

# Productivity growth in a new environment: How will the green transition and geopolitics affect productivity in Finland?

JANNE HUOVARI

FINNISH PRODUCTIVITY BOARD, CHAIR

29.4.2025

# Finnish Productivity Board

- The Productivity Board is an independent expert body operating in connection with the Ministry of Finance.
- It is the Board's responsibility to monitor the development of productivity and competitiveness of the Finnish economy, and to regularly provide and publish independent evaluations of it.
- A four-year term of office and a biennial report.
- Senior Ministerial Adviser Janne Huovari, Ministry of Finance, Chair
- Chief Research Scientist Natalia Kuosmanen, Research Institute of the Finnish Economy (ETLA)
- Director Mika Maliranta, Labour Institute for Economic Research LABORE
- Research Director Olli-Pekka Ruuskanen, Pellervo Economic Research (PTT)
- Ministerial Adviser Johanna Alatalo, Ministry of Economic Affairs and Employment
- Research Director Samuli Leppälä, Finnish Competition and Consumer Authority
- Head of Forecasting Juuso Vanhala, Bank of Finland

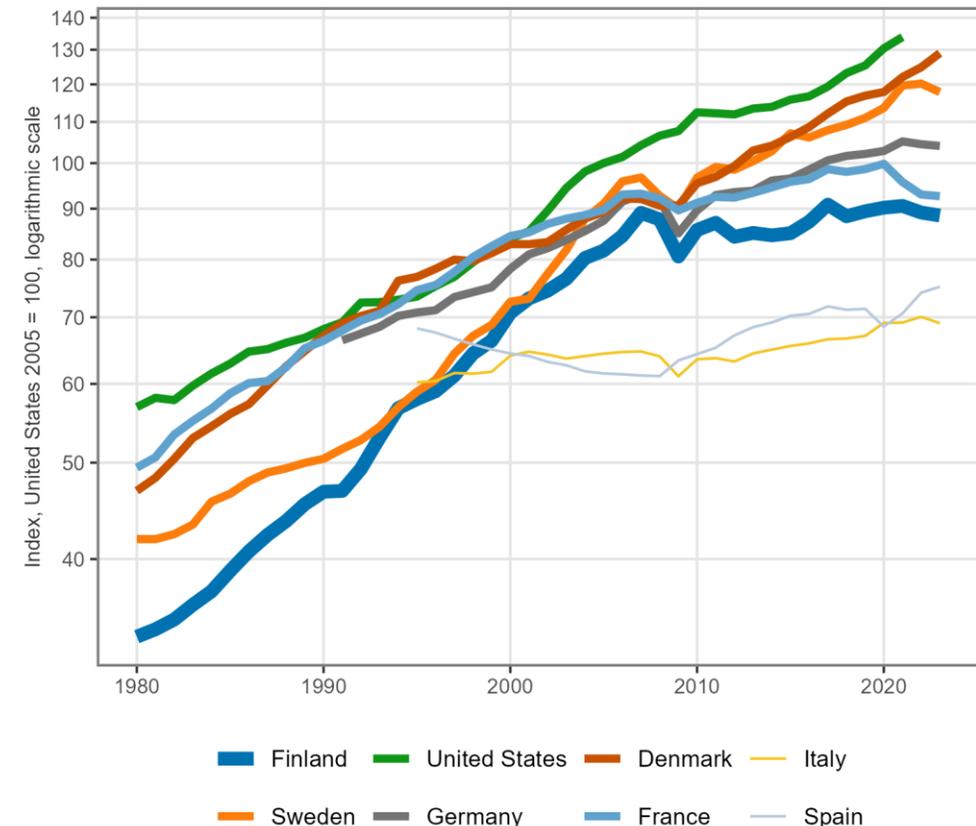
# Productivity in Finland

The slide features a minimalist design with the title 'Productivity in Finland' in a bold, teal font. To the right of the text, there are several overlapping, curved teal lines that create a sense of movement and depth, resembling a stylized leaf or a modern graphic element.

# Labor productivity growth has slowed down significantly

- Productivity growth has generally slowed in Western countries, and in Finland growth has been even slower since 2007.
- In recent years, the gap between Finland and the forefront of productivity has widened further.
- In manufacturing, productivity levels are still good, but growth has slowed.
- In services, both the level and growth are a problem.

