BUILDING CUSTOM PRIVATE EQUITY FUND BENCHMARKS

Versatility and robustness to evaluate private asset managers with privateMetrics®

June 2025

Executive Summary

The Power of Custom Benchmarking. Most GPs invest across sectors and geographies in unique ways, making it difficult for standardised indices to capture the nuance of each strategy. The extension of privateMetrics® capabilities to enable customised benchmarks across PECCS® pillars and geographies allows for more granular analysis of fund manager performance, while retaining robustness. For LPs, fund manager performance can be benchmarked at the most granular level – by geography (country), industry, revenue model, lifecycle, with a multitude of combinations that allows the investor to analyse funds with varying strategies and characteristics. **The choice of benchmark can determine whether a manager has generated alpha or not, impacting investment decisions.** For GPs, the custom benchmarking tool allows the GP to highlight their performance against the most relevant market, something that gets lost in fund manager benchmarks that combine unrelated funds and strategies by vintage.

Case studies of European buyout funds. We examine four European middle market buyout funds by using various customised benchmarks against returns. We examine two Spain-based buyout funds, both with similar vintages in 2017 and 2018, respectively. Returns are benchmarked against broad market indices, such as the private2000®, both value and equal weighted, and more refined benchmarks, such as mid-cap European private equities from the privateMetrics Private Equity Universe (PEU). With custom benchmarking, we can get even more refined by building an index of Spanish mid-cap companies, and tailor this based on industry (e.g. overweight manufacturing) or lifecycle (growth vs mature companies). We also look at a successful Sweden-based buyout fund, SEB Private Equity Opportunity Fund III, and a German distressed/turnaround fund, CMP German Opportunity Fund III. In both cases, we can examine performance against home country private equities represented by a customised index that reflects the sector weightings of the funds.

Robustness + Versatility = privateMetrics®. With ~1 million companies at the Broad Market Universe (BMU) level and ~200k at the Private Equity Universe (PEU) level, the depth and breadth of the privateMetrics database allows robust customised indices to be built. We will show in our cases studies that we can construct a European mid-cap private equities index comprised of 10k companies diversified by activity (sector) and geography. Likewise, we can do this at the country level, without sacrificing robustness. For Germany, we can construct a mid-cap index of private equities comprised of almost 1,300 companies, and over 800 when controlling for mature companies only. Even for a smaller country like Sweden, we can build a custom index of 375 mid-cap companies to benchmark a Swedish-focused middle market buyout manager at the local level.

privateMetrics® Tools

To analyse the returns of the four European buyout funds, we made extensive use of the privateMetrics indices (see: here) and the custom benchmarks (see: here). Using these indices and customised benchmarks combined with the Excel Add-in, we were able to compute all the combinations of risk-adjusted returns. The Add-in has built in indices, custom index construction functionality, and a direct alpha tool. This makes it relatively seamless to compute alpha of funds versus various benchmarks. More details on our MS Excel Add-in are available (here) with documentation available (here).

Custom benchmarks are particularly useful in private markets, given managers take on considerable idiosyncratic risk and hence, have very large 'tracking error' vs a broad market index. Most portfolios are very concentrated and tend to have unique strategies that are not easy to capture in broad market indices. They can be country specific or significantly over/under weight certain sectors. They may focus exclusively on growth or mature companies. Custom benchmarks with privateMetrics allow one to control for these characteristics. We now turn to putting these tools to work by evaluating four buyout funds, capturing their unique strategies in the benchmark design.

Benchmarking Two European Buyout Funds

The SEB Private Equity Opportunity Fund III[1] (SEB) is a 2014 vintage fund based in Sweden that had commitments of approximately SEK 2 billion and a strategy to make control buyouts of lower middle market and middle market companies in the Nordic region, with a focus on Sweden. Based on cash flow data sourced from its Luxembourg filings (RCS), the fund had posted a 21.64% gross IRR as of December 31, 2023[2]. By utilising privateMetrics' broad market, thematic, and customised indices, we can evaluate how this fund compared against the private2000 index, European mid-cap private equities, and Swedish private equities.

