



Global Investment Research | Equities

US equity market betas – why they matter and how they are changing

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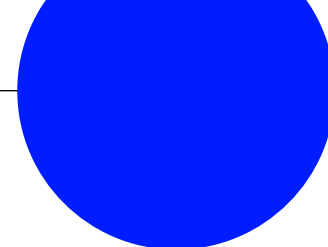
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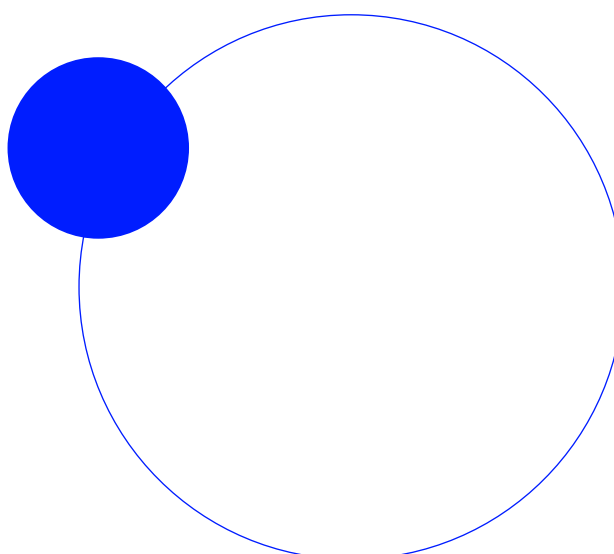


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Highlights

- The beta of an investment security, like a stock or group of stocks, measures its correlation and volatility of returns relative to the market, or broader benchmark, and is an important characterization of the security's risk relative to the benchmark
- Betas are not static but respond to changes in the benchmark, changes in the economic and regulatory environment, and economic shocks
- In recent years, there have been notable changes in the beta of industries and sub-sectors driven both by potentially transitory changes (Covid supply shock, oil price shocks) and by structural shifts in the economy (investment in AI technologies, the green transition, the lasting legacies of Covid)
- Investors should be mindful of these shifts when thinking about the cyclical/defensive characteristics of their portfolios and assessing where investment opportunities may lie in the context of the economic and market cycle
- It is difficult to determine whether changes in industry and sector betas are temporary or permanent, but investors should consider the persistence of economic shocks in forming expectations of beta



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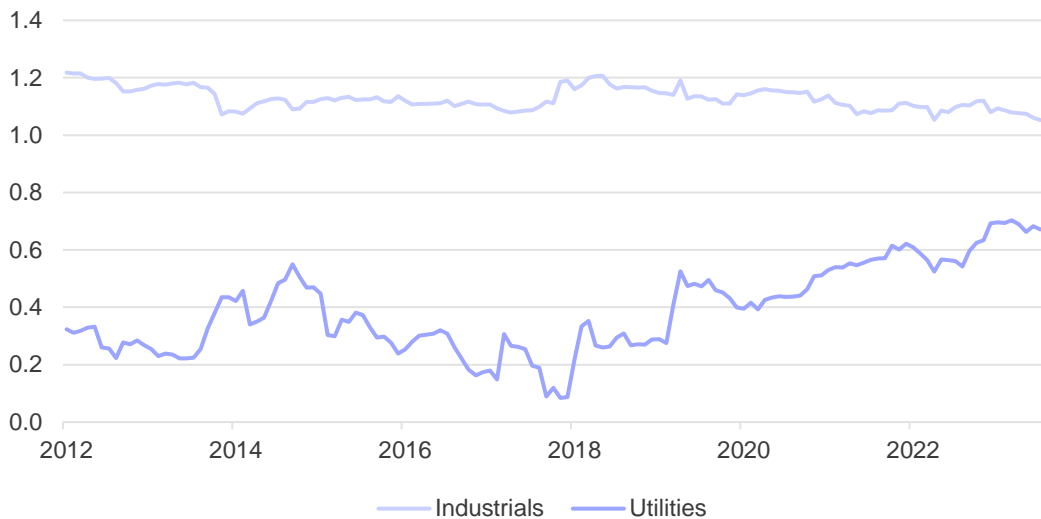
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Introduction - why betas matter

The cyclical nature of a group of stocks, as measured by their beta to the broad market, gives us an idea of the direction and degree of their co-movement with the market. Are stocks in a certain industry more cyclical, moving in sync with the market to some extent and benefiting from broad market rallies, or are they more defensive, moving differently from the market, thereby buffering portfolios in the event of a broad downturn? It is an important question when thinking about the risk characteristics of a portfolio.

