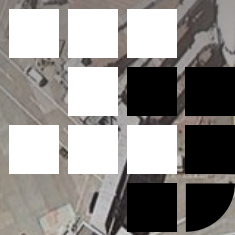


Special Report 2021

IJ Global

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data

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EDHECinfra – Prepare to be disrupted

EDHECinfra talks about bringing transparency and advanced finance to the world of unlisted infrastructure investment, and what it means for the future of the asset class.

To the usual “How was Covid for you?”, the team at EDHECinfra knows not to smile too much. “When we launched the commercial activities of EDHECinfra in 2019,” recalls director and founder Frederic Blanc-Brude, “one of us said something like ‘what we need now is a good crisis!’”

After a decade of rising prices and minimal trouble (if you put Spanish toll roads, UK power and few other things aside), investors in the infrastructure asset class could almost have been forgiven for thinking that these assets never lost value and in fact always became more valuable, while continuing to pay handsome dividends.

“The sector went through a period of re-valuation after the GFC,” says Blanc-Brude. “Objectively, 15 years ago infra was cheap. Since then, investors willing to receive lower returns that is, paying higher prices, for the same risks have led the yield compression we are all aware of.”

But with Covid-19, the perception that infrastructure was impervious to shocks had to be re-considered. “It was on TV,” says Blanc-Brude. “Airports closed, national lockdowns, etc. This is hard to ignore.” Covid has since led to a number of calls for valuations to be reviewed, from Superannuation Trustees to the Danish FSA. How badly and how systematically infrastructure investors were hit by Covid has become a recurring question.

“The problem investors face,” says Abhishek Gupta, Head of Product Development at EDHECinfra, “is that they cannot measure the risks of this asset class by looking at the reported NAV data, which consists mostly of stale appraisals.” This is an old problem in private asset classes of course: assets are appraised year after year using a very similar discount rate than the one used at the time of the investment. Combined with stable infrastructure cash flows, these ‘smooth’ discount rates make it look like the value of the assets never changes much. “Appraisals hide the volatility,” says Gupta. “If you were to believe these numbers, the risk/



“15 years ago infra was cheap. Since then, investors willing to receive lower returns that is, paying higher prices, for the same risks have led the yield compression we are all aware of.”

return profile of infrastructure would be so good that it cannot be true. In fact, it would be extraordinary for fund managers to be selling these assets so cheaply on exit. Ergo, reported appraisals do not capture the fair market value of these assets.”

The reality of course is that nobody believes the risk or volatility suggested by appraisal NAVs to be true. But then what is the fair market value of unlisted infrastructure? And why does it matter?

“It matters,” answers Tim Whittaker, Head of Data at EDHECinfra, “because until you measure fair market value, you cannot measure the risks that investors are taking. And until then, you cannot manage your investments in infrastructure. For example, you cannot decide on a strategic asset allocation or how much DC pension plans can allow members to withdraw without penalising other members.”

The Infrastructure Adventure

Whittaker recalls the beginning of the EDHECinfra ‘infrastructure adventure’ and how the team decided to approach data and valuation. “We are science-minded people, so we were well aware of the issues in existing datasets. They are very biased, especially in terms of what gets measured there is a problem of survivorship bias: only the good assets end up reporting. We wanted all of them, including the train-wrecks...” he says.

Since 2015, Whittaker has been leading a team of financial analysts that embarked on the ambitious project of collecting enough data to build a representative database of the investible universe in the 25 main markets where investors buy and sell unlisted infrastructure equity or debt. “We focus on markets where we can observe transactions,” he says, “and pick up price signals. What you call the ‘principal market’ under IFRS 13.”

The adventure has paid off. At the end of the rainbow, EDHECinfra found close to 7,000 uniquely identified, private, unlisted infrastructure companies, organised using the fast-spreading TICCS taxonomy that EDHECinfra launched in 2018 and is now used by the likes of OTP or Blackrock to classify and benchmark their infrastructure equity and debt portfolios.

From this universe, EDHECinfra tracks the performance of a representative sample of close to 700 firms and thousands of private debt instruments.

Market Calibrations

With all this data, EDHECinfra has been able to apply the kind of advanced asset pricing and portfolio theory that they wanted. “We have collected and validated data for hundreds of private transactions,” says Gupta, “but you cannot use ‘comps’ with infra, there just aren’t enough deals or assets.

Instead, you can reduce the problem to something simple but powerful,” he says.

Abhishek Gupta



"Each of these deals includes information about the price investors are willing to pay to be exposed to certain risk factors, like leverage or size or a country or a merchant revenue stream. If we can measure these factor premia over time, we can price all the other assets, because they are exposed to the same factors, only in different quantities."

