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Climate Transition Risk Spillover

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Executive Summary

The European Central Bank (2020) defines Climate Transition Risk as "an institution's financial loss that can result, directly or indirectly, from the adjustment process to a less carbon and more environmentally sustainable economy". This represents a concern rooting in the Paris Agreement, pushing countries to introduce carbon reduction policies for controlling or limiting the impact on climate change. Many studies have addressed the issue of measuring Climate Transition Risk, how it emerges and how it impacts on the countries' economy, but less attention has been given to the transmission of climate transition across countries (or financial markets). This aspect deserves more attention, due to the globalization of the financial markets and the strong trade and financial links across countries. The study of Yang, Caporin, and Jiménez-Martin (2024) provides a criterion for measuring the spillover originating from climate transition risk, disentangling the simultaneous reaction from the non-simultaneous one, the latter coming from a predictive view. The non-simultaneous risk transmits within 6 weeks from an originating event, with positive and negative shocks being characterized by different speeds of transmission. Economics and financial links across countries/markets represent a major channel for climate transition risk spillover.

Transition risk and its spillover

Following the Paris Agreement several countries have started to implement policies for the reduction of carbon emissions, pushing toward a more sustainable economic development. While numerous studies have addressed the design of optimal policies and the evaluation of their economic impact, knowledge about the risks induced by the transition toward a greener economy is limited. On the one hand, tools for measuring these risks, also denoted as Climate Transition Risk, are needed, and on the other hand, the heterogeneity in the policies, the heterogeneity and interdependence across the countries' economies and markets, could lead to spillovers after global and local shocks. Thus, the risks generated by climate transition to a given market or country could thus be larger than expected, and originate by local shocks in connected markets/countries, with the need of increasing our knowledge on how those shocks could transmit, and to design policies to limit or control their potential impact.

The evaluation of climate transition risk (CTR) spillovers presents two relevance challenges. The first is given by the measurement of climate transition risk and the second, building on an estimate of CTR, focuses on the evaluation of the magnitude of the spillovers across markets originating from CTR. Different approaches might be considered for the measurement step, either using climate change data, as done, for instance, by Germanwatch, with a greater emphasis on physical risks, or taking advantage of financial markets data, as done, among others, by Bolton and Kacperczyk (2021). Yang, Caporin, and Jiménez-Martin (2024) follow a similar approach and, building on the intuition that, if present, climate transition risk is priced in the financial markets, and it materializes into a Carbon Risk Premium (CRP). The latter implies that high emission companies should provide higher market returns compared to low emission companies. Then, shocks due to transition risk will also be reflected into shocks on the CRP, and thus the latter might be used as a proxy for CTR. The construction of the CRP builds on the approach put forward by Fama and French (1993), based on double sorting companies (using the size and their emissions), and the construction of a market neutral portfolio whose returns proxy for carbon risk. Figure 1 provides a graphical evolution of the cumulated Carbon Risk Premium computed on the same data of Yang, Caporin, and Jiménez-Martin (2024) from January 2013 to June 2021. Notably, the CRP peaks in 2016 around the Paris Agreement and during the Covid-19 pandemic event.

