RETHINKING BENCHMARKS

Listed Equities Benchmarks Continue to Misrepresent Pension Fund Private Equities Performance

July 2025

Executive Summary

The private2000® index delivered a 0.45%[1] USD total return for 2024 (3.86% local return), capping off a difficult two years of performance for private equities. 2023 returns were also near zero as the market continues grappling with higher costs of capital and a large inventory of unsold assets acquired at high valuations in 2020/21. The private2000 EV/EBITDA multiple reflects this having declined from its peak in mid-2021 by 22%, weighing on returns.

Benchmarking Choices. We evaluate the benchmarking choices for eight large Canadian pension plans (known as the "Maple 8"). With the backdrop of recent poor performance of private equities, many pension plans' private equities returns are unfortunately benchmarked to public market proxies (or, absolute return proxies) that have performed exceptionally well, positioning such plans as "underperformers." As we document in the report, the choice of benchmarks offers a poor reflection of private equities performance at these institutions. This can create confusion in the market and has generated unflattering coverage[2].

Canada's Maple 8 Performance. We previously wrote about the 2023 performance of the eight pension plans (see here). With 2024 results now available, we have updated to reflect performance in the most recent year. Not surprisingly, the results are like those from 2023. Lower returns (currency adjusted) that reflect the realities of the private equities market, as captured by the private2000 index. However, 2024 benchmarks are still disconnected from the private equities market and instead capture the strength of the large cap listed equities market. We looked at 5-year data to see if it is more instructive but find it to be just as misleading as 1-year data. If you use the wrong benchmark, changing the measurement period does not help!

Towards a Better Benchmark. The benchmarks employed by certain institutional investors fail to capture the performance and risk attributes of the private equities market. This leads to incorrect assessments of risk-adjusted performance. The private equities market is large and mature and should be evaluated against a benchmark that reflects that underlying market. As we stated in our prior report, pension fund leadership, trustees, and beneficiaries may not be well-informed about how their private equity portfolios are performing. We show that when using the private2000 index (see here), recent private equities performance at these eight pension plans is very much in line with or exceeding the market. Importantly, the relative performance cadence over the prior 5 years looks very different than when compared to listed equities benchmarks.

[1] Unless otherwise stated, all return and risk data are for the VW USD private2000 index.

[2] Private equity portfolios underperform at big Canadian investors

Benchmarking Choices

The following table outlines the benchmarking choices by the eight Canadian pension plans sourced from their most recent annual reports. Almost all use a listed equities benchmark (or customised listed equities benchmark), and in one case, absolute returns. Just one pension plan (CDPQ) included a private equity (fund manager) benchmark as part of their composite.

TABLE 1: MAPLE 8 BENCHMARKING PRACTICES

Pension Fund	Benchmarking Practice
CPP	S&P Developed LargeMidCap (21%) S&P Asia Pacific Emerging LargeMidCap (3%) S&P Asia Pacific Developed LargeMidCap (2%) ICE BofA US 3-month T-Bill (-4%) PE portfolio weight to CPP is ~20%
AIMCO	MSCI World Net Total Return Index +200bps for 2024. 2023 Annual Report - CPI + 650bps as benchmark.
OMERS	Absolute Return – particular methodology not disclosed
BCI	MSCI ACWI + premium for fund investments and deal cost of capital for direct transactions.
OTPP	Public market proxy & CPI plus benchmarks. Particular index or customised index not disclosed in Annual Report or Benchmarking Report.
CDPQ	SSPEI (50%) + 25% MSCI ACWI + 25% National Bank Morningstar Quebec Index
PSP	MSCI ACWI Selected Securities – No disclosure on which securities from index are included
HOOPP	Public market proxy – neither benchmark returns, nor index choice disclosed.

Source: 2024 and 2025 Annual Reports, Investment Policy Guidelines.

We point out some key statistics of the indices chosen by these pension funds:

- The S&P Developed LargeMidCap Index (used by CPP) has 1,554 constituents and mean and median market capitalisations of $53.7Bn and $18.9Bn. Further, the index is top heavy, with the top ten accounting for 26% of index. Hardly representative of the PE environment.
- Likewise, the MSCI World Index has 1,353 constituents and mean and median market capitalisations of $53.6Bn and $19.4Bn.
- Both indices are dramatically different from the private equities market, where most transactions are well below $1Bn (enterprise value). The private2000 mean and median market capitalisation at year end 2024 was $1Bn and $276Mn, respectively.

Private Equities vs Listed Equities Market

We recently released a report documenting key differences between private and listed equities (see here). This has important implications for benchmarking private equities as company characteristics differ meaningfully from listed ones. Table 2 highlights the market scope of listed equities versus the private equities market, as represented by the privateMetrics® database. While listed equities have a larger market capitalisation, the enterprise values are closer in size. There are far more companies in the private equities market, suggesting much lower mean and median company sizes. Table 3 documents these differences. The median enterprise value of a private equity company as represented by the private2000 index (MIU) was $388Mn, compared with close to $2.6Bn in the Bloomberg World Index.

Additionally, we found that listed equities had higher operating margins, lower leverage, lower trading multiples (EV/EBITDA), and different industrial activity composition. Taken together, this suggests that the private equities portfolios should be evaluated against an index that is representative of these characteristics. Large Cap listed equities indices clearly are not.

