Addressing Market Dysfunction and Liquidity Stresses in Nonbank Financial Intermediaries

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Contents

Central Bank Interventions Help Achieve Price and Financial Stability Mandates

Introduction

Central banks support markets or institutions because doing so will help them meet their mandate with regard to the maintenance of price and financial stability. During crises, central banks expand the breadth of their operations, lengthen the duration of lending, and expand the range of counterparties they deal with and the pool of eligible collateral. The central bank provision of liquidity to banks has long been the staple tool for addressing financial stability risks when stresses arise. However, central banks provided liquidity support for many types of nonbank financial intermediaries (NBFIs) during both the global financial crisis and the COVID-19 pandemic. And more recently, central banks such as the US Federal Reserve and Bank of England (BoE) have felt the need to extend access to their operations to certain types of NBFIs given their increasing prominence in the financial system and as strengthened prudential regulation reduced the willingness of banks to provide such liquidity support.

Financial stability can be at risk when, for example, securities dealers are unable to sell or refinance inventory, thereby reducing their ability to support market functioning. Equally, stability risks arise when financial firms (including asset managers) face increasing liquidity demands from margin calls or from their end-investors or are faced with reduced access to funding by lenders, which might result in fire sales of financial assets; that is, a forced sale that results in the asset trading below its intrinsic value. Consequently, nonfinancial firms and consumers might lose access to finance. Such instances of significant market failure arise as a result of asymmetric information, fragile NBFIs, incomplete markets, or certain types of externalities.

Stability risks can also be exacerbated due to the reduced intermediation capacity of broker dealers stemming from internal risk limits. Although prudential regulation should force financial institutions to internalize some of the intermediation risk, imposing full self-insurance of the risk would clearly go too far, so that some residual risk remains that the central bank may have to cover. As the monopolistic issuer of liquidity, the central bank must be able to provide liquidity support (but not solvency support) if systemic risks arise, though care must be taken to mitigate moral hazard and risks to the central bank's balance sheet.

The objective of this note is to examine the central bank policy toolbox. It discusses some desirable design features of central bank liquidity that may support NBFIs—market-wide operations, standing liquidity facilities, and emergency liquidity assistance (ELA)—based on recent observations and some long-standing principles. Because robust regulation and supervision are the first line of defense to address and mitigate the systemic liquidity risks and to contain excessive risk-taking behavior, including those emerging from the NBFI sector, this note briefly discusses key regulatory and supervisory priorities for NBFIs.[1]

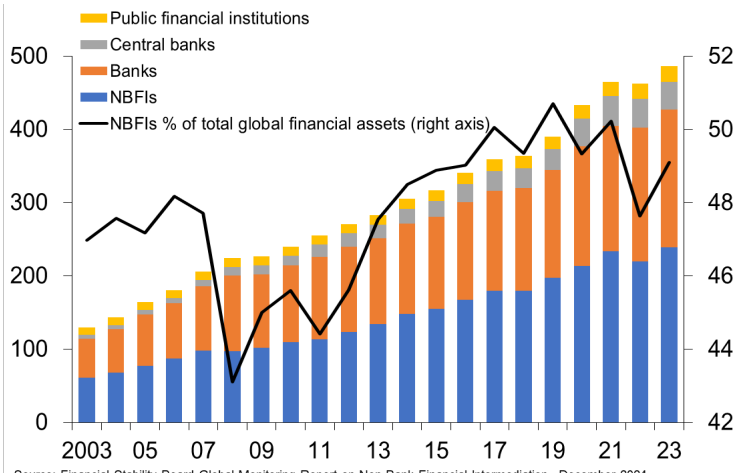
[1] The evolving and growing NBFI sector, the associated financial stability risks, and the regulatory challenges remain topics of key importance. The IMF has done considerable work in this area in recent issues of the Global Financial Stability Report (such as Chapter 3 of the October 2022 issue on investment funds, Chapter 3 of the April 2022 issue on fintech, Chapter 3 of the October 2019 issue on institutional investors, and Chapter 3 of the April 2015 issue on insurance). On NBFI liquidity regulation, some of the recent detailed proposals are Garcia Pascual, Singh, and Surti (2021); Financial Stability Board (2022a, 2022b); and International Organization of Securities Commissions (IOSCO 2019). Reforms that address risks from money market funds and open-ended funds, and margin practices and NBFI leverage, including those developed by the FSB, would strengthen resilience during times of stress.

Changing Nature of Financial Intermediation

Nonbank and market-based finance has experienced spectacular growth since the global financial crisis. During this period, the share of global financial assets held by NBFIs has grown from about 40 to nearly 50 percent (Figure 1), in part a consequence of regulatory and supervisory initiatives that have made the central bank historic counterparties, banks, more resilient, but have also made it more costly for them to engage in financial intermediation, including on behalf of the central bank. Thus, some banking activities have in effect been pushed to other segments of the financial system.

Figure 1. Total Global Financial Assets

(Trillions of US dollars, percent)



Source: Financial Stability Board Global Monitoring Report on Non-Bank Financial Intermediation, December 2024.
Note: NBFIs = nonbank financial intermediaries.

NBFIs, which include a broad universe of intermediaries, have become vital to the intermediation of core financial markets, such as government and corporate bonds. NBFIs are also a crucial driver of global capital flows to emerging markets and developing economies. These flows bring benefits to recipient countries and higher returns and portfolio diversification for international investors. Recent empirical studies show that NBFIs may also play a role as shock absorbers by providing credit during stress episodes as bank lending to firms declines, although credit availability comes at a higher price (Adrian, Colla, and Shin 2012; Elliott, Meisenzahl, and Peydró 2023; Albuquerque and others 2025).

At the same time, vulnerabilities related to financial leverage, liquidity, and interconnectedness have built up in certain segments of the NBFI ecosystem (see Box 1 on NBFI Leverage and Liquidity Risks). Particularly dangerous is the interaction of poor liquidity with financial leverage: the unwinding of leveraged positions by NBFIs can be made more abrupt by the lack of market liquidity, triggering spirals of asset fire sales and investor runs amid large swings in asset prices.

