Scientific Infra & Private Assets
An EDHEC Venture

INFRASTRUCTURE ASSET VALUATION DATA

March 2024

Quantifying Private Markets
London | Singapore

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Indices & Benchmarks

Private Infrastructure Equity & Debt

- 9,200+ assets identified
- 800+ assets actively tracked
- Infra300® equity and debt family
- Infra100® index series
- infraGreen Index family
- Infra Core and Core+ Indices
- Infra mid-market Index

23 ESMA-Registered indices
650+ TICCS® segment indices
60+ analytics included

Private Equity

- 1.3 million assets tracked
- 70+ million prices computed
- private2000
- private3000
- privateUSA Equity

65 Thematic indices
1000+ PECCS™ segment indices
40+ index analytics included

Valuation Data & Tools

Private Infrastructure Equity & Debt

- Income Method Inputs
- Cost of capital and risk premia
- Cash flow benchmarks
- Market Method inputs
- EV/Ebitda, Price to Sales
- Yields and duration
- Credit spreads

Comps available for 400+ segments
Comps Builder in Excel, online
40+ valuation inputs available

Private Equity

- EV/Ebitda, Price to Sales
- Revenue growth metrics
- Price-to-earnings
- Risk factor exposures

Comps available for 1,000+ segments
Computed monthly
Comps Builder in Excel, Python, R
40+ valuation inputs available

Climate Risk Metrics

Private Infrastructure Equity

- Climate impacts
- Carbon intensity
- Financed emissions
- Climate Value-at-Risk
- Scenario Analysis
- Extreme Climate Value
- Ebitda-at-Risk

Benchmarks available for 400+ segments and geographies
40+ valuation inputs available

Data and Index Provider

Since 2019

Clients AUM

USD470bn

Global Team

40+ employees

Scientific DNA

An EDHEC Venture

Aligned with Global Standards

BMR, IFRS, IOSCO, TICCS, PECCS, TCFD

OUR CLIENTS

Trusted by sophisticated investors around the world since 2019

USD20Tr
Client AUM

USD1Tr
Client Private Equity AUM

USD470bn
Client Infrastructure AUM

Goldman Sachs
AIMCo
BLACKROCK
PGIM
ADIA
ARES
CREDIT SUISSE
Allianz Global Investors
stepstone
DWS
CBRE Investment Management

EXECUTIVE SUMMARY

A **multi-factor model** is calibrated using thousands of private infrastructure transactions.

The model predicts *average* asset prices with **almost zero error at the market segment level** (by activity, revenue model, business model, etc.)

The model is used to **shadow price thousands of other private infrastructure companies** on the same date. Instead of magnifying estimation errors, asset-level **errors are diversified away at the segment level,** giving a robust market average.

Leveraging the power of the model, these **results can be customised to capture the risk profile of individual assets** and create genuine and usable comparables that "anchor" asset valuations to market dynamics.

This approach **solves two endemic issues for the valuation of private assets**: the insufficient number of observable transactions to infer robust price averages from raw data, and the staleness of NAVs computed using *ad hoc* assumptions that cannot be updated to reflect market movements.

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Issues with current practices

CAPM creates more problems than it solves.

ISSUES WITH CURRENT PRACTICES

In a series of **recent interviews** with valuers and managers, we found that:

1. The fund target IRR is often used as the discount rate to compute a NAV.
2. A variety of inputs are otherwise used either from listed equity or a 'proprietary database of transactions' that cannot be independently verified.
3. The choice of valuation methodology changes with the client (GP or LP) for the same asset. LP exposed to the same assets via two or more structures confirm that the reported NAVs are not the same for the same investment.
4. Sometimes asset maturities are extended in order to keep the NAV constant and offset the impact of higher discount rates.
5. Generally speaking, there is tendency to avoid updating discount rates and to keep them on the low side.

WHERE DO DISCOUNT RATES FOR PRIVATE INFRASTRUCTURE ASSETS COME FROM?

- There are some bad practices (See previous slide).
- In the better cases (large external valuers), **discount rates are based on an asset pricing model which is then adjusted to reflect certain aspects of the market** e.g., illiquidity, as well as asset-specific or deal-specific components e.g., control, distress, etc.
- Indeed, what is needed is a framework that can…
  - …capture the **current market price of risk**
  - …combine it with the company's actual exposure to these risks to reflect the market (systematic) component of the discount rate, and…
  - …adjust the final discount rate to reflect any asset-specific (idiosyncratic) component

WHERE DO DISCOUNT RATES FOR PRIVATE INFRASTRUCTURE ASSETS COME FROM?