EDHECinfra has been very successful at measuring the market value of private infrastructure assets when compared with actual deal values (see below). This has allowed them to build fully-fledged market indices like the infra300, an index that tracks the performance of 300 unlisted investments in infrastructure equity in 22 countries over the past 20 years.

The infra300® (Bloomberg:infra300) has become a reference index for numerous investors, such as the OECD staff pension plan, for their asset allocation or performance tracking. Thanks to indices such as this, the questions of how risky or how impacted by Covid unlisted infrastructure is can finally be answered.

Another Hurdle

"The infra300 captures the impact of changes in cash flows, risk premia and interest rates, on a mark-to-market basis," explains Blanc-Brude, "it is as close as tracking the fair value of the asset class as you can get. We now produce this index on a monthly basis because many of its users need monthly reporting."

Amongst the by-product of the EDHECinfra indices is a measure of the latest expected returns in the market. Blanc-Brude argues market expected returns for different segments of the market is what LPs should use as hurdle rate in different types of infrastructure funds. Data shows that the hurdle rate of infrastructure funds have been stuck at 8% for the past 15 years. "In effect, there is no difference between the hurdle rates of so-called 'core' funds which are supposed to be investing at the lower end of the risk spectrum and the 'core+' and

Tim Whittaker



'opportunistic' funds that invest in riskier, presumably higher return assets," he says.

Faced with decreasing yield and stuck with a relatively high hurdle rate requested by investors badly informed on the actual market yield of infrastructure assets, fund managers have no other choice but to take more risk and add more fund leverage or stray from their original mandate to invest in infrastructure. In the end, these risks are passed back to LPs who are invested in vehicles that may not have the risk-return profile they intended.

Dry powder has also increased by 200% in a few years and Blanc-Brude is convinced that using the wrong hurdle rates in funds is one of the reasons for this. EDHECinfra research shows that the opportunity cost of all this dry powder is enormous. "Had even half of the infrastructure dry powder had been invested in the infra300 index during the past ten years," says Blanc-Brude, "LPs and GPs would have been able to share approximately USD100bn of extra payouts." Instead, much money is waiting on the side-line for opportunities that would have to return much more than what the average market expected return currently is.

Put on your platform shoes

While the largest database of infrastructure investment data in the world was being built, EDHECinfra was also busy creating a state-of-the-art "index and analytics data platform" for investors to access not only its several hundred indices but also valuation metrics, discount rate tools and soon a fund analyser tool that promises to revolutionise the way fund GPs and LPs can benchmark funds.

Head of Production Fabrice Lee-Choon leads the technical team at EDHECinfra and is responsible for delivering new index data to EDHECinfra's customers on the tenth day of each month. "Producing indices for unlisted assets with a ten-day lag had never been done before," he explains. "Usually, investors have to wait for 4 to 6 quarters before they can get updated numbers."

Fabrice Lee-Choon



But EDHECinfra's clients do not have to wait. "This is the power of using a layer of models with all our data," says Lee-Choon. "We can run the computations using the latest market data for the quarter or the month whenever is necessary. This also allows us to run custom index solutions for specific users," he adds.

As well as EDHECinfra's platform, all this new data is can also be distributed via Blackrock's Aladdin, Rimes or Bloomberg.

Join the Evolution

Infrastructure investors have been adapting to this new reality more or less fast.

"It's really an evolution towards the next generation of indexing and reporting for this asset class," says Lorenzo Menichino, who heads up sales for Northern Europe. "Sophisticated investors have immediately seen the importance of reporting risk and performance more accurately. It's also a way for some managers to differentiate themselves by offering better defined products using TICCS as an anchor and a clear benchmark," he adds.

Recent research by EDHECinfra showed that most investors should really hold about 10% of infrastructure in their portfolio, either equity or debt depending on their profile. "Now that the correlations with other assets can be measured, the applications are many," says Adrien La Greca, who covers North America Sales. "Investors have had these questions about strategic asset allocation for a long time. Now they can be answered," he adds.

The infrastructure investment sector has been through evolutions before. This one is "the end of pre-history," says Blanc-Brude. And literally that is the case: with representative market benchmarks, EDHECinfra has started producing the written history of the sector's risk-adjusted performance and evolution from exotic sub-sub-plot of the alternatives pocket into a major asset class that will play a role for years to come in long-term investment solutions. Get ready. ■

The next generation of data for infrastructure investors

The infrastructure asset class has long suffered from a lack of adequate measures of fair value and risk. A new generation of research and data on unlisted infrastructure equity and debt allows asset owners and managers, consultants and regulators to access the true characteristics of the asset class.

Thanks to years of research, data collection and industry collaboration, EDHECinfra produces as series of essential tools and datasets that support the growth of the asset class by making it more transparent and well-understood. This includes:

- Key **market indices** tracking the fair market value a representative set of hundreds of investments in unlisted infrastructure equity and debt produced on a quarterly and monthly basis. Hundreds of sub-indices provide access to granular benchmarks using the TICC[®] taxonomy of infrastructure

companies, across geographies or investment styles.

