

ECONOMIC VIEWPOINT

The International Financial System Isn't Sheltered from Climate Change

Central Banks Start to Prepare by Developing Stress Tests and Economic Scenarios

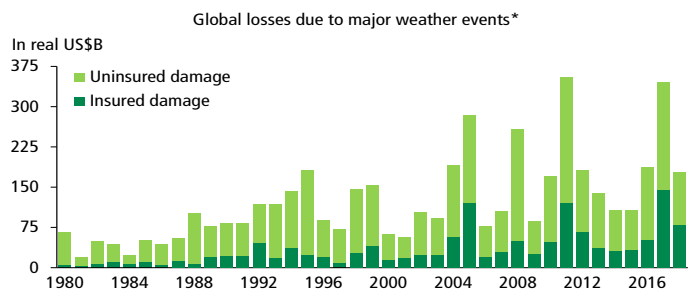
Recently, the focus has shifted to the implications global warming could have for the financial markets. In addition to the direct damages caused by potentially more frequent and more severe natural disasters, there is also a risk that the transition to a low-carbon economy will happen suddenly and unexpectedly. Climate change could disrupt the global financial system, but initiatives to prepare for it are mounting.

Climate change caused by global warming has, for some time now, been one of the biggest challenges facing the world. A recent [Economic Viewpoint](#) explored its potential economic costs, showing that they could be strongly negative worldwide. The financial aspect of climate change and the transition to a low-carbon economy had been put aside in our publication, but global warming also has the power to shake financial market and, according to [some](#), lead to a financial crisis in a more severe scenario.

Natural Disasters Also Affect the Financial Markets

Natural disasters like forest fires, hurricanes, extreme heat waves, flooding and drought seem to have become more frequent and more intense in the last few years, and the scientific community expects this trend to intensify in the future as a result of global warming. This phenomenon has led to increasingly large losses due to natural disasters (graph 1), and Canada has not been spared. Over the last ten years, Canadian insurers have been paying an average of almost four times more in natural disaster compensation than in the two previous decades (graph 2 on page 2). The main cause of the increase is flooding. Not only has winter and summer precipitation increased, but there are more Canadians living in risk areas and more homes with finished basements. Climate change is not the only reason for the higher cost of weather events but, according to a [study](#) conducted by Lloyds, it is largely responsible for it. The authors estimated that the 20-cm rise in sea-level in Manhattan since the 1950s

GRAPH 1
Natural disasters are costing more than in the past



* Caused at least one death and/or produced normalized losses of at least US\$100k, US\$300k, US\$1M or US\$3M based on the income bracket assigned by the World Bank to the country affected.
Sources: Munich Re and Desjardins, Economic Studies

increased the insured losses caused by Hurricane Sandy's by 30% in New York, all else being equal. Insurers are doubly vulnerable to the risks, as a huge natural catastrophe has the potential to trigger major losses in terms of claims, as well as in their investment portfolio. According to the [Financial Stability Board](#), nine major insurers are systemically important worldwide, meaning climate change is a threat to financial stability.

However, uninsured damage represents a large share of the costs associated with natural disasters. People and businesses are not fully protected financially, increasing the risk of default

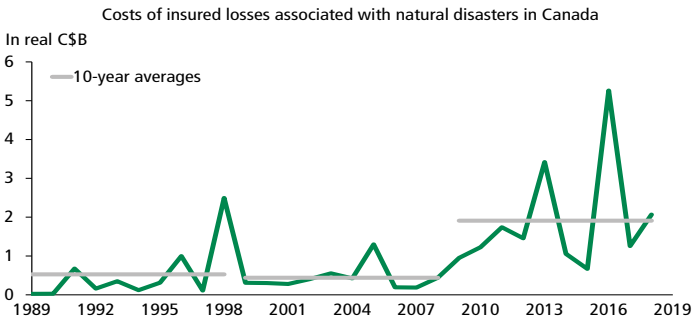
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NOTE TO READERS: The letters k, M and B are used in texts and tables to refer to thousands, millions and billions respectively.

