UNIT 1 · WHY DCF FAILS

Why Private Market Valuation Is Broken

Session 1 · Liquidity Illusion · GE-LAV® Framework

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Primary Text: Liquidity Illusion: The General Equilibrium Theory of Private Capital Valuation (Forthcoming, 2026)

Graduate Finance Course · Spring 2027 · 32 Sessions

What we'll do today

1. **The scale of the problem**
   $13T at stake — and why method matters
2. **How DCF is applied to private assets**
   Standard practice and its embedded assumptions
3. **Why the illiquidity premium is the weak link**
   Origin, magnitude, and the wrong assumption
4. **Preview: the GE-LAV framework**
   Three theories, nested; five main results
5. **Course logistics**
   Tracks, assessment, AI policy, project orientation

Private capital is now too big for valuation errors to be tolerable

$13T

Global private capital AUM (2025)

10,000+

Active private market funds

$2.5T

Public pension fund private market allocations

15-25%

Typical allocation: endowments & large pensions

The implication

A systematic 5% valuation error implies $650 billion mismeasured.

This is not a rounding issue.

PE + VC + Infrastructure + Real Estate + Private Credit, growing ~12%/yr CAGR (2010–2025)

Who has skin in the game

LPs

Pensions · Endowments · SWFs · Insurers

Need correct NAVs for allocation, rebalancing, and reporting. Hold the ultimate fiduciary duty to beneficiaries.

GPs

PE / VC / RE / PC fund managers

Need correct valuations for IC review, board reporting, fundraising, and carry calculation. Career incentives complicate honest marks.

Regulators

Insurance · Banking · Securities · Pension

Need correct valuations for capital adequacy (Solvency II, Basel III), systemic risk monitoring, and accounting standards (IFRS 13).

Auditors / Valuation firms

Big 4 · Specialist valuation consultants

Need defensible methodology for fair value reporting. Liability exposure when methodology fails.

DCF in current private market practice

The basic formula:

$$V_0 = \sum_{t=1}^{T} \frac{CF_t}{(1+r)^t}$$

Discount rate decomposition

$$r = r_f + \beta \cdot ERP + \text{Size premium} + \text{Illiquidity premium}$$

All components held constant for the full fund life (10+ years).

Typical PE buyout calibration (2024):

Component	Symbol	Value	Notes
Risk-free rate	rf	4.0%	SOFR + term premium
Equity risk premium × β	β·ERP	3.0 – 4.0%	Levered for buyout (β ≈ 1.2)
Size premium	—	1.0 – 2.0%	Smaller fund / portco effect
Illiquidity premium	—	**3.0 – 4.0%**	★ Today's focus — the problematic line
Total discount rate	**r**	**11.0 – 14.0%**	**Held constant for 10+ years**

The 3% illiquidity premium: history, not theory

Origin and adoption

- **Amihud & Mendelson (1986):**
  illiquidity premium ∝ bid-ask spread (derived for public markets)
- **Private market practice:**
  averaged historical excess return of PE over public equity ≈ 3.5%
- **IPEV valuation guidelines (2022):**
  endorse historical-average approach
- **Solvency II (insurance):**
  embeds fixed premium structure for capital calculations
- **IFRS 13:**
  permits but does not specify; defaults to industry convention

