

Asset Allocation Dislocation: *Extent, Impact, Solutions*

Emilian Belev, CFA, ARPM
Head of Enterprise Risk Analytics

April, 2020

Overview

- What is Asset Allocation [Dislocation](#) and the Denominator Effect
- Asset Classes are not created equal: [comparison](#) between public and private asset valuations
- Private Asset Valuation [industry guidelines](#)
- A [toolset](#) to implement industry's best practice private asset valuation
- One man's nightmare is another man's learning opportunity: a [Case Study](#) of economically driven risk-adjusted private asset valuations in a crisis
- "The [Solutions](#) are Not (quite) What they Seem"

Overheard

- CIO of a multi-billion US pension plan: “Because of the fluctuations in the market over the past few weeks, our portfolio rates are deviating away from our strategic asset allocation targets”
- CIO of another large US pension plan: “In the past, we have found that after a crisis the opportunities are generally more attractive. We have held cash to be able to take advantage of these types of opportunities.”
- One of the largest global Private Equity firms, which is also *publicly traded corporation*, made a downward adjustment to their global diversified portfolio of **21.6 %** for the first quarter of 2020. For the same period their stock price declined by a commensurate 20%.
- Thomson Reuters Private Equity Buyout Index, which tracks the performance of private equity funds has lost **24 %** this year. The private equity index is derived from a selection of publicly traded securities.

Dislocation Implications

Why is relative value of public and private asset in a mixed portfolio important:

- Affects Total Portfolio Risk estimation
- Affects Total Portfolio Rebalancing
- GP valuations are not standardized and often accounting-based. Not clear how well they reflect the current economic environment. If LPs intend to liquidate interest in funds they may be surprised by the realization value.
- Also LPs have to be able to compare to the value of the commitment – is it justified to keep the position.
- How does an LP strike the right balance in the trade-off between future liquidity capacity (maintain higher public assets weight) and reaching for higher yield in a low yield environment (maintain higher private assets weight)

Illiquid Private Asset Vehicles

- The principle ways in which asset owners invest in private illiquid assets are two:
 - Through limited partnerships – i.e. private funds
 - Through direct investing / co-investing with private asset fund managers

- The typical underlying assets in which limited partnerships invest are:
 - Equity in private companies – common, preferred, hybrid. These investments can be early stage “venture capital”, growth, or late stage, i.e. “buyouts”.
 - Debt in private companies – convertible, or not. These investments can be in companies with stable financial status, or distressed companies.
 - Real Assets – commercial real estate, real assets.
 - Natural resources – farmland, timberland, etc.

Not all *Fair Value* is Equally “Fair”

The term *Value* has vastly different meanings in different investment settings and asset class situations. Yet very often “values” across the board are treated all the same and put under a common denominator.

- Public assets have quoted market prices – a type of value which the investor can redeem for cash at any moment in time
- Private assets have values assigned which are nominally designed to replicate an amount at which the investor can redeem the asset, but this is only in theory based on one of the following:
 - Accounting – *historic, accrual, convention-based*
 - Mark-to-market – *often a misnomer: a subjective assignment of comps*
 - Mark-to-model – *only as good as the model used*
 - Utility to buy and hold – *subjective by definition*

How Public and Private Asset Really Differ

- Public asset investors pay a premium to stay liquid at all times, and they are subject to extreme "fat tails" type of volatility when the listed markets, like recently, hoard to dump exposure and obtain liquidity, or if in strong up markets, hoard to provide liquidity and buy exposure.
- Long term investors, as long as not subject to the same liquidity requirements, are also not subject to such extreme volatility.
- In the long run, the performance of private equity converges with that of public equity because most targeted exits are going public or getting acquired by a public entity.
- With regards to the mean or "expected" performance, however, private management has the advantage of:
 - lower entry point due to the capacity of investors to stay illiquid for long
 - the ability of concentrated ownership to produce better management decisions for growing faster than the particular sector due to better cost saving and improved market share.

Industry Guidelines on Fair Value

- The main sources of industry guidance on private asset valuations come from organizations like the AICPA, IPEV, and the CFA Institute. All of them define fair value as the amount to be realized for an asset sale in an orderly market transaction.
- With some variation in themes they agree that the following valuation approaches are applicable to the usual situations that arise in practice:
 - Cost approach – *adjusting historic values with write-ups and write-downs for events of significance; accounting driven approach*
 - Market Comparable – *finding suitable similar assets that recently traded – public or private, and assume that value*
 - Economic Approach – a range of related techniques and variations: DCF, scenario based, EV-build-up, certainty equivalent approach, PWERM, etc.

What approach makes sense

- Captures the projected behavior of the specific fund or investment in terms of **expected growth and cash flow pacing**
- Reflects the risk of the **uncertain cumulative net cash** flow value over the lifetime of the fund or investment
- Acknowledges the **non-normal statistical distribution** properties of the cumulative net cash flow value. Private investments have serially dependent growth and volatility from one period to the next, so they become non-normally distributed over their lifetime.
- Incorporates explicitly a **multi-period view**. In contrast, a DCF model with a discount rate from a single period model like CAPM *does not* reflect evolving beta or higher-moments of payoff distribution.
- Adjusts for **investor risk aversion** exhibited in recent market transactions

