sheet. The measure of RWA/total exposure in the balance sheet is called RWA density, where the higher the density, the higher the risks generated by assets.

If a bank has a high RWA density, then it is likely that its primary capital constraint will be its risk-weighted capital ratio. I.e. the credit institution will have higher capital headroom⁶⁹ based on its leverage ratio than on its risk-weighted capital ratio.

The following example shows how bank RWAs and total leverage exposure translate into capital requirements and how RWA density affects capital headroom.

For the sake of simplicity, this example will only compare Tier 1 capital ratio and leverage ratio requirements because they both use the same numerator (same definition of capital) and a different denominator (Tier 1 capital ratio uses RWAs and leverage ratio uses total leverage exposure).

A detailed step-by-step explanation can be found below the figure:

⁶⁹ Capital headroom is the difference between a credit institution's capital position and capital requirement.

Table 8

Capital position, capital requirements, capital consumption and RWA density of typical banks and custodians

	Bank B	Custodian C
Tier 1 capital (EUR billion)*	1	1
Tier 1 minimum capital requirements*	10%	10%
Max RWA exposure allowed for 1 EUR billion capital	10	10
Leverage ratio minimum requirements*	3%	3%
Max leverage exposure allowed for 1 EUR billion capital	33.30%	33.30%
Exposure in RWA (EUR billion)*	6	1.9
Leverage exposure (EUR billion)*	18.2	13.7
RWA density	33%	14%
Tier 1 ratio	16.70%	52.10%
Leverage ratio	5.50%	7.30%
Tier 1 ratio capital usage (%)	60%	19%
Tier 1 ratio capital headroom (EUR million)	400	810
Leverage ratio capital usage (%)	55%	41.60%
Leverage ratio Capital headroom (EUR million)	454	586

***Inputs/Assumptions in our example**

Step by step explanation

To compare capital constraints from the 2 ratios let's take an example. Suppose, a bank (B) and a custodian (C) have the same Tier 1 capital position (EUR 1 billion, a 6 bn EUR and 1.09 bn EUR RWA exposure respectively and a 18.2 bn EUR and 13.7 bn EUR leverage exposure respectively.). They also face the same regulatory capital requirements of 10% minimum tier 1 capital ratio and 3% minimum leverage ratio). As a result of this level of capital and capital requirements, both could have a maximum Tier 1 exposure of up to EUR 10 billion⁷⁰ and maximum leverage exposure of up to EUR 33bn⁷¹.

Bank B ratios

We will assume that the bank B has the same balance sheet structure, RWAs, and capital ratios as the weighted average European Banks⁷², as identified by the EBA in its Q4 2018 Risk assessment of the European banking system and that institutions do not quickly materially change their RWA density because it is driven by business model. So our average bank B exhibit a leverage ratio of 5.5%, and a Tier 1 capital ratio of 16.7% which means a RWA density of 33.3%⁷³. With EUR 1 billion of capital, this bank would exhibit a EUR 6 billion⁷⁴ RWA exposure and a EUR 18.2 billion⁷⁵ total leverage exposure.

What do these numbers say about bank B's capital constraint?

To comply with a 10% minimum Tier 1 ratio, Bank B needs EUR 600 million⁷⁶ of capital to cover its EUR 6 billion RWA exposure. And to comply with 3% minimum leverage ratio, bank B needs EUR 546 million⁷⁷ of capital to cover its EUR 18.2 billion leverage exposure. As bank B has 1 billion of capital, its headroom is respectively of EUR 400 million above Tier 1 requirements, and EUR 454 million above leverage requirements. Therefore bank B is slightly more constrained by its Tier 1 ratio. If bank B decides to expand its activity, it is likely to face capital constraints from its Tier 1 ratio first hence capital ratio is its primary capital constraint. Similarly, if bank credit portfolio deteriorates, it will negatively affect its RWA but not its leverage exposure hence putting further pressure on bank Tier 1 capital ratio.

Custodian C ratios

There is no public data on capital or RWA density for a relevant peer group of European custodians so we built one based on average sample data from three custodians⁷⁸ disclosing the relevant information needed for our analysis. The numbers have been standardised to make this example comparable to the one above and details are provided in Annex 8. So our average custodian C has EUR 1 capital, EUR 1.9 billion RWA exposure and EUR 13.7 billion total leverage exposure, a leverage ratio of 7.3% and a Tier 1 ratio of 52.1% and a very low RWA density of 14%.

What do these numbers say about custodian C capital constraint?

To comply with 10% minimum Tier 1 ratio, custodian C needs only 190 million of capital to cover its EUR 1.9 billion RWA exposure⁷⁹. And to comply with 3% minimum leverage ratio, custodian C needs EUR 414 million⁸⁰ of capital to cover its EUR 13.8 billion leverage exposure. As custodian C has 1 billion of capital, its headroom is respectively of EUR 810 million above Tier 1 requirements, and EUR 586 million above leverage requirements. Custodian C is therefore far more constrained by the leverage ratio than the Tier 1 ratio, as it could multiply its RWA exposure by five without breaching Tier 1 capital requirement. Assuming that revenues are a function of risk, custodians could increase their revenues by replacing assets that generate low RWA by assets that generate more RWA without facing additional capital constraints, which explains why some custodians are considering increasing their risk appetite.

⁷⁰ 1 bn capital / 10% Tier 1 min capital requirements = 10 bn.

⁷¹ 1 bn capital / 3% leverage ratio minimum requirement = 33.3 bn.

⁷² European Banking Authority (2019), "Risk assessment of the European banking system".

⁷³ 5.5% leverage ratio / 16.7% T1 capital ratio = 33%.

⁷⁴ 1 bn. capital / 16.7% capital ratio = 6 bn. RWA exposure.

⁷⁵ 1bn. capital / 5.5% leverage ratio = 18.2 bn. leverage exposure.

⁷⁶ 10% Tier 1 capital * 6 bn. RWA = 600 million capital requirements for Tier 1 ratio.

⁷⁷ 3% leverage ratio * 18.2 bn leverage exposure = 5.5 bn. capital requirement for leverage ratio.

⁷⁸ See Annex 8 for detail on custodian sample data.

⁷⁹ 10% Tier 1 capital * 1.9 bn. RWA = 190 million capital requirements for Tier 1 ratio.

⁸⁰ 3% leverage ratio *13.7 bn leverage exposure = 411 million capital requirement for leverage ratio.

4.1.3 Due consideration of inclusion or exclusion of central banks' reserves from the leverage ratio calculation

The Basel Committee on Banking Supervision (BCBS)⁸¹ allows for some flexibility in how jurisdictions can treat exposures to central banks in the calculation of the leverage ratio. As discussed above, custodians hold a large share of their assets as cash reserves in the central bank. Therefore, the decision to exclude these reserves from leverage ratio calculation has a major impact on the primary capital requirements for those institutions. Over the past few years, various major jurisdictions have allowed specific exemptions in the measurement of the leverage ratio:

- **In the United Kingdom, the Prudential Regulation Authority⁸² authorises all banks to exclude central bank exposures under certain circumstances.**
- **In the United States, from April 2020, the Federal Reserve Board⁸³ has authorised banks providing custodial services to exclude their exposures to central banks from their leverage as a response to the COVID-19 pandemic.** This exclusion follows previous exemptions authorising custodians to exclude their sponsored repo⁸⁴ activity from the leverage ratio.
- **In the European Union, from 17 September 2020 and 27 June 2021, the ECB has authorised banks under its direct supervision to exclude euro-denominated central bank reserves from the leverage ratio⁸⁵ owing to exceptional circumstances resulting from COVID-19 pandemic.**

4.1.4 Consequences for supervisors

In our view, when custodians disclose a strong capital ratio and a low RWA density, supervisory authorities should focus on imposing qualitative requirements to mitigate potential deficiencies observed in their supervisory activity rather than increasing weighted capital requirements, because the latter has no impact on effective capital demand.

⁸¹ Basel Committee on Banking Supervision (2019), "[Revisions to leverage ratio disclosure requirements](#)".

⁸² Bank of England Prudential Regulation Authority (2017), "[UK leverage ratio: treatment of claims on central banks](#)".

⁸³ Federal Reserve System (2020) "[Capital Rule: Temporary Exclusion of U.S. Treasury Securities and Deposits at Federal Reserve Banks from the Supplementary Leverage Ratio](#)".

⁸⁴ Sponsored repos are repos traded via a CCP (FICC) and collateralised by short term US treasuries.

⁸⁵ ECB press release 17 September 2020, "[ECB allows temporary relief in banks' leverage ratio after declaring exceptional circumstances due to pandemic](#)". This decision follows regulatory amendments to leverage ratio from [Regulation \(EU\) 2020/873 of the European Parliament and of the Council of 24 June 2020 amending Regulations \(EU\) No 575/2013 and \(EU\) 2019/876 as regards certain adjustments in response to the COVID-19 pandemic](#).

4.2 Credit risk, concentration risk and large exposures

4.2.1 Custodians' exposure to credit risk

Credit risk is the risk of loss resulting from a borrower's failure to repay a loan or meet contractual obligations. Traditionally, it refers to the risk that the lender does not receive the principal and/or interest owed. The widely accepted social function of a bank is (i) to grant credit through the simultaneous creation of credits and deposits; and (ii) to manage the risk of default of its counterparty, using its capital to cover for potential losses arising from borrowers' default. Credit risk is the main driver of capital requirements for almost all European banks under current prudential regulation. A bank's credit risk exposure can be analysed looking at the relevant on-balance-sheet and off-balance-sheet exposures.

Custodians are exposed to two types of credit risk.

- **Credit risk on their balance sheet**, mainly driven by two components:
 - (a) **their investment portfolio**, which should mainly comprise high-quality liquid assets (mostly sovereign or similar, but also corporate bonds) that benefit from high ratings and generate low risk-weighted exposures;
 - (b) **cash exposure in the nostro accounts** (i.e. the custodian's account)⁸⁶ held at various correspondent banks⁸⁷ and reverse repos⁸⁸, which also generate low RWA.
- **Credit risk stemming from granting short-term (intraday) credit facilities:** custodians can provide overdraft facilities to ensure the smooth and efficient settlement of securities transactions. While these credit lines are generally unadvised, uncommitted and based on discretionary criteria, they are part of the services that clients expect from their custodian and a failure to provide this service would weaken the commercial relationship and pose reputational risk to the custodian. The risk arising from intraday credit is not captured as part of the on-balance-sheet and/or off-balance sheet items and consequently does not generate a Pillar I capital requirement. Credit risk only arises on the custodian's balance sheet when one or more clients draw down their credit line and fail to cover it before the end of the day, in which case it appears as an overdraft in the custodian's balance sheet (and starts to generate RWA).

