



Scientific Infra & Private Assets
An EDHEC Venture

Are you using the right data?

Known issues with reported valuation data and listed proxies

Quantifying Private Markets
London | Singapore

REPORTED VALUATION MULTIPLES ARE NOT REPRESENTATIVE OR ROBUST

EBITDA multiples contributed by GPs to MSCI/Burgiss.

Ebitda Multiples

2022 Q2	Count	Top Qtle	Median	Bot. Qtle
All Sectors	1,209	17.1x	12.4x	9.1x
Comm. Services	62	21.7x	13.8x	9.0x
Consumer Discret.	195	15.2x	11.0x	8.2x
Health Care	203	18.3x	14.1x	10.9x
Industrials	270	14.3x	10.5x	7.9x
Information Tech.	259	25.5x	15.7x	11.5x
Materials	62	12.3x	10.6x	7.5x

Source: MSCI/Burgiss, 2023

Reported data is **not representative** of the universe.

Universe Coverage of the reported data

GICS Sectors	MSCI/Burgiss	Universe*	Over/Underweight
Consumer discretionary	18.6%	24.6%	-24.2%
Consumer staples	N/A		
Utilities	N/A	5.0%	-100%
Telecommunications	N/A		
Industrials	25.7%	15.7%	+63.3%
Materials	5.9%	4.0%	+46.7%
Information technology	24.6%	2.8%	+768%
Communication	5.9%	5.6%	+5.3%
Finance	N/A	4.6%	-100%
Healthcare	19.3%	6.9%	+182%
Real Estate	N/A	14.1%	-100%

* privateMetrics Universe based on a representative set of 820,746 private companies available in the privateMetrics database for the year 2022. Industry definitions based on MSCI GICS for Burgiss and PECCS Activities for the universe, mapped at the broader grouping level.

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Reported asset-level multiples are **too few to provide a robust mean at the sector level.**

Even with 200 data points, the uncertainty of the mean value remains significant (see next slide)

These are not actual “comparables”: the sector is not the only segments that matters. What about geography, business model, customer model, etc.?

What about the risk profile of the asset: leverage, profitability, size, revenue growth, etc.?

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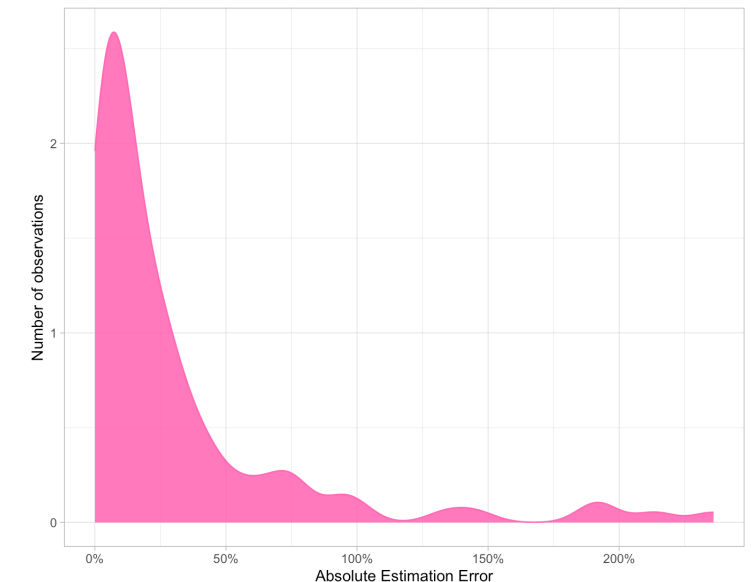
Relying on sample size to minimize valuation errors is not robust.

Let's imagine that the true (but unknown) market average for EBITDA multiples in 2023 is 20. A company with an EBITDA of 5M would have a benchmark market value of 100M.