Investors may be lulled into thinking that these co-movement characteristics are set in stone, and indeed, we frequently talk about cyclical and defensive industries as if these are common knowledge. However, the cyclical nature of stocks in a particular industry or sector is not static. This is illustrated in Exhibit 1, which shows that the beta of the Russell 1000 Industrials industry has slowly declined over the last 12 years or so from about 1.2 to close to 1.0. But the beta of the Russell 1000 Utilities industry, which is often considered the most defensive of industries, has increased dramatically in the last few years.

Exhibit 1: Industrials and Utilities industry 36-month betas to Russell 1000



Source: FTSE Russell/LSEG. Data as of 31 July 2024. Past performance is no guarantee of future results.

In this paper we review the intuition of betas. We then discuss some reasons for betas changing over time, and present some recent examples of betas changing, with an eye to whether these changes are expected to be permanent or temporary. In this discussion we focus on some recent shocks to the market that seem to have contributed to changing betas, including the green transition, Covid, and the Artificial Intelligence (AI) boom. The data used in this study is drawn from the Russell 1000, so the conclusions drawn are specifically about US large cap securities. However, the intuition and the lessons learned can be applied more generally.

Some beta math

To obtain a better intuition of beta, it is useful to review the calculation of beta in its simple form.

$$\text{beta} = \frac{\text{covariance}(\text{security}, \text{benchmark})}{\text{variance}(\text{benchmark})} = \frac{\sigma_s \rho_{s,b} \sigma_b}{\sigma_b^2} = \frac{\sigma_s \rho_{s,b}}{\sigma_b}$$

where σ_s and σ_b are the standard deviations of returns for the security and the benchmark respectively, and $\rho_{s,b}$ is the correlation of the security to the benchmark. Taking the last term and rearranging, we get

$$\text{beta} = \rho_{s,b} \frac{\sigma_s}{\sigma_b}$$

So, beta is the correlation of the security to the benchmark, multiplied by the ratio of the security's volatility (standard deviation of return) to that of the benchmark. The formulation helps with the following intuition:

- If the security has a low correlation with the benchmark and their volatilities are not too different, then the security will have a low beta and be considered defensive.
- If the security has a correlation of one to the benchmark, then the beta is determined by the volatility ratio.
 - If the security has a volatility less than that of the benchmark, then it moves perfectly with the benchmark, but its swings are smaller than those of the benchmark, and it has a beta below one.
 - If the security has a volatility more than that of the benchmark, then it moves perfectly with the benchmark, but its swings are larger than those of the benchmark, and therefore its beta is above one and it is a more cyclical security.

These examples, albeit extreme, help to understand why betas are what they are, and why they change.

Why do betas change?

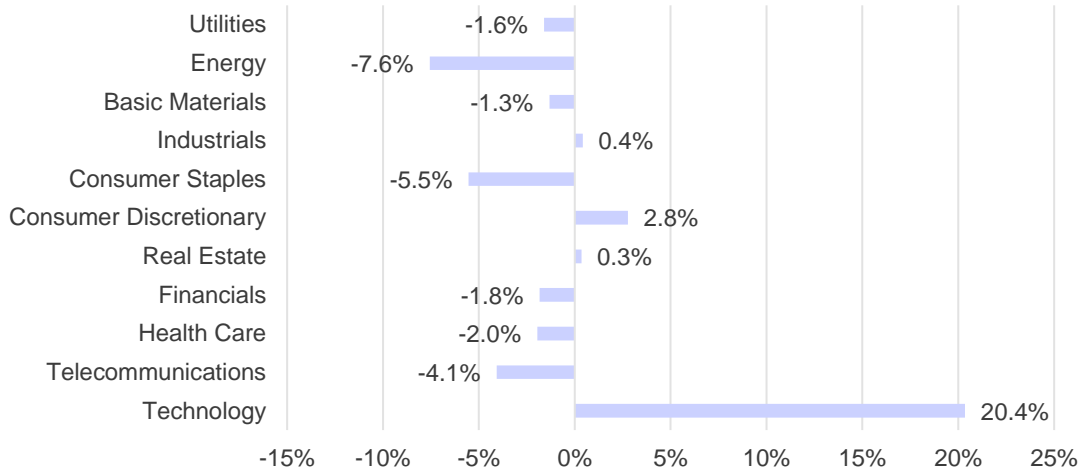
It is important to know why betas have changed, since it may indicate whether these changes are likely to be temporary or permanent. Is it because of underlying structural changes in the economy, or because of one-off shocks, like Covid or the Global Financial Crisis (GFC), or perhaps a combination of the two? We assess these issues in this paper, drawing on Russell data from the last twelve years or so for which we have data for the current [ICB classification](#) of industries, sectors (within industries) and sub-sectors (within sectors) throughout the paper. The betas discussed are measured over rolling 36-month windows.

