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Commitment & Cashflow Modeling: Planning for Uncertainty

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Learning Objectives

- Review of widely-used tools for commitment and cashflow planning, including the Yale model
- Account for capital call lines of credit, in terms of time to call capital and investment duration
- Describe how to model undrawn capital commitments and required liquidity reserves
- Identify historical systematic relationships between returns in public equity markets and private equity
- Identify historical issues associated with valuation of private equity during market disruptions
- Describe how alternative future market scenarios can be used to bracket sets of acceptable outcomes and minimize unacceptable excursions

Tools For Commitment And Cashflow Planning

Types Of Private Equity Cashflow Models

- Cashflow models for private equity can be usefully divided into two broad types
 1. Models that communicate specific values by year
 - Typically embody GP-specific knowledge about deal-specific behavior
 - Usually given to LPs only as fixed numbers for drawdowns, distributions and NAV
 2. Parametric structural models
 - Very top-level, based on broad statistical assumptions
 - Allow LPs to develop their own forecasts based on their own views, about alternative hypothetical futures

Specific-Value Models

- Strengths:
 - Derived from a GP's detailed plans for individual companies
 - Very good for very near-term cashflows
 - Good indications for deals actually in process, whether acquisitions or liquidations
- Weaknesses:
 - Often inaccurate for periods more than a year into the future
 - Generally unclear what macroeconomic environment is assumed by developer
 - Example: Projected rates of return
 - Typical GP projects ~20% net IRR early in fund life
 - Median LBO fund has actually returned ~12% over the past 15 years
 - If you systematically rely on GP forecasts for later years, the actual portfolio may systematically underperform the model for NAV and distributions

Parametric Models

- Strengths
 - Allows user to build a cashflow model that is consistent with his/her views of future macroeconomic environment and other asset classes
 - Allows user to incorporate historical information (e.g. average rates of return, average duration)
 - Generally still allows the user to incorporate near-term information from GP (if available)
- Weaknesses:
 - Typically operate at fund level
 - Typically don't incorporate specific information about specific deals

GPs & LPs Build Cashflow Models For Varying Purposes

- GPs are generally trying to figure out how to make their companies more valuable
 - They care a lot about manufacturing efficiencies, details of capex, details of cashflow management
 - They don't usually care about conditioning these on the macroeconomic environment: company-specific risks rightly tend to dominate their thinking
- LPs care a lot about building portfolios that can sustain a variety of future macroeconomic environments
 - They don't really care about the details of how companies are supposed to become more valuable: That's why they hire GPs
 - Using GP forecasts to address LP concerns often misses the point

Lines Of Credit

Deferrals

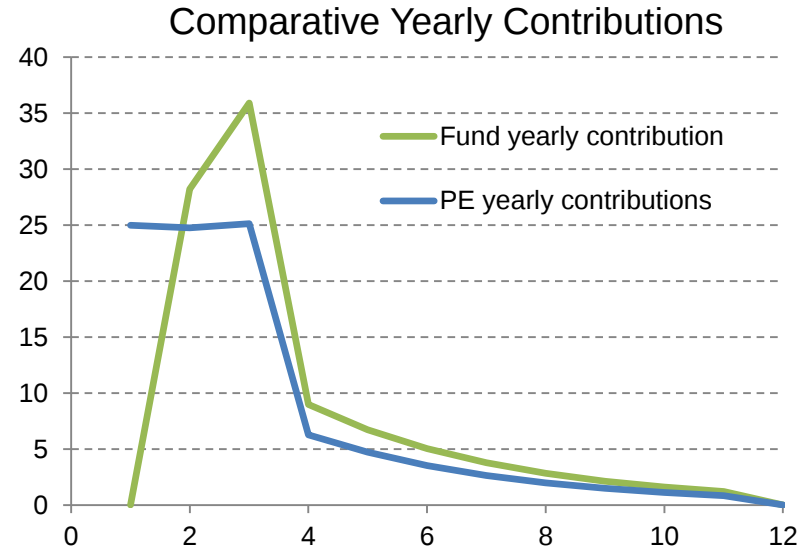
- Private equity firms have long used deferrals as part of their transaction financing package
- Typically these have been of modest size and relatively short duration, up to 6 or 12 months
- Since these deferrals were generally fairly modest in scope, parametric modelers could usually ignore them
- However, it's important to realize that explicit bank financing could always be substituted for this kind of implicit seller financing

