INFRASTRUCTURE ASSET VALUATION DATA
March 2024
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

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  USD1Tr  USD470bn
Client AUM  Client Private Equity AUM  Client Infrastructure AUM
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

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

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

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

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

\[ NAV_i = \sum_{t=1}^{T} \left( \frac{CF_t}{1 + (R_{f,t} + E(R_i))} \right) \]
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+

<table>
<thead>
<tr>
<th>Investments Name</th>
<th>Fair Value as at 31 December 2019 In 000 euros</th>
<th>Methodology</th>
<th>Discount Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Discounted Cash Flows</td>
<td>Risk Free rate: 1.75%  Risk premium: 4.50%  Illiquidity premium: 0.75%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discounted Cash Flows</td>
<td>Risk Free rate: 1.0%  Risk premium: 6.25%  Illiquidity premium: 1.0%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discounted Cash Flows</td>
<td>Risk Free rate: 1.5%  Risk premium: 5.70%  Illiquidity premium: 1.0%</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>3-year</th>
<th>5-year</th>
<th>10-year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appraisal NAV total returns</td>
<td>8.7%</td>
<td>9.7%</td>
<td>9.2%</td>
</tr>
<tr>
<td>Appraisal NAV total returns volatility</td>
<td>2.7%</td>
<td>2.7%</td>
<td>2.9%</td>
</tr>
<tr>
<td>Implied Sharpe Ratio</td>
<td>2.79</td>
<td>3.19</td>
<td>2.86</td>
</tr>
<tr>
<td>Volatility of Appraisal NAVs only</td>
<td>2.3%</td>
<td>2.5%</td>
<td>2.4%</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>Preqin Unlisted Infrastructure</th>
<th>MSCI Global Unlisted Infrastructure</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-y Annualized Return</td>
<td>10.41%</td>
<td>13.42%</td>
</tr>
<tr>
<td>10-y Annualized Std Dev</td>
<td>3.11%</td>
<td>3.26%</td>
</tr>
<tr>
<td>Risk-Adjusted Return</td>
<td>2.99</td>
<td>3.78</td>
</tr>
<tr>
<td>Max Drawdown</td>
<td>1.37%</td>
<td>0.00%</td>
</tr>
</tbody>
</table>

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

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)

Original Valuation

Disc Rate: 7%
NAV: $3,880.01

Dividend Forecast Error

ERROR: 20%
NAV: $3,104.01
NAV Error: -20.0%

Discount Rate Error

ERROR: 100 basis points
EqE Rate: 8.0%
NAV: $3,065.31
NAV Error: -20.97%
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 amplifies estimation errors.
Infrastructure Asset Valuation Metrics
Unbiased, robust and granular data

Scientific Infra & Private Assets
An EDHEC Venture
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 *

<table>
<thead>
<tr>
<th>by geo</th>
<th>9 regions, 20+ countries available</th>
</tr>
</thead>
<tbody>
<tr>
<td>by TICCS class</td>
<td></td>
</tr>
<tr>
<td>Business models</td>
<td>(3 classes available)</td>
</tr>
<tr>
<td>Industrial Activity</td>
<td>(33 classes available)</td>
</tr>
<tr>
<td>Corporate Structure</td>
<td>(2 classes available)</td>
</tr>
<tr>
<td>by style</td>
<td></td>
</tr>
<tr>
<td>Mid-Market</td>
<td></td>
</tr>
<tr>
<td>Core, Core+</td>
<td></td>
</tr>
<tr>
<td>Opportunistic</td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td></td>
</tr>
</tbody>
</table>