Because dealer banks are major providers of funding to NBFIs and thus account for much of their financial leverage, interconnectedness can also become a crucial amplification channel of financial stress. This can generate spillovers to other markets, including core funding markets, as well as to other intermediaries (both banks and NBFIs) and across borders (for example, NBFIs that intermediate capital flows to emerging market and developing economies). In addition, the extended period of low interest rates and loose financial conditions after the global financial crisis may have also resulted in NBFIs shifting investments to riskier assets to find higher returns (Kashyap and Stein 2023).

Assessing Systemic Importance of Nonbank Financial Intermediaries

NBFIs have grown to become key financial intermediaries. Historically, liquidity support to NBFIs has been provided primarily through banks. However, opening access to central bank liquidity to certain NBFIs could be necessary to maintain financial stability if there is a high risk of contagion either to systemically important NBFIs or to markets or if the sector or entities are important for financial intermediation and credit provision and they cannot be reached out efficiently through the central bank's standard counterparties. Importance in an institutional context is attributed to the three determinants—size, interconnectedness, and substitutability.[2,3]

Authorities should have determined in advance about which segments and related markets are potential candidates for support. Given size and liquidity risks (see Table 1: Preliminary Assessment of NBFI vulnerabilities), central counterparties, investment funds, pension funds, money market funds, and securities dealers are potential candidates; regarding markets, sovereign and high-quality corporate securities are relevant.[4] There is likely a significant jurisdictional variation in which types of institutions or markets are systemic, requiring national determination. Beyond the analysis of how much a market or a counterparty "matters" for financial stability, the central bank should also assess the counterparties "through which" it could implement its policy most efficiently and at the least risk.

[2] FSB, IMF, BIS. Report to G20 Finance Ministers and Governors. Guidance to Assess the Systemic Importance of Financial Institutions, Markets and Instruments: Initial Considerations. October 2009.

[3] Relatedly, for assessing in which markets to intervene as well as size, credit risk and liquidity in normal times could also be considered (King and others 2017).

[4] Some central counterparties already benefit from access to central bank facilities and emergency liquidity, and a couple in Europe even have banking licenses. In addition, various policies have been implemented and are in the process of implementation to address several of these vulnerabilities. See FSB (2024), Enhancing the Resilience of Non-Bank Financial Intermediation: Progress Report.

Table 1. Preliminary Assessment of Vulnerabilities of Major Nonbank Financial Intermediaries

NBFI (GFA)	Financial Leverage	Liquidity Risk	Interconnectedness	Currency Mismatches
Investment funds, excluding money market funds and hedge funds ($58 trillion, 12 percent of GFA)	Low, but medium for bond funds with derivative exposures	High for fixed-income funds holding illiquid emerging market/ high-yield assets; medium otherwise	High, cross-border spillovers (emerging market and developing economies) and potential links to banks on derivative exposures	Low, but significant externalities to foreign exchange market
Insurance companies ($40 trillion, 9 percent of GFA)	Low	Low, but medium if subject to policy surrenders	Medium; insurance companies are large holders of bank debt; some exposure to margin calls	Low, but medium is subject to policy surrenders
Pension funds ($43 trillion, 9 percent of GFA)	Low, but medium in jurisdictions with a large share of defined-benefit schemes	Low, but could be high in some jurisdictions with a large share of defined-benefit schemes and negative cash flows	Severe data gap does not allow to make any informed assessment here but could be high in some jurisdictions with a large share of defined-benefit schemes and negative cash flows	Low
Money market funds ($8.5 trillion, 2 percent of GFA)	N/A	Low, but medium for prime funds	High; key players in core funding markets	N/A
Structured finance vehicles ($6 trillion, 1 percent of GFA)	Medium/high	Medium	Medium; insurance and pension funds can be large investors in structured finance vehicles	Low
Hedge funds ($6 trillion, 1 percent of GFA)	Medium/high	Medium; most hedge funds have strengthened liquidity terms	Medium/high	Medium
Central counterparties ($0.7 trillion, 0.1 percent of GFA)	N/A	High, but central counterparties have strong risk and financial management controls to reduce such risk	High, given their systemic position across markets	N/A

Sources: Financial Stability Board 2022c; and IMF staff.
Note: GFA = global financial assets; N/A = not applicable; NBFI = nonbank financial intermediary.

Increasing Interconnectedness of Nonbank Financial Intermediaries and the Financial System

Interconnections among financial institutions can be direct (direct borrowing/lending and investment exposure) or indirect (for example, through exposure to a common asset). Interconnectedness is a feature of an open and integrated global financial system that facilitates the sharing of risk but can also spread distress of one financial intermediary to others through financial links. This transmission channel can amplify risks when entities along intermediation chains employ a high degree of leverage and engage in liquidity and maturity transformation.

Limited data availability precludes comprehensive systemic risk assessment. National and cross-border who-to-whom matrices in financial accounts remain incomplete at the sectoral level, whereas entity-level data are sparsely available in ready-to-use form and are resource consuming when needing to be reconstructed from scratch. Direct links between banks and nonbanks (domestic and cross-border), as well as within the NBFI ecosystem, have grown. Indirect interconnectedness, that is, overlaps or commonalities in entities' portfolios, could also be a risk amplifier.

Finally, interconnectedness can also trigger cross-border contagion, as emerging markets and developing economies (EMDEs) may face an intensification of cross-border portfolio outflows, many of which are

intermediated by NBFIs. Importantly, NBFIs tend to be more susceptible to global financial conditions, especially investment funds that are either passively managed or follow benchmark indices, accentuating the procyclicality in capital flows. In addition, long-standing currency mismatches, particularly among nonfinancial corporations, may interact with vulnerabilities stemming from a greater reliance on NBFIs in financing EMDEs' external debt.