Lines Of Credit

- In the past few years, banks have been more willing to provide substantial fund-level lines of credit, backed by the credit quality of the fund's LPs
- It is believed that about \$400 billion is outstanding in lines of credit to private equity funds, and these lines may be outstanding for multiple years
- This is not a difference in kind from the long-used seller deferrals, but it's a substantial difference in quantity
- Modelers may want to take these lines of credit into account explicitly in their forecasts

Changes In Drawdowns

- Historically, we are accustomed to seeing something like the “private equity yearly contributions” line
 - Fairly steady in early years
 - Drops off sharply in later years
- With a large line of credit, we may see something more like “fund yearly contributions”
 - Little or no drawdowns in first or second year
 - Sharp increases somewhat later
 - Total contributions essentially unchanged
- Behavior can differ markedly depending on line of credit terms and the GP’s liquidity strategy



Impact Of Line Of Credit On Fund Values

- Lines of credit generally don't create capacity for GPs to buy more assets than they would otherwise
- However, just like deferrals, they allow the LPs' money to come in later, thereby shortening invested duration and (in a profitable fund) raising IRR
- As a result, although the LPs' equity exposure at any time is completely unchanged by the line of credit, their stated fund valuations and cashflow patterns may change dramatically

Managing Fund Commitments & Cashflows With Lines Of Credit

- Key point to recognize is that a fund with substantial line of credit is now long private equity but short cash:
 - $\text{FundValue} = \text{PEValue} - \text{LOCvalue}$
 - Of course that LOCvalue is also available as free liquidity somewhere else in the investor's portfolio (since it hasn't been called)
- Look at this from the CIO's point of view:
 - CIO wants PEValue to stay in some target range: that's your economic exposure to private equity
 - Separately, CIO wants total portfolio liquidity to stay in some other target range
 - CIO couldn't care less about FundValue, which is some awkward combination of the two
- How to manage this situation?

Line Of Credit Informational Needs

- To manage the overall portfolio, the investor needs to know their outstanding pro-rata line of credit balance (LOCvalue), separate from their private equity exposure (PEvalue) and their fund NAV
- Commitment plans should be developed targeting actual exposure to private equity (PEvalue), rather than fund NAV
- At the same time, total liquidity needs must be calculated from three items, instead of two as previously:
 - Other institutional needs for liquidity
 - Potential private equity capital calls in the absence of a line of credit
 - Outstanding line of credit balance

Liquidity Management Strategies

- Having additional liquidity available in a portfolio provides institutional investors with a range of options
- For institutions with line of credit balances that are small with respect to other liquidity needs, it might be unnecessary to make an explicit accommodation
- For institutions with significant line of credit balances, it may be valuable to develop an explicit organization-wide management strategy
- As a fallback, it's always possible to simulate the no-line of credit situation by putting a cash amount equal to the line of credit balance into a bank account. This will generally not be ideal

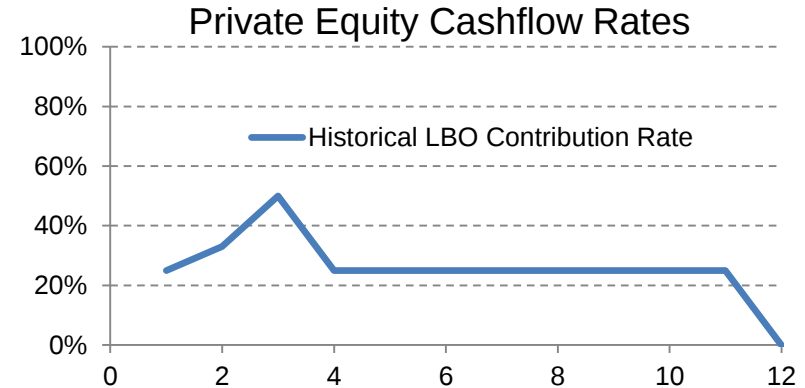
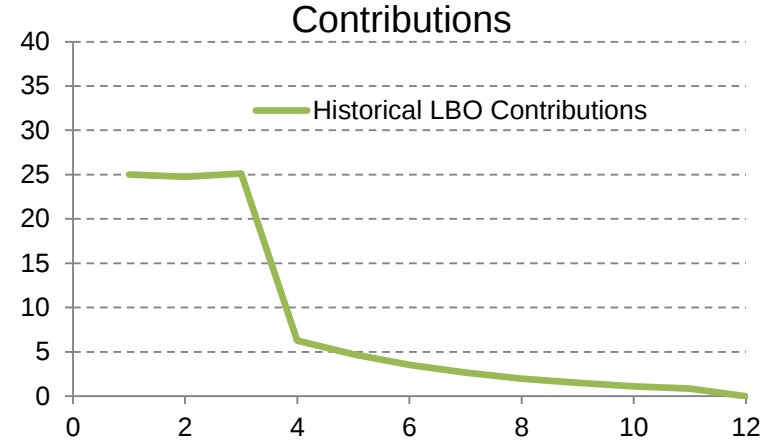
Modeling Private Equity Exposure