The CMP German Opportunity Fund III[3] (CMP) is a 2017 vintage fund based in Germany that had €250 millions of commitments. CMP is focused on investments in "Mittelstand" companies, with a focus on special situations, turnarounds, and distressed companies. The investments are primarily made in German-speaking Europe (DACH), with a focus on Germany. Likewise, based on CMP's Luxembourg filings, the CMP had generated a gross IRR of 13.4% as of December 31, 2023. We will utilise custom benchmarking to see whether CMP outperformed the German mid-cap private equities market, and the broader European and global markets.

[1] SEB Private Equity Opportunity Fund III SCA SICAV-SIF sourced from RCS

[2] December 31, 2023, reflects latest filed financials for fund at RCS

[3] CMP German Opportunity Fund III, SCA SICAV – SIF sourced from RCS

Table 1 below details the characteristics of the two funds, and the various benchmarks employed to assess performance.

TABLE 1: EUROPEAN MIDDLE MARKET BUYOUT FUND COMPARISON

Fund & Benchmark Characteristics	SEB Private Equity Opportunity Fund III	CMP German Opportunity Fund III
Vintage	2014	2016/17
Size	SEK 2 billion	€250 million
Geography	Nordic (Sweden)	DACH (Germany)
Industry Focus	Diverse	Manufacturing tilt
Segment/Style	Mid-market/Buyout	Mid-market/Turnaround
Gross IRR	21.64%	13.40%
Private2000 VW € Return	17.70%	14.80%
Private2000 EW € Return	12.08%	8.34%
PEU Europe Midcap EW € Return	14.11%	11.76%
PEU Country Midcap EW € Return	13.00%	10.31%
PEU Country/Sector Midcap EW € Return	13.00%	11.31%

*Index returns calculated using Direct Alpha approach where fund cash flows are assumed invested in broad and customised indices based on the timing of cash flows of the underlying fund investments.

To evaluate the returns of SEB, we started with the broad market index, the value weighted private2000, with returns in Euros. SEB had a gross IRR of 21.64%. If SEB funds cash flows were invested in the value weighted private2000 at matching dates, the IRR would have been 17.70% (equal weighted - 12.08%), indicating that the fund generated alpha against the private2000. The large differential between value and equal weighted indices shows the outperformance of larger caps in the flagship index and may be worth controlling for when benchmarking.

Incorporating customised indices to evaluate SEB returns, we constructed the following:

- Index of European mid cap equities comprised of ~10k private equities diversified by sector and country
- Index of Swedish mid cap equities comprised of 375 private equities diversified by sector
- No sector tilt adjustment for customised benchmark

For the European mid-cap equities customised index, the IRR was 14.11%, assuming matching timed investments as SEB. At the more granular level of Swedish mid-cap private equities, the IRR was 13%.

For SEB, regardless of the index used, the fund outperformed significantly. The outperformance was more dramatic against the customised and equal weighted indices relative to the value weighted private2000. We will look at the various splits between pure and allocation alpha in an upcoming section.

Turning to CMP, we follow a similar approach, first benchmarking against the broad market private2000 and then against a series of customised benchmarks designed to best represent the fund's strategy. Measured against the value weighted private2000, CMP trailed slightly with a 13.40% IRR vs 14.80% for the index. However, CMP outperformed the equal weighted version (8.34%) substantially.

For customised indices to evaluate CMP returns, we constructed the following:

- Index of European mid-cap equities comprised of ~10k private equities diversified by sector and country
- Customised regional index of German (75%) and Swiss (25%) midcap equities diversified by sector comprised of 1273 companies
- Further customised regional index to overweight manufacturing to reflect fund's sector focus, comprised of 841 companies

Relative to the equal weighted European mid-cap equities index, the fund outperformed, with a 13.4% IRR vs 11.76% for the index. At the regional level, CMP also outperformed our custom German/Swiss mid-cap private equities portfolio, which generated a 10.31% IRR. Finally, we further customised our regional index to overweight manufacturing to 50% of the portfolio to reflect the investment strategy of CMP. With this adjustment, the IRR of the index increased to 11.31%.