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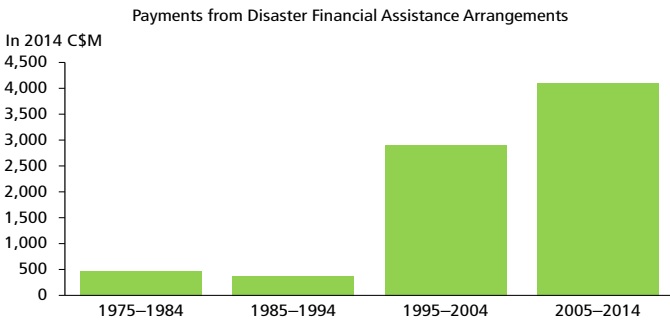
GRAPH 2
Canadian insurance companies are vulnerable to the increase in the cost of natural disasters



Sources: Insurance Bureau of Canada and Desjardins, Economic Studies

on loans made by financial institutions. This effect is limited for now, but repeated or large-scale occurrences could curb the capital available for new loans. Moreover, some of the uninsured damage must be covered by governments. In a March 2019 [press release](#), the Insurance Bureau of Canada (IBC) noted that: "For every dollar paid out in insurance claims for homes and businesses, IBC estimates that Canadian governments pay out \$3 to recover public infrastructure damaged by severe weather." This is why governments in several countries have set up emergency funds for dealing with natural disasters. The amounts paid out by the funds are on the rise in Canada among others (graph 3).

GRAPH 3
Natural disasters are an increasingly heavy burden on the federal government



Sources: Office of the Parliamentary Budget Officer and Desjardins, Economic Studies

These costs should continue to increase if the climate predictions come true. In addition, potential tax revenue would be lower, as economic activity would be adversely affected. The [IBC](#) stresses that large disasters have, thus far, been estimated to lower tax revenues by 3% of GDP and increase public debt by more than 8% of GDP in developed economies. The [Obama administration](#) estimated that, by 2100, the increase in the U.S. government's costs from climate change would be between US\$9B and US\$27B and that the decline in revenue could reach US\$60B to

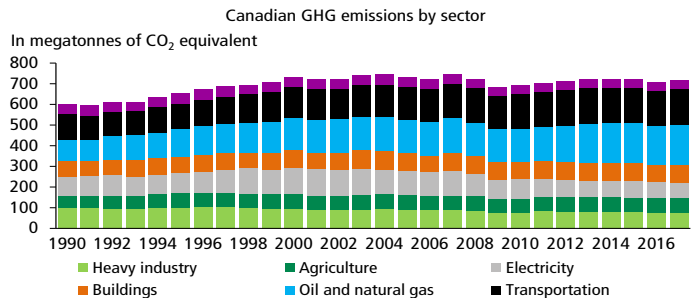
US\$110B per year, at present value, representing almost 1% of total U.S. GDP.

Damaged assets and weakened economic growth and productivity due to climate change could also trigger major losses in investors' portfolios. A [study](#) conducted by The Economist Intelligence Unit estimates that expected losses stemming from climate change to the global stock of manageable assets, i.e., the assets held by non-bank financial institutions, would be around US\$4,200B in terms of 2015 present value. To provide a sense of this number's magnitude, it would represent about 3% of the global stock of manageable assets in 2015, when the researchers published the study. If the climate warmed by only 2°C, the loss could be cut in half. However, the authors warn that the very real risk that the temperature will go up more than expected could prove very costly: in their opinion, 6°C of warming could lead to a loss of about 10%. Other researchers are getting [similar results](#).

The Transition to a Low-Carbon Economy Has Its Own Risks

Aside from natural disasters, climate change poses an additional risk to the financial markets: the transition risk. As the costs associated with climate change are likely to only go up, transitioning to a less carbon-intensive economy is necessary. The spectrum of potential transition scenarios ranges between two principal outcomes. The more negative outcome would be a situation in which authorities' efforts to mitigate climate change are not credible. In this case, fossil fuel prices would remain low and would not completely factor in carbon's effects on the environment. The incentives for switching to more sustainable energies would not be big enough. Investment in fossil energy would continue to rise. This would increase the risk of climate change costs becoming too high, precipitating a sudden transition, with no gradual divestment, to a low-carbon economy. Businesses generating high carbon emissions would see the value of their assets plummet, and stockholders would be heavily penalized. In Canada, for example, CO₂ emissions are heavily concentrated in the transportation and the oil and gas industries (graph 4). These sectors, and the ones that depend

