



Liquidity Risk Management in Alternative Funds



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Executive Summary

Liquidity risk management ('LRM') of investment funds has attracted growing regulatory attention in recent years. Many policymakers are assessing whether current LRM requirements and practices are still fit for purpose and whether changes are needed. This paper primarily examines LRM in 'professional investor funds', which for purposes of this paper includes alternative investment funds in the European Union and private funds in the United States. Consideration is also given to how LRM requirements of 'retail funds', which encompass Undertakings for Collective Investments in Transferable Securities ('UCITS') and investment companies registered under the U.S. Investment Company Act of 1940, as amended, differ from the LRM requirements applicable to professional investor funds and why those differences are appropriate.

Many authorities are concerned that investment funds' exposure to illiquid assets (or assets that could become relatively illiquid) could raise the risk of liquidity and redemption mismatches (as well as the risk of funding exposures such as margin calls on derivatives or interest payments on borrowings not being met), resulting in potential financial instability. Some authorities have advocated a tightening of LRM requirements to alleviate these risks, and the adoption of measures aimed at better protecting investors who remain invested in the fund at the time of financial stress. For certain types of investment funds, some bodies recommend following a quantitative approach, with the imposition of limits or prescriptive approaches related to one or more liquidity attributes.

We argue that the current regulatory approach for retail funds is not appropriate in the context of professional investor funds. Existing principles-based requirements for professional investor funds coupled with the observance of basic sound practices identified by the industry have proven to be robust in the face of even the most challenging conditions.

The liquidity of professional investor funds is a complex issue that embraces at least four attributes:

- investor liquidity,
- asset liquidity,
- strategy liquidity, and
- funding liquidity.

Investor liquidity hinges on terms such as the redemption frequency and the redemption notice period, and on whether additional tools such as redemption gates can be used. Asset liquidity encompasses many dimensions (e.g., asset characteristics, market structure), thus making its measurement complex. Strategy liquidity partly depends on the necessary holding period of assets, no matter the liquidity of these assets. Funding liquidity relates to the ability to carry out a strategy whenever financial or synthetic leverage is used to achieve returns.

Existing rules on liquidity and LRM differ markedly between retail funds and professional investor funds. The core assumption behind retail fund regulatory requirements is that investors are entitled to receive their money back promptly (i.e., inflexible investor liquidity), and, as a result, the range of permissible strategies to slow redemptions in times of stress is often smaller than/different to that of professional investor funds. In order to ensure that retail funds can meet these expectations,

certain quantitative restrictions have been adopted for asset and funding liquidity.¹ These types of specific regulatory thresholds have the effect of limiting the types of strategies that can be offered through retail funds. Rules for professional investor funds do not contain hard limits on investor liquidity and permit contractual freedom to manage the speed of redemptions in times of stress through the use of a wide variety of LRM tools (some of which are not often available to retail investor funds (e.g., lock up periods, redemption gates and side pockets)), which can result in a more flexible product design.

The flexibility to choose how to address investor liquidity risks allows strategy considerations to drive product design. Sophisticated strategies have evolved over time to meet professional investor demand. Thanks to the absence of quantitative restrictions on the liquidity offered to investors in professional investor funds, the market for these funds provides a multitude of liquidity schemes and a variety of LRM practices that are dependent on multiple factors and not necessarily focused primarily on asset liquidity.

The freedom to determine sound methods to manage the LRM of the funds they manage permits managers to choose investment strategies that meet the need of professional investors while also strengthening capital markets and the real economy. Many strategies adopted for professional investor funds increase the sophistication and resilience of capital markets. For instance, strategies such as relative value arbitrage contribute to reduce unfounded price distortions in capital markets. Thanks to the high diversity in investor LRM tools, managers of professional investor funds are able to build a broad and diversified investor base, boosting liquidity in capital markets.

Managers of professional investor funds can also support the real economy in a manner which complements the activities of retail funds, notably by developing long-term strategies that offer little liquidity to investors but fund key activities (e.g., construction sector, promising startups).

Imposing quantitative restrictions on the liquidity attributes of professional investor funds, as it is the case for retail funds, would jeopardise the multiple benefits these funds bring to capital markets and the real economy. However, other types of actions may be taken to strengthen the LRM of professional investor funds' managers, firstly by maintaining and reinforcing industry sound practices, and secondly by effectively enforcing existing rules.

Some sound practices for the managers of professional investor funds that our members have identified include:

Managers should take care when designing and establishing professional investor funds to provide for an appropriate range of ex-ante and ex-post LRM tools, building those into the organisational documents of the fund and making appropriate disclosures to investors in the fund's offering documents.

Managers should ensure that appropriate disclosure is made to fund investors about LRM tools that may be employed and the circumstances in which they may be employed, although what is appropriate will vary.

Managers should carry on with robust LRM throughout the life of the fund (design, post-launch and potential fund liquidation) and develop effective documentation on their LRM processes and performance throughout the life of the fund.

Funds' asset liquidity should be well aligned with funds' redemption profile and other liabilities. A variety of tools should be considered to achieve this outcome depending on the investment strategy.

The conduct of frequent and effective liquidity stress testing should help predicting possible liquidity issues, thus enabling managers to take corrective actions. Stress testing should include the potential scenarios of null asset liquidity and stresses on funding liquidity (e.g., sudden and larger than usual spikes in margin costs) and develop contingency plans in case such a scenario materialises.

Managers of professional investor funds should have a proper understanding of funding liquidity constraints and, when feasible and relevant, adopt tools and approaches that mitigate related funding liquidity risks.

Managers should maintain close relationships with counterparties in order to negotiate appropriate margin requirements, collateral, haircuts, repo, etc. The use of technologies such as treasury management analytic tools should assist managers in minimising funding liquidity risks.

The paper has identified several actions that authorities should consider (or in fact refrain from) to help managers strengthen the performance of their LRM:

In the EU and the U.S., there is no need to amend the existing principles-based legislation governing the LRM of professional investor funds. All the necessary liquidity rules already exist and simply need to be continuously and effectively enforced. Prescriptive and quantitative rules are unsuitable for the LRM of professional investor funds.

Professional investors must have access to tailored information on liquidity design and LRM processes, in order to make informed decisions. Homogeneous rules on what aspects of LRM should be disclosed fits poorly with the diversity of investors and strategies of professional investor funds. Therefore, authorities should avoid adopting one-size-fits-all disclosure requirements.

The relevance and coherence of the information required by supervisors should be improved. Streamlining and harmonising the existing reporting requirements with respect to LRM would benefit both the managers of professional investor funds and their supervisors.

Access to a full range of LRM tools should be ensured for all professional investor funds, in order to empower fund managers to curb financial instability and protect more patient investors in critical moments. Professional investors should continue being fully informed of the existence and use of such tools. Where relevant and appropriate, such tools could also be made available for retail funds.

Authorities should share more quality data on liquidity with managers of investment funds. The European Securities and Markets Authority and the U.S. Securities and Exchange Commission already publish aggregate data on liquidity trends, and we encourage the continued progress toward a European consolidated tape and continued development of TRACE in the United States. However, authorities should be able to develop more comprehensive statistics on liquidity dynamics, notably by breaking down unnecessary data silos within and between authorities.

Introduction

Fund management is a complex and highly regulated business. While the portfolio selection and management aspects of fund management often get the most public attention, recently, the risk management aspects of the business have been getting the most regulatory attention. News of high-profile fund liquidity events has increased the intensity of liquidity risk management ('LRM') conversations among various authorities² and within industry, with many authorities considering whether current LRM requirements for fund managers are working properly and whether they need to be enhanced with more specific interventions.

Members of the Alternative Investment Management Association (AIMA)³ have reacted to the interest in LRM process by reflecting on the concerns being raised in the policy debate, how they view LRM for the funds they manage, what the key practices for sound practices LRM are and what types of policy responses might be more or less helpful to enhancing their ability to perform robust LRM with respect to the funds they manage.

This paper examines LRM in relation to "alternative investment funds" (or 'AIFs')⁴ and "private funds"⁵ (collectively referred to in this paper as 'professional investor funds')⁶ as these are the predominant types of funds managed by AIMA members. The paper also explores how the requirements for LRM differ as between professional investor funds and retail-focused funds such as Undertakings for Collective Investments in Transferable Securities ('UCITS') and investment companies registered under the Investment Company Act (referred to collectively in this paper as 'retail funds').

1



Section 1

of the paper analyses the current policy debate on the LRM of investment funds, identifying the key concerns being postulated and recommendations made by key authorities.

2



Section 2

of the paper discusses the different liquidity attributes of professional investor funds (as well as those of retail funds) in an effort to better understand the various shapes of liquidity risk and how it can manifest itself. This approach helps define potential issues and the nature of the actions that could be taken to further address these risks for professional investor funds. Section 2 then compares the legislation of retail funds and professional investor funds in the EU and the U.S., and shows why the regulatory approach for retail funds does not fit professional investor funds.

3



Section 3

of the paper emphasises the sound practices identified by the industry that should be continuously followed by managers of professional investor funds to ensure robust LRM.

4



Section 4

of the paper provides some recommendations to enhance managers' ability to conduct robust LRM processes with respect to the professional investor funds they manage by focusing on the enforcement of existing rules and some other forms of support from authorities.

■
Policy debate on
the management
of fund liquidity risk



1.1 Main risks identified

While there are many counterarguments that can and have been made, the following stress factors have been identified by global authorities as liquidity risks in the fund management industry that may impact liquidity:

- Central banks have continued to ease their monetary policies in recent years, through cuts in policy rates and/or purchase programmes targeting specific financial assets, which has contributed to reduce the yield spreads of many financial assets, notably corporate bonds;⁷
- Changes to central bank limits on the capacity of banks to intermediate in various markets, such as the U.S. Treasury markets, during times of surging market volatility may restrict liquidity for certain assets in times of stress which can affect the liquidity of a fund's assets, especially assets that normally rely on banks acting as market makers, and increase the costs of funding and the ability to obtain and maintain it in times of stressed market conditions;⁸
- When the cost of funding increases or the ability to obtain and maintain funding (through margin or otherwise) is constrained, funds that rely on that funding can find themselves having to liquidate assets to close out open positions or to raise liquid assets for purposes of meeting margin calls, which can increase the stress on markets that may already be volatile and may have downstream impacts on other types of funds and market participants;⁹
- Vulnerabilities in the bank and non-bank sectors may lead to contagion across the entire financial system due to a high degree of interconnectedness;¹⁰
- When funds offer daily redemptions while investing in illiquid assets, some investors may be incentivised to try to redeem ahead of others, particularly in stressed conditions;¹¹

- The low interest rates environment has resulted in a rising search for yield and a growing preference for less liquid assets.¹² Reacting to these changing preferences, many fund managers have increased their funds' exposure to illiquid assets, including in funds that are open-ended with very high frequency in their redemptions and/or significant short-term financing obligations in connection with financial or synthetic leverage;¹³ and
- In particular, "fixed-income investment funds have reacted to declines in interest rates by shifting the composition of their portfolios toward riskier and less liquid investments."¹⁴ This may make them more vulnerable to liquidity shocks in stressed market conditions.¹⁵ "Any future redemptions pressures from open-ended funds with short redemption periods could result in fund managers selling less-liquid assets quickly", which can lead to a deterioration of liquidity conditions in the corporate debt markets.¹⁶ The difficulty of some investment funds to cope with rising outflows could trigger fire sales, which could adversely affect other financial market participants that own the same or closely correlated assets.¹⁷

Covid-19 has been a major catalyst in shaking-up traditional LRM practices and has put greater emphasis on reviewing and reinforcing existing models in light of the types of LRM risks discussed above. In July 2020, AIMA hosted a series of roundtable discussions with its manager members to discuss the effects of Covid-19 on a range of different asset classes and the trends that members observed in LRM during the first half of 2020. Over the course of these discussions several core LRM-related lessons emerged which are discussed below, together with the results of a survey AIMA conducted to help illuminate the Covid-19 LRM experience of its members. The result of these discussions is included in Box 1.

As the global Covid-19 pandemic continues, it is possible that "further declines in the market value of assets or a sharp increase in market volatility could prompt renewed outflows from funds"¹⁸ having knock on effects for other market participants and markets themselves. Although these theoretical risks exist, they do not inevitably materialise in periods of market stress.¹⁹ A case in point is the investor redemption experience of professional investor funds with respect to the early months of the Covid-19 pandemic as explored further in the Annex.



Box 1: Case Study

Covid-19 and LRM

The first half of 2020 saw tremendous volatility across many asset classes. This affected the liquidity risk for funds in different ways, but one key differentiator was the types of assets that funds were holding. When compared to Q4 of 2019, almost a third (31%) of AIMA's survey respondents experienced a large decline in market liquidity in the assets they traded while more than a third (38%) only observed a slight decline. The key drivers behind this volatility identified by the survey respondents were the shift to working from home for most, if not all market participants, the high demand of corporates for short-term funding, and the overall large declines in global equity markets.

Towards the end of March 2020, stress levels in almost all markets and strategies were increasingly fragile. Given the high volatility observed throughout March, there were expectations of very significant net outflows for Q1 and Q2 in hedge funds' markets, although this appeared not to have crystallised in the end, with redemption levels for most funds remaining at or near normal levels (see Box 2).

There were multiple reasons for the restrained outflows offered but it was clear that investment fund managers seemed to have a better overall risk management framework in this crisis when compared to the global financial crisis of 2007-08, including around LRM, with fewer liquidity mismatches in less liquid strategies. The speed and scale of government intervention was unprecedented and contributed to maintaining investor confidence who have, since the global financial crisis, become more

long-term oriented and less susceptible to panic and liquidation of positions. The sudden but seamless shift to remote working played a contributing factor to the industry's operational stability.

Performance of the hedge fund sector was relatively good in the first half of 2020, leading to fewer than expected investor withdrawals during the second quarter of 2020. While half of the survey respondents observed a slight improvement in market liquidity in the assets they traded, almost one-fifth (19%) noted a slight decline. Most asset classes experienced higher overall volumes of trading accompanied by increased transaction costs such as widening bid-ask spreads. Because of this, simultaneous occurrence of higher overall volumes, high price volatility and widening of the bid-ask spreads, managers and investors did not experience the level of liquidity that they would generally expect at the prevailing volume levels. Transaction sizes became smaller in many markets and the ability to execute without large impact decreased significantly. This phenomenon has important implications for quantitative models that heavily rely on average daily volumes as indicators of 'good' liquidity conditions.

Even the most liquid markets such as U.S. Treasury markets experienced severe liquidity issues where traditional intermediaries such as banks are unable to use their own balance sheets to make markets. The reasons for this are multiple but the impact of banking and other regulatory reforms on the ability of traditional intermediaries like banks to make markets in stress situations is likely among the main causes. The leverage ratio restriction is one example of a regulatory constraint that has limited the capacity of intermediaries to provide balance sheet as a 'marketplace',

even for the supposedly safest asset classes. When the U.S. Federal Reserve acted to lift the leverage ratio restriction, albeit on a temporary basis, near the end of March, intermediaries were immediately able to return to providing markets for instruments through trading off the intermediary's own balance sheet which had the effect of easing the liquidity strain in the markets and calming the volatility, although it is worth noting that more than half (53%) of the survey respondents indicated they did not see any large stresses in the funding of their positions, with only 23% having observed stresses in the repo market.