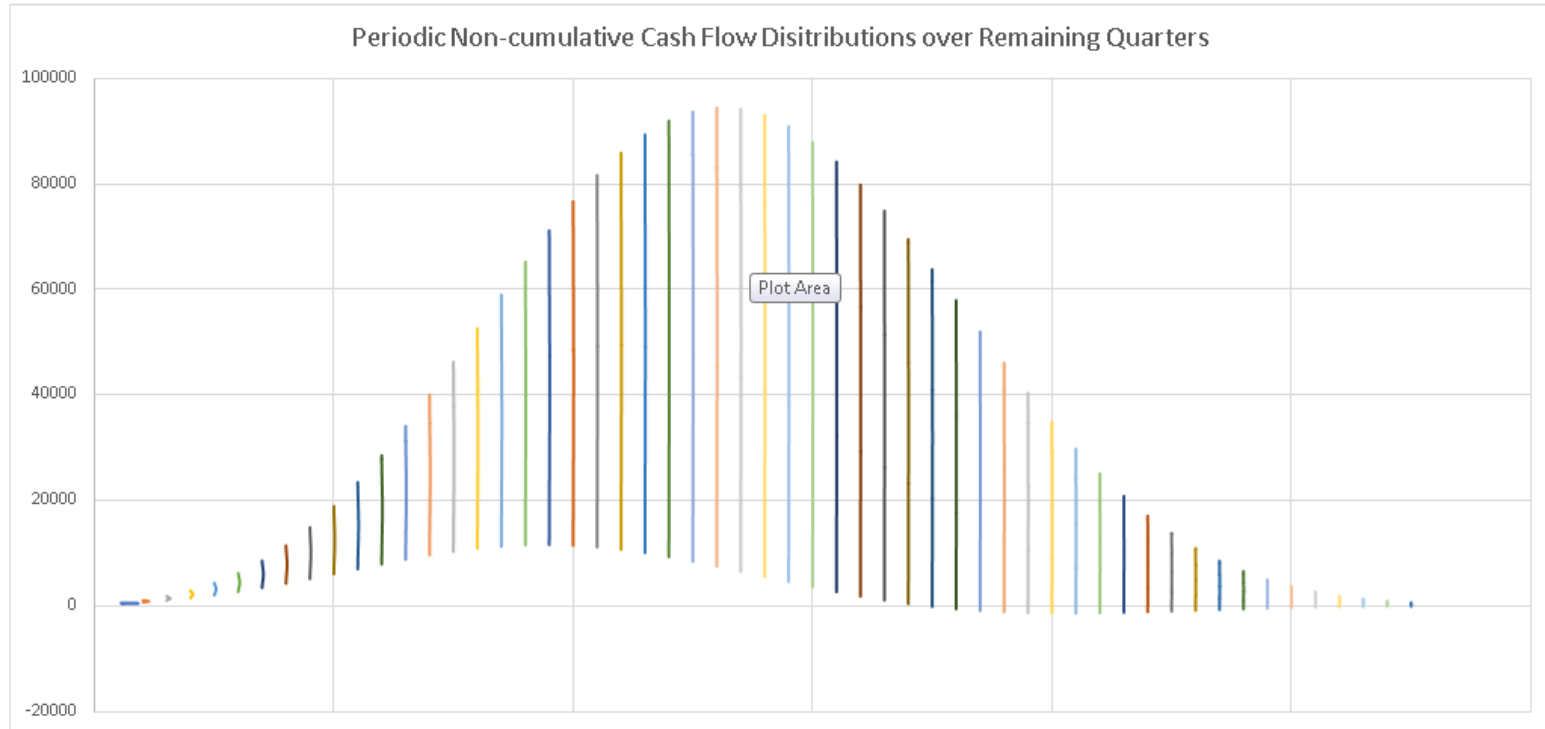
Valuation approach:

The **Economic Approach** gives the framework to reflect all the variables driving payoff:

1. We start by calibrating a **cash flow pacing model** that reflect normal and stress conditions
2. Forecast **expected cash flows** using growth rates that fit respectively normal and recessionary environments
3. Apply a risk factor model to introduce probability ranges (**cash flow risk**) of net cash flows in each period of the specific fund lifetime
4. Use the periodic cash flow ranges and a large number of paths (**10²¹**) that span the full spectrum of possible cumulative cash flow realizations to build a **statistical distribution of cumulative fund value**
5. Using the level of **risk aversion** of the most recent market environment, adjust the statistical distribution (4) to be "**risk neutral**". The expected value of a "risk neutral" distribution is the fair **price of the private fund position**.

