

Do Private Equities Track Public Markets (and when)?

Horizon Correlations in Private Equities

November 2025

Executive Summary

Rolling and Horizon Correlations in Private Equity. Long term price level correlations between the private2000 index, S&P 500 and Russell 2000 indices are high (~0.9). However, price return correlations between private and public equity returns are time varying and can change sign, understating long-term relationship between these asset classes. Analyses using the private2000 index show that 12-month rolling correlations with the S&P 500 and Russell 2000 fluctuate significantly, falling during periods of large drawdowns in listed equities (2018, 2020, 2022). However, as the measurement window extends to 24 or 36 months, and especially when horizon-based (multi-quarter hold period) returns are examined, aligning with private equity investments horizons, correlations rise toward 0.4 to 0.6.

Short Term Volatility and Correlations Matter. While long term horizons are important for understanding correlations among asset classes, short term, higher frequency data is essential to understand private markets and track the current performance, value and riskiness of private asset portfolios. Recently, lower fund distributions and a slowdown in exits have pushed some limited partners to sell or explore sales on the secondary market, where there are significant discounts to reported NAVs. This has called into question the idea that private equity investors can ignore the short term. Given the high cost of transacting in the secondary markets, investors need to have a current view on the price their private assets may transact at, not just the NAVs. With the development of continuation vehicles and evergreen structures, the ability to take both a short and a long term view is key and privateMetrics® can help investors understand these dynamics by capturing and incorporating the latest deal metrics in monthly pricing.

Long Term vs Short Term. Rolling monthly and quarterly correlations between the private2000 index and listed equities' indices ranges from 0.3 to 0.4. Hold period correlations, which measure returns over horizons consistent with private equity ownership, show levels closer to 0.6, even approaching 0.8 at some points. The lower shorter term correlations indicate that the markets are different and one cannot be effectively proxied with the other. Naturally, at longer horizons (hold periods), the correlations increase, reflecting that both are still 'equities' and thus influenced by similar fundamentals. With correlations well below 1, the case for diversification still exists, but less than that implied with shorter term rolling correlations. Moreover, the disconnect in the shorter term highlights the need for reliable private equities' data as listed equities can diverge from unlisted equities in the short and medium term. This is where data is most needed, for benchmarking, valuations, and understanding the private equities' current market dynamics.

Data and Methods

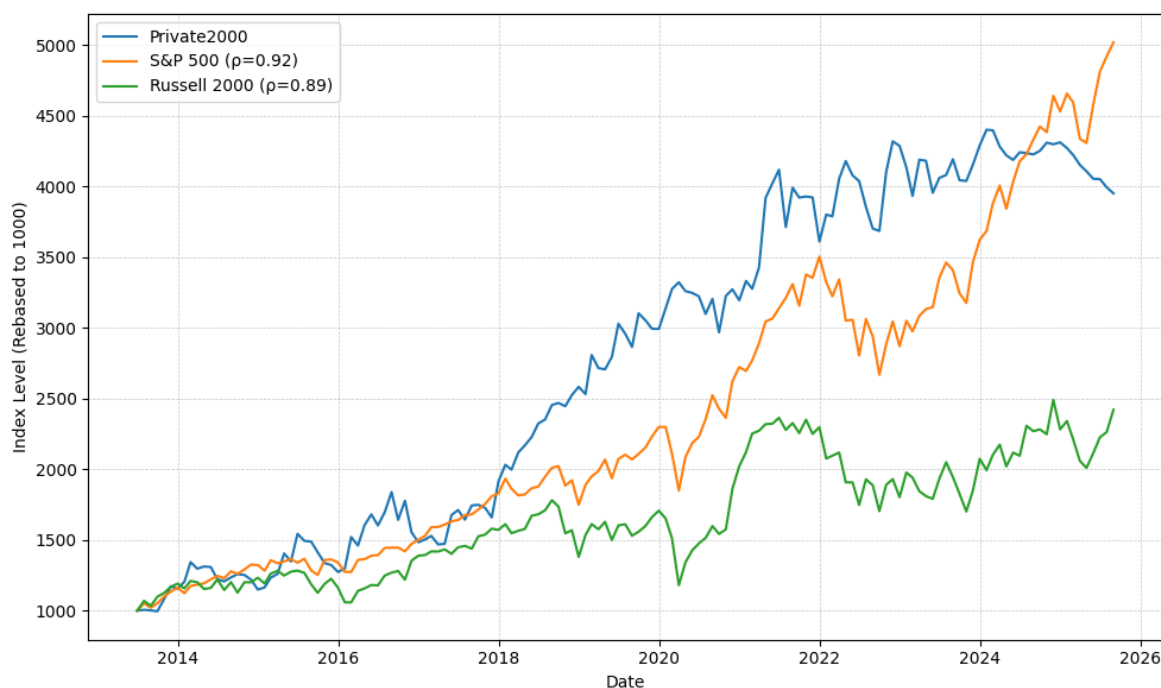
We utilise the privateMetrics® database to obtain monthly index prices and time series of returns for the private2000® value weighted index (see the index factsheet [here](#)). This was facilitated by using the privateMetrics Excel Add-In tool (see [here](#) on how to use the add-in in Excel), which allows one to pull the data directly into Excel for further analysis (also available via Python). The privateMetrics index data starting date is June 30, 2013. We have used a research index for years prior to this date to carry out the analysis, particularly for longer hold period returns and correlations.

Monthly and quarterly returns were measured against the S&P 500 and the Russell 2000 indices to determine correlations. We looked at both rolling correlations of monthly price returns using various windows to reveal correlations. We then examined hold period or horizon correlations by exploring correlations for longer term hold periods that one may find consistent with hold periods in private equity.

Price Level Correlations

Figure 1 shows the price levels of the private2000 index and the S&P 500 and Russell 2000 indices for the period covering June 30, 2013 (index=1000) to August 31, 2025. Over longer periods of time, there is a high correlation among the index levels as evidenced by the 0.92 correlation with the S&P 500 and 0.89 correlation with the Russell 2000. This should be expected, given both markets reflect equity positions and have similar exposure to economic fundamentals.