The Yale Model

- The Yale model is probably the most widely-used parametric model for private equity cashflow forecasting
- Published in 2001 by Dean Takahashi and Seth Alexander of the Yale University Investments Office
- Relies on a very simple fund-level parametric model:
 - Contribution rate as a function of time (fraction of undrawn)
 - Distribution rate as a function of time (fraction of value)
 - Rate of return as a function of time
- All of these rate functions can be specified in a number of ways

Contribution Rate

- Contributions are fairly easy to model
- GPs are generally going to deploy a large fraction of committed capital in first three to five years, due to structure of typical LPAs
- Contribution rate is the fraction of undrawn capital drawn in each year
- Empirically, contribution rates don't usually change much in different economic environments
- Reminder: We're talking about contributions to private equity exposure, however funded (capital calls or lines of credit)

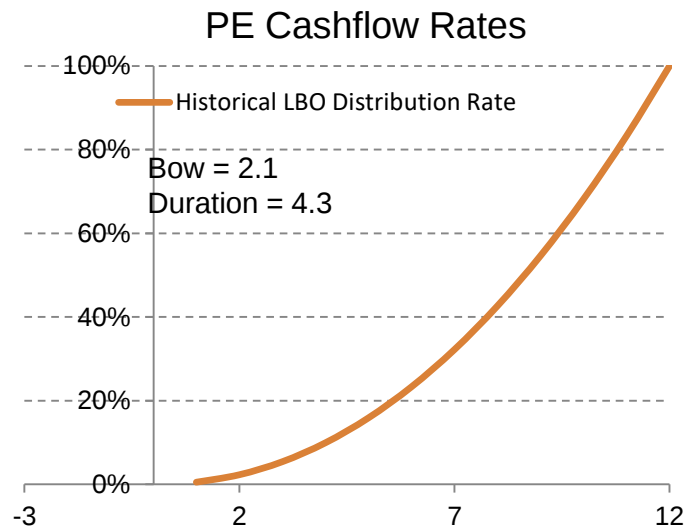


Distribution Rate

- Distribution rates are more interesting
- We know that most funds don't distribute very much until their deals are several years old
 - Average hold periods are typically three to seven years
- We also have a sense that as funds approach the end of their contractual lives, GPs want to liquidate the remaining assets
- Combining these two observations, we expect distribution rates to increase as the fund ages

Distribution Rate: The Bow Parameter

- The Yale model addresses this changing rate issue in a very clever way
- They assume that the distribution rate goes to 100% at some point (i.e. the fund is fully liquidated)
- They further assume that the distribution rate grows over time by
 - $DR = (t/L)^{\text{bow}}$
- The larger the value of “bow”, the longer until the average distribution
- Note that any time series can be used for distribution rate

