



Higher Return per Unit of Market Risk:

Capital Efficiency in
Lower Middle Market
Private Equity

August, 2026

EXECUTIVE SUMMARY:

This paper examines the systematic risk characteristics of Arvore Partners, an evergreen lower middle market private equity strategy. The question is what kind of risk its return compensated, and whether an allocator could obtain the same exposure more cheaply through liquid instruments.

Ten risk factors spanning Canadian equity, fixed income, credit, inflation, currency and the Fama-French style premia are tested individually against quarterly net returns, then jointly in nested specifications. Standard errors throughout are Newey-West with four lags.

The central finding concerns the level of systematic risk rather than the presence of unexplained return. Arvore's equity beta measures 0.302 contemporaneously and 0.487 once lagged market response is included. At the portfolio company capital structure of three turns of debt on a six-turn entry multiple, that implies an asset beta of 0.244.

ARVORE AT A GLANCE

- Sharpe ratio: 0.86 reported (0.74 de-smoothed)
- Simple beta: 0.302
- Dimson sum-beta: 0.487
- Asset beta: 0.244
- Treynor ratio: 0.140

Published deal level estimates for buyout funds imply an asset beta of 0.575. On this unlevering comparison, the underlying businesses in this strategy show materially lower implied systematic risk than those in conventional buyout portfolios.

That difference translates directly into capital efficiency. Arvore's Treynor ratio, which measures excess return per unit of systematic risk, is 0.140, against 0.045 for a buyout fund delivering 12% net of fees at a beta of 2.30 and 0.053 at 14% net. On these comparators the strategy converted market exposure into return materially more efficiently, and it does so while carrying no measurable loading on any of the four Fama-French style premia.

For allocators the practical implication is that this is a building block rather than a substitute for equity. What it delivers is a return stream whose systematic risk is low relative to its return, which shows no detected loading on conventional equity style exposures, and which retains a measurable relationship to inflation.

INTRODUCTION:

Private equity is customarily assessed on return. Internal rates of return, total value multiples and distributions to paid in capital dominate manager reporting and allocator diligence. Risk enters the discussion, if at all, through volatility, which for a quarterly marked private portfolio is a weak measure.

This is an incomplete basis for capital allocation. A return earned by bearing market risk is not a manager contribution. Equity beta is available at a few basis points through an exchange traded fund, and an allocator can dial that exposure up or down at will. What cannot be manufactured cheaply is a high ratio of return to systematic risk, or a return stream with little measured relationship to the exposures already in the portfolio.

The analysis that follows therefore concentrates on risk decomposition rather than return attribution. Nine findings are presented. Each begins with an explanation of what the measure is and why it matters, followed by the result. Supporting data for every section is collected in the appendix.

DATA:

Arvore's quarterly net total return series spans 2014Q3 through 2026Q1, covering 47 consecutive quarters. Returns are per unit and time weighted, combining change in net asset value with cash distributions, and are net of management fees and fund operating expenses. Net compound annual growth over the period was 8.56% with annualized volatility of 7.91%. Ratio and comparison calculations use the compound annual figure; the arithmetic mean quarterly return of 2.15% is reported in Table A7.

The factor dataset contains ten independent variables spanning six domains. Canadian equity and fixed income contribute the market excess return, the yield curve term spread, the change in investment grade credit spreads, quarterly consumer price



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inflation and the change in the real interest rate. Currency contributes the Canadian dollar return against the United States dollar. The Fama-French five factor dataset contributes the size, value, profitability and investment premia.

METHODOLOGY:

Estimation proceeds in three stages. Each of the ten factors is first regressed individually against Arvore's quarterly net return, establishing a clean bivariate relationship free of interference from other variables. The factors are then entered jointly in nested specifications of one, six and ten variables, which measures the explanatory contribution of each factor after controlling for the others.

The third stage addresses smoothing. Privately marked portfolios respond to market movements with a lag, because valuations are revised periodically rather than continuously. A contemporaneous regression therefore understates the true exposure. The Dimson correction sums the coefficients on the contemporaneous market return and its first two lags, capturing the delayed response. Appendix Table A4 reports the same procedure applied to liquid series, where contemporaneous and summed estimates should coincide. The liquid controls show little evidence of comparable inflation in the summed estimates, supporting the interpretation that the larger Dimson figure reflects lagged market response rather than a mechanical effect of adding lag terms.