Labor productivity level in the market sector



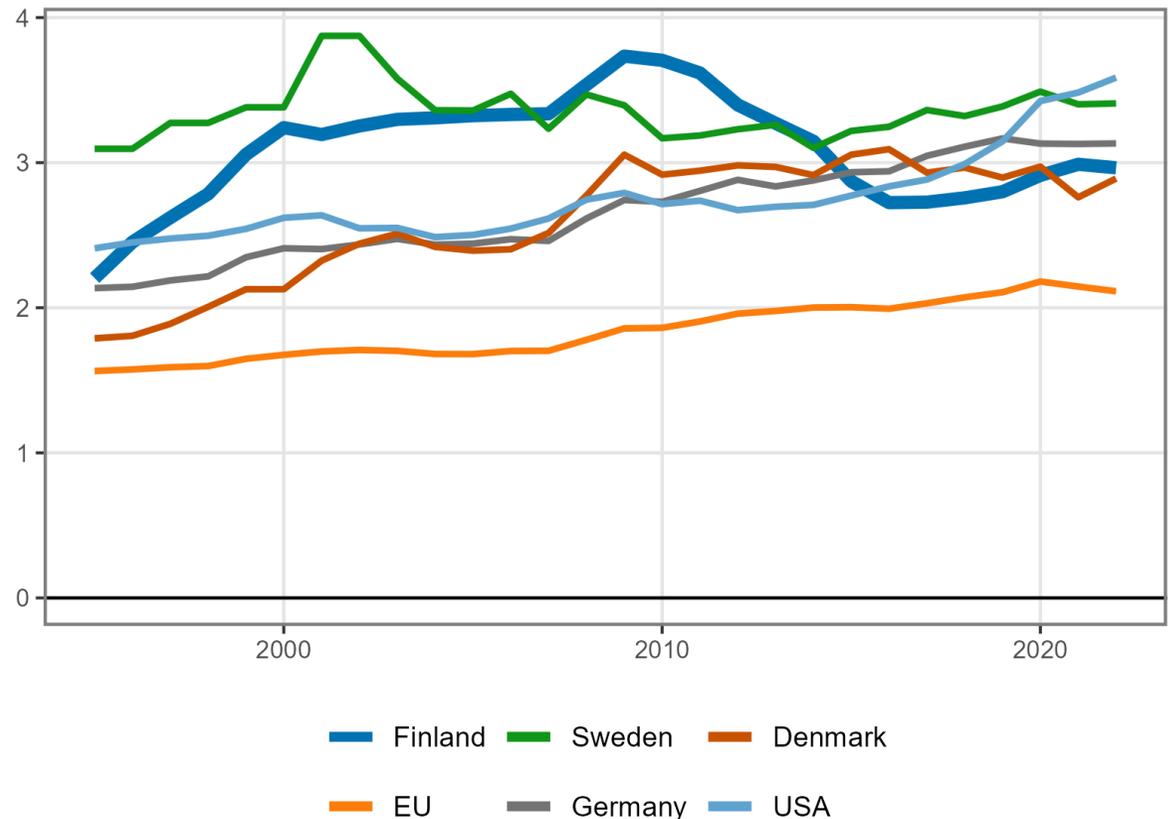
# Reasons for the slowdown in productivity growth in Finland

- A general slowdown in productivity growth in Western countries, reflected in Finland.
- Slow recovery from the financial and euro crises of the 2010s and the collapse of Nokia.
- Negative effects of the COVID-19 pandemic and Russia's war in Ukraine on productivity.
- Lack of top-performing companies in high-growth sectors, such as
- Declining investments, especially in R&D
- Weakening of human capital growth
- Inefficiency in resource allocation

# R&D investments

- The decline in R&D investment relative to GDP is largely due to Nokia's declining importance.
- The level is still relatively high, but real growth has been weak (Kangaspunta 2024a).
- Positive signs: Small and medium-sized companies invest heavily in R&D compared to their main competitors. Activities are less concentrated and more oriented towards service sectors (Huuskonen & Maliranta 2024).
- Public R&D investments are growing.