The fundamental problem

The 3.5% is a

HISTORICAL AVERAGE

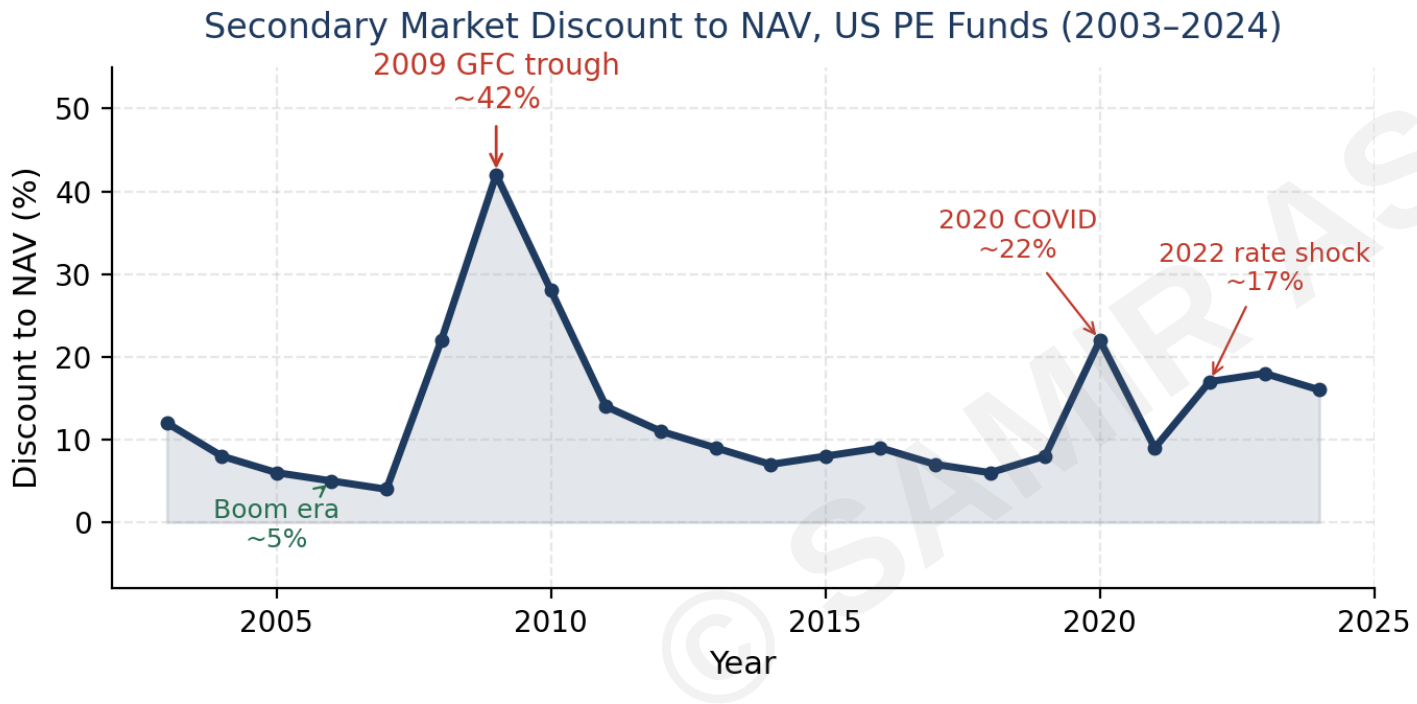
not a theoretical equilibrium.

Two implicit assumptions hidden inside:

1. The premium is constant across regimes.
2. Averages capture the right valuation in each regime.

Both are empirically falsified.

What the secondary market actually shows



Four regimes, four magnitudes

2003–2007	3–8%	*Boom*
2008–2010	35–50%	*GFC*
2011–2019	5–12%	*Normalization*
2020–2024	15–25%	*Multi-shock*

If the illiquidity premium is fixed at 3.5%, where do these moves come from?

We unpack this in Session 3. For now: DCF cannot explain what the market is doing.

Three reasons DCF fails for private assets

Failure 1

The premium is stochastic, not constant

Empirical evidence (Session 3) shows the secondary market discount varies from 3% to 50% across regimes. DCF assumes one number.

→ Ornstein-Uhlenbeck process · Session 4

Failure 2

Premium variability creates Jensen bias

When the discount rate is stochastic and the discount factor is convex, E[exp(-rT)] > exp(-E[r]T). DCF is systematically too low.