Unfortunately, there are **more issues** with the typical approach used today:

- The asset pricing model is usually the CAPM…
- The company's CAPM beta is impossible to know and the "market return" is not coming from the right market (stock market).
- As a result, very 'smooth' inputs are used to represent the equity risk premia and the company beta (which is considered fixed in time).
- The adjustments made to the CAPM (the "alpha") are ad hoc and impossible to update.
- These adjustments are "absolute": they do not refer to a difference with a "typical company" from the same peer group; they are neither explicit nor dynamic.
- Let's call this approach **"CAPM+"**

WHY APPRAISALS ARE STALE

$$NAV_i = \sum_{t=1}^{T} \frac{CF_t}{\left\{1 + \left(R_{f,t} + E(\tilde{R}_i)\right)\right\}^t}$$

Dividend forecast

Moving average of short-term interest rates. Usually quite smooth..

$$R_i = \beta \times ERP + \alpha$$

Market beta of a listed infrastructure index should be very close to 1

Equity risk premium is a smooth moving average of the risk premium observed in the stock market.

Ad hoc premia for 'illiquidity' or 'lack of marketability' that does not change

BOTTOM-UP DISCOUNT RATE ASSUMPTIONS ARE HARD TO JUSTIFY OR CHANGE ONCE MADE

I.R.L. Example of Fair Value Reporting by an Infrastructure Manager using CAPM+

Same Transport Asset in France

Investments Name	Fair Value as at 31 December 2019 In 000 euros	Methodology	Discount Rate
[redacted]	[redacted]	Discounted Cash Flows	Risk Free rate : 1.75% Risk premium : 4.50% Illiquidity premium : 0.75%
[redacted]	[redacted]	Discounted Cash Flows	Risk Free rate : 1.0% Risk premium : 6.25% Illiquidity premium : 1.0%
[redacted]	[redacted]	Discounted Cash Flows	Risk Free rate : 1.5% Risk premium : 5.70% Illiquidity premium : 1.0%

Investments Name	Fair Value as at 31 December 2020 In 000 euros	Methodology	Discount Rate
[redacted]	[redacted]	Discounted Cash Flows	Risk Free rate : 1.25% Risk premium : 5.0% Illiquidity premium : 0.75%
[redacted]	[redacted]	Discounted Cash Flows	Risk Free rate : 0.75% Risk premium : 6.25% Illiquidity premium : 1.0%
[redacted]	[redacted]	Discounted Cash Flows	Risk Free rate : 0.0% Risk premium : 4.5% Illiquidity premium : 1.0%

Risk Premia and "illiquidity Premium" are *ad hoc* and hard to justify, even harder to update…

What is the "illiquidity premium" the following quarter? the following year? On what basis?

Clearly, the risk level of transport investments in France changed between 2019 and 2020 (Covid-19 Lockdowns), but ***on what basis*** *can investors update the risk premia?*

REPORTED NAVS ARE "SMOOTH"

Ponzi scheme-style Sharpe ratio?

Reported NAV returns in infrastructure funds

	3-year	5-year	10-year
Appraisal NAV total returns	8.7%	9.7%	9.2%
Appraisal NAV total returns volatility	2.7%	2.7%	2.9%
Implied Sharpe Ratio	2.79	3.19	2.86
Volatility of Appraisal NAVs only	2.3%	2.5%	2.4%

Source: Annual reports, NAV of assets for 13 funds of unlisted infrastructure equity representing c.USD23.4bn of investment in 2020

Unlisted infrastructure equity NAV return indices using contributed fund data

	Preqin Unlisted Infrastructure	MSCI Global Unlisted Infrastructure
10-y Annualized Return	10.41%	13.42%
10-y Annualized Std Dev	3.11%	3.26%
Risk-Adjusted Return	2.99	3.78
Max Drawdown	1.37%	0.00%

Source: Preqin, MSCI,, All computations use quarterly USD Returns.

THE DISCOUNT RATES, THEY ARE NOT CHANGIN'

- At the time of investing, the discount rate cannot be too different from the actual market cost of equity (even if the method used to reflect this number is CAPM+). **It is the price that really matters**.
- But once set, CAPM+ discount rates tends to become stale and very hard to change:
  - they do not refer to a genuine and representative market benchmark,
  - nor do they refer to the company's relative exposure to this market,
  - nor do they say explicitly what is the difference between this company and the "average company" represented by the benchmark.
- As they become stale, CAPM+ discount rates are likely to diverge over time compared to their true market value and become less and less representative of the cost of equity that was used at the time of the investment.
- **So, discount rates are ad hoc, they are not easily updated, and they probably become more and more wrong as time passes… but does it matter?**

