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Peer Review

# Review of: "A Philosophical Theory of Quality Time: The Seneca Model"

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***A Philosophical Theory of Quality Time:***

***The Seneca Model. Referee Report***

**General Assessment**

The paper proposes an original and intellectually stimulating extension of the Ramsey growth model by incorporating Seneca's notion of \emph{quality time} as an additional state variable. Formalizing philosophical reflection within a canonical macroeconomic framework is novel and potentially impactful. The paper is technically sound, well-motivated, and addresses an underexplored question in growth theory: how non-material uses of time may interact with capital accumulation and long-run economic outcomes.

That said, several conceptual and interpretative issues require clarification before the contribution can be fully assessed.

**Major Comments**

- *Interpretation of Time and the Economic Agent.*
- The distinction between Seneca's representative patrician and the representative agent in the Ramsey model is conceptually important but not sufficiently emphasized. Since labor supply is entirely absent and production is independent of time allocation, the economic relevance of introducing time as a state variable may not be immediately clear to the reader. A more explicit discussion of why this abstraction is appropriate—and how it fundamentally differs from Becker-style time allocation models—would strengthen the paper.
- *Non-autonomous versus Autonomous Formulation*

- The paper characterizes the Seneca model as a non-autonomous version of the Ramsey model. However, once real time is replaced by quality time and the utility function is rewritten as $U(c,Q,q)$, the problem appears formally autonomous. The authors should clarify whether the non-autonomy is conceptual, technical, or both, and explain what is gained analytically by this reinterpretation.
- Linearity in the Control Variable
- The Hamiltonian is linear in the control variable $q$, implying bang--bang solutions or indifference conditions. While this is standard in optimal control theory, the economic interpretation of corner solutions is not discussed. In particular, the paper should clarify what it means economically for the patrician to choose maximal or minimal accumulation of quality time.
- Separable versus Non-separable Preferences
- In the separable case, quality time is determined independently of capital and consumption, and the model closely mirrors the Ramsey framework. While intuitive, this result risks appearing tautological. The paper would benefit from a clearer explanation of why separability implies neutrality with respect to growth. By contrast, the non-separable case constitutes the main contribution. However, the assumption of non-separability between consumption and quality time requires stronger economic motivation. The authors should provide intuition or examples supporting this preference structure.
- Breakdown of the Modified Golden Rule
- The breakdown of the modified golden rule in the non-separable case is an important result. However, it should be emphasized that this failure arises because the Euler equation for consumption becomes intertwined with the dynamics of quality time, rather than from the mere introduction of time as a state variable. Making this mechanism more explicit would sharpen the theoretical contribution.

**Minor Comments**

- The notion of a \emph{Seneca equilibrium} is appealing but should be clearly defined and used consistently throughout the paper.

- Notation could be streamlined, particularly in the presentation of the dynamics of quality time.

- The philosophical discussion is engaging, but it should remain concise and always tied directly to the formal results.


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**Recommendation**

The paper offers a novel and thought-provoking contribution by bridging philosophy and growth theory within a rigorous analytical framework. With clearer motivation, a stronger economic interpretation of the optimal control problem, and a more explicit justification for non-separable preferences, the paper has the potential to make a meaningful contribution to the literature on optimal growth and intertemporal choice.

I therefore recommend revise and resubmit, subject to the concerns outlined above.

## Declarations

**Potential competing interests:** No potential competing interests to declare.