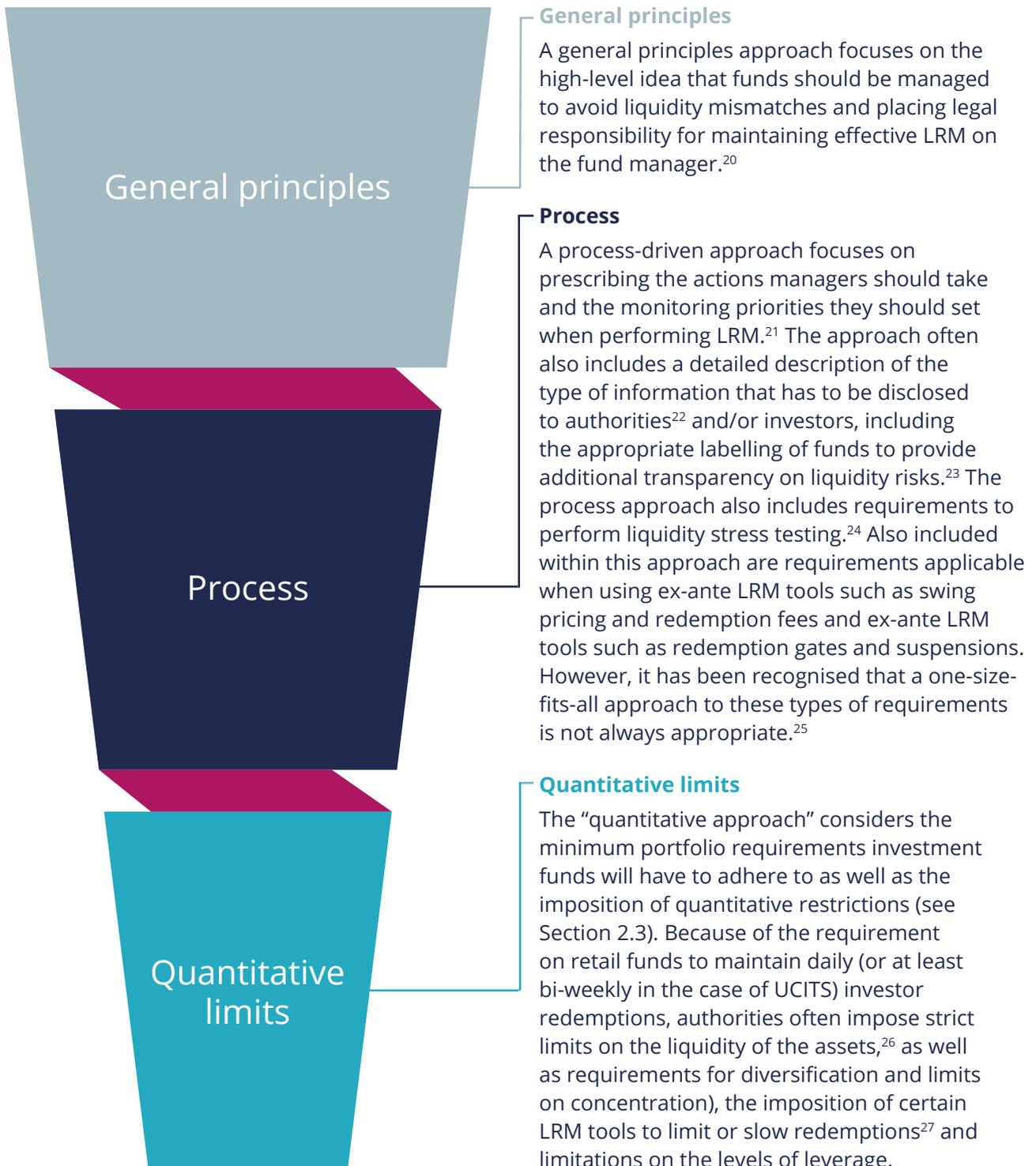
Broker-dealers in the exchange-traded and OTC markets facing regulatory capital constraints exacerbated by the volatility crisis were compelled in March and April to increase the levels of initial margin charged on derivatives transactions, causing many managers to experience several rounds of capital calls for existing transactions. This in turn caused managers to seek liquidity in markets like the U.S. Treasury markets – a procyclical result. Initial margin increases were anticipated given the volatility in the markets and the way margin requirements work. Of the survey respondents, almost one-third (31%) reported an increase in initial margin of between 0-50% while others (31%) noted no increase in initial margin requirements. Some level of “padding” is

understandable on the side of broker-dealers who were trying to protect themselves. The varying levels of “padding” among broker-dealers introduces an often non-modellable and potentially pro-cyclical element into initial margin increases, making it more difficult for managers to estimate the potential extent of margin increases they may face in the future. Survey respondents, however, found that the increases in initial margin were, to a great (22%) or moderate (25%) extent based on observable and modellable criteria.

Markets, hedge fund managers and regulators have improved the tools at their disposal since the global financial crisis, from improved technology to sophisticated liquidity monitoring and management infrastructure. However, there is still economic downside risk through credit downgrades, defaults and declining market values which could increase redemption pressure on the investment fund sector in the future in one or more asset classes. Accurate monitoring of the true liquidity of the fund assets remains essential in order for fund managers to ensure an appropriate and effective response to the ebbs and flows of investor activity in times of extreme uncertainty.

1.2 Potential policy approaches to solve the identified issues

Some jurisdictions have already put in place regulations, requirements and approaches designed with the goal of reducing possible liquidity mismatch of certain investment funds. In general, authorities have adopted approaches that include a combination of approaches:



A combination of these distinct approaches, which will necessarily vary between retail funds and professional investor funds as the approaches become more prescriptive, allows authorities to adopt a holistic and pragmatic view when putting in place applicable rules and guidance, taking into account the specifics of the relevant markets, recent trends as well as investment-specific considerations. In many instances, authorities may introduce high-level principles, followed by the adoption of prescriptive rules, outlining specific requirements that funds will need to meet. Finally, where appropriate based on the structure and terms of the fund and the nature of the investors, quantitative limits can be introduced which include restrictions on liquidity attributes (see Section 2.3).

2

Liquidity and professional investor funds: a problem with many solutions



2.1 Liquidity attributes of professional investor funds

The liquidity of professional investor funds encompasses at least four attributes: (i) investor liquidity, (ii) asset liquidity, (iii) strategy liquidity, and (iv) funding liquidity.

Investor liquidity

Investor liquidity covers the pre-defined conditions under which investors may redeem some or all of their shares and receive back the then current net asset value ('NAV') of those shares. A fund's normal redemption frequency is set when the fund is established. For open-end funds, typical redemption frequencies include daily, weekly, monthly, quarterly, semi-annual and annual redemptions.

A lock up period and a redemption notice period can also be added (see Table 1). For closed-end funds, shares are only redeemed by the fund and not at the request of investors.

In the design phase of a fund, additional tools designed to slow down redemptions or restrict investor access to their invested capital can be included in the fund's organisational documents (see Table 1). Some of these features are shaped to function in normal circumstances, while others are meant to be used in stressed liquidity or other exceptional circumstances. The degree of investor liquidity is proportionate to these pre-defined conditions.

Table 1. Liquidity tools used by managers of professional investor funds

Feature	Description
Usual liquidity tools	
Lock up period	An initial period during which the investor is not allowed to redeem shares
Redemption frequency	Once the lockup period expiration passes, investors can redeem at certain points in time
Redemption notice period	Investors are required to give advance notice before any redemption
Additional liquidity tools	
<i>Protecting fund capital</i>	
Redemption gates	Partial restrictions to investors' ability to redeem their capital, generally on a pro-rata basis (restrictions on the amount that can be withdrawn as a proportion of the investor's capital in the fund, on the fund's total NAV or on the funds held under a particular class of shares)
Side pockets	Arrangements that segregate illiquid or hard-to-value positions from the main pool of assets in a fund until such time as they are realised or are no longer difficult to price
Suspension of redemption	Temporary measure that aims at preventing investors in the fund from withdrawing their capital

Feature	Description
<i>Protecting remaining investors by passing transaction costs on to redeeming investors</i>	
Swing pricing	Process for adjusting a fund's NAV to effectively pass on transaction costs stemming from net capital activity (i.e., flows into or out of the fund) to the investors associated with that activity during the life of a fund, excluding ramp-up period or termination
Anti-dilution levy	Charge paid by investors on the fund's NAV price to protect the value interest of remaining fund investors from any dilution through large transactions
<i>Preventing short-term trading</i>	
Redemption fees	Fee charged to an investor when shares are sold within a pre-defined period after the launch of the fund
<i>Other lines of action</i>	
In-kind redemptions	Tool that allows the fund to offer redeeming investors a payment other than cash, often securities on a pro-rata basis

Source: AIMA and IOSCO²⁸

Managers of professional investor funds generally have broad access to the types of tools described in Table 1, although some restrictions persist in some domestic jurisdictions (see Table 6 in Section 4.4 for more information in this regard).

Of the four liquidity attributes, investor liquidity is likely the easiest to quantify. The longer the lockup period, the lower the redemption frequency and the longer the redemption notice period, for example, the lower the investor liquidity. The presence of additional liquidity tools in the clauses of the contract can also reduce investor liquidity.

Asset liquidity

Asset liquidity refers to how easily and quickly assets can be converted into cash. As this liquidity attribute embraces multiple dimensions, it remains challenging to quantify asset liquidity. The Bank for International Settlements (BIS),

Basel Committee on Banking Supervision (BCBS) developed a helpful system in 2014 (see Table 2). This matrix provides the different characteristics of asset liquidity, as well as possible criteria behind each characteristic and possible metrics to measure the related degree of liquidity.

Table 2. Characteristics, criteria and metrics of asset liquidity

	Characteristics	Criteria	Examples of metrics/measures
Asset characteristics	Asset quality	Probability of default	Ratings
			Spreads
			Price drops during distress
		Flight to quality (performance during distress)	Performance relative to risk-free asset
			Correlation with financial stress
			Volatility
	Duration/time to maturity		
	Transparency and standardisation	Collateral eligibility	Eligible/haircuts at FMIs*
			Across private counterparties
		Standardisation	Small number of standardised product types
Standardised risk modeling			
Well understood risk properties			
Price transparency		Pre-trade pricing broadly available	
	Post-trade pricing broadly available		
Market structure characteristics	Trading venues	Electronic (including hybrids)	
		Exchange-traded	
	Size	Volumes (number of trades and dollar value)	
		Outstandings	
		Related financing markets	Repo financing available
			Other secured/forward financing
	Market participation	Related hedging markets	
		Breadth of investors (low concentration)	
Market liquidity	Liquidity	Depth/price impact of trading	Amihud ratio (price changes relative to volume)
			Autocorrelations of returns
		Breadth	Effective bid-ask spreads (ex post)
	Quoted bid-ask spreads (ex ante)		
	Immediacy	Average number of trades per day	
		Number of days with zero return/volume	

*: Financial Market Infrastructures – FMIs could include payment systems, central securities depositories, securities settlement systems, trade repositories and central counterparties.

Strategy liquidity

A particular investment strategy may be confined to highly liquid financial instruments and assets yet exhibit much less overall liquidity than is implied by its assets to the extent that it requires either longer holding periods or additional catalysts to come to fruition. For example, many arbitrage strategies will require the holding of the respective positions until price convergence. The convergence period may be driven by the instrument characteristics (e.g., expiry of a futures contract) or by a different external catalyst (e.g., approval of a merger). Either way, the manager and investors cannot simply look at the liquidity of the assets used in the strategy in isolation.

Similarly, strategies opting for highly concentrated positions tend to be less liquid than the average liquidity of the traded securities.³⁰ Shareholder activism can also disentangle the strategy liquidity from the asset liquidity.³¹ For instance, while activist hedge funds typically hold liquid assets that are publicly traded, the average time for a complete investment cycle and the realisation of returns can be relatively long.

Funding liquidity

Funding liquidity relates to the availability and terms of credit to finance the purchase of financial assets or the ease with which one can support synthetic positions through margining. As is the case for asset liquidity, funding liquidity encompasses many dimensions. Among the main factors affecting funding liquidity are: (i) asset/collateral type; (ii) asset/collateral liquidity; (iii) funding terms; (iii) funding costs; and (iv) the number and type of funding liquidity providers.

Managers of professional investor funds often borrow money to buy assets in excess of their initial investment equity. They obtain funding and use the purchased assets as collateral ('margin lending'). Similarly, professional investor funds can enter into 'repo' transactions whereby they obtain financing through repurchase agreements which, though taking a different legal form than collateralised lending, have the same economic effect. Using derivatives, whether OTC or exchange traded, will require funds to manage initial margin and variation margin in such a way as to be able to maintain their desired exposure. Whether engaging in borrowing, repo or derivatives transactions, funds need to have adequate liquidity to be able to meet their obligations arising from adverse market changes.

Whether these changes manifest themselves in increases of initial margin requirements, higher haircuts for repo transactions or variation margin calls, funds need to ensure that adequate amounts of unencumbered cash or financial instruments are available in order to avoid forced unwinding of their positions. Sudden market financial stress that reduces both the value and the liquidity of the fund's assets could reduce funding liquidity.

The ability to meet margin calls will also depend on future levels of volatility and the ongoing resilience of funds' liquidity management.³²

The terms of the margin lending or repo arrangements, as agreed between the fund and the counterparty, can significantly impact the funding liquidity of the fund. For example, shorter lending term periods heighten rollover risk (the inability to continue financing an existing position). The absence of a pre-notice period before changes in margin requirements become effective can also raise the funding liquidity risks faced by leveraged funds.³³

Finally, counterparty risks are generally unrelated to the funds' performance or behaviour. They can materialise when the counterparty, often a prime broker or repo counterparty, decides to change its internal strategy or has to face a sudden change in liquidity conditions within markets. In both cases, the counterparty might stop financing or dramatically change the terms of future financing which may lead to significant changes to the fund strategy. Fund managers could be forced to liquidate fund positions, often at a high cost (in particular for illiquid positions). High counterparty risks therefore tend to reduce funding liquidity and can be alleviated by the adoption of certain risk mitigation approaches (see Section 3.2).

2.2 Professional investor funds' overall liquidity risk

The quantum of a professional investor fund's overall liquidity risk will be a function of how the fund balances redemption frequency, the types of redemption restrictions that may be

imposed, the liquidity of the assets held and the requirements for maintaining funding liquidity. Funds with different answers on each of these factors can have the same overall liquidity risk as explained in Box 2.



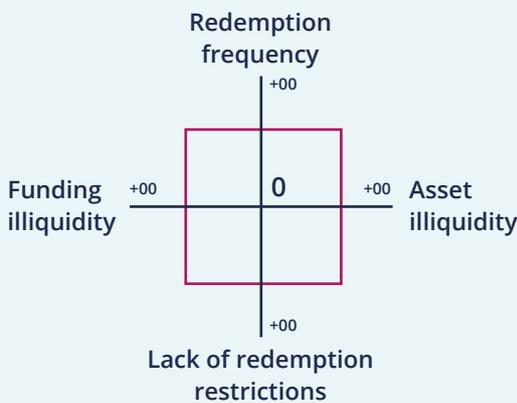
Box 2: Quantification of investment funds' overall liquidity risk

In the series of illustrations below, the overall liquidity risk faced by a fund is quantified by the area of a specific "liquidity rectangle", and depends on four "liquidity factors":¹

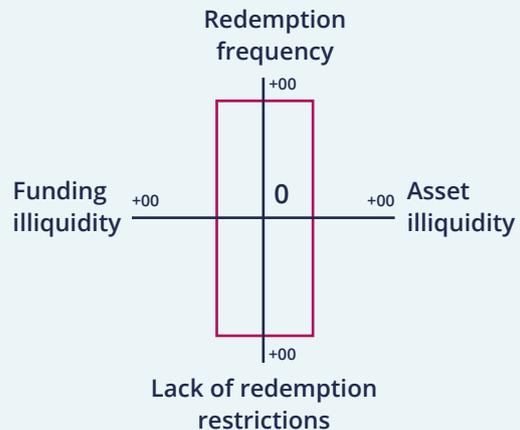
- (i) fund managers' choices regarding the liquidity of funding;
- (ii) fund managers' choices regarding the liquidity of assets;
- (iii) the chosen redemption frequency; and
- (iv) the available ex-post redemption restrictions such as gates or redemption suspensions.²

Increases in asset illiquidity, funding illiquidity, redemption frequency and/or the lack of redemption restrictions boost the overall liquidity risk of the fund. The growing liquidity risk is mirrored by an increasing area of the liquidity rectangle and therefore a larger 'risk' area. Should a manager wish to maintain identical liquidity risk over time, any change in one of the four liquidity factors would require a change in at least one of the three other liquidity factors, in order to keep the 'risk' area constant. For example, an increase in redemption frequency would automatically raise funding liquidity risk if no adjustments are adopted for the other factors.

