Banc Ceannais na hÉireann
Central Bank of Ireland
Eurosystem

Good Practices on incorporating implicit costs into the calibration of price-based LMTs

April 2026

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Overview

Liquidity management tools (LMTs) are mechanisms used to aid in the management of open-ended fund (OEF) liquidity needs and risks. There are two main types. Quantity-based tools (Q-LMTs) seek to restrict the quantity of investor redemptions or subscriptions for a period of time (or, in the case of suspensions, indefinitely). Q-LMTs are typically used in in stressed scenarios, in response to increased redemptions. Anti-dilution or price-based LMTs (P-LMTs) aim to pass on the estimated costs of liquidity associated with fund subscriptions or redemptions to the transacting investors by adjusting the net asset value (NAV) of the fund or the price at which they transact.

The responsibility for the use of P-LMTs lies with regulated firms. The Central Bank recognises that there is a range of P-LMTs that could achieve similar economic outcomes and that the operationalisation of these can entail practical challenges. In that context, these Good Practices are designed to assist fund managers in estimating the implicit costs associated with subscriptions and redemptions, including any significant market impact, and in incorporating these implicit costs in the calibration of P-LMTs.

Including both the explicit and implicit costs of trading activity within the calibration of P-LMTs allows the costs of liquidity to be accurately allocated to investors subscribing to or redeeming from a fund, thus preventing dilution of the remaining investors' value. It also helps mitigate first-mover advantage at the fund level, thereby discouraging runs that can amplify market volatility with an adverse impact on broader financial stability. Accounting for both explicit and implicit costs is a key component of P-LMT calibration, as set out in the 2025 IOSCO Guidance for Open-ended Funds for Effective Implementation of the Recommendations for Liquidity Risk Management.

Implicit costs are the market related costs associated with a specific transaction. They include costs associated with the bid/ask spread and market impact estimates, and unlike explicit costs (such as broker commissions, taxes and other fees) these can often be non-linear in nature and can change based on market conditions. Implicit transaction costs are more difficult to estimate in advance of the transactions than explicit costs, as they may vary depending on the

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asset in question and prevailing market conditions. The importance of implicit costs, and the accompanying calibration challenge, is acknowledged in the ESMA Guidelines on LMTs of UCITS and open-ended AIFs which call for implicit costs (including any significant market impact) to be considered on a best effort basis, where appropriate to fund strategy, as part of the calibration of P-LMTs. The inclusion of implicit costs is particularly relevant for daily dealing OEFs investing in assets which fall into Category 2 (less liquid) as outlined under Revised FSB Recommendation 3, as these assets can experience further reduced liquidity under stressed market conditions.

This document primarily focuses on market impact when discussing implicit costs, as this is more complex than the bid/ask spread component. The good practices below are designed to accommodate diverse fund types, recognising that market impact varies by investment strategy, asset class, and market environment.

Section 1 introduces the role of implicit costs (particularly market impact) within LMT calibration and outlines its key components. Section 2 contains examples for incorporating market impact estimates into different P-LMTs. Section 3 summarises the main data sources which help to estimate market impact. Finally, section 4 sets out some good practice approaches to other aspects such as governance, disclosure and transparency.

Section 1 - Introduction

1.1 Background

The Financial Stability Board (FSB) and the International Organization of Securities Commissions (IOSCO) have collaborated in recent years to address liquidity mismatch vulnerabilities in open-ended funds (OEFs), resulting in revised policy recommendations and guidance issued in December 2023. The FSB's Revised Recommendations introduce a categorisation system, with OEFs labelled according to asset liquidity (liquid, less liquid, illiquid) to align redemption terms with asset liquidity, aiming to reduce financial stability risks. IOSCO's Guidance on Anti-Dilution (or Price-Based) Liquidity Management Tools (LMTs) promotes consistent use of tools like swing pricing and anti-dilution levies to mitigate investor dilution and first-mover advantages, while also emphasising robust

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governance, disclosure, and calibration in both normal and stressed market conditions.

At a European level, ESMA developed Regulatory Technical Standards (RTS) relating to LMTs following a consultation period in 2024. These RTS aim to enhance fund managers' ability to manage liquidity under stress, promoting consistency in application of LMTs across European Union member states. The European Commission adopted ESMA's proposals with some amendments in November 2025.[1] The RTS will become immediately applicable for funds established on or after 16 April 2026, while funds already in existence prior to that date will have a one-year implementation period.