FIGURE 1: INDEX PERFORMANCE SINCE JUNE 30, 2013, WITH LEVEL CORRELATIONS



Source: privateMetrics, DataStream

Price Returns Rolling Correlations

While price level correlations are instructive, price return correlations are typically used when evaluating correlations among asset classes. We can look at rolling price return correlations among the same indices. Figure 2 shows the rolling correlations of monthly returns among the private2000 index and both the S&P 500 and Russell 2000 indices.

For shorter horizons (rolling 12 months), price return correlations can be volatile, reflecting the dynamics discussed in the previous section. More specifically, the correlations dropped during the Covid and 2022 inflation shock sell-offs. While listed markets experienced violent sell-offs, private markets showed weakness, but less dramatic. Following this, correlations moved back towards 0.5. Interestingly, we observe a similar breakdown in correlations between the S&P 500 and the Russell 2000 at various points. While typically close to 1, the price return correlations for rolling 12-month periods have dropped below 0.4 (2017/18) and 0.5 (2021/22).

For longer windows of rolling correlations (24 and 36 months), this volatility in correlations is smoothed. Recent correlations between the private2000 and S&P 500 approach 0.5, while closer to 0.25-0.3 with the Russell 2000.

We can extend the monthly return correlations to quarterly and observe the outcomes for longer term windows of 20 quarters (Figure 3: left) and 24 quarters (Figure 4: right). With quarterly rolling window returns, the correlation with the S&P 500 and Russell 2000 has oscillated around 0.4, dropping below in periods of large sell-offs in listed equities. A similar outcome is shown for the rolling 24 quarter periods. Table 1 details the latest, mean, and median correlations for various windows and associated significance for mean correlations.

TABLE 1: ROLLING WINDOW CORRELATIONS SIGNIFICANCE

Quarters	Pair	N	Latest	Mean	Median	t-stat	p-value
12	P2000:SP500	98	-0.579	0.295	0.271	3.03	0.003
12	P2000:R2000	98	-0.263	0.294	0.276	3.01	0.003
20	P2000:SP500	90	0.182	0.312	0.316	3.09	0.003
20	P2000:R2000	90	0.357	0.300	0.300	2.95	0.004
24	P2000:SP500	86	0.130	0.314	0.330	3.03	0.003
24	P2000:R2000	86	0.252	0.295	0.285	2.83	0.006

Source: privateMetrics, DataStream. Calculations by SIPA.

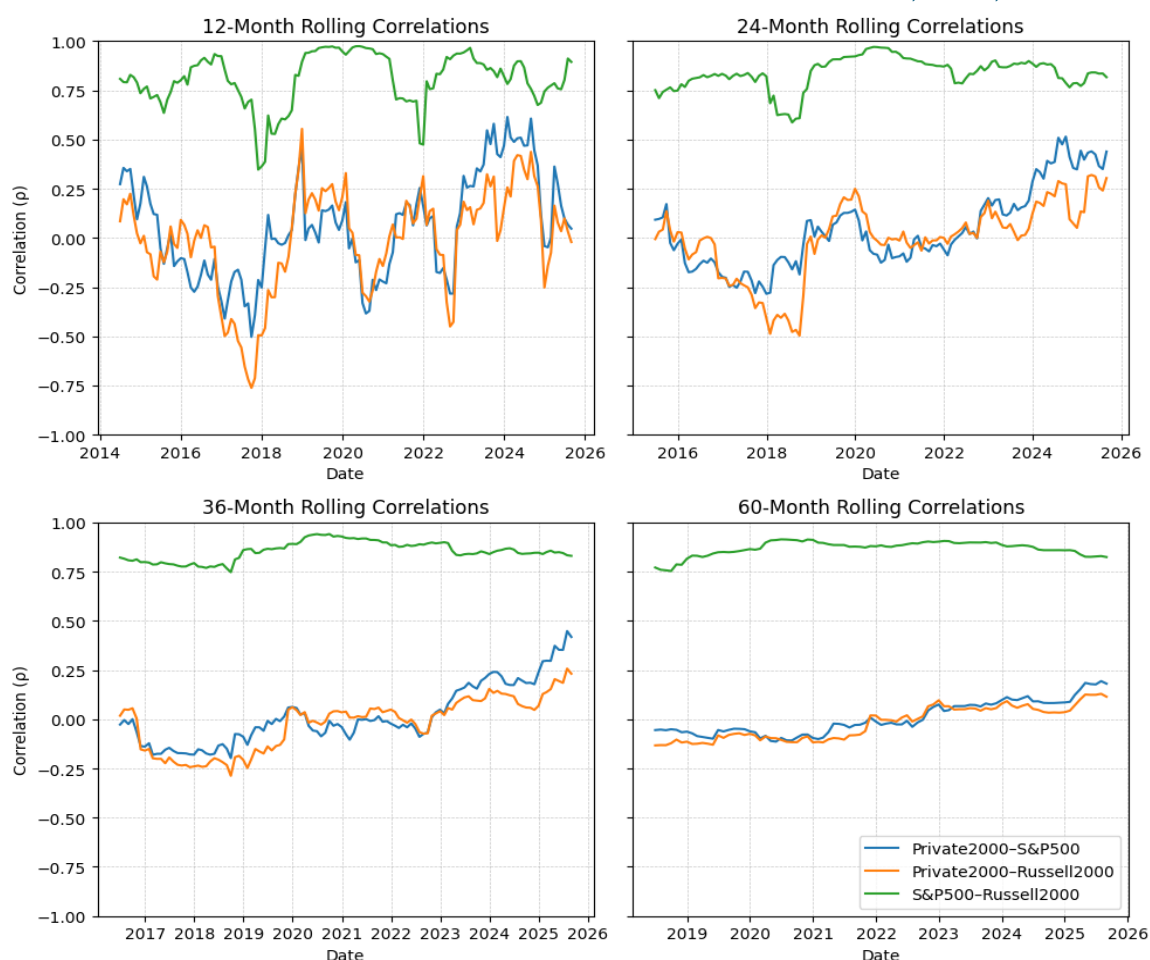
Thus, the long relationship between public and private equities can break down as correlations between asset classes fluctuate over time. For example, over the last three years¹, the S&P 500 has delivered explosive returns, up 63% vs 28% for the Russell 2000 and just 6.7% for the private2000. The strength in the large cap weighted S&P 500 index is attributed to a select group of mega cap securities. The equal weighted variant of the S&P 500 has returned 42% over the same period. Similarly, the Russell 2000, while up

