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Private Fund Commitment Planning for Target Asset Class Allocations

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A Plan about Planning

- Objective and complexities of commitment planning for private funds
- The link between the input parameters and the objective variables
- Challenges presented in the current industry practice
- Ideas how the challenges can be addressed
- Step-by-step description of a systematic approach to commitment planning
- The inter-relationship between optimizing commitment planning and liquidity in a multi-period setting

Motivation 1

- Unlike public investments, private funds are not instantaneously invested
- An investor commits to the fund at one point in time, and his investment is absorbed over a period of time – 1 to 5 years thereafter
- The timing and periodic amounts of the investment capital calls by the manager are uncertain. The only certainty is the total amount called over time.
- As the fund accumulates capital, its NAV increases due to:
  - Increased capital base *(which is uncertain)*
  - Organic growth up to the point time *(which is uncertain)*
- For an investor that is bound by an investment policy, NAV determines the target allocation.
- Uncertainty of capital calls, growth, and distributions shrouds future NAV in mystery

Motivation 1 (cont'd)

- If NAV is unknown, then the allocation cannot be forecasted and cannot be compared with the target
- To make matters more complicated, the NAVs of the rest of the asset classes move as well, which makes the particular private asset class allocation even more uncertain
- In a nutshell, there are various exogenous factors to the relationship:

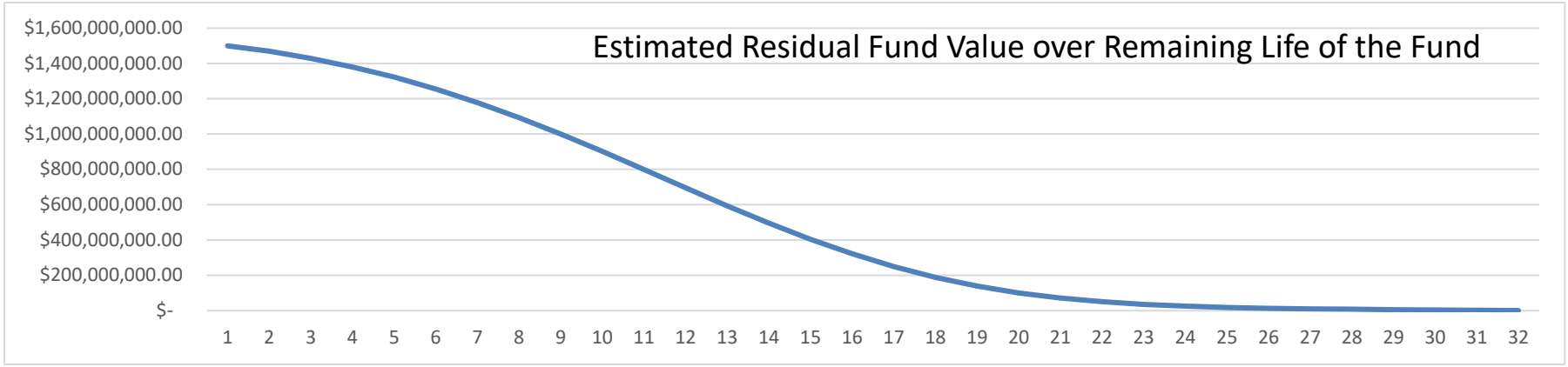
  Commitment ($X, t=0) → *NAV($Y, t = 1,2,3…)*