The Central Bank supports the FSB and IOSCO's efforts to enhance the resilience of the Non-Bank Financial Intermediation (NBFI) sector, including addressing vulnerabilities related to liquidity mismatch in OEFs. Specifically, the Central Bank supports the FSB proposals on greater use and greater consistency in the use of anti-dilution or price-based LMTs. A key aspect outlined in the proposals is the need for responsible entities to estimate the full cost of liquidity, i.e., explicit and implicit transaction costs of subscriptions or redemptions, including any significant market impact of asset purchases or sales to meet those subscriptions or redemptions.

This document thus aims to outline overarching good practices relating to P-LMTs, outlining how fund managers can ensure they have appropriate systems, procedures and controls for P-LMT use as part of everyday liquidity risk management. In particular, the document outlines good practices in accounting for implicit costs (particularly market impact) when calibrating P-LMTs.

1.2 Explicit and Implicit Transaction Costs

When investors subscribe to or redeem from an OEF, fund managers have to invest capital received by purchasing assets or distribute capital redeemed by selling assets. Such transactions incur costs, both explicit and implicit, relating to the transaction (which would otherwise not occur). Non-transacting fund investors may suffer

[1] See here ESMA's changes to their Guidelines to align with the RTS as adopted by the European Commission: https://www.esma.europa.eu/sites/default/files/2025-12/ESMA34-671404336-1363_Report_on_amended_guidelines_on_LMTs.pdf.

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dilution unless fund managers attribute these associated explicit and implicit transaction costs to subscribing or redeeming investors. If that is not the case, the NAV per share or unit may be reduced by the amount of the transaction costs expected to be incurred.

To mitigate material dilution and to protect remaining investors, IOSCO guidance states that responsible entities should attribute the explicit and implicit transaction costs to entering or exiting investors by using anti-dilution or P-LMTs to adjust the fund NAV or the final price to be paid / received by transacting investors. Furthermore, by mitigating material investor dilution, the use of such tools may also help to reduce any first-mover advantage, as investors will no longer benefit (in terms of pricing) from redeeming earlier than other investors.

Explicit costs such as brokerage/market fees, taxes and levies are generally stable and quantifiable in advance of the transactions to a high degree of accuracy. Fund managers should be able to identify these costs based on previous transactions and contractual arrangements.

Implicit transaction costs such as bid/ask spreads and market impact are more difficult to estimate in advance of the transactions, as they may vary depending on the asset in question and prevailing market conditions. Bid/ask spreads, for example, may range from single-digit basis points in liquid markets during normal conditions, to hundreds of basis points for less liquid assets during stressed market conditions. IOSCO's guidance expects fund managers to use their professional judgement, trading experience and best efforts to estimate implicit transaction costs, incorporating relevant external data sources where appropriate.

1.3 Role of market impact in LMT calibration

Market impact is another implicit cost incurred, in addition to bid/ask spreads, when a fund manager completes the trading necessary to meet a net fund flow. This cost is also sometimes referred to as price 'slippage', as it accounts for the potential difference between the price when the order was placed and the final executed price. For example, when a transaction from a fund is large relative to the overall market liquidity, part of the transaction may be executed outside the market 'screen price' or stated bid/ask spread, and this

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additional cost constitutes the market impact of the transaction of that asset.

The use of P-LMTs ensures that transacting investors bear costs which more closely reflect their trading activity, thus mitigating material dilution of non-transacting investors. Estimating the market impact of trading activity supports this goal, particularly when market conditions are stressed, the order size is large, and/or if the underlying market is less liquid, any of which can lead to the transaction being executed outside of what is known as the "screen price".[2]

Thus, good practice is for fund managers to estimate market impact when applying P-LMTs, as this ensures fair cost allocation and alignment with the NAV strike, which is typically calculated at a fixed point (e.g., end-of-day) and used to price investor subscriptions or redemptions. Estimating market impact in this manner allows P-LMTs to more accurately attribute anticipated transaction costs (e.g. bid/ask spreads, significant market impact), preventing dilution of remaining investors' value. Including this market impact estimate in the calibration of P-LMTs is particularly important when it is 'significant' such that the dilution impact arising from fund subscriptions/redemptions will be material on investors.