¹ 3 years ending 31 August 2025

over the last couple years, has shown more muted results given the broader composition, with no overlap with the S&P 500.

The reaction to higher inflation and thus higher interest rates was different between listed and private markets. While listed equities experienced an immediate major correction (down over 25% from Dec 2021 to Sep 2022), the private equities market showed a smaller drawdown, followed by a prolonged weaker environment (2022-P) as buyers and sellers adjusted to the new rate environment. Deal values transacted during that time did not reflect the sharp sell-off that occurred in listed equities. Further, though deal activity and value dropped from the elevated levels of 2021/22, they still remained at the levels prior to 2020. In the US, buyout deal volumes and values peaked in 2021 at 2,300 and \$668 billion², respectively. For 2023 and 2024, volumes and values declined to 1,500 deals and \$350 billion in value, similar to levels during the years 2017-2019. However overall NAV had doubled during this time.

FIGURE 2: ROLLING MONTHLY PRICE RETURN CORRELATIONS FOR PRIVATE2000, SP500, R2K



Source: privateMetrics, DataStream. Calculations by SIPA.

² Pitchbook

If we look at returns for the past four years (before the listed equities correction in 2022), the Russell 2000 has delivered a cumulative return of just 4.1%, with the private2000 down 1% for the same period. The S&P Small Cap 400 index was up 5.2% during that period. With the exception of the tech heavy S&P 500, market returns have been lower, trying to earn their way into the lofty valuations after the 2020/21 surge. Table 2 summarises the returns of the indices.

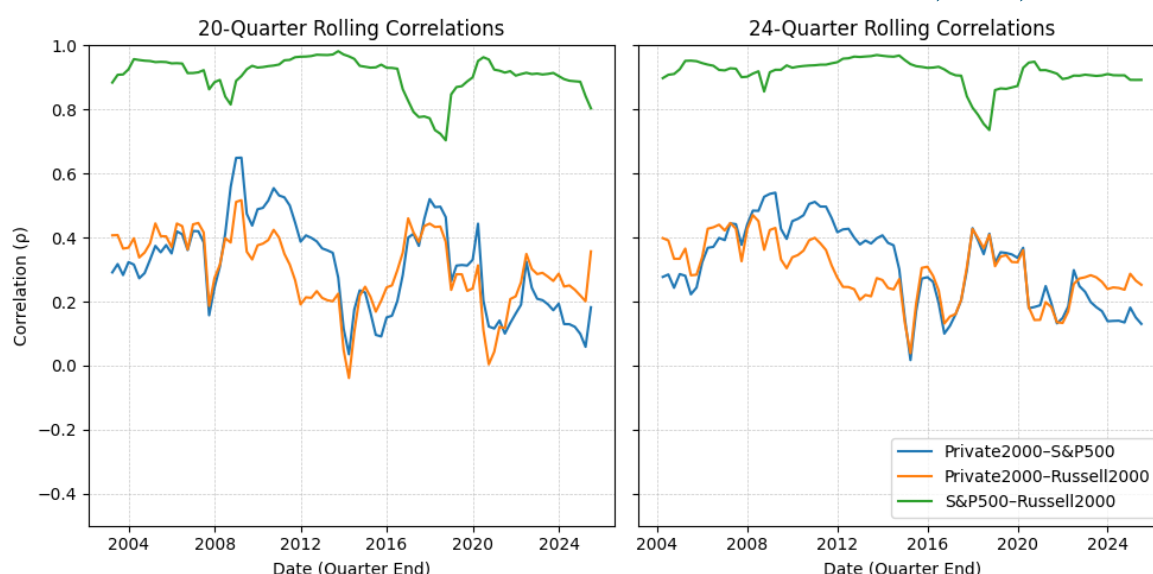
TABLE 2: CUMULATIVE 3 AND 4 YEAR RETURNS FOR PRIVATE2000 INDEX VS LISTED INDICES

Index	3 Yr Return (cum)	4 Yr Return (cum)
private2000 VW USD	6.7%	-1.0%
Russell 2000	28.3%	4.1%
S&P Small Cap 400	21.4%	5.2%
S&P 500	63.3%	42.8%

Source: privateMetrics, Bloomberg, DataStream. Cumulative returns to August 31, 2025, in USD.

The difference in performance since 2022 can be partially explained by how quickly new information is transmitted to asset prices. The long-term nature of the private equity fund, provides the GPs a valuable option to hold, anticipating a better exit environment. Notwithstanding this, secondary transactions have persistently been executed at discounts to NAV, indicating that the market clearing price has declined. This may have led them to take a longer term perspective on valuations, thereby not accepting the haircuts seen in listed markets. Unfortunately, that has not come yet, with earnings growth largely offset by valuation compression³, with EV/EBITDA and EV/Sales multiples for the private2000 index declining by over 20% since 2021/22, leading to the recent trendline in results. Public markets, on the other hand, tend to incorporate pricing in real time, flushing out immediately, and resetting.

FIGURE 3: ROLLING QUARTERLY PRICE RETURN CORRELATIONS FOR PRIVATE2000, SP500, R2K



Source: privateMetrics, DataStream. Calculations by SIPA. Prior to June 30, 2013 represents research index.