Neutral model



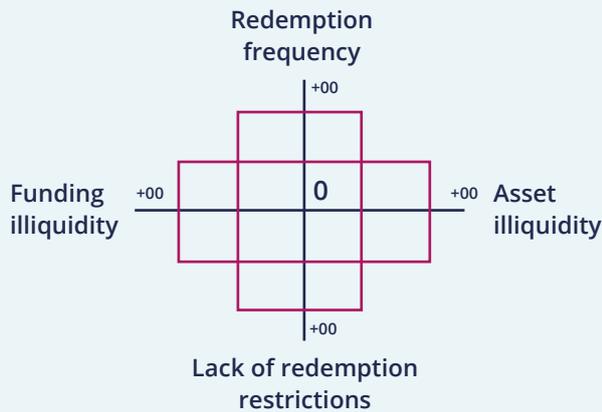
Retail model



1 For the sake of simplicity, strategy liquidity has not been included in these analyses.

2 The first illustration includes the "lack" of redemption restrictions in order to be aligned with liquidity frequency. The effect of a higher lack of redemption restrictions can be similar to the effect of an increase in liquidity frequency. The measurement of the lack of redemption restrictions can for example be approached by a quotient that includes the number of redemption restrictions in the denominator.

Hedge fund models

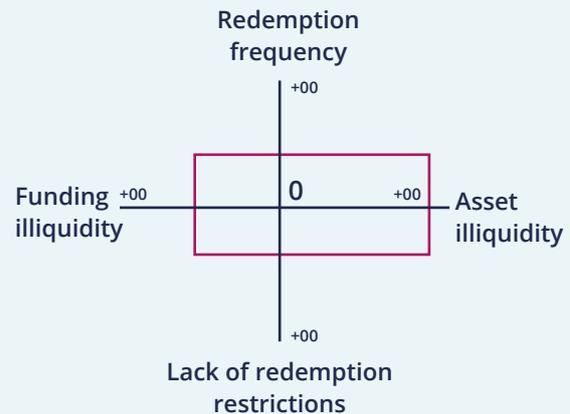


Different approaches towards LRM can be adopted. The “neutral” model (see the first illustration in Figure 4) considers that liquidity risk is equally distributed across the four factors, no matter the area of the liquidity rectangle. Any change in one of the four factors should result in the adjustment of one or more of the other factors if there were to be no increase in liquidity risk as compared to the neutral model. In that context, a raise in redemption frequency for a fund, would imply the need to adjust asset liquidity (increase), funding liquidity (increase) and/or require the ability to impose more ex-post redemption restrictions.

As long as the fund manager is capable of appropriately defining the overall liquidity risk tolerance (the size of the rectangle), the fund manager should be able to design the fund and the strategy in more than one manner to ensure the resulting liquidity risks are well managed.

Hedge funds’ LRM can vary from a model with high liquidity in assets and funding, to a model combining low liquidity in both these factors (see the third chart in Figure 4). Both models can keep an overall liquidity risk that is broadly equivalent to the neutral model provided that redemption frequency and redemption restrictions are appropriately selected. For example, the model with illiquid assets and funding should exhibit lower redemption frequency and/or more redemption restrictions. Depending on the fund, a different trade-off can be made between redemption frequency and redemption restrictions.

Private equity model



For example, a hedge fund could adopt high redemption frequency but with a significant amount of redemption restrictions while still having the same ‘risk’ area as the neutral model. The liquidity shape would then be shifted further to the top of the vertical axis in the illustrations but the overall ‘risk’ area would remain the same.

By way of comparison, open-ended private equity funds typically purchase highly illiquid assets with limited leverage.³⁴ In order to keep a liquidity risk that is identical to the optimal model, private equity funds would need to adopt low redemption frequency and a significant amount of redemption restrictions. LRM for these funds would then be represented by a horizontal rectangle representing its ‘risk’ area. For closed-end private equity or debt funds, asset illiquidity would become less of an issue given the inability of investors to redeem their shares before the fund manager is capable of liquidating the fund assets. The shape of the LRM ‘risk’ area would then almost blend in with the horizontal axis.

To conclude, for an equivalent overall liquidity risk, investment funds can adopt very diverse distributions of this risk across the liquidity factors: redemption frequency, redemption restrictions, asset liquidity and funding liquidity. This means that managers of professional investor funds can adopt multiple approaches towards LRM which is fully compatible with both investor protection/preference and financial stability needs of the system.

2.3 Current quantitative restrictions for retail funds

Two main legal approaches have been embraced to oversee the liquidity attributes of investment funds: one for retail funds,³⁵ the other one for professional investor funds. Rules are applicable to the fund itself in the case of retail funds but apply to the fund's manager in the case of professional investor funds. Rules for retail

funds are, in essence, product-based regulation and include strict liquidity standards for that purpose. Rules for professional investor funds aim at ensuring an appropriate behaviour of the manager who manages the liquidity risk profile of the fund. A high-level comparison of the liquidity requirements is included in the Table 3 below.

Table 3. Restrictions on liquidity attributes: comparison between UCITS, open-end registered investment companies,³⁶ AIFs and private funds

	UCITS (EU)	Open-End Registered Investment Companies (U.S.)	AIFs (EU)	Private funds (U.S.)
Investor liquidity				
Liquidity to investors	Minimum once every two weeks	Daily	No limit	No limit
Gate to investors	Yes, but limited	Not permitted	Permitted	Permitted

	UCITS (EU)	Open-End Registered Investment Companies (U.S.)	AIFs (EU)	Private funds (U.S.)
Funding liquidity				
Fund level borrowing	10% max for temporary borrowing	Can only borrow from a bank and limited to 300% asset coverage ³⁷	No limit	No limit
Measures of leverage (gross market exposure)	<p>Achieved through the use of derivatives. Two approaches are used to calculate leverage:</p> <p>(i) commitment approach where derivatives cannot exceed 100% NAV;</p> <p>(ii) VaR approach. Capped at 20% NAV monthly at 99% confidence level. The VaR approach can be further subdivided into an absolute and a relative VaR approach. The absolute VaR limit depends on the risk profile of a fund but the maximum absolute VaR limit is 20% over a 20-day holding period based on a confidence interval of 99%. The relative VaR limit is twice the VaR of a derivative free benchmark.</p>	<p>Use rules that came into effect 19 February 2021 and must be complied with by 19 August 2022. A relative VaR test is the default where VaR of the fund's portfolio cannot exceed 200% (or 250% for closed-ended funds with an outstanding class of senior securities that is a stock) of the VaR of a designated reference index. If the derivatives risk manager is unable to identify a designated reference index that is appropriate for the fund taking into account the fund's investments, investment objectives and strategy, the fund must instead comply with an absolute VaR test (VaR of the fund's portfolio cannot exceed 20% (25% for the types of closed-end funds qualifying for the 250% limit) of the value of the fund's net asset value). These VaR models are required to use a 99% confidence level and a time horizon of 20 trading days.</p>	<p>Two approaches are used to calculate leverage: (i) gross method and (ii) commitment method. None of the two is capped. The AIFM shall demonstrate that the leverage limits fixed ex-ante are reasonable and respected ex-post.³⁸</p>	No rule ³⁹

	UCITS (EU)	Open-End Registered Investment Companies (U.S.)	AIFs (EU)	Private funds (U.S.)
Asset liquidity				
Illiquid investments	10% unlisted securities (not unregulated funds)	Up to 15% (illiquid if it takes longer than 7 days to liquidate in the normal course)	No limit	No limit
Maximum position size in one issuer	10% (increased to 25% for bonds issued by EU/EEA credit institutions subject by law to special public supervision designed to protect bond holders and up to 100% for sovereign issuers provided six or more issuers and no more than 30% in one issue)	Generally, 25% if diversified	No limit	No limit
Positions over 5% of NAV (aggregate size)	40% max (for bonds issued by EEA credit institutions 80% max)	25% max if the fund is "diversified" (otherwise 50% max under U.S. Internal Revenue Service's Subchapter M diversification rule) but concentration limits may also apply	No limit	No limit

In contrast to professional investor funds, current liquidity rules for retail funds include tight quantitative restrictions. The key criterion concerns investor liquidity – i.e., the ability of investors to sell back or redeem their fund shares for cash. This is limited to minimum once every two weeks for UCITS⁴⁰ and daily for open-end registered investment companies (commonly referred to as ‘mutual funds’).⁴¹ In addition, the access of retail funds to additional liquidity tools (see Table 1) is usually more restricted than for professional investor funds. For example, in the U.S. (see Table 3) or UK,⁴² redemption gates are allowed only for non-retail funds. Based on these primary constraints, many other quantitative restrictions on asset liquidity, strategy liquidity and funding liquidity have been adopted, in order to ensure that funds meet the required investor liquidity conditions.

As regards asset liquidity, investment in unlisted securities cannot be above 10% of fund’s NAV under the UCITS regime. Similarly, U.S. mutual funds can invest no more than 15% of their net assets (10% for money market mutual funds) in illiquid securities (defined as securities that cannot be sold within seven days at approximately the price at which they are carried by the mutual fund).

Furthermore, both the UCITS Directive and the Investment Company Act include strict limits for the diversification and concentration of assets. In UCITS, as shown in Table 3, the 5/10/40 rule requires that:

- The UCITS cannot invest more than 10% of its NAV in securities issued by a single corporate issuer; and
- The sum of all exposures in such issuers in which the UCITS invests greater than 5% should not exceed 40% of the UCITS’ NAV.

This rule, and other restrictions on specific types of UCITS, aim at limiting excessive exposure to any single issuer’s risk, maintaining high liquidity in the fund and restricting the universe of possible investments.⁴³ In the U.S., registered investment companies must opt for a strict “diversified” or “non-diversified” form.⁴⁴ Registered investment companies are also required to state in their prospectus any objective to concentrate more than 25% of their net assets into a specific industry or group of industries.

While there is no quantitative restriction on strategy liquidity per se, strict ceilings imposed on other liquidity attributes limit the possibilities in terms of strategy liquidity. For example, the obligation of providing daily liquidity to investors limits the ability of mutual funds to adopt illiquid strategies that are often profitable only after a relatively long holding period.⁴⁵

Quantitative restrictions apply to funding liquidity. Under the UCITS Directive, both the commitment approach and the value at risk ('VaR') approach can be used to limit the exposure of the fund.⁴⁶ The commitment approach is suitable for UCITS that do not trade derivatives extensively (derivatives cannot exceed 100% NAV) or use complex derivatives. This approach is based on the market value of the asset underlying the derivative and sums up the aggregate absolute value of the underlying exposures' notional values. For a UCITS using the commitment approach, derivatives are converted into their equivalent position in underlying assets. The exposure is then calculated following netting. The VaR approach estimates the maximum potential loss at a given confidence level over a specific time period in normal market conditions. The VaR approach can be further subdivided into (i) an absolute and (ii) a relative VaR approach. The maximum absolute VaR limit is set at 20% over a 20-day holding period and based on a 99% confidence interval. The relative VaR limit is twice the VaR of a derivative free benchmark. A UCITS must report on a regular basis to its home Member State regulator detailing its exposure to financial derivatives, related risks and limits and the methods used to estimate those risks (the frequency of reporting differs by jurisdiction). A UCITS using the VaR method must provide additional information in its prospectus on the expected level of leverage and the possibility of a higher level of leverage. Alternative UCITS often use the more sophisticated VaR-based approach as a result of the types of investments being made.

To calculate leverage, ESMA requires UCITS to use another simpler calculation method, the so-called "sum of notionals" method. The sum of notionals method adds together all notional amounts of any derivative positions without using any netting or hedging (often resulting in arguably misleadingly high numbers).

This method has the benefit of providing a common comparative standard among various funds, though its applicability across different strategies may vary significantly.

In the U.S., bank borrowing of mutual funds cannot exceed one third of the funds' assets. The SEC also limits the usage of leverage by banning the issuance of 'senior securities', as defined in Section 18 of the Investment Company Act. Senior securities are those that notably constrain the fund to make a payment in the future or supply securities. The SEC has identified a list of transactions that have the ability to create senior securities: repurchase agreements, written options, futures and options on futures, forward contracts on currencies or securities, firm commitment agreements, standby agreements, short sales, entering into writing call options on futures, writing call options or entering into swaps. To comply with U.S. rules, funds must cover the obligation created by a senior securities transaction with liquid securities and/or cash in the fund's portfolio.⁴⁷

The SEC recently significantly changed the existing legal framework for the use of derivatives by open-end registered investment companies.⁴⁸ The SEC has acknowledged that the current instrument-by-instrument approach based on industry practices and staff guidance has often resulted in a lack of consistency in the way funds treat similar types of derivatives. Therefore, the primary objective of the new approach is to impose a consistent set of rules.

Among the key changes, funds have to nominate a derivatives risk manager and build comprehensive risk management frameworks for derivatives. Funds are required to comply daily with a relative VaR test (VaR of the fund's portfolio cannot exceed 200% (or 250% for closed-ended funds with an outstanding class

of senior securities that is a stock) of the VaR of a designated reference index). If the derivatives risk manager is unable to identify a designated reference index that is appropriate for the fund taking into account the fund's investments, investment objectives and strategy, the fund must instead comply with an absolute VaR test (VaR of the fund's portfolio cannot exceed 20% (25% for the types of closed-end funds qualifying for the 250% limit) of the value of the fund's net asset value). These VaR models are required to use a 99% confidence level and a time horizon of 20 trading days. Specific reporting requirements have also been imposed for the funds to show compliance with the new leverage limits. Finally, "limited derivatives users" – available to a fund that limits its derivatives exposure to 10% of its net assets - are exempt from setting a derivatives risk management programme, the VaR-based limit on fund leverage risk and the related board oversight and reporting requirements.

To conclude, the main priority of the rules for the LRM of retail funds is that a high degree of investor liquidity can be provided anytime. The liquidity structure of retail funds is built under this constraint, which justifies the multitude of quantitative restrictions on the types and concentrations of assets the funds can invest in, and the amount and measurement of leverage used by the funds. Collectively, these LRM-related requirements can have the effect of limiting the types of strategies that can be offered through a UCITS or a mutual fund.