Measurement effects due to the evolution of the benchmark

Beta is measured relative to a benchmark, and equity benchmarks reflect not only the underlying economy but the market conditions that result in the inclusion of stocks in the benchmark. Specifically, the weights of the stocks in the benchmark become very important in determining its characteristics. Since 2010, the structure of the broad index against which cyclical is measured has changed and may *partly* explain the shifts in the data (i.e., there may be a measurement effect). Within the Russell 1000 US

large-cap universe, the Technology industry made up 35% of the index in July 2024, compared to 14% in January 2010, on the back of faster growth in technology companies. Over that period, Consumer Staples, Energy and Telecommunications saw their index weights decrease by about 5.5%, 7.6% and 4.1%, respectively (Exhibit 2). Of course, these changes in index composition have a basis in the real economy and in some of the same structural shifts that have influenced industry cyclical.

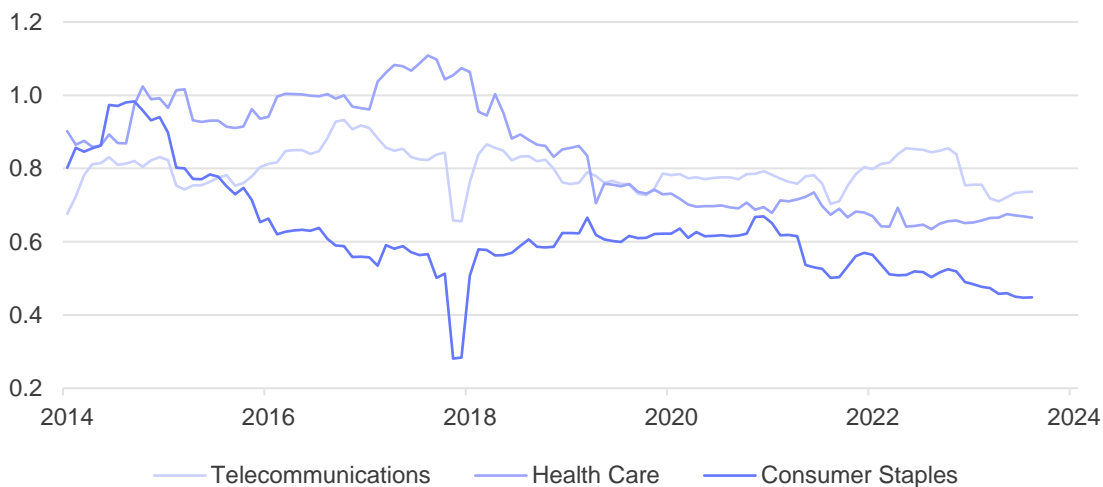
Exhibit 2: Change in Russell 1000 industry weights between January 2010 and July 2024



Source: FTSE Russell/LSEG. Data as of 31 July 2024. Past performance is no guarantee of future results.

Going back to the beta intuition, increasing the weight in the Technology industry means that industry groups that have economic characteristics more like those of technology stocks will have higher correlations with the benchmark, and consequently higher betas. On the other hand, since Technology tends to have higher than average volatility, the volatility ratio for many other industries dropped, resulting in lower betas. Exhibit 3 shows that the betas for Telecommunications, Health Care, and Consumer Staples dropped over the last ten years or so as Technology accumulated more weight in the Russell 1000 benchmark.