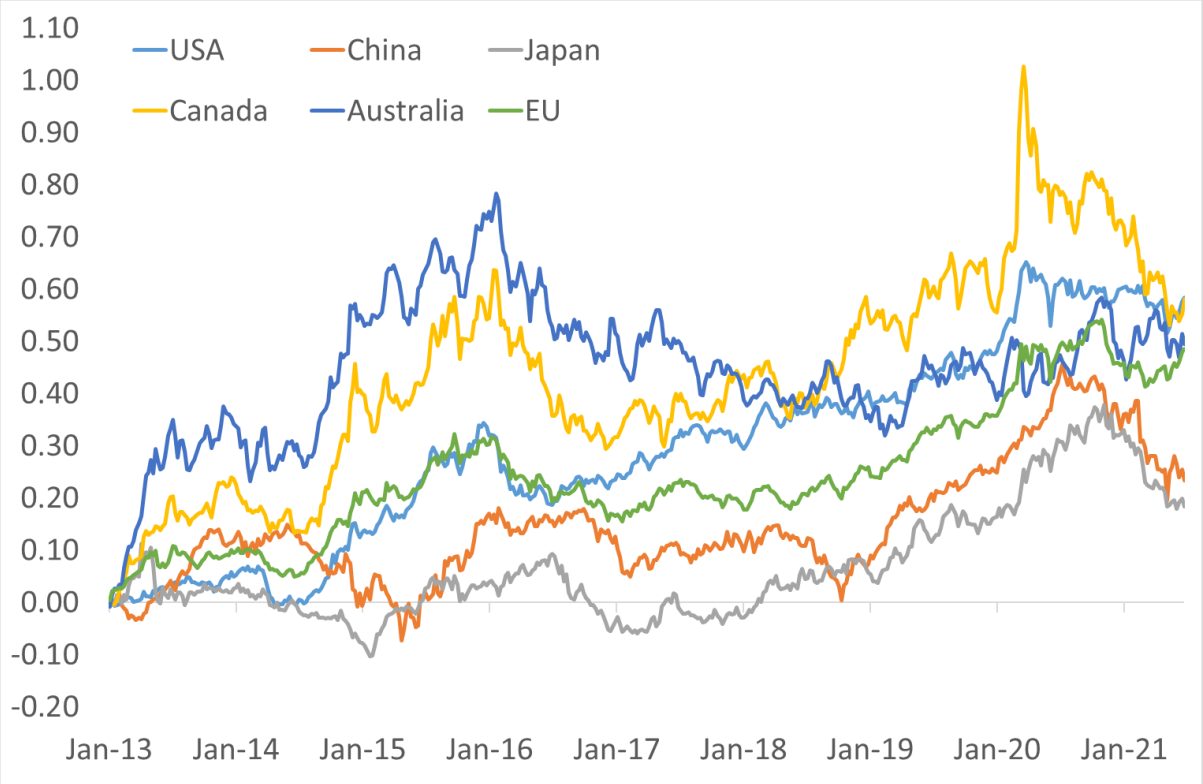

Figure 1 – The Carbon Risk Premium (cumulated) from January 2013 to June 2021 for selected countries and the European Union.

The CRP, after proper filtering to remove any effect associated with the market, other company characteristics, or possible predictability, is considered a proxy of carbon risk and represents the CTR variable. The CTR indicator can be constructed for a single financial market (representing a country) or for a group of markets (with a focus on a geographical area), or taking a more detailed view, restricting attention to a single economic sector.

The study of CTR spillover is challenging from both the methodological point of view and from the conceptual point of view. In this respect, Yang, Caporin, and Jiménez-Martin (2024) set up and then evaluate different hypotheses regarding CTR spillover, namely, i) the transmission of news as a channel of CTR transmission, ii) the relevance of socio-economic connections (sector interaction and trading volumes), iii) the role of financial market integration (in terms of financial flows and financial risk spillover), and iv) how the type of climate events impact CTR spillover.

To study the CTR spillover, different tools are taken into consideration to address several aspects. First of all, it is possible to separate the diffusion of climate transition

risk that occurs simultaneously across countries/markets in response to global and local events, from the non-simultaneous one. The former, represent a sort of co-movement of multiple CTR indicators in response to global or local shocks. Differently, the non-simultaneous effect implies a delayed reaction, with the possibility of monitoring the time needed to the climate transition shocks to spread across markets, also conditioning on their sign (with a potentially different impact coming from positive or negative shocks). Figure 2 provides an example of the evaluation of CTR spillover, reporting the intensity of spillover (the larger the value the stronger the spillover) after a shock on the lower (upper) tail of the transition risk indicator occurring from 1 to 10 weeks before the evaluation. The longer the delay the more time needed to the shock to impact the countries in the analyses. Notably, shocks need about 6 weeks to transmit, in particular on the upper tail.

