



Private Capital Returns and Valuation

Market scale, investor
performance, and the cost of
capital

Will Frazier, FASA

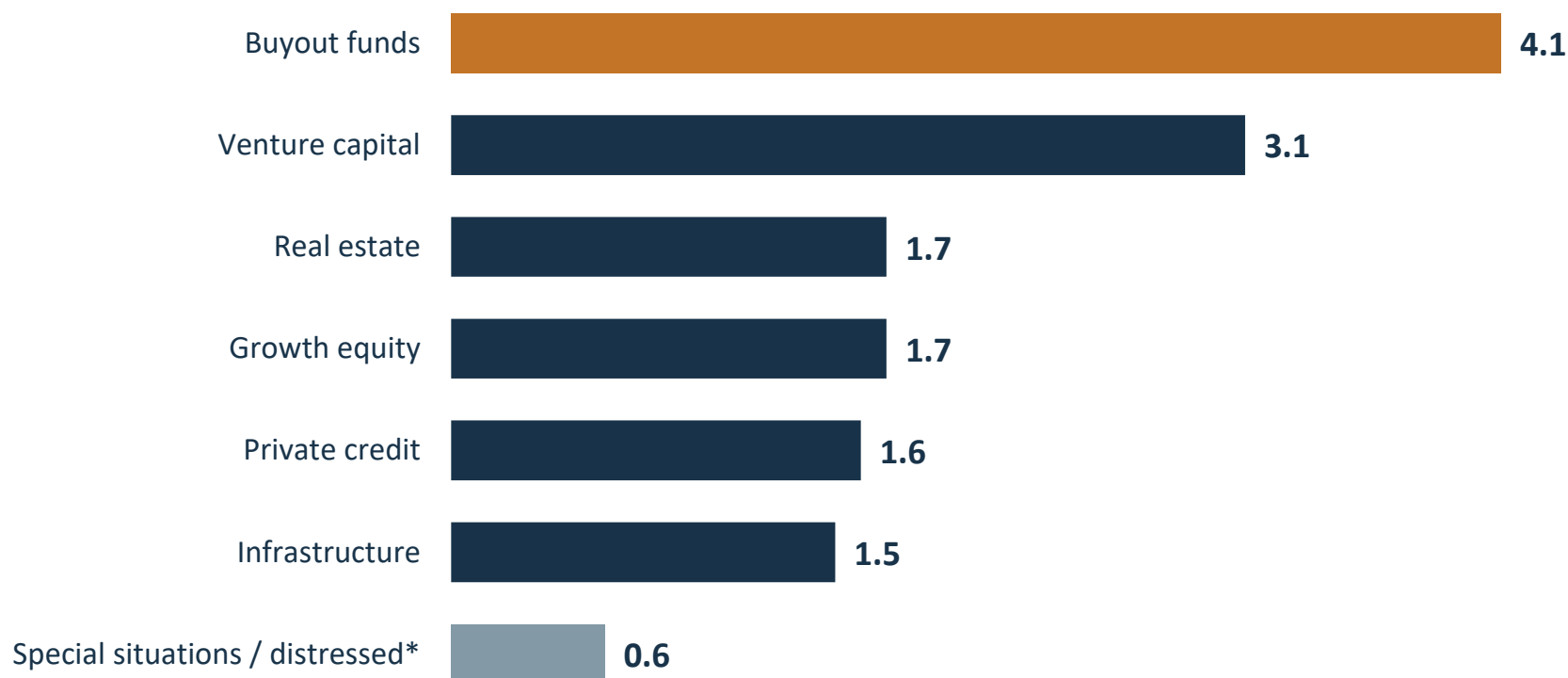
October 21, 2026



ESTATE PLANNING COUNCIL OF NORTH TEXAS

The scale of private capital

Global assets under management · June 2024 · Approximate US\$ trillions



*Credit strategies only; included in private credit. Bars are not additive.

AUM includes invested assets and dry powder. Rounded estimates from published charts.

Sources: Preqin; McKinsey Global Private Markets Report 2025. See notes for definitions.

Private equity return metrics

Return measures answer different questions about growth, timing and cash received

Metric	What it measures	Investor interpretation
IRR Internal Rate of Return	Annualized return using the amounts and dates of cash flows and remaining value	How quickly has invested capital earned a return?
MOIC Multiple of Invested Capital	$(\text{Proceeds} + \text{remaining value}) \div \text{invested capital}$	How much value did each dollar invested produce?
TVPI Total Value to Paid-In Capital	$(\text{Fund distributions} + \text{remaining NAV}) \div \text{paid-in capital}$	Total fund value, including unsold investments
DPI Distributions to Paid-In Capital	$\text{Fund distributions} \div \text{paid-in capital}$	How much money has actually come back?
RVPI Residual Value to Paid-In Capital	$\text{Remaining fund NAV} \div \text{paid-in capital}$	How much reported value remains invested?
PME Public Market Equivalent	Comparison with a public-market benchmark using PE cash-flow timing	Would a public-market investment have performed better?

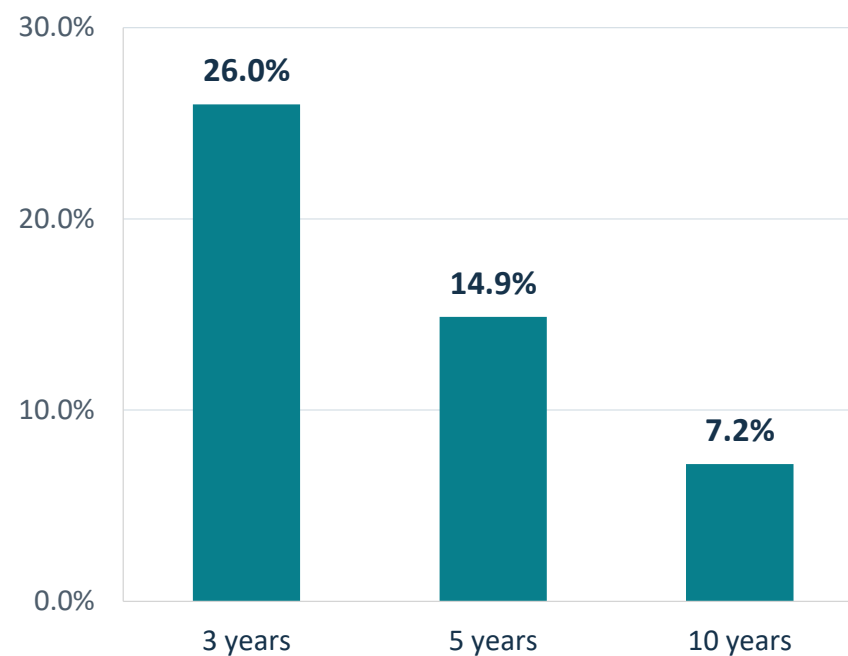
TVPI = DPI + RVPI

NAV = net asset value. Multiples include original capital.