⁸⁶ "Nostro", and "vostro" accounts are accounts held by two banks in relation to each other, to help simplify bilateral transactions. "Nostro" means "our" in Italian and "vostro" means "your". When Bank A refers to its "nostro account" at another bank, it refers to its balances held at Bank B, this same deposit will be called the "vostro account" by Bank B. Conversely, any account held by Bank B at Bank A will be a "vostro account" for Bank A, and a "nostro account" for Bank A.

⁸⁷ A correspondent bank is a bank that provides services on behalf on another bank. For example, when a French tourist visits Japan and makes a payment in Japanese yen, the French tourist's bank will transfer the amount of the transaction from the tourist's deposit account to the vostro deposit account of its Japanese correspondent bank and instruct the correspondent bank to make the payment in yen to the shop's bank. Custodians need various correspondent banks to allow their clients to invest in securities in different countries.

⁸⁸ Most common form of secured lending.

To sum up, given their credit risk profile, custodians have lower capital requirements in relation to credit risk than banks because their assets comprise (i) investment securities with high ratings (which bear low risk weights); or (ii) short-term credit which is mainly intraday and generates no Pillar I capital requirements. Therefore, unlike banks, custodians' capital requirements are not, in the main, driven by credit risk but by other risks, such as concentration risk.

4.2.2 Concentration risk and large exposures

4.2.2.1 Custodians exposure to concentration risk and large exposures

Despite a strong capital ratio, a credit institution may fail if its exposures are concentrated in one or just a few counterparties that fail to meet their obligations. In other words, concentration risk – “large exposures”, in the regulatory jargon – arises when a credit institution experiences significant losses in the event of a sudden failure of a single counterparty or a group of connected counterparties. The risk of large losses associated with such a failure is not captured by the risk-based capital standards of the BCBS⁸⁹. To prevent it happening, the BCBS, in its “Supervisory framework for measuring and controlling large exposures” (2014), indicates that the sum of all the exposures of a bank to a single counterparty or to a group of connected counterparties must not be higher than 25% of the bank's available eligible capital base at all times.

For banks, limits on large exposures exist to control lending exposures to the bank's largest clients. This could be done via the use of risk mitigation techniques in order to reduce the notional exposure toward a client. For custodians, large exposures (LE) are material, mainly as a result of two specific factors.

- **Custodians face high levels of LE vis-à-vis networks of sub-custodians** because they need to place their clients' deposits in foreign currency at their correspondent bank and nostro deposits at their sub-custodians to perform their activity. As described above, the market is composed of a small number of large players leading to a naturally high concentration; and selecting a less well-known sub-custodian outside of this oligopoly can be perceived as trading concentration risk for credit risk and/or operational risk, as it increases complexity. Consequently, custodians tend to have concentrated networks of sub-custodians as shown in the table below.
- **Euro area custodians face a high level of intragroup LE** owing to high interconnectedness through group liquidity pooling and/or correspondent banking activity from other intragroup entities. For example, a large bank may decide to centrally manage the treasury of all its subsidiaries, in which case the latter will place their cash at the entity centralising the treasury activity. This set-up allows the parent company to be more efficient in its treasury

⁸⁹ Bank for International Settlements (2018), “[The treatment of large exposures in the Basel capital standards](#)”.

management because it manages the pool of liquidity instead of managing the treasury of individual subsidiaries, but the lack of independent management could make each individual subsidiary less resilient if there is a severe idiosyncratic shock at the parent company. It is widely used in Europe because the largest custodians in Europe tend to be subsidiaries of large European or US financial institutions that operate globally.

Table 9
Sub-custody networks of a selection of six global custodians in 14 different markets

Country/net work	Global custody network					
	BNY Mellon	State Street	JP Morgan	Citi	HSBC	BNP Paribas
United States	BNY Mellon	State Street	JP Morgan	Citi	HSBC, Citi, Brown Brothers Harriman	BNP Paribas
United Kingdom	BNY Mellon	State Street	JP Morgan	Citi	HSBC	BNP Paribas
Luxembourg	BNY Mellon	Clearstream, JP Morgan	BNP Paribas	Citi	Clearstream	BNP Paribas
Belgium	BNY Mellon	Deutsche Bank	BNP Paribas	Citi	BNP Paribas, Euroclear	BNP Paribas
Netherlands	BNY Mellon	Deutsche Bank	BNP Paribas	Citi	BNP Paribas	BNP Paribas
Germany	BNY Mellon	State Street, Deutsche Bank	JP Morgan, Deutsche Bank	Citi	HSBC	BNP Paribas
France	BNP Paribas, Citi	Deutsche Bank	BNP Paribas, Société Générale	Citi	Crédit Agricole	BNP Paribas
Italy	BNP Paribas	Deutsche Bank	BNP Paribas	Citi	BNP Paribas	BNP Paribas
China	HSBC	HSBC, Standard Chartered	HSBC	Citi	HSBC	BNP Paribas, HSBC
Japan	Mizuho, Mitsubishi	Mizuho, HSBC	Mizuho, Mitsubishi	Citi	HSBC	HSBC
India	Deutsche Bank, HSBC	HSBC	JP Morgan	Citi	HSBC	BNP Paribas
Russia	ING	Citi	JP Morgan, ING	Citi	Citi	RosBank
Saudi Arabia	HSBC	HSBC	SABB	HSBC	HSBC	HSBC
Brazil	Citi, Itaú	Citi	JP Morgan	Citi	Bradesco	BNP Paribas

Notes: The table above shows an extract of the sub-custody network of six global custodians in 14 selected countries⁹⁰. Example of how to read the table: When a client of BNY Mellon in the United States acquires Chinese securities, BNY Mellon sub-delegates the custody services for these Chinese securities to an HSBC subsidiary in China. A custodian may have more than one sub-custodian in a country, for example, one for bonds and one for equities.

4.2.3 Supervising custodians' credit risk

Credit risk is a core risk for all credit institutions but supervisors should ensure that custodians have implemented a risk control framework that allows them to identify, measure, and monitor risks arising from their specific activity, and especially from their intraday credit activity, their investment portfolio and their deposits to other financial institutions (and possibly from other exposures if the custodian has a more complex asset portfolio).

⁹⁰ The table has been produced using available data on custodians' own websites and that of the US financial services regulator, the Securities and Exchanges Commission (SEC). Data from bank sources are from 2018, but the figures from the SEC are not dated and the current custody network of some of the financial institutions may have increased. Sources for the sub-custodian network are available in the references at the end of this paper.

From an intraday risk perspective, supervisors should ensure that custodians have set up an effective intraday credit risk framework, that enable them to monitor their intraday credit risk exposure on a real-time basis and have established appropriate limits and controls to maintain their actual intraday credit exposure within their risk acceptance level.

There is currently no regulatory requirement stemming from intraday credit activity or an industry-wide best practice methodology on how to measure capital requirements stemming from intraday credit risks. Supervisors should therefore assess whether the custodian has internally assessed the materiality of its intraday credit activity, and if it is the case, whether it has implemented a robust internal framework in its ICAAP and posts capital to cover against potential credit risk stemming from its intraday credit activity.

From a concentration risk perspective, custodians typically operate with large financial counterparties. Measures of credit risk concentration, such as the Herfindahl index, applied to the sector of activity do not provide meaningful information when used to assess concentration risk by type of customers.

From a large exposure perspective, supervisors should assess whether custodians have established a robust risk control framework that allows them to identify, quantify and monitor their concentration risk in relation to a single name or group of related counterparties, and the policies and limits they have implemented to mitigate these exposures.

Custodians have several risk mitigation techniques available to reduce their large exposure risks, which include the following:

- **Setting credit risk limits for their “usual suspects”:** large counterparties with whom they are the most likely to face large exposure limits.
- **Swapping end-of-day nostro cash balances from large counterparties to other institutions.**
- **Holding capital surplus in addition to their minimum requirements under risk-weighted approaches.** However, this option can turn out to be more capital intensive than using other mitigations techniques, because custodians already generate low RWA. Therefore, holding even more capital would decrease the institution’s return on equity, which is not the preferred option for shareholders;
- **Using master netting agreements (MNAs) that allow them to net their exposure with bilateral counterparties** when they are exposed to a sub-custodian that is also exposed to them for a similar reason. For example, if a European custodian “A” uses sub-custodian “B” in China and that custodian “B” also uses European custodian “A” as sub-custodian in Europe, both parties can enter into an agreement that allows them to use the mutual deposits they hold with each other to cover their mutual exposures.
- **Asking for funded and/or unfunded guarantees** to be provided by the counterparty or a third party. This option has the advantage of not having to rely

on a counterparty's reciprocal deposit, as in the case of MNAs described above, to cover the exposure. However, it can be relatively costly because the entity to which the custodian is exposed may have to immobilise some high-quality collateral to cover the exposure.

4.3 Operational risk

4.3.1 Custodians' exposure to operational risk

Operational risk, is the risk of loss resulting from inadequate or failed internal processes, people and systems or from external events, including legal risk⁹¹.

This type of risk is particularly applicable to custodians, for which the success of their activity relies on processing large volumes of transactions and corporate actions, managing confidential client information and operating directly or indirectly in many markets with different requirements. Therefore, custodians are dependent on complex IT architecture as well as manual interventions, which can act as operational risk vectors. Additionally, their interconnectedness with other large financial institutions can make them vulnerable to contagion effects if a large counterparty faces difficulty.

While custodians' operational risks are no different in nature from those of other banks, the size and volume of their operations makes them distinct.

Generally speaking, examples of custody-related operational risks include: (i) a major disruption that could inhibit the smooth functioning of financial markets for several days; (ii) a client data leak; (iii) insufficient client due diligence, which can lead the custodian to fail in its anti-money laundering and combating terrorist financing (AML/CFT) obligations; and (iv) misbehaviour in terms of client practices. All these actions could result in direct losses, regulatory fines and a damaged reputation for the custodian⁹², but also weaken the financial or operational resilience of other interconnected financial actors.

⁹¹ CRR article 4 (1) no. 52.

⁹² International Securities Services Association (2018), "[Cyber Security Risk Management in Securities Services](#)".