³ privateMetrics

Horizon Correlations and Long-Term Holding Periods

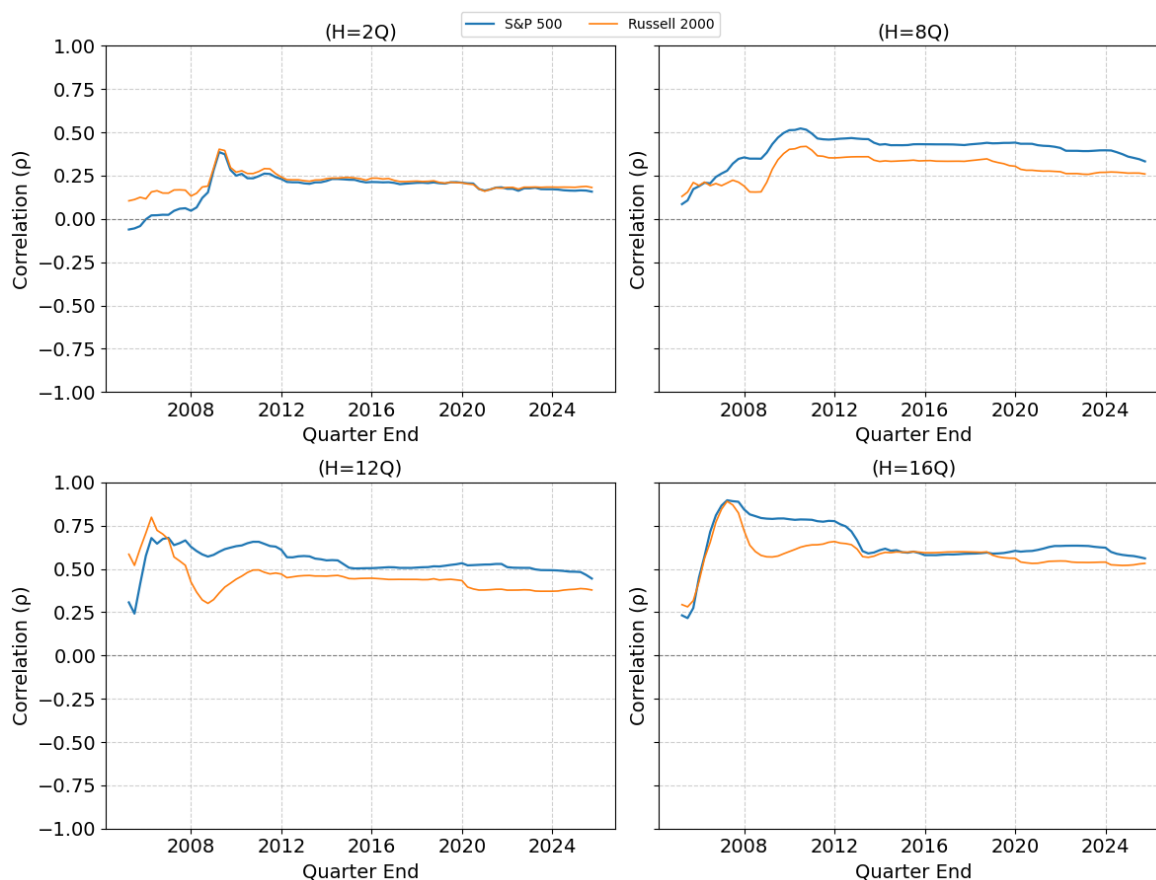
An alternative way to look at correlations is to observe horizon correlations. Given private equity investments are longer term in duration, it is useful to look at holding period price return correlations that align with private equity hold periods. Figure 4 displays overlapping hold periods of 2, 8, 12, and 16 quarters to show how longer hold periods of private equities generally leads to higher correlations with listed equities.

For 8 quarter (2 year) overlapping hold periods, correlations range between 0.3 and 0.4 with the Russell 2000 and S&P 500, respectively. Extending the hold period out to 12 and 16 quarters increases the correlations to between 0.4 and 0.6.

Figure 5 shows similar results but controls to ensure no hold periods overlap.

Results are consistent with earlier discussion on level correlations. As we extend the hold period or investment horizon, correlations should increase as the short term noise in each market (listed vs private) should dissipate, with long term returns reflecting the fundamental and economic conditions and exposures of an equity investor, irrespective of the market those positions are held.

FIGURE 4: HOLD PERIOD PRICE RETURN CORRELATIONS FOR PRIVATE2000, SP500, R2K



Source: privateMetrics, DataStream. Calculations by SIPA. Overlapping hold periods. Data prior to June 30 2013 uses research index.

Table 3 provides the latest correlation figures and mean and median from the sample. Significance levels are shown. It's important to note that there are overlapping hold periods in the data, which can impact the significance.

TABLE 3: HORIZON HOLD PERIOD CORRELATIONS SIGNIFICANCE

Quarters	Pair	N	Latest	Mean	Median	t-stat	p-value
8	P2000:SP500	82	0.41	0.47	0.50	4.70	0.00
8	P2000:R2000	82	0.38	0.41	0.43	4.05	0.00
12	P2000:SP500	82	0.54	0.65	0.62	7.57	0.00
12	P2000:R2000	82	0.52	0.57	0.56	6.22	0.00
16	P2000:SP500	82	0.61	0.75	0.71	10.00	0.00
16	P2000:R2000	82	0.61	0.73	0.74	9.44	0.00

Source: privateMetrics, DataStream. Calculations by SIPA.

Does The Short Term Matter in Private Assets?

The discussion thus far relates to asset class correlation assumptions for long term strategic asset allocation. In other words, using shorter term price correlations may understate the true correlations with listed equities, thus a poor input for asset allocation.