- For each segment of the unlisted equity and debt universe, essential **risk analytics** are also available, including extreme risk and credit risk measures.
- **Valuation metrics** reflecting the latest evolution of the market price of risk for different types and styles of infrastructure and a dynamic valuation tool for investors to estimate the risk premia of their own assets using the latest information from secondary market data.
- A **fund benchmarking** tool uses market-to-market returns for hundreds of equity unlisted infrastructure investments over the past 20 years to simulate thousands of funds invested in specific strategies or segments and produce robust benchmarks of fund performance (available in Q2 2021).
- **Peer group benchmarking** using pooled

portfolio of actual holdings by investors, comparing the strategies, risk and alpha of direct investors, asset managers etc. Peer groups are based on in-depth research on individual portfolio holdings by asset owners and managers on an ongoing basis and the fair market valuation of the relevant assets.

EDHECinfra is also at the origin of a classification system of infrastructure investments (TICC[®]) as well as data collection standards for the evaluation and reporting of performance at the asset level (see below). These standards are validated and used across the industry to create transparent and robust assessments of the performance and risks of the asset class.

Users of EDHECinfra data include the largest asset managers and asset owners in the world, prominent consultants and valuers, as well as prudential and economic regulators. ■

Table 1: Index & Analytics Data Produced by EDHECinfra

Market Indices		Available quarterly and monthly		
inc. infra300® infraGreen® infraDebt500®				
Sub-indices and benchmarks		Available quarterly		
Global TICC [®] Indices	Equity Style Indices (Core, Core+, Mid-Market..)"	Debt Style Indices (Inv. Grade, RPI-linked, Fixed/ Floating Rate..)	Geographies (Regions and Selected Countries)"	
Risk & Performance Analytics		Available quarterly and monthly for selected indices		
Capital Gains	Cash Yield	TICC [®] Contributions	Max Drawdown	
Value-at-Risk	Duration	Expected Loss	Default Risk	
Valuation Metrics		Available quarterly and monthly		
Market Ratios	Risk premia	DCF drivers	Cost of Capital	
Credit Spreads	Yield to maturity			
Fund Benchmarking Tool		Updated quarterly		Available in Q3 2021
by Style	by Vintage	by Horizon	by Fee Structure	
PMEs	Direct Alpha	Dietz Returns	IRR Quartiles	
Peer Group Benchmarking		Updated semi-annually		Available in Q4 2021
Peer group ratings	Peer group performance	Peer group style analysis		

Source: edhecinfra.com

EDHECinfra: from academic insights to industry relevance

Robust research practices and the objective to create solutions for the industry are at the heart of the *EDHECinfra* approach.

EDHECinfra was created in 2015 at EDHEC Business School thanks to the support of the Monetary Authority of Singapore, Natixis, Meridiam, Campbell Lutyens, the members of the Long-Term Infrastructure Investors Association and the Global Infrastructure Hub (a G20 initiative).

From the onset, the objective of EDHECinfra was the creation of industrial-grade market indices and benchmarks for the purpose of documenting the characteristics of the infrastructure asset class.

The academic DNA of EDHECinfra means that we put modern financial theory first. In practice, it means that returns must correspond to risks priced by markets and that asset valuations should reflect current market data, especially the latest changes in interest rates and risk premia.

We set out to build a representative, bias-free database of investible infrastructure companies including data on both equity and debt instruments, and to design asset pricing models that could capture the evolution of the price of risk for unlisted infrastructure investments.

The industry supports this effort and

the EDHECinfra Advisory Board provided essential guidance as EDHECinfra developed its approach and designed the benchmarks and valuation tools the industry and regulators need.

Already in September 2015, in a letter to the Dean of EDHEC, the Chairman of EIOPA wrote that the conclusions of the regulator with regard to the definition and treatment of infrastructure under Solvency-II "draw to a very large extent on the work of Professor Blanc-Brude." (EIOPA 15-726)

Since then, numerous investors have started using EDHECinfra indices and benchmarks directly in the investment process, including for risk reporting, asset allocation and performance monitoring.

EDHECinfra now provides the industry with the only access to current, mark-to-market, representative indices and benchmarks of the risk-adjusted performance of unlisted infrastructure equity and debt.

Thanks to this project, the infrastructure asset class has entered a new era of transparency and granular data, which will continue to improve the prudential treatment of the asset class, increase global

asset allocations to unlisted infrastructure and support the development of the infrastructure investment industry.