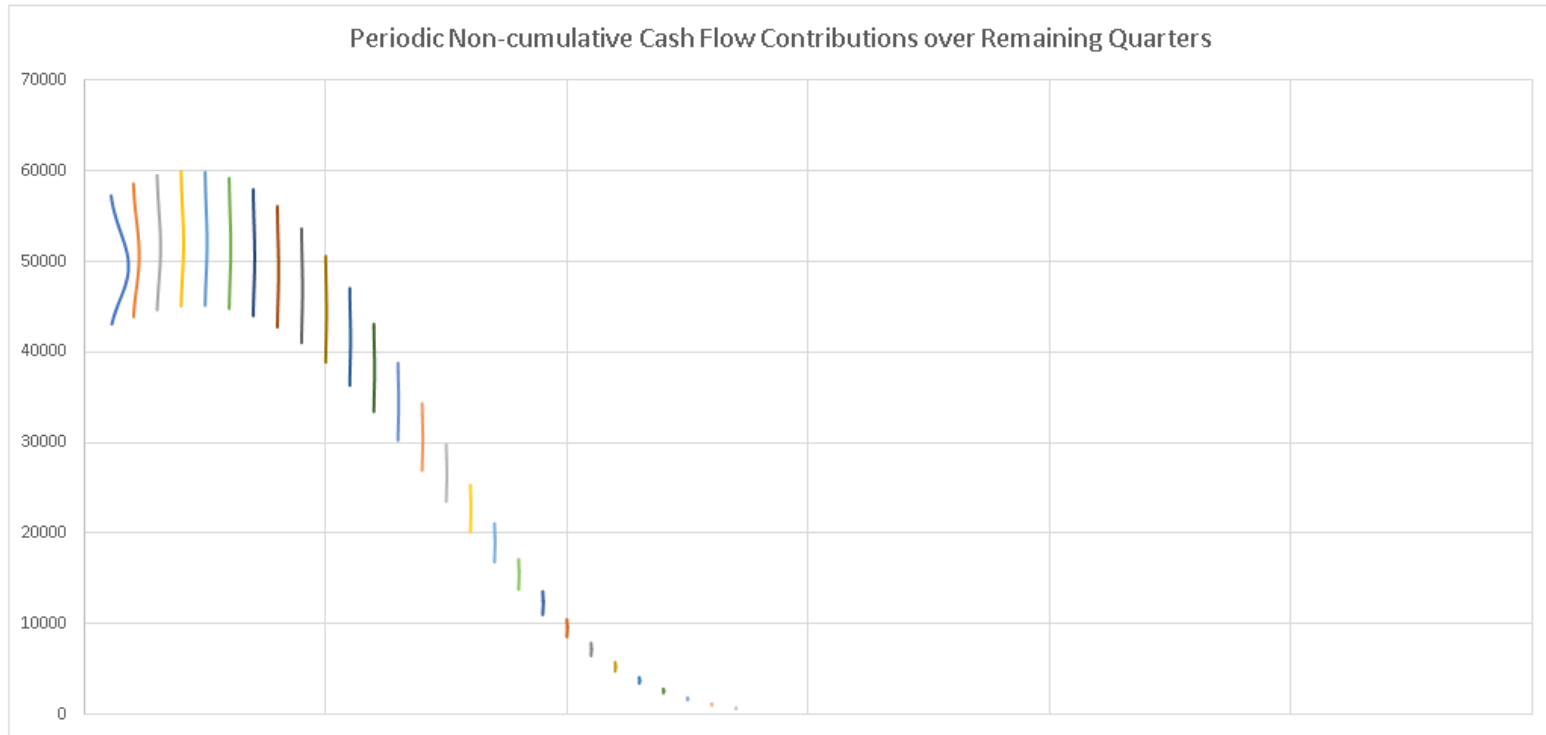
Forecasting Private Fund Cash Flows

Cash Flow Forecast

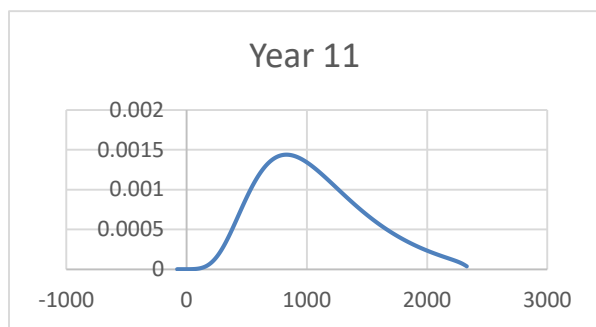
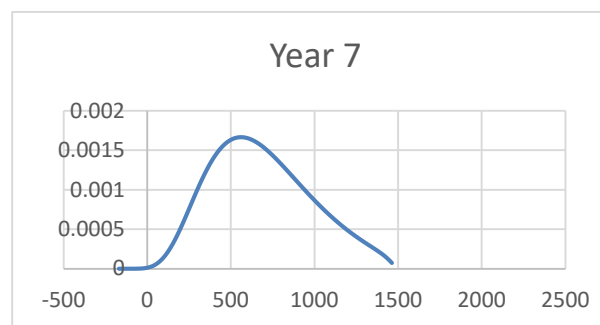
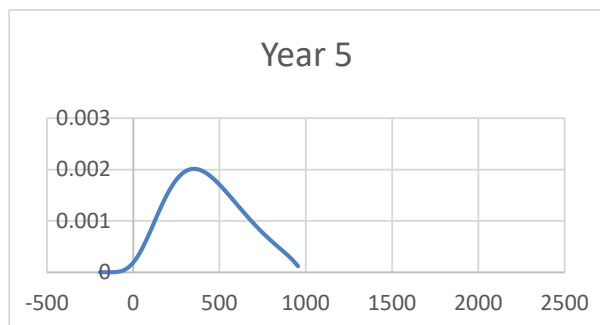
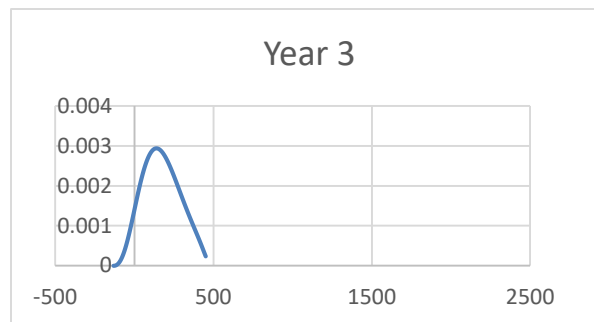
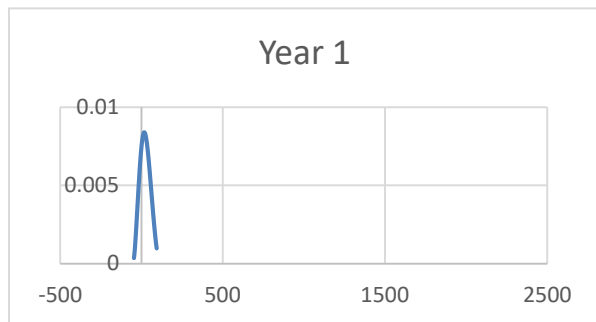


Forecasting Cash Flows (cont'd)