INCOME METHOD (DCF) COMPUTATIONS ARE VERY SENSITIVE TO DISCOUNT RATE ASSUMPTIONS

Years	Subordinated Debt Interest Paid	Subordinated Debt Repayments	Dividends	Subordinated Interest Accrued	All Shareholder Cash flows
1	0.00	0.00	0.00	0.00	0.00
2	0.00	0.00	0.00	0.00	0.00
3	0.00	0.00	0.00	0.00	0.00
4	673.98	273.15	0.00	673.98	1621.10
5	1301.84	430.57	0.00	1301.84	3034.25
6	1249.26	441.98	0.00	1249.26	2940.50
7	1205.24	124.70	0.00	1205.24	2535.17
8	1189.73	144.34	0.00	1189.73	2523.80
9	1170.83	186.21	0.00	1170.83	2527.86
10	1147.47	214.84	0.00	1147.47	2509.77
11	1121.45	213.07	0.00	1121.45	2455.98
12	1093.83	270.09	0.00	1093.83	2457.75
13	1060.19	233.88	0.00	1060.19	2354.26
14	1035.02	192.04	298.39	1035.02	2560.47
15	1011.01	216.05	514.82	1011.01	2752.89
16	984.00	243.06	442.24	984.00	2653.30
17	953.62	273.44	468.51	953.62	2649.19
18	919.44	307.62	378.95	919.44	2525.45
19	880.99	346.07	514.22	880.99	2622.27
20	837.73	389.33	596.76	837.73	2661.55
21	789.06	438.00	507.96	789.06	2524.09
22	734.32	492.74	556.62	734.32	2518.00
23	672.72	554.34	541.27	672.72	2441.05
24	603.43	623.63	637.87	603.43	2468.36
25	525.48	701.58	757.49	525.48	2510.02
26	437.78	789.28	800.94	437.78	2465.78
27	339.12	887.94	742.22	339.12	2308.39
28	228.13	998.93	696.75	228.13	2151.94
29	103.26	1123.80	1544.59	103.26	2874.91
30	0.00	0.00	3430.90	0.00	3430.90
31	0.00	0.00	9882.19	0.00	9882.19

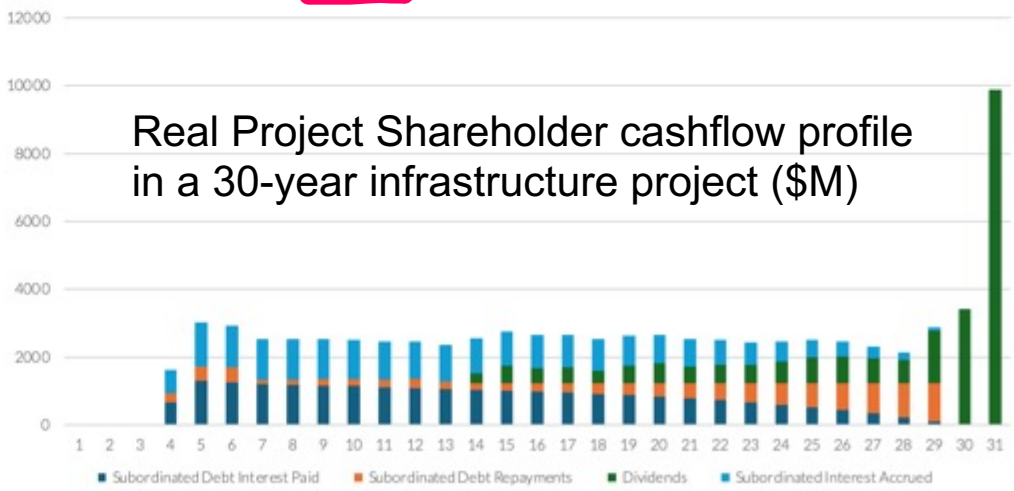
ORIGINAL VALUATION	
Disc Rate	7%
NAV	$3,880.01

DIVIDEND FORECAST ERROR	
ERROR	20%
NAV	$3,104.01
NAV ERROR	-20.00%

DISC. RATE ERROR	
ERROR	100 basis points
Disc Rate	8.0%
NAV	$3,066.31
NAV ERROR	-20.97%

Getting the **discount rate wrong is much more problematic** than wrongly forecasting the dividends..

A 100-basis point error in the discount rate is worse that a 20% error in the dividend cash flow forecast!



Real Project Shareholder cashflow profile in a 30-year infrastructure project ($M)

AS TIME PASSES, WHAT HAPPENS TO CAPM+ NAVS?

- In infrastructure, there is a great focus on forecasting cash flows and updating these forecasts. This is legitimate due to the nature of these investments.
- But while valuation errors due to cash flow errors are only material if the error is very large, a not-so-large error in the discount rate can lead to a large error in the NAV.
- We know that CAPM+ discount rates tend to diverge from the true market value of the cost of equity of the firm over time.
- **As time passes, CAPM+ NAVs can become very wrong… because compounding over many years <u>amplifies</u> estimation errors**

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Infrastructure Asset Valuation Metrics

Unbiased, robust and granular data

Quantifying Private Markets
London | Singapore

VALUATION METRICS COVERAGE

privateMetrics®

- USD50Tr+ Market Capitalisation*
- 1.2M+ private companies
- 10-year track record
- 150+ countries
- 60+ activity sectors
- 65M+ prices computed

infraMetrics®

- USD680bn Market Capitalization*
- 800+ private infrastructure companies
- 25 countries
- 33 activity sectors
- 23-year track record
- 400k+ prices computed (equity and debt instruments)

