CLIMATE CHANGE CONSIDERATIONS IN INVESTMENT PORTFOLIOS

NOVEMBER 2015

THIS MONTH, GLOBAL DELEGATES WILL MEET TO DEVELOP A BINDING AGREEMENT TO REDUCE THE PACE AND IMPACT OF climate change. This conference marks the awareness that climate change is a concern that may require international legislative action. Regardless of whether an agreement is reached, varying approaches to greenhouse gas (specifically, carbon) reduction will continue to emerge. Whether the implementation is regulatory or market-based, such policies can impact equity investments and deserve investor attention. Acadian offers an array of resources to help asset owners evaluate and address environmental issues. This includes carbon exposure reporting, portfolio-level carbon exposure controls, research on potential carbon-related alpha signals, and shareholder engagement.

CLIMATE CHANGE NEGOTIATIONS IN PARIS: WHAT IS AT STAKE?

From November 30 through mid-December, Paris will host the 2015 United Nations Climate Change Conference (COP 21). The objective is to develop a binding agreement that will reduce global greenhouse gas emissions. It will be the 21st annual conference supporting the United Nations Framework Convention on Climate Change, whose goal is to "stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system."

The movement to reduce our impact on the environment is motivated by the scientific consensus that rising greenhouse gas emissions, of which carbon based pollutants are the leading contributor, may have catastrophic impact on our global climate. Some cited examples of the impact of climate change include extreme drought (e.g. Syria, Brazil), rising sea levels threatening low lying coastal areas with erosion (such as the Maldives) and higher intensity and frequency of major storms.

There is growing recognition that environmental externalities can impact not only our daily lives but also businesses and investment portfolios. For example, regulatory and market-based responses to climate change can affect business operations and, hence, investment returns. As of today, we can group policy responses into two broad categories:

- Regulation: Some countries favor an approach based on hard limits in terms of emissions. For example, in the U.S., following recent regulation of coal-fired power plants, many utilities foresee earlier-than-originally-expected retirement of such plants and have written down the value of their assets accordingly. Similarly, in 2011, the U.S. updated its "Corporate Average Fuel Economy" (CAFE) standards that require tighter fuel economy standards for automobiles through 2025, and this is materially shifting the industry.
- Market based: under these schemes, companies are allowed at any given point in time a certain quota of emissions that they can trade if they need more or could generate less ("cap and trade" system). This creates a "price" for carbon emissions and, ideally, motivates companies to invest in cleaner technologies. In Europe, emissions are managed by setting a price on carbon, which is dynamically set by a market-based mechanism.

Whether or not the conference achieves its objective of reaching a binding legal agreement, convening international leaders to address the issue marks the potential for increased focus. Regional approaches to greenhouse gas management will likely differ, as will timelines for implementation, but we expect to see further regulation, whether legislative or market-based. Many corporations around the world also foresee further action despite uncertainty about timing and form; as a result, some firms that may be materially impacted by new regulations are calling for resolution. For example, six major oil companies, among them Shell and BP, have proposed the introduction of a global price on carbon.[1]

Finally, we increasingly see large institutional investors taking action with their own investment portfolios by engaging with or divesting from certain companies.[2]

[1] BP. Oil and Gas Majors Call for Carbon Pricing. 1 June 2015. Web. 18 Nov. 2015.

[2] "Divestment Commitments." Fossil Free. 350.org. Web. 18 Nov. 2015.

HOW CAN CLIMATE CHANGE MANAGEMENT AFFECT ASSET OWNERS?

There are three primary channels through which COP21, and climate change and its regulation more broadly, may affect investment outcomes and processes:

- Portfolio performance: We would expect regulations that directly restrict or incentivize changes in the business operations of some types of firms to affect their stock returns; whereas there is limited regulation of major commodity producers' carbon emissions today, risk of future regulatory action may not be priced into current stock prices. For example, an agreement to lower emissions may inhibit some energy companies' ability to extract resources, effectively de-valuing company reserves. An investor may elect to actively manage this "stranded asset" risk or other forms of exposure to potential regulation; we describe some possible approaches, including a portfolio limit on carbon exposure, below. Investors might also wish to increase exposure to industries that could benefit from changing policies, including promotion of alternative transportation models and energy sources.
- Relationships with stakeholders: Plan beneficiaries may call for more carbon awareness from their funds. In Europe and Australia, in particular, we see significant interest in portfolios that have lower carbon profiles.[3] North American, and specifically U.S., beneficiaries have been relatively muted in calling for climate change awareness, but several prominent U.S. college endowments are facing pressure to divest their exposure to carbon assets. Further encouraging responsible investing, the U.S. Department of Labor recently clarified that it does not discourage ERISA plans from investing in such strategies.[4]
- Reporting requirements: Emblematic of the growing importance of carbon exposure measurement, the 2014 UN Principles for Responsible Investing (PRI) Montreal Pledge calls on signatories to measure the carbon footprint of their portfolios.[5] The objective is to facilitate establishment and implementation of targets for carbon reduction. Since then, some countries have also mandated the disclosure of portfolio characteristics on environmental, social, and governance (ESG) issues. For example, France adopted mandatory disclosure in 2015.