IRR and MOIC across holding periods

Illustration: invest \$100 today and receive \$200 at exit, with no interim cash flows

Holding period	MOIC	IRR
3 years	2.0×	26.0%
5 years	2.0×	14.9%
10 years	2.0×	7.2%



Same 2.0× multiple, lower annualized return as the wait increases

For this illustration: $IRR = MOIC^{(1 \div \text{years})} - 1$

Gross and net private equity returns

The reporting basis determines whose economic return the metric describes

	Gross returns	Net returns
Perspective	Performance before fund management fees, fund expenses and carried interest	Performance after fund management fees, fund expenses and carried interest
Typical use	A manager evaluates investments in portfolio companies	A limited partner evaluates the return on a fund investment
Cash-flow basis	Cash invested in companies, proceeds received and remaining investment value	Investor capital contributions, distributions received and remaining net fund value
Common measures	Gross IRR and gross MOIC	Net IRR and net TVPI

Net returns reflect the investor's cash flows

Calculate net IRR from dated investor cash flows. Annual fees cannot simply be subtracted from gross IRR.

Basis of the performance comparisons

The following charts describe period returns across private capital sectors and the S&P 500

Measurement period

Calendar-year and six-month returns describe the stated period. They differ from a fund's since-inception IRR.

Benchmark differences

Private fund benchmarks cover global holdings. The S&P 500 covers US public stocks. Fees, leverage and valuation timing differ.

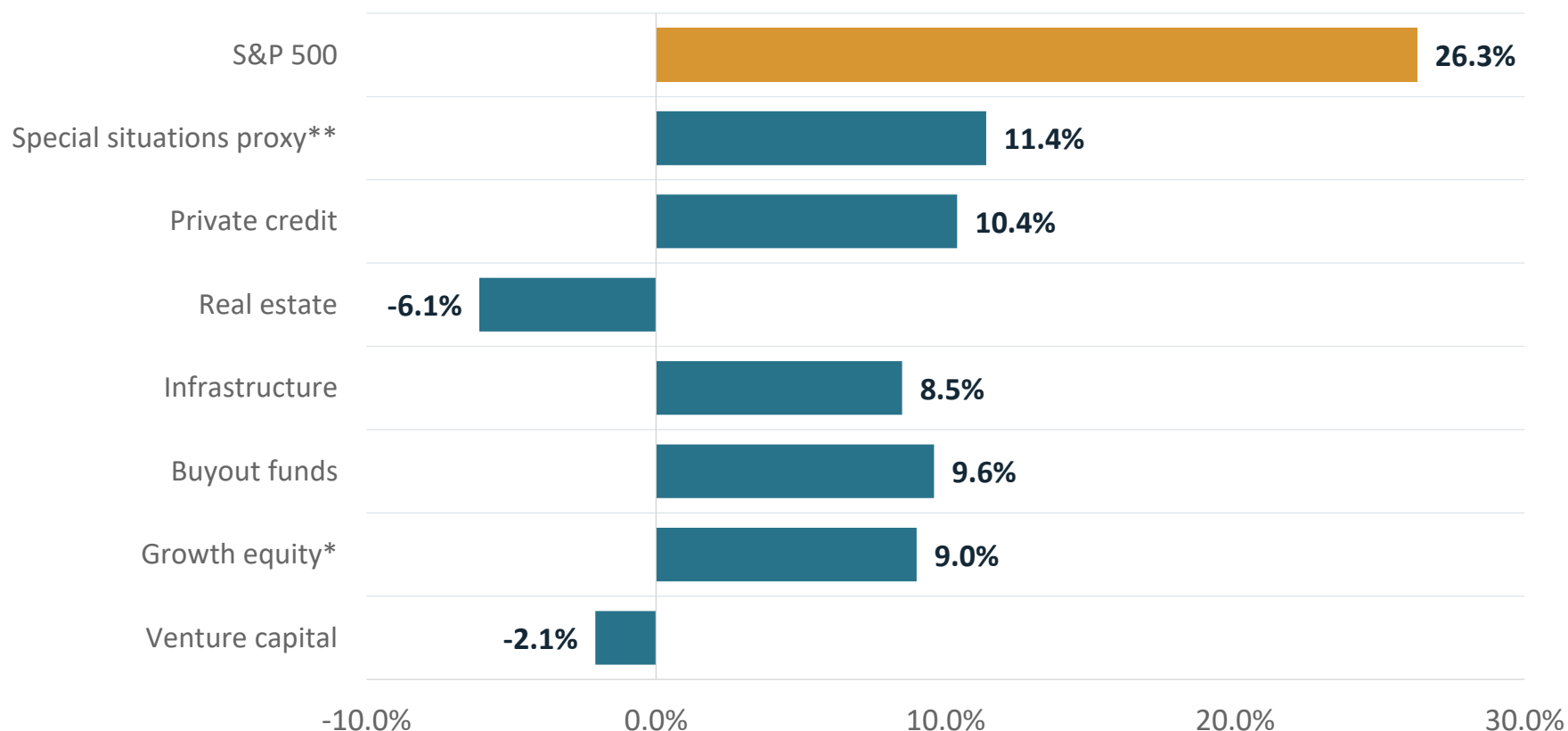
Sector coverage

Growth equity uses expansion capital. Special situations uses opportunistic lending as a broader proxy. Midyear coverage is incomplete.

These comparisons provide context for valuation. They do not establish a required return.

Private capital and S&P 500 returns in 2023

Calendar-year returns in USD (%)