GRAPH 4
Canada's GHG emissions are primarily focused in the fossil fuel industry and transportation

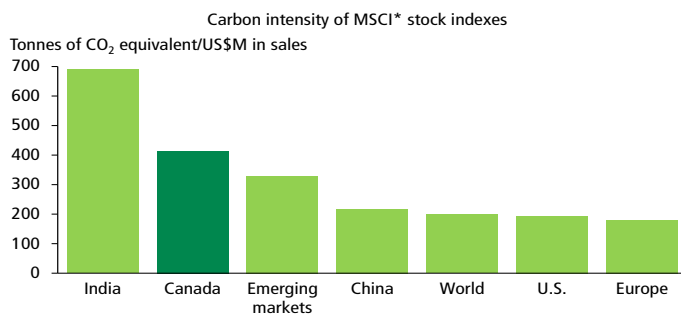


GHG: Greenhouse gas; CO₂: Carbon dioxide
Sources: Environment and Climate Change Canada and Desjardins, Economic Studies

on them, would be especially hard hit. The remaining fossil fuel reserves would remain unexploited, which could represent US\$1,000B to US\$4,000B in asset value losses for the global energy sector. For the industrial sector in general, the stranded assets could total up to US\$20,000B, according to [Adam Tooze](#), Director of Columbia University's European Institute.

Stock markets would also be disrupted, and indexes could plunge, particularly the ones associated with high carbon emission industries. Moreover, rating agencies like Moody's and Standard & Poor's have, in recent years, begun to consider climate risk in their analysis. Globally, one third of equities and fixed-income securities are issued from carbon-intensive sectors. The Canadian market is especially vulnerable, as it is still heavily concentrated in high-emitting industries (graph 5). A [study](#) conducted by a group of economists attempted to quantify businesses' exposure to the risk of energy transition, and concluded that, on average, the most vulnerable countries were South Africa, Brazil and Canada, whereas European companies were the least vulnerable to this risk. With no ability to correctly anticipate the transition, the financial markets would be shaken, which could potentially have systemic repercussions. Carbon capture technologies have the potential to reduce this scenario's costs, but they will probably not be sufficient and advanced enough to justify continuing to extract fossil fuels at today's pace.

GRAPH 5
The Canadian stock market has a high carbon footprint



CO₂: Carbon dioxide; * As of June 29, 2018.
Sources: MSCI and Desjardins, Economic Studies

At the other extreme, however, is a scenario that features environmental policies that are credible, serious and announced ahead of time. Business decisions and investments would reflect the environmental costs of carbon, making green technologies more attractive. The transition would be less painful for businesses and individuals, as the losses associated with carbon assets are predicted and valued so as to reflect the transition. Fossil fuel reserves are also abandoned in this scenario, but fuel prices would have increased enough by then, reflecting the true cost of carbon, to encourage investors to gradually divest and head for clean energies. The market is therefore ready, making it possible to transition into a less carbon-intensive economy

without a lot of upheaval. The reality could lie somewhere between these two scenarios. However, the sooner the transition begins, the more gradual it will be, and the smaller the adverse consequences for the financial system will be. Moreover, the [Canadian Standards Association](#) has launched an initiative to define investment and finance in the green and transition sectors in Canada. It also bears noting that the transition to a low-carbon economy does not represent only negative economic effects. There are also opportunities for industries that are considered greener, which could potentially see a period of stronger investment and productivity.

Central Banks Get on the Bandwagon

Faced with the threat to the economy and financial stability posed by climate change, the central banks and financial institutions have started to look at what role they can play. Mark Carney, Governor of the Bank of England (BoE) and recently appointed the United Nations (UN) special envoy for climate action and finance, started the ball rolling with a 2015 [speech](#) in which he stressed the financial risks involved in climate change and the responsibility of financial institutions to ensure a gradual transition. The movement has strengthened since then; about 50 central banks now belong to a green network. The Central Banks' and Supervisors' Network for Greening the Financial System (NGFS) is one of the largest, with 42 members, including the Bank of Canada (BoC) since 2019. However, U.S. institutions have not yet joined. The NGFS aims to help bolster the global effort required to achieve the objectives of the Paris Accord, expand the financial markets' role in managing climate risk, and mobilize the capital required for green investment. Their first [official report](#) was released in April 2019; it proposed several recommendations to financial institutions for protecting financial markets from disruptions caused by climate change. These recommendations primarily stressed the need to establish norms in order to standardize what is considered a green asset, develop scenarios and stress tests that factor in the impacts of climate change, ensure greater transparency in the disclosure of weather risks, add environmental sustainability criteria to financial institutions' portfolio management and promote data sharing.

