

Inflation and Rising Rates An Opportunity for Infrastructure Investors?

 **ARES**

IN COLLABORATION WITH

 **EDHEC***infra*



Executive Summary

In this report, we illustrate that private investments in infrastructure assets can provide resilience in the current rising rate and high inflation macroeconomic environment. The primary structural reason for this resilience is the ability of private infrastructure assets to increase revenues along with inflation.

Private infrastructure assets demonstrated this characteristic during the turbulent first half of 2022. Private infrastructure companies tracked in the EDHECinfra300¹ index declined 5.2% through the first half of 2022², which compares favorably to major public equity indices such as the S&P 500 which declined 20.6%³ during the same period. Infrastructure assets also demonstrated attractive performance relative to similar-duration fixed income benchmarks such as US government debt, which declined 10.8%⁴ in the first half of 2022.

The fundamental driver of private infrastructure's resilience during periods of high, unexpected inflation is the asset class's ability to increase cash flows as inflation rises. While these links between inflation and cash flows are neither universal nor perfect for all infrastructure assets, this report demonstrates there is a meaningful correlation between the two. As inflation rises, the nominal income of infrastructure companies and their dividends (or cash flows) can be expected to increase as well. While some infrastructure assets can adjust their revenues almost immediately to rising inflation, others may only be able to do so with a lag. Compounding the lag effect is the "duration" of infrastructure assets, with longer-duration assets experiencing greater sensitivity to interest rates, and thereby, during periods of rising interest rates may experience greater short-term valuation declines.

While assets that face more of a lag or that have longer duration may experience declining valuations early in an inflationary period, there is good reason to believe that they may provide an opportunity for savvy investors. These assets tend to experience a short-term, negative impact in valuation due to the uncertainty in the length of the lag in rising cash flows. As this uncertainty dissipates, and visibility for rising cash flows improves, these high quality, long-duration assets may provide outsized forward returns as valuation discounts are reversed.

A key takeaway from our analysis is that high inflation is likely to impact different infrastructure assets differently, and these differences may benefit investors who understand how to take advantage of them, or partner with managers who do.

To that end, given high inflation levels, we believe that current conditions may widen the market opportunity for private capital investing in infrastructure assets in both the primary and secondary markets. In addition to the effects on the short and long-term valuations of infrastructure assets, we believe that rising interest rates may constrain federal and local governments' ability to invest in new projects or continue to fund existing infrastructure commitments. As a result, these governmental bodies may increasingly turn to private sources of capital or even divest attractive infrastructure assets. This strain on governments comes at a time when significant investments in infrastructure will be required to support forward economic growth. Therefore, we believe that the supply of private infrastructure assets may increase markedly going forward, creating further opportunities for investors.

We believe this report will serve to remind investors of the fundamental drivers that have underpinned the development of this asset class and that it will illustrate the widening opportunity set that we believe will unfold in both the primary and secondary markets in the years to come.

An Analysis of Inflation, Interest Rates and Infrastructure

In the following pages we, 1) conduct a deep dive into the business models of infrastructure assets and the impact that inflation has on their cash flows, 2) analyze the impact that inflation and rising interest rates have on infrastructure asset prices, 3) review recent performance trends for infrastructure assets relative to other risk assets with similar durations, and, 4) examine the impact of the current environment on governments’ willingness and ability to fund necessary infrastructure assets and the opportunities which could arise for private capital.

increase in the face of inflation to a significant lag following inflation. In this context, it is useful to differentiate between the main infrastructure business models defined in "The Infrastructure Company Classification Standard" (TICCS®⁵) which distinguishes between three types of infrastructure assets: (1) contracted, (2) merchant and (3) regulated. See Figure 1.



I. Inflation and Infrastructure Cash Flows

Future Revenues as an Inflation Hedge

Private infrastructure investments are often presented as an inflation hedge because their revenues tend to be linked, in different ways, to increases in inflation. However, for different types of infrastructure investments, the ability to increase revenues can range from a near-immediate

