

FRAMEWORK FOR APPROACHES TO HEDGING CLIMATE RISK

While hedging and its related incarnations are often thought of as one of the exotic investment inventions of the 20th century, its origins are actually far more traditional – as far back as 350 B.C. Aristotle described hedging through futures trading on the olive harvest.¹ Hedging in the financial world typically involves making an investment that offsets the risk of adverse price movements of another contrary investment – we hedge every day, however, such as by buying health insurance to offset the risk of a costly adverse medical issue. In short, hedging is insurance against loss when you are making a bet on anything from the financial markets to your health.

While organizations have hedged their investments for decades – multinationals hedge currency risk through forward exchange contracts, and airlines utilize futures contracts to hedge the price of fuel – these instruments have typically focused on traditional types of financial risks: those of currencies, commodities, stocks, and volatility, amongst others. In recent years, however, there has been an increasingly prominent new type of risk to businesses that is prompting an emerging discussion about how investors can hedge against potential losses from it. This is the risk imposed by climate change.

While climate change has stayed in the realm of scientists and climatologists for many years, there has been growing interest in how climate change has had and will continue to have an impact on businesses. The Risky Business Project, co-chaired by Michael R. Bloomberg, Henry Paulson, and Tom Steyer, released a [report](#) in the summer of 2014 titled “The Economic Risks of Climate Change in the United States,” detailing the costs climate change poses to our country and businesses. The Carbon Tracker Initiative also entered the national spotlight by introducing the concept of [stranded assets](#) – fossil fuel energy resources which, at some time prior to the end of their economic life, are no longer able to earn an economic return, as a result of changes in the market and regulatory environment associated with the transition to a low-carbon economy. In essence, companies with large balance sheets of fossil fuel resources might be severely damaged if those assets precipitously drop in value.

While there are myriad ways in which climate can impact a business, or, by extension, an organization invested in that business, it is useful to group these risks into three categories in order to discuss potential approaches for hedging each particular risk dimension. For the purposes of this paper, we choose to focus on how these risks can ultimately impact an investment portfolio. First, there are risks to businesses from the impact of climate change-

¹ “A History of Hedging,” *The Wall Street Journal*, June 12, 2010.
<http://www.wsj.com/articles/SB10001424052748703509404575300713078134020>

related events – for example, more frequent and intense weather events disrupting supply chains and damaging capital investments. Business can also be indirectly impacted by climate change through unforeseen adjustments to the value of assets held on their balance sheets; if regulatory or policy changes place restrictions on carbon emissions or make renewable energy more cost-competitive, companies with large fossil fuel reserves may find their valuation suddenly diminished. Finally, both public pressure and the rising clamor of the divestment movement are creating a reputational risk for businesses and organizations associated with the fossil fuel industry. While the common denominator of these risks is their association to climate change, each type of adverse impact carries with it different implications for mitigation.

CLIMATE CHANGE-RELATED DAMAGE RISKS

The Risky Business Project report highlighted the magnitude of potential damages from climate change to the U.S. economy in the coming years – over the next 15 years, higher sea levels and storm surges during coastal storms could cost an additional \$2-3.5B annually. When hurricanes are added to the equation, those costs rise to \$7.3B annually. Crops across the Midwest and southern U.S. could see yield declines of more than 10% over the coming years if we are not able to adapt to changing temperatures and precipitation patterns, and on our current path, \$66-106B of existing coastal property will be under water by 2050.²

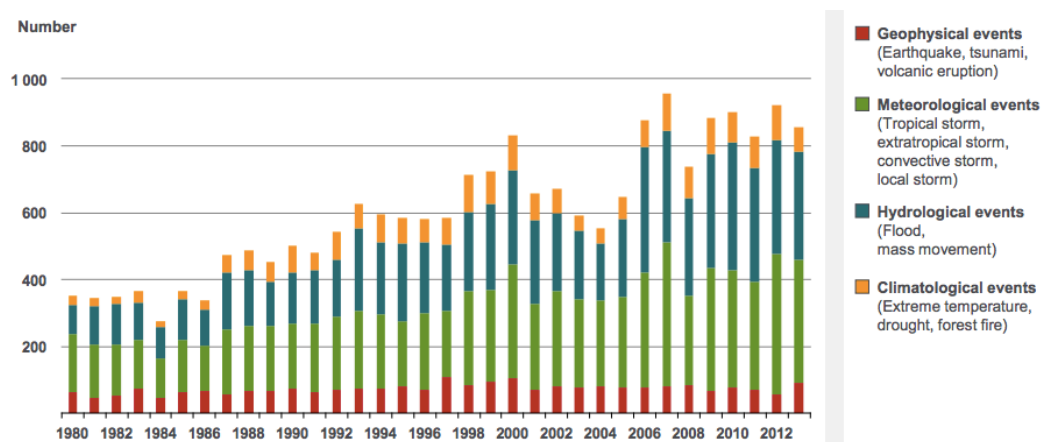
Other sources echo the magnitude of the correlation between U.S. productivity and climate change – The National Oceanic and Atmospheric Administration noted that one-third of the U.S.’s GDP is generated by weather- and climate-sensitive industries.³ Furthermore, climate-related loss-generating events have been growing frequency in recent years – the green, blue, and yellow bars below demonstrate increases in meteorological, hydrological, and climatological loss-generating events, respectively, while the red bars, loss-generating geophysical events (such as earthquakes), have remained relatively stable.⁴

² Risky Business Project, “The Economic Risks of Climate Change in the United States,” June 2014. <http://riskybusiness.org/reports/national-report/executive-summary>.