THE EDHECinfra Advisory Board

Advisory board members include:

- Anne-Christine Champion (Natixis)
- Paul Shantic (Calstrs)
- Gillian Tan (MAS)
- Adriaan Ryder (ADIC)
- Laurence Monnier (Aviva)
- Robert Bianchi (Griffith University)
- Kim Jee (KIC)
- Christopher Manser (Swiss Life)
- Marie Lam-Fremdo (GIH)
- Noel Amenc (EDHEC)
- Matthew Lim (GIC)
- James Davis (OPTrust)
- Timo Väilä (UCL)
- André Laboul (OECD)
- Paul Carrett (FWD)
- Premod Thomas (Bayfront)
- Stefano Gatti (Bocconi)
- Jordan Schwartz (World Bank)
- Ian Berry (River & Mercantile)
- John Faye (CDPQ)
- Sancho Chan (Sunlife) ■

Advisory board members



TICCS®: define your style

Collecting a lot of infrastructure data required EDHECinfra to create a taxonomy of infrastructure investments: The Infrastructure Company Classification Standard or TICCS® was first released in October 2018 and soon became an industry standard that allows the definition of clear and robust investment styles in the asset class.

There are several ways to define 'infrastructure': the OECD and the World Bank use definitions that focus on what infrastructure does, that is, delivering essential services. For the purposes of classifying investments in infrastructure, a better approach focuses on what infrastructure 'is like' in terms of its attributes as a business. This is the route taken by financial regulators in their effort to define qualifying infrastructure assets under various prudential frameworks. Criteria-based definitions of qualifying infrastructure companies exist under the Basel-II Accord, the Solvency-II Directive and the CRR-2 Regulation of European banks.

The TICCS® View

TICCS® is not strictly speaking a definition of what is and what is not 'infrastructure' but a taxonomy to objectively organise the constituents of the infrastructure investment universe. We identify six fundamental economic criteria for an asset to be meaningfully designated as 'infrastructure':

- **Single-use investment:** infrastructure assets are 'relationship-specific' i.e. the investment required only makes sense in the context of a 'relationship' – typically a contract, license or concession.

- **Sunk or irreversible capital investment:** this relationship is needed because the initial capital expenditure is 'sunk' i.e. irreversibly invested and unusable for any other purpose than the one originally intended.
- **Large size requiring a long repayment period:** the investment is sizeable in absolute terms, making the repayment period necessarily long.
- **Inflexible total cost structure:** infrastructure assets have highly predictable fixed costs and low variable costs, resulting in an inflexible cost structure. Hence the need for certainty of future revenue streams and the role of long-term contracts since assets have no alternative use.
- **Infrastructure as a service:** infrastructure companies have value because their assets provide a useful service to users, despite consisting mainly of large tangible, immobile assets.
- **Not a store of value:** unlike other 'real' assets such as land, buildings, etc., infrastructure is not a store of value, only a provider of useful services.

An industry standard

On this basis, TICCS has four pillars as shown in the table 2. The super-class level (eg. Transport), breaks down into a class level sectors (e.g. Rail) and asset level sub-classes (e.g. High-speed rail). TICCS is the object of annual market consultations and reviewed by the independent TICCS Review Committee. In 2021 members of the TICCS Review Committee (see box).

TICCS is used by pension funds, insurers and asset managers to categorise their investments and reflect their exposures to well-defined segments of the infrastructure universe that can also be benchmarked by equivalent sub-indices since the EDHECinfra data is organised using the same taxonomy. For example, an investor in contracted and merchant infrastructure projects across social and transport infrastructure can design a representative portfolio benchmark using the weights of each segments in its own portfolio. ■

TICCS Review Committee as of Q1 2021

- Andrew Knight (RICS) – Chairman
- Avi Turetsky (Landmark Partners) – Secretary
- Mark Blair (OTTP)
- Anne-Christine Champion (Natixis)
- James Davis (OPTrust)
- Christophe Dossarp (SOURCE)
- Fraser Hughes (GLIO)
- Marie Lam-Frendo (Global Infrastructure Hub – G20)
- Serge Lauper (BlackRock)
- Trevor Lewis (Asian Development Bank)
- Christoph Manser (Swiss Life)
- Laurence Monnier (Aviva Investors)
- Petya Nikolova (New York City Comptroller's Office)
- Paul Shantic (CALSTRS)
- Marija Simpraga (LGIM)
- Nicholas Tan (Clifford Capital)
- Rick Walters (GRESB)

Table 2: The Four TICCS® Pillars

Pillar I: Business Risk	Pillar II: Industrial Activity	Pillar III: Geo-Economic Exposure	Pillar IV: Corporate Governance
Contracted	Power x-Rnw	Global	Projects
Merchant	Env. Services	Regional	Corporates
Regulated	Social Infrastructure	National	
	Energy & Water Res.	Subnational	
	Data Infrastructure		
	Transport		
	Renewable Power		
	Network Utilities		

TICCS®:

- 3 classes and 5 sub-classes of business risk;
- 8 industrial super-classes, corresponding to 33 industry classes of specific industrial activities and 95 industrial asset-level subclasses;
- 4 geo-economic classifications; and
- 2 corporate-governance classes with 2 subclasses.