Central Bank Toolkit for Nonbank Financial Intermediaries

Policymakers today have the benefit of being able to assess the effectiveness of unconventional tools used during two events over the last 15 years to address severe dislocation in financial markets—the global financial crisis and the COVID-19 pandemic. The wide variety of tools employed during these events, in general, were successful in containing financial market stresses across markets and institutions. However, even if central banks' intervention is effective in restoring market functioning to preserve financial stability, they can have adverse effects that must be taken into account while designing intervention tools, including risks to the central banks' balance sheet and also moral hazard associated with perceptions of overly frequent and generous liquidity support programs.

There are at least several dimensions along which liquidity can be provided. Interventions can be at the discretion of the central bank or can be designed as standing facilities. The former intervention is deployed by a central bank as a stress event is unfolding if judged necessary to protect financial stability, whereas the latter are on-demand facilities accessible but usually not used in normal market conditions (see Table 2 for a list of potential central bank responses to NBFI liquidity stress). Discretionary interventions can be market-wide to address financial stability concerns for a given market or NBFI sector, or alternatively, they could be idiosyncratic to support a specific, systemically important institution, akin to emergency liquidity assistance.

Support could be provided through the purchase of assets from NBFIs under liquidation pressure. This could occur either directly from the NBFIs or indirectly through traditional counterparties of the central bank. Alternatively, the central bank could lend to the NBFIs, which may necessitate an extension of the central bank's list of eligible counterparties.

Table 2. Liquidity Frictions: Diagnoses and Potential Responses

Nonbank Financial Intermediaries	Risks	Security Types	Potential Central Bank Responses
Nonbank intermediaries	Securities dealers lose access to funding because of uncertainty about: • Counterparty creditworthiness • Collateral values	Sovereign bonds	Collateralized lending (for example, repo): expanded eligibility for counterparties
		Corporate bonds, asset-backed securities	Collateral upgrade (that is, swaps)
		Commercial paper	Asset purchases: expanded counterparties and asset universe
	Securities dealers cannot sell assets at reasonable prices	All types of securities	Asset purchases: expanded counterparties and asset universe
Investment funds (including money market and hedge funds)	Funds face temporary redemption pressures (liquidity mismatches)	All types of securities	Collateralized lending (for example, repo): expanded eligibility for counterparties
	Funds face persistent redemption pressures (liquidity mismatches)	All types of securities	Asset purchases: expanded counterparties and asset universe
Pension funds	Funds face early/unexpected redemption	All types of securities	Asset purchases: expanded counterparties and asset universe
	Funds face liquidity pressure arising from derivative/valuation	All types of securities	Collateralized lending (for example, repo): Expanded eligibility for counterparties
Insurance	Insufficient liquidity buffer/ unexpectedly high pay-off	All types of securities	Asset purchases
Central counterparties	Central counterparties lose access to funding (and cannot sell high-quality liquid assets)	High-quality liquid assets	Idiosyncratic (lender of last resort)
Systemic nonbank financial intermediaries regardless of the type	A systemically important (solvent) nonbank financial intermediary loses access to funding	Various, including credit claim	Idiosyncratic (lender of last resort)

Source: IMF staff.
Note: The central bank response would depend on the nature of the liquidity issue. Collateralized lending would respond in priority to temporary funding pressure, whereas asset purchases would address market illiquidity and liquidity drain with less chance of recovery.

Discretionary Market-Wide Interventions

Lessons from previous crises highlight that market-wide intervention programs should have objectives grounded in the central bank's financial stability mandate and have the following attributes:

- They should be targeted at systemically important NBFIs and related markets.
- They should be well-specified in terms of intervention triggers.
- They should be designed to self-liquidate and return to market-driven trading and price discovery, as market conditions improve and financial stability is restored while containing moral hazard and risks to the central bank.

Effective programs hinge on diagnosing the source of market dysfunction and, though not mutually exclusive, problems can be distinguished between *funding liquidity* and *market liquidity*.[5] It is important to emphasize that central bank actions should only target liquidity problems while leaving solvency problems

[5] Market illiquidity and funding illiquidity reinforce each other through various financial frictions. First, through collateral constraints: when funding liquidity is low, traders reduce positions on high-margin securities thus causing market liquidity to fall (Brunnermeier and Pedersen 2009). Second, through asymmetric information about the quality of assets which causes the offer prices of such assets to be low and can originate a funding illiquidity event. This, in turn, can exacerbate investors' pessimistic beliefs about asset prices and further decrease market liquidity (Li and Ma 2016).

for the fiscal authorities to address, though such clean separation may be difficult to achieve in practice. The difficulty arises from the fact that central banks may have to intervene quickly in crisis situations without having clarity about the solvency of the borrower; in such situations, they should have Treasury support including in the form of a fiscal backstop.

Funding Liquidity Problems

Symptoms of *funding liquidity* problems include widening of spreads between borrowing and risk-free lending rates, and other critical terms of lending, such as increased margins or haircuts demanded by lenders in repo markets. Traded volumes will likely have fallen sharply. To provide funding liquidity, central banks can conduct overnight or term repo operations to *an expanded range of counterparties*, targeting either those where the problem is most acute or those that have the best capacity to intermediate the market.

To illustrate, in response to funding pressures during the global financial crisis, the Federal Reserve Board established the Primary Dealer Credit Facility (PDCF) which provided primary dealers (securities dealers licensed and supervised by the Federal Reserve Board) with access to overnight funding collateralized by investment-grade securities. The initial commitment was for six months and then extended for another eight months before it was withdrawn as funding pressures eased. In other markets, such as Hungary and Korea, central banks expanded term repo operations to NBFIs (for example, mutual funds, insurance companies) to address sectoral liquidity stresses. Collateral swaps are an effective tool where markets are hampered by uncertainty about collateral values. The Federal Reserve Board's Term Securities Lending Facility (TSLF) allowed primary dealers to borrow Treasury securities for 28 days in exchange for lesser quality collateral (for example, corporate bonds), appropriately margined to mitigate the risks to the central bank. This program supported market-based activity as the counterparty used the upgraded collateral to transact in the market rather than accessing central bank liquidity. In other jurisdictions, the central bank provided term funding and purchased assets from NBFIs through banks, without extending its counterparties list to NBFI, as the central bank assessed that it can efficiently reach the markets and institutions under pressure without taking the risk of extending its counterparty list.

