

COMMENTARY:

Influence of climate science on financial decisions

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Investors are increasingly aware of climate risk to their investments, but can science drive a broader shift to green investments? Green bonds are an example of a financial market that could be better informed by climate science.

Extreme events, changing precipitation patterns and over reliance on fossil fuels can all have substantial financial impacts. Economic losses from extreme weather events have increased tenfold from the middle of the twentieth century¹. Port cities are particularly exposed to extreme weather events, with an estimated US\$3 trillion in vulnerable assets across the largest port cities in the world². Changing rainfall patterns can impact food sustainability, and continued high temperatures can result in decreased worker productivity³. In the 15 countries with the highest greenhouse-gas emissions, the damage to health from poor air quality (mainly because of burning coal) is valued at an average of over 4% of GDP⁴. Over the next few decades climate policies that affect the price of greenhouse-gas emissions — through taxing, for example — will also have significant impacts on the return from a wide variety of investments.

Investors are becoming increasingly aware of climate risks to investments, as evidenced in philanthropic divestment campaigns and green finance pledges. At the UN Secretary General's *Summit on Climate Change* in New York in September 2014, climate finance received increased attention as governments and institutional investors made pledges for green investments and the purchase of green bonds. Green bonds are simply plain 'vanilla' bonds applied to green projects. Purchases of green bonds were specifically targeted by Barclays, ACTIAM and Zurich, for a total of US\$4 billion in 2015. By 2020, three large pension funds aim to invest US\$31 billion in low-carbon investments. The pledges are substantial on a yearly basis — in the range of hundreds of billions of US dollars, but pledges are also made for rapid growth in green finance. Depending on how these pledges are implemented and the resulting impact

to the climate, they could be the start of a growing green finance trend.

Although investors are more aware of climate risks, valuing this risk into financial decisions is not straightforward. Timeframes for investment decisions typically focus on the near term, sometimes even on financial returns in the coming months. On the other hand, risks of climate impacts or policy shifts are likely to be felt most strongly in the long term. Further, the magnitude of climate risk is also uncertain.

One proactive step that investors can take is to consider financial resiliency across a range of climate change possibilities. This could include evaluating the risk to fossil-fuel investments, and targeting investments that support a low-carbon climate-resilient future.

Green bonds

Green bonds are a promising financial instrument for robust investment decisions in consideration of climate and environmental risks and potential impacts. Green bonds are a simple financial instrument that, when coupled with climate science, can make a positive investment in a low-carbon climate-resilient future. A company or institution that issues a green bond also needs to coordinate across its internal financial and environmental departments, sending a signal to investors that it is better prepared to proactively manage climate risk.

The green bond market, although in its infancy, is growing rapidly. The market has tripled in 2013 and again in 2014, with a current outstanding value of over US\$45 billion (ref. 5). Most green bond issuances to date have been over-subscribed, with an expanding set of investors participating beyond so-called socially responsible investors.

Science can, and should, play a crucial role in defining what constitutes viable climate-friendly and green projects.

Currently, some green bonds are marketed as self-labelled green — that is, without any independent verification of the climate soundness of the projects that are financed through the issue of the bonds. Banks operating as underwriters in the green bond market developed the Green Bond Principles⁶, which call for delineated use of bond proceeds and transparency to investors. However, the principles fall short of forming opinions on the eligible green project categories.

This is where independent second opinions have an important role to play. Climate science should be connected to the financial market to shift the bond market towards greener and climate-robust investments. To maximize the total impact of green bonds, improved transparency on climate risks should be achieved without creating undue transaction costs on the financial sector.

There are currently no common standards for second opinions, nor agreed definitions for what constitutes a 'green project'. Climatic science must first of all inform second opinion providers about investment risks from a climate change adaptation and mitigation perspective. Energy efficiency improvements of fossil-fuel power plants are a case in point, as they more likely than not lead to increased cumulative carbon emissions over the lifetime of the project. Science should advise on how to avoid such lock-ins where investment projects lead down 'blind alleys' when it comes to securing a low carbon and climate friendly future. Rebound effects and supply-chain emissions should be considered as part of the green credentials of the projects. Transparency and reporting on which projects have been supported by green bonds is also important, for disclosure of potential risk and future assessment on environmental impacts. Scientific

assessments of ‘greenness’ should take into account different development paths and best practices around the world.