Figure 1 - Contracted, Merchant and Regulated Business Models

ADJUSTMENT TO INFLATION	
FASTER	Contracted Infrastructure This type of infrastructure asset is characterized by long-term contractual agreements, under which a public- or private-sector customer of the asset commits to paying a defined price or commits to providing a defined income over a pre-agreed contractual period. These contracts are generally long-term in nature, typically in excess of a decade. Such contracts can include explicit inflation pass-throughs. For example, social infrastructure projects in the UK contain contractual clauses that provide for an increase of service payments matching the UK Retail Price Index ("RPI") over the 20+ year contractual service period. However, not all contracted infrastructure benefits from such inflation protection. In each case, a diligent review of the governing agreements is warranted to assess an asset’s exposure to the risk of unexpected inflation.
	Merchant Infrastructure Infrastructure assets that are unregulated and don’t have contracted revenues (or only a small portion thereof) are classified as merchant assets. Merchant asset operators, like power plants or privatized airports, are largely exposed to market risk including fluctuations in pricing or demand. In return they have a great degree of flexibility regarding their pricing. Increases are typically market-based, but to the extent a portion of the revenues is contracted, it is common to see contractual terms that are similar to those encountered in contracted infrastructure. Additionally, merchant operators may, at times, be impacted by regulation in adjacent markets (e.g., the electricity grid for a merchant power generator). Given their market power, some merchant assets may increase revenues near-term with a very tight and quick link to inflation, while others may be able to increase revenues only with a lag. ⁶
SLOWER	Regulated Infrastructure These assets are regulated by a third party which may or may not be independent from the local or central government. The regulation specifically pertains to the (typically monopolistic) business model of the firm, covering, for example, prices or tariffs, capital expenditures or return on invested capital. The operator of such an asset must first agree with the regulator about its cost of capital before a ‘fair’ future revenue stream and tariffs can be determined. The ‘fair’ revenues then tend to include an added incentive for the regulated monopolist to be efficient. A review of the arrangement typically takes place once every five years.

Different Types of Infrastructure Behave Differently

The TICCS classification of infrastructure assets allows us to distinguish important characteristics that can impact an investment's behavior in an inflationary environment. Certain contracted assets, at one end of the spectrum, may automatically increase revenues without meaningful delays when inflation begins to rise. For merchant assets, the ability to increase prices with inflation depends on individual circumstances: these assets will generally need to rely on sustained demand and their inherent market power to increase prices. Regulated assets, at the other end of the spectrum, often require protracted negotiations with regulators or waiting for the next rate rebasing exercise (which can be years away) until prices and revenues can adjust to higher levels of inflation. These types of lagged inflation pass-throughs are higher-risk because the timing and size of higher cash flows are not immediately clear. Importantly, while rational investors would be expected to price the eventual revenue and cash-flow increases into their asset valuations immediately, the uncertainty regarding the duration of the delay and the magnitude

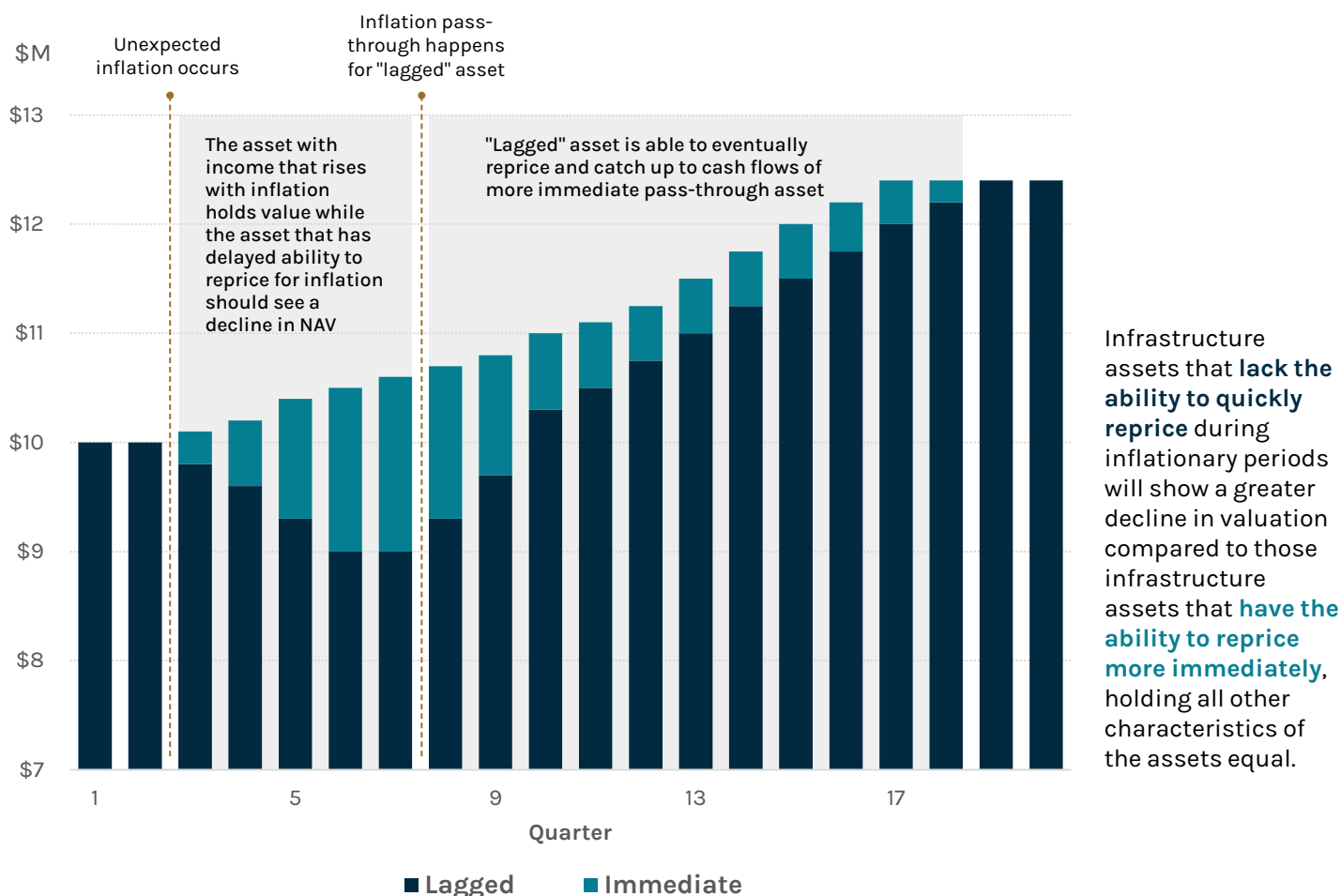
of ultimate pass-through from an inflationary shock can lead to interim valuations that decline by more than the actual lag would warrant, if it was known with certainty in advance. Savvy investors may try to exploit this interim impact on valuations to their advantage, seeking to acquire assets at a discount.