HOW CAN ACADIAN PORTFOLIOS ACCOUNT FOR ENVIRONMENTAL CONSIDERATIONS?

A SIGNATORY OF THE UN PRI

Acadian became a signatory of the UN PRI in 2009, the first quantitative manager to do so. We believe that responsible investing, including consideration of ESG information, goes hand in hand with traditional investing; company externalities and exogenous factors are material business issues, and it is consistent with our fiduciary duty to account for such non-financial data. The UN PRI has rated our over-arching approach to responsible investing an "A" in the 2015 review period.[6]

Our disciplined, quantitative investing approach can provide advantages in addressing ESG concerns in a rigorous framework. There are four specific capabilities that Acadian offers to help investors formulate and meet their carbon-related objectives: portfolio level carbon emissions reports, lower-carbon portfolios, alpha research on environmental factors, and shareholder engagement on environmental matters.

REPORTING ON CARBON EXPOSURE

The first step in managing carbon exposure is measuring it. Acadian can provide clients with a report that measures the carbon footprint of an equity portfolio, whether or not it is an Acadian strategy; see Figure 1. This report displays benchmark-relative carbon emissions and "carbon intensity" of the invested portfolio, i.e., emissions divided by sales. The report also displays the exposure's sector composition.[7]

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[3] Kozlowski, Rob. "ABP looking to double 'cleaner future' assets by 2020, cut CO2-related investments." Pensions & Investments. Crain Communications, Inc. 14 Oct. 2015. Web. 18 Nov. 2015. Reeve, Nick. "Dutch Pension to 'Halve Carbon Footprint by 2020'." Chief Investment Officer. Asset International Inc. 17 Nov. 2015. Web. 18 Nov. 2015.

[4] U.S. Department of Labor. New Guidance on Economically Targeted Investments in Retirement Plans from U.S. Labor Department. 22 Oct. 2015. Web. 18 Nov. 2015.

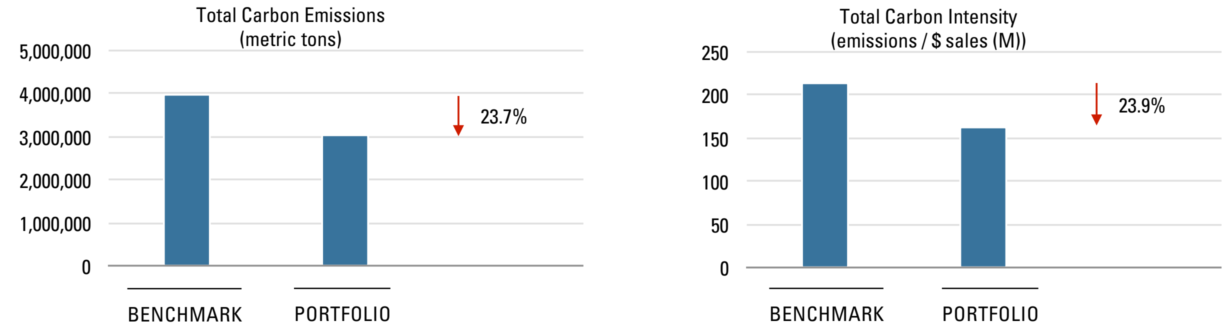
[5] "PRI Montreal Pledge." UNEP Finance Initiative; United Nations Global Compact. Web. 18 Nov. 2015.

[6] This rating is not indicative of future performance. Acadian Asset Management has been awarded an A grade in the Overarching Approach module of the PRI Reporting Framework. This rating is taken from the assessment report, which is compiled from AAMs responses to the PRI Reporting Framework. The Transparency Report showing these responses is available on PRI's website.

[7] Acadian additionally offers a Brinson attribution, shown in Appendix A, to further identify and understand the sources of carbon exposure, whether they are from allocation effects or stock selection within a region or sector.