Exhibit 3: Telecommunications, Health Care, and Consumer Staples industry 36-month betas to Russell 1000

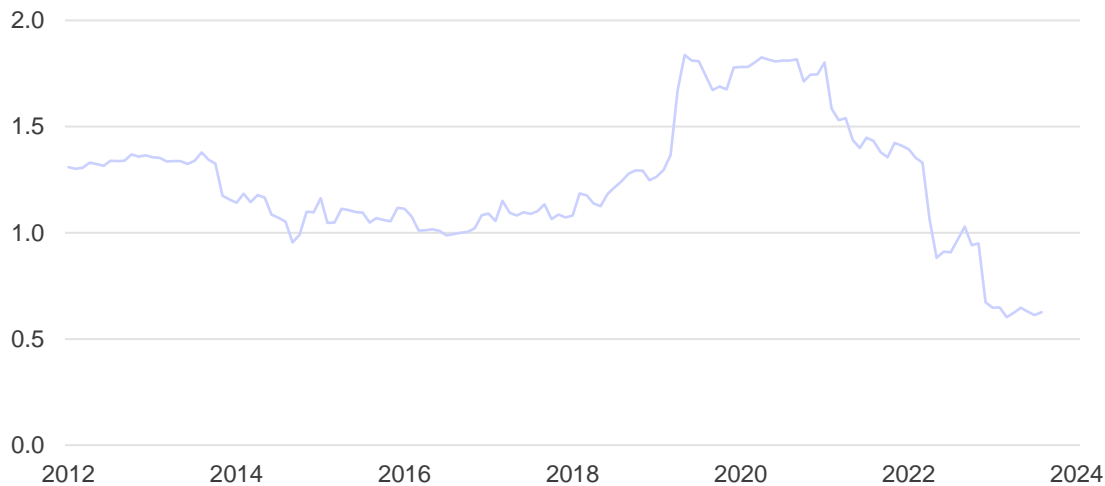


Source: FTSE Russell/LSEG. Data as of 31 July 2024. Past performance is no guarantee of future results.

Transitory shocks and changes in betas? The case of Energy

More dramatic changes in beta can come from economic shocks that significantly change the correlation of a particular group of stocks to the benchmark. A good example is Energy. Exhibit 4 shows that the industry's 36-month rolling beta has gone through massive swings.

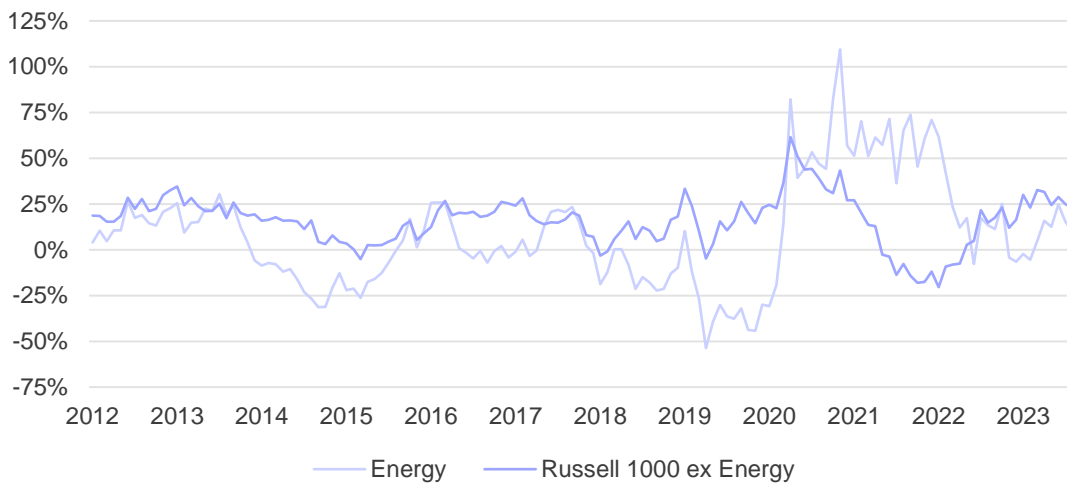
Exhibit 4: Energy industry 36-month beta to Russell 1000



Source: FTSE Russell/LSEG. Data as of 31 July 2024. Past performance is no guarantee of future results.

The big spike in Energy beta came in March 2020 at the beginning of the Covid shock. While most of the equity market bounced back relatively quickly, the global slowdown in economic production led to a prolonged slump in oil prices, and consequently in the Energy industry. This divergence in returns can be seen in Exhibit 5 which shows the 12-month rolling returns of the Energy industry and that of the rest of the Russell 1000 index. Oil prices did spike with the invasion of Ukraine in early 2022, at the same time that rising interest rates led to a broad sell-off in the market, again leading to a disconnect between Energy and the rest of the market. As the equity market recovered in 2023, the Energy industry cooled down as oil prices came back down. The Covid and Ukraine shocks led to a drop in correlation between Energy and the benchmark, leading to a low beta recently. However, it is doubtful that this low correlation will persist, and Energy's beta could return to its long-time measure.