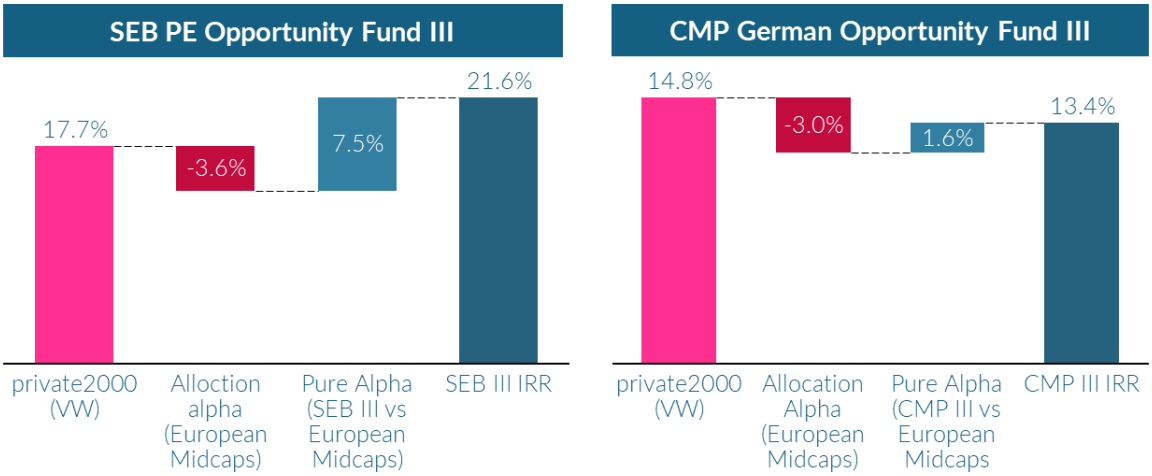
For CMP, the choice of benchmark makes a difference in assessing performance. Measured against the value weighted private2000, CMP trails the index by 140bps. However, when evaluating returns against several equal weighted benchmarks, CMP shows meaningfully positive alpha. The ability to drill down to the precise geography and sector over/under weights allows one to compare performance with the most relevant market.

Figure 1 displays the risk-adjusted performance of the two funds against the value weighted private2000 index and our custom European mid-cap private equities. SEB outperformed both the private2000 and European mid-cap private equities. Conversely, CMP trailed the private2000 but outperformed European mid-cap private equities, potentially a more meaningful benchmark.

Figure 2 displays the same results against the equal weighted version of the private2000. In this case, both funds outperform across the board, generating positive pure and allocation alpha.

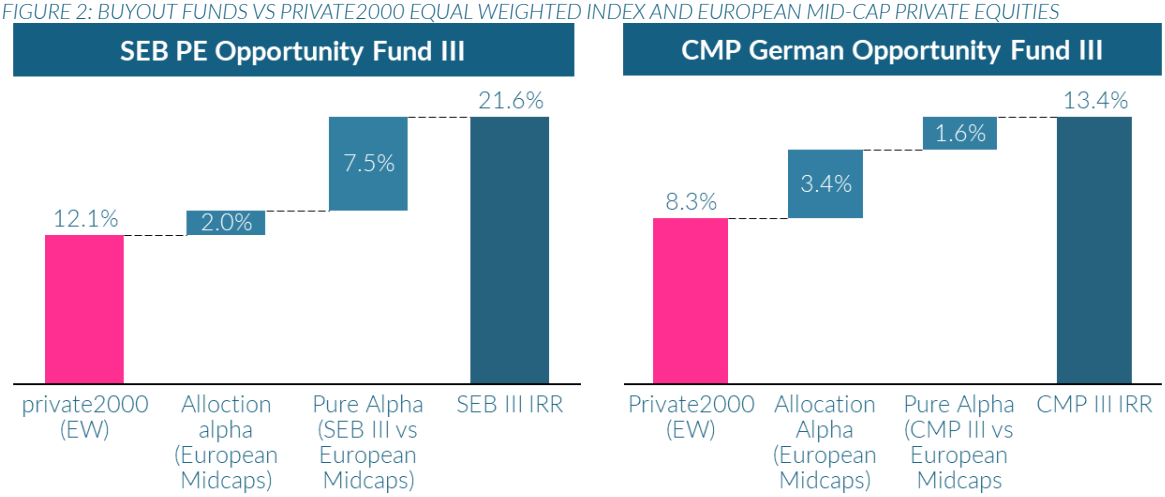
Figure 3 shows results from two custom benchmarks. Here we use the custom European mid-cap equities as the broad index and the local market mid-cap equities adjusted for sector and geography weights, for the second index. This analysis allows one to see how each fund performed against the broad European mid-cap private equities space and their respective local market, providing the most granular view of performance.