Effects on Valuations – Theory

Figure 2 provides an illustration of how the different timing of inflation pass-throughs may impact the valuations of two hypothetical infrastructure assets: The light blue bars depict an asset that is able to immediately pass-through inflation-driven price increases. Contracted or merchant infrastructure assets could follow this path depending on their underlying contracts or market power. The dark blue bars show an asset with a lag in its ability to adjust pricing to prevailing inflation levels, for example due to a regulatory approval process. Valuations diverge until inflation pass-through at the "lagged" asset occurs and the uncertainty about future cash flows disappears.

Figure 2: The Impact of Inflation on Infrastructure Investments: Immediate vs. Lagged Pass-Through

Differences in Impact to Net Asset Values from Inflation



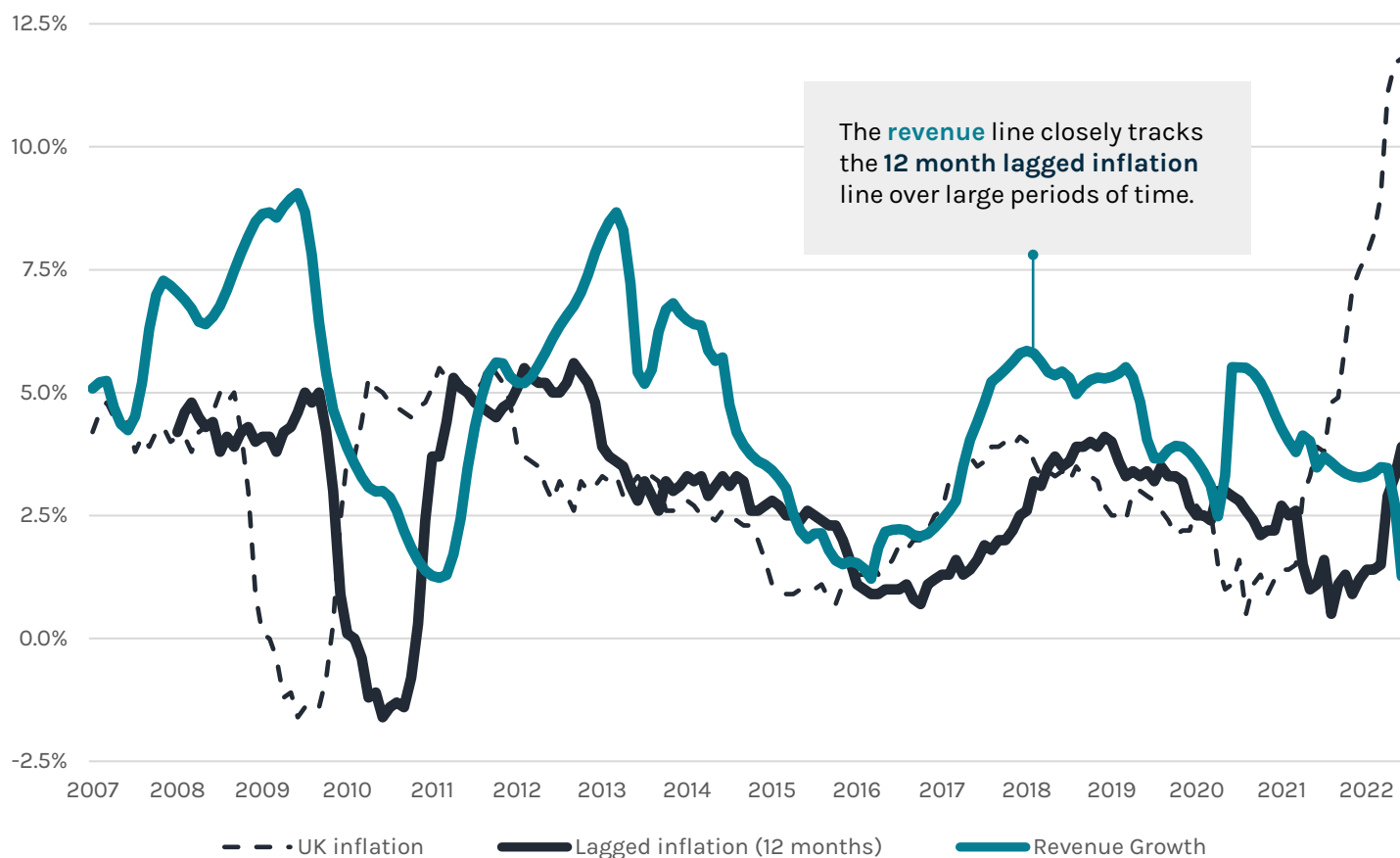
Real World Observations

In order to examine this dynamic in practice, we analyzed a practical example of the relationship between infrastructure companies' revenue growth and inflation. Figure 3 shows the 12-month moving average revenue growth of private infrastructure companies in the UK tracked in the EDHECinfra database between 2007 and 2022, alongside the 12-month change in UK inflation.⁷ We believe this database constitutes one of the most comprehensive datasets measuring the performance of global unlisted infrastructure assets over an extended time period.

At first glance, it appears that periods of rising inflation (dashed blue line in Figure 3) tend to be followed by

increasing revenue growth (teal line in Figure 3) and vice versa. To test this intuition, we analyzed the correlation between inflation and revenue growth over time and found it to be statistically significant for at least 12 lags (months) after the increase in inflation. **This means that infrastructure revenues tend to increase for a period of 12 months after a rise in inflation** confirming, on an aggregate