→ Closed-form Jensen formula · Session 24

Failure 3

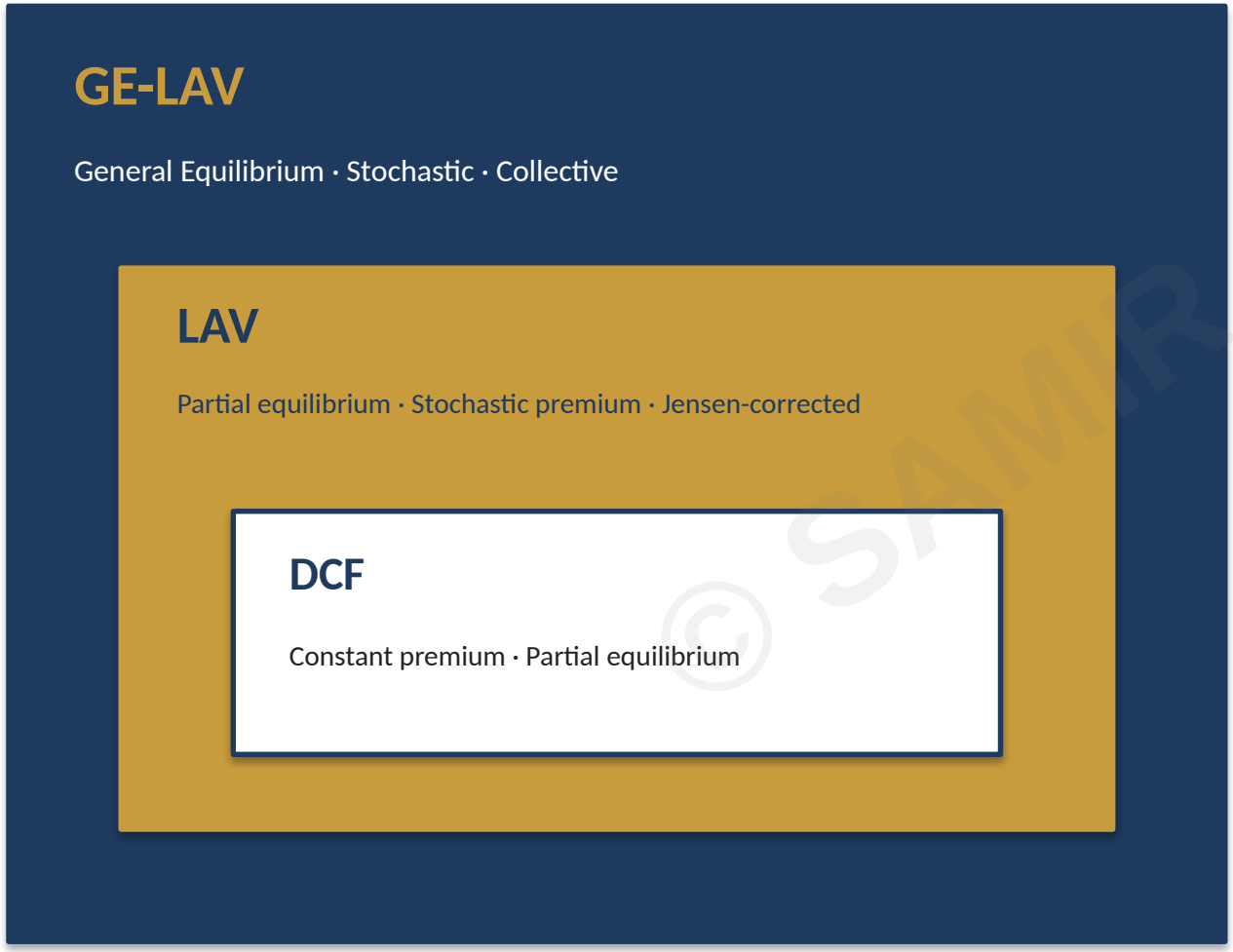
Liquidity is collectively determined

When 1,000 LPs each decide to sell, the secondary market price clears at much higher discounts than any individual LP's decision implies.

→ McKean-Vlasov externality · Session 21

Today is the preview. Session 2 begins the detailed treatment.