If investors randomly observe normally distributed EBITDA multiples in 2023, with a mean of 20 and standard deviation of 200 (src: Pitchbook), they **need to make more than 18,000 observations to make a valuation error below 5%.**

Number of Obs.	Average of Observed Multiples	Average Absolute Error
68	31.4x	98%
138	12.4x	63%
276	21.4x	19%
556	16.7x	29%
1,116	17.0x	17%
2,242	20.1x	9.8%
4,506	21.5x	12.6%
9,054	20.3x	5.9%
18,190	19.8x	4.8%

Distribution of absolute estimation errors



REPORTED VALUATION MULTIPLES ARE NOT REPRESENTATIVE OR ROBUST

Using reported EBIDTA multiples to estimate asset values leads to large errors (1).

Ebitda Multiples

2022 Q2	Count	Median
All Sectors	1,209	12.4x
Comm. Services	62	13.8x
Consumer Discret.	195	11.0x
Health Care	203	14.1x
Industrials	270	10.5x
Information Tech.	259	15.7x
Materials	62	10.6x



Mapped to 120+ pitchbook deals that took place in 2022 for which Ebitda is available and used to compare actual deal EV with multiple-implied EV.



→ **Absolute errors are large**

	Abs. Error
Min	1%
Q1	23%
Mean	74%
Q3	86%
Max	708%

Activity	Absolute Error
Information and communication	56%
Transportation	95%
Manufacturing	73%
Real estate and construction	81%
Hospitality and entertainment	113%
Retail	60%
Professional and other services	68%
Utilities	96%
Health	46%
Financials	55%
Natural resources	33%
Education and public	30%

REPORTED VALUATION MULTIPLES ARE NOT REPRESENTATIVE OR ROBUST

Using reported EBIDTA multiples to estimate asset values leads to large errors (2).

2022 Healthcare Deal Data (PitchBook)					Reported EBIDTA Multiples Healthcare (Burgiss, 2022)			Estimation Error			
Company Name	Sector	Deal Date	Deal EBIDTA Multiple	EBIDTA M\$	Top Quartile	Median	Bottom Quartile	Upper Bound	Median	Lower Bound	Avg Abs. Error
Natus Medical	Health Care Equipment & Supplies	7/5/22	22.8x	48.6	18.3x	14.1x	10.9x	20%	38%	52%	37%
Artel	Health Care Equipment & Supplies	6/13/22	28.0x	5.0				35%	50%	61%	48%
IntriCon	Health Care Equipment & Supplies	5/24/22	51.2x	4.3				64%	72%	79%	72%
Hanger	Health Care Providers & Services	10/3/22	12.2x	100.74				-50%	-16%	10%	26%
Probo Medical	Health Care Providers & Services	3/8/22	15.0x	30.0				-22%	6%	27%	18%
Tivity Health	Health Care Providers & Services	6/28/22	19.5x	157.7				6%	28%	44%	26%
							Avg Abs. Error	33%	35%	46%	38%

Representativity issue: The 6 deals come from different sub-sectors, but reported data only covers the broader healthcare sector. These transactions are all US-based but the data comes from a global sample.

The average error compared to the known value of the deal is very large.

REPORTED VALUATION MULTIPLES ARE MOSTLY MODEL-BASED

EBITDA multiples contributed by GPs to MSCI/Burgiss.

Current Ebitda Multiples

2022 Q2	Count	Top Qtle	Median	Bot. Qtle
All Sectors	1,209	17.1	12.4	9.1
Comm. Services	62	21.7	13.8	9.0
Consumer Discret.	195	15.2	11.0	8.2
Health Care	203	18.3	14.1	10.9
Industrials	270	14.3	10.5	7.9
Information Tech.	259	25.5	15.7	11.5
Materials	62	12.3	10.6	7.5

Entry Ebitda Multiples

2022 Q2	Count	Top Qtle	Median	Bot. Qtle
All Sectors	114	14.6	10.1	7.7
Comm. Services	7	15.5	11.0	8.3
Consumer Discret.	14	11.8	7.6	7.0
Health Care	22	16.3	12.1	10.1
Industrials	29	10.7	9.1	6.9
Information Tech.	23	18.1	11.1	8.5
Materials	9	10.9	9.5	9.1

Exit Ebitda Multiples

2022 Q2	Count	Top Qtle	Median	Bot. Qtle
All Sectors	43	16.4	12.2	9.3
Comm. Services	2	N/A	N/A	N/A
Consumer Discret.	10	14.4	12.4	9.9
Health Care	9	16.7	14.2	10.4
Industrials	11	15.4	12.0	8.9
Information Tech.	6	21.8	12.3	10.1
Materials	1	N/A	N/A	N/A

There is much less reported data for actual entry and exit transactions (especially after the market slowed down in 2021). This implies that **most of the reported valuation data are model-based.**

$(114+43)/1209 = 13\% \rightarrow$ **87% of reported multiples are model-based!**

REPORTED MULTIPLES ARE...