* as of 31 Dec 2023

MILLIONS OF DATA POINTS

privateMetrics®

- 80+ metrics
- 1,000+ PECCS® segment combinations
- 6M+ accessible datapoints (equity)
- Updated monthly

infraMetrics®

- 100+ metrics
- 450+ TICCS® segment combinations
- 10M+ accessible datapoints (equity, debt, climate risk)
- Updated monthly

infraMetrics VALUATION METRICS

200+ robust price-related metrics for hundreds of segment combinations

DATA SEGMENTS *

by geo	9 regions, 20+ countries available
by TICCS class	Business models (3 classes available) Industrial Activity (33 classes available) Corporate Structure (2 classes available)
by style	Mid-Market Core, Core+. Opportunistic Green

AVAILABLE METRICS PER SEGMENT

Valuation Metrics
Income Method (DCF)
Discount rates (Expected Returns)
Unlisted Infrastructure Equity Risk Premia
Risk factor exposures and factor returns
WACC
Revenue Growth
Dividend Payout Ratios
Market Method (Multiples)
EV-to-EBITDA
Price-to-Sales
Price-to-Book

Risk Metrics
Return volatility
Value-at-Risk
Max Drawdown

Climate Risk Metrics
Carbon intensity
Financed Emissions
Ebitda-at-Risk
Transition Risk Extreme Value
Late Alignment Risk
No Alignment Risk

CUSTOMISATION OPTIONS

Risk Factor	**Adjustment available**
Size	Level of Total Assets
Investment	Capex to asset level
Leverage	Level of senior leverage
Profitability	Return on assets level
Remaining life	Time to Maturity
Country risk	Term spread level

Each valuation metrics can be customized within its segment to correspond to a given quintile or user–defined interval matching the risk factor profile of the asset of interest.

infraMetrics VALUATION METRICS

For PRIVATE DEBT INVESTORS, 50+ debt-related metrics

DATA SEGMENTS *

by geo	9 regions, 20+ countries available
by TICCS class	Business models (3 classes available) Industrial Activity (8 classes available) Corporate Structure (2 classes available)
by style	Origination Currency Maturity Green

AVAILABLE METRICS PER SEGMENT

Valuation Metrics
Income Method (DCF)
Yield to Maturity
Credit Spread

Risk Metrics
Return volatility
Value-at-Risk
Duration

CUSTOMISATION OPTIONS

Risk Factor	Adjustment available
Size	Outstanding Face Value
Maturity	Time to Maturity
Credit Risk	Credit Ranking
Duration	Interest rates
Slope	Term spread level
Market	Advanced vs Emerging

Each valuation metrics can be customized within its segment to correspond to a given quintile or user–defined interval matching the risk factor profile of the asset of interest.

ANCHORING PRIVATE VALUATIONS

Problem statement: We know that using contributed or listed data leads to poor results because these datasets are typically not representative of the market segment of interest in terms of activity, business model or risk profile, and because they are not robust i.e., they contain too few data points to provide a good starting point for private market valuations that is not too noisy or biased.

The market anchoring approach: Asset pricing model cannot predict prices perfectly, but a good model calibrated with data coming from the relevant (private) market can provide a robust starting point or Market Valuation Anchor (MVA). Moreover, this MVA can be updated easily as it is recalculated each month, based on new market conditions, eliminating the staleness issues found in private valuations. Because the model is calibrated using private market prices, no illiquidity premium needs to be added to the valuation exercise, which removes a frequent contributor to valuation staleness since illiquidity premia a usually ad hoc and impossible to update.

A **Market Valuation Anchor** is characterized by three key features:

1. Granular sector and geography
2. Representative risk profile in terms of systematic risk factor exposures
3. Robust in terms of number of data points used to produce an average value

Once the MVA is obtained, it can be adjusted for asset- or deal-specific characteristics, which are clearly distinguished from the market effect on prices.

ANCHORING PRIVATE VALUATIONS

In practice: To create a valuation Anchor for a market multiple or discount rate, select a time period and start from a combination of market segments and geography, then create a risk adjusted comparable that matches the factor profile of the asset.

STEP 1

Pick geography & market segments (TICCS® or PECCS®)

Combine segments like activity and business model for more granularity.

STEP 2

Customize βs for Asset *i*

For each known risk factor, the company fits into a peer group by risk exposure.

STEP 3

Compute Valuation Anchor

Because each factor is independent, the multiples can be averaged across factors to get the Anchor multiple.