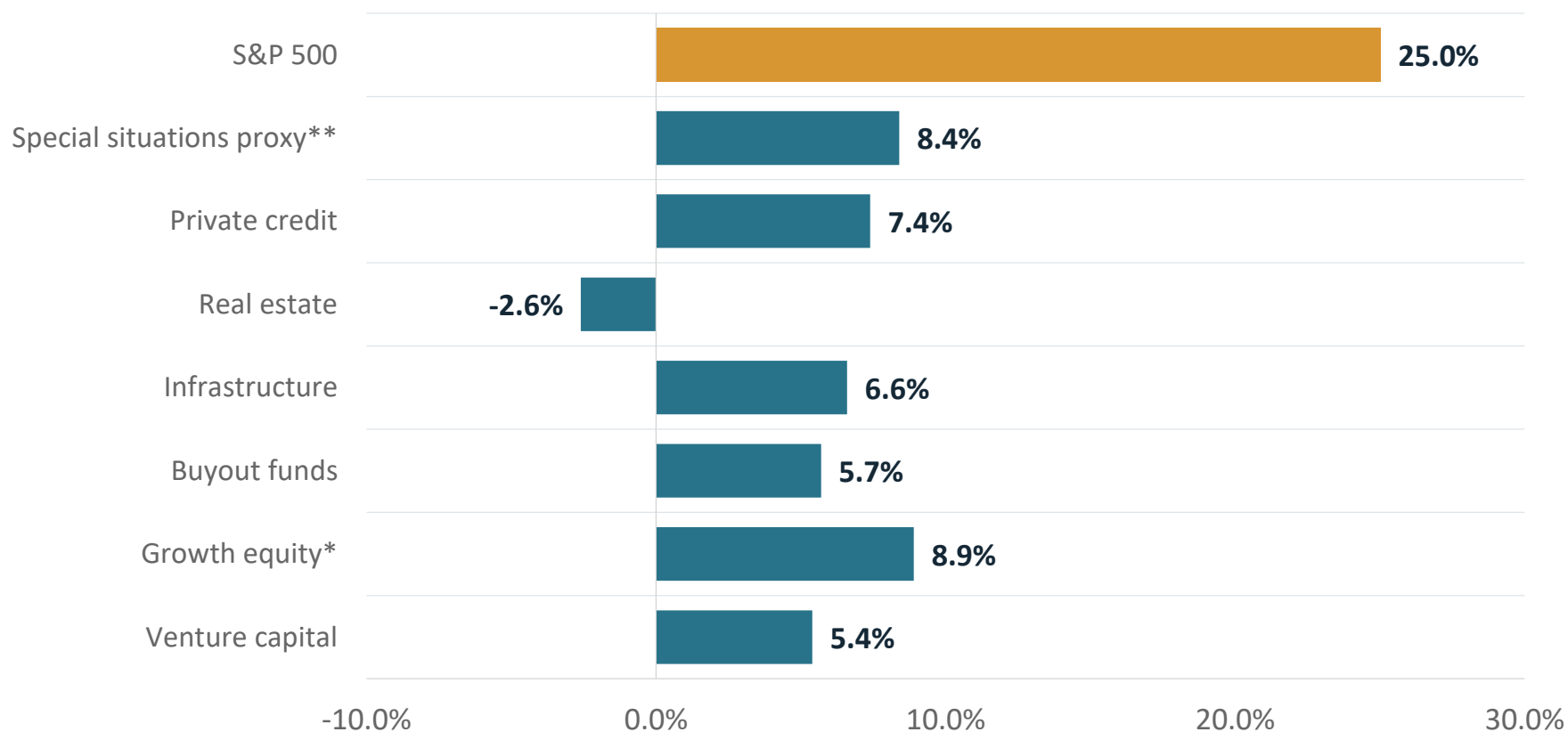


*MSCI expansion capital. **MSCI opportunistic lending, a broader proxy for distressed/special situations.

Private funds: global closed-end benchmarks. S&P 500: US stocks, dividends reinvested. Annual returns, not lifetime IRRs.

Private capital and S&P 500 returns in 2024

Calendar-year returns in USD (%)

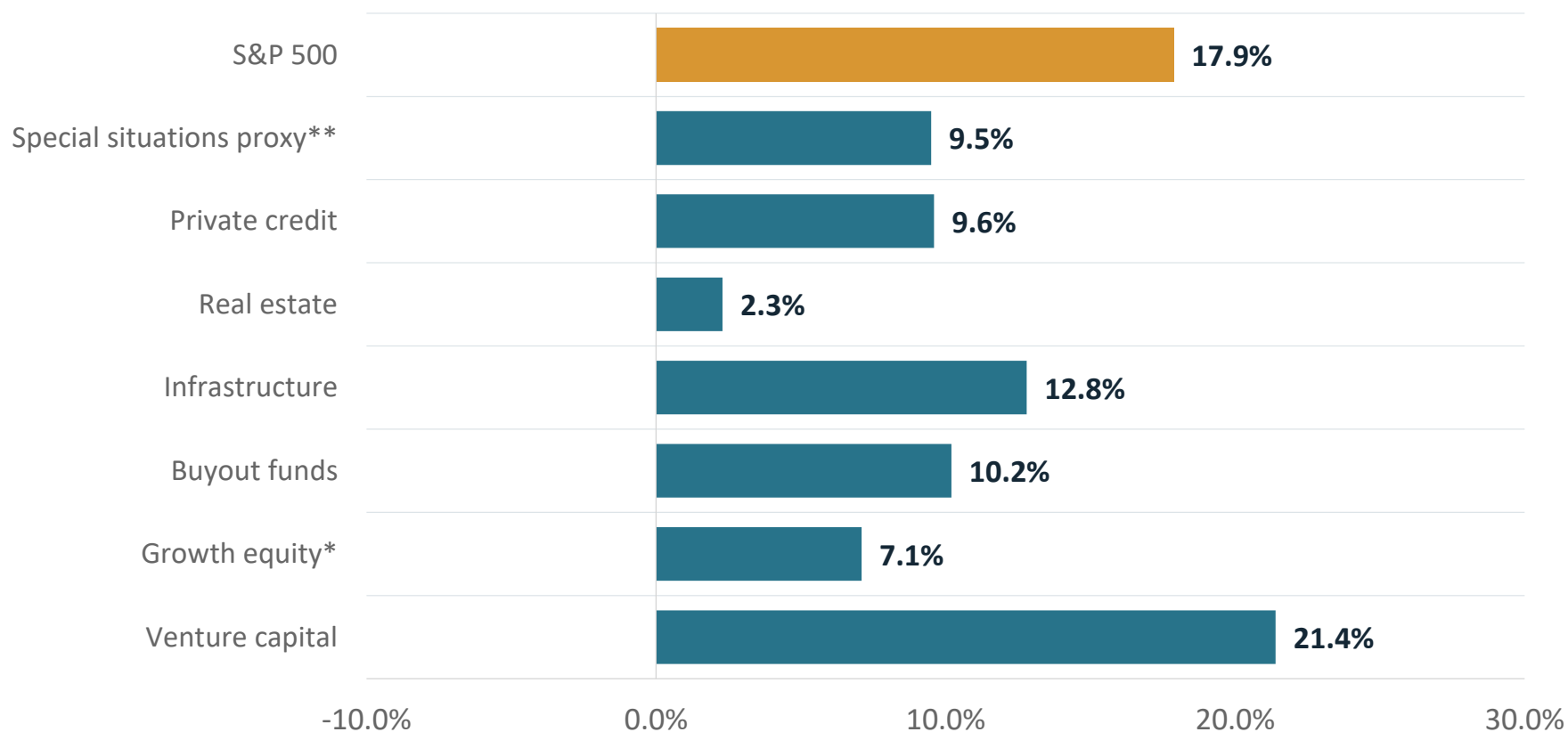


*MSCI expansion capital. **MSCI opportunistic lending, a broader proxy for distressed/special situations.

Private funds: global closed-end benchmarks. S&P 500: US stocks, dividends reinvested. Annual returns, not lifetime IRRs.

Private capital and S&P 500 returns in 2025

Calendar-year returns in USD (%)

