



A machine learning and quantile analysis of FINTECH and resource efficiency in achieving sustainable development in OECD countries

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ABSTRACT

This study aims to examine the impact of fintech investments and resource efficiency on sustainable development in OECD countries between 2010 and 2019. Various estimation techniques, including the Method of Moments Quantile Regression (MMQREG), machine learning-based Kernel Regularized Least Squares (KRLS), and Generalized Method of Moments (GMM), have been utilized in this study. MMQREG and KRLS are both estimators that examine the relationship between variables in several quantiles, increasing the reliability of the findings. The research results indicate that fintech investments and resource efficiency support sustainable development. Additionally, institutional quality, environmentally friendly technologies, and foreign trade are found to have a positive impact on sustainable development. These findings suggest that financial technology and resource management can play a significant role in promoting both economic and environmental sustainability.

1. Introduction

With the expansion of the global economy, sustainability has gained importance due to environmental concerns such as pollution, resource depletion, and ecological imbalance. Sustainable development is widely accepted as a worldwide consensus and a vital strategic choice for countries (Deng et al., 2019; Barut et al., 2023). In recent years, the magnitude of environmental damage caused by economic activities has been followed with concern by international organizations, governments, and academics (Demirtaş et al., 2023; Çitil et al., 2023). The present apprehensions regarding environmental matters have resulted in the development of numerous novel patterns in the realm of technology and financial administration (Anwar et al., 2023). Among these novel patterns is FINTECH, which is observed within the framework of digital conversion and sustainable finance. FINTECH has emerged as a viable substitute for conventional financial establishments (Vergara and Agudo, 2021). On the other hand, this innovative approach not only addresses financial aspects but also aligns with key Sustainable

Development Goals (SDGs), in particular SDG 13 (climate action) and SDG 7 (affordable and clean energy). By integrating these advances, countries can sustain economic activities that contribute to global sustainability goals and promote a holistic and responsible approach to address both financial and environmental challenges on a global scale (Dogan and Seker (2016).

In addition to being considered a milestone in economic development and technological progress (Zhou et al., 2022), FINTECH encompasses a wide range of issues, reshaping not just the institutions of finance and technology but the delivery of financial services as a whole (Isabetli and Guz, 2023). Fintech, as defined by the Financial Stability Board (FSB), is a form of financial innovation driven by technology that leads to new business models, practices, processes, or products that have a significant impact on financial markets, institutions, or the development of financial services (FSB, 2016). Digital transformation and the Sustainable Development Goals (SDGs) have underscored the importance of financial technology (FINTECH) (Ellili, 2022), positioning both FINTECH and sustainability as major drivers of change. As illustrated in

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