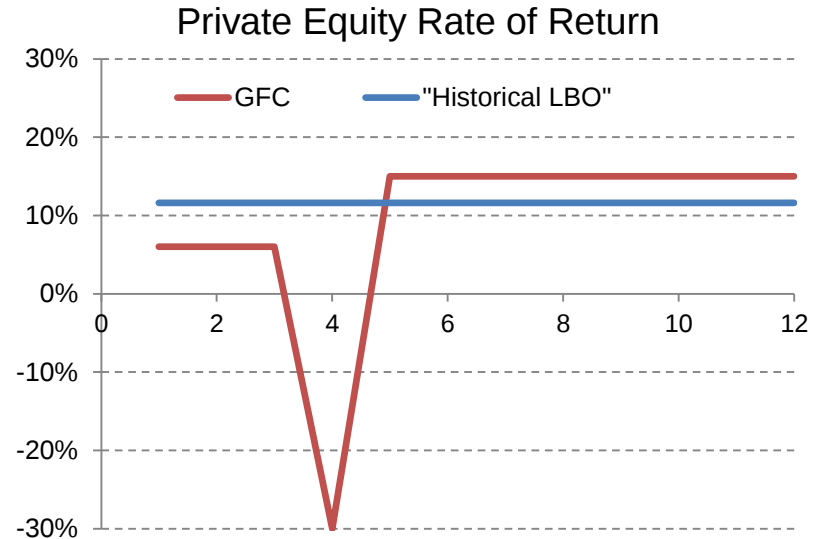


Tuning The Bow

- Although the original Yale paper was written in terms of IRR and TVPI, we have found that it's more useful to think in terms of duration
- By “duration” we mean the time the average dollar is outstanding – taken directly from bond math (NOT the same as the contractual fund life!)
- If you use the “bow” construction for distribution rate, you can search for a bow parameter that will give a desired duration
- That duration usually won't change dramatically even if the projected return sequence does change – even if TVPI does
- Tuning for duration is a useful tool for thinking about what happens if liquidations speed up or slow down

Rate Of Return

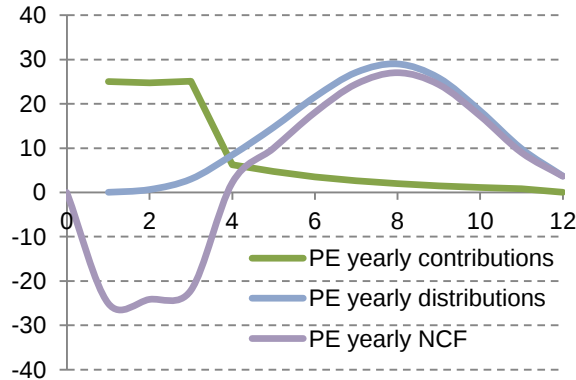
- There are two broad ways to think about the rate-of-return sequence
- One way to model a fund that achieves a particular IRR is to use that constant value as the yearly return for every period in the model
- Another is to consider that the rate of return might change every year
 - Looked at this way, the final IRR is an output rather than an input



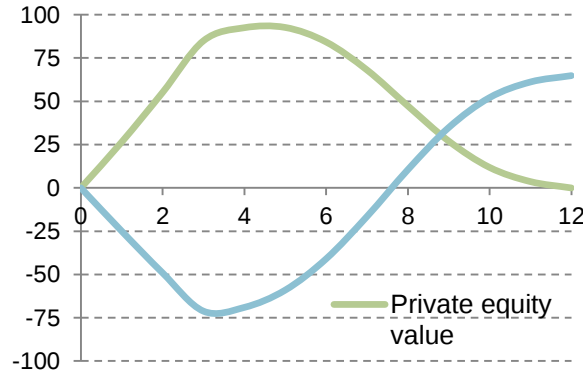
Putting It All Together

- Constant 11.6% IRR
- TVPI = 1.7, Duration = 4.3 years
- Maximum PE value: 92% of commitment

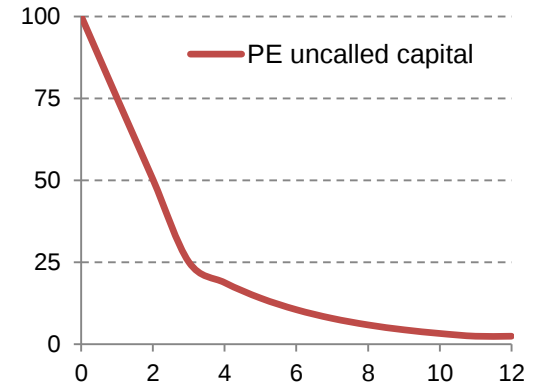
Yearly Cashflows



Private Equity Value
& Cumulative NCF



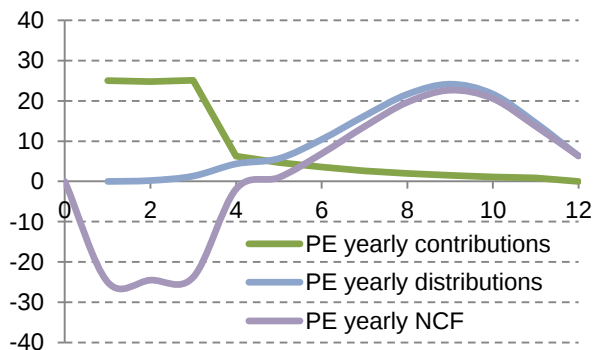
Private Equity
Uncalled Capital



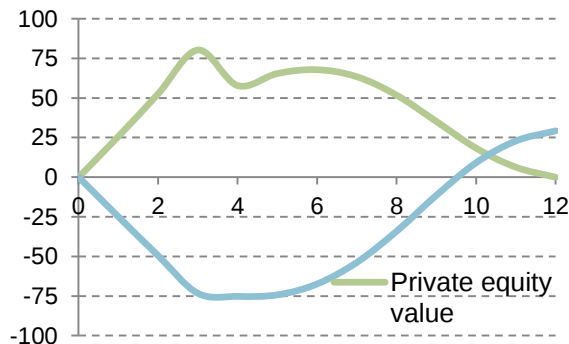
Modeling The GFC

- We can approximate the GFC by using the same contribution and distribution rates with a different set of return assumptions
 - IRR = 4.9%, TVPI = 1.3, Duration = 6.0 years
 - Maximum PE value: 80% of commitment