The same lag structure supplies a de-smoothed Sharpe ratio. Scaling systematic volatility by the ratio of the Dimson sum-beta to the contemporaneous beta (0.487 over 0.302) raises the equity-market systematic component from 3.77% to 6.08%; recombined with residual volatility of 6.96%, total volatility on an economic basis is 9.24% and the Sharpe ratio is 0.74, against 0.86 on reported volatility. The correction is applied to the full 47 quarter return series. The corrected figure remains above the 0.4 to 0.7 range that the replication literature attributes to buyout on an economic basis, so the risk-adjusted conclusion is unchanged by the correction.

Standard errors throughout are computed using the Newey-West heteroskedasticity and autocorrelation consistent estimator with four lags, appropriate for quarterly data with positive serial correlation.

FINDING ONE: ASSET BETA

Equity beta measures how sensitive an asset's returns are to the equity market. A beta of one moves with the market; a beta of zero has no systematic relationship. It matters because beta is the component of return an allocator can purchase cheaply and independently, so only the residual justifies an active fee.

Equity beta alone is not comparable across strategies with different capital structures. Debt amplifies the sensitivity of the equity claim. The same operating business bought without debt and bought with 75% debt produces very different equity betas while the underlying business risk is unchanged. Asset beta, or unlevered beta, strips out the financing effect and isolates the systematic risk of the operating business itself. It is calculated as equity beta divided by one plus the debt-to-equity ratio.

Arvore's contemporaneous equity beta is 0.302. Including two lags of the market return raises the summed estimate to 0.487, significant at t equals 2.62. At the portfolio company structure of three turns of debt on a six-turn entry multiple, the implied asset beta is 0.244.

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Published deal level buyout estimates of 2.2 to 2.4, measured gross of fees at a debt-to-equity ratio of three, imply an asset beta of 0.575. On that comparison Arvore's operating businesses show approximately 58% lower implied systematic risk. The direction holds across specifications; the magnitude does not.

One point of method deserves emphasis. Arvore's estimate is smoothing corrected. Comparing it to uncorrected fund level buyout betas of approximately one would be inconsistent, since those are precisely the estimates that cannot be reconciled with three turns of leverage on businesses whose underlying equity betas are near one. The comparison here is between two smoothing corrected figures.

FINDING TWO: TREYNOR RATIO

The Treynor ratio is excess return divided by beta. It is the close relative of the Sharpe ratio, with one substitution: Sharpe divides by total volatility, Treynor divides by systematic risk alone. It therefore answers how much excess return an investment produced per unit of market exposure, rather than per unit of total risk.

The distinction matters when comparing strategies of different risk levels. A manager producing a higher absolute return by taking proportionately more market risk has not added value. Treynor removes

that effect. It is the appropriate measure for an asset held as one component of a diversified portfolio, where residual risk is diluted by the surrounding holdings.

Arvore's Treynor ratio over the sample is 0.140. A buyout fund delivering 12% net of fees at a beta of 2.30 produces 0.045; at 14% net the figure is 0.053. On both comparators the strategy generated more excess return per unit of systematic risk.

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FINDING THREE: ABSENCE OF EQUITY STYLE LOADINGS

The Fama-French factors describe systematic patterns in equity returns that persist beyond market exposure. Size captures the tendency of smaller companies to behave differently from larger ones, value the difference between cheap and expensive stocks on book measures, profitability the difference between more and less profitable firms, and investment the difference between conservative and aggressive capital deployment. These matter to an allocator because each is available through liquid factor products. If a private strategy's returns were substantially a size or value tilt, that exposure could be replicated in public markets at a fraction of the cost, and the private structure would be delivering a familiar risk premium in an expensive and illiquid form.

None of the four premia shows any relationship to Arvore's returns. The largest absolute t statistic across the four is 0.91 for the value premium, well below conventional significance. Size registers +0.54, profitability +0.35 and investment +0.33. Individual coefficients of determination are below 0.03.

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No statistically significant loading is detected on the four Fama-French factors tested, so the return stream is not explained by the equity style factors examined.

FINDING FOUR: INFLATION RESPONSE

An inflation beta measures how an asset's returns move with changes in the consumer price index. Real assets are widely marketed as inflation hedges, but the claim is often asserted rather than measured, and many assets described as inflation protected show no contemporaneous relationship to inflation at quarterly frequency.