basis, the theory that infrastructure assets should be able to adjust their revenues to inflation, albeit sometimes with a lag. We have further illustrated this finding by replicating the UK inflation line with a 12-month lag (full bodied blue line in Figure 3) towards the actual inflation line (dashed blue line in Figure 3). The lagged inflation line now tends to rise and fall more in line with actual revenue growth, underscoring the relationship.

Figure 3 - The Impact of Inflation on Infrastructure Revenues



As of June 30, 2022. Source: infraMetrics®. EDHEC Private UK Infrastructure Companies 2007-2022; 12-month moving average revenue growth and inflation ("RPI") change.

II. Inflation & Interest Rates – Isolating Impact on Valuations

Duration and Discount Rate Sensitivity

Clearly the timing and ability to grow revenues to keep pace with inflation is a key factor in preserving the Net Asset Value of infrastructure assets, but in an inflationary environment this is not the sole driver of changes in value. Market interest rates, which are themselves highly sensitive to inflation, also play a key role in the valuation of infrastructure assets. Infrastructure investments largely derive their value from a stream of future cash flows that extend far into the future. This creates significant "duration", which is a measure of average length of time that a dollar is invested in the asset, and, as a result, also an indication of the sensitivity of asset values to moves in the interest rate. The longer duration of infrastructure assets generally translates into higher interest rate sensitivity for investors.

We should note, however, that long-duration assets can be highly attractive for certain investors, such as pension funds or insurance companies. In the declining interest rate environment that characterized the post-GFC period, many of these investors saw interest rate sensitivity as a way to defend against low-interest rates driving up the investors' interest-rate-sensitive liabilities.

