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Assessing Climate Risk in Portfolios

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If the world is to cap global temperature increases to 1.5 degrees Celsius in the latter half of this century, thereby avoiding dangerous climate change, a dramatic reduction in greenhouse gases is required. In fact, emissions need to be net zero by 2050. As the International Energy Agency (IEA) warned in May 2021 in its landmark report *Net Zero by 2050: a roadmap for the global energy sector*¹, this requires nothing less than a complete transformation of how the world produces, transports, and consumes energy.

While countries and companies have been making pledges to achieve net zero emissions by 2050 with increased frequency in recent months, the changes required to reach these targets by 2050 remain poorly understood. Even if all of the pledges made globally by May 2021 are achieved by 2050 – which seems doubtful, given the lack of short and medium targets that will see these pledges reached – the IEA warns that there will still be 22 billion tonnes of carbon emissions in 2050, consistent with a temperature rise of 2.1 degrees Celsius by 2100.

If the world continues to grow emissions at its current rate, taking little or no action to mitigate rising carbon emissions, the Intergovernmental Panel on Climate Change says that average global temperature rises are likely to reach up to 4 degrees Celsius by 2100, resulting in severe economic losses globally².

¹See <https://iea.blob.core.windows.net/assets/ad0d4830-bd7e-47b6-838c-40d115733c13/NetZero-by2050-ARoadmapfortheGlobalEnergySector.pdf>

²See <https://www.ipcc.ch/sr15/> IPCC Special Report “Global Warming of 1.5C

Investors face significant uncertainty in this context. Climate change threatens to negatively impact economic growth and investment returns. Markets are likely to re-price companies well ahead of physical and transition risks playing out, but the rate of transition is unclear, and the extent of physical impact is very difficult to predict.

It follows that there is tremendous value in accurately positioning portfolios for this future.

How climate risk affects portfolios

Investors are exposed to two broad categories of risks: the physical impact of climate change and the financial impact of transitioning to a lower carbon economy.

Physical impacts include the costs or financial impacts of more extreme weather patterns or natural catastrophes, while financial impacts associated with the transition are more indirect and include costs flowing from regulatory change, changing consumer demand, or the changing energy mix. For example, changing policies, technologies and consumer preferences may accelerate zero-emissions technology and disadvantage carbon intensive activities, seeing emissions-intensive businesses or assets lose value.

The risk for investors in active, fundamental strategies, is that new expertise is required in order to fully understand the point at which these earnings and valuation risks are priced in by the market. The skill of the manager in identifying and applying climate risks and opportunities is paramount.

The risk for investors in data-driven quantitative or passive strategies is naked exposure to the transition as the market adjusts.

How should investors approach climate risk? Our new tool

Investors may understandably assume that reducing the carbon exposure of a portfolio will reduce the climate change risk of that portfolio. Intuitively, this makes sense. Companies producing high levels of emissions are likely to find the transition more challenging than those with lower emissions, so it's reasonable to assume that the risk of holding those companies will be higher. However, this misses the potential for companies to transition in the short to medium term and be rewarded for those efforts. Companies with high emissions today may sell their high emitting assets and/or profitably position in green technologies³, making them theoretically more valuable than similar companies who do not transition.

The assumption that a lower emitting portfolio is a lower risk portfolio also fails to account for the likelihood that the transition will be uneven. While the market may expect some coal miners and utilities to have already started to transition, for example, the harder to abate industries like aviation and steel manufacturing may be given more time and may be able to incorporate offsets without being penalised by the market. The markets that companies operate in may also result in different investor expectations, given that developed economies are expected to move faster than developing economies.

These effects would see two companies with similar carbon emissions today priced differently by the market over the short to medium term. Reducing exposure to both, simply because they both have the same carbon emissions profile today, may result in an underperforming portfolio, all other things being equal.

³Cohen, L., Gurun, U. G., & Nguyen, Q. H. (2020). The ESG-Innovation Disconnect: Evidence from Green Patenting (No. w27990). National Bureau of Economic Research

In this context, we think that simply measuring a portfolio's carbon emissions to produce a footprint is a blunt instrument with significant limitations - if the aim is to accurately measure and manage climate risk.