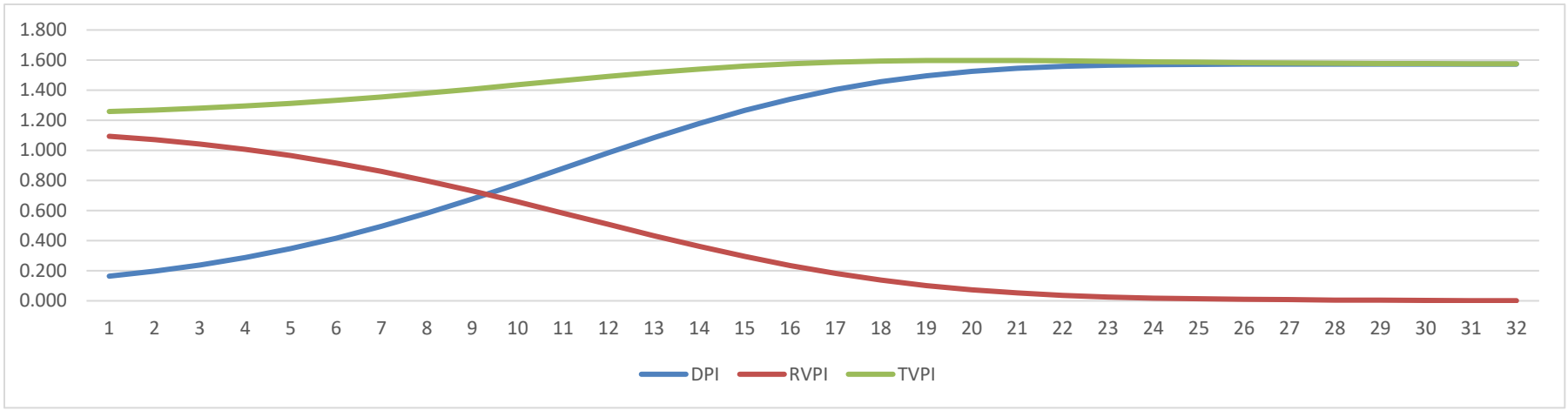
- In the absence of a precise toolset, the implementation of a private asset allocation policy is like steering a cruise ship – you need a lot of room for error
- Errors in investment over- or under-shoots are expensive, as we shall demonstrate…

Motivation 2

- The sister problem to the problem with NAV is that of liquidity
- Three types of liquidity problems over three different time horizons:
  - Too little private asset investment can impede liquidity in the *long term* due to insufficient returns to meet liabilities
  - Too much private asset investment can impede liquidity in the *medium term* due to resources tied in illiquid assets that redeem fully only over the long run
  - Uncertain capital calls may require cash sitting in segregated accounts with constrained risk exposure, which affects both TAA, as well as *short term* liquidity

Preview: Forecasting Expected NAV





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Current Industry Practice

- Takahashi and Alexander is the cash flow pacing model employed most frequently
- Therefore forecast point estimates of NAV is based on projected growth, capital call and distribution pacing according to the TA model
- Challenges with this approach:
  - The TA model is very simplistic, particularly on the side of capital calls – one set of capital call rates over each year: 25% in year 1, 30% in year 2, 50% thereafter
  - The point estimates do not provide a measure of the margin of error of these forecasts
  - More importantly the estimates do not relate the uncertainty of the dollar allocation of the specific asset class to the uncertainty of the other asset classes in the overall portfolio as to determine the range of possibilities of the percentage allocation in question

How can we address these problems

- *Address:* The TA model is very simplistic, particularly on the side of capital calls – on set of capital call rates over each year: 25% in year 1, 30% in year 2, 50% thereafter

  The best course of action to address this is to develop a robust and intuitive econometric model for contributions as well as distributions pacing

- *Address:* The point estimates do not provide a measure of the margin of error of these forecasts