Exhibit 5: 12-month return for Energy and Russell 1000 ex Energy

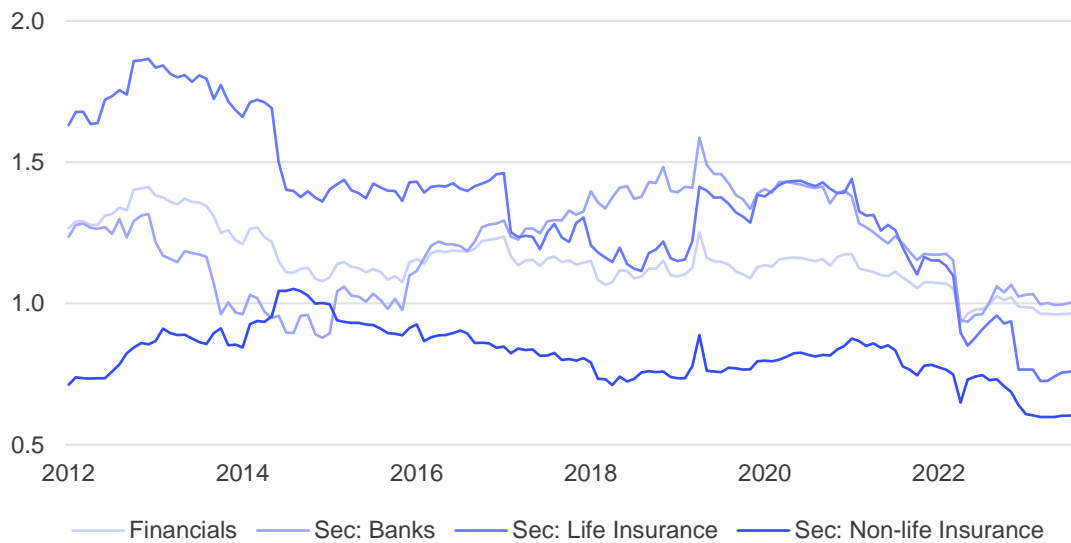


Source: FTSE Russell/LSEG. Data as of 31 July 2024. Past performance is no guarantee of future results.

Permanent shocks and changes in beta? The case of Financials

The Financials industry presents an interesting case in which we may expect that the change in beta is more likely to persist. Exhibit 6 shows that Financials had high and fairly stable beta between 1.0 and 1.2 (and correlation around 0.8 to 0.9) since 2010. It did not rise much in the early stages of Covid in 2020 despite investor fear of another financial crisis. Within Financials, the beta for the Banks sector has actually declined in the post-Covid era from 1.4 in early-2020 to about 1.0 in July 2024 (with a slight uptick in beta since the regional banking crisis in March 2023 that impacted small-cap banks more). And betas for the Life Insurance and Non-life Insurance sectors have declined since end-2021 when the Covid-crisis started to abate. It is possible that post-GFC regulatory factors such as higher bank capitalization requirements and Basel 3 regulations have reduced the leverage of bank and insurance sector balance sheets and served to somewhat reduce their sensitivity to market shocks. They may also have benefited from the higher interest rate regime since 2022, after nearly 15 years of near-zero rates and flat yield curves dampened net interest income (even as banks' Treasury portfolios suffered from rising rates).

Exhibit 6: Financials industry and select 36-month sector betas to Russell 1000



Source: FTSE Russell/LSEG. Data as of 31 July 2024. Past performance is no guarantee of future results.

Recent economic changes and changing betas

The examples of changing betas given above were either long-term changes, in the case of benchmark evolution and regulatory changes impacting Financials, or expected ephemeral changes, in the case of the Energy industry. However, from recent history, we observe several secular drivers of fundamental changes in betas. In the remainder of the paper, we identify three thematic drivers that seem to have had important impacts on beta: investment in AI technologies, the green transition and changes in economic behavior resulting from the Covid era. The macro environment post Covid, marked by high inflation and interest rates, may also have had an impact. In each of these cases, we tie the movement in beta to the thematic driver.

Exhibit 7 summarizes the change in beta of the industries, sectors and sub-sectors discussed thus far in the paper and in the following section on secular themes.