FIGURE 1: BUYOUT FUNDS VS PRIVATE2000 VALUE WEIGHTED INDEX AND EUROPEAN MID-CAP PRIVATE EQUITIES



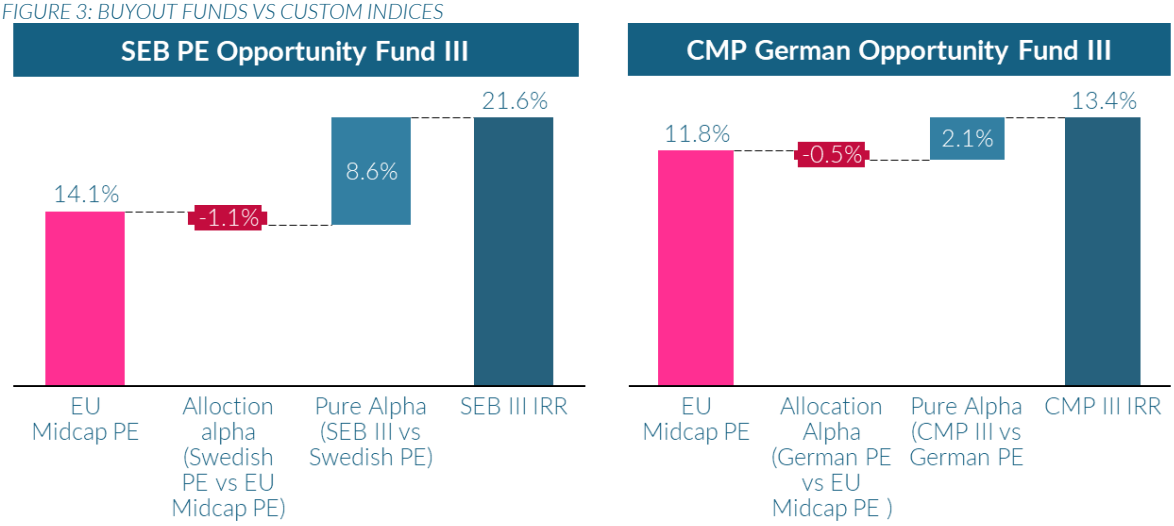
Source: privateMetrics, RCS

FIGURE 2: BUYOUT FUNDS VS PRIVATE2000 EQUAL WEIGHTED INDEX AND EUROPEAN MID-CAP PRIVATE EQUITIES



Source: privateMetrics, RCS

FIGURE 3: BUYOUT FUNDS VS CUSTOM INDICES



Source: privateMetrics, RCS

The Case of Two Spanish Buyout Funds

Next, we turn to evaluating the performance of two Spanish buyout funds with similar vintages.

Fund I is a 2017 vintage fund with €600 million of commitments focused on middle market buyouts in Spain. The fund has several portfolio companies in the niche manufacturing sector and a number with services orientation, so we have reflected this when constructing custom benchmarks.

Fund II is a 2018 vintage fund with €200 million of commitments focused on the lower middle market and middle market buyout space in Spain. The fund highlights its focus on industrials, and this has been reflected in the custom benchmark constructed to evaluate performance. Table 2 provides more characteristics of the two funds and their benchmarks.

TABLE 2: SPANISH MIDDLE MARKET BUYOUT FUND COMPARISON

Fund & Benchmark Characteristics	Fund I	Fund II
Vintage	2017	2018
Size	€600 million	€200 million
Geography	Spain	Spain
Industry Focus	Manufacturing tilt/Services	Manufacturing tilt
Segment/Style	Mid-market/Buyout	Lower/Mid-market
Gross IRR	26.46%	7.23%
Private2000 VW € Return	14.75%	10.69%
Private2000 EW € Return	7.80%	4.74%
PEU Europe Midcap EW € Return	11.60%	8.61%
PEU Country Midcap EW € Return	11.65%	7.65%
PEU Country/Sector Midcap EW € Return	12.23%	8.29%

*Index returns calculated using Direct Alpha approach where fund cash flows are assumed invested in broad and customised indices based on the timing of cash flows of the underlying fund investments.