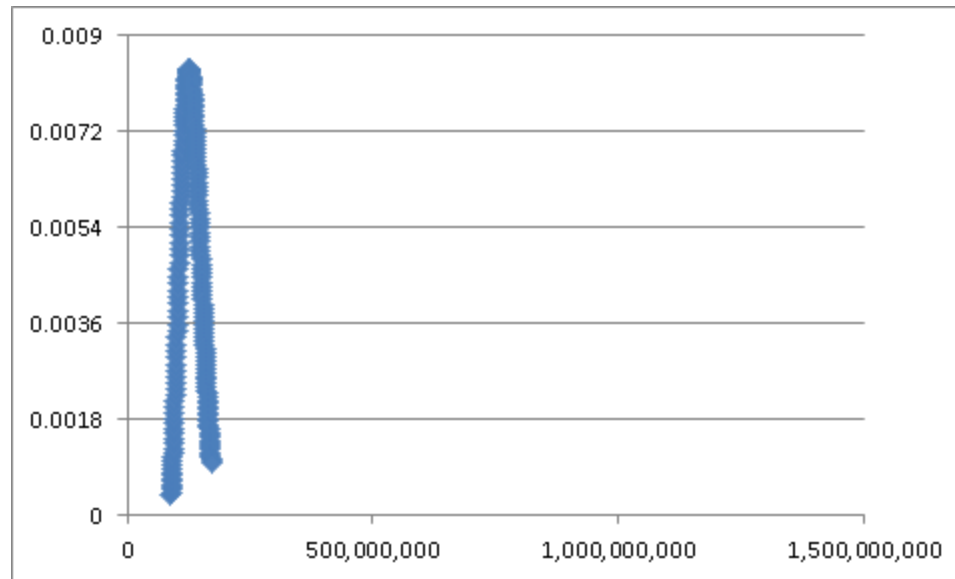
Cash Flow Forecast



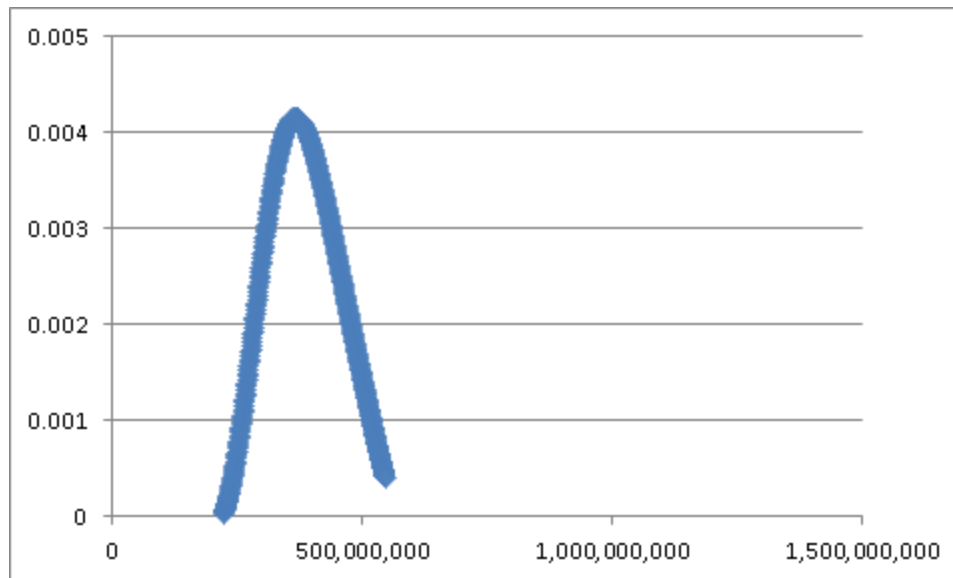
Cumulative Statistical Distribution of a Private Fund CFs



