New Approach to Strategic Capital Market Assumptions for Long-Horizon Institutional Portfolios

A cash-flow and starting yield anchored forward-looking framework for return and risk modeling of public and private assets

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# SAA Requires a Forward-Looking, Institutionally Grounded CMA

- This CMA framework is designed for long-term institutional investors, whose portfolios include fixed income and increasingly tilt toward private assets.
- This framework constructs forward-looking return expectations and rigorous and practical risk measures grounded in asset-specific cash flow dynamics and starting valuations.

	Asset	Schedule	Rating	NAIC Designation	Capital Charge X PAF	Duration	Expected Credit loss
Government	US Treasuries, Short/Intermediate	D-1	AAA	1A	0.00%	3.7	0.00%
	US Treasuries, Long	D-1	AAA	1A	0.00%	13.8	0.00%
	US Taxable Munis	D-1	AA	1C	0.00%	10.6	0.10%
	Global ex-US Government, hedged	D-1	AA	1C	0.42%	8.3	0.10%
Public Corporates	US Public Corporates IG AAA	D-1	AAA	1A	0.16%	5.0	0.00%
	US Public Corporates IG AA	D-1	AA	1C	0.42%	6.8	0.10%
	US Public Corporates IG A	D-1	A	1F	0.82%	8.3	0.07%
	US Public Corporates IG BBB	D-1	BBB	2B	1.52%	8.2	0.49%
	US Public Corporates, HY Intermediate	D-1	BB–	3C	6.02%	3.9	0.67%
	US Public Corporates, HY Long	D-1	BB–	3C	6.02%	9.5	0.67%
	Global ex-US Corporates, hedged	D-1	A	1F	0.82%	6.2	0.07%
Structured	Residential Mortgage-Backed Securities	D-1	AA	1C	0.00%	6.7	0.10%
	Commercial Mortgage-Backed Securities	D-1	AA	1C	0.00%	4.1	0.10%
	Asset-Backed Securities	D-1	AA	1C	0.42%	3.3	0.10%
Private Credit	Corporate IG Private Placement A	D-1	A	1F	0.82%	8.1	0.07%
	Corporate IG Private Placement BBB	D-1	BBB	2B	1.52%	8.0	0.49%
	Corporate HY Private (Leveraged Loans)	D-1	B+	4A	7.39%	3.9	2.42%
	Residential Mortgage Whole Loans	B	AA	1C	0.68%	6.4	0.10%
	Commercial Mortgage Whole Loans	B	AAA	1A	0.90%	4.1	0.00%
PE and PRE	Private Equity	BA			30.00%		
	Real Estate (via partnerships, equity)	BA			30.00%		

Cash and FX Risk Do Not Belong in Long-Term Strategic Allocation

- Cash is excluded from return modeling due to its structural return deficiency, policy-driven volatility, and minimal long-term role in insurer portfolios; a fixed 1% allocation reflects its tactical liquidity function.

- Foreign currency bonds are modeled using hedged indexes to strip out uncompensated FX volatility, aligning with institutional best practices that seek interest rate exposure, not currency noise.

Figure 1: Foreign currency volatility makes up the majority of the unhedged foreign currency bond risk
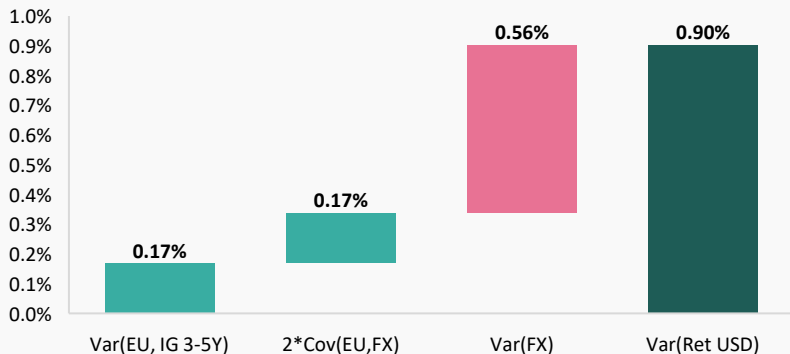
- Asset owners earn yield by holding bonds to maturity, so expected returns are anchored in index yield-to-worst minus forward-looking credit loss estimates.
- Expected returns are input as geometric (IRR) terms, avoiding mismatches from compounding or volatility drag.
- Reinvestment risk is not forecasted path-wise but absorbed into the return RMSE metric, ensuring tractability and real-world alignment.