4.3.2 Analysis of operational losses from the custody business

Table 10

Custody-related operational losses from 2012 to 2017 reported to ORX⁹³ compared with total operational losses

		Clients, products, and business practices	Disasters and public safety	Employment practices and workplace safety	Execution, delivery and processes management	External fraud	Internal fraud	Technology and infrastructure failure	Total
Agency services	Number of events	374	23	565	4,372	68	22	182	5,606
	Loss declared (EUR millions)	713	9	49	1,200	20	8	130	2,128
	Average loss per incident (EUR millions)	1.91	0.37	0.09	0.27	0.29	0.37	0.71	0.38
Total all business lines	Number of events	75,768	4,040	59,208	109,549	98,935	6,086	5,083	358,669
	Loss declared (EUR millions)	226,665	1,210.1	6,780	37,325	13,391.6	3,139	4,865.9	293,377
	Average loss per incident	2.99	0.30	0.11	0.34	0.14	0.52	0.96	0.82
Agency services loss events as a percentage of the total loss events		0.49%	0.57%	0.95%	3.99%	0.07%	0.36%	3.58%	1.56%
Agency services loss amount as a percentage of the total loss amount		0.31%	0.70%	0.72%	3.22%	0.15%	0.26%	2.67%	0.73%

Notes: Distribution of operational losses as reported to ORX for the period 2012-17 by 83 banking corporations. Agency services include (i) custody service (escrow, depository receipts, securities lending (customers), corporate actions, issuer and paying agents, securities settlement); and (ii) corporate trust and agency (prime brokerage special financial services performed on an agency basis. Includes activities that were previously (2007) coded under "custom services").

The analysis of public data from the ORX database can be summarised as follows:

- On average, operational events reported in a custodian are less than half as costly as in other banks.** Indeed, custodians report 1.56% of total operational events to the ORX database, but only 0.73% of the total amount of losses. This could be due to better risk management, effectively mitigating losses when events occur and the absence of a "black swan event" over the reporting period.
- Issues related to "execution, delivery and processes management" are the main operational loss event for custodians according to ORX.** Indeed, those issues reported by custodians represent 3.99% of total business execution, while custodian losses only account for 1.56% for total loss events reported by all financial institutions. Business execution failure is the predominant type of loss reported by custodians, representing 78% of custodians' operational loss events (and 56% of loss amount). The predominance of this type of event is explained by the very high volume of administrative tasks performed by custodians for their clients.

⁹³ Operational Riskdata eXchange Association (ORX) operates a global banking database that offers the most complete set of operational loss events available in the financial services industry. ORX participants report operational losses exceeding certain thresholds (financial loss above €20,000) in a standardised format to allow all participants to better assess and model their operational risk exposure.

- **Custodians also report more than twice more IT incidents than other financial institutions** (as compared to their share of total reporting), however, these incidents are not more costly than other types of incidents, indeed, IT-related issues (technology and infrastructure failure) represent 3.25% of custodians' operational loss events but 3.58% of total IT issues reported by banks.

4.3.3 Challenges in quantifying capital requirements for operational risk

Forecasting the capital required to cover the materialisation of operational risk is a very difficult exercise for several reasons.

- **Unlike other risks, capital requirements cannot be derived from an institution's balance sheet or effective exposure.** Instead they are derived from past events which are not necessarily forward-looking.
- **Empirical results show that banks' largest operational losses tend to drive the bulk of total operational losses** (Naim 2016) where extreme non-foreseen tail events can have a disproportionate impact.

An approach that could be worth exploring for banks as part of their ICAAP⁹⁴ could be to develop internal models that use bank exposure to risks to processes, people and systems and external events as the driver for calculating operational risk. Using an exposure-based approach to operational risk would have two favourable outcomes but at the cost of comparability (hence it is a preferred approach for ICAAP measurement). It would (i) provide a capital incentive to actively improve management of operational risk (improving controls could directly lead to a decrease in the capital charge), and (ii) link the measurement of the operational risk to the exposure to the risk (rather than to revenues and/or to past operational losses). Annex 5 of this paper provides a list of inputs which could be used to build an ICAAP model using an exposure-based approach to operational risk.

In line with the principle of proportionality, large custodians should be encouraged to run large-scale stress simulation exercises (e.g. default simulation exercises simulating the distress of a major client or sub-custodian) to ensure the institution is able to survive the event and mitigate its risk exposure without putting undue pressure on other market participants.

4.3.4 Supervising custodians' operational risk

Operational risk is a core risk for custodians, and supervisors should dedicate particular attention to ensuring that custodians have a comprehensive framework in

⁹⁴ ICAAP refers to a bank Internal Capital Adequacy Assessment Process. The ICAAP is a process by which banks measure their capital needs based on its own internal approach. Internal models developed as part of a Bank ICAAP do not have to be formally approved by the supervisory authority unless the Bank specifically request for authorization to be able to use these models for measuring its Pillar I regulatory capital requirements and are therefore usually more "flexible" than regulatory models. Regulators expect banks to comply with the most conservative between their regulatory capital requirements and capital requirements stemming from their ICAAP.

place to allow them to identify the various types of operational risks to which their business is exposed and especially the following:

4.3.4.1 A comprehensive operational risk register

Custodians should have a comprehensive framework in place to identify all sources of operational risks arising from their business model, assess their materiality and implement mitigation measures when necessary. Custodians should also ensure that the calculation of their internal capital requirements measures potential losses that may arise from failure of the aforementioned areas. In particular, this framework should cover the following risks.

- **Operational risk resulting from failure to execute, deliver and process corporate actions, and securities settlements** and potential associated costs, as this represents the core of their business.
- **IT-related risks owing to the high reliance of custodians on their IT infrastructures and potential impact of different types of disruptions** on their own activity, their clients' activity, their reputation and financial markets.
- **Restitution risk, stemming from their restitution responsibility** with regard to various financial products.
- **Legal risk and conduct risk, stemming from their activity in servicing clients in various jurisdictions** with different legal and regulatory requirements.
- **Reputation risk, as reputation is key to custodians and reputational damage can have disruptive consequences on their business opportunities.** This is because custodians' clients are professional investors particularly concerned by the safety and security of their financial information. Reputation risk is not per se an operational risk as defined in the BCBS's Principles for the Sound Management of Operational Risk⁹⁵, however as this risk is paramount to custodians, they should have a framework in place to identify, measure and mitigate this risk.

4.3.4.2 A comprehensive and efficient resilience framework

Supervisors should assess whether the custodian bank has implemented a comprehensive approach to resilience that covers the various aspects of business continuity, IT continuity and cyber resilience. In particular, they should have the following frameworks in place.

- **A strong business continuity framework** that identifies sources of business disruptions and implements relevant actions to maintain business continuity in all plausible scenarios.

⁹⁵ Basel Committee on Banking Supervision (2011), "[Principles for the Sound Management of Operational Risk](#)".

- **A comprehensive IT continuity framework** to ensure that there is an inventory of critical functions and critical applications servicing these functions and that the custodian can recover critical IT systems within a sufficiently short timeframe.
- **An efficient cyber resilience framework** to ensure that the custodian is able: (i) to identify, (ii) to detect, (iii) to protect, (iv) to respond to, and (v) to recover from malicious cyber incidents.

4.4 Market risk

4.4.1 Custodians' exposure to market risk

Market risk relates to the risk of losses in on and off-balance-sheet positions in the trading book arising from movements in market prices. Custodians do not usually run a regulatory trading book. However, a custodian's banking book may be exposed to variations from movements in market prices.

Custodians invest a significant share of their clients' deposits in banking book securities to generate some interest income. However, the market risk exposure of custodians tends to be quite low as their securities are, generally speaking, high-quality and highly liquid, and can be used as collateral at the central bank or for repo transactions in the event of liquidity need. Investing in securities also allows the custodian to manage its interest rate risk in the banking book (IRRBB) to offset the modelled duration of deposits and generate additional returns f) within the firm's risk appetite.

Custodians bear foreign exchange (FX) risk when providing clients with FX services. These services are primarily related to transactions that support trade settlement and asset servicing and do not typically lead to large FX trading positions (The Clearing House, 2016) because custodians often use FX swaps to reduce/mitigate FX risk (with their parent company or with the market).

Custodians are exposed to credit valuation adjustment (CVA) risk⁹⁶. CVA risk arises when holding derivative positions. Thus, in practice, a custodian may not actively manage the CVA risk position like trading banks would do, as it only has a few FX derivative positions on its balance sheet.

Custodians are exposed to credit spread risk in the banking book (CSRBB)⁹⁷ on assets representing a significant part of their banking book investment

⁹⁶ When trading a derivative, the CVA is the difference between the value of the portfolio with and without taking into account the risk of a counterparty defaulting. In simple terms, the CVA is the market value of counterparty credit risk.

⁹⁷ In its *Standards on Interest rate risk in the banking book* (2016), the BCBS defines CSRBB as "any kind of asset/liability spread risk of credit-risky instruments which is not explained by IRRBB, nor by the expected credit/jump-to-default risk." The credit spread risk is the risk of decrease of the fair value of an asset following a non-interest rate related event. For example, if a bank grants a loan with a coupon indexed to Euribor or similar, the bank faces CSRBB if the counterparty's rating decreases (even if it does not default), as the bank would have been able to ask for a higher spread if it was granting the same loan now.

portfolio. To mitigate this risk, it is not sufficient for the custodian to invest in high-quality sovereign bonds because, if there is a crisis in this highly rated issuing country with a subsequent downgrade in its credit rating, it may have a material impact on the value of the bonds issued by the counterparty. To reduce this risk, custodians need to diversify their investment portfolio and monitor the macroeconomic outlook and events that could downgrade the quality of their assets.

4.4.2 Supervising custodians' market risk

Even if custodians tend to bear a limited market risk in their book, supervisors should ensure that custodians have the operational capability (human skills, IT capabilities and adequate processes) in place to effectively measure and mitigate their market risk.

4.5 Interest rate risk in the banking book

Interest rate risk in the banking book⁹⁸ is defined as “the risk to the bank’s capital and earnings arising from adverse movements in interest rates that affect the bank’s banking book positions.” It is composed of two elements, the net interest income (NII) and the economic value of equity (EVE).

From a NII perspective, interest rate changes will have an impact on the profit or loss generated by the financial instruments of an institution. For example, if interest rates increase, revenues generated by floating rate instruments on the asset side of a credit institution’s balance sheet will increase, whereas if interest rates decrease, revenues generated by these products will fall. Similarly, on the liability side, if interest rates increase, funding costs are expected to rise because revenues generated by many financial instruments will increase and clients will therefore expect the remuneration of their deposits to increase accordingly. Otherwise, clients may decide to remove their deposits and invest their cash in these more profitable instruments.