The lessons from these operations highlight the need for targeted operations and also to design programs to facilitate exit once funding pressures abate. The central bank should be mindful of the generally higher risk of dealing with less tightly regulated NBFIs and ensure that appropriate risk mitigation measures—eligible collateral and margining—are in place. They should also be aware in advance of the types and volumes of collateral held by NBFIs that are potential candidates for support. A central bank would likely have to deal with illiquid collateral in a crisis either because normally highly traded assets have temporary lost market liquidity or because the liquidity need exceeds the pool of liquid collateral. Therefore, the central bank should be ready to treat an extended collateral universe, including securing the legal basis for asset mobilization and calculating haircut for assets without market pricing. Prepositioning (illiquid) collateral would thus help to prepare for a crisis. Finally, the central bank should only deal with *adequately* regulated and supervised institutions that provide to the central bank, either directly or through other supervisors, the necessary data to inform the central bank decision whether to extend support to the institution. It may need to coordinate across agencies to make such a determination.

Market Liquidity Problems

Symptoms of problems with *market liquidity* typically revolve around widening bid/offer spreads, precipitous falls in trading volumes, and sometimes outright market freezes. With ex-ante determination of which NBFIs and associated markets are systemic, the central bank can quickly announce a program to underscore its commitment to financial stability. The announcement should cover the nature of the problem; the objectives of the intervention program and its modalities, including the securities to be purchased, how they will be purchased (that is, pricing); and any time and volume limits.

The actions by the BoE in September 2022 provide an example for addressing a loss of market liquidity during a tightening cycle.[6] The program, which addressed the sell-off of UK Gilts by pension funds and liability-driven investment (LDI) funds, entailed several features that helped increase overall effectiveness and distinguish it from earlier asset purchases designed to add monetary accommodation. The diagnosis of the problem was clear—although it incorporated a funding dimension, constraints on leverage and capitalization meant that a straight funding solution would not work and, therefore, the decision was taken to purchase Gilts. An announcement was made by the Financial Policy Committee (FPC) to ensure differentiation from monetary policy action, as the latter would be under the purview of the Monetary Policy Committee (MPC).[7] The Bank of England demonstrated a strong commitment to restore orderly market conditions. A 13-day time limit was set as this was judged to be sufficient time to allow pension and LDI funds to rebuild their resilience, all of which indicated the Bank of England was not targeting any specific quantity of purchases or yield. It conducted auctions with reserve pricing,[8] and in the end, stability was restored with a relatively low volume of Gilts purchased (£19.3 billion) also abetted by a change in fiscal stance. The program incorporated three further desirable features; the stated intention that purchases under the program would be unwound in a timely and orderly way; the operation was fully indemnified by HM Treasury; and it targeted the long end of the gilt yield curve, where the stress was concentrated, which was a further distinction from monetary policy actions.

Lending Operations versus Market Purchases

Assets purchases appear to be an easier solution for addressing liquidity pressures in the NBFI segment, as they can often be implemented through the central bank's traditional counterparties without needing to extend the eligibility list. They tend to have a direct and immediate effect on the market. However, asset purchases could conflict with monetary policy, especially during tightening cycles. They may also contribute to a buildup of longer-term financial vulnerabilities by distorting markets, and present financial, political, and reputational risks for the central bank. Collateralized liquidity support, rather than asset purchases, may be preferable for limiting risk to central banks' balance sheet and because such an intervention could be more targeted than asset purchases. Considerations along these lines spurred the BoE, for instance, to develop a collateralized lending facility to supply liquidity to insurers and pension funds.

Lending operations require close collaboration with regulators and effective data access to monitor counterparties' solvency and collateral, making them particularly effective for short-term liquidity risks in well-regulated institutions. They focus on predefined institutions, which should limit moral hazard, as long as pricing is not overly lenient. In contrast, asset purchases address systemic liquidity issues without monitoring individual counterparties' solvency. However, they pose significant financial risks if asset prices decline and may create moral hazard by providing a broad, untargeted safety net for asset holders (Table 3).

[6] Thirteen days in October: How central bank balance sheets can support monetary and financial stability—speech by Andrew Hauser: Given at the ECB's 2022 Conference on Money Markets, 4 November 2022.

[7] https://www.bankofengland.co.uk/news/2022/september/bank-of-england-announces-gilt-market-operation.

[8] The auctioneer sets a maximum price at which it would purchase a security to ensure that participants in the auction incur a minimum discount, thereby reducing moral hazard by retaining some of the risk within the market.

Table 3. Comparisons between Lending Operations and Asset Purchases

	Lending Operations	Asset Purchases
CB capacity	Requires close collaboration with regulators, good data access, and CB capacity to monitor a broader set of counterparties and evaluate their collateral effectively.	Does not require central bank to monitor and observe individual NBFI solvency.
Effectiveness	Particularly effective for addressing short-term liquidity risk in a smaller group of well-regulated NBFIs (that is, funding liquidity).	Particularly effective for addressing systemic market liquidity problems, or liquidity risks from firms that are leverage constrained.
MP interaction	Limited interaction with monetary policy (can usually be accommodated within the normal functioning of the operating framework).	Can complement monetary easing, but may interfere with (communication around) monetary tightening.
Duration of unwind	Tends to be shorter term in nature and relatively easy to unwind.	Can be more difficult to unwind.
Financial risks	Exposes CB to possible financial risks associated with collateral valuation and counterparty solvency.	Exposes CB to significant financial risks if the prices of the purchased assets fall or policy interest rates rise.
Risk sharing arrangements	May require arrangements with fiscal authority to indemnify CB from financial risks associated with ELA.	May require arrangements with fiscal authorities to risk share losses from asset purchases.
Moral hazard	Lending programs reduce moral hazard by operating through a limited set of approved counterparties with sufficient regulatory incentive for liquidity self-insurance and with appropriate pricing.	Moral hazard risks can arise as asset purchases provide a backstop to all asset holders (that is, are not targeted).

