



Modelling Illiquid Assets within Multi-Asset Portfolios

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A Common (But Flawed) Approach to Incorporating Illiquid Asset Classes

It is common practice for investors and consultants to establish return, volatility and covariance assumptions for all their asset classes, and to use these to produce a raft of portfolio return and risk statistics. A key assumption underpinning this kind of analysis is that portfolios can be rebalanced to target, even after large market drawdowns. One of the key benefits of diversification comes from the idea that we can rebalance from assets that have performed well into those that have not, and then reap the benefits as they mean revert to their long-run returns.

But certain characteristics of illiquid asset classes can invalidate this key assumption. To illustrate this, you simply need to recall the situation that some funds found themselves in during the Financial Crisis. After years of strong returns and expanding fund

balances, these funds found themselves underweight private market asset classes and made unfunded commitments to get back to target. When equity markets collapsed the size of the funds shrank, but their unfunded commitments remained. To retain liquidity to meet potential capital calls, some funds were forced to reduce distributions, sell equities at depressed prices, or even borrow, while elsewhere in the market many asset classes offered valuations at generational lows.

Lessons From the Financial Crisis

The introduction of illiquid asset classes into a portfolio brings with it several features that investors need to incorporate into their portfolio modelling if they are to gain a more complete picture of their risks and opportunities. The experience of the Financial Crisis highlights that investors should consider the following when modelling illiquid asset classes:

- Breaking the nexus between the fund size and the percentage allocation to illiquid asset classes.
- Incorporating cash flows: Capital calls and distributions, along with growth and income, need to be factored into portfolio modelling.
- Incorporating unfunded commitments into portfolio modelling and stress testing.

Breaking the Nexus Between Fund Size and Percentage Allocations

Assuming an illiquid asset class's weight is fixed as x% of total fund size does not always make sense, as the overall portfolio value can change day-by-day with market moves or cashflows, while illiquid asset values may only be updated once per quarter and can take months or years to rebalance.

Instead, investors should be able to identify which of their asset classes are illiquid and allow their portfolio weights to be determined by how the value of those asset classes move relative to the overall portfolio. This is particularly useful for stress-testing applications as shown in Exhibit 1.

The top panel of Exhibit 1 shows a forecast for fund size and the relative allocation to illiquid asset classes assuming no new investments are made. The bottom panel shows the same charts assuming a market drawdown event in year one. By breaking the nexus between fund size and illiquid asset class weights we can see that overall illiquidity spikes after the fund drawdown in year one. This analysis can also be extended to include the impact of recurring or one-off cash flows into or out of the fund.

Incorporating Cash Flows

An existing portfolio of illiquid asset class investments will have cash inflows (capital calls) and outflows (income or capital distributions) that need to be considered, especially when stress testing. To demonstrate the importance of cash flows in this paper, we use results based on an example multi-asset portfolio from the Jacobi platform that includes four illiquid asset classes – private equity, real estate, debt, and infrastructure.

In the early years of our analysis, both the private debt and infrastructure asset classes are drawing capital from pre-existing commitments, while private equity and private real estate are returning capital. Later in the simulation the private debt portfolio begins returning capital also. These assumptions are easily visualized in the platform as shown in Exhibit 2.