FIGURE 1: PORTFOLIO CARBON PROFILE

Includes Scope 1 + Scope 2 emissions*



SECTOR ANALYSIS	Benchmark	Portfolio	Reduction	Benchmark	Portfolio	Reduction
TOTAL	3,963,870	3,022,550	23.7%	215	164	23.9%
Energy	288,135	235,517	18.3%	42.3	32.7	22.6%
Materials	3,134,060	2,464,474	21.4%	109.8	87.5	20.3%
Industrials	21,555	4,971	76.9%	8.3	2.6	69.3%
Consumer Discretionary	3,219	5,397	-67.6%	2.8	3.7	-34.2%
Consumer Staples	205,185	161,522	21.3%	4.3	3.2	25.3%
Health Care	8,694	6,443	25.9%	2.5	1.8	26.9%
Financials	65,368	65,213	0.2%	13.4	15.1	-13.4%
Information Technology	88	42	52.2%	0.2	0.5	-149.7%
Telecommunications	64,080	58,114	9.3%	3.0	2.6	11.1%
Utilities	173,485	20,858	88.0%	28.3	13.8	51.4%

For illustrative purposes only. Figure 1 reflects the carbon profile of an actual portfolio of Australian domiciled companies managed against the S&P ASX300 benchmark with carbon emissions constrained to 80% of that benchmark. Data as of Oct. 2015. Investors have the opportunity for losses as well as profits. Past results are no guarantee of future results. Reference to the benchmark is for comparison purposes only and is not intended to indicate that a portfolio will contain the same investments as the benchmark. Index source: S&P ASX300.

*Emissions definitions: Scope 1: All direct greenhouse gas emissions. Scope 2: Indirect greenhouse gas emissions from consumption of purchased electricity, heat or steam.

CONSTRAINING CARBON EXPOSURE WHILE REDUCING THE INVESTMENT IMPACT

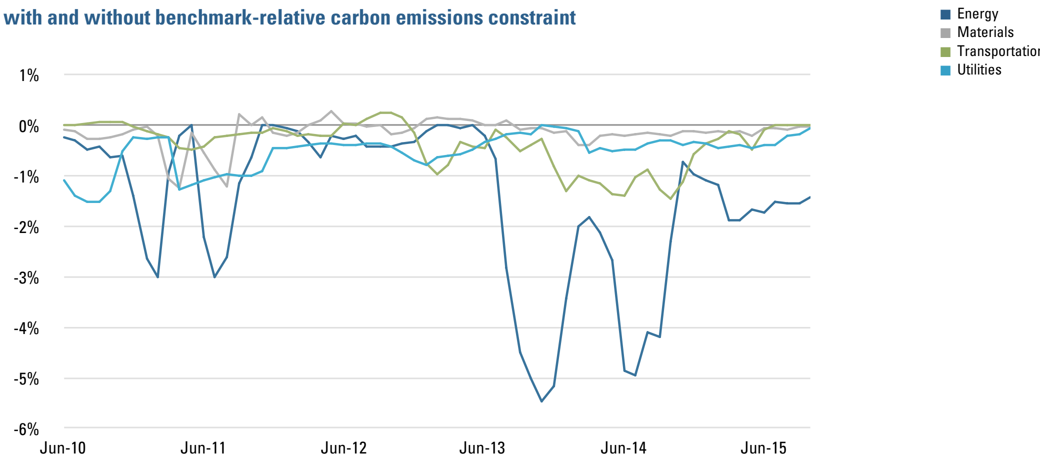
Investors who believe we are transitioning towards an economy that will reward lower carbon companies and industries may wish to tilt their portfolios now towards lower emissions. While simple divestment may create significant tracking error and shrink the opportunity set for finding alpha, we can help investors find a less costly path towards a lower carbon profile. For example, we may be able to target a lower emissions level without outright exclusions, achieving ESG objectives while minimizing the impact on forecasted alpha and risk.

Utilizing our systematic portfolio construction process and broad investment universe, implementing such constraints may turn out to be less costly than investors might fear. Restricting a portfolio's carbon emissions to a fraction of the benchmark's may have only a modest impact on the return and risk profiles of a portfolio. Simulations of a global reduced-emissions portfolio, benchmarked to MSCI World, show a modest alpha decline with a negligible impact on risk.[8] While alpha is reduced, the negative impact is offset by shifts in industry exposure as well as preferential stock selection to lower-emitting companies within industries. Notably, in the simulation environment, low-emissions portfolios seek lower exposure to high-emissions sectors (Figure 2), including the energy sector, but the overall sensitivity to oil prices remains the same, suggesting that this constraint limits undesirable carbon exposure but is not a simple tilt away from oil.