...**not robust** at the sector level.

...**not actual comparables** controlling for geography and asset risk profile.

...the source of **large valuation errors** if used *as is*.

...**90% model-based** (using a range of different models and assumptions)

→ only 10% of the data come from actual transactions.

Conclusion: **Since** raw reported data are not good enough, **and** most reported private market data is the product of a model, **ergo it is essential to have a robust model and the right data!**

PUBLIC MARKET PROXIES ARE NOT BETTER

Using public market data as a proxy of private market multiples also leads to large errors in estimated value (1).

The Domodoran dataset (NYU)
Listed proxies offer more
granularity: 91 categories

But data availability can also be
a problem:

- 17% of the company types
have less than 20 observations.
- 60% have less than 50 obs.



Mapped to same 120+
pitchbook deals that took
place in 2022 for which
Ebitda is available and used
to compare actual deal EV
with multiple-implied EV.

→ **Absolute Errors are
even larger than with
reported data!**



	Abs. Error
Min	0%
Q1	26%
Mean	103%
Q3	100%
Max	1195%

Activity	Absolute Error
Information and communication	70%
Transportation	107%
Manufacturing	78%
Real estate and construction	143%
Hospitality and entertainment	179%
Retail	54%
Professional and other services	109%
Utilities	207%
Health	45%
Financials	355%
Natural resources	11%
Education and public	48%

PUBLIC MARKET PROXIES ARE NOT BETTER

Using public market data as a proxy of private market multiples also leads to large errors in estimated value (2).

Deal Data (PitchBook)					Listed Healthcare EBITDA Multiples (Domodoran, 2022)	Estimation Error
Company Name	Sector	Deal Date	Deal EBITDA Multiple	EBITDA M\$		
<i>Natus Medical</i>	Health Care Equipment & Supplies	7/5/22	22.8x	48.6	22.5x	2%
<i>Artel</i>	Health Care Equipment & Supplies	6/13/22	28.0x	5.0		20%
<i>IntriCon</i>	Health Care Equipment & Supplies	5/24/22	51.2x	4.3		56%
<i>Hanger</i>	Health Care Providers & Services	10/3/22	12.1x	100.7	12.6x	-4%
<i>Probo Medical</i>	Health Care Providers & Services	3/8/22	15.0x	30.0		16%
<i>Tivity Health</i>	Health Care Providers & Services	6/28/22	19.5x	157.7		35%
					Average Absolute Error	22%

Some of the valuation errors compared to the known value of the deal are very large.

MODELS ARE UNAVOIDABLE & USING THE WRONG DATA LEADS TO LARGE VALUATION ERRORS...

In private market, **most data is modelled** because too few transactions take place to have access to robust observed data. Using raw reported data or listed proxies introduces biases and noise and leads to large estimation errors.

→ Market multiple techniques **magnify estimations errors.**

→ Cash flow discounting techniques **compound estimation errors.**

Private market investors need some 'risk management' of model valuation errors: while unavoidable, they can be almost eliminated through diversification if the model allows pricing large numbers of assets and is correct *on average*.

This requires a parsimonious model that can be applied to thousands of companies to capture the risks systematically priced in the market, and good data. (see next section)

IN 2024, GETTING PRIVATE VALUATIONS RIGHT MATTERS

- Private investments can be presented as ‘patient’ money and they exist as the only way to really know asset values.
- This could be acceptable when private assets were a niche investment, and investors had a long-term horizon.
- In 2024, **private market allocations are large and private assets are found in numerous products that have a shorter horizon** or need some liquidity (decumulating DB plans, DC plans, evergreen funds, 401ks, life insurance, etc.)
- From all strategic, prudential and fiduciary standpoints, **knowing the current market value and risk of private assets matters.**