Interest rate movements will also have an impact on EVE on the credit institution’s balance sheet, together with a direct impact on the profit and loss of financial instruments. For example, if interest rates decrease, the yield of a fixed-income product will remain the same, but as new similar products issued on the market will have lower yields, the EVE of the older fixed-income product will increase.

4.5.1 Custodians' exposure to interest rate risk in the banking book

Banks bear IRRBB because they engage in maturity transformation in granting long-term credit funded by shorter duration liabilities. The average maturity of assets on their balance sheet is usually longer than the duration of their liabilities (see

⁹⁸ Basel Committee on Banking Supervision (2016), “[Standards on Interest rate risk in the banking book](#)”.

Annex 6 for an illustration of an on-balance sheet maturity analysis for banks and custodians).

Custodians face IRRBB from the opposite perspective. Instruments on the asset side of a custodian's balance sheet tend to be of a shorter duration than instruments on its liability side, because custodians do not have to fund a loan portfolio. They receive deposits which do not usually have contractual maturity (non-maturity deposits) from clients and hold these deposits (i) as cash at the central bank, (ii) as cash at correspondent banks, or (iii) invest them in highly rated fixed-income securities. Clients' deposits tend to be sticky (i.e. of long maturity) but custodians must maintain a liquid balance sheet (short maturity) to face exceptional events. Sovereign bonds are mostly issued as fixed-income securities that have a very limited (or negative in euro) yield in the current interest rate environment, therefore NII does not tend to represent the primary source of income for custodians.

To mitigate their IRRBB, custodians tend to (i) pass on interest rates shocks to their clients⁹⁹, which relies on their repricing power over clients; and **(ii) match the average maturity of their investment portfolio with the modelled duration of their client deposits** (by acquiring some long-term securities in their investment portfolio).

4.5.2 Challenges in quantifying custodians' exposure to IRRBB

Supervisors and custodians face several challenges in assessing custodians' exposure to IRRBB. Pursuant to the EBA guidelines on the management of the IRRBB of non-trading activities¹⁰⁰ (implementing BCBS guidelines), credit institutions' interest rate sensitivity is assessed as the gain/loss following a sudden and unexpected change in interest rate of 200 basis points (up or down) and measuring the loss (or gain) in these scenarios.

Interest rates have reached a historically low and protracted¹⁰¹ level in Europe, and both supervisors and custodians can face difficulties in estimating and predicting client behaviour during hypothetical interest rates shocks, because these shocks will have a different effect depending on the type of client. Standard stress scenarios applied to all banks subject to European banking supervision may not be suited to capturing the interest rate risk profile of custodians.

Custodians' real IRRBB profile is dependent on their capacity to reprice clients' deposits.

- **In theory, when interest rates increase, part of the customer deposits leave credit institutions, as it becomes more attractive to acquire new securities which are issued with a higher yield.** From a stress-testing perspective, to

⁹⁹ If interest rates become negative, the custodian will charge clients for holding deposits.

¹⁰⁰ European Banking Authority (2015), "[Guidelines on the management of interest rate risk arising from non-trading activities](#)".

¹⁰¹ The authors' observation is based solely on backward-looking information, they have no information about future interest rate decisions by the ECB's Governing Council.

cover this gap created by the flight of deposits from the credit institution, banks and supervisors consider that the bank will have to refinance this gap with new liabilities issued at the new interest rate. This approach is relevant for banks, as they have long-term assets and need to refinance their funding gap. However, this approach does not adequately capture custodian IRRBB because custodians do not need to refinance long-term assets.

- **In practice, interest rate shocks have a different impact on client deposits depending on numerous factors:** (i) whether the custodian has leeway to pass on the interest rate shock to its client, (ii) the timing and scale of this repricing, (iii) the reaction of client deposit behaviour to an overall new interest rate and repricing by its custodian.
- **Simply speaking, large clients that generate a high share of custodians' profit and have operational capacity to transfer their activity to another custodian have more bargaining power to negotiate better costs, whereas custodians have more repricing power with clients that have limited operational, legal or contractual capacity to transfer the bulk of their deposit base.**

4.5.3 Supervising custodians' IRRBB

Supervisors should ensure that custodians have implemented robust methodologies for their IRRBB measurement in all their material currencies and taking into account the specificities of their business model. In particular, custodians should make sure that their model adequately measures the effective maturity of their non-maturity deposits, as this type of deposit constitutes the bulk of their liabilities. In particular, supervisors should investigate whether there are major differences between duration modelling for IRRBB and operational deposit modelling for liquidity risk.

Supervisory authorities should also ensure that their IRRBB guidelines, applicable to all financial institutions, adequately capture custodians' IRRBB profile. For instance, not requiring banks to model an effective maturity for non-maturity deposits of financial institutions deposits¹⁰² can have a disproportionate impact on custodians' IRRBB profile, as the quasi-totality of custodians' balance sheets are made up of financial institutions' deposits, meaning that custodians will almost always be treated as outliers in horizontal analysis.

¹⁰² European Banking Authority (2015), "[Guidelines on the management of interest rate risk arising from non-trading activities](#)".

5 Liquidity risk

Liquidity risk refers to the risk that a financial institution is unable to meet its contractual obligations when they fall due. A bank mainly faces two liquidity risks.

- **Funding sustainability risk**, i.e. the risk that the bank is unable to renew (roll over) its funding needs by the time they fall due, owing to the inherent maturity mismatch between the assets of the bank (which are long-term) and its liabilities (which are more short-term).
- **Short-term liquidity risk**, i.e. the risk that a bank holds limited liquid assets and/or assets that are not sufficiently liquid to cover its outflows in normal and/or stress situations. In this case, the risk materialises if the liquid assets held by the bank to cover its outflows cannot be liquidated (or only at an extremely low price) and the bank cannot face outflows.

Custodians' exposure to liquidity risk materialises itself differently compared with bank: this is explained by the fact that the balance sheet of a custodian is liability driven. Furthermore, client activity has an important influence on daily fluctuations of the balance sheet, especially during certain periods of the year (e.g. when dividends are collected), and can fluctuate around reporting dates (if clients adapt their investment behaviour to window dress their balance sheet and disclose more "market-friendly" reporting (Munyan 2015).

5.1 Custodian exposure to funding sustainability

A bank bears funding risk as it needs to regularly roll over its money market funding¹⁰³. The extent to which a bank is exposed to funding sustainability risk depends on the ratio of its long-term funding to short-term funding (a higher share of long-term funding means that the bank will be more resilient to money market funding shocks), the duration of its short-term funding (the shorter the duration, the higher the risk) and the concentration of its funding (a higher level of funding concentration increases the risk of not being able to roll over the funding if the usual lender does not want to or cannot roll it over).

This funding risk tends to be low for custodians. Their activity does not involve either funding a loan portfolio or owning long-maturity, non-liquid assets and they do not rely on client or wholesale funding to carry out their core business. Additionally, custodians' assets are of a shorter average maturity than their deposit assumptions, so a custodian expecting high outflows in the future can simply decide not to roll over some of its securities or repos when they reach maturity.

¹⁰³ Money market funding commonly refers to short-term funding (from overnight to one year). While retail customers' deposits can also be withdrawn overnight, in practice they tend to be stable on the whole, and therefore are rarely a concern for banks' funding sustainability.

Table 11**Simplified bank balance sheet – liquidity profile**

Simplified bank balance sheet					
Asset liquidity	Assets		Liabilities		Behaviour of the liability in case of crisis
Immediately available to make payments	Cash (central bank reserves)	15	10	Money market funding	Quickly depletes to zero
Can be quickly exchanged for cash (sold on the market or pledged at the central bank)	Liquid asset portfolio	15	80	Customer deposits	Outflow increases
Mostly non-liquid	Customer loans	70	10	Capital	No outflow
	Total assets	100	100	Total liabilities + equity	

The figure above shows that the level of cash reserves (i.e. its means of payment) held by banks is smaller than the volume of its customer deposits (its customers' means of payments).

Under normal market conditions, liquidity risk does not materialise because retail deposits are sticky and their outflow rate is low (the bank experiences customer payments in and out with limited delta between the two). However, under stress conditions, banks' deposits can become more volatile and outflow rates may increase (because customers transfer their money out of the bank). To mitigate this risk, banks build an investment portfolio of highly liquid securities that can be quickly turned into cash (either via financial markets or at the marginal lending facility of their central bank) to deal with unexpected outflows. The size of a bank's liquid asset buffer can vary a lot depending on its business model and risk appetite, and usually represents between 20% and 30% of a retail bank's balance sheet. Where the outflows of a bank exceed its inflows and liquid asset buffer, and the bank is unable to get funding (i.e. borrow) on financial markets, the liquidity risk will materialise and the bank will ultimately fail.

Table 12**Simplified custodian balance sheet – liquidity profile**

Simplified bank balance sheet					
Asset liquidity	Assets		Liabilities		Behaviour of the liability in case of crisis
Immediately available to make payments	Cash (central bank reserves)	60	95	Deposits	Outflow increases
Can be quickly exchanged for cash (sold on the market or pledged at the central bank)	Liquid asset portfolio	40	5	Capital	No outflow
	Total assets	100	100	Total liabilities + equity	

The table above shows that cash reserves and the liquid asset portfolio held by custodians are close to client deposits in terms of amount, therefore their liquidity risk does not directly arise from the risk that clients transfer their deposits to other financial institutions.

Custodians face short-term liquidity risk from a different perspective. On the liability side, custodians receive deposits from institutional investors whose behaviour is more volatile than that of retail depositors, because they have better treasury functions and are more reactive to market information. However, these investors also need to maintain minimum cash deposits to make (time-critical) payments, and meet operational needs (for example, funds need cash deposits to perform share buybacks). Custodians face liquidity risk owing to the risk of unexpected material outflows from one or several major clients resulting from market and/or idiosyncratic events; these outflows may even exceed client deposits when the custodian provides credit facilities to its clients. For example, in the event of market stress in a given geographic area, clients of funds that invest in this area will ask the funds to redeem their shares. However, if the “panic sell” makes securities illiquid, funds may need to draw on the credit facilities provided by the custodian and the latter may end up facing liquidity stress due to its clients’ behaviour.