Exhibit 7: Select US equity industry, sector and sub-sector 36-month beta changes relative to Russell 1000

Industry	Sector / Sub-sector	Period		Beta change		Direction of change	Relevant themes
		Start date	End date	Start beta	End beta	increase (+) / decrease (-)	
Energy	--	Dec-21	Jul-24	1.80	0.63	-1.18	Oil price shocks
Financials	Banks	Mar-20	Jul-24	1.59	1.01	-0.58	Regulatory impact
Financials	Life Insurance	Dec-21	Jul-24	1.44	0.77	-0.68	Regulatory impact
Financials	Non-life Insurance	Dec-21	Jul-24	0.88	0.61	-0.27	Regulatory impact
Technology	Semiconductors	Dec-21	Jul-24	0.96	1.72	+0.76	AI
Utilities	Conventional Electricity	Oct-18	Jul-24	0.02	0.67	+0.65	AI, Green transition
Utilities	Multi-utilities	Oct-18	Jul-24	-0.01	0.58	+0.59	AI, Green transition
Discretionary	Automobiles	Apr-19	Jul-24	0.51	1.77	+1.26	Green transition
Energy	Renewable Energy Equipment	Aug-18	Jul-24	0.82	1.73	+0.91	Green transition
Real Estate	Industrial REITs	Feb-21	Jul-24	0.48	1.35	+0.87	Covid
Real Estate	Infrastructure REITs	Oct-19	Jul-24	0.10	1.09	+0.99	Covid
Real Estate	Office REITs	Jan-20	Jul-24	0.73	1.26	+0.53	Covid
Real Estate	Retail REITs	Jan-20	Jul-24	0.50	1.10	+0.60	Covid

Source: FTSE Russell/LSEG. Data as of 31 July 2024. Past performance is no guarantee of future results.

The Green transition and the AI revolution

The first two of these recent secular trends have the potential to change fundamental patterns of economic behavior. From that standpoint, both the green transition and the AI revolution could result in long-lasting changes in betas. There is also considerable overlap in the affected industries and sectors.

Semiconductors and Conventional Electricity betas rise amid AI enthusiasm

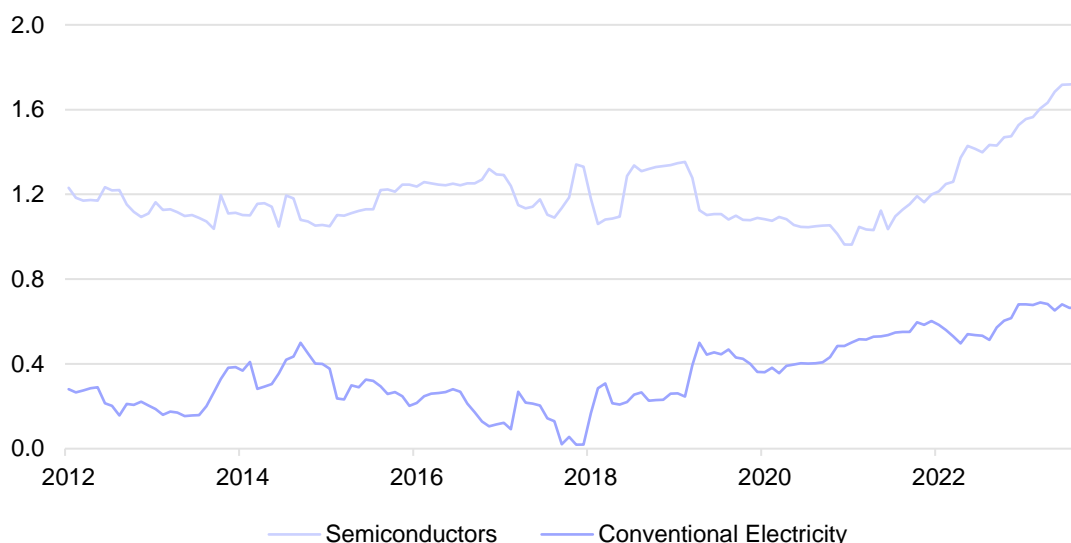
Enthusiasm behind the potential for AI technologies to transform myriad roles and functions and broadly enhance productivity has led to heavy capital investment in this area. The beneficiaries of this investment are spread across the technology supply chain – semiconductor chipmakers, chipmaking equipment manufacturers, software providers, cloud providers – and beyond to other suppliers of AI computing needs – data centers, providers of electricity and low latency communication networks, etc.