Three nested theories: DCF ⊊ LAV ⊊ GE-LAV



What each theory adds

DCF →	constant premium, deterministic
LAV →	stochastic premium (OU), Jensen correction
GE-LAV →	+ market clearing, + McKean-Vlasov collective dynamics

Strict containment: *DCF is a special case of LAV*

LAV is a special case of GE-LAV

What GE-LAV delivers: five main results

1	**Jensen convexity bias**	*Closed-form formula*	Calibrated 0.8–3.6% by asset class · Session 24
2	**Optimal exit boundary L*(t)**	*HJB free-boundary problem*	Quantitative "hold or sell" decision rule · Session 12
3	**Welfare gap**	*Quantified externality cost*	≈ 2.3%/yr · $300B/yr aggregate · Session 24
4	**Pigouvian exit tax**	*State-contingent $\tau^*(L)$*	0% normal · 7% at GFC depth · Session 24
5	**Valuation hierarchy**	*Strict containment*	DCF ⊊ LAV ⊊ GE-LAV · proved in Track 2 S30

By the midterm, you will compute or apply each of these.

The $73 million gap: one number to anchor the course

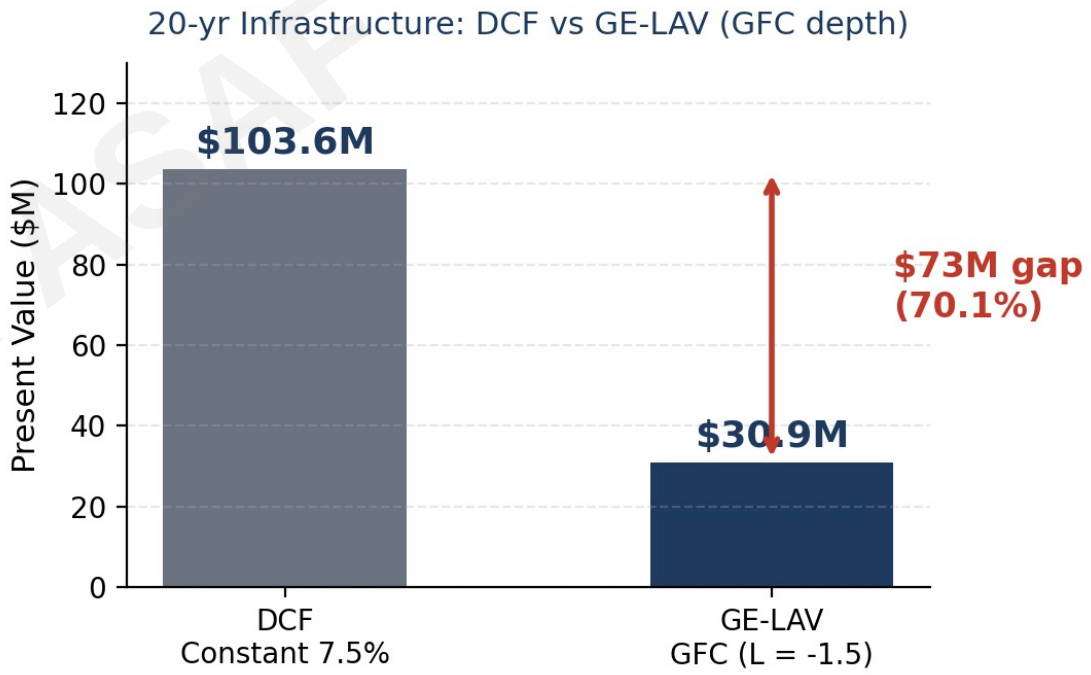
Setup

A pension fund holds a 20-year infrastructure asset

$50M annual contracted cash flow, 20-year tenor.

Four methods, four answers

DCF (constant 7.5%, illiq premium 3.5%)	**$103.6M**
LAV (Jensen-corrected, normal markets)	**~$108M**
GE-LAV (normal markets, L ≈ 0)	**~$95M**
GE-LAV (GFC depth, L = −1.5)	**$30.9M**



This is not a mark-to-market fluctuation.

It is the correct equilibrium price at which the secondary market would clear.