Certain central banks have recently instituted concrete environmental initiatives. The [Bank of France](#) and the BoE's [prudential regulation authority](#) recently issued their guidelines for managing the financial risk of climate change for financial institutions, including such things as disclosing asset's climate risk and stress testing. In November 2019, the [Bank of Sweden](#) announced that it will no longer be investing in assets of heavy carbon emitters. It recently began to divest from Alberta and some Australian states. The BoC has also begun some initiatives, for the first time including climate change as a vulnerability in its May 2019 [Financial System Review](#) and launching a research program on the economic impacts of climate change. The matter is in its very early days, however, as the BoC is still weighing how to incorporate climate change into its scenarios, according

to [one of its recent studies](#). The question is a challenge for the central banks in general, as climate change includes an enormous amount of uncertainty and calls for a broader forecast horizon than monetary policy.

Progress toward Greener Stock Markets

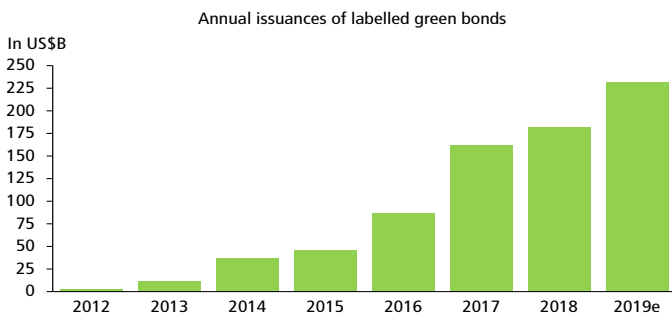
Besides the central banks, efforts to mitigate the financial risk from climate change are also underway in the private and public sectors, with initiatives such as the [Montreal Carbon Pledge](#), the [Principles for Responsible Banking](#) and the federal government’s [Expert Panel on Sustainable Finance](#), which are aiming for greater transparency on the environmental implications of investment and clear mitigation targets. For now, climate risk disclosure is being done on an autonomous, volunteer basis, leading to a lack of consistency in how assets are classified. However, the [Task Force on Climate-Related Financial Disclosure](#) is attempting to develop disclosures for climate-related financial risk for use by business. The popularity of labelled green bonds has shot up (graph 6) and seem to continue, with the [Climate Bonds Initiative](#) estimating the 2019 bond issuance to have hit US\$231.2B. It will be important to make sure these bonds are truly compatible with a low-carbon economy, as no universal classification or robust audit system exists yet. Progress has been made in this area, with 47 stock markets writing guidance on the reporting of environmental, social and governance issues, according to the [Sustainable Stock Exchanges initiative](#).

Conclusion

It is hard to tell what the future will bring. Numerous studies are underway to fully grasp the consequences of global warming for the financial markets, and the first steps have been taken to prepare the market for climate risk. Financial authorities recognize the potentially negative impacts of climate change and the transition to a low-carbon economy on inflation, credit spreads, stock markets, spending habits, bank’s balance sheets and many other financial variables. However, the tools are not yet in place for a quantitative assessment of these impacts. A lot of effort has been expended and the financial market seems to be on the right track. For now, however, financial authorities’ general conclusion is that more action will be needed to avoid an overly large shock, and the longer it takes to introduce these actions, the bigger that shock’s price tag will be. Not only will we have to divest from polluting energies, but the financial market will have to be adequately prepared for the transition. However, the burden of the transition cannot lie solely on financial authorities’ shoulders. From consumer habits to public policy, a social effort will be necessary.

Carine Bergevin-Chammah, Economist

GRAPH 6
The popularity of green bonds has soared



e: Estimate of the Climate Bonds Initiative
Sources: Climate Bonds Initiative and Desjardins, Economic Studies