## AVAILABLE METRICS PER SEGMENT

<table>
<thead>
<tr>
<th>Valuation Metrics</th>
<th>Risk Metrics</th>
<th>Climate Risk Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income Method (DCF)</td>
<td>Return volatility</td>
<td>Carbon intensity</td>
</tr>
<tr>
<td>Discount rates</td>
<td>Value-at-Risk</td>
<td>Financed Emissions</td>
</tr>
<tr>
<td>(Expected Returns)</td>
<td>Max Drawdown</td>
<td>Ebitda-at-Risk</td>
</tr>
<tr>
<td>Unlisted Infrastructure</td>
<td></td>
<td>Transition Risk Extreme Value</td>
</tr>
<tr>
<td>Equity Risk Premia</td>
<td></td>
<td>Late Alignment Risk</td>
</tr>
<tr>
<td>Risk factor exposures and factor returns</td>
<td></td>
<td>No Alignment Risk</td>
</tr>
<tr>
<td>WACC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Revenue Growth</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dividend Payout Ratios</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Market Method (Multiples)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EV-to-EBITDA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price-to-Sales</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Price-to-Book</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

## CUSTOMISATION OPTIONS

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Adjustment available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Level of Total Assets</td>
</tr>
<tr>
<td>Investment</td>
<td>Capex to asset level</td>
</tr>
<tr>
<td>Leverage</td>
<td>Level of senior leverage</td>
</tr>
<tr>
<td>Profitability</td>
<td>Return on assets level</td>
</tr>
<tr>
<td>Remaining life</td>
<td>Time to Maturity</td>
</tr>
<tr>
<td>Country risk</td>
<td>Term spread level</td>
</tr>
</tbody>
</table>

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 *

<table>
<thead>
<tr>
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<th>9 regions, 20+ countries available</th>
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<tr>
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</tr>
<tr>
<td>Business models (3 classes available)</td>
<td></td>
</tr>
<tr>
<td>Industrial Activity (8 classes available)</td>
<td></td>
</tr>
<tr>
<td>Corporate Structure (2 classes available)</td>
<td></td>
</tr>
<tr>
<td>by style</td>
<td></td>
</tr>
<tr>
<td>Origination Currency</td>
<td></td>
</tr>
<tr>
<td>Maturity</td>
<td></td>
</tr>
<tr>
<td>Green</td>
<td></td>
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AVAILABLE METRICS PER SEGMENT

<table>
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<tr>
<th>Valuation Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Income Method (DCF)</td>
</tr>
<tr>
<td>Yield to Maturity</td>
</tr>
<tr>
<td>Credit Spread</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Risk Metrics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return volatility</td>
</tr>
<tr>
<td>Value-at-Risk</td>
</tr>
<tr>
<td>Duration</td>
</tr>
</tbody>
</table>

CUSTOMISATION OPTIONS

<table>
<thead>
<tr>
<th>Risk Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
</tr>
<tr>
<td>Maturity</td>
</tr>
<tr>
<td>Credit Risk</td>
</tr>
<tr>
<td>Duration</td>
</tr>
<tr>
<td>Slope</td>
</tr>
<tr>
<td>Market</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Adjustment available</th>
</tr>
</thead>
<tbody>
<tr>
<td>Outstanding Face Value</td>
</tr>
<tr>
<td>Time to Maturity</td>
</tr>
<tr>
<td>Credit Ranking</td>
</tr>
<tr>
<td>Interest rates</td>
</tr>
<tr>
<td>Term spread level</td>
</tr>
<tr>
<td>Advanced vs Emerging</td>
</tr>
</tbody>
</table>

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 are 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.

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

<table>
<thead>
<tr>
<th>MARKET SEGMENTS</th>
<th>April 2022</th>
<th>Data points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Global Market</td>
<td>23.6x</td>
<td>4.9M</td>
</tr>
<tr>
<td>United States</td>
<td>17.7x</td>
<td>374k</td>
</tr>
<tr>
<td>Health Equipment &amp; B2B</td>
<td>24.2x</td>
<td>82k</td>
</tr>
</tbody>
</table>