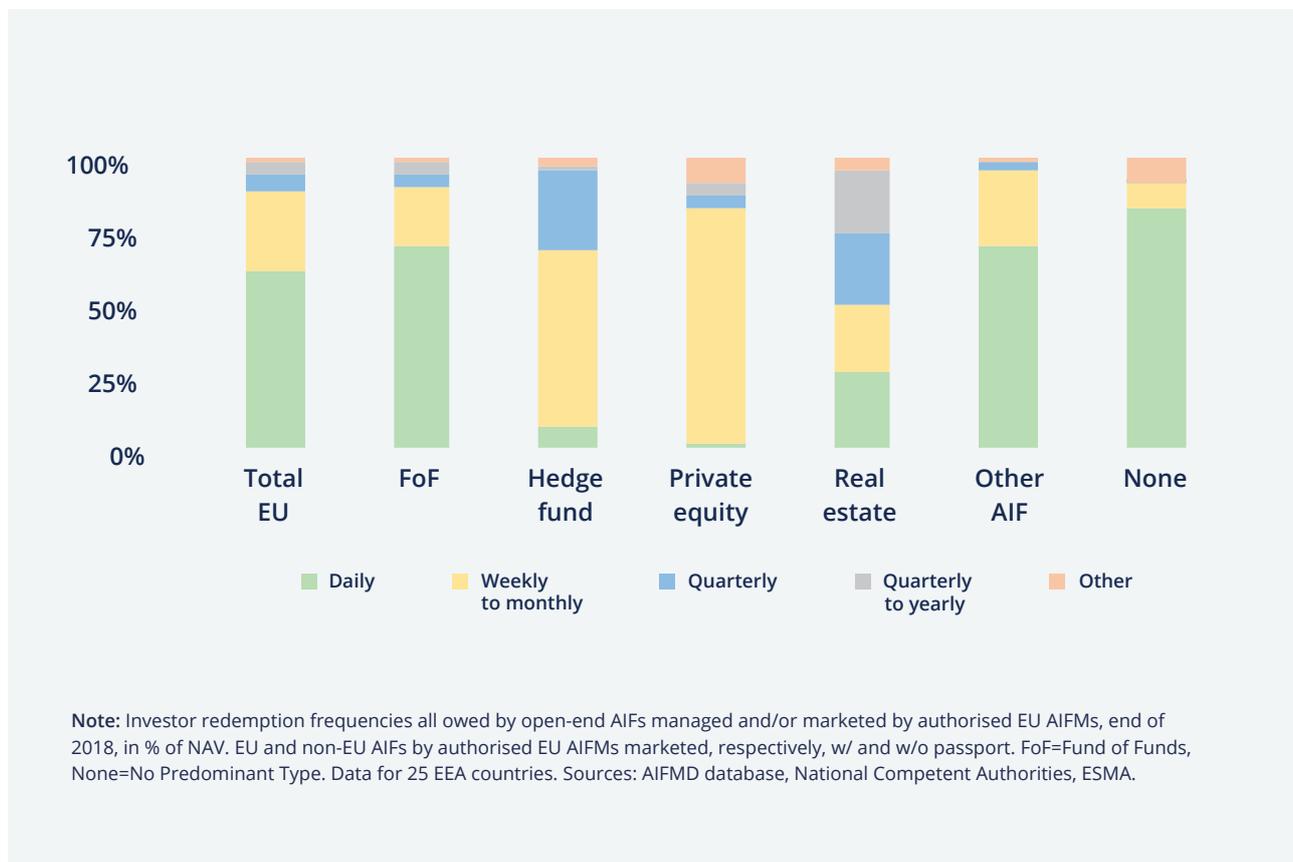
2.4 Quantitative restrictions are not suitable for the LRM of professional investor funds

Liquidity risk and its management in professional investor funds can be perceived as a problem with many solutions. For any given investor or fund liquidity level, the underlying liquidity⁴⁹ results from a series of trade-offs that can be designed in multiple ways. For each liquidity attribute, managers of professional investor funds can adopt different approaches, provided that investors' redemptions are met throughout the life cycle of the fund. The relaxation of the core assumption behind the retail style products

that investors are entitled to receive their money back promptly (see Table 3) opens up a large universe of fund/strategy design possibilities.

Investor liquidity varies markedly across professional investor funds, thanks to the absence of quantitative restrictions. For example, more than 70% of the U.S. hedge funds' NAV recorded an investor liquidity above one quarter. Redemption frequency also differs markedly across strategies, as revealed by Figures 2 and 3, and Table 5. Overall, the variety of investor liquidity mirrors a vast diversity in investment strategies and lines of action towards LRM.

Figure 1. Redemption frequency for AIFs in the EU



Source: ESMA⁵⁰

Table 4. Investor liquidity for certain types of private funds in the U.S.

(% of aggregate NAV, as reported on Form PF)

Liquidation period	Qualifying hedge funds (Questions 9 and 50)		
	Q3 2017	Q2 2018	Q2 2019
At most 1 day	8.3	9.0	8.1
At most 7 days	14.6	15.2	14.0
At most 30 days	27.5	27.8	27.3
At most 90 days	48.2	47.5	46.4
At most 180 days	61.6	58.8	57.4
At most 365 days	73.6	73.5	70.2

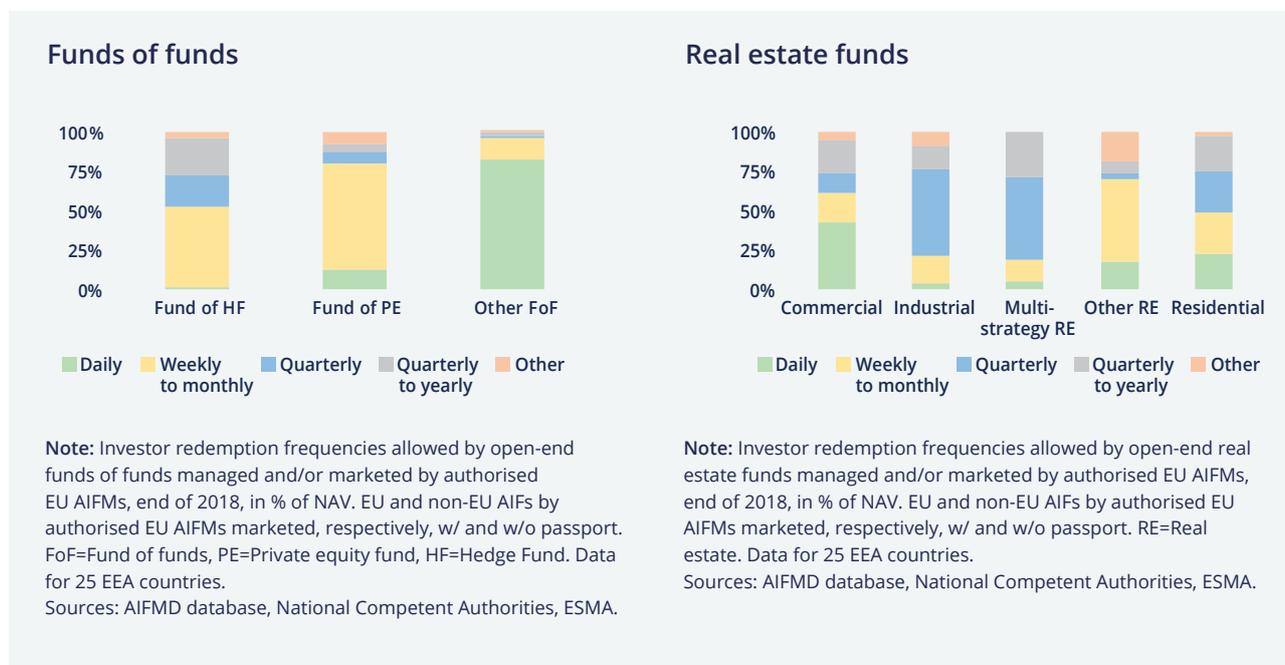
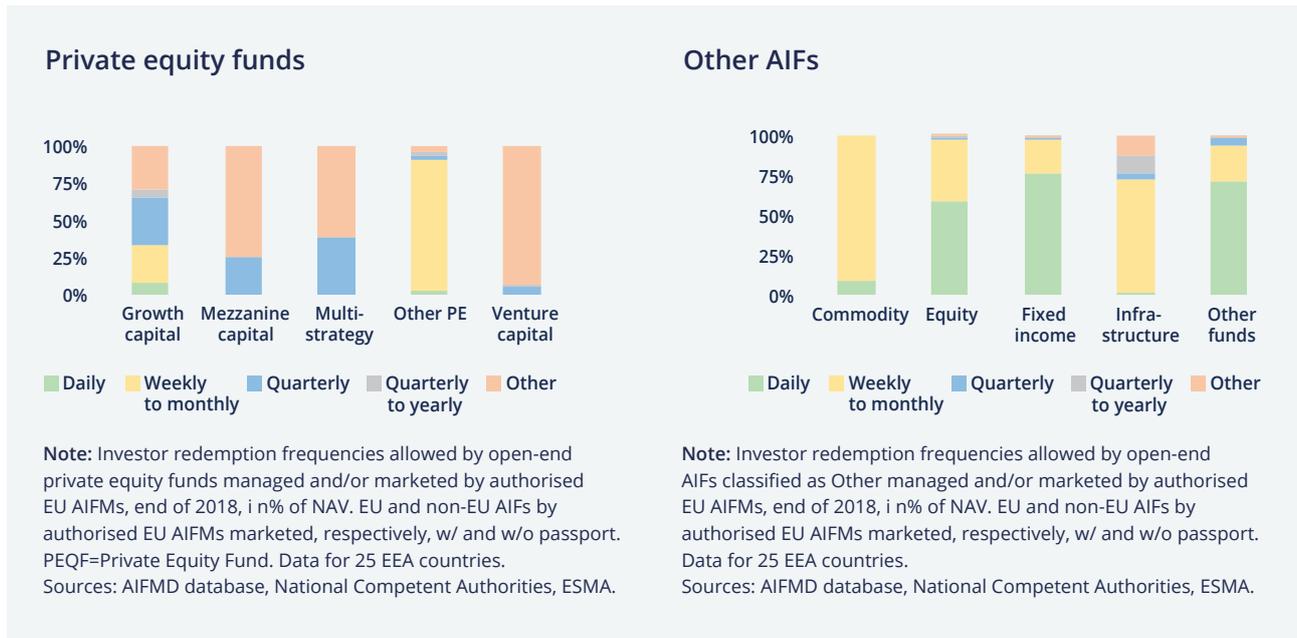
Source: SEC⁵¹**Figure 2.** Redemption frequency for funds of funds and real estate funds in the EU, across main strategiesSource: ESMA⁵²

Figure 3. Redemption frequency for private equity funds and other AIFs in the EU, across main strategies



Source: ESMA⁵³

For a specified investor liquidity, different designs can be adopted to ensure that liquidity and redemption match (see Table 5). Consider an example of two unleveraged open-ended funds that offer similar investor liquidity. These funds could opt for lower investor liquidity, for instance through quarterly redemptions, and shape very different underlying liquidity. One could purchase highly liquid assets but adopt a

strategy that requires long holding of the assets for it to work (e.g., an activist),⁵⁴ whereas the other one could be investing in more illiquid assets such as broadly syndicated loans. For both types of funds, the liquidity of the asset may play a role but other considerations enter into the equation which make it so that resulting investor liquidity is, in the end, lower than the liquidity of the underlying assets.

Table 5. Liquidity of hedge funds by attribute and across main strategies, globally

	Asset	Strategy	Funding	Investor
Convertible arbitrage	1	2	1.5	2
CTA/Managed Futures	3	3	3	3
Distressed	1.5	1	3	1
Emerging	2	2	1	1.5
Event Driven	3	1.5	2	1.5
Fixed Income arbitrage	1.5	2	1.5	2
Long/short equities	3	2	3	2
Macro	2.5	3	3	2.5
Multi-strategy	2	1.5	2	2
Private credit	1	1.5	3	1

Source: AIMA Efficient Flows⁵⁵

Note: liquidity attributes range from a low degree (=1) to a high degree (=3)

Conversely, these two unleveraged open-ended funds could offer daily redemptions and still select dissimilar underlying liquidity. One fund could invest in highly liquid assets, such as global futures, and maintain a highly liquid strategy. The other one could primarily favour less liquid, yet tradeable assets, such as loans, but maintain an investor-level gate, in combination with a portion of more liquid assets such as high yield bonds, to ensure redemptions can be managed appropriately. Both funds should therefore be able to satisfy the daily redemptions, but with very different strategies and limitations on the nature of daily liquidity, especially in times of stress.

Diversity in liquidity designs is even higher for leveraged open-ended funds. Two funds can for example maintain similar funding liquidity, while displaying very different fund leverage ratios.

No matter the asset liquidity and strategy liquidity, moderate leverage ratios have little

impact on LRM, resulting in high funding liquidity. For macro strategies, high asset liquidity (due to investments in options, futures, forwards, etc.) entails that funds could easily satisfy potential margin calls, even in stressed conditions, and with high margin requirements and/or high leverage ratios. Therefore, a professional investor fund that is highly leveraged, and that invests in highly liquid assets and/or maintain large liquidity buffers is capable of proposing high investor liquidity.

Overall, because the universe of AIF and private fund strategies is potentially infinitely diverse, a more principles-based and flexible approach to balancing investor liquidity, asset liquidity, strategy liquidity and funding liquidity is required. For this reason, to date, there have been no strict quantitative restrictions on any of these types of liquidity in the AIFMD or in the requirements applicable to managers of private funds (see Table 3).

Managers are left to manage LRM in the manner subject to existing high-level requirements, provided that there is appropriate disclosure to investors and, where required, to the relevant regulator(s).⁵⁶ While no quantitative limitation exists on the investor liquidity of professional investor funds, they should be able to meet any investor's redemption, under the conditions pre-defined by the fund and the manager. Managers of professional investor funds are free to settle on the liquidity structure that will meet these conditions (see Box 2), balancing the frequency of redemptions with one or more of the types of investor liquidity management tools discussed in Table 1.

By freely settling on the LRM of professional investor funds, managers strengthen the capital markets and real economy. Many of the adopted strategies increase the sophistication and resilience of capital markets. For example, strategies based on arbitrage contribute to reduce unfounded price distortions in capital markets.

Through the high diversity in investor liquidity, funds are able to meet the liquidity needs of a multitude of investors. As shown by BIS, a broad and diversified investor base, with different risk profiles and time horizons, trade continuously thus boosting asset liquidity.⁵⁷ Conversely, markets with fully homogeneous investor bases are more exposed to liquidity risk, as investors tend to enter or leave over a short period of time, without "counterbalancing order flows from other investor groups".⁵⁸

The high variety in investor liquidity can curb financial crises. If, as a result of unexpected market stress, many investors desire to redeem and cash in their shares, high heterogeneity in liquidity terms across funds should limit the risk of synchronised fire sales.

Finally, by combining investments in funds with different risk strategies, investors can develop adequate liquidity diversification.

Due to the relaxation of the constraint on investor liquidity, professional investor funds can support the real economy which complements the funding provided by retail funds to public markets. This notably concerns long-term strategies, that offer little liquidity to investors, but can fund key activities of the real economy, often providing an alternative to bank funding. For instance, real estate funds supply large financial resources to the construction sector (residential, commercial, industrial, etc.), generally with low redemption frequency for its investors (except for commercial strategies, as revealed in Figure 2). Often more effectively than banks, private equity funds can fund promising startups.

Therefore, imposing quantitative restrictions on the liquidity attributes of professional investor funds, as it is the case for retail funds, would jeopardise the multiple benefits brought by professional investor funds to capital markets and the real economy. While preserving these benefits, what actions would reinforce LRM in professional investor funds and ensure that all funds can meet their clients' redemptions at any time? On the business' side, the industry constantly promotes sound LRM practices and should continue doing so. On the legal side, all the necessary rules already exist and should be continuously enforced. In addition, specific initiatives of authorities could help professional investor funds' managers strengthen their LRM.

3

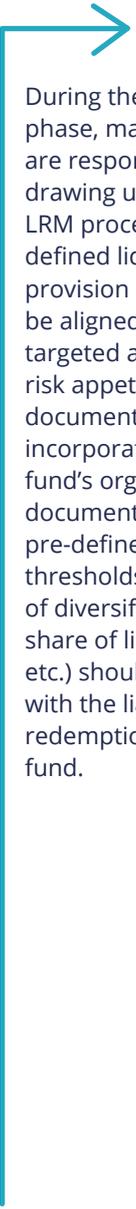


Which industry practices are important?