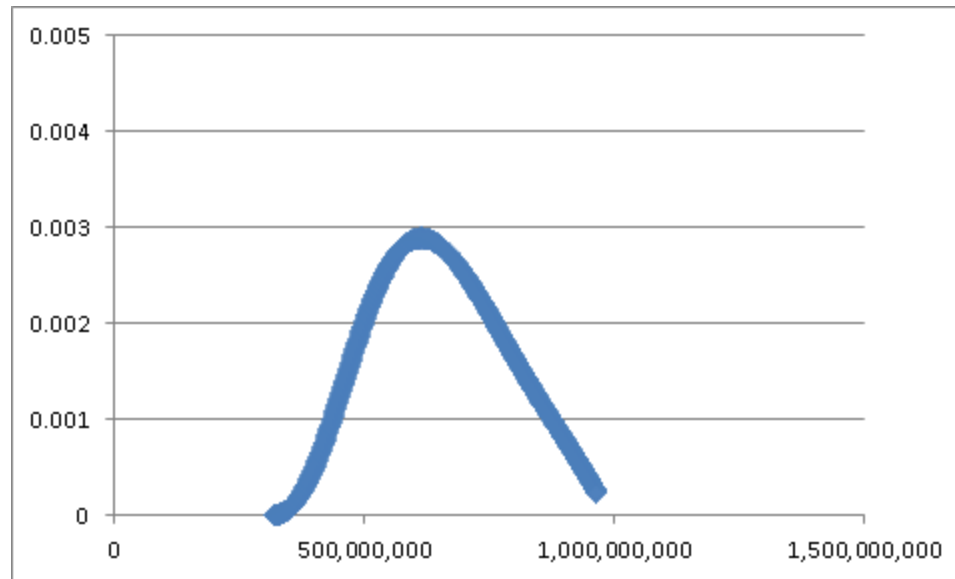
Cumulative LP Cash Flows: Private Fund



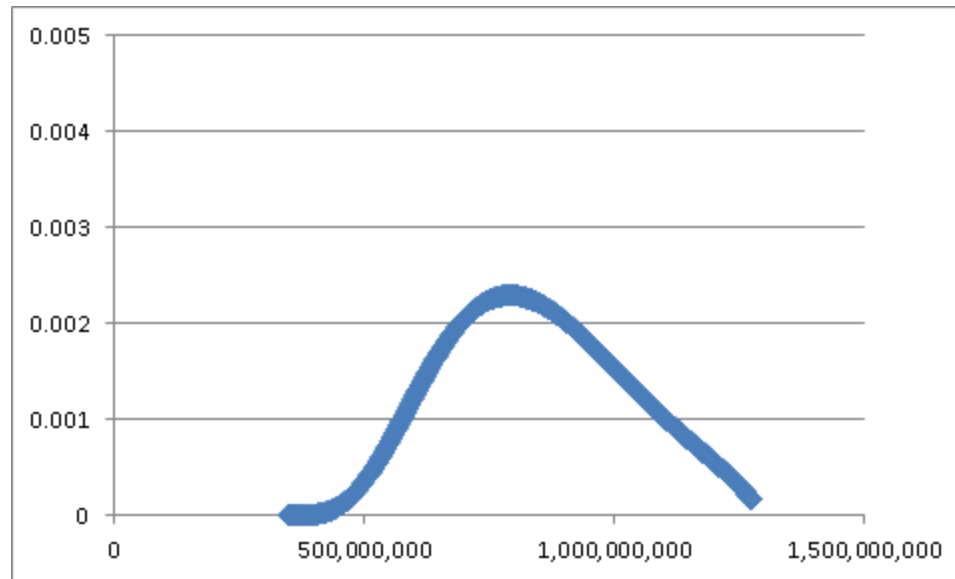
Cumulative LP Cash Flows: Private Fund



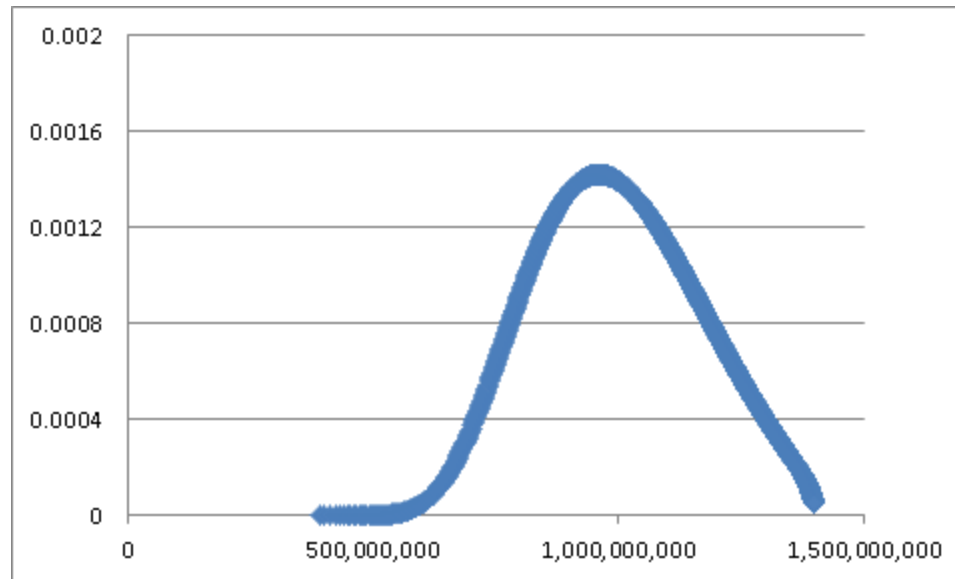
Cumulative LP Cash Flows: Private Fund



Cumulative LP Cash Flows: Private Fund



Cumulative LP Cash Flows: Private Fund



Case Study: Economic Markdowns in 2020

- We take into consideration three broad strategies – **Buyouts, Venture, and Private Debt** and analyze them under **normal conditions**, largely resembling to Q4 of 2019. We perform Economic Valuation for each type.
- Consider the same funds under different conditions – a prospective **V-shaped** recession characterized by 4 quarters of annualized GDP contraction of 5%, normal growth thereafter. Reflect elevated cash flow risk in the first year, reverting to regular cash flow volatility thereafter. Perform Economic Valuation under these conditions.
- Consider the same funds under a prospective **U-shaped recession** characterized by 4 quarters of annualized GDP contraction of 5%, followed by another 4 quarters of 2% contraction, and thereafter normal growth until maturity. Reflect elevated cash flow risk in the first two years, reverting to regular cash flow volatility thereafter. Perform Economic Valuation under these conditions.
- We consider both funds that have been in existence for two 2yr as well as 7yr since inception. We assume total fund lifetime of 15 years in each case.

Case Study Markdowns (cont'd)

- The projected GDP contraction rates were chosen as consensus ranges by economists and large financial firms under two recession scenarios. In summary, the underlying variables they reflect are:
 - The impact of the pandemic to erode the production base of the economy
 - The impact of massive stimulus borrowing to affect long term tax rates
- The projected GDP growth rates were not used as the expected growth rates of the funds in the cash flow forecasting model, but were incorporated as one of the inputs to the growth rate model
- The elevated volatility in the V or U environment was based on risk model estimates from the aftermath of the GFC. The additional sources of uncertainty in this environment are:
 - The length of the effective lockdown period and future bouts of contagion
 - The range of possible impact on bankruptcy, long term unemployment, sustained drop in aggregate demand, and deflationary pressures