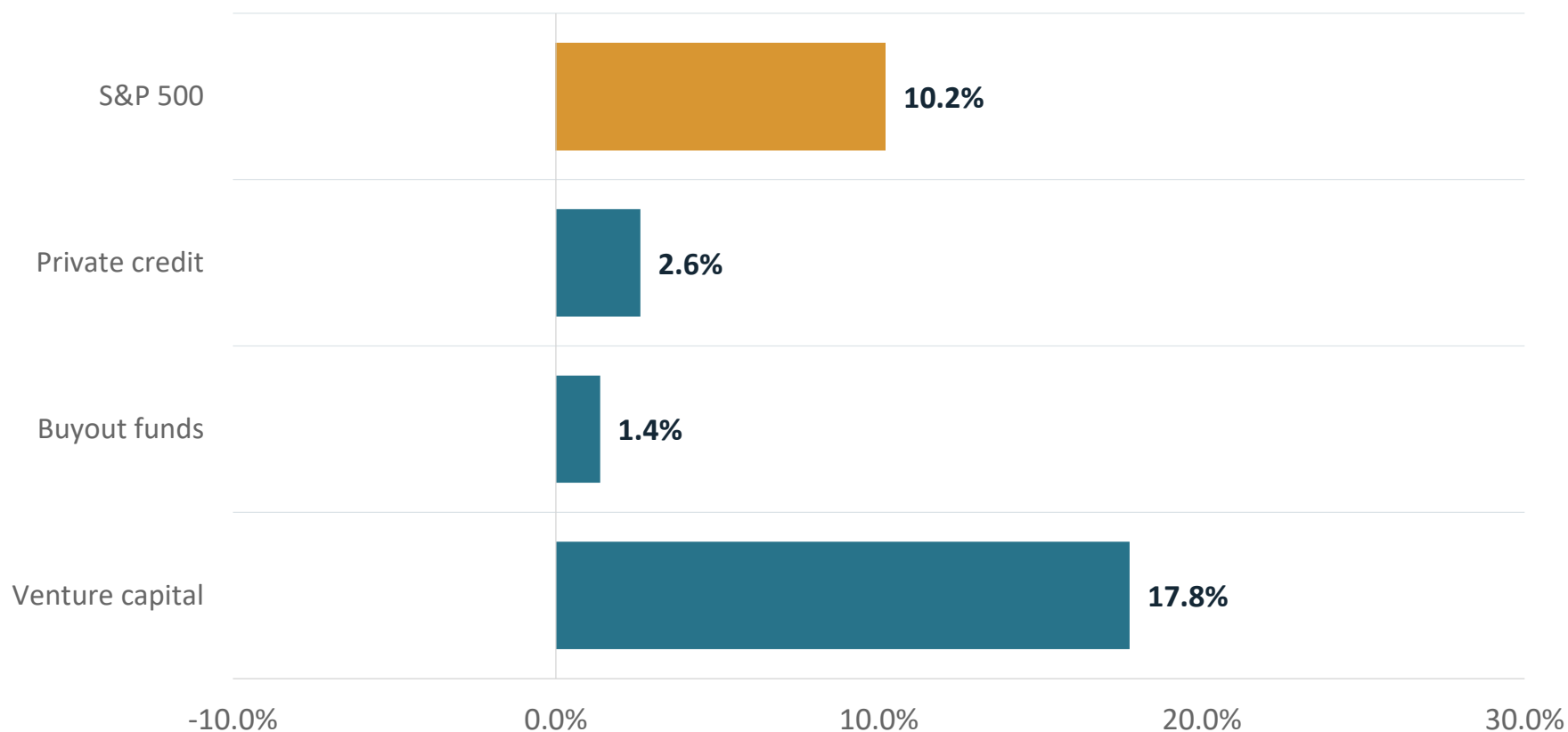


*MSCI expansion capital. **MSCI opportunistic lending, a broader proxy for distressed/special situations.

Private funds: global closed-end benchmarks. S&P 500: US stocks, dividends reinvested. Annual returns, not lifetime IRRs.

Private capital and S&P 500 at midyear 2026

January 1-June 30, 2026 returns (%) · Not annualized



Verified six-month figures. Other requested sectors appear on the next slide.

Private returns compound Q1 and Q2: $(1 + Q1) \times (1 + Q2) - 1$. Calculations use rounded published quarterly returns.

Midyear 2026 sector return report

Returns in USD (%) · Six-month figures are not annualized

Sector	Q1 2026	Q2 2026	Six months
Venture capital	4.5%	12.7%	17.8%
Growth equity*	Not verified	Not verified	Not verified
Buyout funds	-1.1%	2.5%	1.4%
Infrastructure	Not verified	2.5%	Not verified
Real estate	Not verified	0.2%	Not verified
Private credit	0.9%	1.7%	2.6%
Special situations proxy**	Not verified	2.4%	Not verified
S&P 500 total return	—	15.20%	10.21%

*MSCI expansion capital. **MSCI opportunistic lending, a broader proxy for distressed/special situations.

Not verified: could not retrieve the current release's required quarterly figures. Earlier Q1 estimates are excluded.

Reported IRR and the required equity return

A historical investment outcome can inform a valuation without determining its discount rate

	Reported equity IRR	Required equity return
Question answered	What return did the investment produce?	What return do investors require today for this risk?
Basis	Dated contributions and distributions Interim IRR also includes remaining value	Current market conditions and the risk of expected future equity cash flows
Interpretation	A performance record influenced by leverage, entry price and exit timing	A forward-looking cost of equity for the investment being valued
Valuation role	Evidence to assess and reconcile	Discount rate for expected equity cash flows

Historical equity IRR does not automatically equal the required return

IRR can also describe a forecast. A projected IRR is an expected outcome to compare with the required return.

Leverage in the historical equity record

Illustrative five-year buyout, in \$ millions, with no interim distributions or new equity

	Acquisition	Exit after 5 years
Enterprise value	\$100	\$140
Net debt	\$50	\$30
Equity value	\$50	\$110

2.2× MOIC

17.1% equity IRR

Equity gain = \$60
\$40 business-value growth
\$20 net-debt reduction

The 17.1% describes this outcome. It does not establish today's required return.

Debt reduction assumes cash generation after interest, taxes and reinvestment. Leverage also magnifies losses.

Required equity return within WACC

Illustration: market-value weights of 60% equity and 40% debt, with a 25% tax rate

Capital source	Weight	Required return	WACC contribution
Equity	60%	20.0%	12.0%
Debt	40%	8.0% before tax 6.0% after tax	2.4%
Total	100%		14.4% WACC

$$\text{WACC} = 0.60 \times 20\% + 0.40 \times 8\% \times (1 - 25\%) = 14.4\%$$

The 20% is an assumed current required equity return. A reported fund IRR cannot be inserted without reconciliation.

Using PE returns in a valuation

Historical returns provide supporting evidence after reconciliation to the investment being valued

Cash flow being valued	Applicable required return
Cash flow available to debt and equity providers Free cash flow to the firm (FCFF)	Company WACC
Cash flow available to equity owners Free cash flow to equity (FCFE)	Required equity return

Reconciliation before using a PE return benchmark

Benchmark difference	What the analyst should assess
Leverage and reporting basis	Company debt versus fund borrowing, gross versus net returns, fees and carry
Investment risk and timing	Business risk, diversification, liquidity, holding period and current market conditions

A defensible required return needs a current risk assessment, supported by market evidence.

Implications for valuation

PE performance provides evidence to assess alongside the risks of the interest being valued

Return measurement

IRR captures cash-flow timing. MOIC and fund multiples show total value, cash distributed and value remaining.

Reporting and leverage

Gross versus net identifies the reporting level. Debt and its repayment influence the equity return recorded.

Required return

Historical IRR supports reconciliation. Current market conditions and investment risk determine the required equity return.

Cash-flow consistency

FCFF uses company WACC. FCFE uses the required equity return. A fund's net IRR requires reconciliation before use.



October 4-6 | Fort Worth, Texas | In Person & Virtual

2026 ASA INTERNATIONAL CONFERENCE

A New Frontier: Appraising in a World of Change



It's Turtles All the Way Down II: Tiered Discounts: Modern Theory in Practice

William H. Frazier, FASA
AltaView Advisors
Anne Appler, ASA
Weaver

Value Flows Downstream. So Does Risk.

Start where the value lives — business, real estate, or portfolio.

Risk is reduced along the way, so each step inherits what was already priced.



No new risk? No new discount.

One tier down: the same assets, less information

Information at Tier 2

No private placement memorandum.

No access to management.

No visibility into how NAV was set.