The distinction matters for portfolio construction. An investor holding nominal bonds and equities carries substantial exposure to an inflation shock. An allocation whose returns rise with inflation offsets part of that exposure, and the value of that offset increases in a fiscally dominated environment where inflation risk is elevated.

Arvore's returns show a positive and statistically significant relationship to quarterly inflation. The coefficient is 1.325 with a t statistic of +2.46, significant at conventional thresholds, explaining 7.8% of quarterly return variance in isolation.

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FINDING FIVE: MAXIMUM DRAWDOWN

Maximum drawdown is the largest peak to trough decline in cumulative value over a period. It differs from volatility in measuring the worst realized outcome rather than the average dispersion of outcomes, and for many investors it is the binding constraint.

An institution that must not breach a funding threshold, or an individual who capitulates after a large loss, is governed by drawdown rather than standard deviation. Arvore's maximum drawdown over the sample was -10.58%, recorded in 2020Q1 during COVID, which was also the worst single quarter at -10.58%. Recovery to the prior peak took five quarters.

FINDING SIX: COMPARISON AGAINST A BETA MATCHED LIQUID PORTFOLIO

A beta matched replicating portfolio is the cheapest liquid holding that carries the same equity sensitivity as the strategy being assessed. If the strategy has a beta of 0.30, the replicant is 30% equity index and 70% treasury bills, rebalanced quarterly. It contains nothing else, employs no leverage and costs a few basis points.

The comparison poses the question an allocator ultimately asks. If the same market exposure can be bought directly, the strategy must beat that portfolio to justify its fee and its illiquidity. At the contemporaneous beta of 0.302, the replicant returned 4.45% against Arvore's 8.56%, an advantage of +4.11% annually. At the Dimson beta of 0.487, which is the more demanding comparison because it assumes higher market exposure, the replicant returned 6.06% and the advantage narrows to +2.50%. The strategy outperformed its liquid equivalent on both specifications.

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FINDING SEVEN: RESIDUAL RISK AND PORTFOLIO DIVERSIFICATION

Total risk divides into two parts. Systematic risk is the portion explained by market movements, and it cannot be diversified away because it affects all assets together. Idiosyncratic risk is everything else, arising from circumstances specific to the holding. Classical theory holds that idiosyncratic risk is uncompensated, since an investor can eliminate it by holding many independent positions.

The implication is frequently misread. Idiosyncratic risk is not undesirable in a portfolio context; it is uncompensated in isolation. An allocation whose risk is largely residual to the market factor and weakly correlated with the rest of the portfolio contributes far less to total portfolio risk than its standalone volatility suggests, because the independent component dilutes against everything else held.

Arvore's total volatility of 7.91% decomposes into an equity-market systematic component of 3.77% and a market-regression residual of 6.96%. The coefficient of determination against the market is 0.227, meaning approximately 77% of return variance is unexplained by contemporaneous equity-market movements. Part of that variance reflects other systematic exposures: the ten-factor specification in Table A3 explains 43.7% of return variance, leaving 56.3% unexplained by the factors tested. The market-regression residual also exhibited little contemporaneous correlation with a sixty forty portfolio over the sample, at -0.031.

Adding the strategy to a 60/40 core raises the Sharpe ratio from 0.65 to 0.71 at a 10% weight and 0.77 at 20%, while the beta matched replicant leaves it substantially unchanged.

The portfolio effect is measurable. At a 10% weight the strategy lowers total portfolio volatility from 8.42% to 7.94% while raising the compound return from 7.22% to 7.39%; the beta matched replicant achieves the same volatility reduction only by giving up return. Adding the strategy to a 60/40 core raises the Sharpe ratio from 0.65 to 0.71 at a 10% weight and 0.77 at 20%, while the beta matched replicant leaves it substantially unchanged.

FINDING EIGHT: RETURN RELATIVE TO CAPITAL ASSET PRICING MODEL EXPECTATION

The capital asset pricing model states that an asset's expected return equals the risk-free rate plus its beta multiplied by the equity risk premium. It provides a benchmark for what a given level of systematic risk should have earned. Return above that benchmark is unexplained by market exposure.

Applying the model at a beta of 0.487 and an equity risk premium of 5%, against a sample average risk free rate of 1.74%, produces an expected return of 4.17%. Arvore returned 8.56% net, a difference of +4.39% annually. The result ranges from +4.14% to +4.63% across equity risk premium assumptions of 4.5% to 5.5%.