[8] Setup: Simulated global carbon constrained portfolio. Reduces total emissions exposure to no more than 60% of MSCI World benchmark's emissions. Starting from cash. Based on simulations, 6-20-2010 to 10-1-2015. The low carbon portfolio limits the investable universe to securities where carbon emissions data is available. See Figure 2 for full disclosures.

FIGURE 2: REDUCTION IN EXPOSURE TO HEAVY EMITTING SECTORS

Simulated portfolio with and without benchmark-relative carbon emissions constraint



For illustrative purposes only. Acadian simulated environment comparing global carbon constrained and unconstrained theoretical portfolio exposures. Both simulated portfolios limit the investable universe to securities where carbon emissions data is available. Base case does not limit carbon emissions; low carbon case allows no more than 60% exposure versus the MSCI World benchmark. Starting from cash. Based on simulations, 6-20-2010 to 10-31-2015. Simulated portfolios do not represent actual trading or an actual account, but were achieved by means of retroactive application of a model designed with the benefit of hindsight. Results may not reflect the impact that material economic and market factors might have had on the adviser's decision-making if managing actual client assets, and do not reflect advisory fees or their potential impact. Investors have the opportunity for losses as well as profits. Past simulated results are no guarantee of future actual results. Additional information about how the simulated environment was constructed is available upon request.

Our process allows clients to explore tradeoffs of pursuing a policy of moderate to aggressive carbon controls. Adding almost any constraint to portfolio construction will reduce expected alpha, and limiting carbon footprint is no exception. Even so, investors who believe that carbon exposure is a material risk, one that is not incorporated into conventional risk models, may view a carbon-restricted portfolio as a superior risk-adjusted outcome.

Not only can we customize carbon profiles of Acadian strategies, but we can help investors tune the carbon footprint of their overall portfolios as well. Given information on holdings in a multi-manager portfolio, we can evaluate total carbon exposure and develop a "completion" strategy that will target desired investment characteristics subject to a carbon constraint. We work with clients over time to manage carbon targets and restrictions as their objectives vary.

ALPHA SIGNALS USING ENVIRONMENTAL DATA

Climate change regulation may not only create risk, but opportunity as well. To this end, Acadian continues researching environmental policy as a source of alpha to expand our existing family of governance signals.

There are two main reasons why firms' efforts to reduce carbon footprints may be good for investors. First, companies that increase the efficiency of their facilities and products, or invest more in low-carbon technologies relative to competitors, may be better at recognizing and addressing risks to their core business in the form of increased regulatory costs or liabilities. Such efforts may attract a valuation premium over time, especially if environmental risks become even more prominent. Second, firms that pay more attention to carbon emissions via measurement and reduction policies may generally be doing a better job of controlling costs and achieving operational efficiency than less carbon-aware competitors. In this sense, having a proactive carbon-reduction policy may proxy for better operational and reporting quality.

Acadian is actively researching the potential investment rewards of firms' efforts to reduce carbon. Although lack of historical data makes such research challenging, we are seeing an increase in the amount and quality of carbon metrics that firms make available. In time, this should play to the advantage of quantitative models, which thrive on "breadth", i.e., application of signals across large numbers of stocks. What's more, Acadian's process allows for modulation of signal weights by industry and region, so we will be able to increase their influence in sectors or geographic areas where we expect particular carbon-related signals to be most effective. Finally, since carbon policies tend to be long-lived, we would expect related signals to have relatively long workout horizons, which we can capture through our process's Time Horizon Adjustment (THA) factor.

SHAREHOLDER ENGAGEMENT

Acadian participates in shareholder advocacy via proxy voting. We have adopted the voting policy of an industry-leading proxy provider, which casts votes according to principles relating to board structure, accounting policy, and share issuance.[9] We provide transparency on voting outcomes to our investors.

To meet increasing interest in environmental considerations, our clients may wish to learn more about adopting an SRI policy. Such policy would advocate for increased disclosure, adoption of UN norms, and generally support shareholder proposals on environmental matters.

CONCLUSION

Climate change represents both risk and opportunity for investors. Indeed, some industries and companies will benefit from policy initiatives, while others may see their markets erode or become subject to government intervention.

