**Lehrstuhl für Wirtschaftliche Staatswissenschaften,
insbesondere Energiewirtschaftslehre**

Master Thesis

Energy expenditure, economic growth and minimum EROI: a replication

The relationship between energy use and economic growth has gained renewed attention as countries face rising energy prices, the ongoing energy transition and concerns about long-term economic resilience. Fizaine & Court (2016) show for the United States that economic systems display thresholds in energy expenditure beyond which growth becomes constrained. Their findings indicate that rising energy costs and declining energy-return-on-investment (EROI) can exert macroeconomic pressures on productivity and structural change. Complementary evidence from Lambert et al. (2014) links lower societal-level EROI to reduced living standards and economic constraints, underscoring the need to understand minimum EROI levels. An application with recent data would help to verify the findings in the accelerating global energy transition towards renewable and low-carbon energy sources.

This thesis will replicate the empirical analysis of Fizaine & Court (2016) with more recent and expansive data for the US, the UK and the world to test the robustness of their findings. The research aims to determine if the identified expenditure limits hold true across different economic regions and through the most recent decade of energy market shifts.

Key tasks and objectives of the thesis

- Review and summarize the methodological framework of Fizaine & Court (2016).
- Collect and prepare long-run energy and macroeconomic data for the US, the UK and the world.
- Replicate the empirical of Fizaine & Court (2016) with the new data, including energy expenditure and EROI indicators.
- Compare the results with the original study and discuss implications.

Your profile

- Student of economics with a strong interest in energy and sustainability topics
- Motivation to work with quantitative and empirical methods
- Ability to think analytically and conduct independent academic research

Literature

- **Fizaine, F. and Court, V. (2016):** Energy expenditure, economic growth and the minimum EROI of society. *Energy Policy*, 95, **pp. 172–186**. https://doi.org/10.1016/j.enpol.2016.04.039
- **Lambert, J.G., Hall, C.A.S., Balogh, S., Gupta, A. and Arnold, M. (2014):** Energy, EROI and quality of life. *Energy Policy*, 64, **pp. 153–167**. https://doi.org/10.1016/j.enpol.2013.07.001

Contact

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Topics

- Energy expenditure
- Economic growth
- EROI and energy transition

Methods

- Literature review
- Empirical analysis