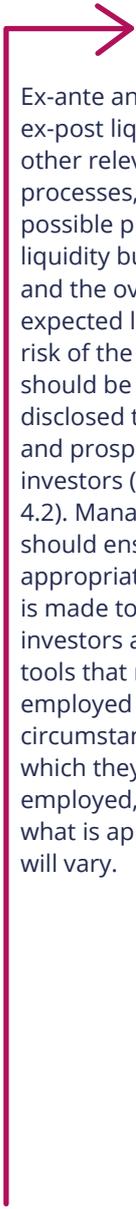


3.1 Robust LRM maintained throughout the life of the fund

Robust LRM should continue being performed at all stages of the product (design, post-launch and potential fund liquidation). In particular, an appropriate alignment between asset liquidity and redemptions terms should be maintained throughout the life cycle of the product. For that purpose, managers of professional investor funds should continue following the below sound practices:



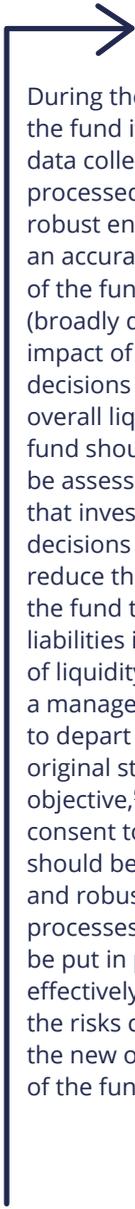
During the design phase, managers are responsible for drawing up effective LRM processes. The defined liquidity provision should be aligned with the targeted audience's risk appetite, well-documented and incorporated in the fund's organisational documents. The pre-defined liquidity thresholds (in terms of diversification, share of liquid assets, etc.) should be in line with the liabilities and redemptions of the fund.



Ex-ante and ex-post liquidity tools, other relevant LRM processes, such as possible pre-defined liquidity buffers, and the overall expected liquidity risk of the fund should be effectively disclosed to investors and prospective investors (see Section 4.2). Managers should ensure that appropriate disclosure is made to fund investors about LRM tools that may be employed and the circumstances in which they may be employed, although what is appropriate will vary.



Managers should carry on with robust LRM throughout the life of the fund (design, post-launch and potential fund liquidation) and develop effective documentation on their LRM processes and performance throughout the life of the fund.



During the life of the fund itself, the data collected and processed should be robust enough to give an accurate picture of the fund's liquidity (broadly defined). The impact of investment decisions on the overall liquidity of the fund should always be assessed to ensure that investment decisions do not reduce the ability of the fund to meet its liabilities in terms of liquidity. Should a manager decide to depart from the original strategy and objective,⁵⁹ investor consent to the change should be obtained and robust LRM processes should be put in place to effectively address the risks caused by the new orientation of the fund.



Potential mismatches between the different liquidity factors should be frequently assessed through effective LST. When relevant and possible, the LST exercise should include the risks of counterparties and other third parties, as well as the interconnection of liquidity risk with other factors such as market risk or reputational risk. Liquidity analysis should be capable of identifying potential areas of liquidity stress, thus enabling the manager to take corrective actions before stresses materialise.



During the whole life of the fund, the conduct of robust LRM requires a proper understanding of the risk behaviour of the fund's professional investors. This entails the monitoring of possible changes in investors' risk appetite, through adequate modelling and/or the maintenance of close relationship with investors, when possible. Modelling should notably integrate to which extent the fund's professional investors have control on key investment decisions such as fund redemption. For example, should the fund's exposure to highly leveraged investors increase over time (implying a possible higher volatility in redemptions), the fund's manager might consider broadening the fund's liquidity buffer.⁶⁰



The nature of the intermediary chain between professional investor funds and their investors should also be well understood. The use of nominee accounts and/or third-party marketing companies tends to distance the fund's manager from the fund's professional investors. The higher the distance, the higher the risk that the fund's manager misconceives changes in the fund's investors' risk appetite. In order to address this risk, the fund's manager should work closely with the distributing managers to ensure that the latter is informed and aware of changing behaviours of investors. Provided that the applicable data protection rules are respected, fund's managers can ask distributing managers to share pertinent data on fund's investors.



Potential fund liquidation, for example because of poor performance, should be prepared in advance. As part of the LST exercise, the time needed to liquidate each type of asset at a reasonable price should be assessed continuously, both under normal and stressed conditions. The estimation of the cost incurred by asset liquidation should also be estimated. This information should give the necessary time and cost to liquidate the whole fund and should provide a preliminary roadmap to conduct that liquidation in an orderly fashion. In case the liquidation of the fund materialises, the conduct of rigorous LRM still applies. The management and liquidation of assets should be performed in a prudent and efficient manner, in order to minimise revenue losses over the liquidation period and ensure the distribution of surplus assets to creditors and investors as quickly as possible.

3.2 Understanding funding liquidity constraints and tools to mitigate related liquidity risks

Managers of professional investor funds should have a proper understanding of funding liquidity constraints and, when pertinent, adopt tools and approaches that mitigate related liquidity risks.⁶¹ They should have a good comprehension of the main terms used by counterparties and of their implications in terms of LRM (see “liquidity funding” in Section 2.1).

The manager should have a clear appreciation of the main liquidity risks inherent to the strategy of the fund. The manager should also have a grasp of the different options available and of how they would best fit the strategy and LRM of the fund. The manager should notably understand the liquidity implications of opting for derivative-based leverage (in options, futures, and other securities), shorting or repo (generally through a prime-broker), embedded leverage (using bespoke derivatives products), etc.

Thanks to this knowledge, the manager will have the opportunity to interact effectively with the counterparty and build leverage with a robust LRM. Given the lack of standardised practices, funds’ managers and counterparties should agree on common language, standard definitions for margin and collateral, and consistent measures of risk and value. Counterparties such as prime brokers often perceive clients in different ways based on their overall business and client base.

When relevant and possible, managers should pro-actively talk to trading desks in order to assess whether they could be valuable clients and ensure liquidity risks would be adequately addressed. Open dialogue is particularly beneficial in OTC markets and for the use of bespoke derivatives products that are tailored to the needs of the funds. Overall, adopting a pro-active approach with counterparties such as prime brokers has become more important since the adoption of new banking rules under Basel III.⁶²

Eventually, fruitful interactions with counterparties should allow managers to negotiate appropriate margin requirements, repo, creditor agreements, haircuts, borrowing lines and/or the size of derivative strategies. Such negotiations should always integrate the LRM component as a key selection criterion.

One key decision concerns the choice of collateral that will minimise liquidity risks. Prime brokers often use contractual levers to encourage their clients to post those assets as collateral that are most advantageous for the bank from a profitability, regulatory and relationship standpoint. Managers should nonetheless conduct their own assessment and, for that purpose, use technologies such as specific treasury management analytic tools. These tools should help managers define optimal collateral mix and margins, and process and interpret the ever-growing amount of data that can say something about liquidity risk.

In order to reinforce their LRM through better monitoring and modelling, funds’ managers could benefit from the sharing of quality data by both counterparties and authorities, as often as it is practicable (See Section 4.6).

Finally, the debate remains open on the optimal number of counterparties that should be used. Managers and investors are often advised to use several counterparties in order to mitigate their exposure to any single negative event which one counterparty might experience (see Section 2.1). This approach applies to all types of contracts, strategies and professional investor funds. However, concentrating relationships could have beneficial impact on the ability to trade in less liquid markets, as becoming a valued client could make an important difference in times of market stress.

3.3 Understanding of some other key issues

Managers of professional investor funds should have the necessary understanding of some other key issues, such as the extreme situation of a null liquidity, and the development and use of effective fund's documentation.

Null liquidity

Managers of professional investor funds should understand in detail the extreme scenario of liquidity dropping to zero, or effectively so. This knowledge should help managers in periods of crisis management if such extreme scenarios take shape. In case null liquidity affects certain assets classes, proper diversification of the portfolio and the existence of effective redemption restrictions throughout the life of the fund should help the fund's manager coping with short-term issues. At a macroeconomic level, operation of redemption restrictions limits fire-sale transmission mechanisms from one asset class to another. Should the null liquidity be generalised to all assets in the portfolio, the only option for funds' managers would be to block all redemptions and to wait for the maturity date of the assets, where relevant, in order to receive the proceeds and pay the investors accordingly.

Use of the fund's documentation in case of financial stress

Effective documentation is key to ensure robust LRM under stressed conditions. For example, at the design phase, all the liquidity tools that can be used in case of high volatility should be specified in the fund's documentation (redemption fees, redemption gates, swing pricing, etc.). At best, for each given stressed situation, the documentation should provide the optimal tool. The choice of the right tool could depend on the intensity of the crisis, the number and total amount of the redemptions, etc.

Maintaining effective documentation is also essential after the launch of the fund. A contingency funding plan should set out the procedures to follow in case of liquidity crisis and should be regularly tested and kept up to date. The outcome of each LST exercise (to know whether particular action has been taken in light of the results of the LST) should be well documented by the responsible entities. The performance of the LRM should be documented, reviewed and disclosed to the relevant entities (including supervisors when requested) throughout the life cycle of the product.

Fund managers should also be operationally prepared and regularly conduct operational scenario planning for episodes of market volatility. This will ensure that all parties involved understand and apply the necessary escalation procedures.

4

Which rules are important?



4.1 High-level principles and/or process approach

Several rules are necessary to limit the risk of liquidity mismatch of some professional investor funds. Most of these rules already exist and need to be continuously supervised and enforced. They are correctly based on a 'general principles approach' and/or 'process approach' rather than on a 'prescriptive' or 'a quantitative approach' (see Section 1.2). As shown in Section 2.4, one of the main roles of professional investor funds is notably to develop strategies that cannot be assumed by retail funds and to fund activities of the real economy that cannot be funded by retail funds. The fulfilment of this role requires a certain degree of freedom. The adoption of 'quantitative restrictions' for LRM would definitely harm this equilibrium and mission.

The 'general principles approach' of U.S. and EU requirements provides the necessary rules to address potential liquidity issues and to ensure that supervisors can perform their tasks in good conditions. In the U.S., rules state that the investment adviser should "identify conflicts and other compliance factors that create risks for [the firm], and then design policies and procedures that address those risks."⁶³ In particular, investment advisers have to address issues related to portfolio management processes. These include "the allocation of investment opportunities among clients and consistency of portfolios with clients' investment objectives, disclosures to clients, and applicable regulatory restrictions." LRM and the need to align the liquidity of the fund with the liquidity demand of investors are therefore accounted for in these principles.

Article 39 of the AIFMD Level 2 Regulation emphasises that AIFMs shall establish a "permanent risk management function." This function has to "implement effective risk management policies and procedures in order to identify, measure, manage and monitor on

an ongoing basis all risks relevant to each AIF's investment strategy to which each AIF is or may be exposed".

The manager has also to ensure that the AIF's risk profile disclosed to investors "is consistent with the risk limits that have been set in accordance with Article 44 of [the AIFMD Level 2 Regulation]".⁶⁴

More specifically, Article 16 of the AIFMD requires that managers shall, for each fund they manage which is not an unleveraged closed-ended AIF, employ "an appropriate liquidity management system, including procedures to monitor the liquidity risk of the AIF and to ensure that the liquidity profile of the investments of the AIF complies with its underlying obligations". In the same article, the EU legislation requires AIFMs to "regularly conduct stress-tests, under normal and exceptional liquidity conditions "in respect of such AIFs. These requirements appear to be most relevant to open-ended AIFs, as each of the liquidity types discussed earlier in this paper would generally apply to those AIFs.

However, Article 16 of the AIFMD also applies to leveraged closed-ended AIFs. For those AIFs, although investor, asset and strategy liquidity issues are less likely to be relevant, AIFMs may decide it is appropriate to comply with the AIFMD requirements by incorporating funding liquidity aspects into their liquidity management and stress-testing processes. This could potentially include addressing the risk that investors may default on their commitments to the fund, if relevant. The ESMA LST Guidance provides a detailed description on how LST may be conducted and relates to a "process approach" rather than a "general principle one".⁶⁵ The ESMA LST Guidance supplements the requirements on LST contained in the AIFMD and became applicable from September 2020.

4.2 Disclosure to investors

Both pre-contractual and post-contractual information should be accessible to all investors. In the EU, Article 23 of the AIFMD adopts a 'process approach' and requires the AIF to disclose to investors details on the investment strategy and objectives of the AIF, the types of assets in which the AIF may invest, the techniques it may employ for that purpose and the types of related risks. The description of the 'AIF's LRM' focuses on "the percentage of the AIF's assets which are subject to special arrangements arising from their illiquid nature" and "any new arrangements for managing the liquidity of the AIF". Article 108(2) of the AIFMD Level 2 Regulation also requires the AIF to disclose information on any possible arrangements they may use for illiquid assets (redemption gates, side pockets, etc.).⁶⁶

According to the KPMG report on the operation of AIFMD,⁶⁷ the EU disclosure requirements have somewhat reinforced consistency in practices and eased comparability. These rules on disclosure to investors should be continuously enforced. However, given the diversity of investment strategies and investors' types in the alternative space, the adoption of a long list of standardised disclosure requirements, as it is common for retail investors, is not proportionate for professional investor funds.

4.3 Streamlining the reporting exercise

U.S. and EU rules have extensive reporting requirements for liquidity risk. In both jurisdictions, forms include firm-level and fund-level sections. The U.S. Form PF has seven sections, based on the size and strategy of the manager and the professional investor funds. Additional separate sections have been designed for large hedge funds, liquidity funds, and private equity funds.⁶⁸ Some thresholds of size were adopted to cover only those specific private funds that could significantly impact financial stability. In the EU, the Article 24(2) of the Directive 2011/61/EU provides the general types of liquidity information that AIFs have to report to their national competent authority (detailed items have been incorporated into the Annex IV of the delegated Regulation).

Both forms have similarities. They require funds to provide information on the liquidity of the portfolio and to estimate how much of a portfolio can be liquidated in the prescribed time period.⁶⁹ They also require information on liquidity financing, in particular the value of cash financing, unencumbered cash and borrowings. Finally, supervised funds have to describe investor liquidity, as well as potential restrictions on investor redemptions and investor concentration.⁷⁰

Numerous managers emphasise that parts of the reporting exercise have made no positive impact on LRM, while still being burdensome. Many data points in the Annex IV have little relevance for financial stability and some might even provide a false interpretation of liquidity.⁷¹

Therefore, authorities should streamline this exercise, by improving the relevance and coherence of the required information.⁷²

4.4 Access to liquidity tools

Forcing professional investor funds' managers to satisfy redemption requests, no matter the market conditions, can spark damaging effects. Under generalised market stress, liquidity buffers of investment funds could quickly vanish.⁷³ The systematic fulfilment of investors' requests would accentuate fire sales of less liquid assets, harming the positions of more patient investors and threatening other parts of the financial system. The costs of meeting these sudden redemption requests are often borne by the remaining investors which can give rise to a first-mover advantage and can contribute to redemptions in times of stress.⁷⁴

Depending on the jurisdiction, managers of professional investor funds have access to some or all of the existing liquidity tools aimed at discouraging or delaying redemption requests under adverse situations (see Table 1 in Section 2.1 for a definition of each tool and Table 6 below for the availability by jurisdiction). The availability of instruments such as redemption gates ensures both the protection of more patient investors and financial stability in critical moments. Authorities should therefore preserve the use of such tools when relevant. One key condition for the successful use of these instruments is that funds continue providing professional investors with full ex-ante and ex-post transparency on the instruments' features.