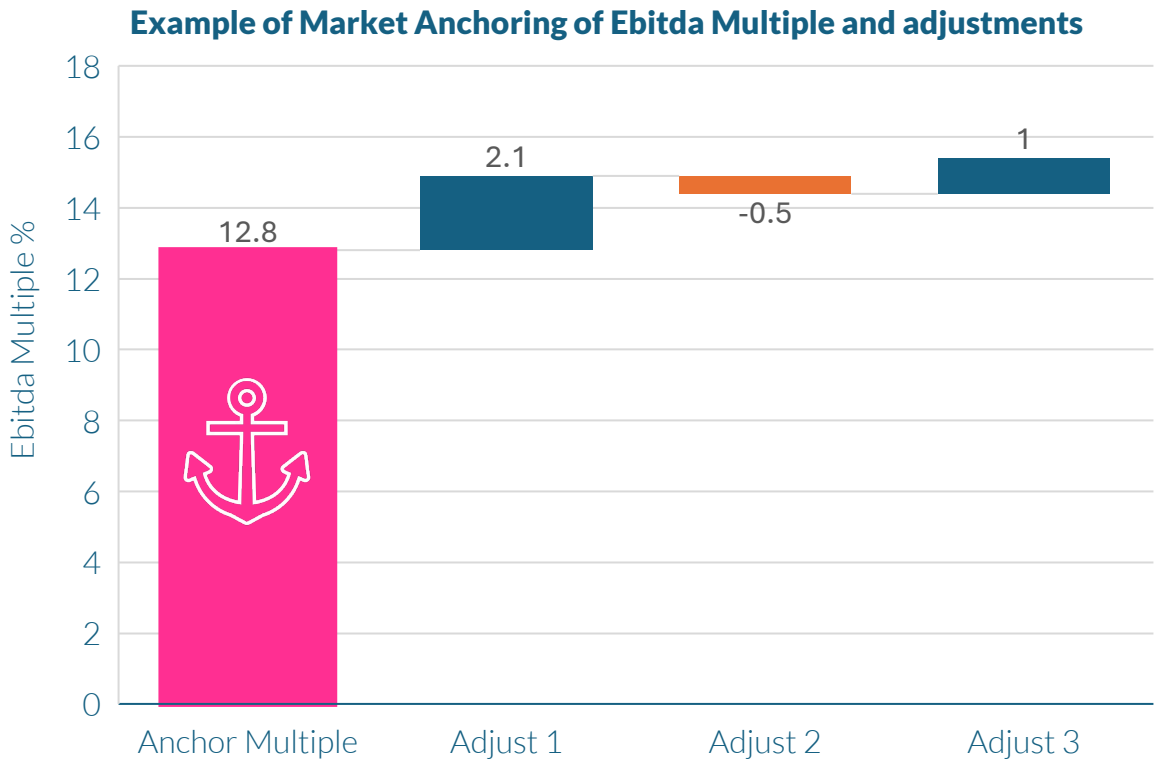
Data and functionalities available in MSEXCEL

Example MVA for a US healthcare equipment B2B company in April 2023

		April 2022	Data points
Global Market Ebitda Multiple		23.6x	4.9M
MARKET SEGMENTS			
	United States	17.7x	374k
Health Equipment & B2B		24.2x	82k
RISK FACTOR PROFILE		**within the Mkt segments**	
Size	Low Exposure	28.9x	8k
Growth	High Exposure	23.1x	12k
Leverage	Neutral Exposure	27.7x	32k
Profitability	Med-Low Exposure	24.3x	26k
Maturity	Low Exposure	28.9x	4k

MVA Multiple	**24.9x**

ANCHORING PRIVATE VALUATIONS



Once the Market Anchor Valuation is established for a given value date, **idiosyncratic adjustments can be made by investors.**

Starting from the Anchor Rate provides an **explicit measure of asset-level adjustments since they** are not mixed with market-level considerations. This helps documenting, updating and justifying them.

The Anchor stays dynamic: it is updated monthly in privateMetrics without making static assumptions about an “illiquidity premium” or a public market beta, which are unknown and impossible to update.

THE BENEFITS OF ANCHORING PRIVATE ASSET VALUATIONS (1)

A quantitative, model-based approach to private asset valuation presents multiple advantages:

1. It is **robust**: the calculation is customized to reflect the segments and the risk factor profile of the assets of interest while relying on enough datapoints.
2. It is **transparent**: the factors contributing to the valuation are explicit and defined, based on an economic rationale e.g., higher profits equates higher value (everything else held equal), and documented to be persistent.
3. It is **dynamic**: on each valuation date, a new market benchmark can be used (they can be calculated monthly), anchored to the asset's risk profile (which may have changed) and adjusted to reflect asset-specific elements.

   A major improvement on non-robust or traditional approaches is that **the NAV never becomes stale**: it is anchored to a continuously evolving private market benchmark.

THE BENEFITS OF ANCHORING PRIVATE ASSET VALUATIONS (2)

4. Anchoring the valuation creates a **clear distinction between systematic (market-level) and idiosyncratic (asset-level) risks**: this approach dispenses the valuer from assuming the existence of an 'illiquidity premium' since the inputs do not come from listed markets, but instead from the same illiquid markets in which the assets are priced.

   All systematic or market elements are taken care of in the first two steps (benchmarking and anchoring) and any asset-specific adjustment can be clearly documented and justified.

5. Anchoring is consistent with investors' **prudential and fiduciary duties**: NAVs that are not stale or smoothed allow investors to measure and manage risk and ensure the fair reporting of valuations to final investors in pension plans, insurance and wealth management products.