FINDING NINE: CAPITAL EFFICIENCY UNDER LEVERAGE

If an asset produces more return per unit of systematic risk than an alternative, an investor holding it at higher exposure should outperform that alternative at matched market beta. Applying leverage to a low beta asset raises both its expected return and its market sensitivity proportionally, while the borrowing cost is subtracted. The test is whether the leveraged position still beats the higher beta alternative after financing costs, and it is the formal statement of why a superior Treynor ratio has practical value.

Matching a buyout beta of 2.30 from Arvore's 0.487 requires leverage of 4.72 times. At a borrowing cost of the risk-free rate plus 150 basis points, the leveraged position returns 28.36%. At the risk-free rate plus 450 basis points it returns 17.20%, against the buyout comparator of 12%. The conclusion holds across the plausible range of financing costs.

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CONCLUSION:

Arvore Partners returned 8.56% net of fees over 47 quarters at an equity beta of 0.302 contemporaneously and 0.487 after correcting for lagged market response. The strategy produced its return while bearing materially less systematic risk than conventional buyout portfolios. At the portfolio company capital structure employed, the implied asset beta of 0.244 sits approximately 58% below the level implied by published deal-level buyout estimates. The resulting Treynor ratio of 0.140 exceeds the 0.045 implied by a buyout fund netting 12%, and the strategy exceeded a beta matched liquid portfolio on every specification tested.

The return stream carries no measurable loading on any of the four Fama-French style premia and shows a positive, statistically significant relationship to inflation. Approximately 77% of its variance is unexplained by equity-market movements and showed little correlation with a conventional balanced portfolio, so that a 10% allocation lowers total portfolio volatility while raising the portfolio Sharpe ratio from 0.65 to 0.71.

The Arvore return stream carries no measurable loading on any of the four Fama-French style premia and shows a positive, statistically significant relationship to inflation. Approximately 77% of its variance is unexplained by equity-market movements and showed little correlation with a conventional balanced portfolio, so that a 10% allocation lowers total portfolio volatility while raising the portfolio Sharpe ratio from 0.65 to 0.71.

For an allocator, the appropriate reading is that this is a component rather than a substitute. It is not a replacement for equity exposure, it is a source of return whose systematic risk is low relative to what it produced, which is not explained by the liquid factors tested, and which sits in a distinct location in the portfolio from both public equity and conventional private equity.

APPENDICES:

Table A1. Data Sources

Variable	Construction	Source
Arvore net return	Per unit NAV change plus distributions	Fund records
Term spread	GoC 10yr less 1-3yr average	Bank of Canada
Market excess return	XIU total return less T-bill	BlackRock / Bank of Canada
CPI change	Quarterly CPI change	Statistics Canada
Credit spread change	Change in ICE BofA US IG OAS	ICE BofA
Delta real rate	First difference, GoC 10yr less CPI	Bank of Canada / StatCan
CAD/USD return	Quarterly change, DEXCAUS	Federal Reserve Bank of St. Louis
SMB, HML, RMW, CMA	Monthly compounded to quarterly	Ken French Data Library

Table A2. Bivariate Factor Regressions

Factor	Coefficient	t-statistic	R-squared
Term spread	1.5901	+2.41	0.0615
Market excess return	0.3017	+3.43	0.2268
CPI change	1.3251	+2.46	0.0776
Credit spread change	-0.0345	-2.87	0.1265
Delta real rate	-0.0024	-1.86	0.0643
CAD/USD return	-0.0031	-1.80	0.0823
SMB (size)	0.0625	+0.54	0.0068
HML (value)	0.0891	+0.91	0.0283
RMW (profitability)	0.0471	+0.35	0.0022
CMA (investment)	0.0363	+0.33	0.0017

Each factor regressed individually against Arvore quarterly net return. n = 47. Newey-West HAC standard errors, lag 4.

Table A3. Nested Joint Specifications

Specification	Factors	Intercept (ann.)	t-statistic	R-squared	Adj. R-squared
1 factor - term spread	1	+6.81%	+2.76	0.0615	0.0407
6 factors - macro, rates, FX	6	+0.19%	+0.05	0.3677	0.2729
10 factors - plus Fama-French	10	-0.95%	-0.27	0.4370	0.2807

Intercept instability across specifications indicates omitted factor exposure rather than a durable manager contribution. Newey-West HAC, lag 4.