While estimating market impact can be challenging, it is a key consideration in liquidity cost allocation, so that remaining fund investors do not suffer dilution. As a result, IOSCO guidance states that fund managers should use their best efforts in estimating market impact, taking into consideration potential limitations around data availability. It is expected that the estimation of market impact will improve over time as fund managers gain experience and, following regular reviews, refine their calibration.

1.4 Components of market impact

Market impact arises from a series of factors that can increase transaction costs beyond explicit fees (e.g. fiscal charges, broker commissions) and are not directly included in bid/ask spreads. Good practice is for fund managers to consider each of the components set

[2] More information on best practice standards relating to market timing can be found here: https://www.iosco.org/library/pubdocs/pdf/IOSCOPD207.pdf.

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out below when estimating implicit costs and ensure estimates reflect the true, estimated total cost of market transactions.

Trade Size: The size of a trade is important in the context of an asset's overall average daily trading volume. Large trades in less liquid assets, such as small-cap equities or private debt, can significantly move prices. If the trade is sufficiently large, then bid/ask spreads alone may not be a good indicator of the total transaction fee involved. Good practice is to consider assessing trade size in the context of the asset's liquidity profile, using metrics such as average daily volumes to estimate the potential price impact. This will imply different market impact estimates for different individual securities within a fund.

Market Depth: The depth of a market relates to the number and size of buy and sell orders at different price levels in the order book. Shallow depth indicates limited liquidity and therefore higher price sensitivity to trading activity. Analysing order book data from trading platforms or third-party data providers to gauge market depth could be considered before executing trades. Good practice is to incorporate depth estimates into market impact models, particularly for less liquid assets. During periods of unusually low overall market depth, good practice is to account for uncertainty and to protect against unexpected costs being assigned to non-transacting investors.

Market Volatility: This refers to the magnitude and frequency of price fluctuations in a market, where higher volatility increases the price sensitivity of trades, thereby amplifying market impact costs. Good practice is to monitor relevant volatility metrics for their traded assets, for instance VIX or VSTOXX for equities, or MOVE or Bund volatility indices for bonds, and integrate volatility forecasts into market impact models, using stress testing or scenario analysis to estimate costs under both normal and stressed conditions.

Trading Venue: This refers to the platform or market where a transaction is executed. For example, listed stock exchanges will often have more liquidity than over-the-counter (OTC) markets or 'dark pools'. Fund managers can select trading venues based on asset type and liquidity needs, evaluating factors such as venue-specific liquidity, transparency and execution speed. Good practice is to use venue-specific data when estimating market impact, with order book

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depth or historical execution cost data appropriate for exchanges, while pre-trade broker quotes may be more appropriate for OTC markets. Incorporating trading venue effects into LMT calibration can support fair cost allocation to investors.

Good practice is to consider each of the above factors at the asset or security level (a 'bottom-up' approach). Once the market impact is estimated, fund managers can assess the materiality of this impact and whether to include it in the calibration of the P-LMT.

Section 2 – Examples for incorporating market impact estimates into LMTs

2.1 ESMA guidelines

As outlined earlier, the ESMA Guidelines on LMTs of UCITS and open-ended AIFs call for any significant market impact, where appropriate to funds' strategy and on a best efforts basis, to be considered as part of the calibration of swing pricing, anti-dilution levies, dual pricing and redemption fees. As LMTs differ considerably in how they are operationalised, this section provides a high-level outline of how estimates of market impact can be incorporated into the respective LMT.

2.2 Swing pricing

Market impact is incorporated into swing pricing through the swing factor, a percentage adjustment to the NAV. The swing factor can include explicit costs such as broker commissions, custody fees and fiscal charges where relevant, along with implicit costs, namely bid/ask spreads and market impact. The latter can be calibrated using the components outlined above, utilising as many data sources as necessary to increase its accuracy and distribute costs to transacting investors effectively.

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Good practice is to allow for dynamic adjustments to the market impact estimate, reflecting current market conditions, that are applied when net flows exceed a threshold (partial swing) or for all flows (full swing). For instance, large outflows in a stressed market will likely warrant higher market impact estimates than small inflows in normal conditions. Similarly, bid/ask spreads will be larger under stressed conditions. As with all inputs contributing to the swing factor, good practice is to put the market impact in place at the fund level, allowing for variations in asset liquidity (e.g., wider spreads for illiquid securities) and trade size relative to market depth, which will vary from fund to fund.