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Modeling Approach & Robustness

Capturing private market dynamics

PRIVATE MARKETS ARE DIFFERENT

The formation of prices in private markets **differs from listed equities.**

A specific combination of **private market (systematic) factors and asset-specific (idiosyncratic) information** explains private asset prices.

Market factors can be determined by quantitative analysis and used to **predict the systematic part of private asset prices**.

This matters because market factors explain most of the variance of private asset prices. They provide a robust prediction of the average price, once idiosyncratic aspects are diversified away in an index i.e., a portfolio.

SELECTING SYSTEMATIC FACTORS IN PRIVATE MARKETS

Factor selection rests on three criteria by order of importance:

1. **Economic rationale** implying a systematic link with transaction prices, e.g., larger size implies high illiquidity and a lower price, *ceteris paribus*.
2. **Statistical evidence** of covariance between factor loadings (betas) and reported transaction prices
3. **Availability of data** for predictors to the model can be used to shadow price all the assets in the universe.

PRIVATE INFRASTRUCTURE EQUITY PRICE DRIVERS

A different set of **risk factors and control variables** systematically explain the variance of transaction prices observed in private equity acquisitions and exits.

Factor	Definition (proxy)	Effect on price	Economic Rationale	References (p.47)
Size	Total Assets	Negative	Larger assets are more illiquid and complex transactions.	Fama & French (1993)
Leverage	Total debt / Total Assets	Positive	Higher leverage increases the risk of future cash flows to shareholders.	Blanc-Brude & Tan (2019)
Profits	Return on Assets Before tax	Positive	Higher profits make future dividend payouts less uncertain.	Blanc-Brude & Tan (2019)
Capex	Capex / Total Assets	Negative	Higher Capex increases the risk of construction cost overruns and delays, making future dividends more uncertain.	Blanc-Brude & Tan (2019)
Country risk	Term Spread	Positive	More uncertain long-term macro prospects (yield curve slope) correlate with greater risks for investors in infrastructure.	Chen & Tsang (2013)
TICCS Control factors	Dummy Variables for TICCS Activity and Business Risk Segments	Positive or Negative	Different segments of private markets exhibit different average level of price because of systematic difference in risk .	See TICCS documentation

RISK FACTOR MARKET PRICES

- In practice, we observe **actual transactions** (market prices) and derive from these the implicit premia of risk factors that are common to all infrastructure companies using a Kalman filter (Bayesian inference)
- For each factor, a premia is updated after each deal, separating the market signal from the deal idiosyncratic noise. **Every investment carries pricing information relating to common risk factors**.
- Once we can estimate the price of common risk factors, we can value any asset, given its exposure to each risk.

Estimated based on recent deals

$$\gamma_{t,i} = \sum_{k=1}^{K} \beta_{i,k,t} . \lambda_{k,t}$$

Available for all assets to shadow price (financials)

infraMetrics MODEL ROBUSTNESS

At the TICCS segment level (see appendix) the average difference between modelled prices and observed transaction prices is very small.

SECTOR-LEVEL ROBUSTNESS TEST

Average difference between estimate valuation and observed prices (sample of 1k+ transaction)

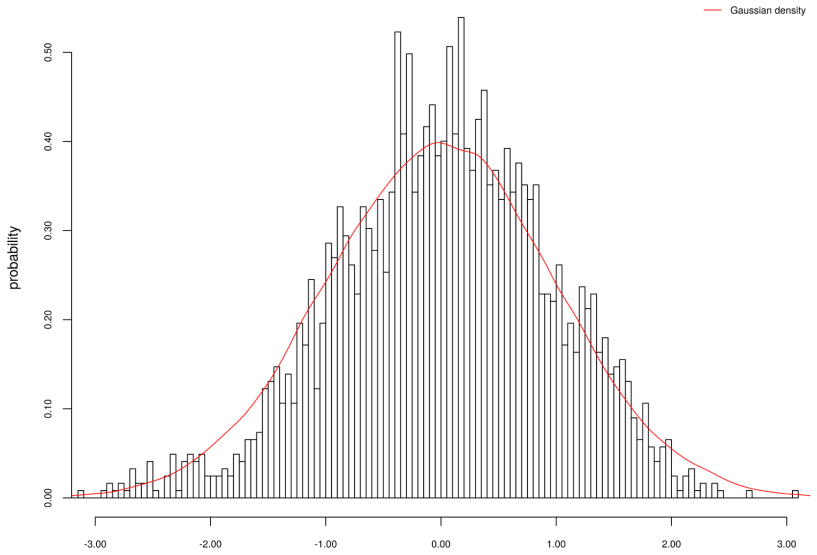
TICCS Code	TICCS Name	Average Difference	Confidence Bounds	
			Lower	Higher
IC10	Power	-1.1%	-6%	1%
IC20	Env. Services	0.0%	-1%	1%
IC30	Social	-2.1%	-7%	4%
IC40	Nat. resources	-0.5%	-4%	1%
IC50	Data	0.6%	0%	2%
IC60	Transport	-0.2%	-3%	2%
IC70	Renewables	-0.1%	-2%	2%
IC80	Net. Utilities	-0.6%	-3%	1%

As for PE, a good model of infrastructure asset prices calibrated with the right data produces **robust estimates of the average price of assets**, that can be customised to create pricing anchors (see next section).