We think that a more helpful measure of risk is captured by our new quantitative tool, which measures each company's sensitivity to climate change shocks. We've called this tool the Platypus Carbon Beta. The higher the company's sensitivity to carbon (its carbon beta), the higher the risk of re-pricing by the market as the transition gains pace. The lower the sensitivity or beta, the lower the risk of re-pricing on purely carbon related grounds.

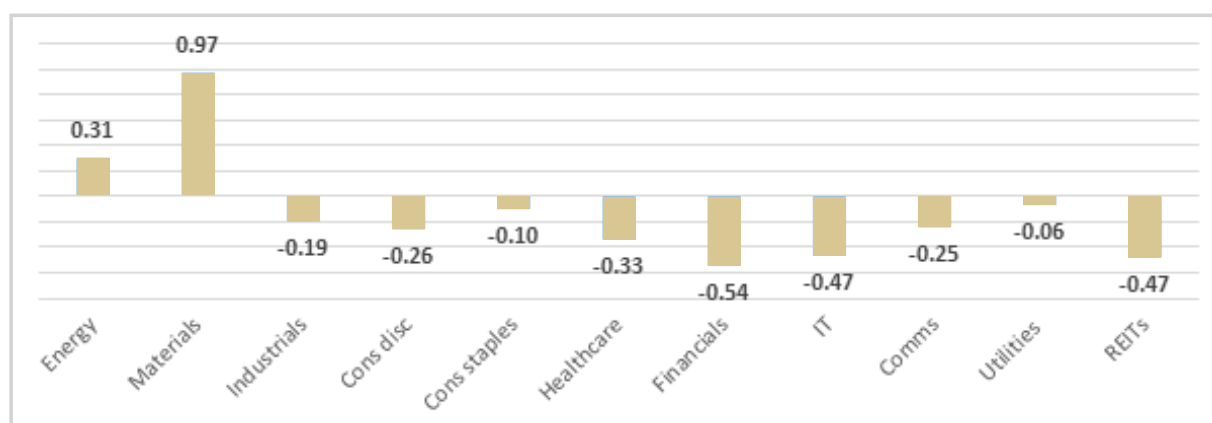
Applying this tool to a portfolio also provides us with a measure of whether a particular portfolio is more or less risky with respect to carbon than the market. If clients then wish to reduce the investment risk of the portfolio to climate change, we can accommodate this within institutional mandates, whether they be quantitative or qualitative.

The Platypus Carbon Beta: the results

We have measured every company's sensitivity to climate risk in the ASX300 using the Platypus Carbon Beta over rolling 12 month periods since 2013.

The results are below, presented by industry, at 30 April 2021.

Chart 1: Sectors most affected by climate change: sensitivity of GICS sectors to carbon risk



Source: Bloomberg, ASX300 company data, Sustainalytics emissions data at 30 April 2021

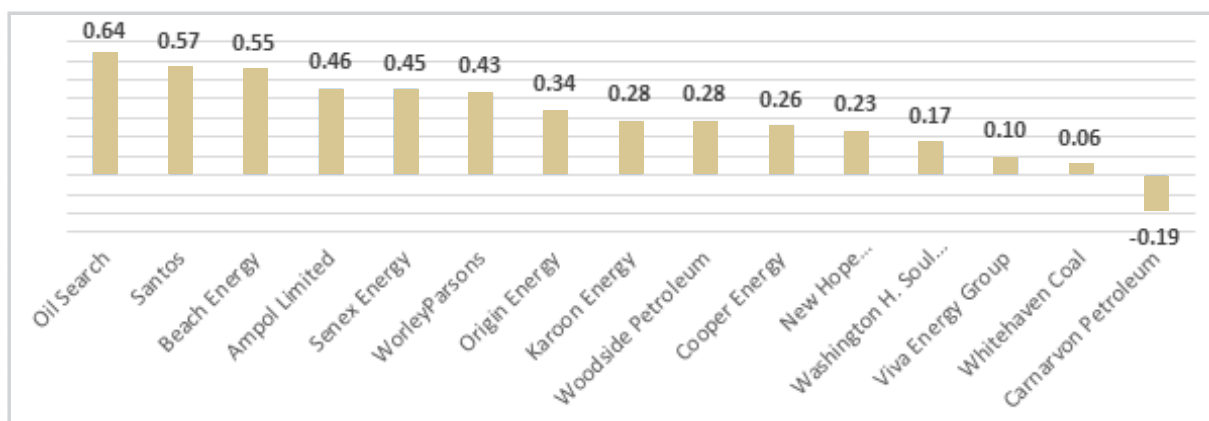
Perhaps unsurprisingly, the energy and materials sectors have the highest carbon betas, with financials, IT and REITs the lowest. This suggests that energy and materials companies are the most exposed to climate risk, on average, while financials, IT and REIT stocks are the least exposed.