Custodians are particularly exposed to intraday liquidity risk¹⁰⁴. This risk arises from the fact that custodians provide intraday credit facilities to their clients to facilitate their transactions (i.e. securities settlement and share buybacks). While these facilities are not necessarily committed, they are part of the services clients expect from their custodians. A custodian who refuses to grant overdrafts may prevent/delay a client transaction and ultimately harm the relationship between custodian and client. As a result, custodians tend to grant (undisclosed) intraday credits based on discretionary criteria¹⁰⁵. Custodians’ activity generates a high level of intraday liquidity risk because of (i) the high volume of intraday credit, and (ii) the complexity of managing intraday liquidity needs arising from payment and settlement activities with various FMI in different time zones.

5.2 Limits of liquidity regulation tool for custodian liquidity risk

5.2.1 Limits of the regulatory tool (LCR¹⁰⁶) for capturing custodian liquidity risk

From a regulatory perspective, the harmonised indicator that serves to measure and regulate minimum liquidity reserve requirements to cover the short-term outflows of financial institutions is the liquidity coverage ratio (LCR). This ratio shows the relationship between a credit institution’s liquid asset buffer (cash and eligible highly liquid securities, with potential haircuts to reflect

¹⁰⁴ See for example, Zoltan Poszar (2019) “[Collateral Supply and o/n Rates](#)”, which includes a step-by-step explanation of how BNY Mellon extends a large amount of intraday credits to primary dealers in settlement of US treasuries.

¹⁰⁵ Criteria and limits are discretionary for each custodian and may depend on several factors, for example the client’s assets under custody, its rating, the existence or absence of formal commitments, or national regulation.

¹⁰⁶ See Commission delegated [Regulation \(EU\) 2015/61 of 10 October 2014 to supplement Regulation \(EU\) No 575/2013 of the European Parliament and the Council with regard to liquidity coverage requirement for Credit Institutions](#).

liquidity scarcity), and net outflows (outflows minus inflows, both stressed to mimic a bank run and liquidity shortages) over a 30-day period.

The LCR works under the main assumption that credit institutions hold a low ratio of liquid assets to customer deposits, which is the case for banks.

However, this logic is flawed with regard to custodians as the amount of liquid assets they hold (closely) matches the amount of their liabilities. In Annex 4, of this paper a technical explanation is provided of this, including a step-by-step calculation, highlighting how the respective LCRs of banks and custodians are developed for stress scenarios. This technical explanation can be summarised as follows.

For the purpose of calculating its LCR, a financial institution applies outflow rates to its customer deposits based on their expected stickiness in turbulent times. For example, retail deposits are assigned an outflow rate of between 3% and 25% (depending on the type of deposit, and whether it is insured by a deposit protection scheme).

Demand deposits from financial sector institutions are assigned a 100% outflow rate to mimic the fact that in a stress situation they could be withdrawn quickly, and in their entirety, by institutional investors. However, it is reasonable to consider that some deposits, maintained for the purpose of performing clearing, custody and cash management could face legal and/or operational impediments that would limit the effective outflows of their clients during a stress situation. For example, if a client only holds one cash account, and/or only uses it for their daily cash management and transaction activity, it is unlikely that the deposits would escape as easily.

To acknowledge the stickiness of these deposits, financial institutions can apply a more favourable weighting to the outflow of their deposits¹⁰⁷ (25% rather than 100%) provided they can demonstrate they are able to distinguish which part of their customer deposits is stickier (known as operational deposits), from the part that is more volatile (referred to as non-operational deposits or excess deposits). Adequately measuring the ratio of operational deposits to non-operational deposits is challenging, as both can refer to the same money in clients' current accounts. The client's behaviour in relation to the management of their deposits determines whether the deposit should be considered as operational or not.

- **For a bank, there is a mismatch between the amount of liquid assets in the numerator of the ratio and customer deposits in the denominator of the ratio.** There are more customer deposits than liquid assets but the outflow rate of these deposits as per LCR computation is low (between 3% and 25% depending on the type of deposit for retail deposits). In the event of massive client withdrawal, the amount of liquid assets and customer deposits will both decrease, and the ratio of liquid assets to customer deposits will decrease, resulting in a weaker LCR owing to the fact that there will be proportionally fewer liquid assets compared to the new net outflows. In this case, the LCR plays its

¹⁰⁷ See in particular article 27 of the LCR DA on Outflows from operational deposits.

role as the decrease in the ratio highlights the weakening of the bank's liquidity position.

- **For a custodian, the amount of liquid assets (closely) matches the amount of clients' deposits.** These deposits comprise operational deposits (outflows weighted at 25%) and non-operational deposits (outflows weighted at 100%). In the event of client withdrawal, on the liabilities side, this will impact non-operational deposits because they are assumed to be more volatile than operational deposits. Given the high outflow rates on the liabilities' side, net outflows will decrease more than HQLA as a result of the stress¹⁰⁸. This will result in a stronger LCR. Therefore, the LCR does not play its role as the increase of the ratio wrongly implies an improvement of the custodian's liquidity position.

As a result, custodians should not only rely on regulatory indicators to measure their liquidity risk but must have a robust internal framework in place which adequately captures the liquidity risks that are idiosyncratic to their business model, such as intraday liquidity risk, as part of a comprehensive ILAAP.

5.2.2 Supervising custodians' liquidity risk

Supervisors should pay particular attention to ensuring that custodians have a comprehensive framework in place to allow them to identify the various types of operational risks to which their business is exposed. In addition, considering that custodians' liquidity risk differs from that of other credit institutions and that the LCR is not well-suited to assessing a custodian's exposure to liquidity risk, supervisors should ensure the following.

- **Custodians have developed relevant metrics, as part of their internal framework, which adequately capture their liquidity risk** (and in particular their intraday liquidity risk), and measure, monitor and mitigate their exposure arising from granting intraday credits.
- **Similar to banks, custodians must have adequate estimates of how their assets can be quickly converted into cash to cover for potential outflows in normal and under different stress scenarios¹⁰⁹** that are relevant to their business models and hold a sufficient liquid asset buffer as a result.
- **Custodians tend to hold very liquid balance sheets,** composed of cash deposits at the central bank (for local currency) and cash deposits at various correspondent banks (for foreign currencies), or invest them in liquid assets (once they consider that they have a sufficient level of cash to cover their needs).
- **Custodians may also lend excess cash on the money market or invest a proportion of their assets in less liquid securities to improve their**

¹⁰⁸ This is the case even if the decreases in the total balance sheet (as a result of the stress) impacts only the HQLA on the assets' side.

¹⁰⁹ Banks' stress tests must include different scenarios relevant to their business model, for example, macroeconomic tensions, rating downgrade and capital controls.

earnings, although they usually have limited interest in acquiring non-liquid securities, as a lack of liquid assets could slow their capacity to process transactions and ultimately, to perform their core functions. When a custodian decides to acquire fewer liquid securities, supervisors should ensure that the custodian regularly tests the liquidity of the acquired assets.

6 Conclusion

Custodians have unique risk profiles when compared with other credit institutions. Importantly, custodians are liability-driven institutions and have a limited risk appetite. The lack of active risk-taking and limited credit activity is a feature of the custody business and translates into a balance sheet that exhibits a low level of capital risk and a comfortable liquidity position, satisfying regulators' requirements and clients' expectations of their custodian acting as a safe haven.

Nonetheless, the custody business is exposed to a high level of operational risk (which includes IT risk, restitution risk, reputational risk and legal risk) and to intraday credit and liquidity risk, which are part of its core business.

These risks are harder to capture with existing regulatory tools, because their main focus is on-balance sheet risks. In the absence of regulatory requirements that are sufficient to capture these risks, supervisory authorities should encourage custodians to develop innovative, and comprehensive risk-based approaches to capture their respective idiosyncratic risks in their internal capital and liquidity risk computation frameworks to ensure adequate capital and liquidity allocation by custodians.

Annexes

Annex 1: Detailed list of services provided by custodians and associated risks

Type of service	Service	Service description	Main risks
Core custody	Asset safekeeping	Safekeeping of various types of assets: -holding in dematerialised custody financial instruments that may be registered in a securities account at the CSD; -holding in physical custody instruments that should be physically delivered; -keeping records as a notary for other assets.	Restitution risk Operational risk
	Asset servicing	Processing corporate actions linked to financial securities (i.e. collecting dividends on shares and interests on bonds, acting as a proxy voting agent on behalf clients, etc.).	Operational risk
	Securities settlement	Ensuring delivery of securities against corresponding payment. In Europe, settlement takes place at T+2 after trading date for most securities.	Operational risk
	Fund depository	In Europe, to protect unit-holders, UCITS and alternative investment funds (AIFs) ¹¹⁰ should appoint an independent depository that will perform the following three functions: -safekeeping of financial and non-financial instruments; -cash flow monitoring (i.e. ensuring that cash of the fund is booked in segregated cash accounts); -overseeing fund operations (i.e. sale, issue, repurchase, redemption and cancellation of units, valuation of fund units, securities settlement, profit distribution).	Restitution risk Operational risk
	Depository receipts	Supporting foreign companies in having their shares traded on a foreign market: for example, if a foreign company wants to allow European investors to acquire its shares on European financial markets, a European custodian will acquire part of the stock of the foreign company and issue an equivalent number of depository receipts on a European stock exchange, allowing local investors to acquire this stock without the need for an international broker and eventually directly in euro.	Operational risk Market risk (FX risk)
Fund services	Fund services	Providing multiple services to UCITS and AIFs such as: -valuation (calculating the net asset value of the fund); -issuing and redeeming fund shares and managing and keeping track of registered shareholders of open-ended funds; -acting as transfer agent (recordkeeping, reporting and communications to shareholders).	Operational risk
Banking services ancillary to core custody	General banking services (incl. payments)	Providing cash accounts in multiple currencies and access to different payments systems and FMs in commercial bank and central bank money. Provision of (intraday) credits and eventually overdrafts.	(Intraday) liquidity risk (Intraday) credit risk
	Fund financing	Fund financing can take two different forms: -liquidity facilities which are used by the fund to meet short-term liquidity needs, such as funding redemptions or make time-critical payments; -leverage facilities allowing clients to leverage their investments and enhance portfolio returns Most custodians provide uncommitted discretionary facilities to support their payment activity but some custodians may also provide additional committed facilities.	Credit risk/ liquidity risk
	Foreign exchanges services	Enabling its clients to invest in foreign markets more easily by providing them with foreign exchange services and multicurrency cash accounts.	FX risk
	Securities lending	Serving as an agent between clients who want to lend or borrow securities. For example, an investor may want to borrow high-quality securities to serve as collateral or a specific security for short selling, while a long-term investor may be interested in lending these securities for additional fees, in which case the custodian would act as an agent between the borrower and the seller of the securities and ensure execution of all necessary actions (such as segregating the securities on a specific account, payment of borrowing fees, restitution upon demand, and eventually reinvestment services for cash collateral received).	Operational risk

¹¹⁰ UCITS: “undertakings for collective investment in transferable securities” are investment funds regulated by the EU directive of the same name. For more details regarding UCITS vs. alternative funds, please refer to Annex 2.