Scientists can guide the development of common standards by relating the context of projects financed by green bonds to climate pathways, to determine which project types are consistent with a low-carbon climate-resilient future. Currently there are several actors in the financial community making implied judgements on the green aspects of a bond, including investors who determine which bonds fit into their responsible investment portfolio, and financial index providers who screen bonds to be included in green bond indices. If the scientific community is engaged in developing a set of common standards, this could provide useful information to financial experts as they make decisions on which investments are green or climate-robust. One option for engaging the climate science community is through organized discussions of methods developed for independent second opinions of green bonds.

Brown investments

Despite the promising trends of increased investor awareness of climate change, investments in activities that emit greenhouse gases far outweigh the climate-friendly investments. Currently less than a fraction of 1% of the global bond market could be considered green⁷. Further, the majority of the most active banks as underwriters in the green bond market provide greater financing to coal-based activities (Fig. 1).

This imbalance of finance for green and emitting (or ‘brown’) activities is also reflected at the macro level in government support for these activities. According to the International Energy Agency, global fossil-fuel subsidies in 2013 amounted to some US\$548 billion (ref. 8). This is more than four times what is offered to renewable energy; allotted US\$121 billion in 2013, for example. The majority of subsidies are for energy consumption in oil-exporting countries. But China and India are also topping the list of countries with high fossil-fuel subsidies. The Organisation for Economic Co-operation and Development has estimated the value of support for fossil-fuel production and consumption in its member countries at US\$55–90 billion per year in 2005–2011. These are mostly indirect subsidies in the form of tax breaks for consumption⁹. Fossil-fuel subsidies are not only holding back much needed investments in energy efficiency and renewables, they are also very costly for the government budgets

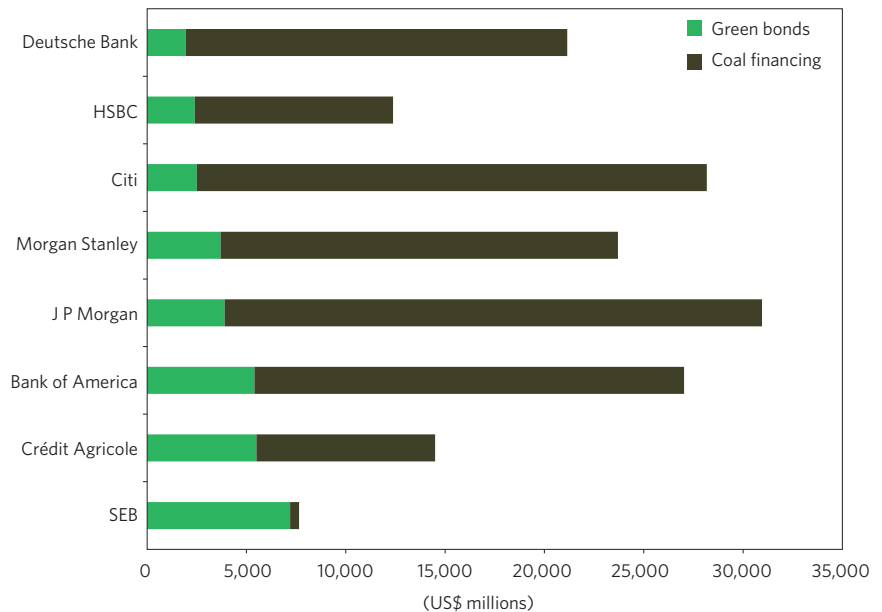


Figure 1 | Coal financing versus green bonds. Coal financing includes corporate loans, share issues and bond issues, and is cumulative from 2005 to April 2014¹⁰. The green bonds value refers to the cumulative green bonds that the banks have underwritten since the beginning of the green bond market in 2007 through to October 2014¹¹.

and can exacerbate inequality. The G20 is committed to rationalize and phase out inefficient fossil-fuel subsidies, but it is politically challenging to do in practice. The lower oil prices we see today might be a window of opportunity for changing these inefficient policies.

Leading role

Science should play a crucial role in defining green investments and shifting finance from brown to green activities. We need more green bonds and carbon pricing and less financing of coal and fossil-fuel subsidies to shift economies to a low-carbon future.

To grow the market for green bonds and other green financial instruments, trust is of utmost importance for investors, issuers and the environmental community, as well as the general public. It is therefore essential over time to develop easily implementable environmental standards that can be used to grade green investments, if not into ‘fifty shades of green’, then into easily recognizable dark and light green categories that can guide investors in their quest for environmentally responsible investments. Such categories should be guided by the latest knowledge in climate science, leaving the financial community to choose the risk/return profile they desire.

Investors need more accessible climate research as they consider the full

range of climate risk to their investment portfolios. To connect the financial and scientific communities, the burden is on us as researchers to clearly communicate climate risk and potential implications to investors. □

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