Table 6. Availability of liquidity tools for managers of professional investor funds, by jurisdiction

Tools	AU ¹	BE ²	FR ³	DE ⁴	IR	IT ⁵	LU	NL	PO ⁶	RO ⁷	ES	UK	US ⁸
Swing pricing		✓	✓		✓	✓	✓	✓				✓	✓
Redemption fees	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Anti-dilution levy		✓	✓		✓	✓	✓	✓		✓		✓	
Redemption gates	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓
Redemptions in kind	✓	✓	✓	✓	✓		✓	✓	✓		✓	✓	✓
Side pockets	✓	✓	✓		✓	✓	✓				✓	✓	✓
Suspension of redemptions	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

Source: IOSCO⁷⁵

Notes:

Some of the data likely needs to be updated. [NB: We note that since the original IOSCO publication cited here as the source of this information, some of the listed countries have amended their legislation to permit broader use of these types of tools, e.g., changes in Germany and Spain to permit swing pricing.]

1. Applies to retail funds and alternative funds including closed-end funds. Limits on illiquid investments apply where the fund offers ongoing redemptions.
2. Non-retail funds can contractually determine the policy tools available.
3. Maturity restrictions apply only to [money market funds ('MMFs')]. Some of the tools mention such as the limits on asset concentration may vary depending on the type of funds considered.
4. Minimum investment periods and liquidity buffers apply to open-ended real estate funds. For funds with more than one investor, redemptions in kind are subject to the conditions of vertical slicing (i.e. the redeemed assets have to mirror proportionally the composition of the fund's portfolio).
5. Gates and side pockets can only be used in other (non-retail) funds, as long as the interests of the funds' participants are upheld.
6. Redemption gates apply only in the case of real estate CIS.
7. Maturity restrictions apply only to MMFs. Illiquid asset investments generally refer to unlisted companies.
8. The responses are generally applicable to open-end funds. However, the use of side pockets is generally applicable only to hedge funds and not open-end or closed-end funds. Responses corresponding to suspension of redemptions, redemption fees, redemption gates and redemptions-in-kind are generally not applicable to closed-end funds because they do not generally offer redemption privileges.

4.5 Actions that favour innovation

Policymakers have several tools at their disposal to support innovation in LRM processes. They can relax certain rules during a predefined period and under certain conditions (the so-called “regulatory sandboxes”), in order to allow new processes to be tested.⁷⁶ Other possibilities concern the financial education of

fintech companies, lower registration costs and better access to funding for startups, subsidies for innovation labs and accelerators, and/or tax cuts. Each of these policy options contains pros and cons, and the final choice among them depends on the jurisdiction and local circumstances.

i

Box 3: Innovation in the measurement of asset liquidity

Methodologies used by professional investor funds’ managers to measure and manage asset liquidity are in line with the latest technological developments. Significant investments have been made over the last decade to refine measurement and improve responsiveness to liquidity shocks. The fast-growing velocity, volume and variety of data on several assets classes and securities have posed new problems for storing and analysing liquidity data. In order to solve the storage issue, professional investor funds have increasingly adopted cloud computing. Public clouds in particular have likely contributed to reduce operational costs and facilitate the analysis of liquidity data.

Automation in liquidity analyses has become the norm. There has been an increasing

use of advanced algorithms and predictive analytics to better estimate, anticipate, prevent and react to potential liquidity stress.

As a result of unequal access to data across asset classes and securities, innovative intensity differs significantly across investment strategies.⁷⁷ Least liquid strategies tend to include assets with poor market information, limiting the ability of funds to apply robust data analytics.

On the other hand, innovative intensity tends to be high for liquid strategies, as large volumes of data are available on targeted assets. For those strategies, funds are capable of continuously assessing the asset liquidity. Based on detailed behavioural scenarios, complex algorithms, continuous data collection/production and possible ‘liquidity caps’, stress testing can be effectively conducted at high frequency (typically daily), which empowers managers to adjust investments promptly.

4.6 Supervisors should share more information with managers of investment funds

The use of high-quality data is necessary for investment funds' managers to conduct effective LRM. "Quality data" implies an appropriate degree of accuracy, breadth and depth. Accuracy means correctness and factuality in the data. Breadth refers to the number of securities within each asset class for which distinct data can be produced. Finally, depth reflects the granularity of the data that can be identified for each security.

Supervisors could facilitate the access to quality data for investment funds' managers by (i) ensuring that the sharing of quality data by relevant stakeholders is effective and generalised, and (ii) embracing a more pro-active approach and producing their own quality data, making that available to market participants, through, for example, a European consolidated tape and the development of TRACE in the United States.

Supervisors typically have access to large amounts of data, through mandatory reporting of funds and interactions with other authorities (at both national and international levels). Provided that they allocate the needed resources to structure and analyse this data, supervisors can have a more holistic view of liquidity dynamics than most funds can. Some authorities have already published aggregate data on liquidity trends.⁷⁸ Nevertheless, authorities could develop more comprehensive statistics on liquidity dynamics (for example, by taking inspiration from the BIS-BSCS Table 2 discussed in section 2.1 of this paper). Such statistics would be beneficial for market participants, especially the smaller ones which do not have large distribution channels at their disposal to produce relevant data.

To be effective, the production and sharing of quality data by supervisors should follow certain principles. The manner the data is shared and used must comply with all the applicable data protection rules. Furthermore, authorities that collect and aggregate reporting data should assess to which extent this data is consistent across funds, investment strategy, asset classes, local jurisdictions, etc. (see Box 4).

Supervisors should also break down unnecessary data silos. For example, the supervision of trading venues and investment funds' managers might be ensured by two distinct departments that collect data separately and do not have any possibility to cross their data with the one of the other departments. For example, the European Central Bank collects statistical data on funds' balance sheets but does not typically share this with national, local supervisors. However, when it is shared, the data points collected by the ECB is often collated and presented in a different way that is not fungible with the manner through which other supervisors would collect and present this data.

Therefore, common platforms and databases should be established between the different departments in charge of the supervision of different parts of capital markets. The removal of barriers between databases is essential for the production of comprehensive measures.

When several authorities have distinct mandates to supervise capital markets, they should ensure that relevant data can be shared between them. This is the typical case of a "twin peak" model where central banks supervise financial market infrastructures, and a separate entity is in charge of funds. Finally, as capital markets tend to be global, global convergence in the indexes published by authorities should facilitate a smoother monitoring of liquidity risks.

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Box 4: Diversity in the methodologies used to measure asset liquidity

High diversity can be observed in the methodologies and tools used to measure the degree of asset liquidity of portfolios. Practices hinge largely on business models, investment strategy, asset classes, local jurisdiction, types of database used, accessibility to quality data or not, etc. For example, the use or not of liquidity buckets, that is the classification of assets according to their degree of liquidity (usually with a clear gradation), is dependent on the types of assets in which the managers of professional investor fund invest. While well-accepted methodologies do exist to classify the degree of liquidity of fixed-income products, over-the-counter derivatives typically do not have such metrics. Regarding professional investor funds' managers that use bucketing, the scales and metrics can differ markedly, notably depending on the accuracy, consistency and granularity of the data identified.

Overall, the amount of available data to assess liquidity can vary significantly across assets. On one hand, vast amounts of data can generally be collected for assets that are continuously traded on large stock exchanges: marketable securities, treasury bills, foreign currencies, etc. On the other hand, little or no data can be found for assets traded in certain jurisdictions (where ex-ante/ex-post transparency laws are rather limited) or through specific trading channels (such as OTC trading where prices are often not publicly disclosed).

The perceived illiquidity of some assets can be a result of their low trading volumes and lack of data on the market values achieved on transactions involving these assets: private equity shares, complex derivatives, distressed

debt, mortgage-backed securities, etc. Many professional investor funds' managers then adopt specific approaches to seek alternative data sources that can help them assess asset liquidity. They often leverage all types of information that is produced within the fund, notably data on quotes' dynamics at their trading desks.

One of the main challenges for risk managers is to estimate and, if possible, anticipate changes of liquidity over time. Many managers of professional investor funds have created platforms that combine the fund's data with market data. The objective of such initiatives is to design schemes where signals are triggered once pre-determined illiquid thresholds have been reached. If needed, managers can then realign the weighting of portfolio assets to recover pre-defined liquidity levels.

The difficulty of measuring asset liquidity is heightened by the potential diversity of liquidity profiles within each asset class. For example, sovereign bonds for a given maturity tend to be much more liquid in core markets such as Germany than in emerging economies. Within each asset class, the liquidity of several securities can follow different paths, depending on external factors impacting these products. In order to address this complexity, a large share of professional investor funds' managers is able to conduct pertinent analyses at security level.

To conclude, high heterogeneity across funds and asset classes can be observed in the manner asset liquidity is measured. Given the diversity of databases, models and investment strategies of professional investor funds, full consistency in these measures could hardly be achieved. As a consequence, supervisors should be cautious when aggregating liquidity data of professional investor funds, as the aggregate has sometimes little relevance.

Concluding remarks

The EU and the U.S. already have suitable legislation for the LRM of investment funds: the UCITS Directive and the Investment Company Act and related SEC rules for retail funds, and the AIFMD and private funds' rules for professional investor funds. The core assumption of retail funds' legislation is that investors are entitled to receive their money back promptly. As such, many quantitative restrictions have been adopted for the funds to meet this expectation.

Rules for professional investor funds do not contain such a primary constraint and give more freedom for product design, provided that investors' redemptions are met throughout the life cycle of the fund. The building of LRM results from a series of trade-offs that can be designed in multiple ways across the four liquidity attributes of the fund. This freedom is justified by the characteristics of professional investors and by the need to develop a more diverse range of strategies than in the retail space. By freely settling on the LRM of professional investor funds, managers strengthen the capital markets and the funding of the real economy, notably through the creation of long-term illiquid strategies.

Therefore, the necessary rules already exist and should be enforced continuously and effectively. Effective disclosure to professional investors should continue. The reporting exercise needs to be streamlined for the mutual benefit of authorities and professional investor funds' managers. Access to liquidity tools that can be

used under financial stress (redemption gates, redemption fees, swing pricing, etc.) should be maintained or expanded when domestic restrictions persist. Authorities should also take action to support innovation in LRM processes (for LST, algorithms, etc.), especially for illiquid strategies that generate little data. Finally, authorities should share more consolidated liquidity data with managers of professional investor funds.

Sound practices identified by the industry also need to be enhanced continuously. In particular, managers of professional investor funds should apply robust LRM throughout the life cycle of the fund, adjusting practices as necessary over time to meet regulatory requirements and market developments. They should have an adequate understanding of funding liquidity constraints, and of the approaches and tools that can alleviate related liquidity risks. Lastly, they should be able to understand what to do in case of null liquidity and continuously develop effective documentation on LRM.

Annex:

Managing fund liquidity in the time of COVID

(excerpted with permission from the December 2020 SS&C Whitepaper of the same name)



Introduction

Measuring and managing portfolio liquidity is a critical issue for alternative asset managers. Investors understand that fund managers typically have wide latitude in asset selection and that less liquid or illiquid assets can comprise significant percentages of the holdings. Moreover, these percentages can shift quickly and dramatically as managers anticipate and adapt to changing market conditions. Both managers and investors want to know the fund can meet liquidity demands without disruption to the portfolio strategy. Interest in liquidity, of course, is heightened in times of uncertainty and systemic stress, as is certainly the case today world-wide due to the outbreak of COVID-19.

This paper will analyze the impact of COVID-19 on alternative fund liquidity, drawing on SS&C's proprietary indices for redemptions, overall capital movements, and performance. Indices are compiled solely with actual client data collected across all SS&C clients, i.e., there is no bootstrapping or extrapolation of data and no selection or survivor bias. We will also detail how fund liquidity is presented to investors and other external parties, including regulators and risk aggregators.

Liquidity data in the age of COVID-19

Redemptions

Widespread recognition of the COVID-19 outbreak probably dates back to February 2020, when markets first began to reflect the shockingly rapid spread and health consequences of the virus. Therefore, we do not have even a single year of COVID-19 data behind us, so any analysis of the trends must include this caveat.

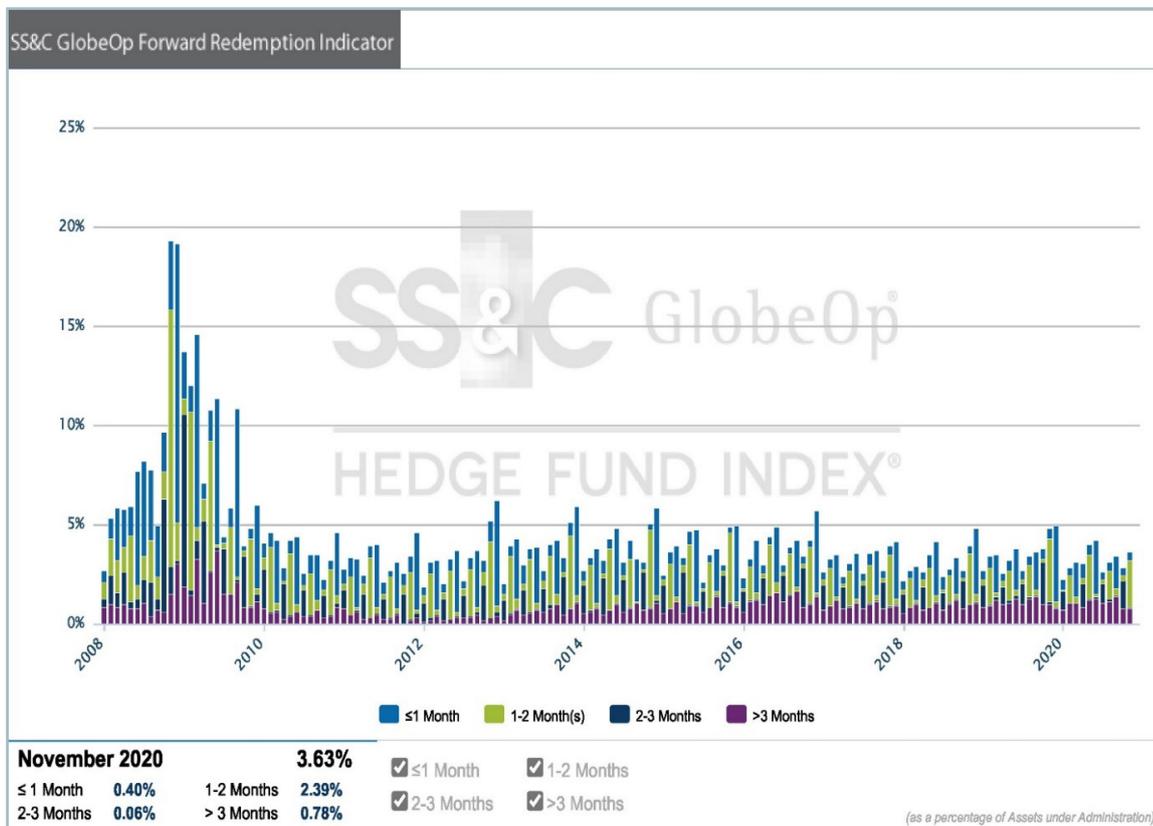
However, the data that has emerged thus far speaks quite clearly. Below is a graph of the time series of redemption notices received by SS&C fund administration clients dating back to the financial crisis of 2008-09. This data is encapsulated in SS&C's Forward Redemption Indicator, a monthly calculation of redemption notices as a percentage of assets under management.

<https://www.globeopindex.com/home.go>

Several points are clear from the graph:

1. Redemption notices throughout 2020 are running steadily in the low single digits. The most recent reading for November of 3.63% continues this trend.
2. The redemption experience in 2020 is entirely consistent with pre-outbreak levels from 2019 and other recent years.
3. As a corollary to these first two points, the 2020 redemption levels in no way resemble those of the last systemic crisis, the financial crisis of 2008-09, when redemptions approached 20%.