Collateral management/ Tri-party repo agent	Acting as manager of client collateral and/or tri-party agent providing collateral segregation, custody, eligible asset selection, collateral optimisation and valuation services. For example, if a client needs to post collateral to several counterparties, the custodian would make a daily measurement of their collateral needs and act as an agent ensuring that the collateral posted by the client meets the requirements of the various counterparties.	Operational risk
Corporate trust	Acting as trustee responsible for supporting corporates (or other issuers such as municipalities) to issue bonds, and monitor loan issuance and post-trade lifecycle acting in the interest of acquirers as well as associated services (paying agent, escrow).	Operational risk

Annex 2: Main differences between UCITS and alternative investment funds¹¹¹

	UCITS funds	Alternative funds
Applicable regulation	UCITS V	AIFMD
Clients	Open to retail investors	Limited to professional investors
Fund valuation periodicity	At least twice a week (usually daily or intraday)	At least every month
Maximum borrowing capacity	10% of Fund assets value – limited to short term	No borrowing limitation
Available products	Transferable securities (stocks, bonds, some derivatives, other UCITS funds)	Stocks, bonds, private equity, commodities, forex, real estate, art, hedge funds, derivatives
Concentration limits	Restrictions on investments on other instruments and single name concentration limits	No concentration limit
Investor redemption	Frequent (can be daily)	Fund can restrict redemption

Annex 3: Functioning of European financial markets and the custodians' role in securities settlement

A.3.1 How shares move around – introduction to the central securities depository

When investors purchase financial securities traded on a regulated exchange, they do not receive a physical certificate by post which acts as proof of security ownership. This method would be inefficient because (i) the securities issuer needs to have some information on its owner to process corporate actions (inviting shareholders to vote, distributing dividends, etc.), and (ii) such a method would result in significant operational risk (such as the loss, destruction or counterfeiting of securities). Instead, all the financial securities of a domestic market are generally held in one place called the central securities depository (CSD)¹¹². Having all securities in a CSD makes it easier to process corporate actions and increases the speed and safety

¹¹¹ This table is provided for illustration purpose only and does not aim at representing a comprehensive picture of the difference between UCITS and alternative funds.

¹¹² Countries can have more than one CSD, however, the number of CSDs in a domestic market tends to be very limited.

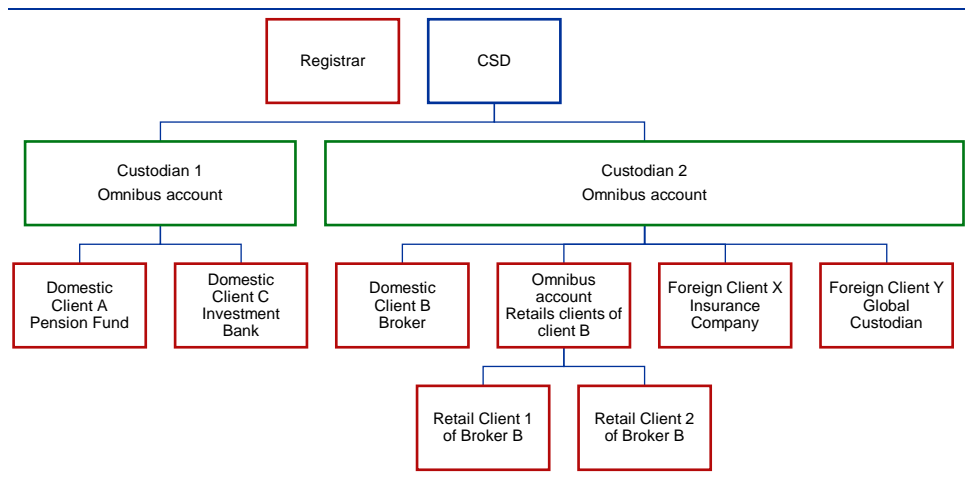
of transferring securities (compared with a physical transfer). As a result, when investors purchase financial securities, the name of the owner of those securities is updated in the register.

Securities issuers are, in principle, responsible for updating the register that records the owners of their securities. However, in practice, this function is often outsourced to the CSD and/or to its direct participants depending on the CSD account segregation structure (see below). Being recorded in the register grants the right to vote and the right to receive dividends (for shares) and interest payment (for bonds). The link between securities holders' registration and securities settlement is not the same in every country because a CSD's account segregation structure can vary significantly from one country to another owing to the existence of various laws and market practices governing securities ownership and investor protection that have been strongly influenced by historical legacy. These different structures have a direct impact on the way direct CSD participants (mostly custodians) interact with the CSD, the legal ownership of the securities, and the updating of the register. For example, in markets in which the CSD has information about end investors, the securities ownership register is a reflection of the CSD accounts and may be updated once or several times a day. By contrast, when the CSD does not have information about end investors, securities issuers tend to update it on a less frequent basis. For the sake of simplicity, these markets will be broken down into (i) omnibus markets, (ii) segregated markets, and (iii) hybrid markets, as per the European Central Securities Depositories Association (ECSDA) classification¹¹³.

A.3.2 Securities ownership in an omnibus market

Figure A.3.1

Illustrative example of a securities ownership structure in an omnibus market



In the example above, there is one CSD and two custodians in an omnibus market. The custodian operates only two accounts at the level of the CSD, one

¹¹³ European Central Securities Depositories Association (2015), "Account segregation practices at European CSDs".

account for its own securities and one single omnibus account on behalf of all its clients. Custodian clients' securities are all held in the same account at the level of the CSD. The CSD does not have information on the end investor¹¹⁴, i.e. the ultimate owner of the securities, the CSD will only have information about the intermediary that operates the two accounts (featured in green in the figures) and no information about the levels below, while the custodian will have a more granular view of its clients securities (in red in Figure A.3.1).

In omnibus markets, the name of the custodian(s) that hold the end investor's assets under custody is entered in the register. This means that as far as the security issuer is concerned, the custodian is considered to be the official owner of the securities.

Omnibus markets are considered to offer higher operational efficiency for two main reasons.

- **Operating omnibus accounts requires a smaller and less expensive infrastructure.** Indeed, only one account at the CSD is needed to meet the needs of all the custodian's clients, whereas in the case of segregated accounts, one CSD account per client is needed. Additionally, when two investors are trading securities, the transaction can be settled by the custodian without the involvement of the CSD since both clients hold their securities in the same omnibus account. It is possible for the custodian to create additional segregated accounts at CSD level to meet client demand, but the end investor will not be known by the CSD.
- **Custodians have more flexibility to provide collateral management services to all clients that are part of the omnibus account, which can also reduce costs for end investors¹¹⁵.**

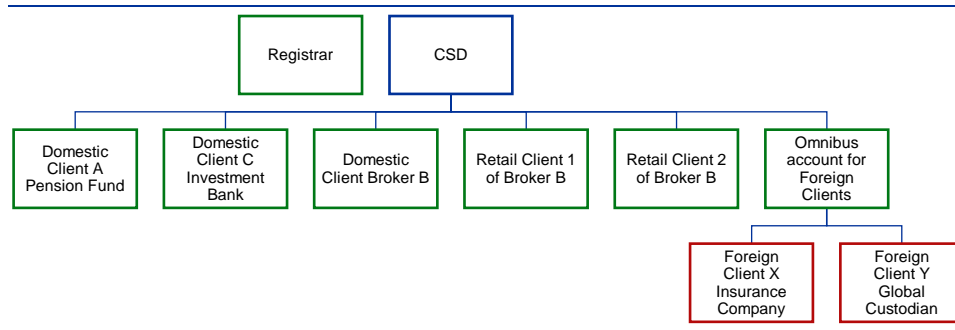
¹¹⁴ The end investor (or beneficial owner) is the ultimate owner of the securities. For example, if a retail investor acquires securities through a broker, and that this broker uses a custodian to hold its securities at the CSD, the custodian will often be the legal owner of the securities in the register and the retail client will be the end investor. In this situation, the end investor's sole evidence of ownership of the securities is the recording of the securities in the account of their broker, and the broker's sole evidence of ownership of the securities is the recording of the securities in the account of its custodian (ECSDA, 2016).

¹¹⁵ For example if one of the custodian's clients wants to borrow securities and another owns these securities and agrees to lend them, the custodian can (i) provide the operational capacity for the first client to borrow them; (ii) segregate these specific securities from other borrowers of other securities; (iii) collect borrowing fees to be shared between the borrower and the custodian; (iv) eventually provide reinvestment options to the borrower for cash collateral received from the lender; (v) assess collateral quality for non-cash collateral received from the lender; and (vi) close the transaction at maturity or upon call.

A.3.3 Securities ownership in a segregated market

Figure A.3.2

Illustrative example of a securities ownership structure in a segregated market



In the example above, there is one CSD and one custodian in a segregated market. The custodian operates as many accounts at CSD level as the existing number of end investors. The only exception for which segregated markets tend to allow usage of omnibus accounts is for foreign clients.

Despite the fact that the CSD holds information about end investors, there is no direct contractual relationship between the CSD and the end investors.