³ National Ocean and Atmospheric Administration, “Weather,” Accessed April 28, 2015. www.noaa.gov/wx.html

⁴ Munich Reinsurance America, “Loss events worldwide 1980 – 2013,” January 2014.

https://www.munichreinsurance.com/site/mram/get/documents_E-205039058/mram/assetpool.munichreinsurance.com/PDFs/5_Press_News/Press/natcat012014/1980_2013_events_and_losses.pdf.



Munich Reinsurance America, "Loss events worldwide 1980 – 2013"

Businesses and their respective investors facing these risks have a range of potential ways to hedge them: investors can diversify portfolios across geographies to hedge against climate risks from adverse climate events in specific locations, and across industries to hedge against businesses that are particularly climate-sensitive. Companies can similarly hedge through supply chain diversification, the location of new plants and facilities, insurance policies, and adaptation and mitigation strategies. While this list is neither mutually exclusive nor exhaustive, these represent options for investors and companies looking to specifically hedge risks from climate change-related damages.

STRANDED ASSET RISKS

The concept of "stranded assets" was introduced by the Carbon Tracker Initiative, and is defined as:

"Fossil fuel energy and generation resources which, at some time prior to the end of their economic life (as assumed at the investment decision point), are no longer able to earn an economic return (i.e. meet the company's internal rate of return), as a result of changes in the market and regulatory environment associated with the transition to a low-carbon economy.

In short, stranded assets are fossil fuel assets on the balance sheet of a company, which may lose value due to unexpected outside circumstances, impinging the implied valuation of the possessor company. These outside circumstances could be regulation (for example, legislation limiting carbon emissions), economic (for example, a change in the relative costs and prices of fossil fuels as compared to renewable fuels), or physical (for example, reserves becoming unextractable due to floods). These risks tend to be either directly or indirectly tied to climate change.

In large part the stranded asset theory is based on the widely cited (but very debated) scientific assertion that in order to avoid the worst impacts of climate change the globe must keep the

average global temperature rise to less than 2° C. Relating these two ideas, the International Energy Agency states that “no more than one-third of proven reserves of fossil fuels can be consumed prior to 2050 if the world is to achieve the 2 °C goal, unless carbon capture and storage (CCS) technology is widely deployed,” hence implying that some fraction of the remaining two-thirds of reserves will be “stranded” in some capacity if the world aims to meet that 2° C target.⁵

Environmentalists and others posit that these stranded asset risks are not appropriately priced into the value of companies, hence leading to investment risks that are not fully accounted for. This implies an entirely different sort of hedging strategy – one in which investors apply their own discount rate to companies with significant fossil fuel energy and generation reserves on their balance sheets (as well as correlated industries), on the presupposition that some portion of the value of those companies will be wiped out in the coming decades. There are also alternate strategies to hedging this risk, such as engaging in shareholder advocacy to encourage these companies to diversify into other industries such as renewable energy generation and transmission.

It is worth noting, however, that critics of the stranded asset theory posit that the world’s financial markets have an incredible ability to efficiently price these risks into stocks, and they could have quite possibly already discounted stock prices for these potential scenarios. Furthermore, it is unlikely that there will be coordinated global legislation that guts the value of these companies instantaneously and simultaneously. Skeptics of the stranded asset theory note that the force of creative destruction is present in almost every industry and is a part of business’ natural cycle; there is no proof that these large fossil fuel companies would not be able to weather the “creative destruction cycle” of fossil fuels becoming uneconomical.

REPUTATIONAL RISKS

Finally, there is a very different but potentially equally damaging type of risk associated with climate change – that of the reputational damage to organizations holding significant investments related to fossil fuels and related industries. The past twelve months have seen a groundswell of divestment protests directed towards universities, foundations, and public pension plans, among others. This movement has been captained by the advocacy organization 350.org – the name a reference to the parts per million concentration of carbon dioxide in the atmosphere we need to reduce current concentrations to retain climate stability. This movement has spurred protests and engagements across the country, leading to confrontations at Stanford University, Harvard University, and others as constituents push investing bodies to divest their holdings of fossil fuel investments. Organizations are struggling to respond to this backlash, and public relations missteps have led to even further negative publicity.