Table 2: MARKET CHARACTERISTICS OF LISTED VS PRIVATE FIRMS

METRIC	**LISTED EQUITIES**	**Broad Market Universe (BMU)**	**Private Equity Universe (PEU)**	**Market Index Universe (MIU)**
Market Cap.	$123T	$60T	$19T	$2.1T
Enterprise Value	$147T	$112T	$39T	$3.7T
Revenue	$71T	$58T	$18T	$2.3T
Constituents	47.8k	935k	193k	2k

Source: privateMetrics, Worldbank, Bloomberg, NYU (Domadoran). As of 31 December 2024.

Table 3: LISTED AND PRIVATEMETRICS VALUATION METRICS BMU, PEU, MIU

US$M	Enterprise Value			Market Cap		
Segment	**.25**	**Median**	**.75**	**.25**	**Median**	**.75**
BMU	14.4	28.5	59.7	10.2	21.9	43.8
PEU	21.9	42.2	98.0	15.5	31.2	67.7
MIU	72.3	388.3	1,691.4	61.8	275.7	1,145
Listed Equities	907.3	2,591.8	7199.3	854.5	2,198.7	6,323.8

Source: privateMetrics, Bloomberg.

Private Equities vs Listed Equities Returns

Recent private equities returns have been anaemic. The private2000 index captures this with 2023 and 2024 returns effectively zero in USD terms, while the local currency variant was modestly positive (+3.86%) in 2024. This is completely at odds with the performance of major listed equities indices. MSCI ACWI was up 18.1% in 2024, the S&P 500 (+25%), and the Russell 2000 (+11.5%). This follows an equally strong 2023 for each index. In five of the past six years, the major listed equities indices have outperformed the private2000 Index, marking a shift from the previous trend of consistent private equity outperformance. Table 4 outlines the annual performance of the private2000 index since 2014, compared with those of three major listed equities indices popularly used in private equities benchmarking.

Figure 1 shows this more explicitly, comparing the private2000 value weighted index with the MSCI ACWI. We can observe the two return paradigms. Private equities outperforming meaningfully up until 2019 and then listed equities dramatically outperforming from 2019 to 2024 (apart from 2022). This is important as we look to evaluate the performance of the private equities departments at the Maple 8 Pension plans.

TABLE 4: PRIVATE2000 RETURNS VS PUBLIC MARKET INDICES

Total Returns	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**
private2000 USD	-0.45%	10.85%	16.47%	29.04%	34.89%	15.86%	6.78%	12.99%	18.75%	0.08%	0.45%
private2000 LCL	5.99%	16.06%	19.03%	22.61%	37.67%	16.35%	3.46%	16.39%	24.22%	0.05%	3.86%
Russell 2000	4.9%	-4.4%	21.3%	14.7%	-11.0%	25.5%	20.0%	14.8%	-20.4%	16.9%	11.5%
MSCI ACWI	4.7%	-1.8%	8.5%	24.6%	-8.9%	27.3%	16.8%	19.0%	-18.0%	22.8%	18.1%
S&P 500	13.7%	1.4%	12.0%	21.8%	-4.4%	31.5%	18.4%	28.7%	-18.1%	26.3%	25.0%

*private2000 value weighted indices in USD and Local Returns. Public market indices US$ returns.

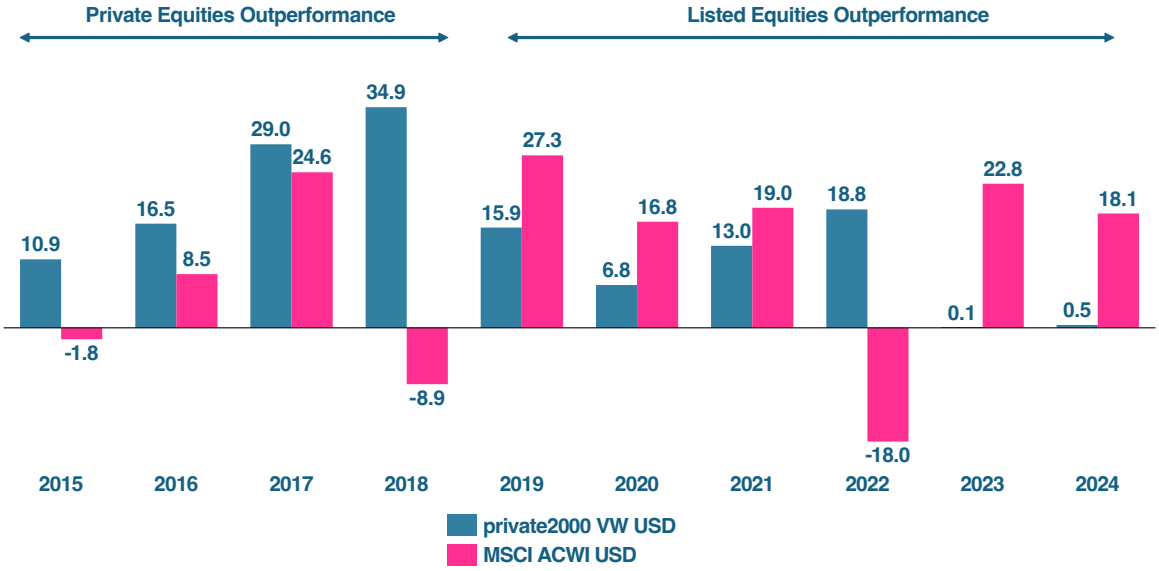


FIGURE 1: PRIVATE2000 VW USD RETURNS VS MSCI ACWI USD RETURNS BY YEAR

Source: privateMetrics, Refinitiv. Returns in percentages.