Exhibit 8 shows the rolling 36-month betas for the Semiconductors and Conventional Electricity sub-sectors within the Technology and Utilities industries, respectively, which have risen notably since 2020. In general, companies that have provided the hardware and equipment necessary for AI computing have seen strong growth during this period. Unsurprisingly, Semiconductors, which was already a highly cyclical sub-sector, with a beta between 1.0 and 1.2 over the last ten years, saw its beta rise sharply

since end-2021 to around 1.7 as of July 2024, in the context of Technology’s growing weight in the Russell 1000 benchmark.

Electricity is a second order beneficiary of the AI investment trend that has generated enormous demand for electricity to power data centers. The International Energy Agency estimated that electricity consumption by data centers, AI computing and cryptocurrency mining could double between 2022 and 2026.¹ As such, the Conventional Electricity sub-sector that includes companies that generate and distribute electricity using fossil fuels has benefited and partially tracked the growth in the broader market resulting in a higher correlation, and higher beta, to the benchmark.

Exhibit 8: Select US equity sub-sector 36-month betas to Russell 1000



Source: FTSE Russell/LSEG. Data as of 31 July 2024. Past performance is no guarantee of future results.

Green transition has cross-industry impact

The green transition, with the goal of shifting energy use to clean energy and more efficient utilization of that energy, has led to significant investment in areas that span several industries and sub-sectors. Exhibit 9 shows the 36-month betas to the Russell 1000 index for the Automobiles, Renewable Energy Equipment, Conventional Electricity and Multi-utilities sub-sectors, all of which show a notable rise in betas since the end of 2018.

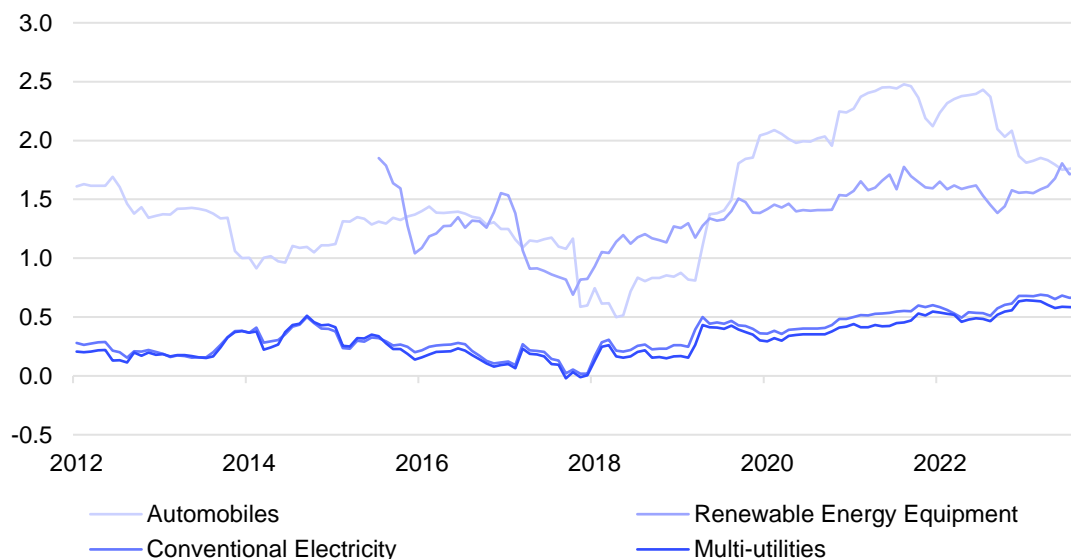
Electric vehicles are a highly visible area of growth that has changed the equation for conventional vehicle manufacturers. The Automobiles sub-sector within Consumer Discretionary has seen a higher volatility relative to the benchmark and higher beta.

The transition to cleaner electric vehicles has further propelled demand for electricity and its distribution networks. The Conventional Electricity and Multi-utilities sub-sectors within Utilities have both seen higher correlations to the benchmark and higher betas. This has contributed to a higher beta for the industry as a whole, challenging the traditional view of Utilities as a defensive area.

And investment in renewable energy generation has benefited the renewable energy supply chain. One example is the Renewable Energy Equipment sub-sector within Energy, which, as a newer area, has been more volatile than the benchmark and slightly more correlated to it, resulting in a higher beta since end-2018.

¹ IEA (2024). Electricity 2024 – Analysis and forecast to 2026.