Exhibit 2: Cash Flow

Source: Jacobi. Simulated results only

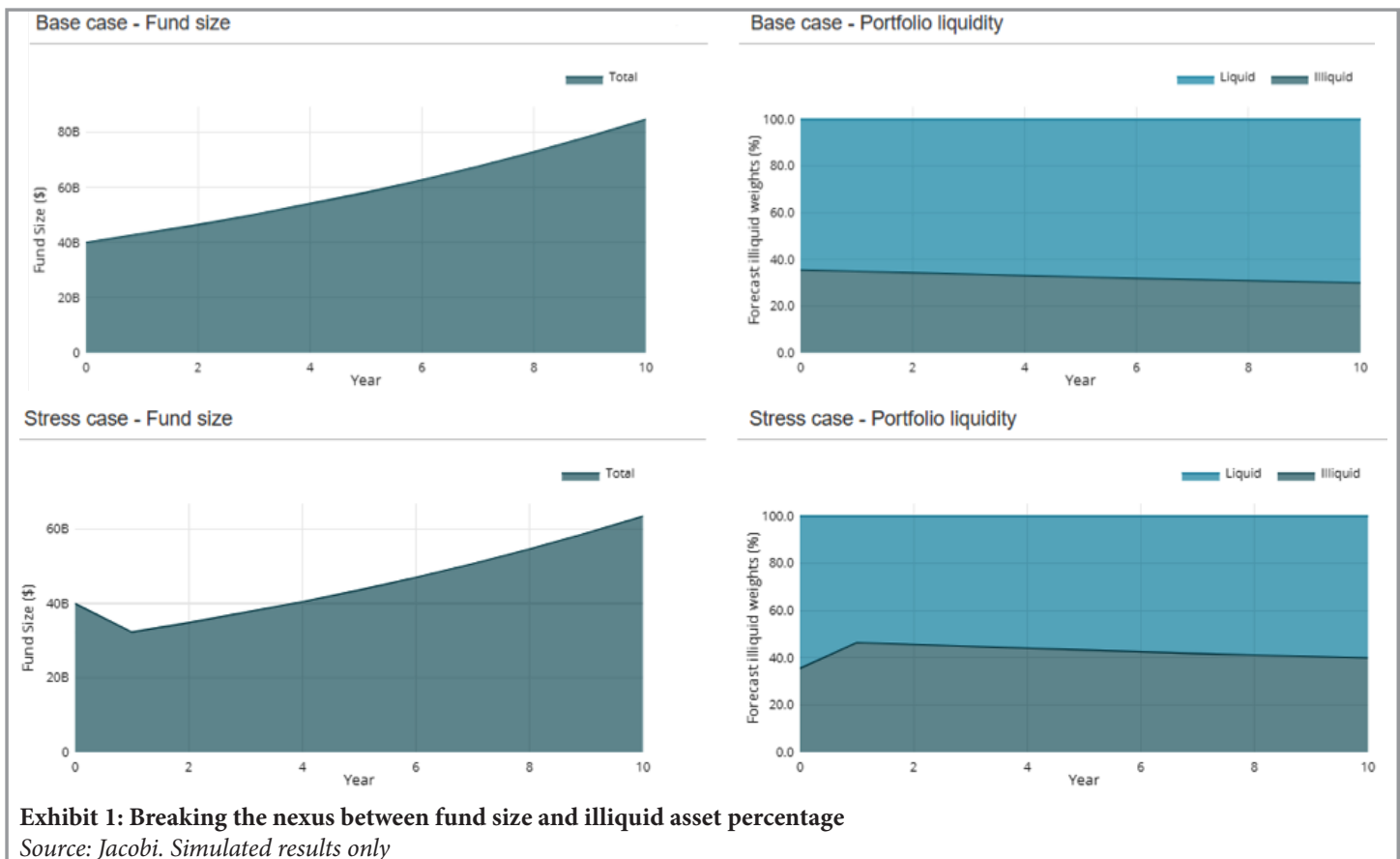


Exhibit 1: Breaking the nexus between fund size and illiquid asset percentage

Source: Jacobi. Simulated results only

Forecast illiquidity

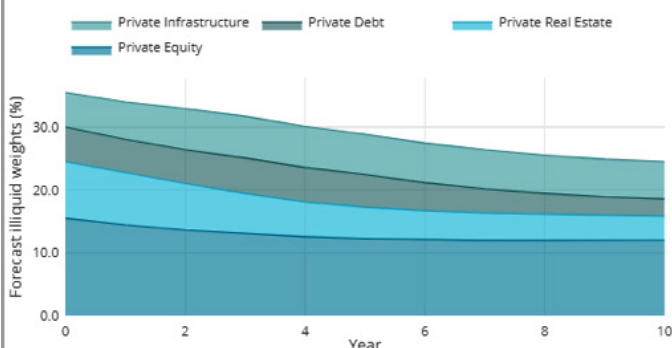


Exhibit 3: Illiquid asset class forecasts with cash flows

Source: Jacobi. Simulated results only

Excess illiquidity (relative to target)



With these assumptions, and splits between growth and income for returns, the investor could forecast their total portfolio volatility as shown in Exhibit 3. The left panel of Exhibit 3 shows the total level of illiquid assets in the portfolio, while the right panel shows the value of illiquid assets relative to the target level.

In this example the weight to illiquid assets falls through time, leading to the portfolio becoming significantly underweight the portfolio targets. Without the ability to incorporate cash flows the modelling would not reflect the extent to which the portfolio was becoming underweight illiquid asset classes. This in turn could result in the portfolio failing to achieve the expected returns and diversification objectives that went in to setting the target weights.

While some investors naturally anticipate the direction of these results, they don't have tools to accurately forecast how much they need to commit/redeem to remain at target weights. This point leads us to the next lesson from the Financial Crisis, the need to forecast and incorporate unfunded commitments.

Incorporating Commitments

Existing commitments can be incorporated into portfolio modelling using the cash flow approach described above. For stress testing and liquidity management purposes the Jacobi platform allows users to have multiple cash flow profiles that can reflect different drawdown rates.

A more interesting application of commitment modelling involves estimating the correct size and pace of future commitments. To maintain illiquid asset classes at their target weights investors continually need to be thinking about the right amount to commit or redeem from their illiquid asset classes. For any given set of circumstances and constraints, Jacobi allows users to solve for the value of commitments or redemptions that best achieves their desired portfolio targets.

Consider again the results shown in Exhibit 3, where the portfolio becomes materially underweight to illiquid asset classes over time. Given a set of target illiquid asset class weights and constraints on what can realistically be committed, Jacobi identifies the commitments shown in Exhibit 4 to minimize variation from target levels of liquidity.