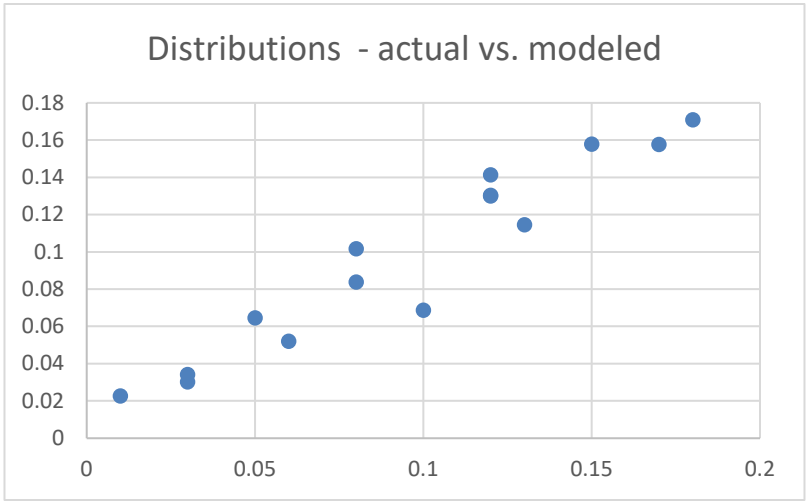
  The pacing models should be open to accommodate probability ranges around the central estimates. This capability should also extend to forecasts of NAV and cumulative fund value

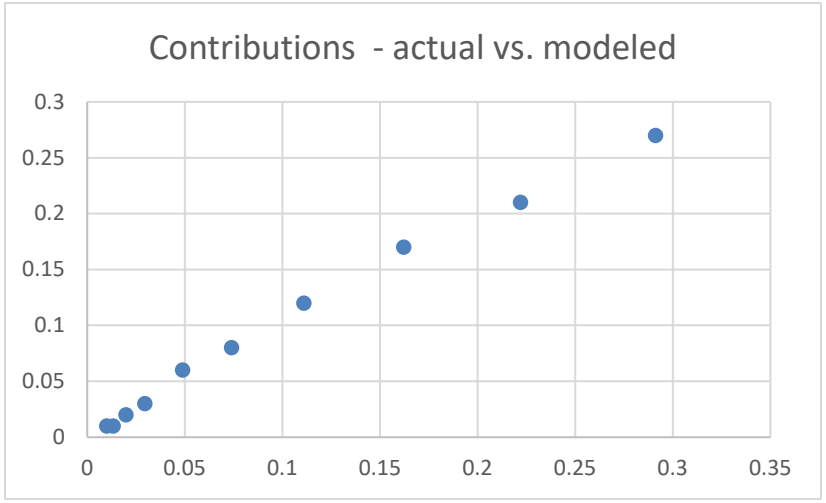
- *Address:* The estimates do not relate the uncertainty of the dollar allocation of the specific asset class to the uncertainty of the other asset classes in the overall portfolio as to determine the range of possibilities of the percentage allocations

  The model of NAV future cumulative fund value should allow capturing the multi-period covariances with the rest of the asset classes in the total portfolio

Private Fund Pacing Models

……The best course of action to address this is to develop a robust and intuitive econometric model for contributions as well as distributions pacing.





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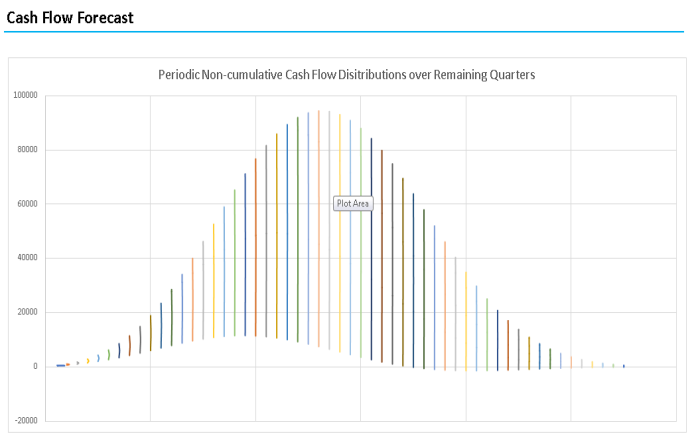
Notes on Estimating Pacing Models

- Have to be sensitive to different environments – growth, recession, etc.
- Have to be able to provide estimates at the individual fund level, a the level of a custom grouping of funds, or at the asset class level
- Have to be amenable to calibration to a specific fund, a group of funds by the same manager, a group of the same vintage and or strategy
- Have to link to explicit driver variables and factors as to allow shocks and stress tests
- Due to scarcity of data of private asset performance, machine learning is not the preferred prediction method as it needs to be fed all of the available data in a single sitting, and as a result makes everything "look the same"

Uncertain Distributions and Contributions

……The pacing models should be open to accommodate probability ranges around the central estimates, which can also can be calculated for cumulative fund value.