Case Study: Markdown Results

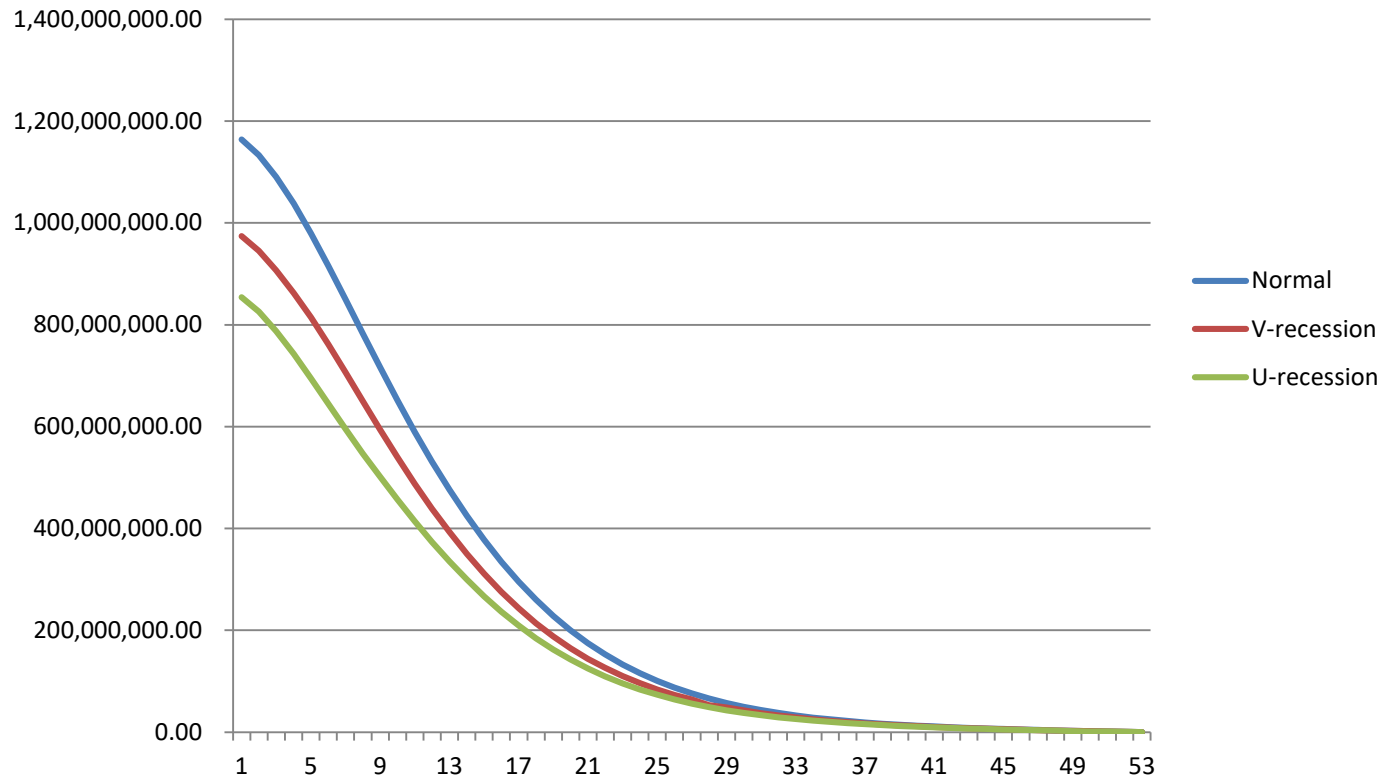
	Buyouts	
	<i>V-recession</i> writedown	<i>U-recession</i> writedown
<i>2 year since inception</i>	-15.1%	-25.8%
<i>7 year since inception</i>	-18.4%	-26.4%

	Debt	
	<i>V-recession</i> writedown	<i>U-recession</i> writedown
<i>2 year since inception</i>	-14.3%	-20.8%
<i>7 year since inception</i>	-15.2%	-19.6%

	Venture	
	<i>V-recession</i> writedown	<i>U-recession</i> writedown
<i>2 year since inception</i>	-16.3%	-26.6%
<i>7 year since inception</i>	-19.1%	-27.7%

