Drivers of Green Bond Market Development: The Importance of Nationally Determined Contributions to the Paris Agreement

Clarence Tolliver, Alexander Ryota Keeley, Shunsuke Managi

1. Introduction

The Paris Agreement under the United Nations Framework Convention on Climate Change calls to keep 21st century global temperature rises within a 2° Celsius threshold and to finance low-carbon, climate-resilient global development. At the core of the agreement are the Nationally Determined Contributions (NDCs), which are country-specific pledges to reduce greenhouse gas emissions and adapt to climate change impacts. The compatibility of green bonds with NDC investment targets and the massive upscaling in global green bond market activities suggest that green bonds are issued as an avenue for firms to finance projects and assets conducive to Paris Agreement objectives. The objective of this study is to investigate how NDCs and conventional bond market drivers affect green bond market capitalization.

2. Methodology

In order to examine the determinants of green bond market issuances and the relationships between those determinants, explanatory factor analysis (EFA) and structural equation modeling (SEM) is employed using panel data for 46 countries and 10 supranationals that issued green bonds from 2007 to 2017. In addition to the inclusion of seven observed (trade freedom [TQ], regulatory quality [RQ], rule of law [RL], trade openness [TO], gross domestic product [GDP], stocks traded [ST], and OECD-membership [OECD]) and two latent variables (Institutional and Macroeconomic) based on previous literature, an original NDC variable is added to the analysis using values calculated from a uniquely constructed index of NDC robustness for each country in the scope of assessment. Then the following five hypotheses built upon findings from existing bond market literature are tested using SEM: 1) macroeconomic factors positively influence green bond issuance volumes; 2) institutional factors positively influence green bond issuance volumes; 3) OECD membership positively affects green bond issuance volumes; 4) robust Nationally Determined Commitments (NDCs) positively affect green bond issuance volumes; and 5) countries with higher quality institutional and regulatory environments have better macroeconomic conditions.

3. Results

13 of the 15 paths portrayed 99% statistical significance. The path from OECD to GBVOL, as well as the path from Institutional to GBVOL, were the two statistically insignificant exceptions. The -0.093 path coefficient for Institutional and GBVOL, though uniquely small and negative, is unlike each of the other coefficients with Institutional in that it is statistically insignificant.

The Macroeconomic latent variable displayed a 0.49 coefficient with NDC, and a 0.15 correlation with OECD in this model. It also had a 0.51 coefficient with GBVOL, portraying it as the variable with the largest magnitude of direct effects on green bond issuance volumes in this model. Moreover, NDC showed a 0.19 correlation coefficient with GBVOL, depicting the largest single exogenous variable impact on green bond issuances. Proven to be statistically significant, the NDC variable has the second largest direct impact out of the four direct impacts assessed in this model. Furthermore, the 0.045 path coefficient for OECD and GBVOL reveals that OECD membership was not a coercive determinant of green bond issuances. Finally, model fit is supported by acceptable values of Satorra-Bentler comparative fit index (CFI) and Tucker-Lewis index (TLI), as well as those for the standardized root mean square residual (SRMR) and coefficient of determination (CD).

Figure 1: Structural equation model for green bond issuance volumes

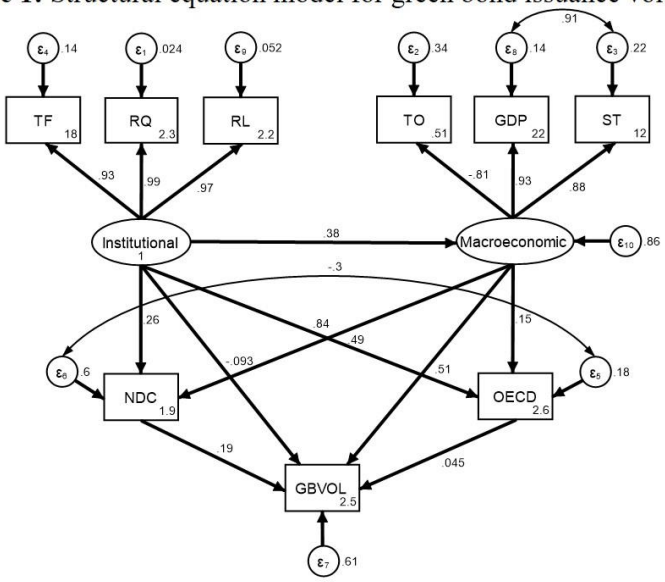

Table 1: Goodness-of-fit measures SEM

CFI	0.947
TLI	0.901
SRMR	0.043
CD	0.986

4. Conclusions

As hypothesized, both macroeconomic and institutional factors promote green bond issuance volumes. The former had the largest, positive, significant direct and indirect effects on green bond issuance volumes. This shows that the importance of macroeconomic factors to green bond market capitalization to be similar to their importance to conventional bond market growth that has been established in previous literature. The considerable, statistically significant indirect of the latter similarly suggest the importance of institutional factors in green bond markets.

The results also revealed a substantial, positive, statistically significant impact of NDC robustness on green bond issuance volumes. Indeed, the strength of NDCs exerted the largest impact on green bond issuance volumes of any single exogenous variable, accounting for nearly half of the direct impacts exerted by macroeconomic factors. This implies that as countries renew and strengthen their NDCs in pursuit of climate change mitigation and adaptation, they will rely on green bond issuances of larger volumes.