Control and owner rights

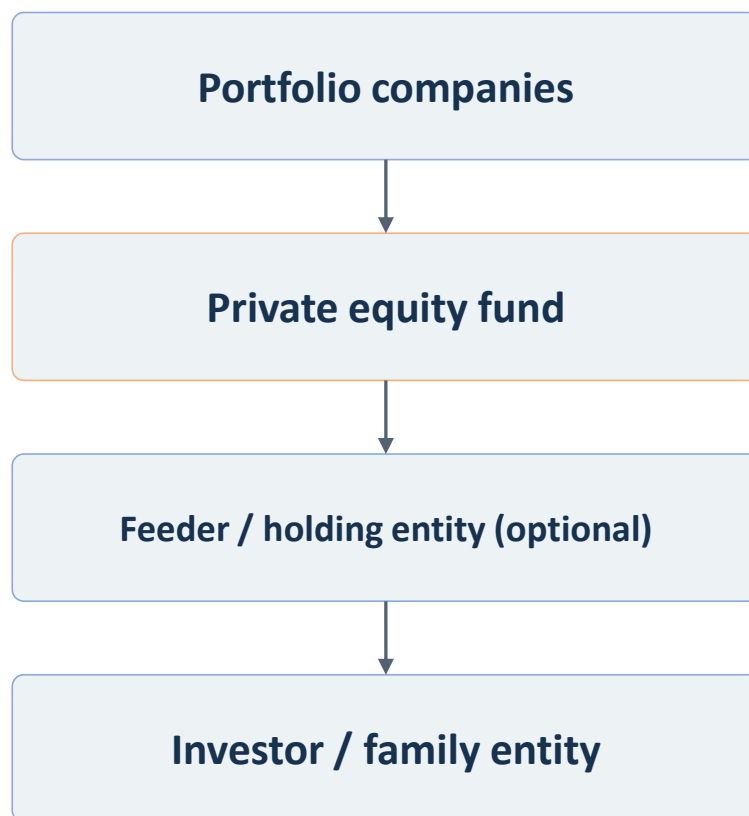
New managers, different control.

Entity form sets the owner's rights.

Read the terms: covenants, buy-sells, puts and calls.

Governance can earn the next discount.

Private Equity: Layers Come Standard



GP discretion over distributions
NAV transparency and information access

Transfer restrictions and liquidity

Illustrative ownership chain

Does the next ownership layer create a distinct impairment?

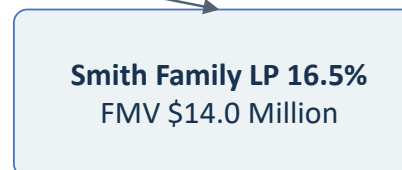
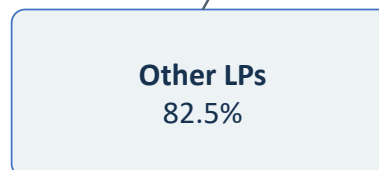
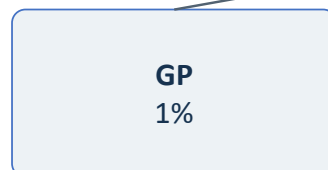
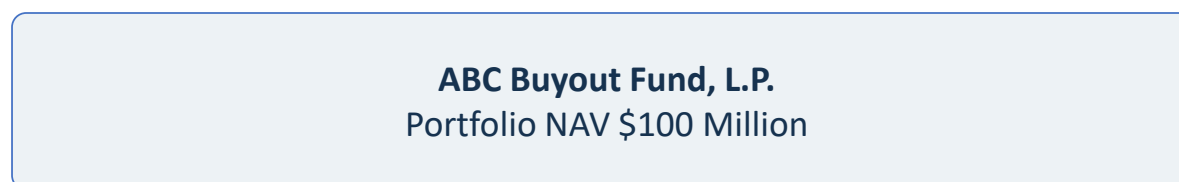
Type 1: ABC Buyout Fund → Smith Family, L.P.



Enterprise Level
Tier 1 — lower tier

Valuation discount
Secondary market 15%

Shareholder Level



ABC's shareholder FMV is Smith's starting NAV

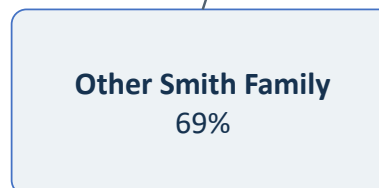
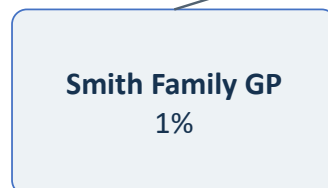
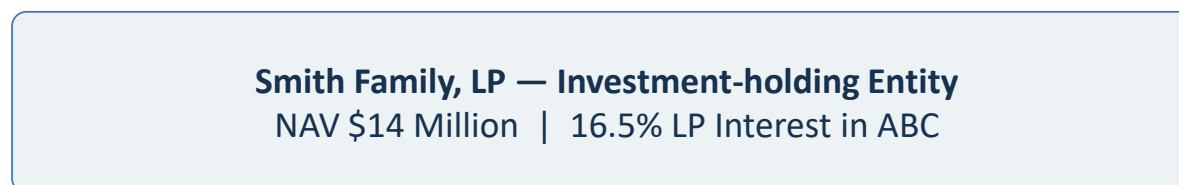


Tiered discount

Enterprise Level
Tier 2 — upper tier

Valuation discount
DLOC 8% | DLOM 25%

Shareholder Level



Type 2: Smith Family, L.P. → JAS Partners, L.P.



Shareholder Level

Smith Family, LP — John & Mary Smith's 30% LP Interest
Shareholder FMV \$2.9 Million

One tier's shareholder FMV is the next tier's starting NAV



Tiered discount

Enterprise Level
Tier 3 — upper tier

JAS Partners, L.P. — Investment-holding Entity
NAV \$2.9 Million | 30% LP Interest in Smith, LP

Valuation discount
DLOC 2% | DLOM 10%
Marginal risk only

Shareholder Level

JAS Partners GP, LLC
1%

John & Mary Smith
19%

Four trusts — 20% each
80% combined

Combined FMV: \$2.0M

Gifted interests: 48.3% total discount to a pro-rata share of the original \$100 million NAV.

Four Levels. Three Discounts One Number.

48.3%

total discount from a pro-rata share
of the original \$100 million of portfolio NAV.



Tier 1 — ABC Buyout Fund

Secondary market 15%

Tier 2 — Smith Family, LP

DLOC 8% | DLOM 25%

Tier 3 — JAS Partners, LP

DLOC 2% | DLOM 10%

Discounts compound, they do not add. Direction and amount of tiered discount varies with the facts.