Post GFC and Pre 2020 was a period that exhibited low interest rates, with US 10-year bond yields below 2.5% for most of this period. This created ideal conditions for the leveraged buyout industry: ample access to liquidity, low interest servicing costs, and expanding multiples. Post 2020, there has been a regime change in interest rates that has weighed on private equities pricing and returns. At the same time, public market indices are increasingly top-heavy, led by extremely large technology companies, experiencing robust growth. This has contributed to perceived underperformance by private equities relative to listed equities. However, we must consider that the two markets are different, with listed market performance offering a poor benchmark or proxy for private equities.

By utilising the private2000 index and thematic or custom indices as benchmarks, institutional allocators and asset owners may find that their performance is tracking in line with the weaker private equities market. In fact, we will demonstrate this by looking at returns from the Maple 8 pension plans.

Canada's Maple 8 Funds 2024 Results

We previously reported on the 2023 performance of eight Canadian pension plans by examining their annual reports (see here). The Maple 8 pension plans have significant allocations to private equity (10-25% of plan assets) and have mature, globally diversified portfolios comprised of fund investments and direct private equities.

We have included the 2024 results in Table 6. The tables below outline the disclosed benchmarking choice, 2023 and 2024 returns (2023R and 2024R), 2023 and 2024 benchmark returns (2023B and 2024B), and the private2000 total returns in both years.

In 2023, five of the eight pension funds generated single-digit net returns, while facing benchmarks that ranged from 9.6% (OMERS) to 20.9% (BCI). Looking at the relative performance, all meaningfully "underperformed", ranging from 3.4% at AIMCo to 14.9% at BCI. Returns for 2023 are consistent with a weaker private equities market, as evidenced by the return of the private2000 value weighted index (CAD, USD and Local Currency (LCU) variants). The private2000 was flat for 2023. Conversely, the benchmarks, comprised of listed equities indices and absolute returns targets, "performed" exceptionally well. Does this mean that the pension funds private equities departments performed poorly? Unfortunately, we cannot answer this question from the data and benchmark choices they provide. The benchmarks and relative performance data provide limited useful information to senior management, the board of directors, and most importantly, beneficiaries.

While one may accuse us of cherry picking a year to make our case, we have updated the data to include the 2024 results. Table 6 details the returns, benchmark choice, and relative performance for 2024 for the same eight pension funds. For the five pension funds that report an annual benchmark, four underperformed, with only OMERS slightly exceeding their absolute return target. Once again, the benchmarks reflect the strong performance in listed equities and the weakening Canadian dollar relative to the US dollar. The relative performance provides no useful information about the performance of the private equities units at these pension funds. We can observe that the returns of the private2000, much like in 2023, better reflect the private equities returns in 2024. The private2000 was up 3.86% in local currency in 2024, and 6.55% in Canadian dollars (reporting currency of the eight pension plans).

Importantly, the 2024 reported returns include a large currency benefit as the Canadian dollar was weak. For example, OMERS reported that its net local return in 2024 was just 2.2% (9.5% in CAD). Similarly, OTPP has local returns of 5.0% (11.7% in CAD) in 2024. Not all funds provided such detail on local vs CAD returns at the asset class level.

Three pension plans (CPP, PSP, and HOOPP) report 1-year returns data for private equities, but only 5-year benchmark data. Given they have the benchmark data (listed equities proxies), the rationale to exclude is not clear. In reviewing the annual filings, PSP reported annual returns and associated benchmark until 2022, thereafter only providing 5-year benchmark data. For HOOPP, there is no information about relative performance vs benchmark in the annual report. We will show that moving to 5-year returns vs 5-year benchmarks does not solve the problem.

TABLE 5: MAPLE 8 BENCHMARKING PRACTICES AND 2023 RETURNS

Pension	PE Benchmarking Practice	2023R	2023B	Relative	private2000
CPP	S&P Developed LargeMidCap (levered)	9.6%	na	na	
AIMCO	Absolute Return (CPI + 650bps)	6.7%	10.1%	-3.4%	
OMERS	Absolute Return	3.9%	9.6%	-5.7%	**CAD: -1.15%**
BCI	MSCI ACWI + premium/cost of capital	6.0%	20.9%	-14.9%	**USD: 0.08%**
OTPP	Public market proxy & CPI plus	3.6%	16.3%	-12.7%	**LCU: 0.05%**
CDPQ	SSPEI (50%) + Public market proxy	1.0%	10.5%	-9.5%	
PSP	Public market proxy. 5 yr rolling.	12.1%	na	na	
HOOPP	Public market proxy	14.1%	na	na	