We apply the same approach as with the previous fund comparison. To evaluate the returns of Fund I, we started with the broad market index, the value weighted private2000, with returns in Euros. Fund I had a gross IRR of 26.46%. If Fund I's cash flows were invested in the value weighted private2000 at matching dates, the IRR would have been 14.75% (equal weighted – 7.80%), indicating that the fund generated alpha against the private2000.

For customised indices to evaluate Fund I returns, we constructed the following:

- Index of European mid-cap equities comprised of ~10k private equities diversified by sector and country
- Index of Spanish mid-cap equities comprised of 481 private equities diversified by sector

- Further refined to overweight both manufacturing sector and services value chain, also with 481 constituents

For the European mid-cap equities customised index, the IRR was 11.6%, assuming matching timed investments as Fund I. At the more granular level of Spanish mid-cap private equities, the IRR was 11.65%. Adjusting for sector and lifecycle tilts, the IRR was 12.23%.

In all cases, Fund I outperformed the benchmarks by a wide margin.

For Fund II, measured against the value weighted private2000, Fund II underperformed with a 7.23% IRR vs 10.69% for the index. However, Fund II outperformed the equal weighted version (4.74%) handily.

For customised indices to evaluate Fund II returns, we utilised the same custom indices that were constructed for Fund I. The most refined version was tilted overweight manufacturing. There were also 481 constituents in the custom indices.

At the country level, Fund II marginally underperformed our custom Spanish mid-cap private equities portfolio, which generated a 7.65% IRR vs 7.23% for Fund II. Finally, we further customised our Spain mid-cap private equities index to overweight manufacturing to 40% of the portfolio to reflect the investment strategy of Fund II. With this adjustment, the IRR of the index increased to 8.29%, increasing the underperformance of Fund II to 106bps.

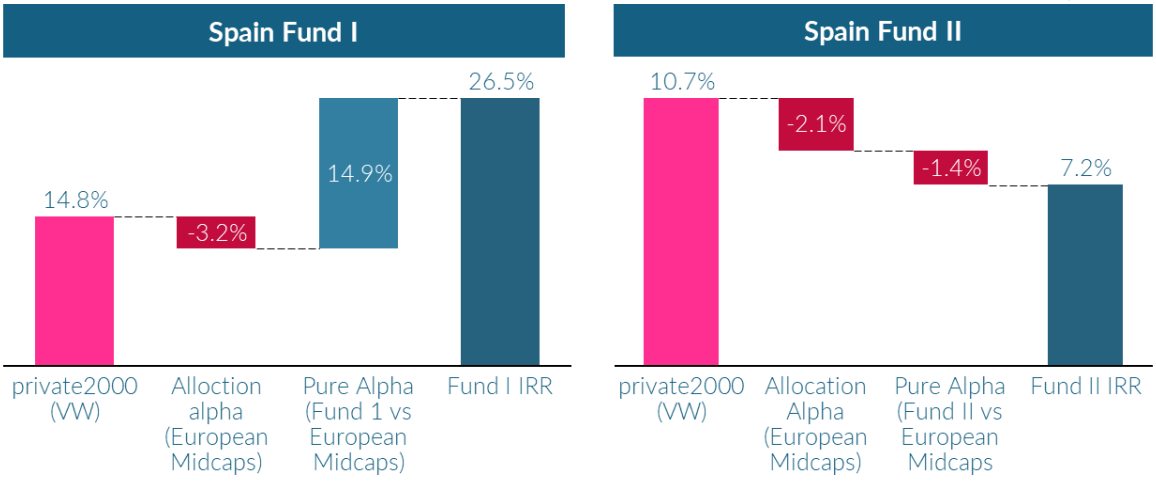
For Fund II, the choice of benchmark makes a difference in assessing performance. Measured against the value weighted private2000, Fund II trails the index by over 300bps. However, when evaluating returns against several equal weighted benchmarks, Fund II shows meaningfully positive alpha. Relative to European mid-cap private equities and Spanish mid-cap private equities, the results trail the market by a much narrower margin (<100bps).