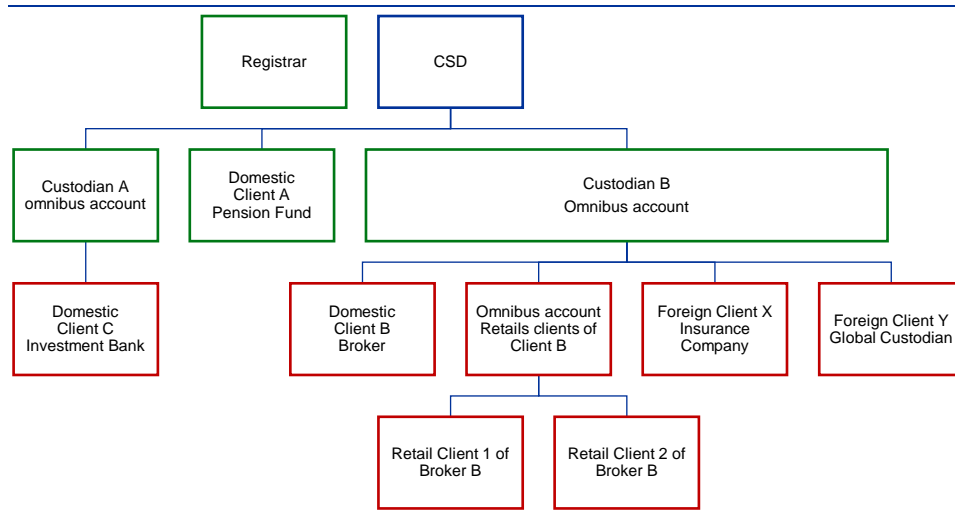
Servicing clients remains the responsibility of the custodian.

While client asset protection depends directly on national regulation rather than on account segregation practices, account segregation at the CSD level offers securities holders protection against the custodian's insolvency in the following way: should the custodian become insolvent, there will be no doubt about ownership of the assets because the account is kept segregated from other clients' securities and the CSD can take over the role of account operator or ask another custodian to replace the defaulting participant and process the corporate actions. In an omnibus market, this process can take more time and investors' only proof of ownership of the assets is what is registered in the information system of the failing custodian.

A.3.4 Securities ownership in a hybrid market

Figure A.3.3

Illustrative example of a securities ownership structure in a hybrid market



The diagram above shows only one possible account segregation structure out of many others in hybrid markets. In these markets, clients can select between omnibus and segregated accounts.

A.3.5 Largest CSDs in Europe

The following list shows the largest CSDs in Europe arranged according to the amount of securities under custody. This ranking mostly follows that of EU economies with two notable exceptions: Euroclear Bank and Clearstream banking Luxembourg which are the 2 international CSDs(ICSDs) (ICSDs differ from domestic CSDs in two main ways (i) they safekeep securities that are primarily aimed at international investors and (ii) they can settle transactions in commercial bank money

Table A.3.1List of CSDs¹¹⁶ holding total assets of over €100 billion

Country	Full legal name	Value of securities held on accounts (EUR billion) as at Q4 2015
BE	Euroclear Bank	12,273
DE	Clearstream Banking AG	7,806
UK & IE	Euroclear UK and Ireland Limited	6,215
FR	Euroclear France	6,073
LU	Clearstream Banking Luxembourg	5,979
IT	Monte Titoli S.p.A	3,305
CH	SIX SIS Ltd	2,936
ES	Iberclear	2,228
SE	Euroclear Sweden AB	1,062
DK	VP Securities A/S	1,036
NL	Euroclear Nederland	993
PT	Interbolsa	566
AT	OeKB CSD GmbH	523
NO	Verdipapirsentralen ASA	520
RU	National Settlement Depository	397
FI	Euroclear Finland Oy	309
TR	Merkezi Kayit Kurulusu A.S.	277
PL	The Central Securities Depository of Poland	271
BE	Euroclear Belgium	271
HU	KELER Ltd.	118

Annex 4: Expansion and contraction of a bank's balance sheet due to money creation and payment

At the beginning of our example, we have a fictional bank that has €200 of capital which is fully maintained as available cash.

Table A.4.1

Bank balance sheet – initial situation

Assets		Liabilities	
Cash	200	200	Capital

When a customer asks for a loan, this does not directly translate into less available cash but in the creation of a deposit in the customer's account (represented by a loan granted by the bank to the customer – see below). For the customer, this deposit is expected to be as liquid as cash, however, in practice, banks' total deposits always exceed their available cash reserves.

¹¹⁶ [ECSDA database](#).

Table A.4.2

Bank balance sheet – after granting a loan

Assets		Liabilities	
Cash	200	100	Deposit
Loan	100	200	Capital

When the customer makes a payment to another counterparty which has an account outside of their bank, the bank needs to transfer its cash to the counterparty's bank. Failure to meet its payment obligations owing to insufficient cash reserves would lead to the failure of the bank.

Table A.4.3

Bank balance sheet – after client makes a payment

Assets		Liabilities	
Cash	100	200	Capital
Loan	100		

Annex 5: Proposed indicators worth exploring in building an exposure-based operational risk model

An approach worth exploring by credit institutions as part of their ICAAP capital quantification would be to use their 'risk exposure' to processes, people, systems and external events as the driver for measuring operational risk. Using an exposure-based approach to operational risk would have two favourable outcomes but comes at the cost of comparability (hence it is a preferred approach for ICAAP). It would (i) provide a capital incentive to actively improve management of operational risk (improving controls could directly lead to a decrease in the capital charge) and (ii) link the measurement of operational risk to the exposure to the risk (rather than to revenues and/or to past operational losses).

This paper suggests that the current approach to operational risk is inherently lagging behind. Possible relevant indicators of operational risk are shown below.

- **For processes risk:**
 - (i) reliance on outsourcing (proportion, and criticality of outsourced services) mitigated by the quality of the service received as assessed in the key risk indicators overseen by the credit institution;
 - (ii) quality of internal processes using inputs (potentially anonymous) surveys from business lines.
- **For people risk:**
 - (i) number of employees with privileged access to critical system and information and to sensitive information;
 - (ii) number of manual processes over critical applications and share of

operational errors, which can be mitigated by controls in place mitigating operational errors.

- **For systems risk:**

(i) quality of IT infrastructure (number and criticality of systems in the production environment facing end of life or end of support life issues).

- **For external events:**

(i) loss resulting from impact of disruption of certain business services or locations mitigated by capacity;

(ii) restitution risk in the sub-custodian network (amount of assets under custody kept by a sub-custodian mitigated by the conservativeness of segregation legislation in the country where the sub-custodian operates, and quality of asset segregation in the sub-custodian as assessed by the business).

Annex 6: Interest rate profile of banks and custodians

The two tables below provide a simplified illustration of the duration of the various instruments on the balance sheet of a bank and of a custodian based on the ECB sensitivity analysis of IRRBB conducted by ECB Banking Supervision in 2017.

Table A.6.1

Simplified bank balance sheet – duration profile

Simplified bank balance sheet						
Average maturity	Assets		Liabilities		Average maturity	Core deposits
1 day	Cash	5	20	Money market funding	3 months	/
4 years	Loans to corporates	45	25	Corporate deposits	3 years	50%
8 years	Mortgages	40	20	Retail saving deposits	4 years	70%
3 years	Consumer credit	10	30	Retail demand deposits	5 years	80%
			5	Capital	/	
	Total assets	100	100	Total liabilities + equity		
	Average duration	5.3 years	2.3 years	Average duration		

Notes: The table shows the balance sheet of an imaginary bank¹¹⁷. On the liability side, the percentage of core deposits represents the percentage of deposits without contractual maturity that do not reprice immediately in case of an interest rate shock. On the liability side, the maturity refers to the contractual maturity in the case of money market funding, and the estimated maturity of core deposits for non-maturity deposit¹¹⁸ instruments. On the asset side, the maturity refers to the contractual maturity of the loan. The average maturity on the liability side is the maturity of the core part of the liability instruments weighted by their respective size on the liability side of the balance sheet. The average maturity at the asset side is the average maturity of the asset side instruments weighted by their respective size on the asset side of the balance sheet.

¹¹⁷ Example data related to instruments maturity, conditional prepayment rates and core deposits are inspired by the results of the SSM Sensitivity Analysis of IRRBB – Stress test 2017. See ECB Banking Supervision (2017), “[Sensitivity Analysis of IRRBB – Stress test 2017 Final results](#)”.

¹¹⁸ Non-maturity deposits (NMD) are deposits that clients are free to withdraw/transfer without constraints. To measure IRRBB on non-maturity deposits in an upward interest rate shock scenario, a credit institution assumes that if it does not reprice customer deposits, a part of them will “take flight” out of the institution to benefit from more profitable investments. This part will be replaced by other sources of funding at higher prices. The share of deposits that will leave the balance sheet depends on the shock and will continue over a given period. The bank then models an average maturity for the “core” deposits that did not immediately leave the balance sheet after the interest rate shock.

When interest rates rise:

(a) On the asset side of the balance sheet:

- (i) the earnings generated by instruments with floating rates and long-term mortgages with repricing option will increase;
- (ii) the value of the bank's current fixed-income portfolio and fixed-rate bonds will decrease because the returns generated by these instruments will be lower than the returns that would be generated if new loans of a similar notional amount were granted at higher rate.

(b) On the liability side:

- (i) the increase in interest rates will result in a higher cost of funding/collecting deposits for instrument with short maturity, or with interest rate sensitive repricing options and for non-maturity deposits where clients' behaviour is linked to interest rates;
- (ii) the increase in interest rates will not result in higher cost of funding/collecting deposits for long-term fixed-rate instrument and for non-maturity deposits where customer behaviour is not widely affected by interest rates.

Table A.6.2
Simplified custodian balance sheet – duration profile

Simplified bank balance sheet						
Average maturity	Assets		Liabilities		Average maturity	Core deposits
1 day	Cash	35	95	Financial sector deposits	4 years	60%
2 years	Highly liquid securities	50	5	Capital	/	
1 day	Demand deposits	15				
	Total assets	100	100	Totals liabilities + equity		
	Average duration	1 year	2.4 years		Average duration	

Custodians tend to be more exposed to upward interest rate shocks, whereas banks tend to be more exposed to downward interest rate shocks. This is because when interest rates rise, earnings generated by instruments with floating rates will increase, which does not really benefit custodians in the short term since they mostly own sovereign bonds – which tend to be issued at a fixed interest rate – and, at the same time, the value of their existing fixed-income instruments will decrease owing to the issuance of new instruments at a higher rate.

Annex 7: Why LCR is an ill-suited indicator of a custodian's short-term liquidity risk

The LCR works under the main assumption that credit institutions hold a small ratio of liquid assets compared to their deposits, which is the case for traditional banks where clients have more deposits in the bank than the bank has central bank reserves. However, this logic is flawed with regard to custodians as the amount of liquid assets they hold (closely) matches the amount of their liabilities.