Source: docs.edhecinfra.com

What is infrastructure investment really like?

Using the EDHECinfra data, valuation approach and the TICCS[®] classification gives investors the true view on what investing infrastructure really is like.

Being exposed to 'infrastructure' can often be a little abstract. In effect, investors are exposed to *some* infrastructure. Using granular data and an objective classification system confirms that the difference in risk-adjusted performance between different segments of the infrastructure universe is significant and suggests that investors need to monitor their exposure to infrastructure in details as shows on table 3.

The period of Covid-19 in particular has highlighted how differently exposed to certain risks investors in infrastructure can be. The Covid pandemic revealed both the capacity for resilience of certain types of infrastructure like contracted projects and the exposure to economic risks of merchant corporates, two segments well-captured by the TICCS taxonomy, as also shown in table 3.

The EDHECinfra approach also reveals the sources of the risk and performance of the different segments of the asset class. Beyond the impact of cash flows, their relative exposure to interest rate risk and changes in risk premia of these companies are major components of the ongoing fair value of unlisted infrastructure companies. In effect, changes in the fair value discount rates are much more significant drivers of

Table 3: Performance and risk measures of key segments of the infrastructure equity and debt universe as of Q4 2020, local currency returns

Indices	1-year total return*	3-year total return	5-year total return	10-year total return	10-year volatility	99.5% 1-year Value-at-Risk	Maximum drawdown	Modified Duration**
infra300 [®]	-1.9%	3.2%	6.6%	13.8%	12.6%	25.2%	31.3%%	9.30
Contracted infrastructure	2.0%	6.7%	8.4%	15.0%	11.2%	19.9%	27.6%	7.90
Merchant infrastructure	-6.6%	4.7%	9.8%	15.3%	14.3%	29.1%	35.5%	10.20
Roads	6.0%	9.7%	11.5%	16.1%	15.3%	31.7%	31.2%	11.10
Airports	-35.1%	-12.6%	-0.7%	10.5%	18.3%	40.7%	39.8%	13.50
Global projects	2.1%	8.4%	10.3%	16.3%	11.9%	21.9%	29.4%	8.50
Global corporates	-13.5%	-2.5%	3.0%	11.2%	13.9%	29.8%	34.0%	9.60

*estimated at YE 2020 **percentage change in value for one percentage change in discount rate
Source: indices.edhecinfra.com

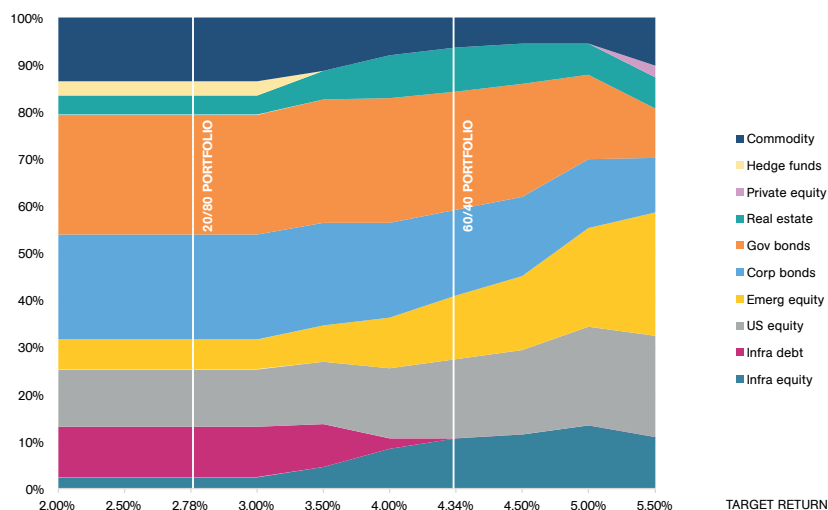
risk and performance than changes in future cash flows, even in a period like the Covid pandemic.

For example, using EDHECinfra data for a sample of 500+ unlisted infrastructure equity investments in 22 countries in 2020, lower future dividends due to Covid-19 contributed on average to reducing the net asset value of unlisted infrastructure investments by approximately -3.5%, while downward movements in interest rates contributed to increasing valuations by more than +5%. Higher risk market premia further deflated them by as much as -9%. Over the past three years, for the same universe, the cumulative impact of changes in interest rates on fair values is +15%, compared to less than one percent for changes in expected cash flows.