*Sourced from 2023 Annual Reports

** 2023R is 1-yr total return for 2023. 2023B is disclosed 1-yr PE benchmark for 2023.

TABLE 6: MAPLE 8 BENCHMARKING PRACTICES AND 2024 RETURNS

Pension	PE Benchmarking Practice	2024R	2024B	Relative	private2000
CPP	S&P Developed LargeMidCap (levered)	8.7%	na	na	
AIMCO	MSCI World Net Total Return Index	11.8%	23.9%	-12.1%	
OMERS	Absolute Return	9.5%	8.7%	+0.8%	**CAD: 6.55%**
BCI	MSCI ACWI + premium/cost of capital	13.4%	30.1%	-16.7%	**USD: 0.45%**
OTPP	Public market proxy & CPI plus	11.7%	23.7%	-12.0%	**LCU: 3.86%**
CDPQ	SSPEI (50%) + 25% MSCI ACWI +	17.2%	20.8%	-3.6%	
PSP	MSCI ACWI Selected Securities	16.6%	na	na	
HOOPP	Public market proxy – not disclosed	12.7%	na	na	

*Sourced from 2024 Annual Reports

** 2024R is 1-yr total return for 2024. 2023B is disclosed 1-yr PE benchmark for 2023.

The benchmarks used by the pension plans fail to capture the realities of the private equities market. Declining multiples, limited exit activity, and long hold periods are not typically associated with 20-30% year over year returns. The returns of the private2000 over the last two years capture this environment well and suggest that the large Canadian pension plans are performing well against these indices (assuming good valuation/pricing practices). Valuation multiples (EV/EBITDA) peaked in mid-2021 for the private2000 index and have since corrected by over 22%. This has weighed on returns, with earnings growth having to overcome this multiple compression. The effect on equity has been even greater given the large amount of leverage in deals.

An argument often put forth is that 1-year returns are less relevant. Public markets can be more volatile and it is thus prudent to look at returns over rolling 5-year periods relative to a benchmark to smooth out differences between markets. We do not subscribe to this view and will show why this does not help by looking at CPP's 5-year rolling returns.

Table 7 shows the previous 5-year returns data for CPP's private equities department alongside the 5-year rolling returns and 5-year rolling benchmark. We have included the 5-year return (LCU= Local return) for the private2000 for comparison.

TABLE 7: CPP PRIVATE EQUITY RETURNS AND BENCHMARK VS PRIVATE2000

YE March 31	Return (CAD) 1 Yr	Return (Local) 5 Yr	Bench (Local) 5 Yr	private2000 (Local) 5 Yr	Return vs Bench	Return vs private2000
2025	8.7%	14.6%	20.1%	6.8%	-5.5%	+7.8%
2024	9.6%	14.1%	11.4%	10.8%	+3.7%	+3.3%
2023	4.3%	15.0%	5.6%	15.7%	+9.4%	-0.7%
2022	17.3%	19.3%	10.6%	22.6%	+8.7%	-3.3%
2021	36.3%	18.0%	15.6%	16.6%	+2.4%	+1.4%

Source: CPP Annual Reports from 2021-2025, privateMetrics

As Table 7 shows, returns have drifted down since the heady days of 2020 and 2021. CPP's 36.3% return in 2021 is still a big contributor to its trailing 5-year return performance data. However, in the next annual report, this figure will be replaced by the 2026 number that is almost certain to be much lower, having a large impact on the rolling 5-year figure.

While private equities returns have been drifting downwards, the benchmark has been moving in the opposite direction. In fact, the 2025 5-yr benchmark was 20.1%, the highest of any period over the last 5 years by a wide margin. This makes little sense in the current environment where private equities have struggled. Of course, the choice of benchmark is driving this. CPP's largest benchmark component is the S&P Developed LargeMidCap index, which has delivered very strong results over the last 2 years, up 18.8% in 2024 and 24.6% in 2023, very different from returns in the private equities market. This is giving the impression of underperformance but is really comparing two different markets. We can see the strangeness of this benchmark again in 2023 (March 31, 2023YE), with a 5.6% benchmark, driven mostly by the large negative year in listed equities in 2022, creating an easy bar for private equities performance to clear.

The private2000 index captures the recent private equities environment more accurately. This makes sense given it is comprised of private equities rather than listed equities, including appropriate size, sector, and geographic representation consistent with the market. The 5-year trailing index returns (local returns) were strongest in the 2021-2023 period, as it captured the very strong annual returns from 2017-2022. As the private equities market weakened significantly from late 2022-present, index returns have fallen dramatically. This is in line with the market and provides a better basis to evaluate relative performance. Using the private2000 index, CPP outperformed on the trailing 5-yr basis for 2024 and 2025 despite the lower returns. Conversely, in 2022, despite having a 19.3% trailing 5yr return, they underperformed the private2000 by 330bps.

Using 5-year returns vs benchmarks (with the wrong benchmark) does not smooth out the errors and is every bit as misleading as the 1-year figures. The benchmark choice can lead to incorrect conclusions about performance, potentially impacting asset allocation decisions, and strategy.

We observe a similar outcome when looking at 1-year returns data over the prior 5 years for Ontario Teachers' Pension Plan (OTPP). Table 8 details the returns and benchmark data. Like much of the private equities industry, returns were low during 2023 and 2024.

The strongest performance of OTPP's portfolio was in 2021, during the loose and expansive Covid period, like the entire private equities market. Much like we observed with CPP, the benchmark remains very high in 2023 and 2024 because it is comprised of listed equities indices. Relative performance over the last 2 years looks abysmal against this benchmark but moderately exceeds the private2000 index in both years.

Once again, the choice of benchmark and relative performance provide little insight into the performance of the portfolio. As we showed with the CPP example, using a longer measurement period does not address the core issue.