The LCR is calculated as follows:

$$\text{LCR} = \text{HQLA} / (\text{outflows over 30-day period} - \text{inflows over 30-day period})^{119}$$

where:

HQLA refers to high-quality liquid assets. This category refers to the most liquid part of the balance sheet of a financial institution and comprises cash and assets that can be quickly turned into cash (with minimal loss of their face value). The LCR framework ranks HQLAs on the basis of their level of liquidity. Less liquid HQLAs are taken into account in the numerator of the LCR with a discounted weighting to reflect potential difficulties in monetising them. The main instruments that are "HQLA-eligible"¹²⁰ are cash (reserves held in their account at the central bank and physical cash), highly rated sovereign bonds and similar (public sector companies, regional administrations and municipalities), multinational institutions, and some high-quality financial instruments (asset-backed securities, covered bonds).

Inflows refer to asset inflows expected over the next 30 calendar days. This category refers to monies due from customers (corporate, financial institutions, retail, etc.). It should be noted that cash accounts held at other financial institutions count as inflows for the purpose of the LCR and not as HQLA, in line with the BCBS standards on the LCR, implemented by EU regulation¹²¹. From a methodological perspective, most inflows are capped at a certain level (75%; apart from inflows resulting from specific business model activity) to force institutions to hold a liquid asset buffer.

Outflows refer to expected outflows over the next 30 calendar days. This can include outflows from on-balance-sheet commitments (e.g. customer deposits) and off-balance-sheet commitments (e.g. credit lines granted to clients). From a methodology perspective, a weight is applied to the value of each on-balance-sheet and off-balance-sheet item of an institution to reflect the relative risk of outflow for each type of instrument.

Demand deposits from financial sector institutions are assigned a 100% outflow rate to mimic the fact that in stress situations they could be withdrawn

¹¹⁹ Most inflows are capped at 75% of gross outflows; for simplification purpose, we exclude specific inflows that are capped at 90% or not capped as these inflows are only applicable for financial institutions whose main business model is related to consumer finance, or leasing and factoring which is out of scope of this paper. In our example, this 75% cap is not reached.

¹²⁰ That is, instruments that can be considered to be HQLAs.

¹²¹ Commission delegated Regulation (EU) 2015/61 of 10 October 2014 to supplement Regulation (EU) No 575/2013 of the European Parliament and the Council with regard to liquidity coverage requirement for Credit Institutions.

quickly, and in their entirety, by institutional investors. However, it is reasonable to consider that some deposits, maintained for the purpose of performing clearing, custody and cash management could face legal and/or operational impediments that would limit the effective outflows of their clients during a stress situation. For example, if a client only holds one cash account, and/or only uses it for their daily cash management and transaction activity, it is unlikely that the deposits would escape as easily.

To acknowledge the stickiness of these deposits, financial institutions can apply a more favourable weighting to the outflow of their deposits (25% rather than 100%) provided they can demonstrate they are able to distinguish the part of their customer deposits that customer is unlikely to withdraw because it critically needs it for its operations known as operational deposits), from the part that is more volatile (referred to as non-operational deposits or excess deposits). Adequately measuring the ratio of operational deposits to non-operational deposits is challenging, as both can refer to the same money in clients' current accounts. The client's behaviour in relation to the management of their deposits determines whether the deposit should be considered as operational or not.

Although banks have some operational and non-operational deposits related to the various services they provide to other banks and institutional investors (such as correspondent banking), those deposits represent a smaller part of their balance sheet compared with custodians.

The two tables below show the LCR of a retail bank before and after a stress scenario in which the balance sheet of the bank decreases by € billion.

Table A.7.1

Example of a simplified LCR of a bank before massive client outflows

Simplified liquidity coverage ratio of a bank before a stress scenario						
LCR eligibility	Assets		Liabilities		Outflow rate under LCR	Total outflows
HQLA	Withdrawable central bank reserves	3	4	Operational deposits	25%	1
HQLA	Liquid asset portfolio	1	2	Non-operational deposits	100%	2
Inflows	Monies due from other financial institutions	2	22	Retail customer deposits	10%	2.2
Not eligible	Long-term loans	24	2	Capital	/	0
	Total assets	30	30	Total liabilities + equity		
	Total HQLA	4				
	Inflows	2				
	Gross outflows	5.2				
	Net outflows (outflows –inflows)	3.2				
	LCR		125%			

Table A.7.2

Example of a simplified LCR of a bank after massive client outflows

Simplified liquidity coverage ratio of a bank before a stress scenario						
LCR eligibility	Assets		Liabilities		Outflow rate under LCR	Total outflows
HQLA	Withdrawable central bank reserves	1	3	Operational deposits	25%	0.75
HQLA	Liquid asset portfolio	0	0	Non-operational deposits	100%	0
Inflows	Monies due from other financial institutions	0	20	Retail customer deposits	10%	2
Not eligible	Long-term loans	24	2	Capital	/	0
	Total assets	25	25	Total liabilities + equity		
	Total HQLA	1				
	Inflows	0				
	Gross outflows	2.75				
	Net outflows (outflows –inflows)	2.75				
	LCR		36%			

In the first table, before stress, the bank has granted €4 billion in loans to its customers, and can mobilise €6 billion (€3 billion from its account at the central bank, €1 billion from monetising its government securities, and €2 billion from its account at another credit institution). These assets are funded by retail customer deposits of €22 billion and financial customer deposits of €6 billion (which comprise €4 billion of operational deposits and €2 billion of non-operational deposits) and the bank's own capital of €2 billion.

Its LCR stands at a comfortable 125%, which is enough to cover its regulatory requirements, as a significant part of its customer deposits are retail deposits that benefit from a low outflow rate.

However, after stress the situation is different: deposits have decreased by €5 billion owing to (i) non-operational deposits being fully withdrawn, (ii) 25% of operational deposits being withdrawn, and (iii) 9% of retail customer deposits being withdrawn. To cover the liquidity outflows, the bank has been obliged to spend almost all of its cash reserve at the central bank (withdrawable central bank reserves), sell its securities (central government assets), and empty its accounts at other commercial banks (monies due from other financial institutions). The change in HQLA (-75%) is higher than the change in net outflows (-47%), resulting in a lower LCR, which stands at 36% after stress, breaching minimum regulatory requirements (100%).

In this scenario, the LCR has played its role because the downgrade of the LCR level (from 125% to 36%) has highlighted the deterioration of the bank's liquidity situation.

Both tables below show the evolution of the LCR of a custodian before and after a stress scenario that result in the balance sheet of the custodian decreasing by €5 billion. Unlike for the bank, the stress situation counterintuitively results in an improvement in the custodian's LCR.

Table A.7.3

Example of a simplified LCR of a custodian before massive client outflows

Simplified liquidity coverage ratio of a bank before a stress scenario						
LCR eligibility	Assets		Liabilities		Outflow rate under LCR	Total outflows
HQLA	Withdrawable central bank reserves	13	14	Operational deposits	25%	3.5
HQLA	Liquid asset portfolio	8	14	Non-operational deposits	100%	14
Inflows	Monies due from other financial institutions	5	2	Capital	/	0
Not eligible	Non-liquid securities	4				
	Total assets	30	30	Total liabilities + equity		
	Total HQLA	21				
	Inflows	5				
	Gross outflows	17.5				
	Net outflows (outflows –inflows)	12.5				
	LCR		168%			

Table A.7.4

Example of a simplified LCR of a custodian after massive client outflows

Simplified liquidity coverage ratio of a bank before a stress scenario						
LCR eligibility	Assets		Liabilities		Outflow rate under LCR	Total outflows
HQLA	Withdrawable central bank reserves	8	14	Operational deposits	25%	3.5
HQLA	Liquid asset portfolio	8	9	Non-operational deposits	100%	9
Inflows	Monies due from other financial institutions	5	2	Capital	/	0
Not eligible	Illiquid securities	4				
	Total assets	25	25	Total liabilities + equity		
	Total HQLA	16				
	inflows	5				
	Gross outflows	12.5				
	Net outflows (outflows –inflows)	7.5				
	LCR		213%			

In the first table, before stress, the custodian’s liabilities are comprised of:

€28 billion aggregated client deposits (split equally into operational and non-operational deposits) and capital of €2 billion. The custodian places these as follows: €13 billion of cash at the central bank, €8 billion in high-quality sovereign bonds, €5 billion in accounts at other commercial banks and €4 billion in non-liquid securities.

In the second table, after stress, clients have withdrawn €5 billion of deposits.

On the liabilities’ side, client outflows first impact non-operational deposits (since operational deposits are by definition “stickier”), which are already weighted at 100%

of outflows. Assuming that the stress impacts only the HQLA (and not inflows) on the asset side in our example¹²², we find that the change in HQLA (-23%) is lower than the change in net outflows (-40%) as a result of the stress, resulting in a higher LCR ratio (213% after the stress compared with 168% before the stress, in our example). This improved ratio would mean that custodian's liquidity position has improved as a result of the client run, which is not the intended behaviour of the ratio.

Based on the above, the current design of the LCR does not adequately enable it to capture the short-term risk liquidity risk of a custodian that maintains a very liquid balance sheet.

Annex 8: data for weighted average custodian used in Table 8

	Tier 1 Capital	RWA	Capital ratio	Leverage exposure	Leverage ratio	RWA density
BNYM SA/NV ¹²³	2,972	3,822	77.3%	28,854*	10.3%	13.2%**
State Street GmbH ^{***124}	2,426	6,382	38.0%	43,715	5.5%	14.6%**
KAAS ¹²⁵	203	543	37.0%	3,984*	5.1%	13.6%**
weighted average	1,867	3,582	52.1%	25,518	7.3%	14.0%**
Weighted average data for EUR 1 billion capital.	1,000	1,919	52.1%	13,668	7.3%	14.0%**

Note: All data are in EUR million

*data point calculated: Leverage exposure = 1/ (leverage ratio / Tier 1 capital)

** data point calculated: RWA density = RWA / leverage exposure

*** data are for SSEHG Group

¹²² In the opposite extreme case where the stress impacts only inflows (and not HQLA) on the assets' side, i.e. that inflows after stress are equal to zero, net outflows and HQLA would stay constant after stress, which means that there would be no impact on the LCR. Therefore, while the impact of the stress on the assets side on HQLA vs. inflows does matter for the overall LCR, it does not change our conclusion: the stress will at worst result in a constant LCR. In all other cases where the impact on the stress is positive on the HQLA, the LCR would improve.

¹²³ BNY Mellon SA/NV, "Annual Report 2018" (Belgium significant institution).

¹²⁴ State Street GmbH, "Annual Report 2018" (German significant institution).

¹²⁵ KAS Bank N.V., "Annual Report 2018" (Dutch less significant institution).

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