Acadian has been a signatory to the UN PRI since 2009, and we have recognized the importance of ESG factors to our clients for many years.[10] We have centered our efforts on three axes:

1. Reporting and risk mitigation—we can help investors evaluate the carbon exposure in their portfolio and its underlying sources. We can help investors understand the trajectory of regulation and the potential impact of new restrictions or market-based approaches;
2. Alpha generation—we believe that policy response may benefit particular industries and companies. This research is not trivial, however, and we apply the same rigorous standards to development of environmentally based signals as to any other potential source of excess return;
3. Shareholder engagement—as investors, we want companies to know that we value long-term sustainability. We are also prepared to pass through our clients' specific views on ESG matters through tailored voting policies.

Climate change and the responses to it have uncertain implications for investors. We are eager to help our clients assess and address their context-specific risks and opportunities. Please contact us for an in-depth consultation.

[9] The details of these principles are available upon request.

[10] The full implementation of ESG considerations into our investment process remains client driven and client specific.

APPENDIX A

Brinson attribution of carbon exposure

CARBON EMISSIONS

	Weight			Effect			
	Benchmark	Portfolio	Active	Allocation	Selection	Interaction	Total
TOTAL	100.0%	99.5%	-0.5%	(468,014)	(587,141)	113,835	(941,320)
Energy	4.3%	4.5%	0.2%	12,351	(62,299)	(2,670)	(52,618)
Materials	13.9%	12.4%	-1.5%	(330,539)	(379,020)	39,974	(669,586)
Industrials	8.0%	6.9%	-1.0%	(2,798)	(15,842)	2,056	(16,584)
Consumer Discretionary	4.7%	6.6%	1.8%	1,261	658	258	2,178
Consumer Staples	6.8%	5.6%	-1.2%	(37,302)	(7,775)	1,413	(43,664)
Health Care	6.5%	6.1%	-0.4%	(491)	(1,866)	105	(2,251)
Financials	47.1%	47.7%	0.5%	745	(891)	(10)	(156)
Information Technology	1.1%	4.0%	3.0%	248	(77)	(217)	(46)
Telecommunications	5.3%	4.7%	-0.5%	(6,592)	698	(72)	(5,967)
Utilities	2.3%	0.9%	-1.4%	(104,898)	(120,727)	72,998	(152,627)

CARBON INTENSITY

	Weight			Effect			
	Benchmark	Portfolio	Active	Allocation	Selection	Interaction	Total
TOTAL	100.0%	99.5%	-0.5%	(27.5)	(21.3)	(2.5)	(51.3)
Energy	4.3%	4.5%	0.2%	1.8	(10.9)	(0.5)	(9.5)
Materials	13.9%	12.4%	-1.5%	(11.6)	(12.0)	1.3	(22.3)
Industrials	8.0%	6.9%	-1.0%	(1.1)	(5.4)	0.7	(5.8)
Consumer Discretionary	4.7%	6.6%	1.8%	1.1	(0.1)	(0.0)	0.9
Consumer Staples	6.8%	5.6%	-1.2%	(0.8)	(0.4)	0.1	(1.1)
Health Care	6.5%	6.1%	-0.4%	(0.1)	(0.6)	0.0	(0.7)
Financials	47.1%	47.7%	0.5%	0.2	1.6	0.0	1.8
Information Technology	1.1%	4.0%	3.0%	0.5	(0.1)	(0.2)	0.3
Telecommunications	5.3%	4.7%	-0.5%	(0.3)	(0.0)	0.0	(0.3)
Utilities	2.3%	0.9%	-1.4%	(17.1)	6.5	(3.9)	(14.6)

For illustrative purposes only. Appendix A reflects the Brinson attribution of carbon exposure of an actual portfolio of Australian domiciled companies managed against the S&P ASX300 benchmark with carbon emissions constrained to 80% of that benchmark. Data as of Oct. 2015. Investors have the opportunity for losses as well as profits. Past results are no guarantee of future results. Reference to the benchmark is for comparison purposes only and is not intended to indicate that a portfolio will contain the same investments as the benchmark. Index source: S&P ASX300.

This example shows a portfolio with 941,320 metric tons lower carbon emissions than the benchmark. This profile was achieved through both allocation effects and stock selection; the greatest reduction in carbon emissions comes from the materials sector, driven by both reducing exposure to the sector itself and preferentially selecting lower emitters with the sector. With respect to carbon intensity, the improved profile is driven by similar trends as well as diminished exposure to utilities, which are heavy emitters relative to their size.

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