A related but separate reputation risk exists for investors that have explicit missions that extend beyond profit maximization, such as a foundation dedicated to global health or a university

⁵ International Energy Agency, “World Outlook 2012: Executive Summary,” <http://www.iea.org/publications/freepublications/publication/English.pdf>.

committed to making the world a better place through education. In certain instances, there has been negative publicity when it has been discovered that such an organization possesses financial investments that run counter to the mission or programmatic work funded by the returns generated on these investments. In a recent example *The Guardian* published an [article](#) revealing that The Bill and Melinda Gates Foundation has over \$1.4B invested in some of the world's largest fossil fuel companies. This comes on the heels of the [annual letter](#) published by Bill and Melinda Gates in January 2015 stating that “the long-term threat [of climate change] is so serious that the world needs to move much more aggressively – right now – to develop energy sources that are cheaper, can deliver on demand, and emit zero carbon dioxide.”

When mission-driven or –aligned organizations take an explicit stance on climate change without fully knowing what they indirectly own by dint of their investment portfolio, they run the risk of being exposed to tremendous reputational risk. This risk can undermine their ability to work towards the mission they espouse, or could cause them to quickly exit undesirable investments in a way that is financially damaging and non-strategic, because the pressure to move quickly prohibits thoughtful divestment and re-investment.

These reputational risks can also be hedged in a number of different ways, the most important and preliminary being a thorough assessment of what is actually held in one's investment portfolio. While this can be challenging to do, particularly for certain, more opaque asset types such as hedge funds, it is a necessary first step to understanding how an investment portfolio aligns with, or contradicts, an organization's mission. There are then a variety of investment strategies ranging in difficulty, which can be gradually implemented over time. While too numerous to detail here, these strategies include everything from screening direct holdings to remove the “worst offenders” such as coal and tar sands, more proactive investments in impact investing or clean energy funds, or redirecting investments to indexes that mimic traditional benchmarks but reduce a portfolio's carbon intensity while minimizing tracking error. Other strategies may include public transparency about current holdings and an articulation of a multi-year plan to gradually and prudently reduce the carbon intensity of an investment portfolio while preserving the returns needed to sustain the organization's mission, or an articulation of why an organization has decided to maintain its current investment approach.

ONGOING CHALLENGES

While it is easy to bucket the risks and associated hedging strategies for dealing with how climate change is impacting investment strategies, it is much more difficult to face challenges that are still hindering our ability to fully understand those risks and implement the hedging strategies. First, it is impossible to predict with any precision the exact impacts of future climate change-related weather and climatic events, making it difficult to target hedging strategies. While insurance companies have become particularly adept at using big data to grapple with this issue, our modeling capabilities remain lacking. In assessing risks from stranded assets it is likewise difficult to predict the likelihood, timing, and magnitude of future events that would actually result in the “stranding” or de-valuing of these assets. It is also difficult to trace the chain of resultant impacts from such an external event: It would affect not just companies with

fossil fuels on their balance sheets but also downstream companies that work in generation or transmission, or, far more broadly, consume this energy.

Finally, it is still incredibly difficult to measure the carbon intensity of a portfolio. Only 7% of the top 500 largest global asset owners are able to calculate their portfolio's carbon footprint.⁶ While several groups have been working on the ability of companies to track this data, as well as their standardization and transparency – such as the Carbon Disclosure Project and the Montreal Pledge – this is still an emerging field with imperfect data. As companies move towards hedging these risks, there are also numerous concerns about the availability of alternative investments, their additionality, their risk-return-impact tradeoffs, and others. Finally, a major challenge in this field is the unavoidable gap between the time horizons of the costs of hedging and the realized benefits of avoiding the loss from the risk of climate change. Companies need to act to hedge in the short term, absorbing costs, which may damage value now, while simultaneously being held accountable for earnings on a quarterly basis. Conversely, many of these risks from climate change may not be felt (and hence, avoided) for years, if not decades, to come. There is a resultantly unavoidable gap in time horizons between the costs borne and benefits realized of these hedging strategies, which may be hard to finance for companies pressured by nearer-term market forces.

CONCLUSIONS

Climate change is often talked about broadly as a “risk” to businesses and investors alike. Unless we are able to tease out what those risk specifically are, however, we in turn risk undermining this serious issue by turning it into a vague moralistic argument. In truth there are several very specific risks presented to businesses and their investors by climate change, which have quantifiable financial implications – the risks of climate-related damages, stranded assets, and reputational harm. In concert with each of these dangers, however, is an actionable way of addressing them through associated hedging strategies. Climate change presents a real and significant risk to businesses and their investors. These constituents should return to basic finance at its essence: identifying the specific risks they face and then taking the necessary steps to hedge them.

⁶ Asset Owners Disclosure Project, “World’s Largest Investors Continue to Gamble on Climate Risk,” April 27, 2015. <http://aodproject.net/news/85-world-s-largest-investors-continue-to-gamble-on-climate-risk.html>