Rates vs. Inflation Impact on Valuation

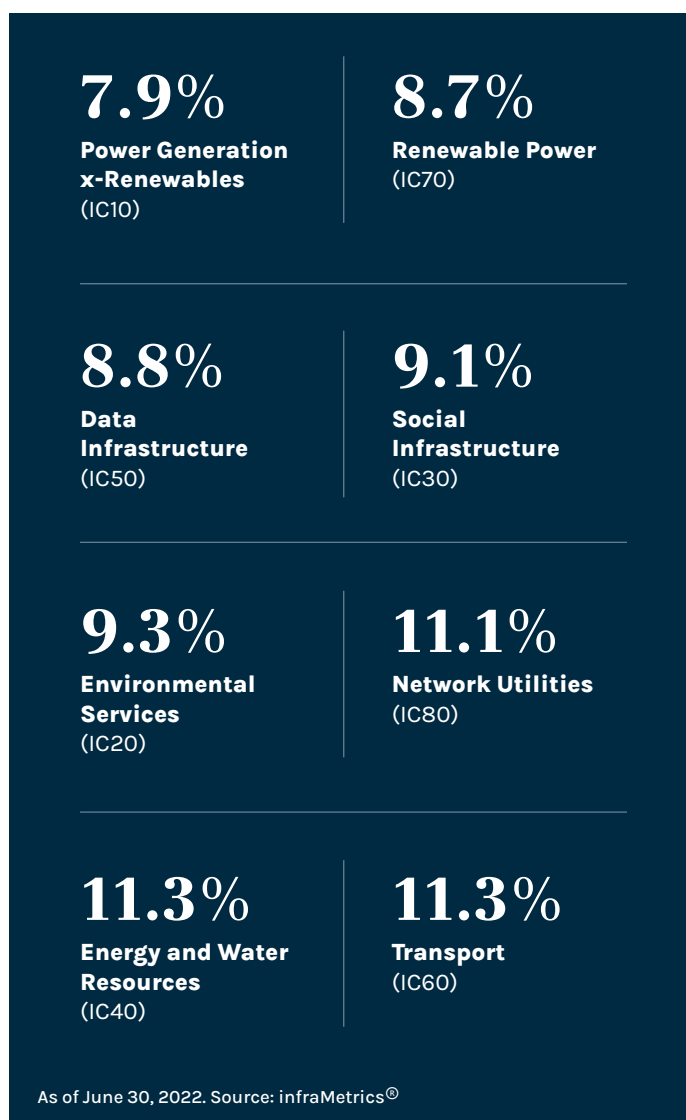
Interest rates can move quickly in the face of higher expected inflation, but most cash flows tend to adjust with a delay. This begs the question: what impact do changes in revenue expectations have on valuations when compared to changes in interest rates? To address this issue, we have attempted to deconstruct the relative impact to Net Asset Values of private infrastructure companies contained in the EDHECinfra300, a broad index of global unlisted infrastructure companies⁸, across revenues and interest rates. For these purposes, we examined changes in NAVs for companies contained in the EDHECinfra300 index due to changes in revenues, the yield curve, or the unlisted infrastructure equity risk premium over the year preceding June 30, 2022.

Based on this analysis, when looking back over the 12 months preceding June 30, 2022, we estimate that changes in the realized level of future dividends caused an average cumulative increase of 5.4% in the NAV of the infrastructure companies that constitute the index. Over the same period, we estimate that the average cumulative effect of individual changes in interest rates resulted in a decline of approximately 11.1% in the NAV of unlisted infrastructure companies in the index. It therefore appears that over the 12 months preceding June 30, 2022, global rate hikes have had a much more pronounced effect on valuations than the prospect of revenue increases.

Differences within the Infrastructure Sector

These results intuitively make sense when considering that duration is generally much more significant when rates rise from a very low base, as was the case over the past year. At the same time, the results highlight the importance of building a diversified infrastructure portfolio consisting of assets with different durations. Based on the analytics provided by EDHEC's infraMetrics⁹, the average duration of different subclasses of infrastructure can vary significantly with the "Power Generation" sector (excluding renewables) at the lower end of the spectrum and "Transport" at the higher end and almost 350 basis points difference in between (see Figure 4).¹⁰

Figure 4: Average 5-year Duration 2017-2022 by TICC Industrial Activity Types



III. Infrastructure Holding Up Well Vs. Other Risk Assets in 2022

Context Matters – Comparison to Other Asset Classes

2022 has been a year of rising global inflation and rising interest rates. So how much short-term risk are investors in infrastructure really exposed to because of inflation and the resulting changes in interest rates?