Table A4. Dimson Correction and Liquid Controls

Series	Contemporaneous	Dimson sum	Difference
Arvore Partners (net)	0.302	0.487	+0.186
S&P/TSX 60 (XIU)	0.998	0.986	-0.012
30% XIU / 70% T-bills	0.298	0.286	-0.012
60/40 XIU/XBB	0.650	0.560	-0.091
Canadian bonds (XBB)	0.129	-0.080	-0.209

Dimson sum-beta adds the coefficients on contemporaneous market return and its first two lags. The equity based liquid series show differences near zero, and where the sum diverges, as in the bond series, it falls rather than rises. The lag terms therefore do not mechanically inflate estimates, and a positive difference of the size observed for Arvore appears only where returns respond to the market with a lag.

Table A5. Asset Beta Derivation

	Equity beta	Debt / equity	Asset beta
Arvore Partners (full sample)	0.487	1.0	0.244
Arvore Partners (marked period)	0.797	1.0	0.399
Buyout, deal level, low estimate	2.20	3.0	0.550
Buyout, deal level, high estimate	2.40	3.0	0.600
Buyout, deal level, midpoint	2.30	3.0	0.575

Asset beta calculated as equity beta divided by one plus debt to equity, no tax shield. Arvore capital structure of three turns of debt on a six-turn entry multiple implies debt to equity of one. Buyout figures from published deal level estimates at a debt to equity ratio of three.

Table A6. Treynor Ratio and Replication

	Beta	Return	Excess return	Treynor
Arvore, Dimson beta	0.487	8.56%	6.82%	0.140
Arvore, contemporaneous beta	0.302	8.56%	6.82%	0.226
Buyout at 10% net	2.30	10.00%	8.26%	0.036
Buyout at 12% net	2.30	12.00%	10.26%	0.045
Buyout at 14% net	2.30	14.00%	12.26%	0.053
Replicant at 0.302	0.302	4.45%	2.71%	0.090
Replicant at 0.487	0.487	6.06%	4.33%	0.089

Replicating portfolios hold the stated beta in S&P/TSX 60 and the balance in Canadian treasury bills, rebalanced quarterly. Risk free rate is the sample average of 1.74%.

Table A7. Risk and Return Summary

Metric	Value
Net CAGR	8.56%
Annualized volatility	7.91%
Sharpe ratio	0.86
De-smoothed volatility (Dimson-scaled)	9.24%
Sharpe ratio, de-smoothed	0.74
Mean quarterly return	2.15%
Maximum drawdown	-10.58%
Drawdown quarter	2020Q1
Worst quarter	-10.58%
Systematic volatility (equity market)	3.77%
Residual volatility (market regression)	6.96%
R-squared vs market	0.2268
Correlation vs market excess return	0.476
Correlation vs Canadian bonds	0.032
Residual correlation vs 60/40	-0.031
Volatility, 2014Q3-2019Q2	5.93%
Volatility, 2019Q3-2026Q1	8.91%
Observations	47 quarters

Volatility figures for the two sub periods are reported to make the effect of the valuation policy explicit. No drawdown was recorded prior to 2019Q3.

Table A8. Portfolio Allocation Grid

Weight	Added allocation	CAGR	Volatility	Sharpe
0%	60/40 core only	7.22%	8.42%	0.65
5%	Arvore Partners	7.31%	8.17%	0.68
5%	Beta-matched replicant	7.09%	8.18%	0.65
10%	Arvore Partners	7.39%	7.94%	0.71
10%	Beta-matched replicant	6.95%	7.94%	0.66
15%	Arvore Partners	7.47%	7.72%	0.74
15%	Beta-matched replicant	6.82%	7.71%	0.66
20%	Arvore Partners	7.55%	7.53%	0.77
20%	Beta-matched replicant	6.68%	7.47%	0.66

Core portfolio is 60% S&P/TSX 60 and 40% Canadian bonds. Beta matched replicant holds 0.302 in equity and the balance in treasury bills.

Table A9. Leverage Analysis

Borrowing cost	Leverage	Levered return	Versus buyout at 12%
Risk free plus 150 bps	4.72x	28.36%	+16.36%
Risk free plus 250 bps	4.72x	24.64%	+12.64%
Risk free plus 350 bps	4.72x	20.92%	+8.92%
Risk free plus 450 bps	4.72x	17.20%	+5.20%

Leverage of 4.72 times is required to match a buyout beta of 2.30 from a Dimson beta of 0.487.



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