Figure 2: Starting yields are good indicators of actual performance
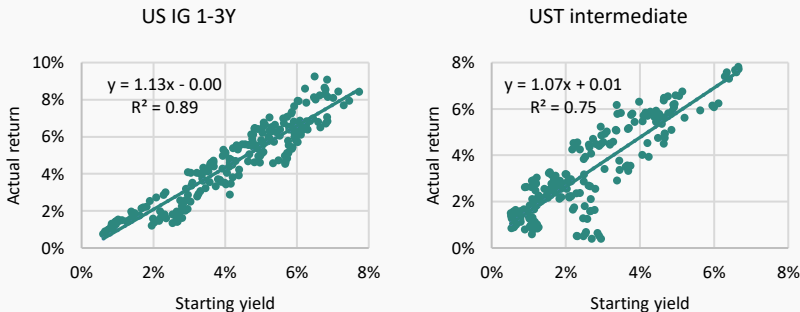
US IG 1-3Y

$y = 1.13x - 0.00$
$R^2 = 0.89$

UST intermediate

$y = 1.07x + 0.01$
$R^2 = 0.75$

- Classical models assume i.i.d. returns and apply a "square-root-of-time" rule, but this overstates long-horizon risk by ignoring valuation-based predictability and mean reversion.
- Maturity-matched analysis shows that fixed income, especially high yield and hybrids, exhibits significant mean reversion, shocks are often reversed as bonds pull to par and reinvestment stabilizes.
- This compresses the dispersion of long-run outcomes, making CAGR-based risk metrics more realistic than standard deviation of annual returns for strategic planning.

Figure 3: Lower deviation in CAGRs compared to annual returns suggest mean reversion in returns, mainly driven by HY bonds, hybrids, and long-term indexes
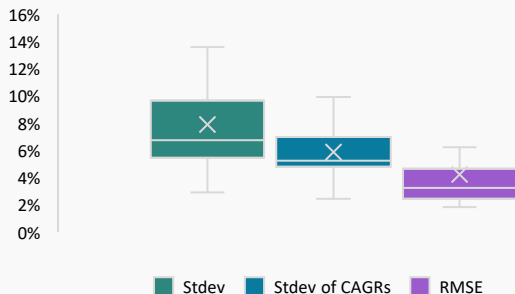
■ Stdev   ■ Stdev of CAGRs   ■ RMSE

- Over multi-year horizons, volatility in HY and structured bonds falls sharply due to income compounding and mean-reverting spread shocks.
- RMSE provides a more realistic measure of long-term forecast risk, reinforcing the case for longer-duration credit in surplus-maximizing portfolios.

Figure 4: Time diversification effect is most pronounced in HY securities
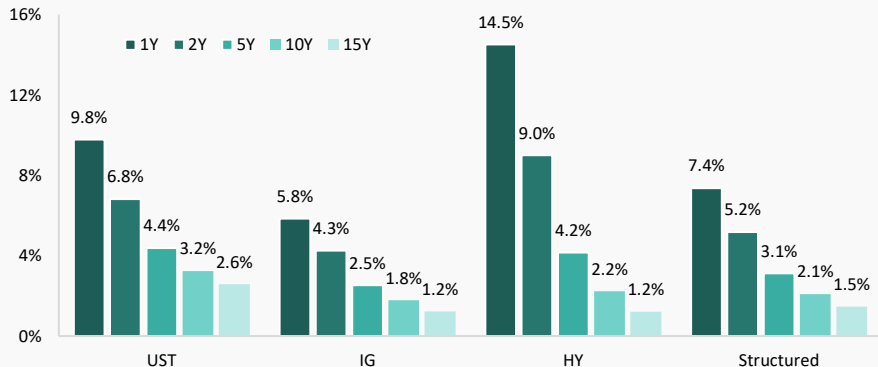
- I define risk as return forecast error, not mark-to-market swings, capturing both reinvestment and credit loss uncertainty via a 10-year RMSE metric, scaled to match volatility units.

