A Paradigm Shift in the Thermodynamic Economic Analysis of Intertemporal Resource Allocation Models

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Abstract. This study re-evaluates the classical intertemporal resource allocation models through the lens of thermodynamic economics, introducing entropy as a critical factor. By integrating entropy metrics, the research challenges traditional assumptions on resource efficiency and consumption patterns. Utilizing advanced mathematical modeling and empirical analysis, the study unveils nuanced insights into sustainable economic growth. The findings suggest that incorporating thermodynamic principles in economic modeling significantly enhances the predictive accuracy of resource allocation outcomes. This work provides a foundation for further exploration of entropy as a determinant in economic theory and policy-making.

Keywords: thermodynamic economics, intertemporal resource allocation, entropy in economics, sustainable economic growth, economic modeling

Introduction

In an era where resource scarcity and environmental sustainability are pressing global concerns, traditional economic models of resource allocation have come under increased scrutiny. Conventional models often overlook the thermodynamic constraints that inherently govern resource use, leading to potential inefficiencies in predictions and policy recommendations. Thermodynamic economics, a novel approach, integrates principles

from physics to address these deficiencies by accounting for entropy in economic processes. This paper presents a critical re-evaluation of established intertemporal resource allocation frameworks by incorporating entropy as a variable. Our approach endeavors to bridge the gap between economic theory and the physical laws governing resource consumption. Through rigorous mathematical modeling and empirical analysis, we aim to elucidate the intricate dynamics of resource allocation that align with sustainable development goals. The structure of this paper is as follows: Section 2 details the theoretical framework and methodology, Section 3 presents the empirical findings, and Section 4 discusses the implications for economic policy and future research directions.

References

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