Where we go from here: the 32-session arc

Sessions 1–10

Diagnosis & Measurement

Why DCF fails · Three structural failures · OU process · IRR/PME · LA-IRR/LA-PME · Midterm

← YOU ARE HERE

Sessions 11–18

Decision & Application

Exit timing · Exit boundary · Portfolio with hedge demand · Regulatory · Platform

Sessions 19–24

Math Intuition Bridges

Brownian · Itô · HJB · MFG · Fokker-Planck · Jensen · Pigouvian · Welfare

Sessions 25–31

Split Track (T1 / T2)

T1: case workshops · T2: full proofs and derivations · Research frontiers

Session 32

Capstone

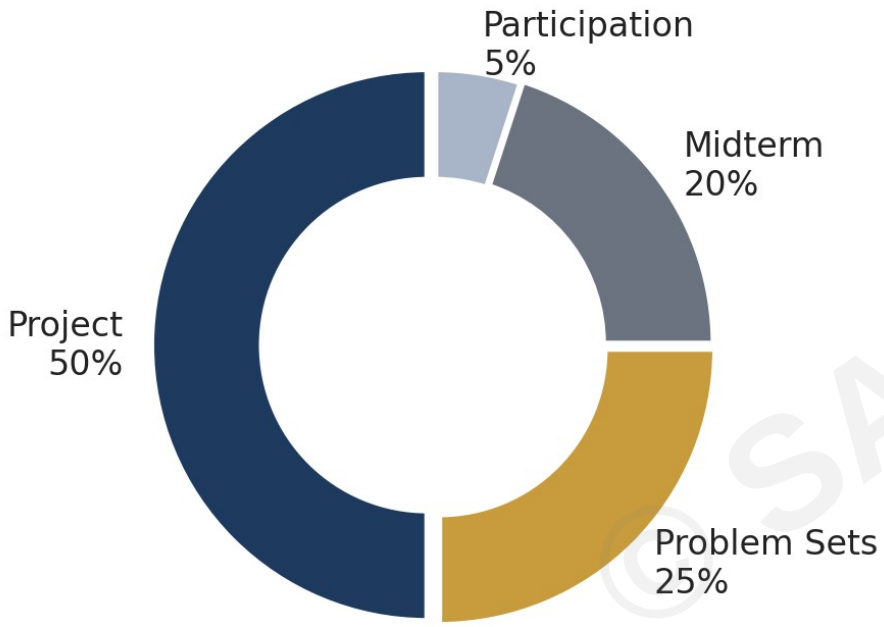
Project presentations

Track 1 (Practitioner) vs. Track 2 (Researcher)

TRACK 1 Practitioner		TRACK 2 Researcher	
Audience	MBA, MS Finance, working professionals	**Audience**	PhD-track, quant-focused MS Finance
Math depth	Intuition + numerical application	**Math depth**	Full proofs and derivations
Session 25–31	Case workshops (PE, infra, credit, secondaries)	**Session 25–31**	Derivations: HJB, MFG, Pigouvian, welfare
Problem sets	Applied: real data, IC memos, allocation decisions	**Problem sets**	Theoretical: proofs, numerical implementation
Project	Asset-class deep-dive with GE-LAV application	**Project**	Research-paper format with theoretical extension
Career fit	LP analyst · GP IR · regulator · valuation firm	**Career fit**	Quant research · PhD · academic finance

Decision point: end of Session 5. Default = Track 1.

How you'll be graded



Key dates

Session 8	PS1 due
Session 10	Midterm exam (in class)
Session 14	Project proposal due
Session 16	PS2 due
Session 24	PS3 due
Session 30	Project draft due · PS4 due
Session 32	Project final + presentations

No final exam. The project (50%) replaces it.

Invest in the project accordingly.

Pair discussion: 5 minutes

Find a partner. Pick ONE question to discuss for 5 minutes. We'll share at the end.

Career relevance

Where in your career do you expect to encounter private market valuation?

If you're not sure: which of the four stakeholder groups (LP, GP, regulator, auditor) is closest to where you might end up?

Prior beliefs

What's one thing you already believe about DCF that this course might change?

Examples: "DCF is the right method" · "Illiquidity premia are stable" · "NAV reports are reliable"

Track choice

Which track are you leaning toward — and why?

Track 1 if: practitioner-oriented, applied math, case-based. Track 2 if: research-oriented, proof-comfortable, quant focus.