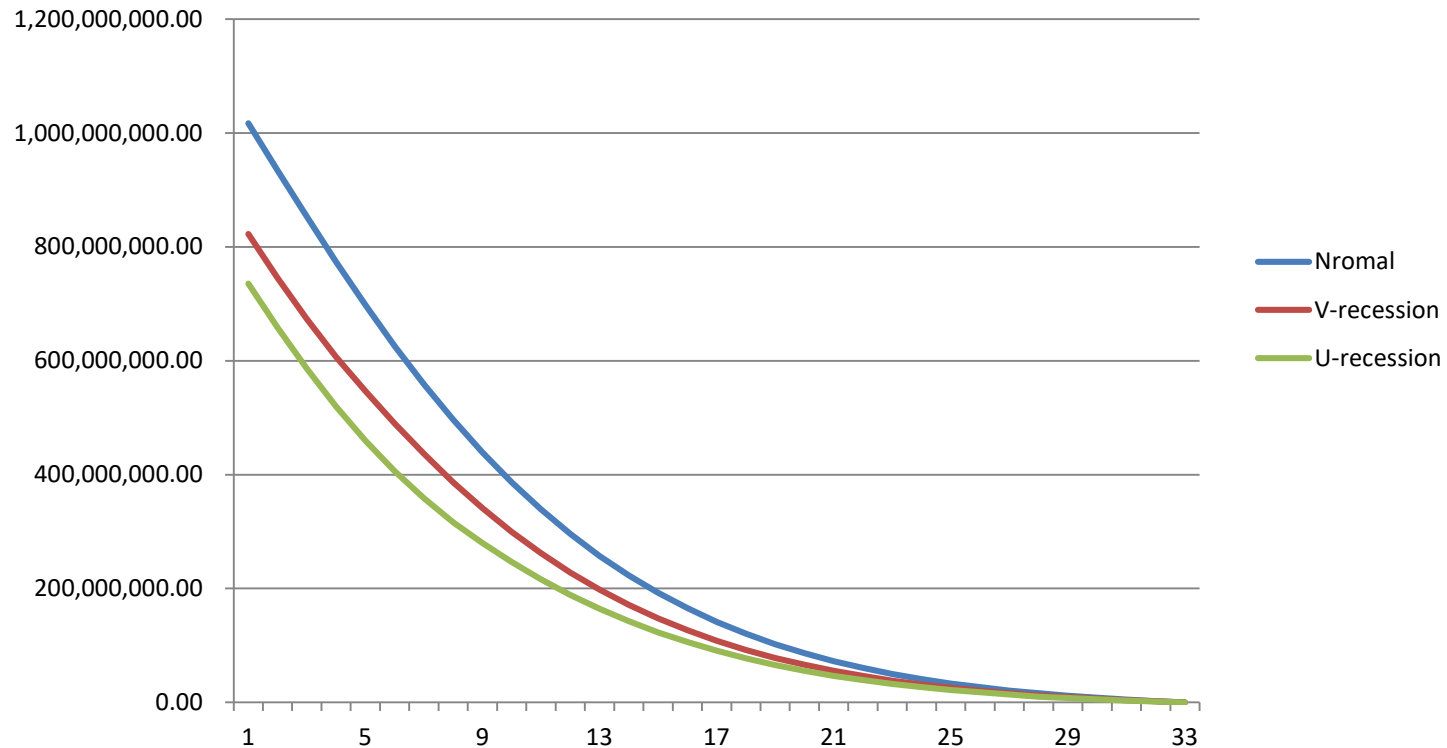
Case Study: Longevity of Impact

Projected Residual Value over Remaining Quarters of Fund Lifetime - *Venture, 2 years since inception*



Case Study: Longevity of Impact (cont'd)

Projected Residual Value over Remaining Quarters of Fund Lifetime - Venture, 7 years since inception



What is the best course of action

In theory asset owners' tools to mitigate the dislocation are:

- Curtail commitment programs - the first "go to" place as it offers a low "transaction costs" avenue
- If this is not enough, investors may need to sell LP stakes at depressed prices.

However, there are a couple of challenges in practice with either of these:

- The Secondary Market has all but dried up, with potential buyers entirely at a loss what the "market comps and EBITDA" are. Lack of consistent methodology for valuation has affected in real time the price discovery. The LPs would face a very fat lower tail if they go to the secondary market now.
- The actual drop in private asset economic values in Q1 and Q2 of 2020 might not be too far from the drop in public asset classes, so the allocation "dislocation" might be not of the magnitude touted across the board, or even be in the reverse direction.

Solution

- LPs should establish the fair value for their private asset class positions now
- The valuation methodology should not depend on market comps or historical accounting data as the first one does not exist, and the other does not reflect the current environment
- Based on these estimates determine the size of the dislocation and the directionality of the required action to be taken
- Prioritize low transaction cost actions – refrain from commitments, adjust public market weights
- Compare existing outstanding commitments to the economic value of each fund, and on that basis determine which fund to liquidate in the secondary market if they need to, and if they can.

Summary

- The lack of consistent methodology for valuation of private funds and assets has compounded the impact of the pandemic crisis by creating uncertainty around the fair value of these instruments.
- Rigorous analysis that reflect the multi-period nature of these assets and the uncertainty over their cash flows over the entire investor time horizon would unravel the true economic value of the private asset positions.
- Economic value is what really matters for the purpose of any aspect of portfolio management and monitoring. **One can think of economic value as the “P” of the “P/B” ratio in parallel to public markets.**
- The solution for multi-asset class investors is to employ proper valuation practice in a way that accounts for all facts and circumstances of their own assets and portfolio. No qualitative assurance of value is a substitute for quantitative assessment.
- Uncertainty is not an excuse to give up before we do the best with what information *is* available

Data and Toolset used in the Analysis

- **Sate Street Associates** PEI index data
- **Northfield** risk models, for equity, debt, real estate, and infrastructure
- **Aspequity** cash flow pacing model, simulation, and valuation technology

Question and Answer Session

Emilian Belev, CFA, ARPM
Head of Enterprise Risk Analytics
emilian@northinfo.com

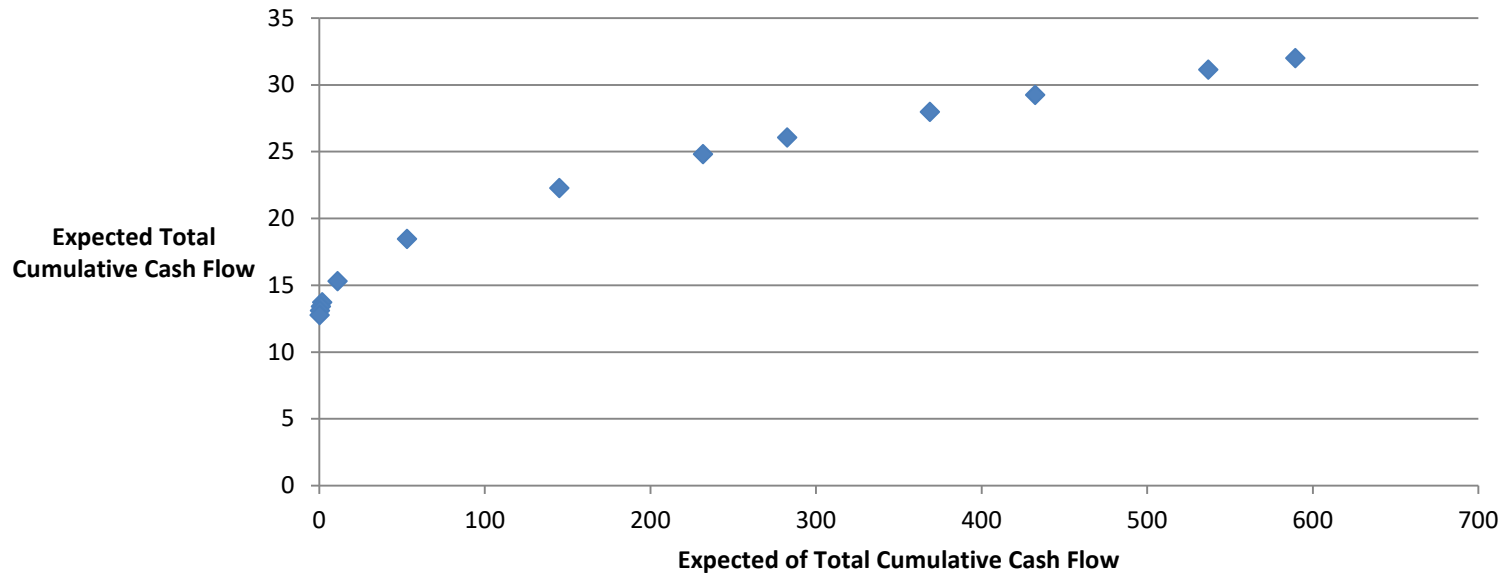
Appendix: Liability Driven Optimization (LDO)