Figure 4 displays the risk-adjusted performance of the two funds against the value weighted private2000 index and our custom European mid-cap private equities. Fund I outperformed both the private2000 and European mid-cap private equities by a wide margin. Fund II trailed the private2000 by close to 350bps but underperformed European mid-cap private equities by a narrower margin, 138bps.

Figure 5 introduces two custom benchmarks. The European mid-cap private equities index with 10k constituents is used for the broad index, and the Spain mid-cap private equities index with 481 constituents is used for the second. The largest difference is noted for Fund II, where the underperformance shrinks noticeably. Relative to the European mid-cap private equities index, Fund II trails by 138bps, which is comprised of -42bps (pure alpha) against the Spain mid-cap private equities market and -96bps (allocation alpha), which reflects the underperformance of Spanish mid-cap private equities vs the broader European version.

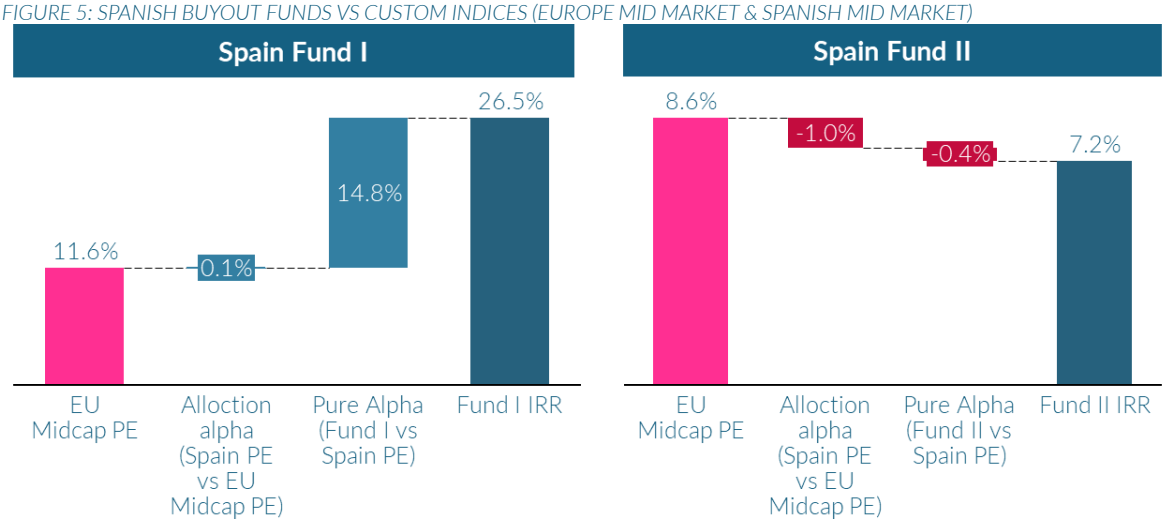
Figure 6 shows results from more refined custom benchmarks. For Fund I, we adjusted the Spain mid-cap private equities index to reflect higher exposure to the manufacturing sector and service-oriented companies. For Fund II, the custom index was adjusted for a higher allocation to the manufacturing sector. The result of this change increased the performance of the refined Spain custom index relative to the prior version, shrinking the pure alpha for both funds, while increasing allocation alpha. In other words, the underperformance of the Spain mid-cap index vs broader Europe was reduced.