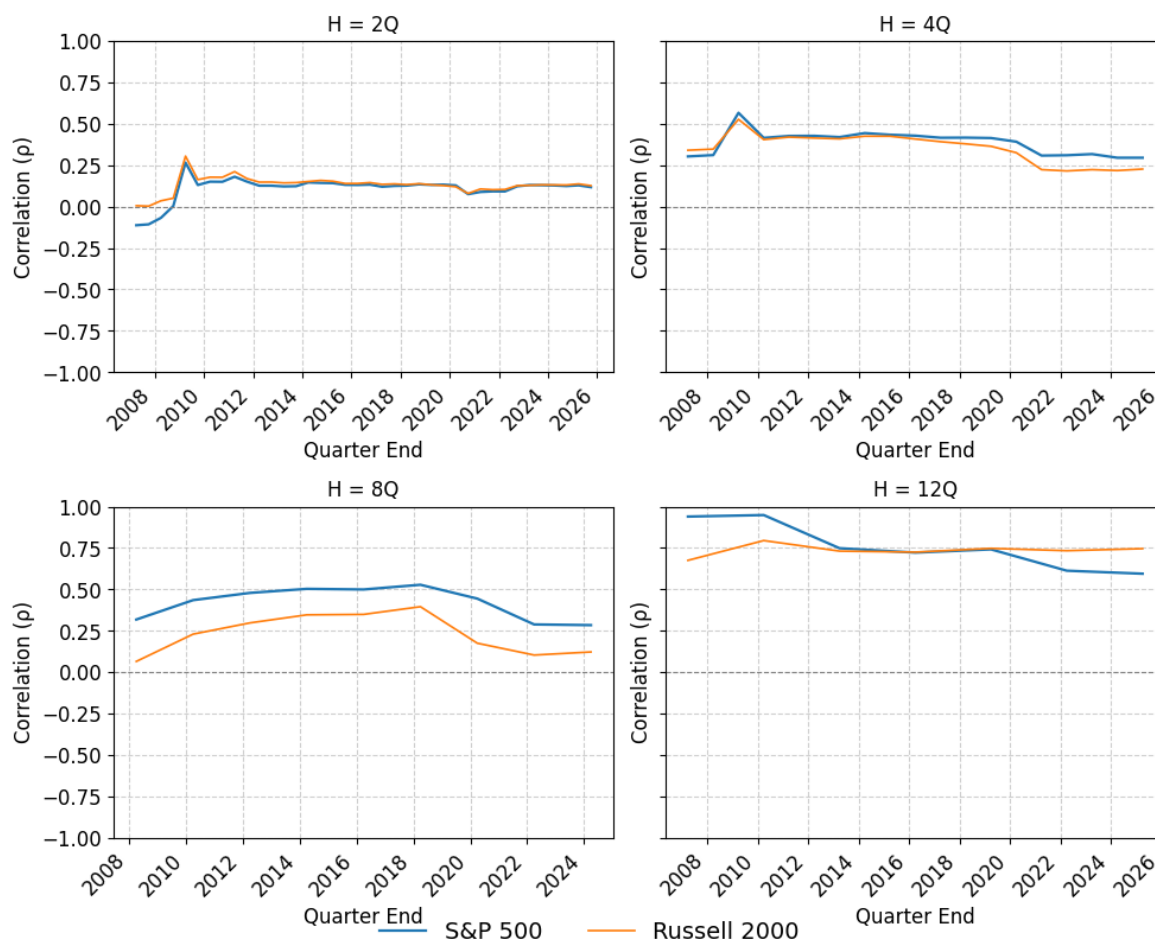
Most institutional investors in private equity have a long term investment horizon. The primary vehicle to invest in private assets, the Limited Partnership, typically has a 10-12 year fund life with no ability to redeem throughout the term. Direct investments or co-investments also have long term investment horizons. The median hold period for a transaction is approaching 6 years (EY). This line of thinking is put forward to support longer term assumptions when incorporating private assets into a multi-asset portfolio. This broadly makes sense.

But what if you have to sell before the end of the fund life or hold period? This is when the short term matters. In the current environment, one characterised by low distributions (MSCI), LPs are not getting their money back at the same rate as before, leaving a lot of NAV still tied up in allocations. This impacted prior pacing assumptions (20-25% of NAV distributed every year on average) and often led to an overweight position in private equity. Given the large shift into private assets over the last 2 decades, many institutions have little room with allocations vs targets and have been selling assets on the secondary market to lower exposure⁴ to the asset class. In this environment, short term volatility and correlations among asset classes matter. We can observe that in secondary market transactions, assets generally trade a discount to their reported NAVs (Campbell Lutyens, Evercore), and this discount can vary by age of fund, type of fund (VC vs PE vs Infra), or geography. Therefore, the need for more high frequency data in private markets is there. Institutions and private markets investors need to know what they can realise on their

⁴ <https://www.privateequityinternational.com/download-nearly-a-third-of-lps-reduced-pe-exposure-in-h1-2025/>

private asset holdings in the secondary market, a value that evidence persistently shows is different than the investee funds NAVs.

FIGURE 5: HOLD PERIOD PRICE RETURN CORRELATIONS FOR PRIVATE2000, SP500, R2K



Source: privateMetrics, DataStream. Calculations by SIPA. Non-overlapping hold periods.

Co-movements

We can also look at higher moment co-movements, including co-skewness and co-kurtosis between the private2000 index and the Russell 2000 index. Figure 6 shows the rolling co-skewness (top) and rolling co-kurtosis (bottom) for various windows ranging from 12 to 60 months.

Co-skewness is modestly negative, consistent with results shown earlier. The private2000 has also declined during large, listed equities sell-offs, while failing to keep pace with the strong gains in listed equities over the last few years. In figure 7, we compare the mean co-skewness and co-kurtosis of the private 2000 and Russell 2000 across four windows (12, 24, 36, and 60 months) and compare that to how two listed indices co-move. Increasing the window increases the negative co-skew, though the level is not as

negative as listed indices, pointing to differences between the markets. Co-kurtosis figures for the same windows are also shown in Figure 7.