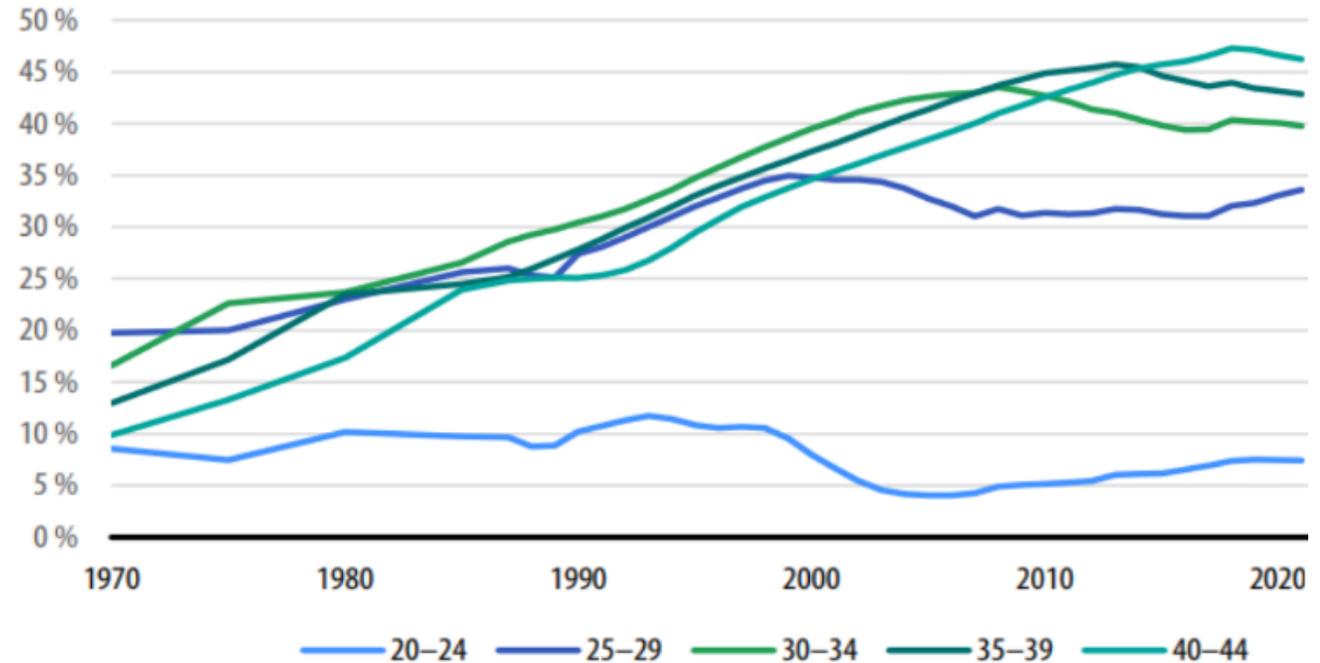
## R&D expenditure , % of GDP



# Human capital

- A key challenge for future economic growth is the shortage of highly skilled labor.
- The increase in the educational level of young people has stalled and has lagged significantly behind comparison countries (Kangaspunta 2024b).
- Without increased education and educated immigration, Finland's human capital will decline.
- The availability of trained labor can be an obstacle to increasing R&D activities (Palmèn).
- Already visible today in the supply of trained labor and wage developments.