Distributions



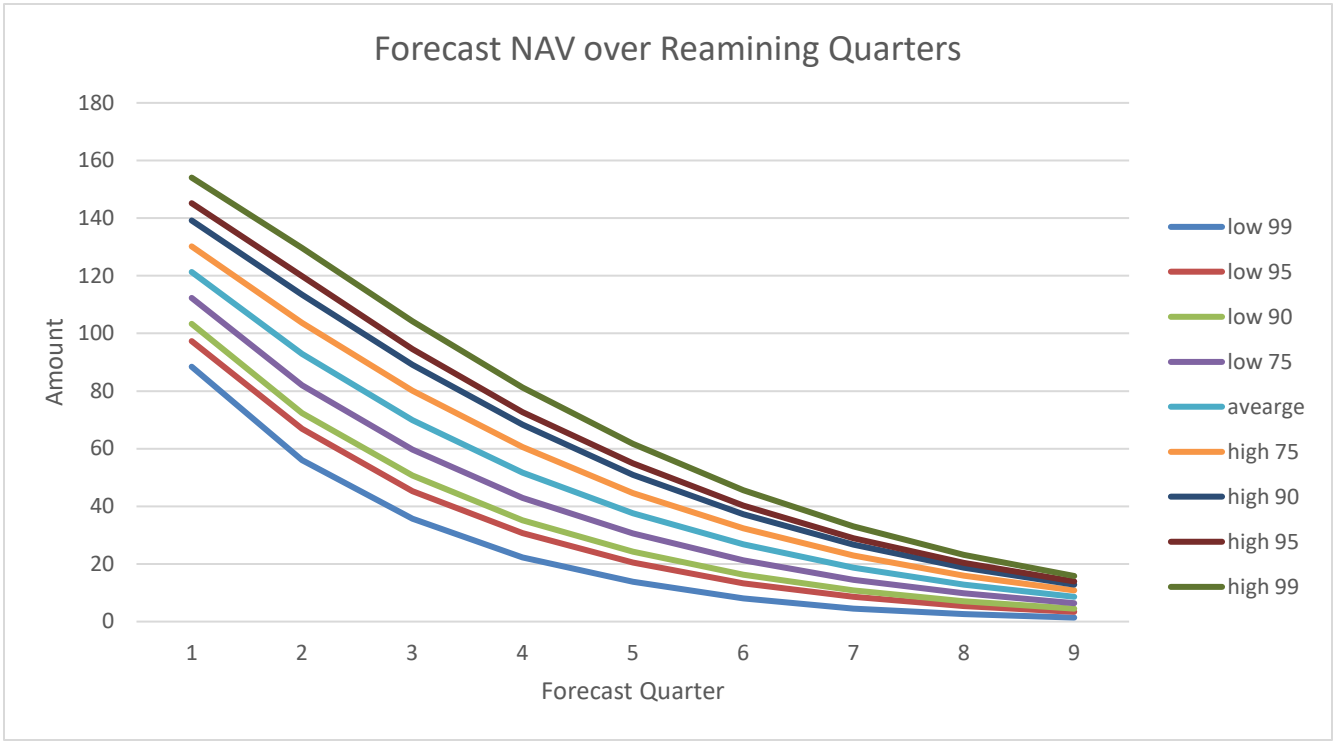
Contributions

Notes on Uncertain Cash Flows

- Distributions uncertainty is driven largely by market factors driving profitability and exits of the businesses underlying a fund's portfolio
- Therefore (factor) risk models are the best choice to base the estimation of distribution probability ranges
- Correlation should be captured across funds at the chosen level of aggregation
- Contributions uncertainty is lower, and ,relatively speaking, more of an idiosyncratic variable than distribution uncertainty which is driven by systemic market factors

