Chapter 11
Sustainability: Climate and Economic Policy Uncertainty in Sustainable Investment Strategy – Evidence From Wavelet Co

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ABSTRACT

The present research analyzes the interaction between policy uncertainties, as captured by Climate Policy Uncertainty (CPU) and Global Economic Policy Uncertainty (GEPU), and key sustainable finance indices such as Global Green Bond Index (GB), S&P Global 1200 ESG Index (ESG), S&P 500 Green Global Index (SPC), S&P Global 1200 Carbon Efficient Index (CF), and S&P Global 1200 Fossil Fuel-Free Index (FF). Using the Wavelet Coherence Analysis technique, this research has managed to identify that each of these sustainable finance indices reacts to uncertainty in different ways, with varying levels of volatility between 2010 and 2023. These findings clearly indicate that while CPU impact is random and acute around key climate change policy deadlines such as COP21, the Green Deal in Europe, and COVID recovery policies for sustainable development, the impact of GEPU is consistent and widespread in all sustainable indices analyzed, thus firmly establishing macroeconomic uncertainty's key and overarching impact on market sustainability and performance in sustainable finance instruments and markets. Phase difference analysis also clearly confirms and supports that sustainable finance markets tend to react and respond to uncertainty signals in general and, more specifically, to those of GEPU, thus clearly and conclusively determining that macroeconomic policies are again and again key and leading determinants of sustainable performance in green and ESG assets. These findings and research conclusions clearly indicate that sustainable markets are certainly not and do not remain insulated or unaffected by macroeconomic conditions in general in today's interdependent and interconnected world; rather, all sustainable markets react and respond to uncertainty in different and varying ways depending on key uncertainties in varying and different instances and circumstances. This research study has provided significant research insights and added substantially to the emerging and growing research and literature on sustainable markets during and in conditions of economic and financial instabilities. This particular research study

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has also helped and supported portfolio and sustainability managers, as well as climate change and sustainability professionals and policymakers, to better and properly recognize and factor in key uncertainties in sustainable assets during long-term sustainable and sustainable finance investments and transactions.

INTRODUCTION

Sustainable finance is increasingly identified as one of the important factors for the emergence of a low-carbon economy, as sustainable finance markets have become lucrative investment avenues for channeling funds into sustainably responsible assets for ensuring a healthy global economy. Some of these issues which play major roles in shaping sustainable finance markets include green bonds, equity indexes based on environmental, social, and governance criteria (ESG equity indexes), as well as instruments of investments in clean energy resources which have witnessed major attention from governing bodies across the world. The sustainability of sustainable finance markets is threatened by global macroeconomic uncertainty or climate policy uncertainty (CPU) as well as global economic policy uncertainty (GEPU), even though sustainable finance markets are of prime significance. Sustainable investment funds which increasingly rely on instruments of climate policies such as carbon pricing mechanisms, providing sustainable resources to renewable energy sources through subsidies, as well as ensuring sustainable resources through climate-disclosure mechanisms, are increasingly vulnerable to conditions of global climate policies or climate policy uncertainty. CPU incorporates uncertainty in environmental policies or resource allocation to address environmental policies or uncertainty in attaining environmental objectives. According to Mouffok & Mouffok (2025), climate policy uncertainty demonstrates explicit volatility in pricing assets in the clean energy sector due to significant implications on future financial flows as well as risk factors. Alharbey & Ben-Salha (2024) also postulate that CPU faces significant asymmetrical implications for major declines in green assets.

Additionally, this is enhanced by the CPU effect, which influences sustainable markets through its impairment of the core valuation of green assets. Green assets such as green bonds, clean energy equity, or ESG indexes get their value, in part, from the projected long-term support of climate policies in the form of subsidies, carbon pricing structures, or renewable energy targets. It should be noted that the CPU impairs this mechanism by making the outcome of climate policies uncertain, thereby creating a regulatory risk premium. When governments renege or drag their feet on their climate policy promises or through poor communication of this climate vision, investors face challenges in trying to predict the long-term cash flows of companies sensitive to the energy transition cycle, implying that (Mouffok & Mouffok, 2025; Pham et al., 2024).

Furthermore, CPU affects the discount rate within the asset pricing paradigm. Green investments are long-term oriented, hence more vulnerable to CPU. When CPU is large, it implies that the discount rate, with the consideration of risk adjustments, rises. This explains why the present value of the return on investment falls, hence hindering both institutional and personal investment within the markets. CPU has multi-scale effects, as shown by Athari & Kirikkaleli (2025). While the short-term uncertainty within CPU creates turbulence within markets, the long-term uncertainty affects the reliable involvement within the provision of sustainable financing. The direct outcome is the amplification of the costs of both price volatility and the failure of the transmission of the climate finance agenda. (Pham et al., 2024) affirm that CPU equally magnifies

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