**RISK FACTOR PROFILE within the Mkt segments**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Exposure</th>
<th>Multiple</th>
<th>Data points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Low Exposure</td>
<td>28.9x</td>
<td>8k</td>
</tr>
<tr>
<td>Growth</td>
<td>High Exposure</td>
<td>23.1x</td>
<td>12k</td>
</tr>
<tr>
<td>Leverage</td>
<td>Neutral Exposure</td>
<td>27.7x</td>
<td>32k</td>
</tr>
<tr>
<td>Profitability</td>
<td>Med-Low Exposure</td>
<td>24.3x</td>
<td>26k</td>
</tr>
<tr>
<td>Maturity</td>
<td>Low Exposure</td>
<td>28.9x</td>
<td>4k</td>
</tr>
</tbody>
</table>

MVA Multiple 24.9x

Data and functionalities available in MSEXCEL

©2024
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.
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.
Modeling Approach & Robustness
Capturing private market dynamics
PRIVATE MARKETS ARE DIFFERENT

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

<table>
<thead>
<tr>
<th>Factor</th>
<th>Definition (proxy)</th>
<th>Effect on price</th>
<th>Economic Rationale</th>
<th>References (p.47)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size</td>
<td>Total Assets</td>
<td>Negative</td>
<td>Larger assets are more illiquid and complex transactions.</td>
<td>Fama &amp; French (1993)</td>
</tr>
<tr>
<td>Leverage</td>
<td>Total debt / Total Assets</td>
<td>Positive</td>
<td>Higher leverage increases the risk of future cash flows to shareholders.</td>
<td>Blanc-Brude &amp; Tan (2019)</td>
</tr>
<tr>
<td>Capex</td>
<td>Capex / Total Assets</td>
<td>Negative</td>
<td>Higher Capex increases the risk of construction cost overruns and delays, making future dividends more uncertain.</td>
<td>Blanc-Brude &amp; Tan (2019)</td>
</tr>
<tr>
<td>TICCS Control factors</td>
<td>Dummy Variables for TICCS Activity and Business Risk Segments</td>
<td>Positive or Negative</td>
<td>Different segments of private markets exhibit different average level of price because of systematic difference in risk.</td>
<td>See TICCS documentation</td>
</tr>
</tbody>
</table>
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.

\[
\gamma_{t,i} = \sum_{k=1}^{K} \beta_{i,k,t} \cdot \lambda_{k,t}
\]

Estimated based on recent deals

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.

<table>
<thead>
<tr>
<th>TICCS Code</th>
<th>TICCS Name</th>
<th>Average Difference</th>
<th>Confidence Bounds</th>
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<tr>
<td></td>
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<td>Lower</td>
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<tr>
<td>IC10</td>
<td>Power</td>
<td>-1.1%</td>
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<td>Env. Services</td>
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<td>IC30</td>
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<td>IC40</td>
<td>Nat. resources</td>
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<td>IC50</td>
<td>Data</td>
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<td>0%</td>
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<tr>
<td>IC60</td>
<td>Transport</td>
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<td>-3%</td>
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<tr>
<td>IC70</td>
<td>Renewables</td>
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</tr>
<tr>
<td>IC80</td>
<td>Net. Utilities</td>
<td>-0.6%</td>
<td>-3%</td>
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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).
Model residuals: the factors pick up the market signal and leave out the idiosyncratic noise of each transaction.
Appendix: The PECCS® & TICCS® Classifications
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, 8 subclasses)
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
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)

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]
Every two years, a global market consultation collects inputs from infrastructure investors on the evolution of asset class. Each market consultation is reviewed by an independent Committee that includes major investors, asset managers and standard setters. 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