FIGURE 6: ROLLING CO-SKEW AND CO-KURTOSIS PRIVATE2000 VS RUSSELL 2000

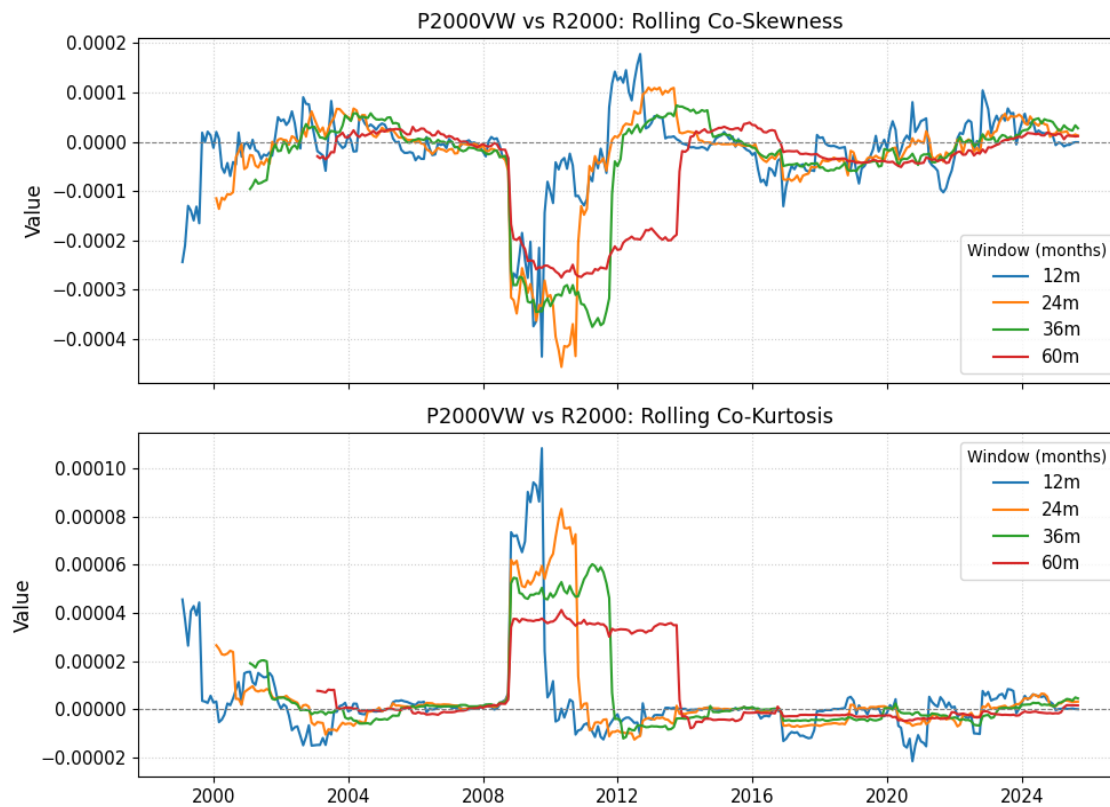
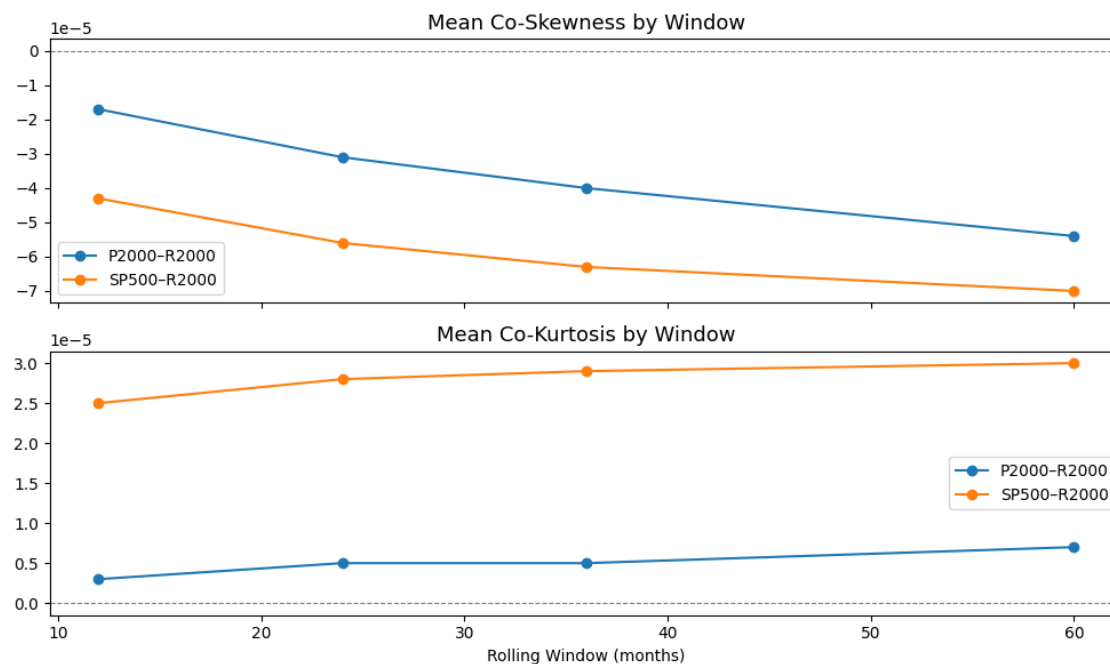


FIGURE 7: MEAN CO-SKEW AND CO-KURTOSIS BY ROLLING WINDOW (12-60 MONTHS)



Source: privateMetrics, DataStream. Calculations by SIPA. Pre June 30 2013 is research index for private2000.