TABLE 8: OTPP PRIVATE EQUITY RETURNS AND BENCHMARK VS PRIVATE2000

YE Dec 31	Return (Local) 1 Yr	Benchmark (Local) 1 Yr	private2000 (Local) 1 Yr	Return vs Bench	Return vs private2000
2024	5.0%	16.3%	3.86%	-11.3%	+1.14%
2023	5.4%	18.3%	0.05%	-12.9%	+5.35%
2022	1.4%	-8.2%	24.22%	+9.6%	-22.82%
2021	31.1%	19.5%	16.39%	+11.6%	+14.71%
2020	13.8%	12.6%	3.46%	+1.2%	+10.54%

Source: OTPP Annual Reports from 2020-2024, privateMetrics

Results versus benchmarks for the other pension plans are available in the Appendix.

Overall, the benchmarking practices, by design, are likely to yield inconsistent results that offer little insight into the risk-adjusted performance of the private equities department of these leading pension plans. The current practices do little more than provide the reader with a view on how private equities have performed relative to large cap listed equities – interesting - but not the objective of benchmarking.

Pension Plans and Risk Data

There is typically limited risk data reported alongside private equities returns of the eight pension plans. We do not know how much risk is taken to achieve these returns and what the returns per unit of risk are. Returns for 2024 ranged from 8.7% (CPP) to 17.2% (CDPQ) but we cannot distinguish between beta and alpha. CDPQ reports volatility metrics for other asset classes on an annual basis but does not provide the same for private equity. CPP provides an extreme risk measure for private equity (VaR) but does not provide annualised volatility metrics associated with returns.

With the private2000 index, calculating risk-adjusted metrics is straightforward. With monthly pricing dating back to 2013, one can measure the monthly returns and volatility of the index. Risk-adjusted performance (beta vs alpha) can be measured against this index using our DirectAlpha tool, which is incorporated in our Excel add-in (here). More nuanced risk and custom benchmarking can be advanced using the same tool.

An example of the risk data available is shown in Table 9. The table below shows volatility, Sharpe ratios, and Value-at-Risk (VaR) for the 3, 5, and 10-year periods for the private2000 index. This is also available for thematic and custom indices.

TABLE 9: PRIVATE2000 RISK DATA

	Volatility			Sharpe Ratio			Var (97.5%)		
	3yr	5yr	10yr	3Y	5Y	10Y	3Y	5Y	10Y
private2000 VW	11.4%	15.0%	18.0%	*neg*	0.16	0.56	19.7%	23.0%	21.8%
private2000 LCU	10.6%	14.9%	17.9%	*neg*	0.25	0.63	17.6%	22.5%	21.1%

Source: privateMetrics. As of May 31, 2025. *neg* = negative Sharpe ratio for period

Conclusion

Much like 2023 results, 2024 returns from leading pension plans reflect the challenging conditions in the private equities market. The choice of benchmark – listed equities indices – offers little insight regarding performance. This leaves trustees, board members, and beneficiaries in the dark about how well their private equities portfolios are performing. This is the case using short-term data (1 year) or longer-term (5 year). Given the diverging performance of listed vs private equities, and the material differences between the two markets, it may be time for pension plans to adopt a more relevant benchmark.

Appendix

AIMCO TRAILING 5-YEAR PRIVATE EQUITIES PERFORMANCE

YE Dec 31	Return (CAD) 1 Yr	Benchmark (CAD) 1 Yr	private2000 (CAD) 1 Yr	Return vs Bench	Return vs private2000
2024	11.8%	23.9%	6.6%	-12.1%	+5.2%
2023	6.7%	10.1%	-1,2%	-3.4%	+7.9%
2022	0.5%	4.2%	26.2%	-3.7%	-25.7%
2021	68.5%	8.8%	12.9%	+59.7%	+55.6%
2020	7.2%	8.1%	3.8%	-0.9%	+3.4%

Source: AIMCO 2020-2024 Annual Reports

BCI TRAILING 5-YEAR PRIVATE EQUITIES PERFORMANCE

YE Dec 31	Return (CAD) 1 Yr	Benchmark (CAD) 1 Yr	private2000 (CAD) 1 Yr	Return vs Bench	Return vs private2000
2024	13.4%	30.1%	6.6%	-16.6%	+6.8%
2023	6.0%	20.9%	-1,2%	-14.9%	+7.2%
2022	4.7%	-10.4%	26.2%	+15.1%	-21.5%
2021	29.7%	19.5%	12.9%	+10.2%	+16.8%
2020	24.3%	16.2%	3.8%	+8.1%	+20.5%

Source: BCI 2020-2024 Annual Reports

CDPQ TRAILING 5-YEAR PRIVATE EQUITIES PERFORMANCE

YE Dec 31	Return (CAD) 1 Yr	Benchmark (CAD) 1 Yr	private2000 (CAD) 1 Yr	Return vs Bench	Return vs private2000
2024	17.2%	20.8%	6.6%	-3.6%	+10.6%
2023	1.0%	10.5%	-1,2%	-9.5%	+2.2%
2022	2.8%	0.0%	26.2%	+2.8%	-23.4%
2021	39.2%	32.2%	12.9%	+7.0%	+26.3%
2020	20.7%	9.9%	3.8%	+8.1%	+16.9%