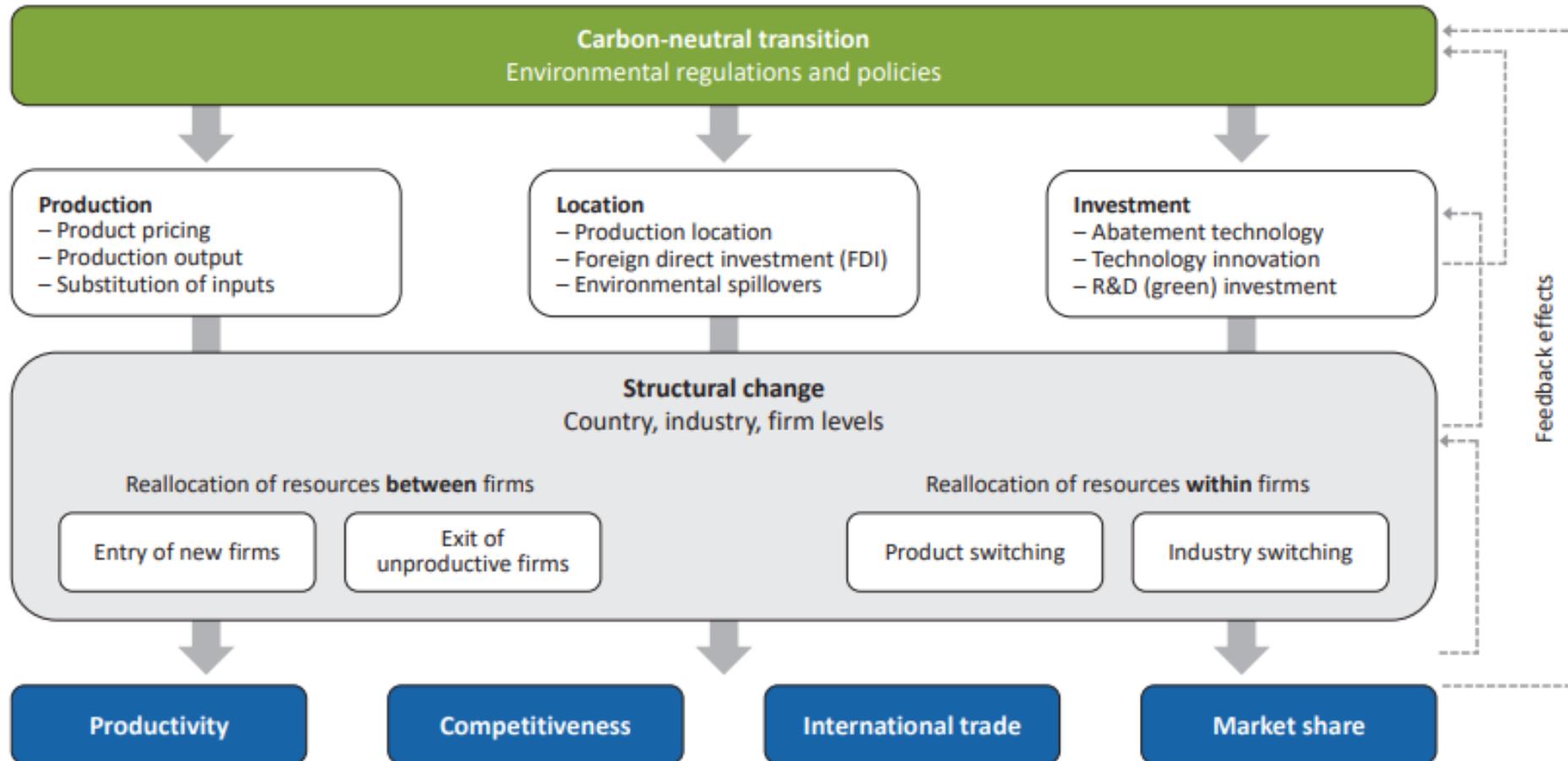
Share of higher education degrees by age group



# Green productivity

Based on Kuosmanen, Kiema, Maczulskij (2024),  
Productivity And Green Transition In Finland,  
<https://www.etla.fi/en/publications/reports/productivity-and-green-transition-in-finland/>

