

## **Evaluate Changes in the Co-movements of Green Bonds and Selected Financial Markets Using GARCH models\***

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### **Abstract**

The green bond market is one of the fastest-growing investment areas. As both investors and issuers are showing a growing interest in this area, it is important to gain a better understanding of the associated risks and returns of green bonds compared to those of other asset classes. This study evaluates the dependence structure of the green bond market in relation to selected financial markets under conditions of structural change. Three multivariate GARCH models were used to analyse the volatility and conditional correlation dynamics between the stock market, the conventional bond market, the green bond market and the VIX Index, which was used as an uncertainty measure. All analyses were conducted for the period from 1 July 2009 to 31 December 2023. Our results reveal dependencies between the analysed time series. However, the direction of these correlations changes depending on the period considered. In the first stage (2009–2013), the correlation with the equity market was positive; since 2014, however, it has been negative. A similar pattern emerges for the VIX Index and green bonds. Notably, the correlation coefficients were negative in the initial period, indicating that green bond profitability decreased during periods of high uncertainty. Dynamic conditional correlations demonstrate the most significant change for green and conventional bonds, with the correlation remaining negative or approaching zero until the end of 2013. After this time, it became positive. This may be due to the introduction of green local government bonds in 2012 and corporate green bonds in 2013.

**Keywords:** Green bonds; Co-movements; Spillovers; Volatility; Market uncertainty