



MEASURING GLOBAL EXPLOITATION, 1990-2023:

DOES GLOBALISATION EQUALISE EXPLOITATION RATES?



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Objectives

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[1] To test the **Smith-Marx hypothesis** on a global scale:

Globalisation, the spread of capitalism, and labour mobility should **equalise exploitation rates**

Exploitation rate = unpaid over paid labour time

Exploitation rates should equalise across **countries** and **industries**

And between **complex** and **simple** forms of labour

[2] To **develop a methodology** to estimate exploitation rates on a global scale:

Need to estimate **exploitation rates** and **transfers of value-added** globally

Produced exploitation rates (at the point of **production**, before transfers of value-added)

Realised exploitation rates (at the point of **exchange**, after transfers of value-added)

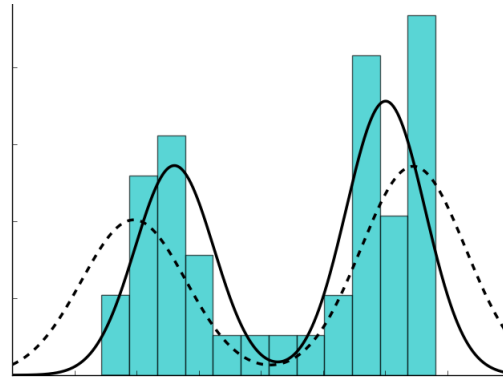
Main results

Main Results

Exploitation rates:

Absolute convergence

Relative divergence



Exploitation rates converge but maintain a **core-periphery** structure across **countries** and across **industries**:

Core = capital-intensive, low-exploitation activities, output prices $>$ labour values

Periphery = labour-intensive, high-exploitation activities, output prices $<$ labour values

Labour value = vertically integrated, skill-adjusted embodied labour

= **direct** + **indirect** labour computed via the **global inverse Leontief matrix**

Main Results

The **unequal exchange of labour** is very substantial:

Most value **production** takes place in the **periphery**

Value **realisation** is concentrated in the **core**

Value-added is transferred from high-exploitation to low-exploitation activities

SNA and GDP misattribute peripheral value-added to core countries

Unequal exchange obscures the fact that a share of the value-added **realised** in the core was **produced** in the periphery

Two main mechanisms of value-added capture:

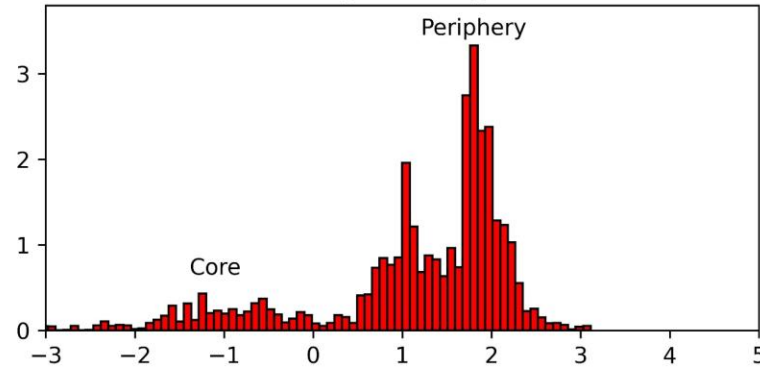
Core: output prices $>$ labour values, and greater **unproductive activity**

Periphery: output prices $<$ labour values, and fewer **unproductive activity**

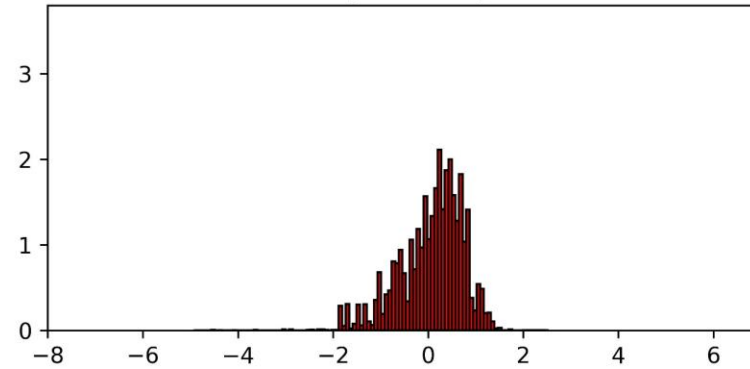
Produced and Realized Exploitation Rates (1990-2023)