Stylised example: Swing Pricing

The Swing Threshold for this fund is set at 1% of its NAV of €150mn, with estimated transaction costs assumed to be 1.2% in normal conditions and 2% in more stressed conditions, reflected in the swing factor in each scenario. As the net redemptions (€75mn) exceed the swing threshold (€1.5mn), swing pricing is used and the NAV is adjusted, as follows:

- In normal conditions, the adjusted NAV per share becomes 100*(1-0.012) = €98.80 per share.
- In stressed conditions, the adjusted NAV per share becomes 100*(1-0.02) = €98.00 per share.

Redeeming investors would receive €98.80 and €98.00 per share in normal and stressed conditions, respectively, with remaining investors protected (the NAV of the fund remains unchanged for these investors).

2.3 Anti-Dilution Levies (ADLs)

Good practice is for market impact to be factored into ADLs when a subscription or redemption will be significant enough to influence the NAV of the fund. The ADL differs from swing pricing as it is a separate fee charged to transacting investors, with the NAV of the fund remaining unchanged (unlike in swing pricing). Fund managers can calibrate ADLs based on the same factors used to calibrate swing factors, both explicit and implicit. Factors which are likely to lead to higher implicit costs and requiring a specific market impact estimate beyond the pricing information provided by bid/ask spreads may include larger trade sizes, lower market depth or higher implied market volatility.

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ADLs can be activated on an ongoing basis (similar to full swing pricing) or dynamically based on pre-defined triggers and thresholds (similar to partial swing pricing). Again, good practice is for the calibration of these triggers and thresholds to be set at the fund level, reflecting the broadest set of data available to a fund manager (for instance historical data, third party data and stress testing). In cases where the ADL is implemented consistently during 'normal' market conditions, fund managers can review its calibration regularly in relation to changing market conditions to ensure its effectiveness in allocating transaction costs.

2.4 Dual Pricing

This tool is typically used by funds that invest in assets whose liquidity costs are mainly comprised of the bid/ask spread. However, good practice is for fund managers to use an additional adjustment to the NAV to account separately for any significant market impact or implicit transaction costs, which could potentially widen spreads in stressed market conditions (particularly for less liquid assets).

Fund managers can consider using pre-defined thresholds (based on the various market impact components and available data sources and incorporating stress testing and scenario analysis) to determine whether such adjustments are required to protect non-transacting investors from dilution.

2.5 Redemption Fees

This tool is most often used by funds that invest in assets where most, or all, of the transaction costs are fixed and foreseeable. As with dual pricing, this tool is sometimes favoured as other P-LMTs may be difficult to implement.

Nonetheless, when calculating appropriate redemption fees within such funds, good practice is for fund managers to apply a methodology which allows for regular reviews and adjustments (if necessary), to reflect higher implicit costs due to factors such as lower market liquidity or higher market volatility. Fees can again be calculated based on the market impact components and data sources outlined in earlier sections of this document, and they can also be calibrated to asset-specific costs.

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Section 3 – Data sources for estimating market impact

3.1 Increasing Accuracy

Increasing the accuracy of the market impact estimate can help to more effectively attribute costs to transacting investors. Incorporating some, or all, of the following data sources can enhance the robustness of the LMT calibration process with respect to market impact.

3.2 Internal Data

This refers to historical trade execution records from the fund's own trading desks, capturing costs, trade sizes, and market conditions for prior transactions. This data is specific to the fund's trading activity and asset holdings. Good practice is for fund managers to have a process to systematically collect and analyse this data to identify patterns in market impact across different assets and market conditions.

Good practice is to maintain a database of trade outcomes, updated regularly, and to segment data by asset class, liquidity profile and prevailing market conditions to refine estimates. Fund managers can consider conducting quarterly or semi-annual reviews of their market impact estimations, comparing estimated costs to realised costs from internal trade data. For instance, where back-testing reveals consistent underestimation in illiquid markets, estimates or models can be adjusted.

3.3 Broker Estimates or Indicatives Quotes

These are pre-trade cost projections provided by brokers, based on current market conditions, liquidity, and their expertise in specific asset classes or venues. Fund managers can consider engaging multiple brokers (where possible) to obtain a range of estimates, reducing reliance on a single source and capturing diverse perspectives on market impact.