But the most appealing feature of unlisted infrastructure equity investment remains its cash yield, which is the main source of stability and attractiveness in risk-adjusted terms. Recent research by EDHECinfra shows that infrastructure companies are very good at paying dividends compared to other firms (Whittaker and Tan, 2020). Thus, the cash yield of the infra300 index remains at 7 to 8% in recent years, as shown on figure 1.

Measuring the true volatility of unlisted infrastructure investments presents the significant advantage of allowing investors to engage in asset and risk management.

Figure 2: Optimal Asset Allocations with ten asset classes including unlisted infrastructure equity and debt.

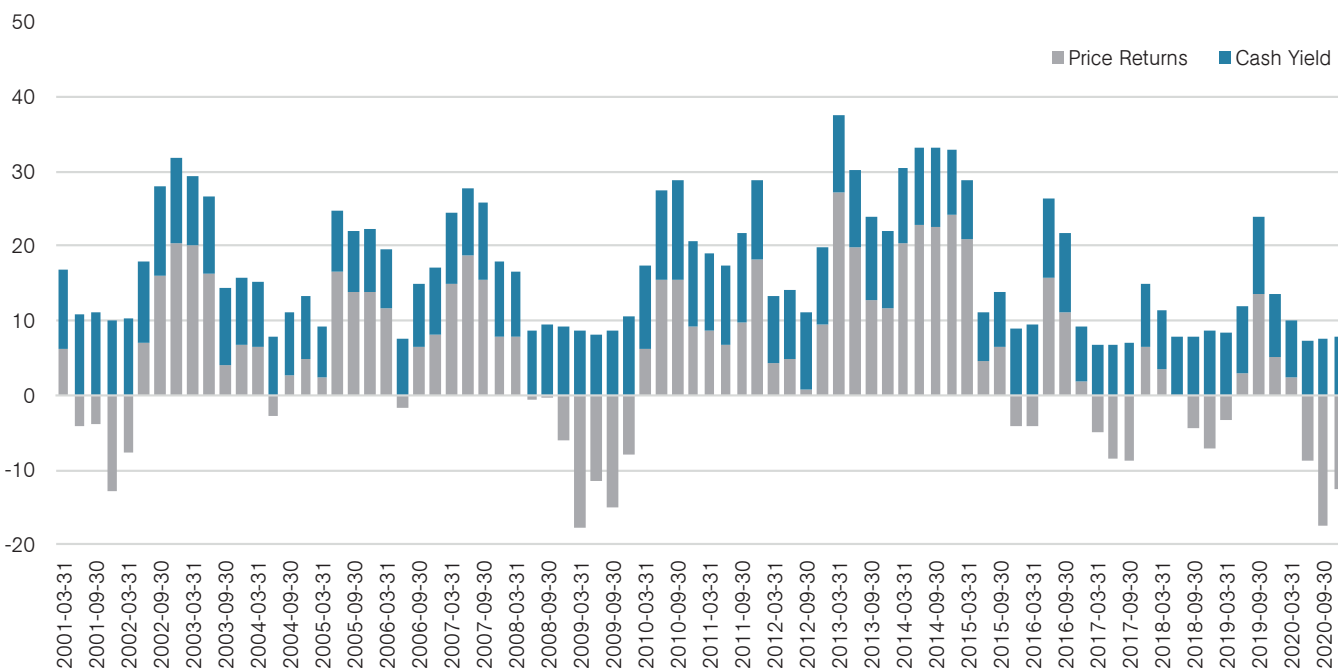


Source: Amenc et al 2021, Strategic Asset Allocation to Unlisted Infrastructure – EDHEC Infrastructure Institute Publications. Forward-looking return and risk data EDHECinfra, other asset classes based on market consensus

Figure 2 shows that in a multi-asset context with 10 asset classes, unlisted infrastructure equity and debt always have a role to play in the portfolio of different styles of investors and that optimal allocations could be as high as 10% compared to the much lower current levels. Once the performance of

the asset class is adequately measured on a fair value basis, investing in unlisted infrastructure can bring significant advantages to investors: it is a demonstrable source of diversification, income and liability hedging, as long as it is properly benchmarked within the portfolio. ■

Figure 1: Year on year price and cash returns of the infra300® index (unlisted equity)