- The final risk input blends RMSE (70%) with standard deviation (30%) to reflect both long-term surplus risk and short-term regulatory sensitivity.

$$\epsilon_{i,t}^{(y)} = R_{i(t \rightarrow t+10)} - Y_i(t) \qquad \text{RMSE}_i = \sqrt{\frac{1}{N_i} \sum_t \left(\epsilon_{i,t}^{(y)\,2} \right)} \qquad \sigma = 0.7 * \text{RMSE} + 0.3 * \text{Vol}$$

Figure 6: Expected return and risk of fixed income indexes
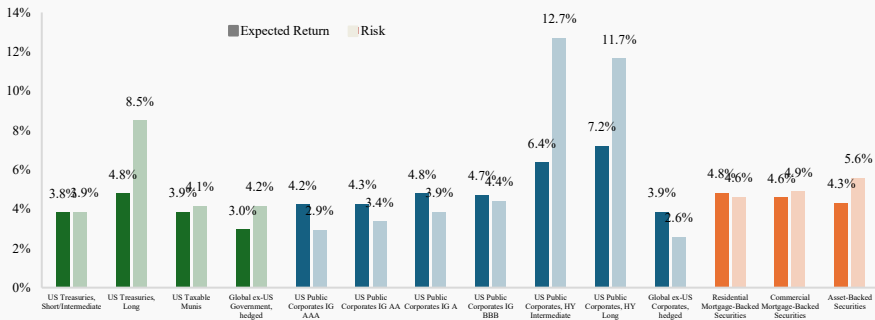
Private Equity Delivers Equity Beta and Growth, But Net Alpha is Illusory

- Private equity behaves like a leveraged small-cap equity strategy, with higher equity beta, modest real growth advantage, and limited evidence of persistent alpha after fees.
- Illiquidity premia are often overstated: investors tolerate reduced transparency and volatility smoothing in exchange for headline stability, not economic compensation.
- Expected returns are modeled using a DCF framework: income yield (~3.6%) plus real growth and modest multiple expansion, adjusted for leverage, fees, and long-term inflation to arrive at a 7.0% net nominal return.

y_u	g_u	$r_u = y_u + g_u$	D/E	k_d	$r_l = r_u + (D/E)*(r_u - k_d)$	m	$r_g = r_l + m$	f	$r_r = r_g - f$	i	$r = r_r + i$
Income Yield	Real Growth Rate	Real Unlevered Return	Debt to Equity	Real Cost of Debt	Real levered Return	Multiple Expansion	Gross Real ER	Fees	Net Expected Real Return	Expected Inflation	Net Expected Return
3.6%	+ 3.0%	= 6.6%	52.0%	3.1%	8.4%	+ 0.3%	= 8.7%	-4.0%	= 4.7%	+ 2.3%	= 7.0%

Private Credit Modeled as Levered High-Yield Exposure

- Private credit return expectations are built from high-yield credit excess returns, scaled by a leverage multiplier (1.2×) and adjusted for inflation.
- This approach yields an expected nominal return of ~7.3% (geometric) with lower variance than direct HY exposure, reflecting the risk/return profile of institutional private credit portfolios.

HY credit expected real return	Cash real return	HY credit excess real return	Leverage multiplier	Expected PC real return (arithmetic average)	Variance of levered HY credit return (L^2*Var(HY))	Expected PC real return (geometric average)	Expected inflation	Expected PC nominal return (geometric average)
5.2%	1.6%	3.5%	1.2	5.9%	1.9%	5.0%	2.3%	**7.3%**

Real Estate Offers Stable Cash Yields but Limited Real Growth

- Unlevered expected returns are anchored in net operating income (NOI) minus recurring capital expenditures, yielding a real free cashflow return of ~3.1%.
- Real growth is assumed to be negligible over long horizons, resulting in a nominal unlevered return of ~5.4% after adding expected inflation.

| NOI yield		CapEx (~NOI/3)		Cashflow yield		Real growth		Unlevered real ER		Expected inflation		Unlevered nominal ER
4.7%	-	1.6%	=	3.1%	+	0.0%	=	3.1%	+	2.3%	=	**5.4%**

- Risk inputs are custom volatility measures tailored to long-term economic exposures
- Correlations are empirically estimated from excess returns of public proxies, then combined with custom σ via the covariance identity: $Cov_{i,j} = \rho_{i,j} * \sigma_i * \sigma_j$