Figure 1: SS&C GlobeOp Forward Redemption Indicator Chart – November 2020



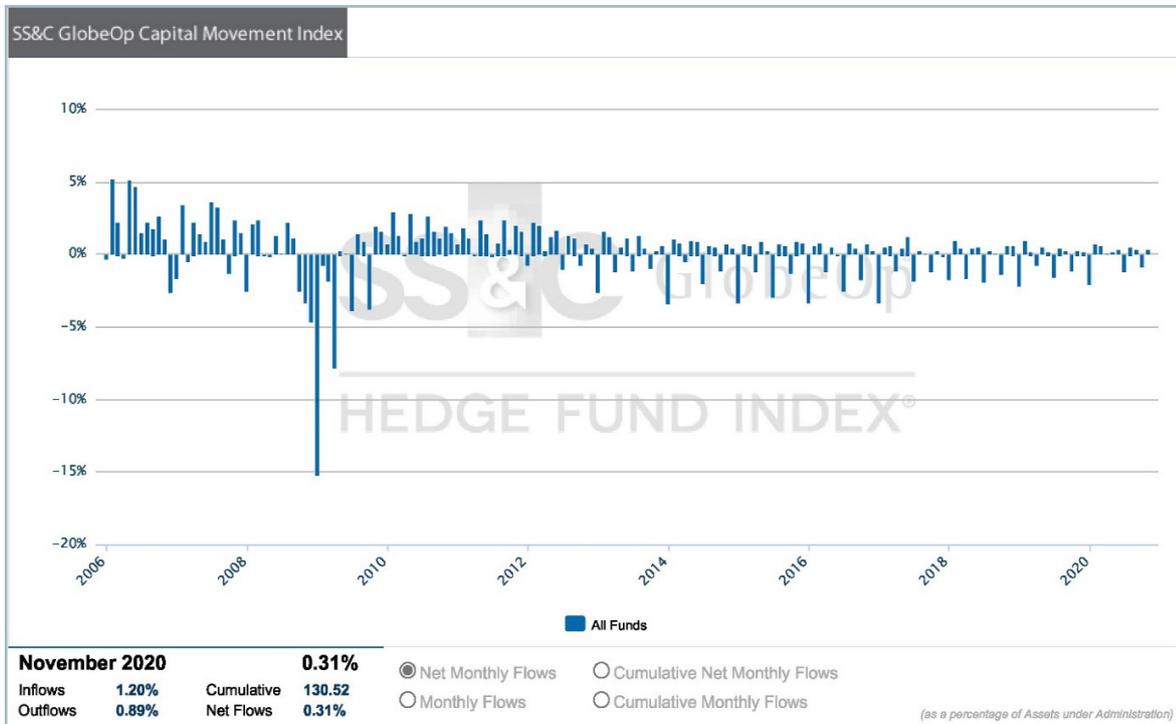
Capital movements

SS&C also calculates a Capital Movements Index, which measures the actual monthly change in capital by tracking inflows and outflows. These outflows differ from redemption notices in that the latter includes redemptions scheduled well into the future. Capital outflows, on the other hand, are amounts that have been withdrawn in the current month. The net inflows and outflows, without gains and losses from performance, are presented as percentages of assets under management.

The Capital Movements Index tells a similar story to the Forward Redemption Indicator discussed above.

1. Net flows of capital have remained remarkably steady in 2020 and are consistent with recent years' data.
2. The two individual components of this measure, inflows and outflows, are steady in their own right.
3. The current flows indicate nothing like the massive outflows that occurred in the financial crisis.

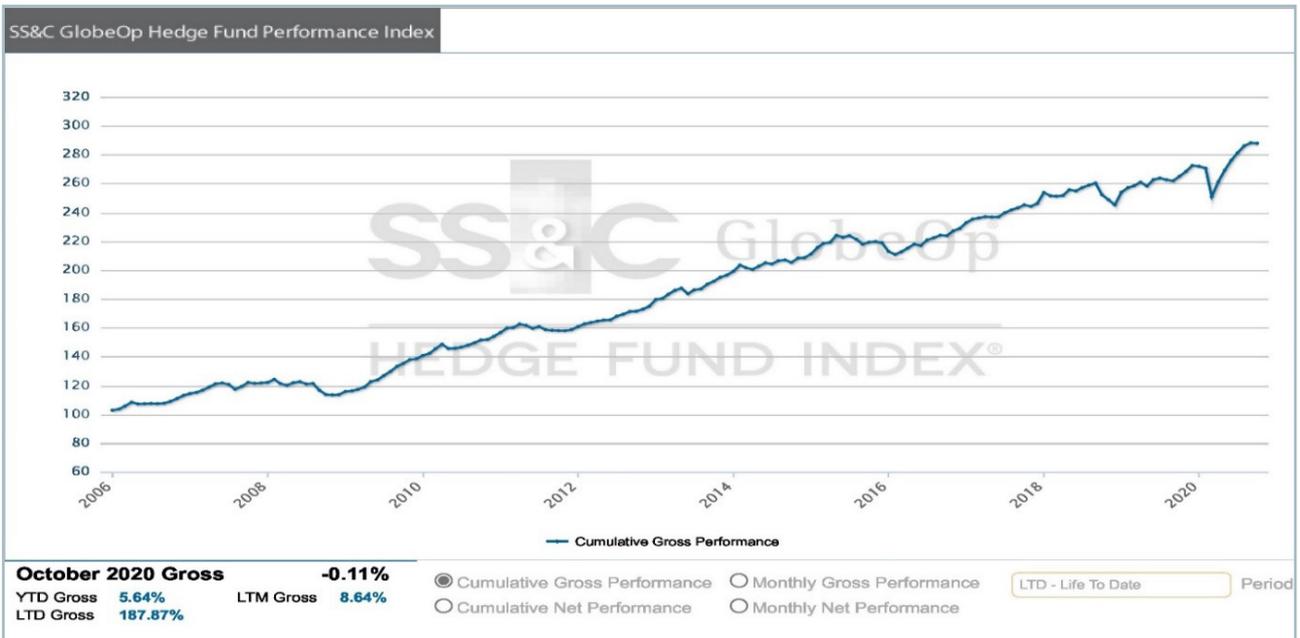
Figure 2: SS&C GlobeOp Capital Movement Index Chart- November 2020



Performance and other factors influencing liquidity

If liquidity demands are a function of market disruption, what accounts for the steady trend lines in redemptions and capital movements? The starting point for this answer is performance. The graphic below presents SS&C aggregated alternative asset fund performance. Investors allocate capital to alternatives to improve their risk-reward position and the performance record for 2020 indicates that managers are fulfilling this mission.

Figure 3: SS&C GlobeOp Hedge Fund Performance Chart – October 2020



Yet, it must be noted that the prospect of this strong performance was not immediately obvious when COVID-19 first roiled markets earlier in 2020. We believe additional factors explain the confidence that investors showed in alternative managers during those turbulent months.

1. The return of volatility to the markets was seen as playing into alternative managers' strengths, both in terms of available long/short strategies and proficiency in active trading.
2. The macro-policy reactions to the COVID-19 crisis were swift and decisive for both fiscal and monetary policy.
3. These speedy reactions helped keep an emerging public health crisis from becoming an immediate market crisis so that markets never "seized up" the way they had in 2008-09
4. Many investors of 2020 had lived through the 2008-09 crisis, understood the implications of policy responses and remembered the V-shaped recovery of that crisis. Panic selling took place, but not on the scale of 2008-09.

The relative calm in redemptions has created opportunities, as well. For example, several fund launches have focused on deep credit and distressed assets, strategies that naturally encompass less liquid assets. These funds can move forward more confidently, given the considerations discussed.

Again, we are only partway through the COVID-19 outbreak and the news is filled with new surges and hopeful signs for developing effective therapies and vaccines. Therefore, markets remain volatile, but with confidence seeming to remain high in alternative asset managers' ability to create attractive risk-adjusted returns, liquidity demands are running in line with pre-COVID-19 levels. ...

Conclusion

Alternative asset funds have proven remarkably resilient and effective in navigating the financial impact of the COVID-19 crisis, and, to date, investors have shown strong confidence in their ability to continue to do so in the aggregate. Still, the market turbulence has reminded all investment stakeholders of the importance of measuring, monitoring, and managing liquidity risk. ... We expect this will continue to be the foreseeable case future among managers, investors and regulators.

Endnotes

- 1 See section 2.3 of this paper.
- 2 Central banks, securities regulators, systemic risk bodies and other international bodies are collectively referred to in this paper as “authorities”.
- 3 AIMA, the Alternative Investment Management Association, is the global representative of the alternative investment industry, with more than 2,000 corporate members in over 60 countries. AIMA’s fund manager members collectively manage more than \$2 trillion in assets. AIMA draws upon the expertise and diversity of its membership to provide leadership in industry initiatives such as advocacy, policy and regulatory engagement, educational programmes and sound practice guides. AIMA works to raise media and public awareness of the value of the industry. AIMA set up the Alternative Credit Council (ACC) to help firms focused on the private credit and direct lending space. The ACC currently represents over 170 members that manage \$400 billion of private credit assets globally. AIMA is committed to developing skills and education standards and is a co-founder of the Chartered Alternative Investment Analyst designation (CAIA) – the first and only specialised educational standard for alternative investment specialists. AIMA is governed by its Council (Board of Directors). For further information, please visit AIMA’s website, www.aima.org.
- 4 Article 4(1)(b) of Directive 2011/61/EU of the European Parliament and the Council of 8 June 2011 on Alternative Investment Fund Managers, as amended (the ‘AIFMD’) defines the term “AIFs” as “collective investment undertakings, including investment compartments thereof, which: (i) raise capital from a number of investors, with a view to investing it in accordance with a defined investment policy for the benefit of those investors; and (ii) do not require authorisation pursuant to Article 5 of Directive 2009/65/EC [(the UCITS Directive)].” The AIFMD sets out the conditions under which alternative investment fund managers (or ‘AIFMs’) are able to market the AIFs they manage in the EU to “professional investors” (as defined in Article 4(1)(ag) of the AIFMD). AIFMs may only market an AIF to an investor that is not a “professional investor” (i.e., retail investors) if the AIFM does so in compliance with the national law of the Member State of the investor. “Professional investors own most of the shares of AIFs, yet retail investor share is significant at 16% of the NAV [of the EU AIF universe as of the end of 2018], with more participation in [funds of funds] and [real estate] funds.” European Securities and Markets Authority (ESMA), “[EU Alternative Investment Funds - 2020 Annual Statistical Report](#)” (10 January 2020) (‘ESMA 2020 Statistical Report’), at page 4.
- 5 Section 2(a)(29) of the U.S. Investment Company Act of 1940, as amended (the ‘Investment Company Act’), defines a “private fund” as “an issuer that would be an investment company, as defined in section 3 of the Investment Company Act, but for section 3(c)(1) or 3(c)(7) of that Act.” As a general matter, each investor in a private fund relying on Section 3(c)(1) of the Investment Company Act is required to be an “accredited investor” as defined in Rule 501(a) under the U.S. Securities Act of 1933, as amended (the ‘Securities Act’). Similarly, each investor in a private fund relying on Section 3(c)(7) of the Investment Company Act is required to be a “qualified purchaser” as defined in Rule 2a-51 under Investment Company Act.

- 6 Although these definitions differ in some of the details from the definition of “professional investor” used in connection with marketing AIFs, they are generally covering the same types of sophisticated professional investors. For this reason, the rest of this paper will refer to AIFs and private funds collectively as “professional investor funds”.
- 7 See, e.g., the impact of the European Central Bank’s 2016/17 corporate sector purchase programme on corporate bonds’ yield spreads, European Central Bank (ECB), [“How ECB purchases of corporate bonds helped reduce firms’ borrowing costs?”](#), Research Bulletin (January 2020), (‘ECB 2020 Research Bulletin’).
- 8 Policymakers have also been reviewing the events of 1H 2020 and considering their implications for liquidity risk management and margin requirements. See, e.g., Daniel Barth and Jay Kahn, [“Basis Trades and Treasury Market Illiquidity”](#), Office of Financial Research (OFR) Brief Series 20-01 (16 July 2020); and L. Rousová, et al., [“Derivatives-related liquidity risk facing investment funds”](#) (May 2020) (‘ESRB 2020 Staff Paper’), published as part of the ECB [“Financial Stability Review”](#) (May 2020), (‘ECB 2020 Report’). See also Financial Stability Board (FSB), [“Holistic Review of the March Market Turmoil”](#) (17 November 2020) (‘FSB 2020 Holistic Review’).
- 9 See FSB 2020 Holistic Review, *supra* note 8, at pages 24-26. See also European Systemic Risk Board (ESRB), [“Liquidity risks arising from margin calls”](#) (June 2020) (‘ESRB Margin Calls’), at page 8.
- 10 See ECB 2020 Report, *supra* note 8, at paragraph 4.1. See also ESRB, [“Financial stability implications of support measures to protect the real economy from the COVID-19 pandemic”](#) (February 2021), at page 14.
- 11 Bank of England, Financial Policy Committee, [“Financial Stability Report”](#) (December 2019) (‘BoE 2019 Report’), at page 76.
- 12 See ECB 2020 Research Bulletin, *supra* note 7 (“reducing yields in the targeted bond market segment, the programme encouraged investors to shift their investments towards similar but somewhat riskier bonds”). See also ECB, [“Financial Stability Review”](#) (November 2019) (‘ECB 2019 Report’), at page 7 (“The search for yield has intensified since the start of the year, with less than 10% of the bonds outstanding globally offering yields of 3%”) and page 46 (“Institutional investors have recently increased their holdings of illiquid assets since they are often associated with higher and positive returns”); and International Monetary Fund (IMF) [“Global Financial Stability Report: Lower for Longer”](#) (October 2019) (‘IMF 2019 Report’), at page 40 (Figure 3.1. Institutional Investors’ Increased Risk-Taking in a Persistently Low-Interest-Rate Environment).
- 13 See BoE 2019 Report, *supra* note 11, at page 76 (“Funds’ holdings of assets that take longer to liquidate in an orderly way, especially during a period of market stress, are increasing. Globally, more than US\$30 trillion of assets are now held in open-ended funds that offer short-term redemptions while investing in longer-dated and potentially illiquid assets, such as corporate bonds. That has more than tripled since 2006.”). According to Bank of England, these estimates are based on [“FSB Global Monitoring Report on Non-Bank Financial Intermediation 2018”](#) (February 2019), at page 5 (notably regarding “collective investment vehicles (CIVs) with features that make them susceptible to runs”).
- 14 IMF 2019 Report, *supra* note 12, at page 39.