FIGURE 4: SPANISH BUYOUT FUNDS VS PRIVATE2000 VALUE WEIGHTED INDEX AND EUROPEAN MID-CAP PRIVATE EQUITIES



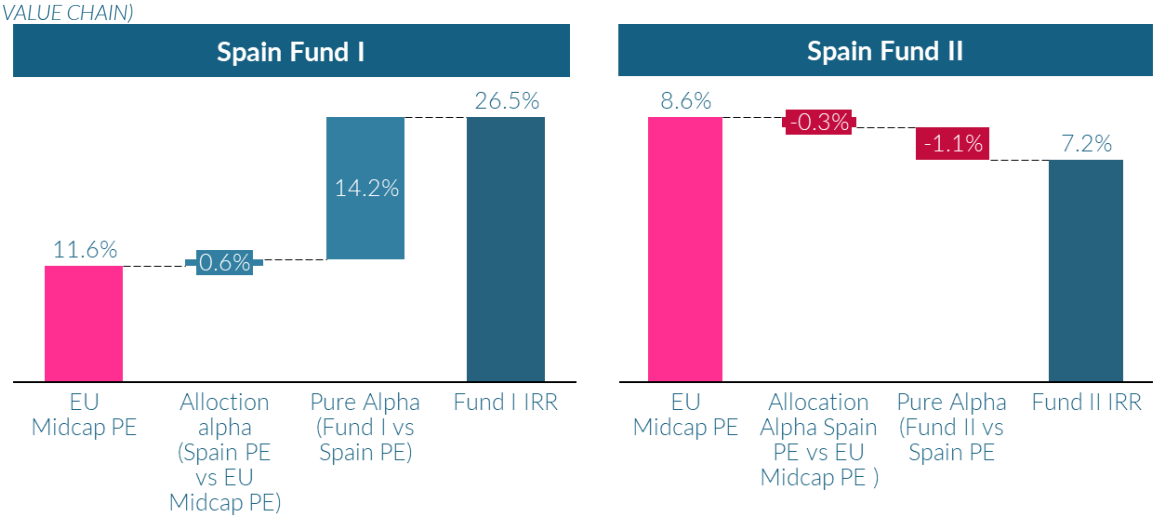
Source: privateMetrics, RCS

FIGURE 5: SPANISH BUYOUT FUNDS VS CUSTOM INDICES (EUROPE MID MARKET & SPANISH MID MARKET)



Source: privateMetrics, RCS

FIGURE 6: SPANISH BUYOUT FUNDS VS CUSTOM INDICES (EUROPE MID MARKET & SPANISH MID MARKET TILTED SECTOR & VALUE CHAIN)



Source: privateMetrics, RCS

Conclusion

The custom benchmarking functionality within privateMetrics extends the capabilities and allows for almost any combination of index construction across PECCS pillars and geographies. This is important because it allows the LP and GP to examine performance against the most relevant benchmark. Given private equity fund managers take meaningful specific risk, often allocating entirely to one country, or to a few specific sectors, the ability to customise a benchmark permits replicating this exposure more accurately than can be done with broader indices. This functionality compliments the existing flagship private2000 indices and thematic indices across geographies and sectors. As we showed in our fund case studies, the choice of benchmark can determine whether a fund has generated alpha or not. The ability to take multiple cuts at the data helps one judge performance more precisely and can lead to better investment decision making (LPs) and improved portrayal of performance (GPs).

privateMetrics API integration

Access all privateMetrics data programmatically and build your own applications for private market investing and reporting

Index Catalogue

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.

Taxonomies

Query the PECCS® and TICCS® taxonomies used to create the privateMetrics universe. Access class codes, names and definitions to build your own index and comps customisations applications.

Index Data

Access a comprehensive set of performance and risk metrics for hundreds of private equity, infrastructure and infra debt indices tracking numerous geographies and segments.

Custom Benchmarks

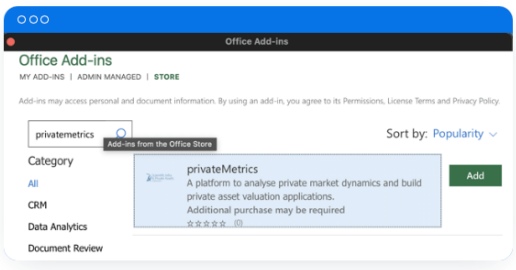
Build custom benchmarks setting target weights by PECCS, TICCS, style and geography that align with your strategy. All index metrics are recalculated for you.

Custom Comps

Create customised comp sets using PECCS® and TICCS® segments, geography and systematic risk profiles. Get metrics like discounts rates and EBITDA multiples.

Yield Curves

Query risk-free rates for a given pricing and maturity date to support discounted cash flow (DCF) calculations, valuation models, and other financial analyses.



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With the **SIPA Assets Excel add-in**, you can integrate market data about private asset markets directly into your investment workflow.

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 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 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.