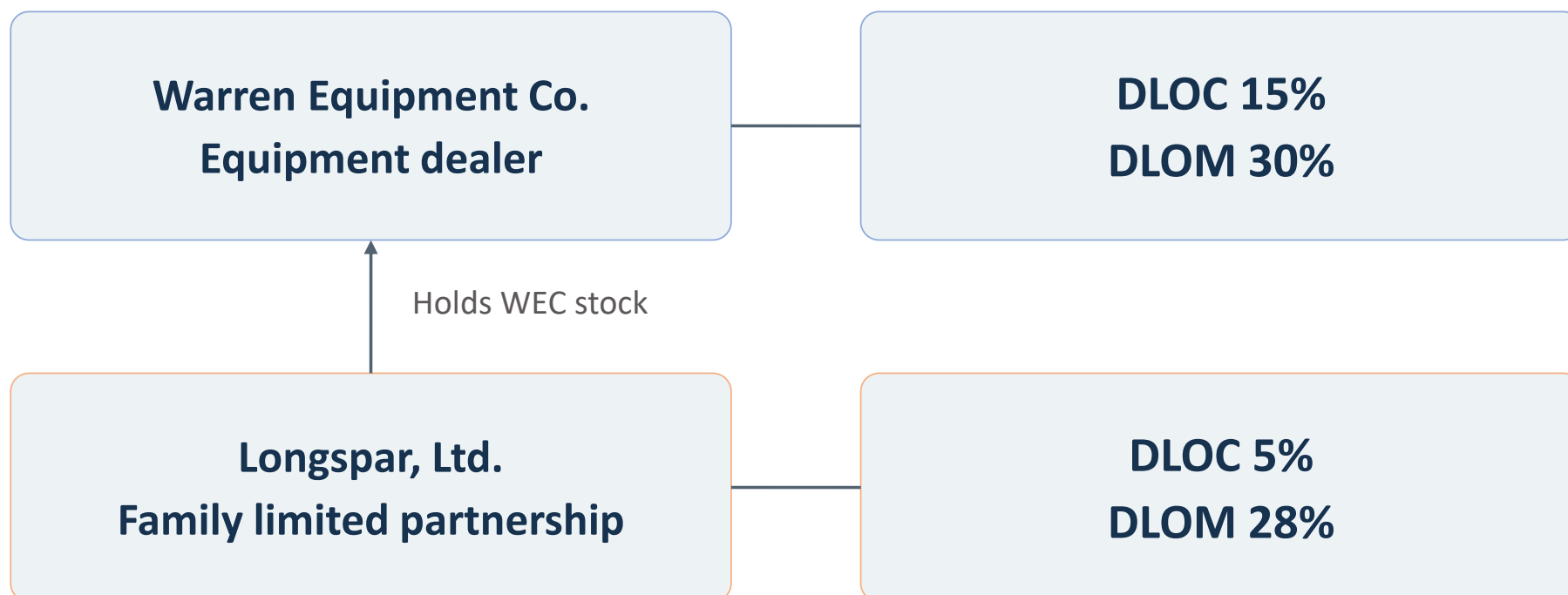
Where Courts Land

A line of cases. Not always a straight line.

Nelson v. Commissioner (2020)

OWNERSHIP

DISCOUNTS AT EACH TIER



Expert: a smaller incremental DLOM.

Court: the argument was reasonable but needed support.

Astleford: How Small Is a “Sliver”?

- AFLP held real estate plus Pine Bend GP.
- Pine Bend: 30% combined discount.
- AFLP: DLOC 17.47%, DLOM 22%.
- IRS: the AFLP discounts already absorbed it.
- Court: Pine Bend was only a sliver of NAV.
- The sliver logic sits uneasily with Nelson.

The Cases: No Straight Line

Gallun '74 O'Connell '78 Piper '79 Wallace '81 Martin '85 Ford '93 Gow '00 Janda '01 Astleford '08 Nelson '20

Case	Tiered discount?	Basis
Estate of Piper (1979)	Cited as yes	Portfolio discount to NAV + 35% DLOM; arguably not two layers
Gallun (1974)	Yes	Layered ownership effects
Gow (2000)	Yes	Minority interests accepted at both levels
Janda (2001)	Partial	Holding company discounted; bank stock was not
Astleford (2008)	Yes	Pine Bend GP was only a "sliver" of AFLP NAV
Nelson (2020)	Yes	Partnership: incremental DLOC 5%, DLOM 28%
Martin (1985)	No	Price the risk at the underlying corporations
Estate of O'Connell (1978)	No	Lower tier was the parent's principal operating subsidiary
Wallace (1981)	No	Successive DLOMs less persuasive; control premium offset
Estate of Ford (1993)	No	No "second stage" discount for interrelated companies

Green = allowed | Orange = partial | Red = rejected | Grey = cited, not two layers

Five Steps. No Free Discounts.

1

Find the source asset: Map what each entity and investor owns.

2

Check rights and governance: Control, information, redemption and exit rights.

3

Trace cash flow: Who controls distributions, timing and reinvestment?

4

Test the next exit: Transfer restrictions and realistic liquidity.

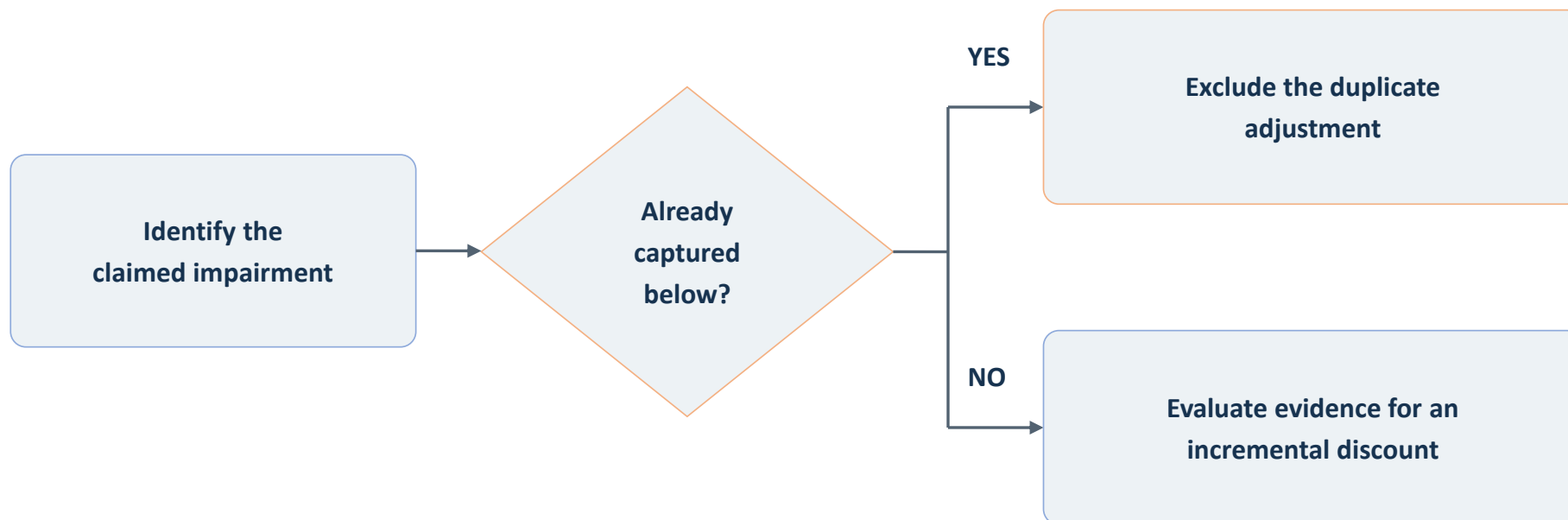
5

Price only new risk: Exclude impairments already captured below.

Map the structure top-down. Trace the risk back to its source.

One Risk. One Price.