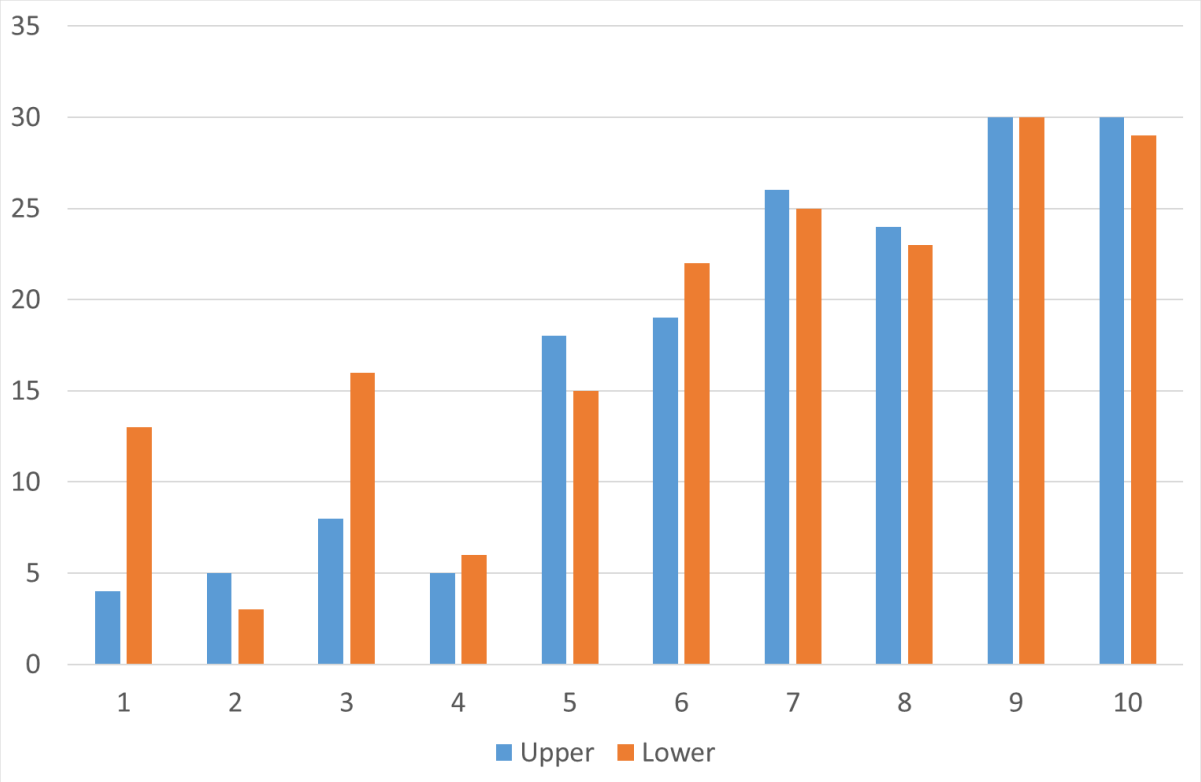

Figure 2: the intensity of transition risk spillover after a shock on the lower or upper tail of the transition risk indicator after a given number of weeks from the event.

Policy Options and Analysis

Option 1: Transition Risk Spillover is simultaneous

- **Analysis:** by focusing on common patterns of the climate transition risk variable recovered across different markets, Yang, Caporin, and Jiménez-Martin (2024) verify that there exist shocks, either global or local, that generate an immediate market reaction, consistent with the intuition that a relevant driver of CTR spillover is given by news, and in line with the wake-up-call theory of Ahnert and Bretsch (2022) for financial contagion.
- **Policy Implications:** financial market reactions to shocks leading to simultaneous spillover impacts on portfolios held by investors (institutional and private). Standard tools for risk control and risk reduction should be generalized to account for a possible role of climate transition risk.

Option 2: Transition Risk Spillover is non-simultaneous

- **Analysis:** when analyzing the CTR variable in a dynamic setting, it emerges that spillovers exist and are associated with larger local climate shocks, and the reaction across markets is heterogeneous as investors are updating their beliefs conditioning on the information received from different markets.
- **Policy Implications:** generalize risk management tools to account for climate transition risk spillovers originating in other markets/countries whose transmission is not simultaneous. Introduce the evaluation of the exposure to climate risks as a standard tool for the analysis of investments' risks.

Recommendations

1. When implementing climate policy consider that their adoption could lead to climate transition risk spillovers to other markets/countries and these shocks might revert back due to the interdependence across markets/countries.
2. Financial intermediaries should account for climate policies and climate transition risks both adopted/generated locally and in foreign countries/markets, and should condition on the type of the policies and risks.

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