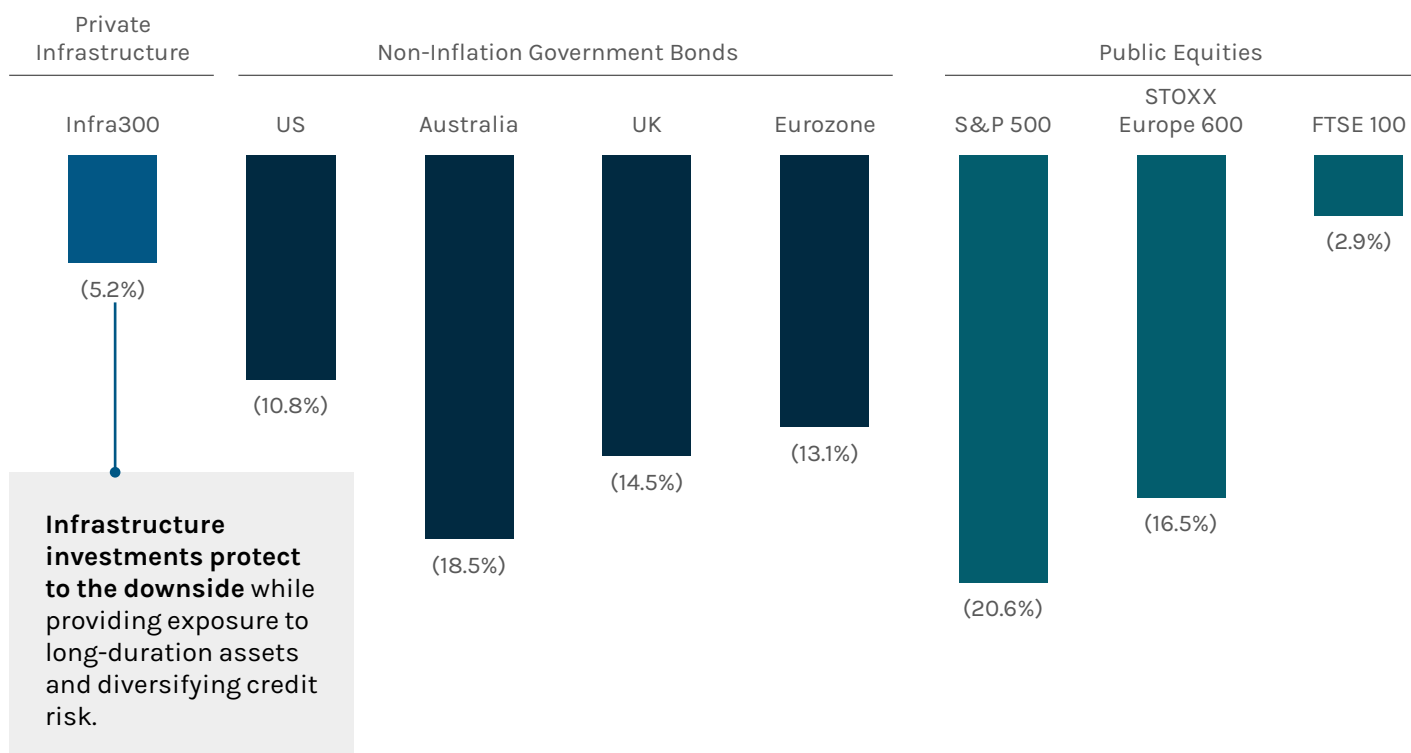
A quick guide is provided by comparing the bond market with the EDHECinfra300 index of unlisted infrastructure equity. On a total return basis, using local currency returns, the infra300 is down 5.2% YTD as of the end of June (see Figure 5). By contrast, non-inflation indexed government bond indices with comparable modified duration (8 to 9 years) for the US, Australia, the UK and the Eurozone are down 10.8%, 18.5%, 14.3% and 13.1% respectively for the same time period.¹¹ In other words, controlling for duration, infrastructure is clearly not as exposed to interest rate risk as are government bonds of similar duration.

Over the same time period, the EDHECinfra300 has handsomely outperformed some of the major equity market indices. For listed equity markets, the first half of

2022 was largely characterized by steep losses (e.g. the S&P 500 down 20.6%, the STOXX Europe 600 down 16.5% and the FTSE 100 down a moderate 2.9%¹²). Admittedly, a large part of these declines was simply driven by the overall volatility that has been roiling public markets since the end of 2021.

Taking a closer look at the private infrastructure market, replacement costs of existing infrastructure assets are currently rising as a result of inflation, which may increase the values of assets in the ground and provide added protection against new market entrants. Accordingly, we observe continued demand for infrastructure assets in the market. Even if overall valuations may have been reduced in the first half of 2022, as indicated by the infra300 index, participants in the secondary market continue to pay par (recently reported NAV) for quality infrastructure portfolios. This shows that the difference between a purely technical DCF-driven valuation and the market valuation determined by supply and demand can be material.

Figure 5 – First 6 Month Declines of Select Indices in 2022



As of June 30, 2022. Infra300: EDHECinfra300 index, equally weighted, based on local currencies. Sources: infraMetrics®, Datastream, CapitalIQ

IV. Broadening Market Opportunity with Changing Inflation and Rate Regime

Effects of Rising Rates – Increasing Supply of Infrastructure?

Thus far, we have focused on the impact that inflation, revenue increases and interest rate increases have on the valuation of infrastructure assets. In addition, we believe rising interest rates may have a profound effect on the supply of infrastructure investments. Rising rates are likely to impact the budgetary constraints for federal and local governments. While during times of near zero or even negative interest rates, holding infrastructure assets on the government's ledger was affordable, going forward it may be prudent for a government to sell pieces of such infrastructure or seek other forms of private capital to advance a project. Similar considerations may apply to privately financed infrastructure projects. Provided that an elevated rate environment persists, this effect may lead to more infrastructure assets seeking a private capital solution. To that, we can add the immense number of new infrastructure projects that are expected to begin in the coming years. Some estimates, based on current trajectories, expect the need for roughly \$130 trillion of global investments into projects to decarbonize the economy and renew critical infrastructure between 2022 and 2027 alone.¹³ Given the laws of supply and demand, this potential increase bodes well for investors who want to deploy more into the asset class going forward.