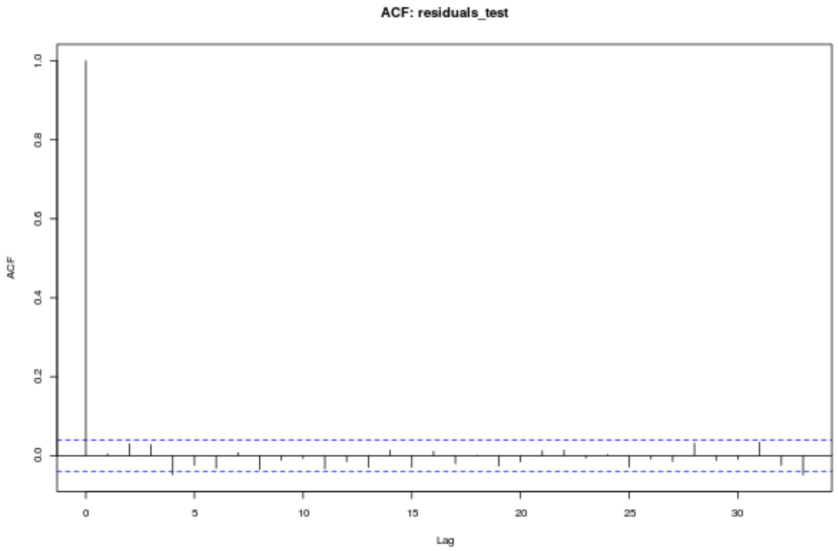
infraMetrics MODEL ROBUSTNESS

Model residuals: the factors pick up the market signal and leave out the idiosyncratic noise of each transaction.

Distribution of the residuals of the expected returns factor model



Autocorrelation of the residuals of the expected returns model



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Appendix: The PECCS® & TICCS® Classifications

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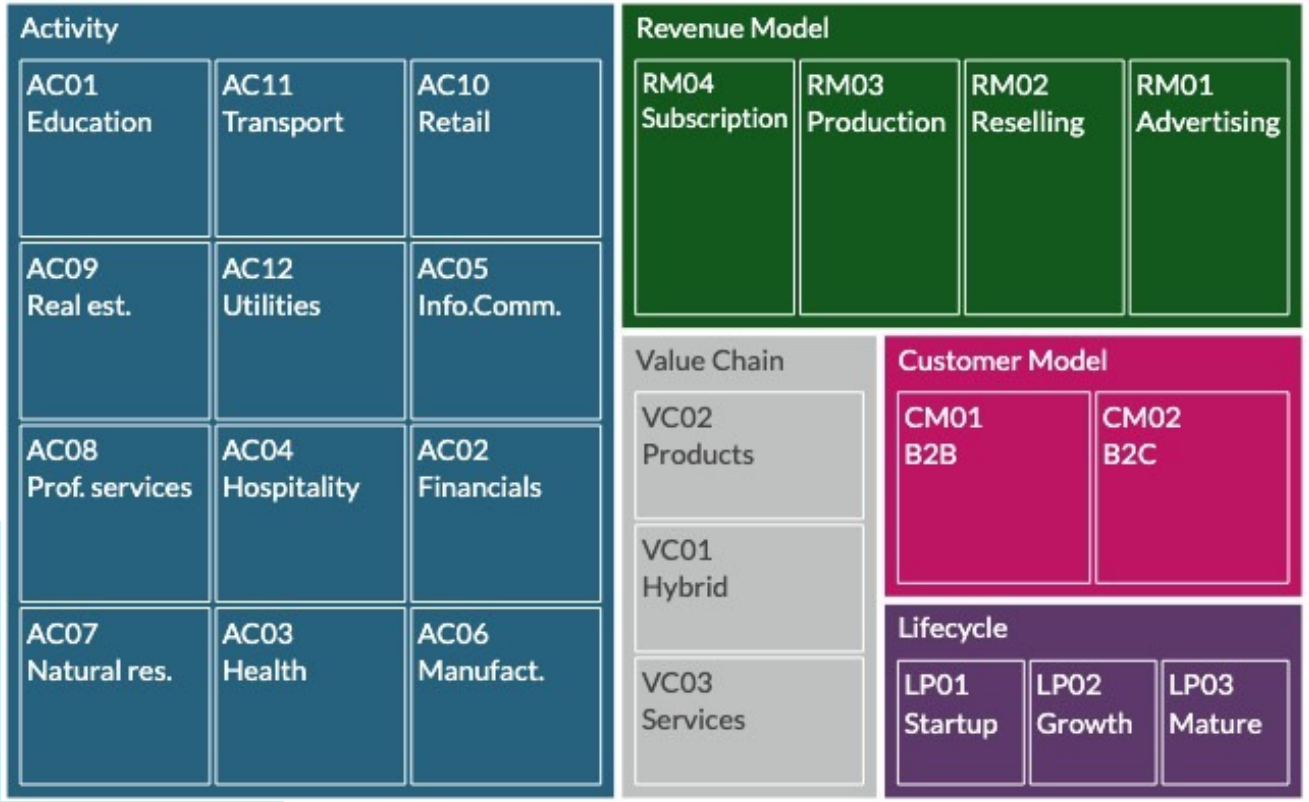
DO PRIVATE MARKETS NEED THEIR OWN CLASSIFICATION?