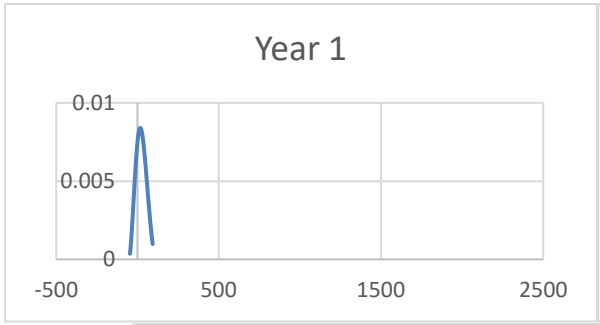
Uncertainty of NAV

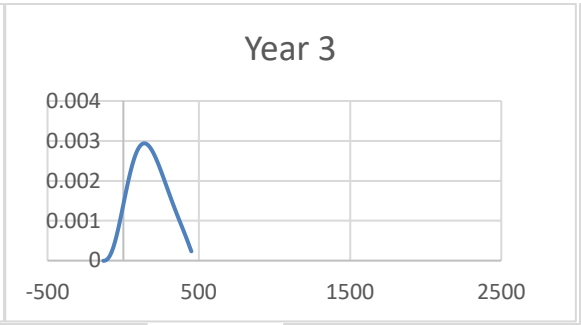
... Calculate probability ranges around the central estimates. This capability should also extend to forecasts of NAV and cumulative fund value

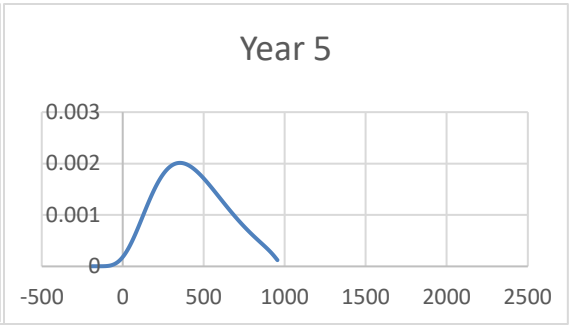


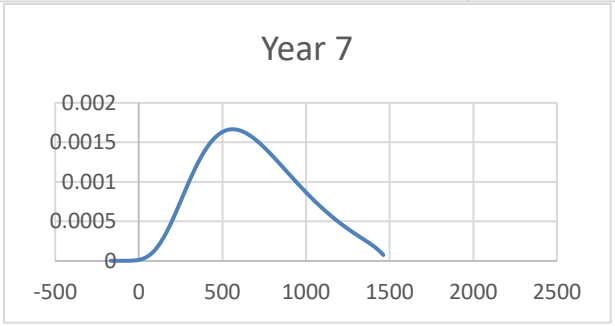
Comparison with Cumulative Fund Value

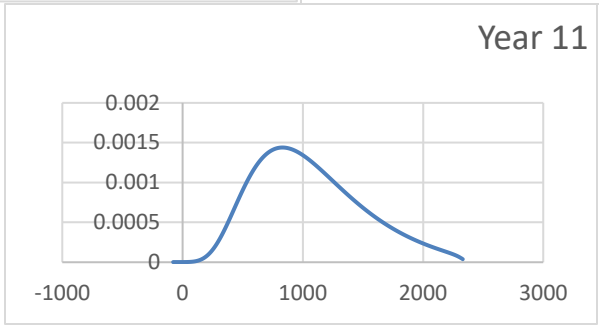
- Unlike NAV which decreases in average expectation and scatter over time, Cumulative Future Fund Value increases in both expectation and uncertainty like shown below.