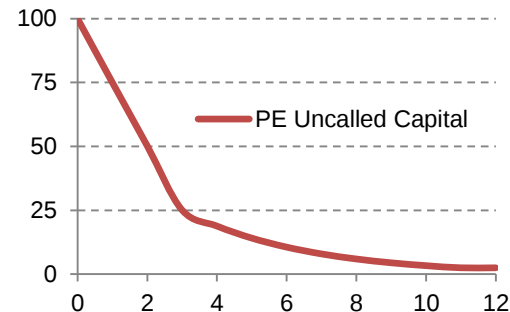
Yearly Cashflows



Private Equity Value
& Cumulative NCF



Private Equity
Uncalled Capital



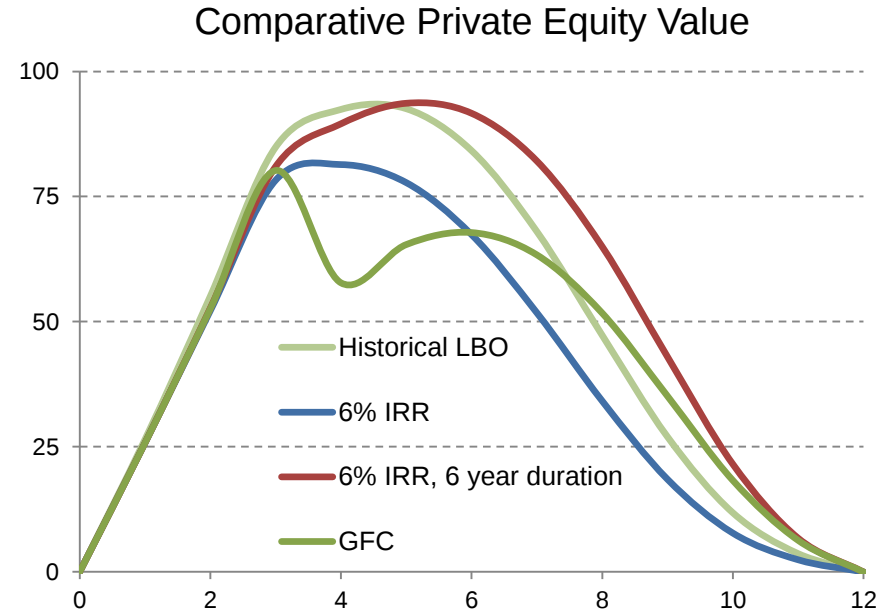
Managing Uncertain Futures

Importance Of Considering Alternative Futures

- As Yogi Berra allegedly said, “It’s hard to make predictions, especially about the future”
- One approach:
 - Make your plans around your best estimate of the future
 - Pro: When you’re right, payoffs can be great
 - Con: When you’re wrong, you may be in for unpleasant surprises – consider the GFC
- Another approach:
 - Make plans that will work for a variety of plausible alternative futures
 - Pro: Downsides for being wrong will be significantly muted
 - Con: Payoffs for being right may be somewhat muted

Several Alternative Futures

- Portfolio planners might be considering several alternatives right now:
 - Historically average returns
 - Lower constant returns
 - Lower returns with longer duration
 - Rerun of the GFC
- All easy to model in this same framework
- However, results may differ sharply for the same commitment



Absolute Targets & Ranges

- Targets for portfolio value and cashflow are often expressed as single points, but we know that we seldom hit those targets exactly
- What is really wanted is to get “close” to the target – but it’s rare to have a concrete idea of what it means to be “close enough”
- Considering alternative hypothetical future scenarios can help clarify acceptable range of outcomes and what it means for a plan to be successful
- Here we look at the potential variability of outcomes of private equity value for a commitment of 100, in terms of absolute dollars

Scenario	Max private equity value
11.6%, 4.3 years	92.56
6.0%, 4.7 years	81.40
6%, 6 years	93.66
GFC (4.9%, 6 years)	80.22