<table>
<thead>
<tr>
<th>Member</th>
<th>Organization</th>
<th>Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Michael Sterkel</td>
<td>Schroders Capital</td>
<td>Head of Valuations</td>
</tr>
<tr>
<td>Ruediger Stucke</td>
<td>Warburg Pincus</td>
<td>Head of Quantitative Research</td>
</tr>
<tr>
<td>Jeroen Cornel</td>
<td>BlackRock PE Partners</td>
<td>Director</td>
</tr>
<tr>
<td>Christian Fischer</td>
<td>Credit Suisse Pension Fund</td>
<td>Strategist, PE and infra</td>
</tr>
<tr>
<td>Alexander Dotov</td>
<td>TIAA</td>
<td>Investment Risk Management, Alts</td>
</tr>
<tr>
<td>Julien Krantz</td>
<td>InvestEurope</td>
<td>Research Director</td>
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<tr>
<td>Allen MacDonell</td>
<td>LPII</td>
<td>Portfolio Manager</td>
</tr>
<tr>
<td>Richard Olson</td>
<td>Lincoln International</td>
<td>Managing Director</td>
</tr>
<tr>
<td>Chee Su Ling</td>
<td>GIC</td>
<td>Total Portfolio Policy &amp; Allocation</td>
</tr>
<tr>
<td>Marc Lickes</td>
<td>StepStone Group</td>
<td>Managing Director</td>
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<tr>
<td>Steven Kaplan</td>
<td>Chicago Booth</td>
<td>Professor of Finance</td>
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<tr>
<td>David LarSEN</td>
<td>Kroll International</td>
<td>Managing Director</td>
</tr>
<tr>
<td>Neven Tkalcec</td>
<td>European Investment Fund</td>
<td>Infrastructure Funds</td>
</tr>
<tr>
<td>Gilles De Soto</td>
<td>Ardian</td>
<td>Head of Valuation Department</td>
</tr>
<tr>
<td>Sheryl Schwartz</td>
<td>ALTI Financial</td>
<td>CIO</td>
</tr>
<tr>
<td>Kate Malcolm</td>
<td>AIMCO</td>
<td>Senior Portfolio Manager, PE</td>
</tr>
<tr>
<td>Peter Cornelius</td>
<td>Carlyle Group</td>
<td>Managing Director</td>
</tr>
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<tr>
<td>Andrew Knight</td>
<td>RICCS</td>
<td>Director</td>
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<tr>
<td>Avi Turetsky</td>
<td>Ares</td>
<td>QRG, Partner</td>
</tr>
<tr>
<td>Mark Blair</td>
<td>OTTP</td>
<td>Director</td>
</tr>
<tr>
<td>Christophe Dossarp</td>
<td>SOURCE</td>
<td>CEO</td>
</tr>
<tr>
<td>Marie Lam-Frendo</td>
<td>Meridiam</td>
<td>Chief Strategy Officer</td>
</tr>
<tr>
<td>Trevor Lewis</td>
<td>ADB</td>
<td>Head, Nonsovereign Ops</td>
</tr>
<tr>
<td>Christoph Manser</td>
<td>Swiss Life</td>
<td>Head of Infrastructure</td>
</tr>
<tr>
<td>Laurence Monnier</td>
<td>EIIPA</td>
<td>Research Associate</td>
</tr>
<tr>
<td>Marija Simpraga</td>
<td>LGIM</td>
<td>Infrastructure Strategist</td>
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<tr>
<td>Joss Blamire</td>
<td>GRESB</td>
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</tr>
<tr>
<td>Fraser Hughes</td>
<td>GLIO</td>
<td>CEO</td>
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<tr>
<td>Serge Lauper</td>
<td>BlackRock</td>
<td>Head of Infrastructure</td>
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<tr>
<td>Anne–Christine Champion</td>
<td>SGCIB</td>
<td>Co-Head of Global Banking</td>
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<tr>
<td>James Davis</td>
<td>OPTrust</td>
<td>CIO</td>
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<tr>
<td>Petya Nikolova</td>
<td>NYC Comptroller</td>
<td>Head of Infrastructure</td>
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<tr>
<td>Paul Shantic</td>
<td>CALSTRS</td>
<td>Director</td>
</tr>
<tr>
<td>Nicholas Tan</td>
<td>Bayfront Infra</td>
<td>CEO</td>
</tr>
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</table>
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