Exhibit 9: Select US equity sub-sector 36-month betas to Russell 1000



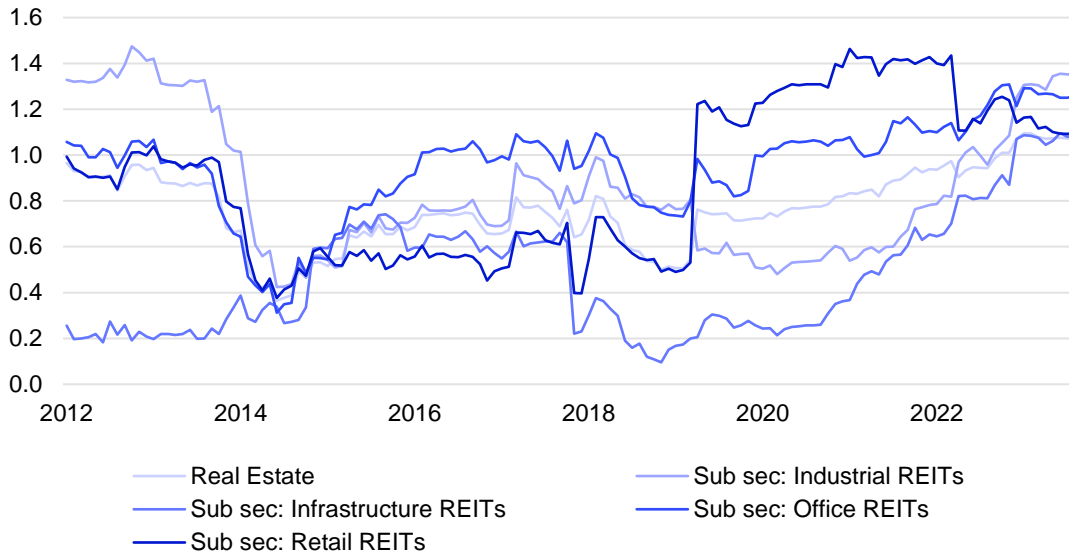
Source: FTSE Russell/LSEG. Data as of 31 July 2024. Past performance is no guarantee of future results.

The long-lasting effects of Covid, particularly in Real Estate

We may not be surprised that economic shocks have an impact on betas, but it would be reasonable to expect betas to revert to their original state after the shock passes. However, the Covid global pandemic’s lasting legacies may have permanently altered certain pockets of the market, notwithstanding the ongoing “normalization” of inflation and interest rates. For example, while many companies are requiring employees to be back in the office at least a few days a week, there seems to have been a downshift in demand for office space and changes to the type of office space sought after (in terms of size, location, etc.). Similarly, increased use of the internet for retail, which accelerated during the pandemic out of necessity, has led to less demand for physical retail space and more demand for industrial and warehousing spaces. The US fiscal stimulus post-Covid directed substantial investment into public infrastructure. Unsurprisingly, the real estate industry reflects these shifts.

The Russell 1000 Real Estate industry is predominantly comprised of real estate investment trusts. Exhibit 10 shows the 36-month betas to the Russell 1000 index for several REITs sub-sectors within Real Estate, indicating a notable rise in betas since the end of 2019 and early-2020. Some of the largest rise in betas in this period can be seen in areas like Industrial REITs, Infrastructure REITs, Office REITs and Retail REITs. In the higher policy rate environment post-Covid, these sub-sectors have displayed higher correlations with the market but also higher volatility, which is reflected in their betas.

Exhibit 10: Real Estate industry and select sub-sector 36-month betas to Russell 1000



Source: FTSE Russell/LSEG. Data as of 31 July 2024. Past performance is no guarantee of future results.

Conclusions

The cyclical nature of industries and sectors is a key consideration when evaluating the risk profile of a portfolio. Our analysis of recent Russell 1000 data indicates that betas are not static but are influenced by changes in the benchmark, the economic and regulatory environment, and economic shocks.

In the past five years, there have been significant changes in the cyclical characteristics of various industries and sub-sectors. These changes are driven by long-term economic shifts, such as the AI revolution and the green transition, as well as events that cause rapid changes in economic and market sectors.

The permanence of these beta changes will depend on the persistence of the underlying shocks and investment behavior. Recent changes in betas highlight the need for investors to continuously monitor and update their views and expectations regarding the risk characteristics of their portfolios.

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