Application: CMAs in Private Assets

Forming capital market assumptions for multi-asset portfolios when including asset classes that have high frequency data (listed assets) and low frequency data (unlisted assets) presents a challenge. Price movements in listed equities, and thus volatility, reflect new information immediately into asset prices. Some argue that the volatility in listed equities may be excessive in the short term⁵ due to over-reactions, nature of fund vehicles (open-ended, ease of redemptions). At the same time, private assets trade much less frequently, and thus data are slower to be reflected in asset prices. This is compounded by the valuation practices of players in the industry. Valuations are performed infrequently (quarterly) and are often smoothed. This has the impact of artificially suppressing the reported volatility of private assets and reducing its apparent correlation with listed assets.

privateMetrics® has addressed this issue by pricing private assets more frequently (monthly) to incorporate the latest information from transactions taking place in the marketplace, capturing changing risk premiums. This allows one to have a better view of near real time performance and volatility. This is incorporated in privateMetrics indices, constructed at the asset level to reflect the global private equities market. The monthly priced indices provide more frequent return and volatility data that reflect ‘private market’ conditions. This is important for understanding how the asset class is performing without the lags and smoothing present in the NAV based benchmarks. Importantly, it provides a current view of expected returns and volatility in the asset class, key inputs for CMAs. Correlation assumptions may better be explored by using longer term horizons or hold periods. Even when incorporating the latest private markets transactions, the data points or turnover still pales relative to activity in the listed markets, potentially rendering shorter term correlations less useful. In the next sections, we will explore longer term correlation relationships between the flagship private2000® index and the S&P 500 and Russell 2000.

In figure 8, we show a simplified asset allocation exercise using five asset classes (US equities, global equities, corporate bonds, government bonds, and private equities). Table 4 provides the key inputs for the exercise. Private Equity expected returns were derived from the latest median discount rate of the private2000 index. Past volatility measures were assumed to persist in the future. For the other asset classes, we have assumed a combination of past and expected returns and volatilities. For private equity, we assumed longer term hold period correlations (figure 5) and explored two cases, one with 0.8 correlation with listed equities (figure 8 – left) and one with 0.6 correlation (figure 8 – right).

⁵ [Public and Private Equity Returns: Different or Same?](#)

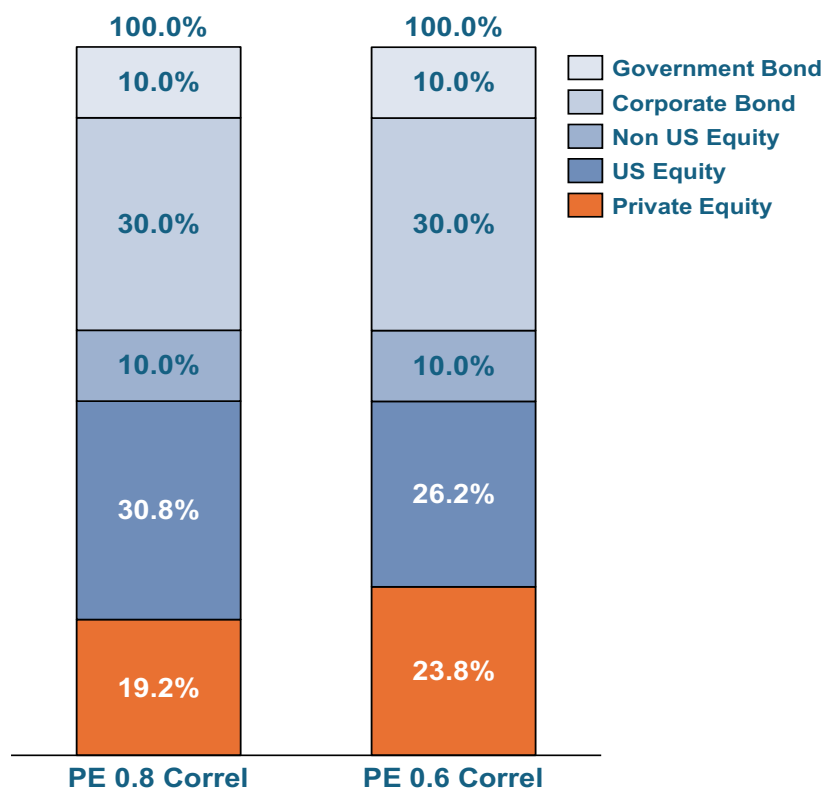
Assuming a 0.8 correlation with listed equities, the weight is 19.2% vs 23.8% in the case of a 0.6 correlation. With more diversifying asset classes (commodities, real estate, infrastructure, hedge funds), the magnitude of the allocation would likely change but this is indicative of the impact of correlation assumptions.

TABLE 4: KEY ASSUMPTIONS BY ASSET CLASS

Asset Class	Expected Return	Volatility
Government Bond	3.0%	6.5%
Corporate Bond	4.5%	4.7%
Non US Equity	7.0%	14.3%
US Equity	9.5%	15.0%
Private Equity	10.0%	17.6%

Source: privateMetrics, Bloomberg. Historical and Expected Returns Used in Forecast.

FIGURE 8: ASSET ALLOCATION USING DIFFERENT CORRELATIONS FOR PRIVATE EQUITY



Source: privateMetrics, Calculations by SIPA. Correlations refer to PE correlation w/listed equities

Conclusion

Higher frequency private equities data, like that produced by privateMetrics via its market indices, provides a dynamic view of the private equities market. Pricing at the asset level monthly, one has a current view on how market participants are pricing risk in the market. Alongside more reasonable volatility assumptions, this can be used to form longer term expected return assumptions. For correlations, a longer term perspective may be more appropriate given there is an interaction among various asset classes. As demonstrated in the paper, correlations can change dramatically over shorter periods of time, reflecting how quickly market participants transmit economic and fundamental news into asset prices. Given liquidity differences in public and private markets, this can lead to different return dynamics over shorter horizons. As we extend the horizon, correlations among listed and private equities increase, reflecting the fact that they are both equity positions and thus share similar exposure. Marrying this with the longer-term investment horizon of private equity participants, it stands to reason that using longer term correlation relationships is more suitable for asset allocation decisions.

privateMetrics API integration

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Browse our catalogue of hundreds of private equity, infrastructure and infra debt indices, inc. market indices like the infra300 and private2000, and thematic indices representing specific market segments.