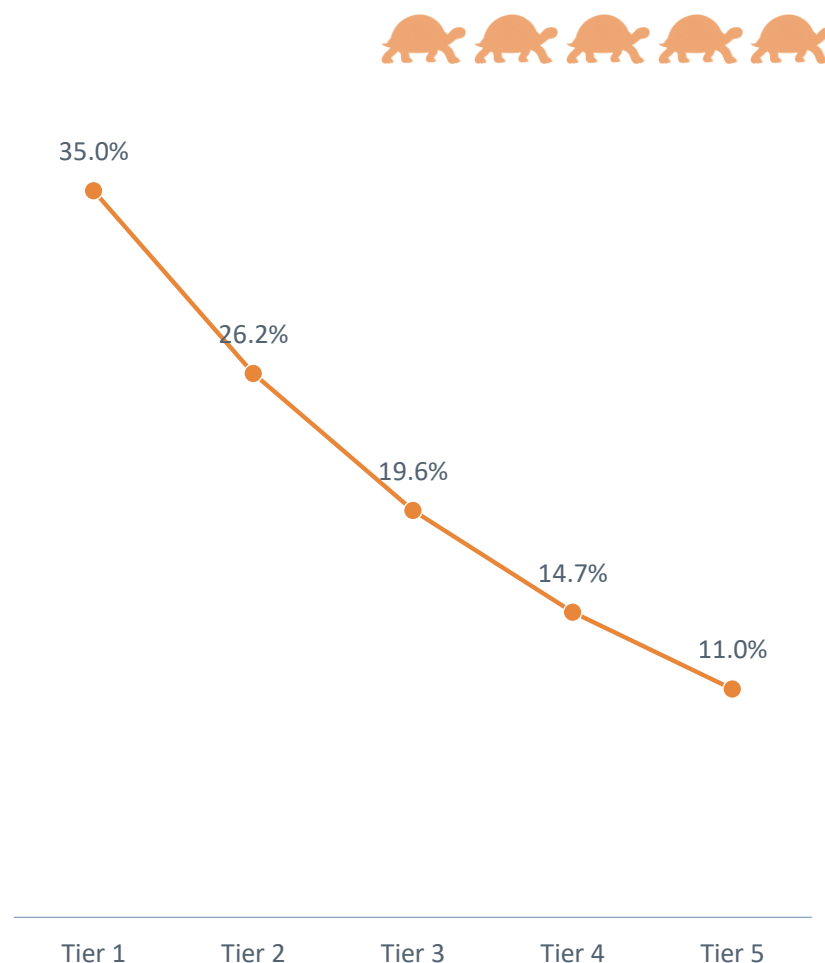
Evidence must support any additional discount.



Check for repeated volatility, liquidity restrictions or governance limits.
 A second full set is rarely defensible.
 Andrews and Heck: DLOC and DLOM can overlap.

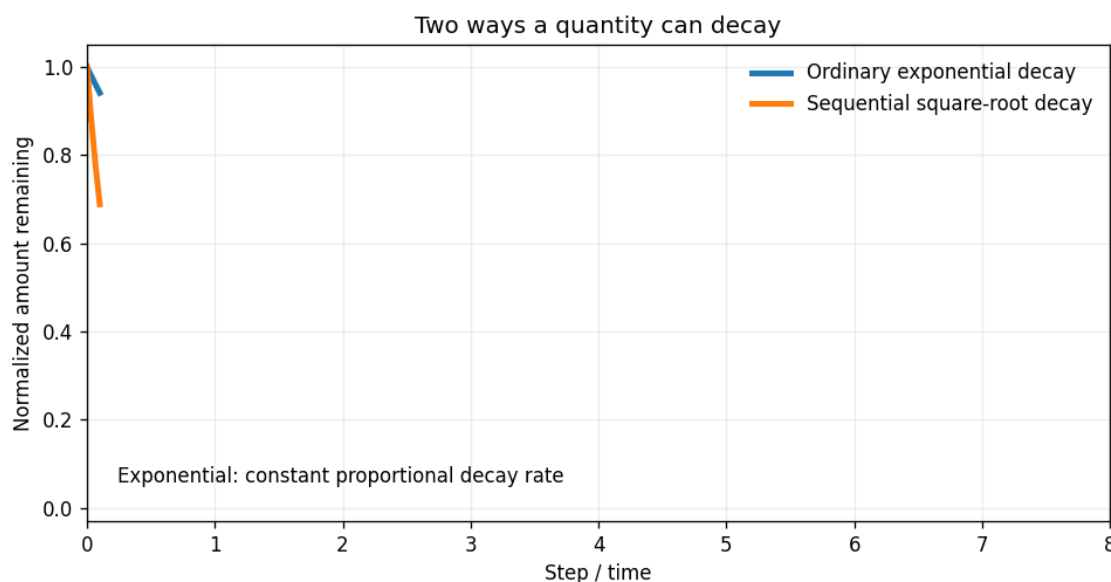
Each Tier Takes a Smaller Bite

- Each tier adds less new risk.
- A fixed discount ignores the decline.
- Model the fade with a decay function.
- Marginal DLOM shrinks at each layer.
- Formula: $d_i = d_1 e^{-\lambda(i-1)}$
- λ sets the pace of illiquidity decay.



Watch the Two Nonlinear Decay Mechanisms Unfold

Both series are normalized to begin at 1 for visual comparison.



Exponential

Constant proportional decay
→ approaches zero

Sequential roots

Exponent is halved each step
→ approaches its asymptote increasingly slowly

Familiar Math. Defensible Inputs?

- Finance already speaks decay.
- Black-Scholes option pricing.
- Annuities and present-value math.
- U.S. Treasury methodology.
- Modern academic illiquidity studies.
- The math is accepted. Prove the inputs.

Physics in Finance

Shared mathematical tools in pricing, portfolio choice and risk analysis

Mathematical method	Financial application	Key idea
Brownian motion	Stock-price models	Random shocks: $dS/S = \mu dt + \sigma dW_t$
Heat / diffusion equation	Black–Scholes option pricing	A change of variables converts the pricing equation to a heat equation.
Hamilton–Jacobi–Bellman (optimal control)	Portfolio and consumption choices	Optimize investment decisions through time.
Random matrix theory	Portfolio correlation estimates	Separate meaningful relationships from estimation noise.
Path integrals	Options whose payoffs depend on the price path	Average discounted payoffs across possible price paths.
Statistical mechanics and fractal methods	Research on herding, crashes and extreme returns	Study investor interaction, scaling and heavy tails.

Physics supplies useful mathematics. Finance adds economic assumptions and market evidence.

Selected sources: Black & Scholes (1973), Merton (1969), Laloux et al. (1999), Bormetti et al. (2004)

Why the Square-Root Function Fits Diminishing Effects

EXPONENTIAL DECAY

$$d_i = d_1 e^{-\lambda(i-1)}$$

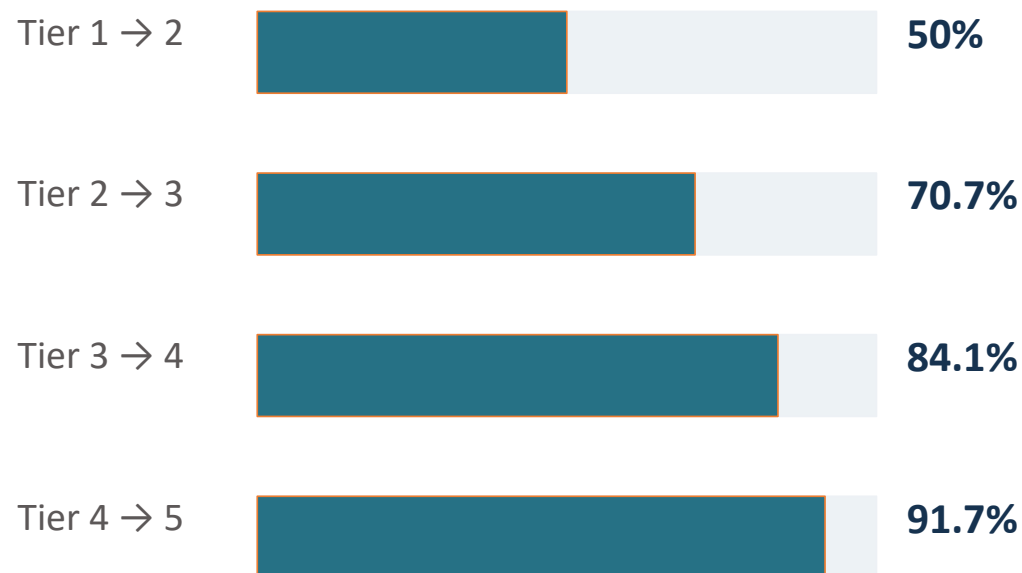
Same proportional reduction each step

SEQUENTIAL SQUARE ROOTS

$$r_i = r^{1/2^{(i-1)}}$$

Smaller incremental reduction each step

Illustrative retention factors



Approaches 100%

New Risk—or Just Another Turtle?