Good practice is to request quotes tailored to the trade's specifics (e.g., size, venue, or timing) and to validate these against historical data or third-party information/data. For less liquid assets, such as

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high-yield bonds or OTC derivatives, brokers' market knowledge is particularly valuable.

3.4 Third-Party Data Providers

Several firms offer data products/solutions which are aimed at Fund managers to understand and manage costs associated with their trading activity. These data (or models) can then be combined with a fund's own data to estimate expected market impact or transaction costs across a range of asset classes, and under specific scenarios. These sources can be particularly useful for benchmarking or estimating costs for infrequently traded assets. Fund managers can consider selecting providers with robust coverage of the fund's asset classes, ensuring access to granular data such as order book depth, volatility indices, or venue-specific costs.

Good practice is to integrate this third-party data into market impact estimates directly, using it to benchmark internal estimates or to help fill gaps for infrequently traded assets. Fund managers can also consider combining third-party data with internal records to tailor market impact estimates to the fund's trading profile, supporting LMT calibration.

3.5 Stress Testing or Scenario Analysis

These tools involve simulating trades under adverse market conditions (e.g., high volatility, low liquidity, or market crises) to estimate potential market impact across various scenarios, which can then be used as a valuable data source for LMT calibration. Fund managers can consider developing scenarios based on historical crises (e.g., 2008 financial crisis, 2020 COVID market shock) or hypothetical events (e.g., interest rate spikes) to assess market impact under stress.

Good practice is to use quantitative estimates that incorporate market impact components such as trade size, market depth, and volatility, supplemented by third-party or internal data. This analysis should be conservative in nature, particularly for funds with less liquid assets, and be reviewed periodically to reflect evolving market risks. Fund managers can also consider documenting scenarios for governance and supervisory purposes.

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Section 4 – Other aspects for consideration relating to fund LRM framework

4.1 Liquidity Risk Management (LRM) Framework

IOSCO guidance states that, independent of which price-based LMT is used, fund managers should ensure that their calibration of market impact is 'fair and reasonable' under both normal and stressed market conditions. This can be supported by other aspects such as periodic back-testing, strong governance and transparency, which are also relevant for a fund's broader liquidity risk management (LRM) framework. Good practices with respect to these aspects are outlined in the below sections.

4.2 Back-testing

The estimation of market impact within the overall calibration of P-LMTs is expected to be an iterative process, due to the level of complexity involved and the forward-looking nature of the calculation at the time of implementation. Therefore, the accuracy of the calibration is expected to be improved over time based on experience gained by fund managers and regular reviews or back-testing.

Good practice is for back-testing to be performed periodically, for instance quarterly, to compare actual transaction costs with the estimated transaction costs, including the market impact estimate. These reviews may also be conducted more frequently during or after significant market events, while feedback from any back-testing can also be used to improve the quality of the calibration.

4.3 Governance

P-LMT calibration can be incorporated into the overall governance and oversight structures, including where relevant specific governance pertaining to how market impact estimates and their integration into LMTs are approved (and reviewed on a regular basis), ensuring consistency in application, accountability and compliance.

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Good practice is to document all processes, from estimation to application, in Board and other relevant governance materials, ensuring transparency. The committee can review LMT outcomes regularly (at least quarterly), including the efficacy of market impact estimates.

4.4 Disclosure and Transparency

The level of disclosure relating to market impact can be aligned to the broader disclosure around LMTs within each Management Company. Where market impact estimates are used within a fund, this can be outlined within the fund's prospectus, with a high-level summary of their purpose included, using accessible language.

Good practice is to address investor queries about LMTs in FAQs, explaining how tools like swing pricing protect against dilution, and how market impact estimates ensure fairness, in both normal and stressed periods. Fund managers can consider emphasising that market impact calculations are estimates, subject to uncertainties like liquidity shifts or volatility. This manages expectations and reduces misperceptions about precision. If a range of swing factors or ADLs are disclosed, it can be noted that these are not a cap or restriction, and the range may have to be expanded during stress periods to allow the LMT to achieve its objective in passing on the relevant liquidity costs to transacting investors. Fund managers can also document the rationale for market impact methodologies more broadly, including data sources and assumptions, in board and audit materials, in line with broader documentation around LMTs. This supports robust oversight and accountability.

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