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1. US Treasuries, Short/Intermediate	1.0	0.9	0.5	0.8	0.9	0.7	0.6	0.5	0.0	0.1	0.7	0.8	0.2	0.3	0.2	0.1	-0.4	0.2	0.2	0.0	0.0
2. US Treasuries, Long	0.9	1.0	0.6	0.8	0.9	0.8	0.6	0.5	0.0	0.1	0.7	0.8	0.2	0.3	0.2	0.2	0.3	0.2	0.2	0.0	0.0
3. US Taxable Munis	0.5	0.6	1.0	0.7	0.7	0.7	0.7	0.7	0.5	0.5	0.6	0.7	0.4	0.6	0.3	0.3	0.2	0.5	0.4	0.0	0.0
4. Global ex-US Government, hedged	0.8	0.8	0.7	1.0	0.8	0.8	0.7	0.6	0.2	0.3	1.0	0.8	0.3	0.3	0.3	0.2	-0.1	0.4	0.3	0.0	0.0
5. US Public Corporates IG AAA	0.9	0.9	0.7	0.8	1.0	0.9	0.7	0.6	0.2	0.3	0.6	0.9	0.4	0.4	0.3	0.2	0.4	0.5	0.4	0.0	0.0
6. US Public Corporates IG AA	0.7	0.8	0.7	0.8	0.9	1.0	1.0	0.9	0.5	0.6	0.6	0.8	0.5	0.5	0.4	0.4	0.4	0.5	0.5	0.0	0.1
7. US Public Corporates IG A	0.6	0.6	0.7	0.7	0.7	1.0	1.0	0.9	0.6	0.7	0.6	0.7	0.6	0.6	0.4	0.4	0.4	0.5	0.6	0.1	0.1
8. US Public Corporates IG BBB	0.5	0.5	0.7	0.6	0.6	0.9	0.9	1.0	0.8	0.8	0.6	0.6	0.6	0.7	0.5	0.5	0.4	0.5	0.6	0.0	0.0
9. US Public Corporates, HY Intermediate	0.0	0.0	0.5	0.2	0.2	0.5	0.6	0.8	1.0	0.9	0.2	0.3	0.7	0.6	0.5	0.5	0.8	0.5	0.7	0.0	0.1
10. US Public Corporates, HY Long	0.1	0.1	0.5	0.3	0.3	0.6	0.7	0.8	0.9	1.0	0.2	0.4	0.6	0.6	0.5	0.5	0.8	0.5	0.7	0.0	0.1
11. Global ex-US Corporates, hedged	0.7	0.7	0.6	1.0	0.6	0.6	0.6	0.6	0.2	0.2	1.0	0.8	0.3	0.3	-0.1	-0.1	-0.1	0.4	0.4	-0.2	-0.2
12. Residential Mortgage-Backed Securities	0.8	0.8	0.7	0.8	0.9	0.8	0.7	0.6	0.3	0.4	0.7	1.0	0.3	0.4	0.2	0.2	0.0	0.5	0.3	0.0	0.0
13. Commercial Mortgage-Backed Securities	0.2	0.2	0.4	0.3	0.4	0.5	0.6	0.7	0.7	0.7	0.3	0.3	1.0	0.4	0.5	0.4	0.0	0.5	1.0	0.0	0.2
14. Asset-Backed Securities	0.3	0.3	0.6	0.3	0.4	0.5	0.6	0.7	0.6	0.6	0.7	0.4	0.4	1.0	0.5	0.5	0.0	0.5	0.5	0.0	0.1
15. Corporate IG Private Placement A	0.2	0.2	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.5	-0.1	0.2	0.5	0.5	1.0	1.0	0.7	0.5	0.5	0.2	0.2
16. Corporate IG Private Placement BBB	0.1	0.2	0.3	0.2	0.2	0.4	0.4	0.5	0.5	0.5	-0.1	0.2	0.4	0.4	1.0	1.0	0.7	0.5	0.4	0.1	0.2
17. Corporate HY Private	-0.4	0.3	0.2	-0.1	0.4	0.4	0.4	0.4	0.8	0.8	-0.1	0.0	0.0	0.0	0.7	0.7	1.0	0.4	0.4	0.7	0.4
18. Residential Mortgage Whole Loans	0.2	0.2	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.5	0.4	0.5	0.5	0.5	0.5	0.5	0.4	1.0	1.0	0.4	0.3
19. Commercial Mortgage Whole Loans	0.2	0.2	0.4	0.3	0.4	0.5	0.6	0.6	0.7	0.7	0.4	0.3	1.0	0.5	0.5	0.4	0.4	1.0	1.0	0.0	0.2
20. Private Equity	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	-0.2	0.0	0.0	0.0	0.2	0.1	0.7	0.4	0.0	1.0	0.7
21. Real Estate (via partnerships, equity)	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.1	0.1	-0.2	0.0	0.2	0.1	0.2	0.2	0.4	0.3	0.2	0.7	1.0