Source: CDPQ 2020-2024 Annual Reports

HOOPP TRAILING 5-YEAR PRIVATE EQUITIES PERFORMANCE

YE Dec 31	Return (CAD) 1 Yr	Benchmark (CAD) 1 Yr	private2000 (CAD) 1 Yr	Return vs Bench	Return vs private2000
2024	12.7%	na	6.6%	na	+6.1%
2023	14.1%	na	-1,2%	na	+15.3%
2022	11.0%	na	26.2%	na	-15.2%
2021	23.7%	na	12.9%	na	+11.8%
2020	10.5%	na	3.8%	na	+6.7%

Source: HOOPP 2020-2024 Annual Reports. No disclosed benchmark returns

OMERS TRAILING 5-YEAR PRIVATE EQUITIES PERFORMANCE

YE Dec 31	Return (CAD) 1 Yr	Benchmark (CAD) 1 Yr	private2000 (CAD) 1 Yr	Return vs Bench	Return vs private2000
2024	9.5%	8.7%	6.6%	+0.8%	+2.9%
2023	3.9%	9.6%	-1,2%	-5.7%	+5.1%
2022	13.7%	11.2%	26.2%	+2.5%	-12.5%
2021	25.8%	8.0%	12.9%	+17.8%	+12.9%
2020	-8.4%	9.0%	3.8%	-17.4%	-12.2%

Source: OMERS 2020-2024 Annual Reports

PSP TRAILING 5-YEAR PRIVATE EQUITIES PERFORMANCE

YE Mar 31	Return (CAD) 1 Yr	Benchmark (CAD) 1 Yr	private2000 (CAD) 1 Yr	Return vs Bench	Return vs private2000
2025	16.6%	na	7.1%	na	+9.5%
2024	12.1%	na	2.4%	na	+9.7%
2023	3.3%	na	12.1%	na	-8.8%
2022	27.6%	19.5%	16.8%	+8.1%	+10.8%
2021	28.4%	31.7%	-8.0%	-3.3%	+36.4%

Source: PSP 2021-2025 Annual Reports. Stopped providing 1 year benchmark from 2022.

The privateMetrics® Valuation Model

Our approach to the valuation of private companies is designed to maximise the available transaction and financial data in private markets and provide a standardised and systematic manner to update prices with every observed transaction.

First, we construct a multi-factor model of prices using a sample of observed transactions over time which can infer the unbiased and precise factor prices that investors pay for different characteristics of a private asset. Although every transaction is idiosyncratic or unique, in a large sample of transactions, the individual errors in each transaction price can be diversified away to discern the price attributable to each factor. Factor prices refer to the premium (or discount) that an investor is willing to pay to seek exposure to a specific factor of return in private companies. For example, observing the relationship between size and valuation among reported transactions, it can be inferred how much premium or discount an investor is willing to pay for purchasing a larger private company.

Second, an important and key application of this approach is that, with the estimated factor prices, say for size, it would then be possible to price unlisted private companies whose size information is available, irrespective of whether they are traded or not. This approach provides a more robust estimate for FV and enables the creation of representative indices of private companies.

Our approach's novelty is calibrating the model to newly observed transactions obtaining the factor price evolution over time, which allows us to update the valuation for all tracked unlisted private companies.

Common risk factors

If investors trade unlisted private companies from each other in mutually negotiated transactions, there must be some common characteristics that at least partially explain prices. For example, private companies that have higher profits or growth opportunities may be more valuable to investors than those that are not.

To arrive at a potential list of factors, we follow simple criteria that there needs to be an economic rationale for the factor to affect valuation. The factor should also be statistically related to the valuation. Moreover, the factor should also be objectively observable or measurable. With a potential list of factors, our factor selection is the result of a statistical approach, where the factors that can satisfactorily explain the variation in observed transaction valuations are included in the final model while trading off being parsimonious with being able to explain a higher variance in valuation. The privateMetrics asset pricing model uses five key risk factors as below:

- **Size**: Larger companies may be more complex, have higher transaction costs, and be less liquid, all of which can make them trade at a lower valuation per $ of revenue.
- **Growth**: As traditional PE strategies rely on growing the entry multiple, that may involve both increasing its top and bottom lines, i.e., revenue and profits. Thus, companies that can grow faster can be more sought after, making them more valuable.

- **Leverage**: Leverage can make a company riskier as it increases the risk of default. However, there is also a signaling effect of leverage, as companies with stable consistent cash flows can support a higher leverage, and vice versa. Thus, leverage is expected to influence the valuation of a company.
- **Profits**: More profitable companies have more predictable (less risky) future payouts and hence attract a lower risk premium, making them more valuable.
- **Maturity**: Younger companies have fewer track records and face higher information uncertainty. Studies have shown that firms with high uncertainty tend to be overvalued and earn lower future returns. Thus, the maturity negatively affects valuation.
- **Country risk**: Investors may require a high return when investing in a high-risk country, thus depressing the current valuation. In other words, in countries with lower risk, investors may be willing to purchase assets at a higher valuation as government policies may be more predictable with lower macroeconomic risks.