Source: IMF staff.
Note: CB = central bank; ELA = emergency liquidity assistance; MP = monetary policy; NBFI = nonbank financial intermediary.

Lender of Last Resort, Standing Facilities, and Emergency Liquidity Assistance

Central banks are deemed the lender of last resort (LOLR) because they are the exclusive issuers of the legal tender within a jurisdiction. The widely referenced LOLR principles, articulated by Bagehot in 1873, advise that “in a crisis, the LOLR should lend freely, at a high rate, against good collateral.” This is akin to a standing lending facility, where rates are typically above market levels, collateral is of high quality, and access is initiated by counterparties. Conversely, the LOLR function is best characterized as emergency liquidity assistance (ELA) when access is not pre-committed, involves additional supervisory oversight and conditions, and, though fully collateralized, may accept lower quality collateral.

An important policy question is whether central banks should provide NBFIs with access to on-demand liquidity through standing lending facilities, similar to those offered to commercial banks. A standing lending facility is part of an interest rate corridor, typically the upper bounds of these corridors. These facilities are generally considered components of the monetary policy implementation toolkit and support financial stability by providing overnight lending on demand against appropriate collateral. They are a permanent feature of the central bank operational framework and not an “emergency intervention.”

Such facilities typically serve a limited number of institutions that have temporarily lost market access and prevents such events from affecting monetary policy implementation, specifically by maintaining the market rate within an interest rate corridor decided by the central bank. However, the term “facility” is also used more loosely to design any central bank intervention that aims to cap a price of an asset by lending

or buying as much as necessary, thereby absorbing the risk the market would like to off-load. The effect on financial stability and the costs and risks to the central bank are of prime importance when considering this question.[9]

Eligibility is crucial for standing facilities. The central bank must target the relevant counterparties within the NBFI's universe as closely as possible to avoid providing the same support to institutions subject to different regulations, which could foster moral hazard and create an uneven playing field. They should take into account the risk of disintermediation that may arise from granting NBFIs access to central bank facilities. In some cases, the central bank provides temporary access to facilities during a crisis, thereby making the facility "non-standing." They are sometimes referred to as "contingent" facilities.[10] However, the moral hazard issue is unchanged as long as there is an expectation that the central bank will extend access during a crisis. In such cases, the focus should instead be on differentiated access conditions, for instance, in term of cost and reserve pricing, to reflect the differences in regulation.

Access to standing facilities requires strict adherence to pre-established prudential criteria. In particular, the central bank should be able to establish point-in-time solvency with great accuracy, clearly distinguishing between solvent and insolvent entities. NBFIs are generally not subject to an internationally agreed set of regulatory standards like Basel III for banks. Their regimes are often less stringent than that for banks, while data gaps, including blind spots on interconnectedness (that is, Archegos case), increase uncertainty about counterparty risks. In addition, accurately confirming solvency can be challenging during a crisis. The bar should, therefore, be very high for central banks to extend access to its standing lending facilities to NBFIs, since such access would likely increase risk taking that may need to be underwritten in the next crisis. This bar should recognize the systemic importance of an NBFI sector in conjunction with a requirement for bank-like regulation and supervision.

Central banks should also be prepared to address stress in individual systemically important NBFIs through ELA. Central banks have considerable discretion and flexibility when they provide support through ELA. It usually targets individual institutions, making it the most targeted instrument in the central bank toolkit. ELA is typically deployed when the liquidity gap of the concerned institutions is large, as reflected by the exhaustion of alternative funding sources (including standing facilities) because of the lack of good collateral.[11] It is crucial that the necessary institutional and legal frameworks are established to enable assistance to individual firms. In normal times, these institutions typically have limited or no access to the standing liquidity facilities available to banks.

Contrary to standing facilities, support under ELA does not come without conditions. It includes an ex-post intervention by the supervisor, which could involve taking control of the institution's risk policy, remuneration policy, and dividend policy. Conditions such as limits on investment, new lending, profit distribution, and salary increases aim to ensure timely repayment of the liquidity assistance and prevent misuse by the management or owners of the beneficiary institution. Conditionality serves as a bulwark against moral hazard, while unattractive financial conditions ensure that counterparties seek ELA only after exhausting all alternative funding sources.

[9] IMF (2020) Chile: Technical Assistance Report—Central Bank Services to Nonbank Financial Institutions: April 2020. Four criteria for assessing access to central bank services are identified: the effect on the central bank's (1) ability to implement monetary policy, (2) financial stability, (3) economic efficiency and market neutrality, and (4) costs and risks. Of most relevance are the questions on financial stability, and the costs and the risks to the central bank.

[10] The Bank of England's Contingent NBFI Repo Facility, though not a standing facility, is accessible to insurance companies, pension funds, and liability-driven investment funds that make a material contribution to gilt market functioning as measured by their holdings of gilts. For further information on the Contingent NBFI Repo Facility parameters and eligibility requirements, see https://www.bankofengland.co.uk/markets/bank-of-england-market-operations-guide/cnrf.

[11] In the United States, the Dodd-Frank Wall Street Reform and Consumer Protection Act (2010) removed the Federal Reserve Board's power to lend to a single entity in "unusual and exigent" circumstances, something it was able to in the global financial crisis, to American Insurance Group for instance. When exercising its powers through 13.3 of the Federal Reserve Act, the Federal Reserve Board must get prior approval from the Secretary of the Treasury and offer the loans to a "broad class borrowers," which has been interpreted as meaning at least five borrowers.

Enforcing ELA conditionality assumes that the central bank has sufficient regulatory and supervisory power over the institution to which it grants ELA. However, this may not be the case with NBFIs. In the absence of expanded regulatory power, the central bank should be confident in its ability to rely on seamless coordination with the NBFI's regulator to enforce conditionality when providing lending to an NBFI outside of its regulatory perimeter. This also includes data exchange and could be established in an inter-regulatory agencies' memorandum of understanding.