- Existing company taxonomies are focused on industrial activity (GICS, SIC, NACE) and do not always match private sector activities like infrastructure.
- The **value of companies is driven by more than industry classes**. Other dimensions like their business model or the type of customer or market are highly discriminating factors when it comes asset value.
- Beyond "Core" or "Core+", what are the **key risk characteristics of private companies that can be used to group them systematically**?
- A complete taxonomy of private firms allows using the information available to classify companies *objectively* into different risk peer groups.

PECCS®
THE PRIVATE COMPANY CLASSIFICATION STANDARD

The five PECCS pillars

1. Industrial Activity (12 classes, 67 subclasses)
2. Revenue model (4 classes, 14 subclasses)
3. Lifecycle phase (3 classes, 7 subclasses)
4. Customer model (2 classes, 8subclasses)
5. Value chain (3 classes, 6 subclasses)



Key features

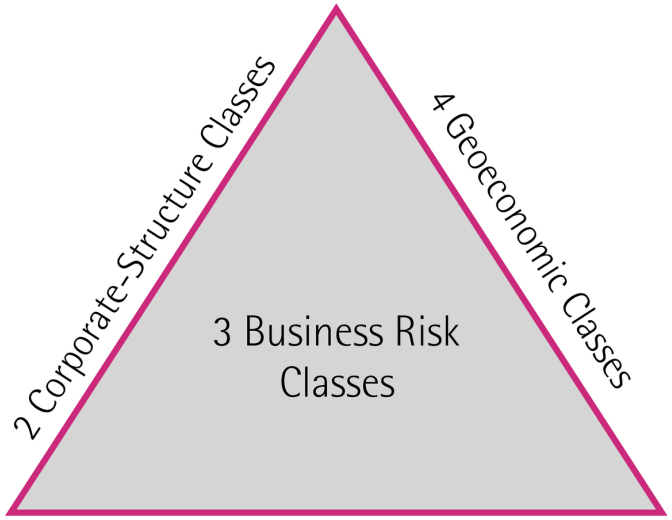
- The 5 pillars are objective and independent
- Exhaustive and mutually exclusive classes
- Activity pillar is mapped to other schemes (NACE. GICS, TICCS)

Find out more here: *link*

TICCS®
THE INFRASTRUCTURE COMPANY CLASSIFICATION STANDARD

The four pillars of TICCS

1. Industrial Activity (8 super-classes, 35 classes and 101 subclasses)
2. Business model (4 classes, 5 subclasses)
3. Geo-Economic (4 classes)
4. Corporate Structure (2 classes, 2 subclasses)



8 Industrial Superclasses
35 Industrial Activity Classes
101 Industrial Asset Subclasses

Key features

- The 4 pillars are objective and independent
- Exhaustive and mutually exclusive classes
- Activity pillar is mapped to other schemes (NACE. GICS, TICCS)

Find out more here: *link*

PECCS® & TICCS ® GOVERNANCE

A transparent governance ensuring market endorsement & adoption

Market Consultations

Every two years, a global market consultation collects inputs from infrastructure investors on the evolution of asset class

Independent Review Committee

Each market consultation is reviewed by an independent Committee that includes major investors, asset managers and standard setters.

PECCS® TICCS® Standard Publication

Following the advice of the Review Committee, the TICCS & PECCS Executive Committees finalise the revision of the standard, which is published by EDHEC.

PECCS® & TICCS® REVIEW COMMITTEES

PECCS Review Committee

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Ruediger Stucke	Warburg Pincus	Head of Quantitative Research
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Chee Su Ling	GIC	Total Portfolio Policy & Allocation
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Steven Kaplan	Chicago Booth	Professor of Finance
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Neven Tkalcec	European Investment Fund	Infrastructure Funds
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TICCS Review Committee

Member	Organization	Role
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Joss Blamire	GRESB	Head of Infrastructure
Fraser Hughes	GLIO	CEO
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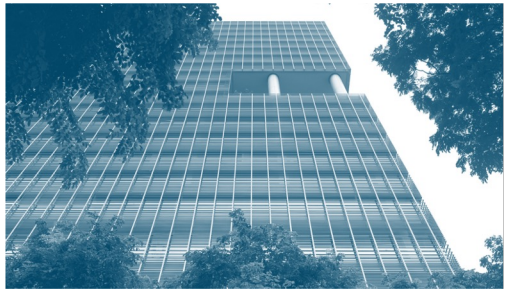

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