TABLE 1: KEY FACTORS, THEIR EFFECT ON VALUATION, & THE ECONOMIC RATIONALE FOR INCLUDING THEM IN THE MODEL

Factor	Definition (Proxy)	Effect on price	Economic Rationale	References
Size	Revenues	Negative	Larger firms are more illiquid and trade a lower price	Fama & French (1993)
Growth	Change in Revenues	Positive	Companies with higher revenue growth trade at a higher price	Fama & French (1992), Petkova & Zhang (2005)
Leverage	Total debt / Revenues	Positive	Companies that can borrow more have a lower cost of capital and a higher value	Gomes & Schmid (2010), George & Hwang (2010)
Profits	Ebitda Margin	Positive	Companies that have higher profits have a higher value	Novy-Marx (2013), Hou et al. (2015)
Maturity	Years since incorporation	Negative	Companies that are mature exhibit less growth potential and trade a at a lower price	Jiang et al. (2005)
Country Risk	Term Spread	Negative	Companies in high-risk countries face more uncertain prospects	Chen & Tsang (2013)

SOURCE: CALCULATED USING OVER 10K DEALS FROM PITCHBOOK, CAPITALIQ, FACTSET, AND OTHER PRIMARY SOURCES BETWEEN 1999-2022

Our factors have been documented in prior academic studies to be associated with valuation. We also include factors that have been identified as key determinants of valuation from a survey of private equity practitioners that we conducted in 2023. Table 1 summarises the key factors that we use in the model, how they are measured, each factor's effect we document in the data on average, the economic rationale for their inclusion, and citations for the work that underpins their inclusion.

Model set up

The privateMetrics asset pricing model uses the Price-to-Sales ratio of observable transactions (the entry price multiple) as the modelled variable. The model is estimated as the linear sum of the product of factor exposures and factor prices. The estimation can then separate the systematic part of the valuation while leaving out "noise" in each valuation.

$$\frac{P}{S} = a + \sum_{k=2}^{K} b_k l_k + e$$

Following standard asset pricing notation, the factor exposure or factor loading is called a beta (β), and the factor premium is called a lambda (l) for the k factors in the model. a is the intercept and e is the noise or idiosyncratic part of the valuation.

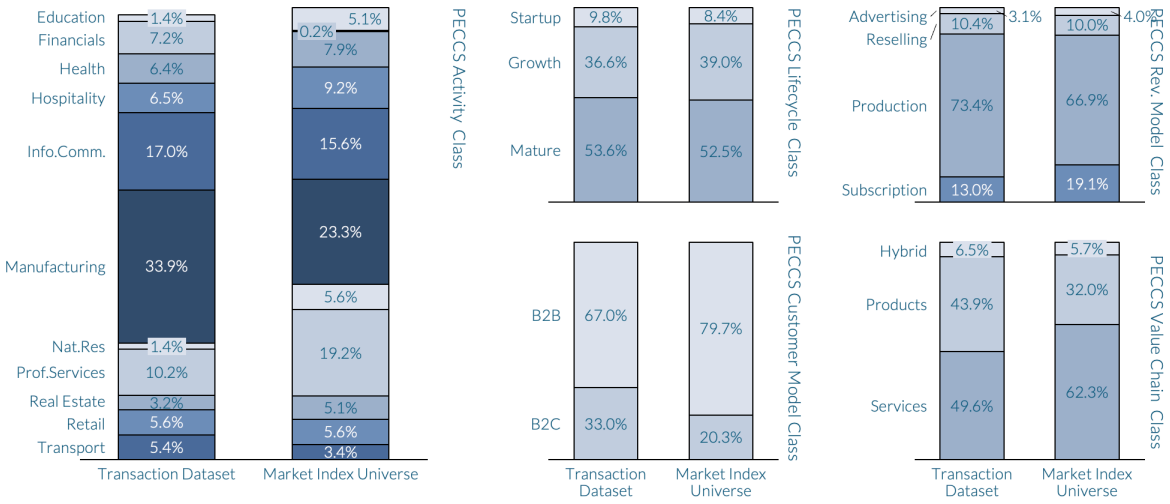
Model calibration

The privateMetrics model uses a carefully curated dataset of more than 10k+ unlisted private company investments going back two decades sourced from a wide variety of datasets including PitchBook, Factset, Capital IQ, fund manager reports, and other publicly available data sources.

We calibrate this model using new observations monthly to update its estimation of the price of risk of each factor. In other words, each transaction observed is then used to 'update' this model (i.e., obtain new ls) through a dynamic estimation (using a Kalman filter), which retains the memory of past ls while also allowing the new transaction to influence the relationship while keeping the average e close to zero. More details on the implementation of the model are available in our online documentation and Selvam and Whittaker (2024). The dataset covers all key segments of the market as shown in Figure1.

A good application of using the model to value unlisted private companies is to create a representative marked-to-market index of private companies that are regularly valued. The privateMetrics index universe in Figure 1 includes the constituents of the private2000® index constructed by Scientific Infra & Private Assets, which is developed on this shadow pricing idea and captures the performance of private companies in 30 countries globally that are important for private equity investors (read more about the index here).

FIGURE 1: PRIVATEMETRICS TRANSACTION DATASET COMPARED TO THE PRIVATEMETRICS INDEX UNIVERSE BY PECCS PILLAR & CLASS



How precise are the predictions across PECCS® pillars?

To examine how closely the predicted valuations track the raw modelled valuations in transactions, we compute the average estimation errors of the full sample, and also by classes within each PECCS® pillar. What stands out is that although the model by design is expected to have lower estimation errors in the full sample, the within PECCS® class estimation errors are also very small. All the errors are within ±10%, reassuring that the model predictions on average even within each segment of PECCS® are reasonable. The errors are summarised in Table 5.