- One of the main applications for reliable economic value weights is portfolio rebalancing and optimization
- As one advanced implementations of this concept, we can formulate the optimization problem at each period over the investment horizon, taking into account the interplay between periodic and cumulative performance of liquid and “non-tradeable” assets to meet periodic liabilities.
- What we care about is the performance of the liquid public assets over each horizon, as well as the cash flows produced by the illiquid asset over the same period, as well as the reinvestment value of those cashflows to a later period.
- The efficient frontiers you will see in the next slides are the end result of the joint application of the valuation and cash flow methodology to achieve this goal.

Feasible Set of Efficient Portfolios

Efficient Frontier for Cumulative Cash Flow available to cover Liabilities after 10 Years

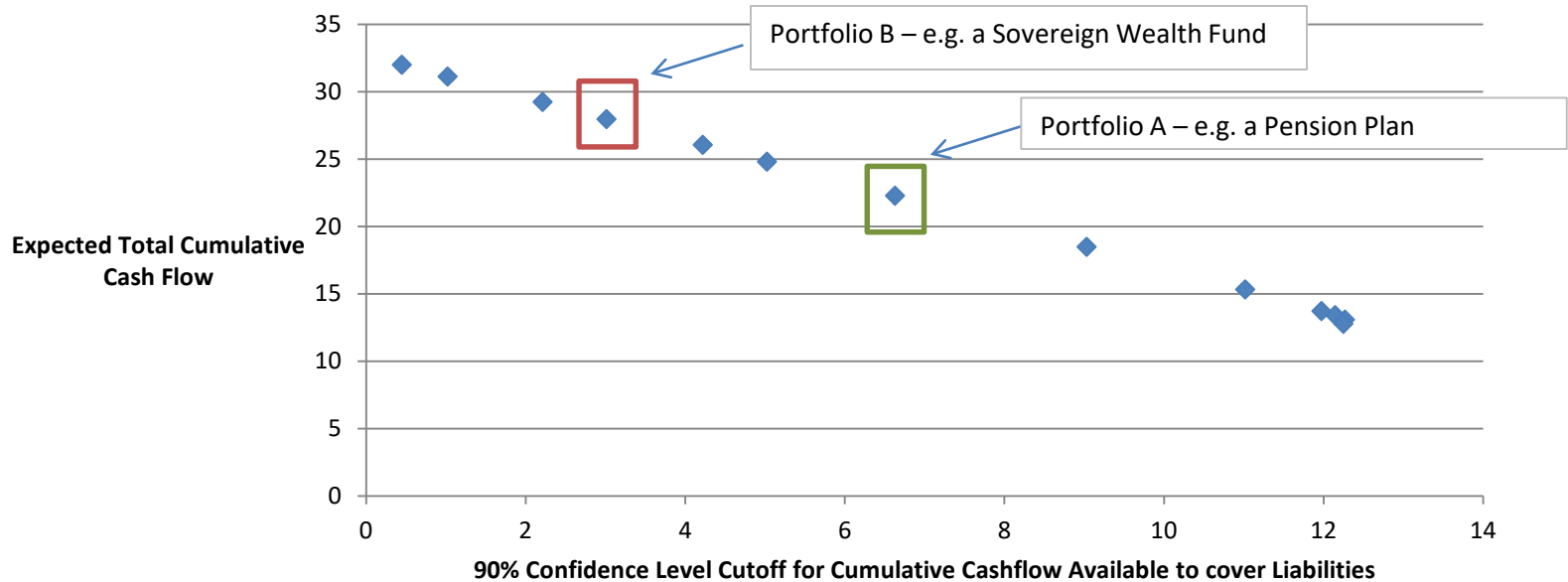
(Axes in Million \$)



Efficient Portfolios with different Liquidity Levels

Cash Flow Efficient Portfolios over 10 Years

(Axes in Million \$)



Key Points About LDO

- LDO has some resemblance to MVO. Mean-variance trade-off, however, is not the end objective of LDO, as there are multi period constraints and dependencies that are factored in the LDO analysis.
- Like all other analytical applications, it addresses private asset content beyond Private Equity. Private Debt, Real Assets, and Resource Assets also weave into LDO well using granular cash flow and risk models as the ones made available by Northfield and Aspequity.
- If the Private Assets to which the investor has access are strong performers, they can get high weights in the optimal mix. Otherwise public equities compete well on the growth dimension. There is no one-size fits-all prescribed allocation, the investor and investment details are important.