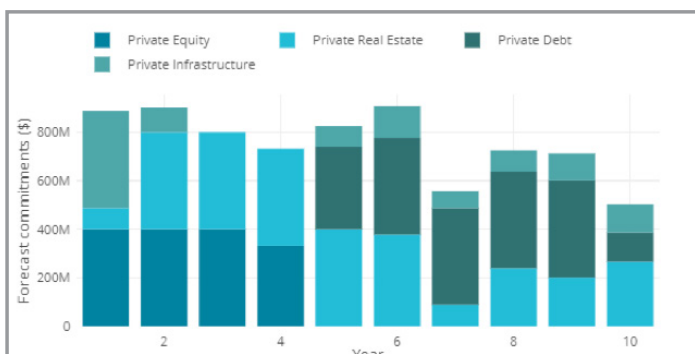


Exhibit 4: Forecast commitments

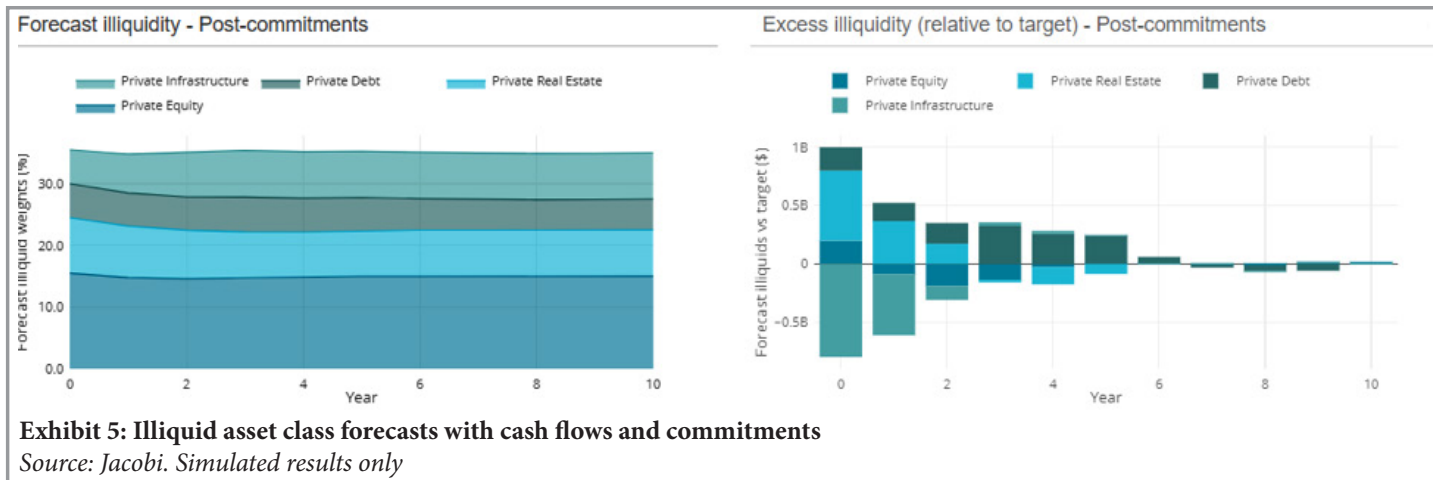
Source: Jacobi. Simulated results only

Incorporating those commitments gives the total portfolio liquidity and excess liquidity (relative to target) shown in Exhibit 5, next page. Clearly, this framework for incorporating cash flows and commitments can be helpful for identifying the size and pace of commitments that are required to help the fund achieve its illiquidity targets.

No Two Investors and No Two Portfolios Alike

The examples used in this paper are relatively simple to clearly illustrate the concepts being discussed. Behind the scenes, there are a wide range of practical questions that investors need to address for their own circumstances to properly model illiquidity within their portfolios. These include:

- How many illiquid asset classes and sub-asset classes do you invest in? What are your assumptions for return and risk?
- From where are capital calls into illiquid asset classes funded?
- What type of rebalancing occurs within liquid asset classes if illiquid weights deviate from target?
- How are fund commitments in foreign currencies handled?
- What pace of drawdowns/capital return should be assumed across asset classes?
- What is the maximum amount the fund can reliably commit in any given year?



We believe that investors need to think very clearly about these questions as they relate to their own portfolios, and be wary of generic, one-size-fits-all solutions or industry “short cut” assumptions.

Conclusion

Investing in illiquid asset classes is not a simple endeavour, yet many investors adopt overly simplistic approaches to modelling them and incorporating them into multi-asset portfolios. Key elements that investors should consider for illiquid assets include breaking the nexus between fund size and portfolio allocation, cash flows, and how commitments/redemptions will impact future asset allocation and liquidity.

Incorporating these three elements into a multi-asset portfolio model, especially in conjunction with the ability to stress factors such as fund returns and cash flows, provides a much more robust way to estimate portfolio risk. As simple as this sounds, there are an infinite number of ways in which this type of analysis could be customized for a given investor’s situation. Investors therefore need a solution that is highly customizable.

Authors' Bio



Daniel Baxter

Jacobi, Head of Portfolio Design

Daniel is a seasoned investment professional with international experience in portfolio construction, risk management and capital markets assumptions. Before joining Jacobi, Daniel was a Senior Strategist at QIC.