It's interesting that utilities have much lower carbon betas relative to energy and materials companies. This demonstrates the value in running analysis of this type, relative to the more simplistic carbon footprint calculations. While investors might perceive the carbon intensity of utilities as being particularly high and exclude them from their portfolios on the basis of their currently high carbon footprints, many utilities have already made commitments to reduce their emissions with the risks priced in.

On a stock level, it's also interesting to note the disparity in carbon betas within sectors. There are currently 15 stocks in the energy industry in the ASX300, with the carbon betas ranging from 0.64 for Oil Search to -0.19 for Carnarvon Petroleum. This dispersion demonstrates that if an investor wishes to reduce the carbon risk of their portfolio, simply

reducing exposure to companies based on their sector classification is not the most efficient way to achieve this goal.

Chart 2: Carbon betas of energy companies in ASX300



Source: Bloomberg, ASX300 company data, Sustainalytics emissions data at 30 April 2021

The Platypus Carbon Beta: a note on methodology

In developing a measure of each stock's sensitivity to carbon risk, we first created a diversified portfolio with overweights to high carbon emitting stocks and underweights to low carbon emitting stocks. The carbon emissions used are Scope 1 and Scope 2 emissions between October 2012 and January 2021. We have not used Scope 3 emissions because of the difficulty in obtaining reliable data points over time.

We then control for a range of factors that might drive a company's share price on any day, in any market environment. For example, we control for momentum, growth, value and size, among others. This is designed to ensure that the variation in returns is accurately attributed to climate change risk, rather than any other factor. Ignoring these factors can result in significant biases in the data set.

By creating a diversified portfolio, the impact of stock specific news is also reduced, with the portfolio's returns then used as a proxy for climate change shocks.

Finally, the company-level beta to this time-series of portfolio returns provides us with a measure of climate risk. We conclude that high carbon beta companies are most likely to perform poorly during periods of tightening regulations on climate change.

Conclusion: be aware of the climate change risk curve

In the short to medium term, investors risk a material re-pricing of scenarios around climate risk. This is because markets are forward looking and there is still little understanding of the way in which the energy transition will play out.

Simply reducing the carbon exposure of a portfolio by excluding or underweighting companies that are high emitters today is unlikely to effectively reduce the risk of the impact of the energy transition. Other quantitative measures, including the Platypus Carbon Beta tool, may be more effective in signalling the companies and industries most exposed to climate change risk, enabling investors to tailor the risk they are prepared to accept and tilt their portfolios to the companies and industries more likely to benefit from the new energy environment.

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Kristen joined Platypus in October 2020 from AMP Capital where she ran AMP Capital's range of ethical and ESG superannuation funds for institutional investors. She is passionate about engagement and driving change and has led ambitious engagement agendas on modern slavery, climate change, gender diversity, sugar and obesity and animal rights. Before funds management Kristen was a sell-side analyst covering financials, a corporate governance analyst at Ownership Matters, a commercial litigator at Piper Alderman, and a business journalist with Fairfax. She holds Bachelor degrees in Commerce and Law and a Master of Laws from the University of Sydney.

Gareth Hurst

Portfolio Manager, Quantitative Investments, Platypus Asset Management

Gareth joined Platypus in April 2019 adding to the in-house research and portfolio management capabilities of the quantitative team. Gareth previously held the position of Investment Analyst at First State Super working on developing in-house quantitative models and the research process. Gareth holds a Bachelor of Commerce (Honours) degree and a PhD in Finance, both from the University of Newcastle. Gareth's research is published in top academic journals, such as the Journal of Financial and Quantitative Analysis and Pacific Basin Finance Journal.



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