As a counterparty of conditionality under ELA, the eligibility criterion could be more flexible. Although lending to institutions that are fundamentally insolvent must be precluded, relying solely on point-in-time capital thresholds to define solvency, as with the standing facilities, may significantly restrict the central bank, particularly when flexibility is needed. The assessment of financial soundness focuses on forward-looking solvency and viability, allowing central banks to extend liquidity support to entities with a credible prospect to restore compliance with prudential requirements within a pre-determined time period. In addition, central bank lending should always be collateralized even if the central bank is constrained to accept a broader set of assets as collateral in a crisis to provide the necessary liquidity support. The conditionality would compensate for the lower overall collateral quality. Finally, a fiscal backstop would be appropriate, especially if solvency or the adequate collateralization is in doubt.

Effective communication regarding liquidity support must align with the specific instruments used. Central banks should clearly articulate eligibility criteria and regulatory requirements to manage expectations and promote sound risk management among counterparties. Access rules for counterparty-initiated tools, such as standing facilities, should be publicly available to foster trust and confidence in the central bank's operations, ensuring that all market participants understand participation standards. Conversely, communication on discretionary lending, especially for ELA, should avoid implying a pre-commitment to liquidity support. Although internal rules for such interventions should be well defined internally, not all need to be publicly disclosed.

Operational Considerations for Central Bank Interventions

Timing of an Intervention

The decision to intervene should be guided by the available data on market functioning. Intervening when the market shows only tentative signs of malfunction could trigger moral hazard, as it may lead the central bank to remove too much risk from the market. Conversely, if the central bank delays intervention, reestablishing proper market functioning may necessitate more sustained involvement than would have been required with a timely intervention. The timing of either a market-wide or an ELA intervention is essential. NBFI stress would manifest in markets to which they are most exposed and show up in movements in price and volume-based indicators such as trading volumes, bid/offers spreads, and price volatility.

A framework based on "discretion under constraints" should be in place. This means that data-driven metrics should guide the decision to intervene (the constraints), while policymakers ultimately retain the discretion on whether to intervene. The metrics may be based on a heatmap of indicators—such as funding spreads, premium in relation to a risk-free benchmark, margin requirements, trading volumes, bid-ask spread, and price volatility—with appropriate thresholds. This can be complemented with more sophisticated methods based on forecasts of the short-term distribution of price changes based on standard volatility models. The central bank would decide how much risk, defined as a percentile of the predictive distribution, it covers (that is, the tails of the distribution) and how much it leaves in the market (Sakurai and Chen 2024). Operating further into the tail reduces moral hazard while still supporting timely price adjustment and avoiding overshooting. The forecast provides a forward-looking input to the intervention decision instead of market developments that are observed either contemporaneously or with a lag. Although these metrics are important guideposts, policymakers' judgment remains crucial in the decision to provide liquidity and ameliorate systemic risk as the metrics cannot process all the information available at the moment of the decision. Market intelligence is also an important input to inform the policy market decision.

Coordinated Crisis Management Response

Regulatory coordination across sectors and jurisdictions is essential both for identifying risks in a timely way and for managing crisis situations. Specifically, internationally coordinated reforms can reduce the risks of cross-border spillovers, regulatory arbitrage, and market fragmentation. Most NBFI regulators across sectors have adopted a risk-based supervisory framework that enables interventions to be adequately calibrated to risks and vulnerabilities and that has mechanisms in place to share information with other regulators and central banks. Jurisdictions should ensure that their data-sharing arrangements ensure timely coordination to swiftly identify cross-sectoral risks and determine further action as needed. Most jurisdictions also have contingency and business continuity requirements for their NBFIs that should be monitored as part of regular supervisory activities. However, the Financial Stability Board (FSB) recently noted that resolution regimes for systemic NBFIs, including central counterparties and insurers, should be strengthened, and that such regimes should be introduced where they do not exist.[12] The FSB also identified the need to address obstacles (for example, legal, regulatory, and operational) to cross-border funding in resolution, including the ability to mobilize collateral across borders.

[12] The Financial Stability Board (2022a, 2022b) calls for urgent work to address cross-border resolution challenges in the nonbank sector.

Cross-Border Considerations

Well-designed policies to address liquidity stresses in NBFIs can have a favorable effect on international spillovers by reducing the procyclicality of cross-border flows and mitigating exchange rate pressures. This is especially the case in emerging market economies that are exposed to large portfolio flows. To harness the benefits that growing cross-border flows bring to EMDEs, a combination of both recipient and source country policies is needed (Garcia Pascual, Singh, and Surti 2021). In source countries, such policies include robust regulation of NBFIs and well-designed central bank interventions. In recipient emerging market and developing economies, the appropriate mix of macrofinancial policies is critical and may include foreign exchange (FX) intervention, macroprudential measures, and capital flow measures.[13] Cross-border coordination in the introduction of policy measures would reduce regulatory arbitrage and improve implementation.

[13] For information on the IMF's Integrated Policy Framework, see http://www.imf.org/en/Topics/IPF-Integrated-Policy-Framework. For further information on capital flows, see IMF (2022). See also Chapter 3 of the April 2020 World Economic Outlook.

Central Bank Interventions Should Complement Established Guardrails

To ensure financial stability, several critical guardrails must be established. These include (1) incentivizing stronger risk management practices within NBFIs, (2) implementing adequate and comprehensive regulatory standards, and (3) conducting well-resourced and intensive supervisory oversight. When these elements are effectively in place, the necessity for central bank intervention is reduced, limiting actions to tail risks and reducing the potential for moral hazard. Last but not least, closing data gaps is essential to enable timely risk assessments by market participants and supervisory authorities, thereby promoting market discipline.

Supervision and Regulation of Markets and Nonbank Financial Intermediaries

To manage risks associated with the growing NBFI sector, it is crucial for NBFIs to strengthen their internal risk management frameworks. Regulators should prioritize comprehensive periodic systemic risk assessments across all NBFIs, incorporating system-wide stress testing and assessments for subsectors that pose significant systemic risks. Specific vulnerabilities, such as liquidity spirals, crowded trades, and indirect interconnectedness, require broader market assessments, particularly in high-risk areas such as derivatives, repos, securities lending, and leveraged loans.