Equity Returns Anchored in Shareholder Cash Flows, Not Earnings Noise

- Public equity expected returns are built bottom-up using sector-level dividend and buyback yields, not accounting-based metrics.
- Cash yield measures are more robust than earnings, as they are harder to manipulate and directly reflect shareholder payouts.
- Buybacks now rival dividends in size and are essential to capturing the true return potential of U.S. large-cap equities.

**Figure 7: Buyback yields have considerably increased since 2012**
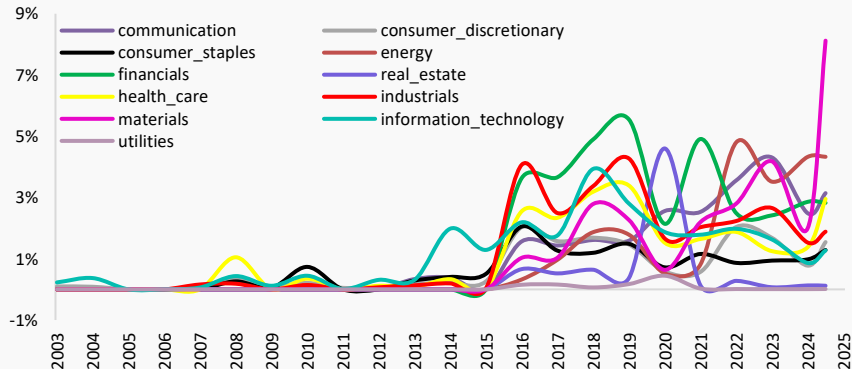
- Implied equity risk premia (ERP) are derived via a two-stage DDM, solving for cost of equity at the sector level.
- This multi-layer approach ensures forward-looking return estimates reflect real sector dynamics.

$$P = \sum_{t=1}^{5} [D_0(1+g)^t / (1+r)^t] + [D_0(1+g)^5(1+g_{term})] / [(r - g_{term})(1+r)^5]$$

Figure 8: Implied ERP levels have been more volatile in the last decade
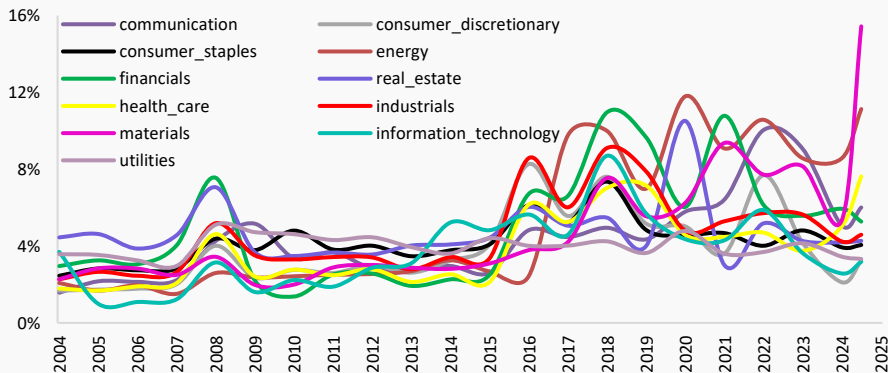
- Implied equity risk premia (ERP) are refined using sector-specific CAPE regressions and long-term profitability trends to capture valuation mispricing and structural shifts.
- Only sectors with strong CAPE-return relationships ($R^2 > 0.2$) received valuation adjustments; profitability trends were layered on top for sectors with meaningful structural margin shifts.
- These enhancements sharpen the signal from implied ERPs, ensuring return forecasts reflect both current prices and evolving fundamentals.

Figure 8: Implied ERP levels have been more volatile in the last decade

Information Technology

$y = 0.0002x + 0.0685$
$R^2 = 0.0002$

$y = -0.0096x + 0.1033$
$R^2 = 0.6828$

$y = -0.0113x - 0.0035$
$R^2 = 0.3723$

Excess Return

CAPE difference of gaps