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Covariances of NAVs in a Broad Portfolio

…model of NAV future cumulative fund value should allow capturing the multi-period covariances with the rest of the asset classes

- **Build Covariance Matrices over Different Horizons (cont'd)**
  - Utilizing the Aspequity multi-path (10^{21}) simulation algorithm build a statistical distribution of one asset class 'NAV over each time horizon. Calculate the standard deviation of this distribution: $\boldsymbol{\sigma_{B,T}}$
  - Utilizing the simulation algorithm, build a distribution of one asset class' NAV as "driven" solely by the other asset class, over each time horizon. Calculate the standard deviation of this distribution: $\boldsymbol{\sigma_{B\sim f(A),T}}$
  - It can be shown that:

$$\boldsymbol{Corr_{Horizon\,T}\,(B,A) = \frac{\sigma_{B\sim f(A),T}}{\sigma_{B,T}}}$$

Putting it All Together

- Forecast Contributions and Distributions for a fund or a portfolio of funds over the investment horizon
- Generate probability ranges for each period's Distributions and Contributions
- Use robust simulation to generate statistical distribution of the fund's or portfolio of funds' NAV
- Capture Covariances across asset classes and generate a distribution of NAV of the whole portfolio
- Estimate the statistical distribution of the ratio of the asset class NAV and the NAV of the overall portfolio

Putting it All Together (cont'd)

- If the target allocation of the specific asset class is denoted by W_a, it can be shown that the ratio $(1/ W_a)$ follows a shifted F-distribution
- Given the extremely large number of paths of our simulation the F-distribution describing the ratio in our set up is indistinguishable form a normal distribution.
- We can iteratively adjust our commitment level until we reach a certain confidence to achieve our target allocation
- If we need to perform this exercise over multiple horizons, we can start with the nearest horizon and work out to further horizons – the commitments in each subsequent period will be incremental to the results form the previous period's optimization

Comparison with Liquidity Planning

- One can find a number of resemblances with an analytical process on which we have previously presented - the multi-period period optimization of liquidity for liability driven investors
- While the underlying toolset here is identical, the usage is to serve a distinct purpose
- With liquidity optimization the investor is maximizing expected portfolio long term value while keeping the confidence in having sufficient liquid resources at a reasonable level to meet future liabilities
- Conversely, the commitment planning optimization is targeting a particular asset allocation
- Even if these are distinct objectives, in some cases, the latter can be viewed as the means to achieve the former

Additional Considerations

- If we decide that the availability of opportunities to invest in private assets are not sufficient for a more aggressive trajectory to allocation, or if, conversely, we have overstepped our current allocation, we have one particular advantage when we observe our portfolio from a multi-asset class perspective

- Using liquid instruments and a multi-asset class risk model in the multi-period simulation framework described previously, we can construct portfolios that mimic the behavior or private assets, and either hold long or short these Synthetic Alternative Portfolios (SAP)

- As the allocation starts to naturally move in the right direction over time for the actual alternative asset classes, we gradually transition the SAP positions into other private or public assets

Summary

- We addressed the second of two major tasks of private asset class mandates – creating a schedule of commitments to private funds to achieve a desired trajectory of target private asset allocation

- This task has traditionally presented significant practical challenges to investment professionals due to oversimplified point-estimate models, or the lack of a comprehensive framework to address the problem of estimate uncertainty

- While building on a toolset which addresses a wide spectrum of private asset investment process objectives and tasks, we develop an rigorous and transparent approach to effectively plan commitments to private fund vehicles

- Our approach presents advantages both in terms of quality of the separate components of the analysis, as well as in the seamless and economically intuitive way in which these components relate in a broad and robust analytical framework for investment management of private assets

Feedback Session

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