Moving forward, regulation must be proportionate to the risks associated with the diverse business models of NBFIs. A one-size-fits-all regulatory approach is inadequate; instead, NBFIs should be supervised from various angles. Conduct regulations, including public disclosure, are essential for promoting market discipline and price discovery, while governance and prudential regulations are necessary to manage quantifiable risks effectively.

Improving the structural resilience of open-ended investment funds is vital, particularly regarding liquidity mismatches and excessive leverage. For funds with illiquid assets, the liquidity offered to investors should align more closely with the liquidity of the underlying assets. Regulators should mandate the effective use of liquidity management tools—such as swing pricing and redemption gates—while considering regulatory mandates when private incentives conflict with financial stability goals. Jurisdictions must also enhance their capacity to assess liquidity mismatches, focusing on understanding investor risk profiles and strengthening liquidity risk management practices. It is crucial that jurisdictions implement previously agreed policies, such as those proposed by the FSB to bolster money market fund resilience.

Financial Sector Assessment Programs have highlighted the need for enhanced resources and operational independence for NBFI supervisory authorities. Interconnectedness, which cannot be fully evaluated through microprudential stress testing, should receive special attention. In addition, regulators may issue guidance on minimum stress-testing requirements and frequency to enhance the quality of assessments in the NBFI sector. Building analytical capabilities to process granular data is essential for effective oversight. Coordination across regulatory sectors is vital, leveraging financial stability committees for data collection and analysis. Strengthening cross-border cooperation on data sharing, supervision, and liquidity management tools is also necessary, with global standard-setting bodies playing a key role in these efforts.

Closing Regulatory Data Gaps

Regulatory data gaps for NBFIs are significant barriers that hinder regulators' ability to effectively assess and monitor systemic risks. Although there has been some improvement in the availability of regulatory

data over time, gaps persist across various NBFIs and are notably inconsistent among jurisdictions when compared to the banking sector, where data quality and availability are generally more satisfactory. A qualitative assessment, as illustrated in the heat map of Table 4, identifies the regulatory data gaps pertinent to different types of NBFIs and their vulnerabilities.

Table 4. Regulatory Data Gaps for Nonbank Financial Intermediaries

NBFI (GFA)	Financial Leverage	Liquidity	Interconnectedness	Currency Mismatches
Investment funds (excluding money market funds and hedge funds) ($58 trillion, 12% of GFA)				
Insurance companies ($40 trillion, 9% of GFA)				
Pension funds ($43 trillion, 9% of GFA)				
Money market funds ($8.5 trillion, 2% of GFA)	N/A			N/A
Structured finance vehicles ($6 trillion, 1% of GFA)				
Hedge funds ($6 trillion, 1% of GFA)				
Central counterparties ($0.7 trillion, 0.1% of GFA)	N/A			N/A

Source: IMF staff elaborations.

Note: This table is to be read jointly with Table 2.1 on NBFI vulnerabilities. Red denotes no/very little data in areas with high or medium/high vulnerabilities; orange denotes no/very little data in areas with low/medium vulnerabilities; yellow denotes some data in select jurisdictions in areas with high or medium/high vulnerabilities; light green denotes some data in select jurisdictions in areas with low or medium vulnerabilities; dark green denotes broadly adequate data irrespective of level of vulnerabilities. GFA = global financial assets; N/A = not applicable; NBFI = nonbank financial intermediary.

One of the areas where data gaps have a pronounced effect is liquidity risks associated with investment funds. These gaps are particularly evident concerning liquidity mismatches, the granularity of liquidity management tools (LMTs), and stress-period disclosures. Regulators typically require high-level reporting of liquidity profiles; however, the required detail and frequency of data reports are often lacking. For example, some jurisdictions necessitate detailed, rules-based, time-tiered liquidity classifications (common in US investment funds and EU alternative investment fund managers), whereas others do not. The reporting on asset characteristics, such as listing status and credit ratings, often serves as inadequate proxies for assessing liquidity risks.

Moreover, on the liabilities side, funds frequently lack visibility about their investor base because of global distribution channels, nominee accounts, and the use of major platforms and broker dealers. Where investor data are accessible, it often fails to account for potential delays or restrictions, such as notice periods and gates. This dual data gap complicates the evaluation of liquidity mismatch and undermines cross-border comparability because of variances in measurement methodologies. In addition, there is a notable absence of granular data regarding LMT disclosures, especially for intricate tools such as swing pricing.

The challenge of data gaps extends into the analysis of leverage within the investment fund ecosystem. Although leverage disclosures for hedge funds have seen improvements since the global financial crisis, significant gaps remain. Although detailed reporting is available in the United States and European Union, there is still a need for more granular disclosures related to complex fund structures and sub-asset classes, especially for high-risk funds. In contrast, many other jurisdictions, particularly emerging markets, lack comprehensive leverage definitions and granular disclosures, leading to industry-wide data gaps.

Public disclosures for hedge funds are limited, generally consisting of industry statistics rather than detailed risk assessments, which hampers cross-border comparisons. Furthermore, leverage disclosures for open-ended funds, such as mutual funds, lag behind, despite existing leverage restrictions. The methodologies in use may allow for substantial leverage levels that remain concealed from regulatory oversight because of insufficient detail in disclosures.

Pension funds also experience significant data gaps affecting the assessment of leverage, especially in fixed-income markets. The long-term liabilities of these funds necessitate matching investments in fixed-income assets, often managed through interest rate derivatives. However, reporting requirements for derivative exposures are frequently insufficient for assessing risk exposure. In addition, the management of derivative positions by third-party asset managers can obscure the actual risks faced by pension funds.