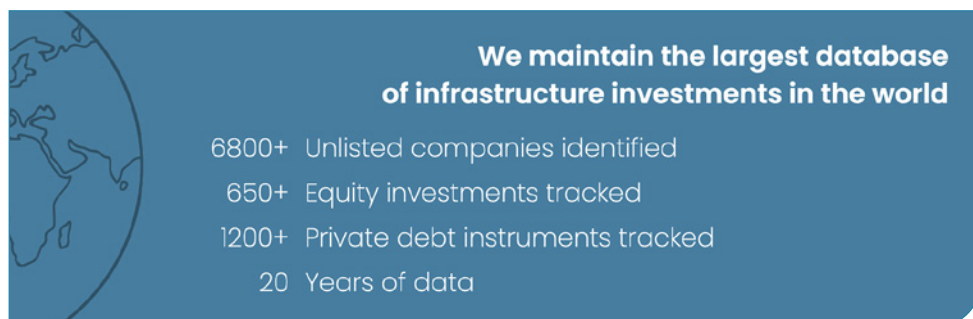


Source: indices.edhecinfra.com

The Infrastructure Investment Toolkit

EDHECinfra has identified more than 6,800 private investible infrastructure companies in 25 countries, from which it has built a representative set of 650+ tracked investments and 1,200+ financial debt instruments going back 20 years. Investors in infrastructure have access to the analytics needed to evaluate, benchmark, compare investments in unlisted infrastructure equity and debt using 20 years of data collected and curated by the EDHECinfra team.

Equity metrics are available by TICCS® segment including business

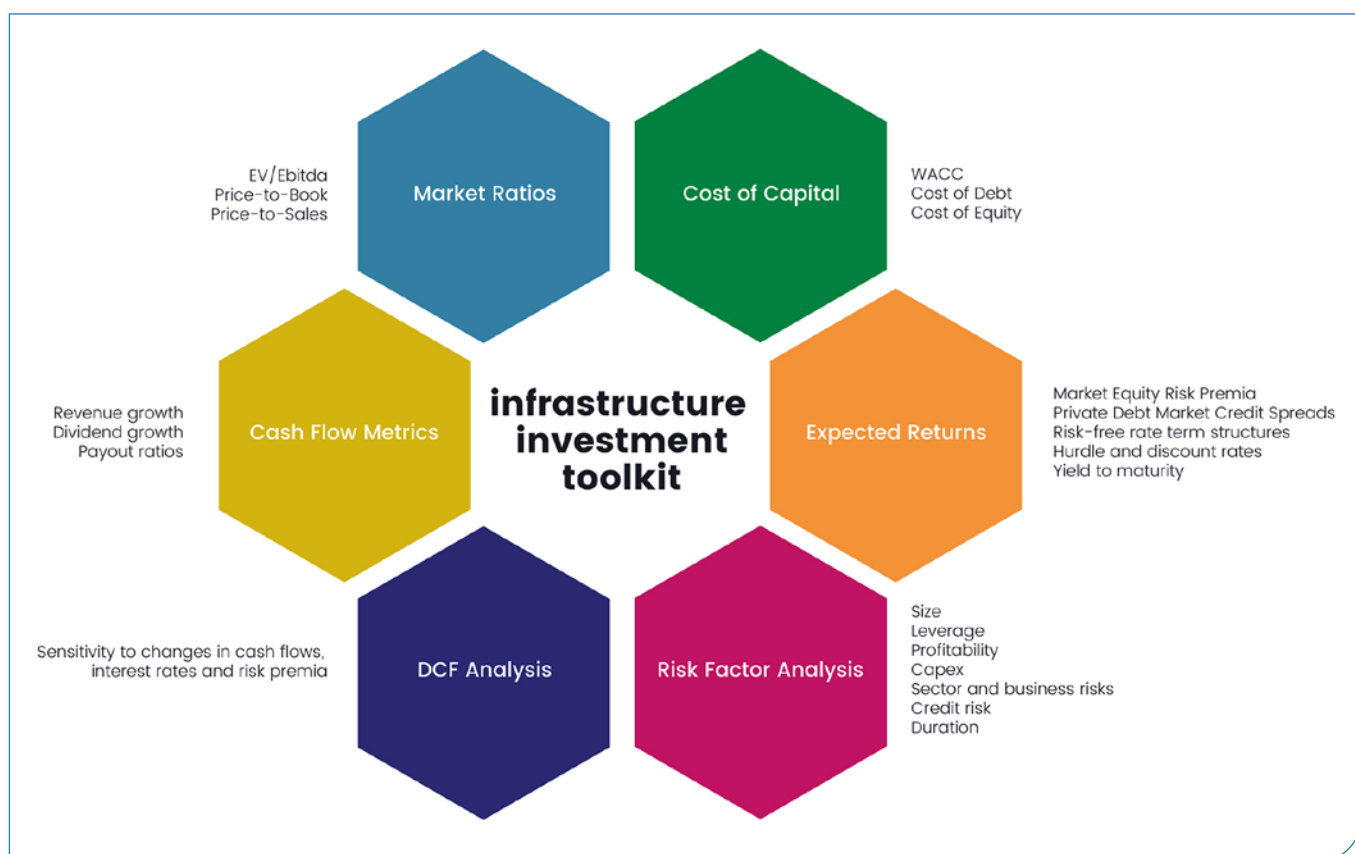


We maintain the largest database of infrastructure investments in the world

- 6800+ Unlisted companies identified
- 650+ Equity investments tracked
- 1200+ Private debt instruments tracked
- 20 Years of data

risk, industry and corporate structure, as well as equity styles including core, core+, mid-market, etc. Debt metrics are also available by TICCS®

segment and by debt investment styles including investment grade, fixed rate, floating rate and inflation-linked (UK only). ■