Opportunities in the Secondary Market

To the extent asset valuations experience a significant decline based on increasing discount rates, the current environment may pose challenges to investors who have been targeting cash flow matching in the near term (e.g., in the insurance industry). The same may be true for closed-end infrastructure funds that are currently approaching their end of life as such structures generally have holding periods that are limited, and their overall life rarely exceeds 12 years (including potential fund extensions). If these limitations are approaching, managers of such funds may attempt to further extend their holding periods. However, some investors may lack the long-term investment horizon necessary to ride out the current seminal shift in interest rates. For assets where either GPs or LPs are seeking liquidity, the secondary market offers solutions. GPs increasingly make use of GP-led secondary transactions, where they offer LP investors the option to roll over their existing interests in a specific fund asset (or group of assets) into a continuation vehicle that the GP continues to manage, extending holding periods. Those LPs opting for liquidity instead are then paid by and replaced with a secondary purchaser. And cash-seeking individual LPs can simply sell their infrastructure fund interests to a secondary buyer.





Conclusion: Investment Opportunities in Infrastructure

Tying it all Together

The data presented above demonstrate that private infrastructure revenues tend to rise following an increase in the inflation rate which provides resilience in inflationary periods. This is evident in the current environment where infrastructure investments hold their value better than other asset classes of similar duration. While the correlation between inflation and valuation is far from perfect or immediate, the impact of higher interest rates is instant and observable. Both recent inflation and the resulting rise in interest rates are showing effects on the values of certain infrastructure assets, and investors should generally expect that – near term and all else being equal – longer duration assets experience larger markdowns compared to shorter duration assets. However, over time, we expect valuations to recover as uncertainty over the transmission mechanisms of inflation into future cash flows dissipates. In the interim, investors holding a diversified mix of different infrastructure assets with varying duration, geographic exposure and underlying business models managed by a seasoned investment team should be able to enjoy the benefits of the defensive nature of many infrastructure investments, together with the other well-known benefits of the asset class.

Investment Horizons Matter

For investors who have deployed concentrated capital into infrastructure assets, especially assets with long duration, the impact of the current rising rates environment comes down to the projected holding period of the respective asset: to those investors with a truly long-term perspective, the short-term impact may not matter at all given that cash flows can be expected to eventually rise and make up for rates-related reduction in headline-value.

Opportunities Abound

On the other hand, investors willing to deploy capital into infrastructure near to medium term may benefit from the valuation uncertainty and attempt to "time the market": especially investors with a longer-term investment horizon who have the ability to hold such assets long enough for any aftershock-inflation to feed through into revenue adjustments should be able to reap the benefits of prudent and disciplined deployment.

Inflation – a Trigger for Deployment?

Regardless of which specific group an infrastructure investor belongs to – primary, secondary, equity or debt – we believe the infrastructure market will offer exciting investment opportunities in the near term, driven by the ongoing valuation re-assessment and the increased uncertainty of values of future cashflows that have been prompted by inflation and rising rates. Add to that the potential of more infrastructure assets being brought to market by cash-strapped governments as a result of rate increases and the need for future investments, and inflation may just have triggered a window of opportunity for investors interested in this asset class.

Co-Authors



Dr. Ralph Eissler, CFA®

ralph.eissler@landmarkpartners.com

Mr. Eissler is a Principal in the Quantitative Research Group within Ares Global Client Solutions. Prior to joining Ares in 2021, Mr. Eissler was a Director at Landmark Partners, where he worked closely with Landmark's Quantitative Research Group in a role focused on legal and compliance. Previously, Mr. Eissler worked as a private equity attorney with Linklaters LLP and Kirkland & Ellis LLP, and as an economist for the European Commission, Brussels, in the internal market directorate covering topics including financial regulation. Mr. Eissler began his career as an Associate in the Corporate and Private Funds Groups at Simpson Thacher & Bartlett LLP. Mr. Eissler holds the German equivalent of a J.D. as well as an M.S. in Economics, both from the University of Konstanz, Germany, an LL.M. from NYU School of Law and the German equivalent of a Ph.D. ("Dr. jur.") from the University of Konstanz, Germany in Law. Mr. Eissler is a CFA® charterholder.



Frédéric Blanc-Brude, Ph.D.

Frederic.BLANC-BRUDE@edhec.edu

Frédéric Blanc-Brude is Director of the EDHEC Infrastructure Institute and EDHEC Asia Pacific and the Director of EDHECinfra. He joined EDHEC in 2012 after 10 years of private sector experience in the infrastructure finance field, and direct involvement in more than USD6bn of transactions. His research work focuses on asset pricing applied to highly illiquid assets and the stochastic modelling of cash flows in infrastructure projects. He has published papers in economics and finance journals, recently co-authored a book on the valuation of unlisted infrastructure equity and debt investments and is a regular contributor to the press.

He is a member of the editorial board of the Journal of Alternative Investments. He holds a PhD in Finance (King's College London) and degrees from the London School of Economics, the Sorbonne, and Sciences Po Paris. He is a regular contributor to the G20 working group on long-term infrastructure investment, has advised the European Occupational Pensions and Insurance Authority on the prudential treatment of infrastructure investments and also represents EDHEC on the Advisory Board of the Global Infrastructure Facility of the World Bank.