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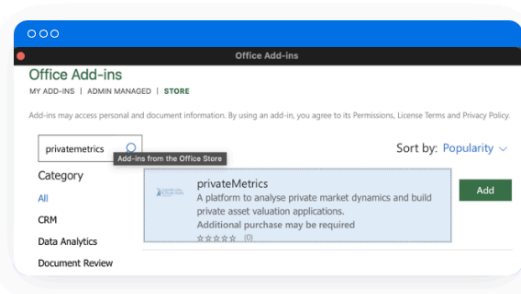
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privateMetrics Excel Add-in Documentation

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 A1: 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 at 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 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 A1 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.

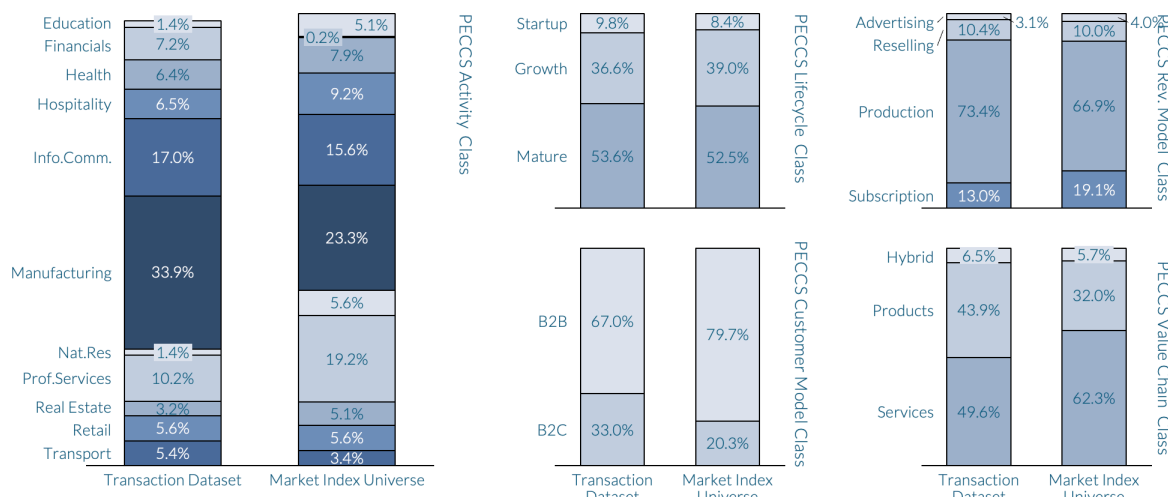
We calibrate this model using new observations monthly to update its estimation of the price of risk of each factor. In other words, each transaction observed is then used to ‘update’ this model (i.e., obtain new l s) through a dynamic estimation (using a Kalman filter), which retains the memory of past l s 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 Figure 1.

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 and 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](#)).

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 $\pm 10\%$, reassuring that the model predictions on average even within each segment of PECCS[®] are reasonable. The errors are summarised in Table A2.

FIGURE A1: PRIVATEMETRICS TRANSACTION DATASET COMPARED TO THE PRIVATEMETRICS INDEX UNIVERSE BY PECCS PILLAR & CLASS



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.

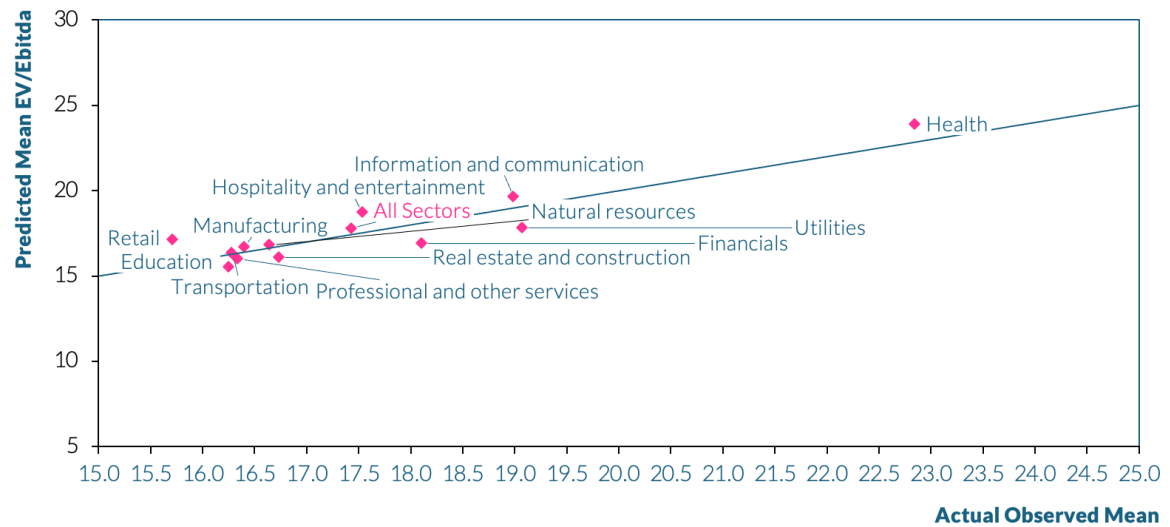
To ensure that is not the case, we compute the EV based on the book value of debt and predicted equity valuation and divide the sum by the EBITDA to get a predicted EV/EBITDA and compare it to transaction implied ratios. Figure A2 presents the average predicted and observed EV/EBITDA by PECCS[®] activity classes. We find that the predictions are very close to the observed values, thus mitigating this concern.

TABLE A2: 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%	PECCS Customer Model
	Professional and other services	3.3%	B2B	1.5%	
	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 A2: 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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