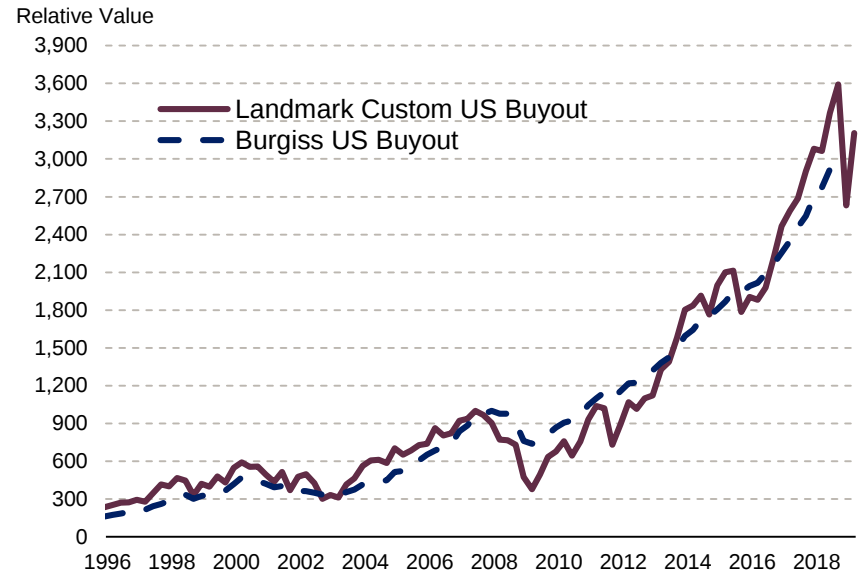
Linking The Plan To The Rest Of The World

- Several complications:
 - Private equity targets are usually relative to the rest of the portfolio, rather than in absolute dollars
 - Private equity funding has to come from – and go to – someplace else in the overall portfolio
 - Private equity is not an absolute return class: When the public market is up or down, private equity markets usually do something related
- Relationships with public market:
 - Not yet an exact science: Estimates have moved a lot in recent years
 - Many current estimates give U.S. LBO a beta of 1.2 to 1.8 against the US public market
 - Many current estimates give U.S. VC a beta of 1.0 to 2.0 against the broad public market or the NASDAQ

Models Of Public & Private Equity

- By modeling the growth of the private equity portfolio in terms of public equity drivers, the commitment plan can be made consistent with house views across the portfolio
- In this example we model U.S. LBO with a beta of 1.5 to a 75/25 mix of the Russell 2000 and the S&P 500
- Note that while the agreement is pretty good over the long term, there are times where private equity valuation smoothing is fairly pronounced and should be considered by the planner

Landmark Relative Value Analysis – U.S. LBO



Relative Targets & Ranges

- In these examples we make a single private equity commitment of 100, funded from a public equity portfolio of 1,000
- Private equity returns are linked to public market returns via the U.S. LBO model discussed previously
- Variability between scenarios as a fraction of total portfolio is significantly reduced, since the public and private returns are linked
- Remember that this is based on true economic values – stated values for private equity may be smoothed, especially in a crisis

Scenario	Max private equity fraction
11.6%, 4.3 years	6.7%
6.0%, 4.7 years	6.8%
6%, 6 years	7.4%
GFC (4.9%, 6 years)	7.0%

Summary

Summary

- Detailed cashflow forecasts derived from GPs' detailed business plans can be very helpful to LPs in the short term, but for periods over 12 months, it's often more valuable to build parametric forecasts
- Lines of credit are just scaled-up deferrals – they can provide the LP with additional flexibility around liquidity, but it's critical to separate your line of credit balances from your private equity value, and understand your total institutional liquidity requirements
- Parametric tools like the Yale Model can be linked to your broader econometric views, as well as to the structural behavior of private equity funds
- Building plans around alternative hypothetical scenarios is a powerful way to avoid unpleasant surprises in dynamic market environments like the GFC

Questions?



THANK YOU

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Landmark U.S. LBO Benchmark (U.S. LBO): A benchmark designed by Landmark Partners to be a proxy for the public-market systematic return component of U.S. buyout funds. It is weighted 75% Russell 2000 and 25% S&P 500, with a total beta of 1.5.

Russell 2000 Index measures the performance of the 2,000 smallest companies in the Russell 3000 Index, which represents approximately 8% of the total market capitalization of the Russell 3000 Index.

S&P 500 is an index of 500 large-cap U.S. public companies.