An additional discount requires a supported impairment not already priced.

- Identify what changes for the buyer.
- Account for what earlier values already reflect.
- Support the remaining effect on value.

Economic logic first. Arithmetic second.

The background of the slide is a black and white photograph of several tall skyscrapers reaching towards a sky filled with clouds. The image is partially covered by large, diagonal geometric overlays in orange and blue. The title 'Overview of AltaView Advisors' is centered in a white sans-serif font within a blue horizontal band.

Overview of AltaView Advisors

Overview of AltaView Advisors

THE ALTAVIEW DIFFERENCE

AltaView was founded by a team of seasoned valuation professionals that offer a unique combination of large firm expertise and boutique firm specialization and service. Our primary mission is to consistently provide:

- Best-in-class valuation services performed directly by highly experienced professionals
- Custom research and analyses tailored to our clients' unique circumstances
- Focused senior-level attention, availability, and responsiveness
- Defensible reports that are thorough yet comprehensible
- Superior products and services at a fair cost
- Timely results that meet or exceed our clients' expectations

To achieve our mission, we adhere to the following core principles:

Valuable Insights

AltaView delivers more than independent valuation opinions. We offer in-depth, customized research and thoughtful analyses conducted to best suit each engagement. Our approach results in deep insights that foster more informed decisions by business owners and enable advisors to preempt and defend against future controversy.

Superior Service

AltaView combines large firm experience with a client-centric approach. Our clients work directly with our senior team throughout the engagement lifecycle in an efficient and highly professional process. As a result, the work is done right the first time, which reduces turnaround times and eliminates what can otherwise be a significant burden to business owners and advisors.

Exceptional Results

AltaView's highly qualified and experienced professionals identify complexities in engagements, develop creative solutions, and deliver accurate results every time. Our approaches and conclusions are articulated clearly and convincingly, reducing the probability of scrutiny along with the associated costs.

VALUATION SERVICES

Tax Planning and Compliance
Financial Reporting
Controversy Support
Transaction Advisory
Corporate and Succession Planning
Alternative Asset Managers
Real Estate

VALUABLE INSIGHTS.
SUPERIOR SERVICE.
EXCEPTIONAL RESULTS.

Overview of AltaView Advisors

Tax Planning and Compliance

AltaView services the nation's top tax planning and compliance professionals including attorneys, accountants, family offices, and wealth advisors. Our professionals bring industry leading experience and insights to each assignment garnered from hundreds of completed fair market value engagements. AltaView offers the following tax planning and compliance valuation services:

- Estate and Gift Tax
- Generation-Skipping Transfer Tax
- Income Tax
- Charitable Contributions
- Foundation Distribution Requirements
- Retirement Plan Assets Distribution Requirements
- Planning in Anticipation of a Liquidity Event
- Guarantee Fees for Related-Party Transactions
- Personal Goodwill Valuations and Allocations

Experience

Tax planning and compliance engagements involve unique businesses, securities, interests, and circumstances necessitating a customized solution that is reliable, well supported, and clearly articulated. AltaView has robust experience with the valuation of the following:

- common and preferred stock in closely held businesses
- family limited partnership interests
- alternative investment fund interests
- carried interests in private equity and hedge funds
- preferred "freeze" partnership interests in compliance with Section 2701
- intra-family loans and promissory notes including self-cancelling installment notes
- illiquid shares in publicly traded companies

Real Estate Valuation Services

AltaView is a leading provider of real estate valuation and consulting services for a broad range of purposes, including the following:

- Estate and Gift Tax
- Qualified Appraisals for Charitable Contributions
- Fair Value Reporting
- Purchase Price Allocations
- Litigation Support and Expert Testimony
- Forensic Appraisal Reviews
- Dispute Resolution Consulting
- Life Estates and Remainder Interests
- Eminent Domain
- Conservation Easements
- Property Tax Appeal

Experience

AltaView's professionals have significant experience appraising the following property types:

- Office, Industrial, and Retail
- Residential (single-family and multi-family)
- Hospitality (single star motels to luxury resorts)
- Senior housing and healthcare facilities
- Self-storage and parking structures
- Manufactured home communities and recreational vehicle parks
- Undeveloped and agricultural land
- Recreational and operating ranches
- Vineyards
- Mineral rights

The background of the slide is a low-angle, black and white photograph of several modern skyscrapers reaching towards a sky filled with clouds. The image is partially overlaid with large, diagonal geometric shapes in shades of orange and blue. A solid blue horizontal band across the middle of the image contains the title text.

Professional Biographies

Key Professional Bios



William H. Frazier, FASA

Principal

Houston, Texas

T: 346.260.4370

E: wfrazier@altaviewadvisors.com

EDUCATION

Spring Hill College, B.S.C., Business Administration
Thunderbird Graduate School of Global Management, M.I.M.,
Master of International Management

CREDENTIALS AND LICENSES

FASA - Member of the College of Fellows of the American
Society of Appraisers (ASA)

PROFESSIONAL ASSOCIATIONS

Houston Business and Estate Planning Council
Trusts and Estates, Valuation Editorial Board

William H. Frazier, FASA, is a senior member of the American Society of Appraisers and specializes in business valuation, appraisal, and related consulting and expert witness services, including matters involving federal tax and litigation.

Will has extensive experience as an appraiser and expert witness, including participation in multiple U.S. Tax Court matters such as Grieve, Steinberg, Hendrix, Jelke, McCord, Dunn, and Gladys Cook. His work frequently addresses complex valuation issues, including discounts for lack of marketability and the valuation of family investment holding entities.

Will possesses particular expertise in the analysis and support of valuation discounts. He is the senior contributing author to the chapter on discounts for lack of marketability in *Valuing a Business* (6th ed.) and co-authored a chapter on the same topic in *The Lawyer's Business Valuation Handbook* (3rd ed.). Will is also the creator of the Nonmarketable Investment Company Evaluation ("NICE") method of valuing family investment holding entities, which is featured as the only chapter on FLP valuation in the *Cost of Capital* textbook.

Will has written numerous articles on business valuation for publications including *Trusts & Estates*, *Business Valuation Review*, *ABA Probate and Property*, *Valuation Strategies*, *BV E-Letter*, and *Estate Planning*. He served on the Internal Revenue Service Advisory Council (IRSAC) from 2009 to 2011, working on appraisal matters related to the Office of Professional Responsibility, and he currently serves on the *Trusts & Estates – Valuation Advisory Editorial Board*. In 2025, he received the ASA's highest recognition, the Fellow (FASA) designation.