- 15 “Liquidity stress scenarios confirm that fixed-income funds are vulnerable to liquidity shocks”. IMF 2019 Report, *supra* note 12, at Box 3.1 at pages 48 and 49.
- 16 ESRB, “[Recommendation on liquidity risks in investment funds](#)”, (ESRB/2020/4) (6 May 2020) (‘ESRB 2020 Recommendations’), at page 2.
- 17 ESRB, “[Recommendation on liquidity and leverage risks in investment funds](#)”, (ESRB/2017/6) (7 December 2017) (‘ESRB 2017 Recommendations’), at page 1.
- 18 ECB 2020 Report, *supra* note 8, at Overview.
- 19 See, e.g., ESMA, “[ESMA Report on Trends, Risks and Vulnerabilities](#)” (17 March 2021), at page 31.
- 20 IOSCO has published a list of recommendations aimed at reinforcing the LRM processes of investment funds and ensuring “proper alignment of fund assets and redemption terms” throughout the life of the fund. IOSCO believes that “the best line of defence against a liquidity mismatch remains with the [collective investment schemes] and the responsible entity” and expects responsible entities “to exercise their sound professional judgement in the best interest of investors [...], in both stressed and normal market conditions”. IOSCO, “[Recommendations for Liquidity Risk Management for Collective Investment Schemes](#)”, Final Report (February 2018) (‘IOSCO 2018 Recommendations’), at pages 2 and 23.
- 21 The IOSCO recommendations state that the LRM of investment funds “must also take account of [...] delivery and payment obligations such as margin calls, obligations to counterparties and other creditors”. IOSCO 2018 Recommendations, *supra* note 20, at page 12.
- 22 Some rules have been implemented to reinforce the quality of the LRM reporting to authorities. For example, the U.S. Securities and Exchange Commission (SEC) introduced new liquidity rules that require U.S. registered open-end investment companies (‘mutual funds’) of more than USD one billion to classify their portfolio holdings into four liquidity buckets. See [Rule 22e-4\(b\)\(1\)\(ii\)](#) under the Investment Company Act. Under these requirements, these mutual funds are expected to classify each investment into one of four liquidity categories, depending on how many business days are needed to sell a position without significant change in its value. Investments can be highly liquid, moderately liquid, less liquid or illiquid. There are clear numerical values for each of this category: less than three business days for the first, between three and seven days for the second, less than seven days for the third and more than seven days for the fourth. See [Rule 22e-4\(a\)\(6\), \(8\), \(10\) and \(12\)](#) under the Investment Company Act.
- 23 IMF 2019 Report, *supra* note 12, at page 47. Also, in September 2019, the UK Financial Conduct Authority (FCA) adopted new requirements for open-ended non-UCITS retail schemes (‘NURSs’) which invest in ‘inherently illiquid assets’ such as property. See [Illiquid assets and open-ended funds and feedback to Consultation Paper CP18/27](#), FCA Policy Statement PS19/24 (September 2019). These new rules imposed requirements for standard risk warnings and other investor disclosures. Managers of these funds will also have to “produce [and disclose to investors] contingency plans for dealing with liquidity risks”. See *id.*, at page 7. Among other things, this plan would describe “how the fund manager will respond to a liquidity risk crystallising”, the type of liquidity tools they “may deploy in such exceptional circumstances [...] and the consequences for investors”, etc. See *id.*, at page 20.

- 24 In 2019, the ESRB recommended that ESMA develop “guidance on the practice to be followed by managers for the stress testing of liquidity risk for individual AIFs and UCITS [...] in order to promote supervisory convergence.” ESRB 2017 Recommendations, *supra* note 17, at page 4. Further to this ESRB recommendation, in September 2019, ESMA published guidance on liquidity stress testing (‘LST’) that applies to both AIFs and UCITS. See ESMA, [“Final Report Guidelines on LST in UCITS and AIFs”](#) (2 September 2019) (‘ESMA LST Guidance’). From September 2020, AIFMs and UCITS management companies are required to regularly stress test the liabilities and assets of the funds they manage, and to use LST to mitigate potential (liquidity) risks, in accordance with the ESMA LST Guidance, regardless of how they were undertaking LST previously. ECB staff members have noted that “[g]oing forward, further extreme market shocks may occur, which calls for the conduct of forward looking simulations of margin calls under stress scenarios.” ESRB 2020 Staff Paper, *supra* note 8.
- 25 IOSCO has stated that “it would be impractical to pursue, as some have suggested, “a global ‘one size fits all’” prescriptive approach which tries to match different asset classes, fund investment strategies and redemption periods according to universally applicable standards”. As such, the 2018 recommendations of IOSCO “contain practical, actionable principles which support those domestic regulators who may wish or need to pursue a prescriptive approach responsive to the nature of particular [open-end funds] they supervise directly and/or specific characteristics of the local markets in which they operate.” [“Statement on IOSCO liquidity risk management recommendations for investment funds”](#) (18 July 2019), at page 2.
- 26 The IMF has emphasised that “minimum eligibility criteria (based on credit quality and liquidity) for the inclusion of assets in fixed-income funds’ portfolios could be introduced to help lessen credit risks and liquidity mismatches”. See IMF 2019 Report, *supra* note 12, at page 47.
- 27 In the UK, NURs that invest in inherently liquid assets will be required to suspend dealing if a standing independent valuer has expressed material uncertainty regarding at least 20% of the fund’s assets’ value, or if that fund invests at least 20% of its assets’ value in units of fund(s) for which dealings in units have been temporarily suspended. See *id.*, Appendix 1, at page 16. The FCA can authorise fund managers “to continue to deal where they have agreed with the fund’s depositary that this is in the fund investors’ best interests.” See *id.*, at pages 4 and 5.
- 28 See IOSCO [“Open-ended Fund Liquidity and Risk Management - Good Practices and Issues for Consideration”](#), Final Report (February 2018) (‘IOSCO Good Practices Report’).
- 29 BIS-BCBS, [“Guidance for Supervisors on Market-Based Indicators of Liquidity”](#) (January 2014), at page 5, (Table 2 – Liquidity characteristics, criteria and metrics).
- 30 AIMA and CAIA Association, [“Efficient flows: Understanding liquidity in alternative investment funds”](#), Trustee Series, Paper 4 (2018) (‘AIMA Efficient Flows’), at page 9.
- 31 Activism occurs when an investor purchases a large number of a public company’s shares and/or tries to obtain seats on the company’s board in order to effect a significant change within the company.
- 32 See ESRB Margin Calls, *supra* note 9, at page 8.

- 33 This risk was one of several margin-related risks remarked upon by the ESRB in a January 2020 paper. “[M]arket participants in derivatives transactions can change collateral requirements at short notice, for example by increasing haircuts or by rendering certain collateral ineligible. Introducing notice periods would provide greater transparency and planning certainty to market participants and could thereby reduce liquidity risk and the likelihood of fire sales.” ESRB Expert Group on the Macroprudential Use of Margins and Haircuts, [“Mitigating the procyclicality of margins and haircuts in derivatives markets and securities financing transactions”](#) (January 2020), at page 56.
- 34 Low leverage entails higher funding liquidity, given the lower funding constraints.
- 35 Retail funds can be used by institutional investors but are primarily designed for retail investors. ESMA has estimated that in 2017, 65% of UCITS were identified as marketed to retail investors and the share of UCITS targeted at institutional investors had reached 35%. See ESMA, [“ESMA Annual Statistical Report: Performance and costs of retail investment products in the EU 2019”](#) (10 January 2019), at page 10.
- 36 As they do not redeem investor shares, closed-end registered investment companies are not covered.
- 37 For instance, a fund with USD 100 million in assets may borrow up to USD 50 million from a bank.
- 38 AIFMs also have to disclose cash borrowing on the template set in Annex IV b) of [EU Delegated Regulation \(No. 231/2013\)](#) (19 December 2012) (the ‘AIFMD Level 2 Regulation’).
- 39 U.S. registered investment advisers are required to report different sorts of measures in the [Form PF \(Paper version\)](#) (‘Form PF Template’). This information provides balance sheet leverage measures by using regulatory assets under management or NAV.
- 40 See Article 76 of Directive 2009/65/EC (the UCITS Directive) (“[T]he competent authorities may, however, permit a UCITS to reduce the frequency to once a month on condition that such derogation does not prejudice the interests of the unit-holders”). In December 2017, the ESRB highlighted that “this option has not been transposed into national law by all Member States”. ESRB 2017 Recommendations, *supra* note 17, at page 15, footnote 3. Despite the flexibility offered for less frequent redemptions, many UCITS offer daily investor liquidity. This is notably the case of Luxembourg where “the majority of UCITS offer daily liquidity.” See IMF, [“Luxembourg: Financial Sector Assessment Program: Technical Note – Fund Management: Regulation, Supervision, and Systemic Risk Monitoring”](#), IMF Country Report No. 17/257 (28 August 2017), at page 12.
- 41 The Investment Company Act governs the operations of U.S. registered investment companies, whether they are of the open-end or closed-end type. Rule 22c-1 under the Investment Company Act requires open-end registered investment companies (collectively, ‘mutual funds’), their principal underwriters and dealers in mutual fund shares to sell and redeem mutual fund shares at a price determined at least daily based on the current net asset value next computed after receipt of an order to buy or redeem.

- 42 IOSCO Good Practices Report, *supra* note 28, at page 50.
- 43 For further details, see AIMA, “Guide to Liquid Alternative Funds” (2015) (“AIMA Guide to Liquid Alts”) (available to members at www.aima.org and to regulators upon request to info@aima.org).
- 44 *See id.*, at page 16 (“A ‘diversified’ fund is required to have at least 75% of the value of its total assets in cash and cash items, government securities, securities of other investment companies, and other securities. The securities of a single issuer that account for more than 5% of the diversified AMF’s assets or that constitute more than 10% of the issuer’s voting securities are excluded from the 75% bucket. A ‘non-diversified’ AMF (a fund that does not meet the definition of “diversified” fund) is not required to comply with this test.”).
- 45 Mutual funds could adopt such strategies if they built significant liquidity buffers to ensure they could meet daily redemptions in most circumstances.
- 46 For further details on these rules, *see* AIMA Guide to Liquid Alts, *supra* note 43, at page 17.
- 47 For further details on these rules, *see* AIMA Guide to Liquid Alts, *supra* note 43, at pages 17-18.
- 48 *See* “Use of Derivatives by Registered Investment Companies and Business Development Companies”, [85 FR 83162](#) (21 December 2020). These new requirements became effective 19 February 2021, however, the compliance date is 19 August 2022.
- 49 The underlying liquidity is the combined liquidity of the three other attributes: asset liquidity, funding liquidity and strategy liquidity.
- 50 ESMA 2020 Statistical Report, *supra* note 4.
- [NB: The reference to private equity’s weekly to monthly redemption frequency may not be fully representative of the wider EU open-end private equity fund population as there is typically no redemption in a broader private equity context.]
- 51 *See* SEC, “[Private Funds Statistics, Second Calendar Quarter 2019](#)” (29 January 2020) (“SEC 2019 Statistical Report”), at page 35.
- 52 ESMA 2020 Statistical Report, *supra* note 4.
- 53 ESMA 2020 Statistical Report, *supra* note 4.
- 54 For a definition of “activism”, *see supra* note 31.
- 55 *See* AIMA Efficient Flows, *supra* note 30.
- 56 A large amount of liquidity related information has to be disclosed by AIFMs on the template set in Annex IV of the ‘AIFMD Level 2 Regulation’, *see supra* note 38. U.S. registered investment advisers are required to report similar information on the SEC’s Form PF. *See* Form PF Template, *supra* note 39.
- 57 *See* BIS, “[Establishing viable capital markets](#)”, CGFS Papers, No 62 (January 2019).
- 58 *See* IMF and World Bank, “[Developing Government Bond Markets: A Handbook](#)” (July 2001), at page 17.
- 59 Style drift occurs when an investment fund’s manager changes the original strategies and goals of the fund. Disappointing returns can for example persuade a manager to adopt new types of strategies that have achieved higher returns. The drift can also occur unintentionally, should the characteristics of the underlying investments change (for instance a mid-size firm can develop into a large one, with different financial needs and dynamics). The frontier between what is style drift and what is not can sometimes be thin. The clauses of some professional investor funds involve extensive parameters

that allow managers for example to invest in the entire investable universe of bonds or stocks. Somehow, style drift can then be practiced within the pre-defined provisions. Whatever the form of the style drift may be, such practice often increases liquidity risks. It remains challenging to pre-define LRM processes that can automatically adapt to new strategies, assets and forms of risks.

- 60 In larger funds, this kind of information is rarely available. Managers act in the best interest of all investors and that might not always be to keep a large liquidity reserve. Modelling typically considers investor concentration aspects (type of investor, largest investors...), combined with qualitative information gathered from the commercial relationships that managers have with clients and the redemption mechanism outlined in the fund's constitutional documentation.
- 61 See AIMA and S3 Partners, "[Accessing the financial power grid, hedge fund financing challenges under Basel III and beyond](#)" (January 2016) ('AIMA Basel III') for further details on the relationship between prime brokers and hedge funds. See also AIMA and CAIA, "[Understanding the use of leverage in alternative investment funds](#)", Trustee Series, Paper 3: Made to measure (2018), for further details on funding liquidity.
- 62 These banking rules have significantly raised the constraints on banks financing professional investor funds, notably "bank internal funding costs". See AIMA Basel III, *supra* note 61, at page 10.
- 63 See SEC, "[Information for Newly-Registered Investment Advisers](#)" (23 November 2010).
- 64 See *supra* note 38, Articles 46 to 49 of the 'AIFMD Level 2 Regulation' for a more detailed analysis of liquidity rules applicable under the AIFMD.
- 65 See ESMA LST Guidance, *supra* note 24.
- 66 For further details on arrangements, see the analyses on "investor liquidity" in Section 2.1.
- 67 KPMG, "[Report on the Operation of the Alternative Investment Fund Managers Directive \(AIFMD\) – Directive 2011/61/EU FISMA/2016/105\(02\)/C](#)", submitted to the European Commission on 10 December 2018, at pages 221-222.
- 68 For further details, see the Table 1 of Turner J., D. Vaughan, C. Gardner and R. Fenwick (2014), "[A Practical Comparison of Reporting Under AIFMD versus Form PF](#)", The Hedge Fund Law Report, Vol. 7, Number 41, Advise Technologies, LLC, Dechert, LLP.
- 69 For that purpose, authorities can advise to use a number of buckets ranging from highly liquid to illiquid.
- 70 The two forms use different categories for the classification of investors.
- 71 For example, the fields 178-185 of the template set out in Annex 4 of the 'AIFMD Level 2 Regulation' (See *supra* note 38) require the AIFM to report the percentage of the AIF's portfolio that is capable of being liquidated within each of the liquidity periods specified. This requirement, however, diminishes the usefulness of the data reported because it causes AIFMs to report that certain AIFs are less liquid than they actually are. For example, a position might be able to be partially liquidated between 1 and 30 days, but it might take up to 90 days to completely liquidate the position. Currently, an AIFM must show that all in the 90-day category. Allowing AIFMs to spread the likely liquidity into the various categories will provide a more accurate view of AIFs' liquidity. The requirements that each investment must be assigned to only one period must therefore be reconsidered.

- 72 AIMA has published a Position Paper on Improving Regulatory Reporting under the AIFMD on potential ways regulatory reporting in the form set out as Annex IV of Commission Delegated Regulation (EU) No. 231/2013 could be improved, see <https://www.aima.org/resource/aima-position-paper-on-improving-systemic-regulatory-reporting-under-the-aifmd.html>.
- 73 Several reports have shown that in recent years the aggregate underlying portfolio liquidity of hedge funds has by far exceeded the liquidity offered to investors across the different time periods. See, e.g., IOSCO, “[Report on the Fourth IOSCO Hedge Funds Survey](#)”, Final Report FR22/2017 (November 2017), at page 25, Figure 11. Following the market volatility in 1Q 2020, the ECB has suggested that “[m]inimum liquidity buffers should also be considered, to manage increased liquidity needs from outflows or margin calls in a stress period.” ECB 2020 Report, *supra* note 8. While liquidity buffers are sound practice for professional investor funds, minimum liquidity buffers are not appropriate in this context due to the substantial diversity of investment strategies and diversity of liquidity profiles in the professional investor fund space.
- 74 See ESRB, “[Issues note on liquidity in the corporate bond and commercial paper markets, the procyclical impact of downgrades and implications for asset managers and insurers](#)” (May 2020), at page 4.
- 75 See IOSCO Good Practices Report, *supra* note 28 (columns that concern exclusively retail funds and/or non-EU countries have been removed).
- 76 Regulatory sandbox was first introduced by the FCA in the UK at end-2015 and broadly similar frameworks have since then been adopted among others by Australia (ASIC, 2016), the Netherlands (AFM-DNB, 2016), Switzerland (FINMA, 2016), Singapore (MAS, 2016b), Thailand (Finextra, 2016) and Hong Kong (Pinsent Masons, 2016).
- 77 Trading of less liquid assets is limited, thus generating little data.
- 78 See SEC 2019 Statistical Report, *supra* note 51, and ESMA 2020 Statistical Report, *supra* note 4.