# The green transition triggers major structural changes in production, distribution, and consumption.



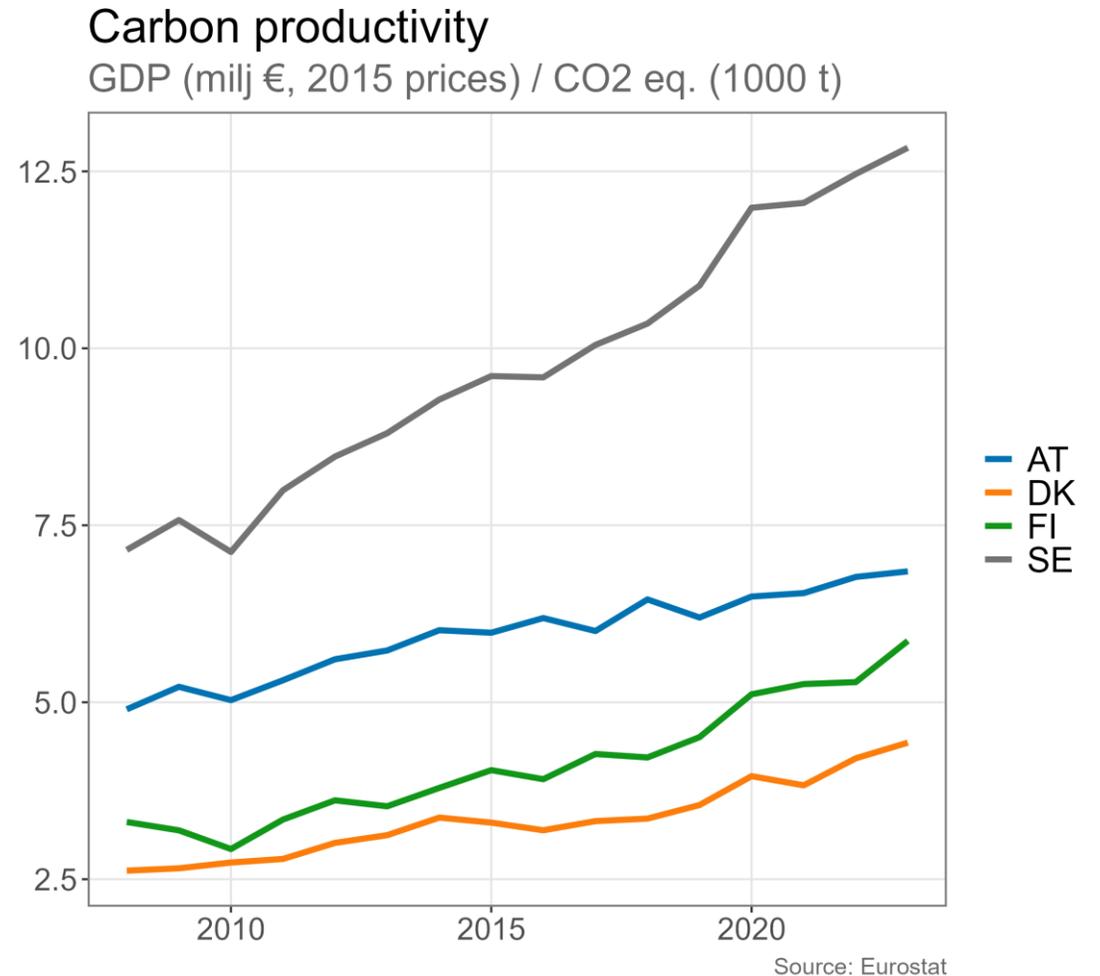
Source: Kuosmanen et al. (2023).

# Mismeasurement of productivity during the green transition

- Significant R&D and capital investments in greenhouse gas (GHG) emissions' abatement
- Conventional productivity measures, such as labor productivity and total factor productivity (TFP), include labor and capital resources allocated to GHG abatement but do not account for GHG reductions or their associated benefits
- This causes a downward bias in conventional productivity measures, as they ignore the benefits of GHG reductions

# Carbon productivity

- Carbon Productivity (CP)
  - Economic output per unit of emissions.
- Green Total Factor Productivity (Green TFP)
  - Includes GHG emissions alongside traditional inputs, such as labor and capital.