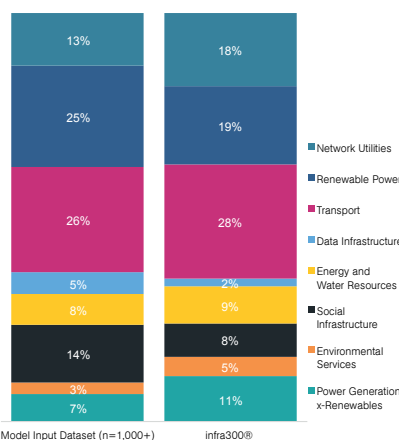
The science of **accurate valuations**

Measuring the market price of illiquid, unlisted infrastructure investments is not straightforward due to the paucity of available data. However, recent advances in data collection and asset pricing using robust, scientific methods and now give very good results.

As more investors consider allocations to unlisted infrastructure, the need to bring the asset class into the mainstream of risk management, asset allocation and prudential regulation is increasing rapidly. Reflecting the impact of Covid-19 on infrastructure valuations has made this trend all the more urgent. Appraisal values typically implying very smooth returns that do not reflect the latest market conditions. In the absence of comparable transactions, most unlisted infrastructure investments have effectively been booked at or near historical cost. However, thanks to recent advances in data collection and asset pricing techniques, it is now possible to estimate the evolution of fair market prices for unlisted infrastructure equity investments. It can be shown that:

1. Common risk factors explain observable valuations of unlisted infrastructure companies.
2. The risk premia of these factors can be measured on an ongoing basis, as new transactions take place. Thanks to these risk premia, individual assets that do not trade but are exposed to the same factors can also be priced.
3. This approach predicts transactions prices accurately within 5% of observed transaction prices and produces robust series of returns with no smoothing.

Figure 3: Transaction price data used in valuations vs infra300® index



Source: Blanc-Bruide and Gupta 2021.

This technology allows measuring the true yield of infrastructure investments, their optimal contribution to multi-asset portfolios, duration and much more.

For example, looking at a comparison between model-predicted ratios like EV/EBITDA, Price-to-Book and Price-to-Sales against actual deals values for a large and diversified set of observed transactions between 2000 and 2020 (see figure 3), we see in table 4 that model-predicted prices are accurate. The prediction error is typically within 5% or less of observed prices.

While we cannot use "comps", because there are too few observable prices, we can reduce the number of dimensions of the problem to a few systematic risk factors that are found in every transactions. On each valuation date, the fair value of any infrastructure investment is a function of a) a future stream of dividends, b) the term structure of risk-free rates in that country and at the relevant horizon and c) a risk premia.

Given a stream of expected cash flows (which can come from the asset owner), and a term structure of rates (built using the yield of risk-free bonds at the relevant horizons, in the relevant country), estimating the fair value of unlisted infrastructure equity boils down to estimating the equity risk premia for a given company.

EDHECinfra research has determined that the most relevant, robust and persistent risk factors that explain transaction prices in unlisted infrastructure transactions are:

- Leverage (Liabilities / Total Assets)
- Size (total assets)
- Profitability (Return on Assets pre-tax)
- Investment (Capex / Total Assets)
- Country risk (Term Spread)
- A range of control variables including business model and industrial activities according to the TICCS® taxonomy.

These factors are in line with fundamental concepts in asset pricing and corporate finance. For example, higher leverage should increase the cost of equity as per the Modigliani and Miller theorem, and the size, profits and investment are well established risk factors in modern equity valuation since Fama and French.

With this technology and curated datasets, it is possible to measure the fair value of unlisted investments on a fair market basis on an ongoing basis and to provide investors and regulators with the granular and accurate information they need. ■

Table 4: Estimated vs. Reported Valuation Ratios and model goodness of fit

Ratio	Reported Mean	Estimated Mean	Reported Median	Estimated Median	R ²	RMSE*
EV/EBITDA	15.54	15.34	12.98	12.61	0.97	2.27
P/Book	2.37	2.28	1.65	1.59	0.87	0.90
P/Sales	3.35	3.21	2.52	2.32	0.85	1.43

* root mean squared error Source: indices.edhecinfra.com



infrastructure: what's in your portfolio?

With the best available data and an industry recognised taxonomy (TICCS®), EDHECinfra provides granular, risk-adjusted performance benchmarks of investments in unlisted infrastructure equity and debt

join the evolution at edhecinfra.com/join