Avi Turetsky, Ph.D.

avi.turetsky@landmarkpartners.com

Mr. Turetsky is a Partner and Co-Head of the Quantitative Research Group within Ares Global Client Solutions. He jointly oversees the group's Original Research, Quantitative Software Development, and Tools Production teams and coordinates with other quantitative professionals within Ares' investment teams. Prior to joining Ares in 2021, he was a Partner in the Landmark Partners Quantitative Research Group, where he focused on analyzing investment strategies, risk management, performance measurement and customer-oriented projects. Previously, Mr. Turetsky was COO of the Riverside Company's European private equity business. In addition, he was an Investment Banking Associate at Lehman Brothers and Lazard Middle Market. Mr. Turetsky holds appointments as an Adjunct Professor of Design & Innovation and as an Engaged Management Scholar Research Fellow at the Weatherhead School of Management at Case Western Reserve University. He is a member of the advisory boards of the INSEAD Private Equity Initiative and the EDHEC Infrastructure Institute, where he is also Secretary of The Infrastructure Companies Classification Standard (TICCS®) committee. Mr. Turetsky holds a B.S. from Bar-Ilan University in Economics, an M.B.A. from INSEAD and a Ph.D. from the Weatherhead School of Management at Case Western Reserve University.

Endnotes

¹ The EDHECInfra300[®] index is an equally weighted equity index that represents the performance of 300 unlisted infrastructure companies. Constituents are selected to create a representative sample of the private investable infrastructure equity investment universe in most major markets globally. The index and subindices are designed to capture the dynamics of the global private infrastructure market. EDHECInfra universe construction and index computation rules, constituents and downloadable index data are available at indices.edhecinfra.com.

² As of June 30, 2022. Source: [infraMetrics[®]](#).

³ As of June 30, 2022. Source: [CapitalIQ](#).

⁴ As of June 30, 2022. Source: [United States Tracker 7-10 Years Datastream Government Index](#).

⁵ The Infrastructure Company Classification Standard (TICCS[®]) was created by EDHECInfra to provide investors with a frame of reference to approach the infrastructure asset class. See <https://edhec.infrastructure.institute/ticcs>

⁶ Certain infrastructure assets, such as for example renewable power plants, can realize immediate "inflation protection" from price increases in markets for functional substitutes, i.e. oil and gas: rising prices in these commodities markets often go hand in hand with (or even drive) a higher inflationary environment.

⁷ UK inflation is here measured by the UK Retail Price Index ("RPI") given that contractual arrangements in infrastructure projects tend to reference this inflation measure (as opposed to the Consumer Price Index). While detailed revenue data for private infrastructure investments are not generally available, Ares' Quantitative Research Group has been able to partner with EDHECInfra for purposes of this paper. EDHECInfra collects data on a broad universe of approximately 6,800 investable unlisted infrastructure companies in 25 key markets, with the UK being selected for purposes this publication purely based on criteria of data quality and availability.

⁸ The EDHECInfra300[®] index is an equally weighted equity index that represents the performance of 300 unlisted infrastructure companies. Constituents are selected to create a representative sample of the private investable infrastructure equity investment universe in most major markets globally. The index and subindices are designed to capture the dynamics of the global private infrastructure market. EDHECInfra universe construction and index computation rules, constituents and downloadable index data are available at indices.edhecinfra.com. We believe the EDHECInfra300 replicates a broad market exposure to the different segments of the unlisted infrastructure equity reference universe in the most active markets in the world.

⁹ As of June 30, 2022. [infraMetrics[®]](#) is a provider of market indices, benchmarks and valuation analytics for investors in unlisted infrastructure equity and private debt. Available at: <https://edhec.infrastructure.institute/>

¹⁰ The EDHECInfra dataset underlying the duration calculation comprises more than 750 infrastructure firms. Averaging over a 5-year period provides a more robust view of the respective differences.

¹¹ As of June 30, 2022. Comparators selected on the basis of 10-year average modified duration: [United States Tracker 7-10 Years Datastream Government Index](#), [Australia Total Over 10 Years Datastream Government Index](#), [European Monetary Union Benchmark 10 Years Datastream Government \(iBoxx\)](#), [iBoxx United Kingdom Sterling Sovereigns and Subordinated-Sovereigns 10-15 GBP](#)

¹² As of June 30, 2022, each in local currencies. Source: [CapitalIQ](#).

¹³ McKinsey Quarterly: Here comes the 21st century's first big investment wave. Is your capital strategy ready? March 18, 2022: <https://www.mckinsey.com/business-functions/operations/our-insights/here-comes-the-21st-century-s-first-big-investment-wave-is-your-capital-strategy-ready>

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