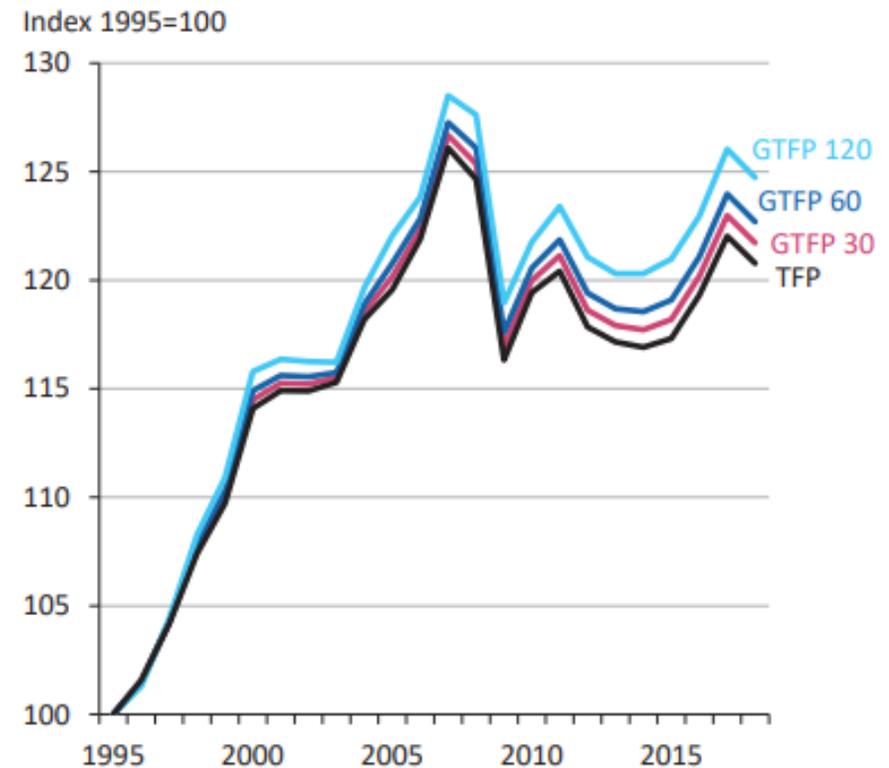


# Green TFP

## EUKLEMS

- $TFP = VA / \text{Aggregate inputs}$
- $\text{GreenTFP} = (VA - \text{price} \times \text{GHG}) / \text{Aggregate inputs}$
- For OECD countries see Dai et al. (2023).

Figure 4 TFP and Green TFP change in Finland in 1995-2019



Source: Kuosmanen et al. (2023).

# Carbon productivity improves also labour productivity on firm level

- In mining, manufacturing and electricity production a 10% increase in CP is associated with a 1.5% increase in LP (Fornaro et al., 2023).
- Firms with higher energy efficiency demonstrate stronger productivity (Kuosmanen and Maczulskij, 2024).
- A positive causal relationship between industrial output growth and CP in Finnish manufacturing firms (Maczulskij and Fornaro, 2024).

# Geopolitics



# Industrial policy and geopolitical competition

- The global economic blockade and the rise of trade barriers threaten to slow down productivity growth and the achievement of sustainable development goals.
- The fight against climate change and geopolitical challenges have increased industrial policy efforts worldwide.
- A well-implemented industrial policy could promote both environmental goals and the resolution of geopolitical objectives and productivity growth. However, the risk is that productivity growth will slow down further.
- The primary objective should be well-functioning markets.
- Industrial policy measures should have a clear problem that it solves more effectively than the market.

# Citations

- FPB (2024) Productivity growth in a new environment : How will the green transition and geopolitics affect productivity? <https://julkaisut.valtioneuvosto.fi/handle/10024/166012>
- Fornaro, P., Kiema, I., Kuosmanen, N., Maczulskij, T., Maliranta, M. & Saarelna, K. (2023). Tuottavuutta edistävät politiikkatoimet ja yrityssektorin dynamiikka. Valtioneuvoston selvitys- ja tutkimustoiminnan julkaisusarja 58
- Huuskonen, J., & Maliranta, M. (2024). Suomen yritysten t&ktoiminta vertailussa: OECD-hankkeen Suomi-analyysi (No. 2024/3; Analyysi). Labore. <https://labore.fi/julkaisu/suomen-yritysten-tk-toiminta-vertailussa-oecd-hankkeen-suomi-analyysi/>
- Kangaspunta, S. (2024a). Koulutuksesta, osaamisesta ja osaavan työvoiman saatavuudesta. (Background Report for the 2024 Annual Report of the Finnish Productivity Board). Finnish Productivity Board.
- Kangaspunta, S. (2024b). Tutkimus- ja kehittämistoiminta, sen rahoitus ja työntekijät. (Background Report for the 2024 Annual Report of the Finnish Productivity Board). Finnish Productivity Board.
- Kuosmanen et al. (2023) Transition to carbon neutrality: Implications for productivity, competitiveness and investments. <https://julkaisut.valtioneuvosto.fi/handle/10024/165281>
- Kuosmanen, N. & Maczulskij, T. (2024). Going green while getting lean: Decomposing carbon and green total factor productivity. Journal of Environmental Management 352, 120046.
- Maczulskij, T. & Fornaro, P. (2024). Firm-level cyclicalty of carbon productivity. Etna Economics Research. Mimeo.
- Palmén, O. (2024). Julkiset T&K-menot ja osaavan työvoiman tarjonta (Background Report for the 2024 Annual Report of the Finnish Productivity Board). Finnish Productivity Board.