Understanding interconnectedness risks among pension funds requires close regulatory cooperation, making liquidity risk assessments more complicated. Corporate sponsors often provide additional liquidity commitments to asset managers, yet details of these arrangements often fall outside mandatory regulatory reporting, further complicating liquidity risk analysis. Pension funds are also significantly exposed to FX risks because of substantial holdings in foreign assets. The lack of detailed reporting on FX derivative positions compounds this issue, as many of these contracts are over-the-counter and difficult to monitor. Insurance companies face relatively stringent regulations that limit investments in riskier assets, including derivatives. These regulations necessitate assessments of various risks, indirectly included in regulatory reporting. However, the use of third-party managers makes it challenging to attain a clear understanding of underlying risk exposures, potentially masking synthetic leverage.

Data gaps are most pronounced concerning interconnectedness risks of NBFIs, particularly regarding cross-border linkages. Investment funds, characterized by high levels of interconnections, often engage in complex multi-layered investments that obscure data on asset ownership and liabilities. The FSB has noted that a significant portion of financial assets within NBFIs lack available sectoral linkage data, leading to challenges in monitoring systemic risks.

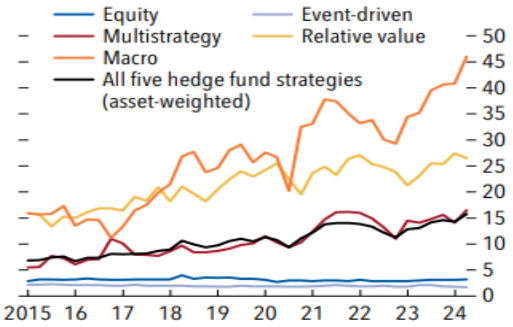
While addressing the data gap, it is important to recognize that the regulator facing information asymmetry in this context is the central bank. The decision to support a market or counterparties rests with the central bank, which necessitates access to appropriate data to inform its decisions. The central bank should also have the capacity to interpret that data effectively. Consequently, proper communication channels should be established with different supervisors, if they are distinct from the central bank, or within the central bank, if it also serves as the supervisors. In addition to the data gap, the central bank may need to confront a “capacity gap” when dealing with counterparties with which its staff may not be familiar.

Box 1. Nonbank Financial Intermediaries Leverage and Liquidity Vulnerabilities Can Amplify Financial Stress

Across various economic and interest rate cycles, investors and institutions can be incentivized to employ financial leverage to increase exposure and boost expected returns. Financial leverage can take many forms, from repurchase agreements to margin borrowing in prime brokerage accounts to synthetic leverage associated with the use of various financial derivatives (such as futures or swaps). For example, many hedge funds domiciled in the United States use synthetic leverage through derivatives to increase exposure to certain asset classes, with some investment strategies employing leverage above 20 times net asset value (Box Figure 1.1). In addition, financial leverage can be embedded in financing vehicles, for example, structured finance vehicles that provide a high amount of market exposure with low initial committed equity or mezzanine capital.[14]

Box Figure 1.1. Hedge Funds' Gross Notional Exposure by Strategy

(Gross notional exposure amount to net asset value)



Sources: US Securities and Exchange Commission; and IMF staff calculations.
Note: This figure uses a representative sample of hedge funds globally with total assets under management exceeding $5 trillion. About two-thirds of the hedge funds in the sample are domiciled outside of the United States.

As financial crises in history have taught us, financial leverage can amplify shocks to the global financial system. Leveraged entities have a higher risk of financial distress. They are more vulnerable to sudden changes in asset prices that may force them to de-lever, thus amplifying the initial price declines. In addition, leveraged entities can spread stress to the wider financial system through fire sales, especially when liquidity is poor, and through interconnectedness with dealer banks and other financial institutions. It is the interaction between market liquidity, financial leverage, and interconnectedness that is most pernicious to the financial system, because it can amplify asset price changes and spread stress to corners of the financial system that ex-ante may seem to have little in common.

The use of financial leverage by nonbank financial intermediaries (NBFIs) is particularly concerning because it is often hidden, even though provided for the most part by dealer banks. Policymakers have little real-time visibility into the risk-taking activity of NBFI entities because of data gaps, opaqueness, and often limited oversight as they operate outside of the traditional banking regulatory perimeter.

Liquidity risk is also a key vulnerability in the NBFI sector. The NBFI sector encompasses a wide range of institutions and business models, with only a few of them contributing to the provision of liquidity (such as principal trading firms) and most typically—but not always—demanding liquidity (such as investment funds, insurers, and pension funds). Fragilities related to liquidity risk in the NBFI sector were brought to the fore in recent stress episodes—such as the March 2020 financial market turmoil or the liquidity problems associated with defined-benefit pension funds and their liability-driven investments in the United Kingdom. These episodes highlighted at least three liquidity-related vulnerabilities:

Liquidity mismatch: for example, open-ended funds offering daily redemptions while holding illiquid assets can amplify the effects of shocks through investor runs and asset fire sales, ultimately contributing to volatility in asset markets and threatening financial stability.

[14] In the case of collateralized loan obligations (CLOs), for example, there can be three layers of leverage: debt issued by sub-investment-grade companies, leverage embedded in the CLO vehicle, and the financing on the margin of CLO tranches.

Liquidity spirals: as noted, the combination of leverage and market illiquidity can lead to the so-called loss and margin call spirals, where a decline in asset prices leads to the deterioration of funding liquidity which then adversely affects market liquidity (Brunnermeier and Pedersen 2009).

Crowded trades: the concentrated ownership of assets or common exposures to assets in combination with correlated liquidity shocks can further amplify stress events when market liquidity is poor (Greenwood and Thesmar 2011). Based on a subset of institutions for which portfolio data are available (investment funds), this section identifies the extent of common ownership of assets and whether this can lead to liquidity strains in periods of stress (when funds face correlated outflows).

On the other hand, some investors may be willing to give up liquidity to reach a higher yield target. For example, some NBFI entities, such as nonbank lenders in the private debt markets, benefit from stable funding sources in the form of long-term locked-in capital and may not be subject to mark-to-market requirements, so liquidity mismatch risks are limited.

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Addressing Market Dysfunction and Liquidity Stresses in Nonbank Financial Intermediaries
NOTE/2025/004