



# Climate Change and Asset Prices

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Mar 31, 2021

6 Minute Read

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## KEY TAKEAWAYS

- Financial markets process complex information every day. The impact of climate change is no exception.
- Academic research provides compelling evidence that prices in a variety of asset markets incorporate information about climate risk.
- These findings also suggest that firms have incentives to manage their climate risk exposure, as a higher exposure can result in a higher cost of capital.

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The economic effects of climate change may be substantial—and may unfold over decades. Climate change can, therefore, affect the future payoffs of a wide range of assets. Given this strong potential impact, a central question is whether markets do a good job of reflecting climate risk in asset prices. Since the effects of climate change are uncertain and potentially long-lasting, some worry that markets might struggle incorporating information about climate risk. Let's not forget, however, that financial markets assess many other complex and uncertain events every day. Examples include the potential changes in consumer demand and business practices after the pandemic, the impact of current stimulus spending on future inflation, the evolution of international political and trade relations, and the impact of technological innovation.

Since the pioneering work of Fama et al. (1969), ample academic research has shown that financial markets are remarkably good at processing new information.<sup>1</sup> Thanks to intense competition among many market participants globally, prices quickly reflect news about the economy, scientific advances, and geopolitical developments. What about climate risk? It appears to be no exception. As we document in



## Pricing of Physical Risk

Physical risk refers to the direct effects of climate change; a coastal property exposed to increased flooding risk would be an example. Painter (2020) notes that municipal bonds offer an interesting setting to study exposure to physical risk, since, unlike corporations, municipalities cannot relocate to avoid the physical effects of climate change. His study, along with Goldsmith-Pinkham et al. (2020), finds that higher exposure to sea level rise is associated with higher municipal bond yields. Importantly, the relation is mostly driven by long-maturity bonds. These results suggest that investors do consider the long-term effects of climate change.

The real estate market offers another important source of evidence. Like municipalities, buildings are essentially impossible to relocate and exposed to physical risk. Bernstein et al. (2019) find that houses exposed to sea level rise sell at a 7% discount to properties with similar characteristics. Interestingly, most of the discount is driven by houses not at risk of being flooded for another 50 years. Even in decentralized, less-liquid markets such as real estate, there is evidence that prices reflect long-run climate risk.

The futures market also provides evidence that investors price the physical risks of climate change. Schlenker and Taylor (2019) look at climate futures traded on the Chicago Mercantile Exchange between 2002 and 2018. The key finding of the study is that warming trends predicted from climate models, inferred from futures prices, and measured from observed temperatures all coincide. The study thus shows that investors transacting in the climate futures market have expectations in line with the scientific consensus. The setting also allows the authors to confirm that these investors do not systematically underestimate or overestimate future temperatures.

## Pricing of Transitional Risk

Transitional risk arises because of the uncertainty surrounding the transition to a low-carbon economy. There is uncertainty, for instance, around both the timing and scope of new environmental regulations. As a result, firms whose business models depend on high fossil fuel use are likely to have high exposure to transitional risk.

Griffin et al. (2015) find that the stock prices of the 63 largest US oil and gas energy firms fell by 1.5% to 2% after the publication of a landmark paper in *Nature* (Meinshausen et al., 2009). The latter paper argues that most fossil fuel reserves would need to remain untouched if warming is to be kept under 2°C by 2050;



policies. Consistent with the idea that asset prices reflect climate risk, markets reacted in the three days following the publication of the article in 2009, although the article was only publicized by the press a few years later.

Looking at other examples of transitional risk, Chava (2014) finds that firms with negative environmental externalities face a higher cost of capital, while Delis et al. (2019) contend that fossil fuel firms incur higher interest rates on syndicated bank loans. In both cases, the mechanism in question has to do not with the direct effect of global warming on firm performance, but rather with potential regulatory or reputational risk. Ilhan et al. (2021) find that equity option prices reflect climate policy uncertainty and that downside risk is costlier to insure for more carbon-intensive firms. Seltzer et al. (2020) look at regulatory risk specifically and find that the bonds of firms with a poor environmental record were more likely to experience rating downgrades and yield increases after the passage of the Paris Agreement. All these studies suggest that asset prices reflect the potential impact of climate policy or changing consumer tastes.

Overall, a growing body of evidence shows that prices across many different markets (stocks, bonds, climate futures, equity options, and real estate) incorporate information about climate risk. This pattern is consistent with the behavior we would expect in competitive markets: buyers and sellers have incentives to use all the information at their disposal to value assets, and the literature suggests that information about climate change is no exception.

These results are also encouraging news for everyone concerned about climate change. Financial markets seem to pay attention to climate risk despite its complexity. Moreover, competitive market forces provide firms with incentives to better manage their exposure to climate risk to reduce their cost of capital.

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reviews the early evidence on the adjustment of market prices to new information and finds that “the typical result in event studies on daily data is that, on average, stock prices seem to adjust within a day to event announcements.” More recent contributions include Busse and Green (2002), Hasbrouck (2003), Chordia et al. (2005), Kelley and Tetlock (2013), Brogaard and Hendershott (2014), and Hendershott et al. (2015), to name a few.

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## GLOSSARY

**Bond yield/yield to maturity:** Annual rate of return that would be realized by purchasing a bond at its current price and holding it to maturity, assuming no default.

**Climate futures:** Futures contracts whose payouts are tied to future weather outcomes (e.g., temperature) over a set period and at a set location.

**Long-dated bonds:** In the context of Painter’s (2020) article, bonds with a maturity above 25 years.

**Municipal bonds:** Bonds issued by a local government or territory, notably cities and US states. The proceeds are typically used to fund public projects, such as infrastructure.

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