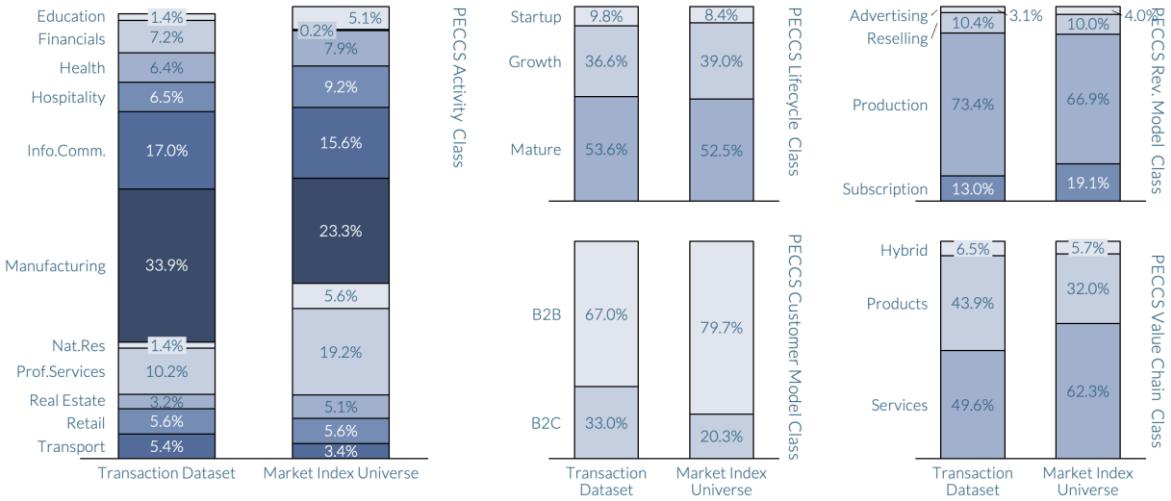
We calibrate this model using new observations monthly to update its estimation of the price of risk of each factor. In other words, each transaction observed is then used to 'update' this model (i.e., obtain new ls) through a dynamic estimation (using a Kalman filter), which retains the memory of past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

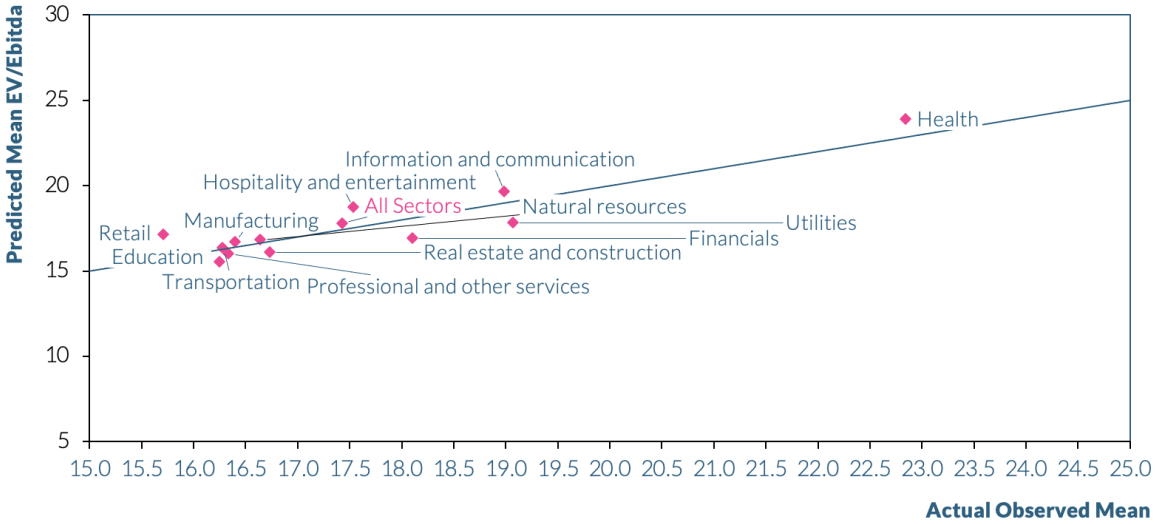
To ensure that is not the case, we compute the EV based on the book value of debt and predicted equity valuation and divide the sum by the EBITDA to get a predicted EV/EBITDA and compare it to transaction implied ratios. Figure A2 presents the average predicted and observed EV/EBITDA by PECCS® activity 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%	
	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 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

About Scientific Infra & Private Assets

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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