The most commonly used metric of valuation in private markets is EV/EBITDA as PE owners have the flexibility to alter the capital structure of their holding company and hence are more interested in operational profitability without factoring interest costs. However, our model is based on P/S because P/S is statistically better, stable, and not affected by loss-making companies. Thus, one may be concerned whether our predictions for EV/EBITDA might be biased.

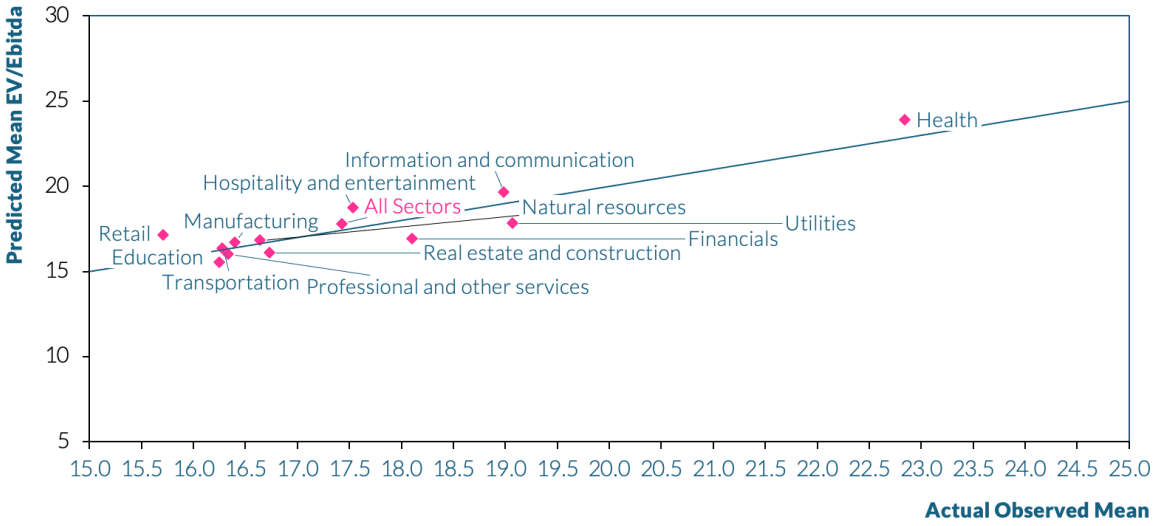
To ensure that is not the case, we compute the EV based on the book value of debt and predicted equity valuation and divide the sum by the EBITDA to get a predicted EV/EBITDA and compare it to transaction implied ratios. Figure 3 presents the average predicted and observed EV/EBITDA by PECCS® activity classes. We find that the predictions are very close to the observed values, thus mitigating this concern.

TABLE 5: AVERAGE ESTIMATION ERRORS ACROSS PECCS® CLASSES, BASED ON THE DIFFERENCE BETWEEN TRANSACTED VALUATIONS AND FACTOR MODEL PREDICTIONS

PECCS Pillar	PECCS Class	Mean Estimation Error	PECCS Class	Mean Estimation Error	PECCS Pillar
PECCS Activity	Education and public	0.9%	Startup	0.1%	PECCS Lifecycle Phase
	Financials	1.8%	Growth	-1.7%	
	Health	2.6%	Mature	2.8%	
	Hospitality and entertainment	-1.1%	Advertising	1.2%	PECCS Revenue Model
	Information and communication	-4.4%	Reselling	4.6%	
	Manufacturing	2.5%	Production	2.9%	
	Natural resources	9.4%	Subscription	-6.9%	
	Professional and other services	3.3%	B2B	1.5%	PECCS Customer Model
	Real estate and construction	1.9%	B2C	0.9%	
	Retail	0.5%	Hybrid	0.6%	PECCS Value Chain
	Transportation	7.2%	Products	1.1%	
Full Sample		**1.1%**	Services	3.4%	

SOURCE: CALCULATED USING OVER 10K DEALS FROM PITCHBOOK, CAPITALIQ, FACTSET, AND OTHER SOURCES BETWEEN 1999-2022

FIGURE 3: PREDICTED VERSUS ACTUAL EV/EBITDA RATIOS BY PECCS® ACTIVITY CLASSES



SOURCE: CALCULATED USING OVER 10K DEALS FROM PITCHBOOK, CAPITALIQ, FACTSET, AND OTHER SOURCES BETWEEN 1999-2022

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Our products come from the cutting-edge R&D of the EDHEC Infrastructure & Private Assets Research Institute, established in 2016 by EDHEC Business School. In 2019, we transformed this academic research into a commercial enterprise, providing services like private market indices, benchmarks, valuation analytics, and climate risk metrics. We take pride in our unique dual identity, bridging scientific research and market applications.

The EDHEC Infrastructure & Private Assets Research Institute (EIPA) continues to advance academic research and innovate with technologies in risk measurement and valuation in private markets, especially utilising artificial intelligence and language processing. Our company, Scientific Infra & Private Assets (SIPA), supplies specialised data to investors in infrastructure and private equity.

Merging academic rigor with practical business applications, our dedicated team excels in integrating quantitative research into private asset investing. Our products, infraMetrics® and privateMetrics®, are unique in the market, stemming from thorough research rather than being ancillary services of larger data providers. We are the Quants of Private Markets, leading with innovation and precision.

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