Histograms in Logs, Weighted by the Share of Global Employment

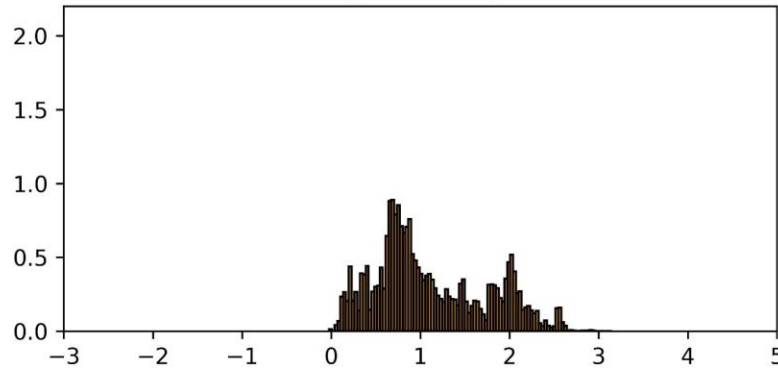
Produced Exploitation Rates By Country



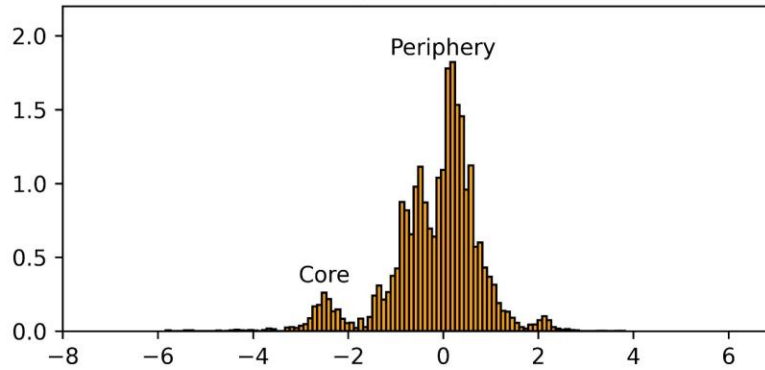
Realized Exploitation Rates By Country



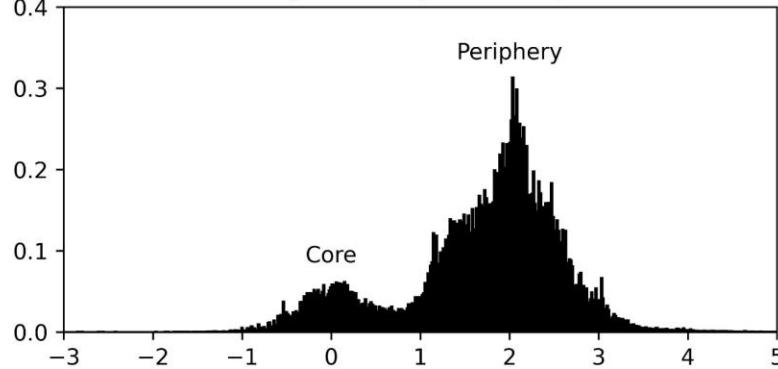
By Industry



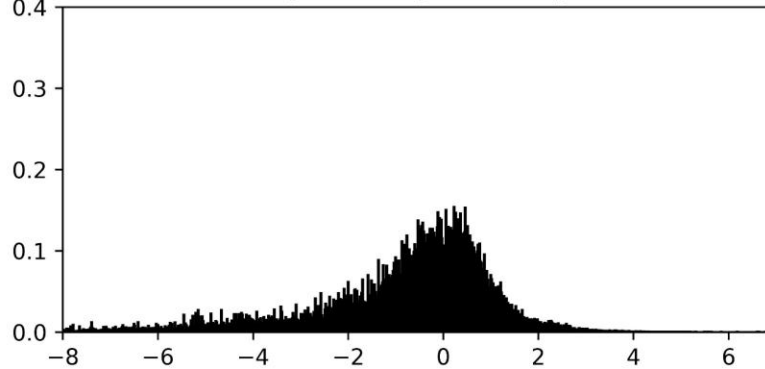
By Industry



By Country-Industry

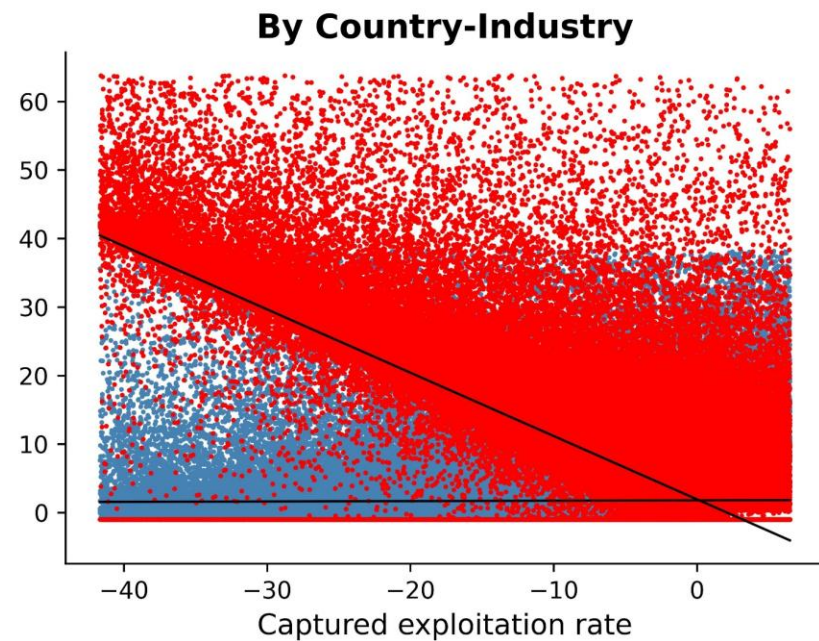
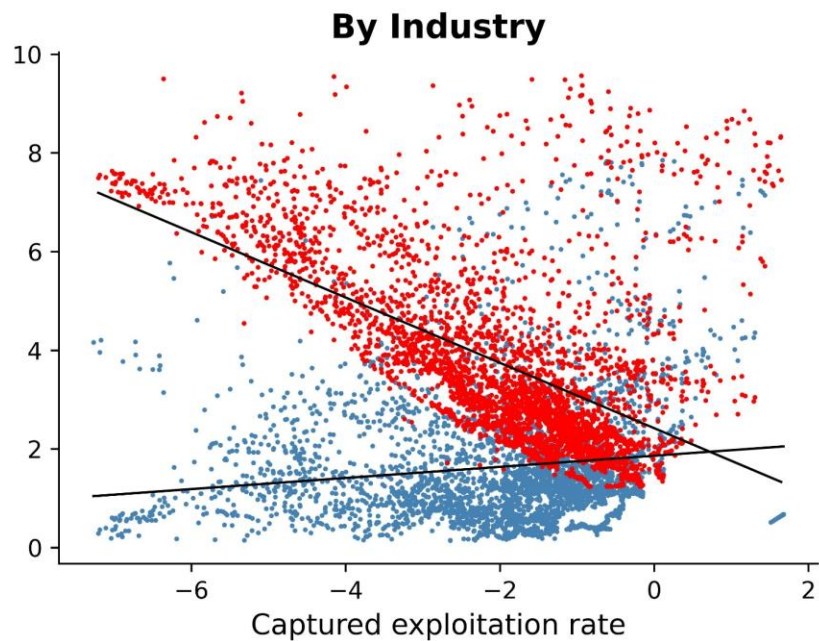
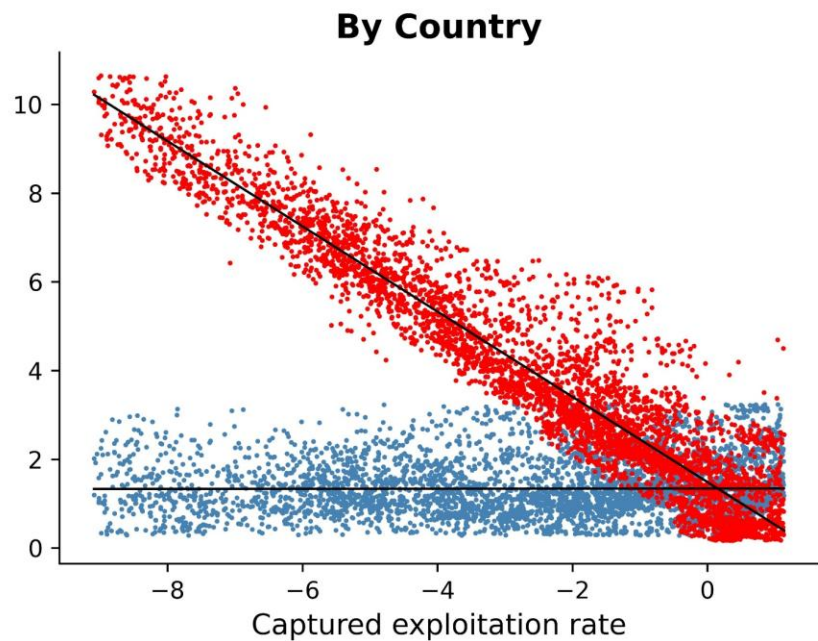


By Country-Industry



Exploitation Rates: Production, Realization, and Capture (1990-2023)

- Realized exploitation rate
- Produced exploitation rate



Methodology

Methodology

Data from the **GLORIA** input-output database:

120 industries across **164 regions** over **1990-2023**

1.2 terabytes of data in release v060

Estimation of global exploitation from GLORIA requires:

Cloud computing (GCC, Azure, AWS)

Python (R will not work)

Nvidia A100 GPU: 6,912 CUDA cores + 80Gb of VRAM (\$20,000)



Methodology

Creation of 8 new **panel datasets**: <https://doi.org/10.5281/zenodo.19282977>

Three levels of aggregation: country-industry, country, industry, global aggregates

Robustness tests:

Marxian approach (productive vs. unproductive activities)

Conventional approach (SNA, all activities are productive)

Homogenous labour (no adjustment for skills)

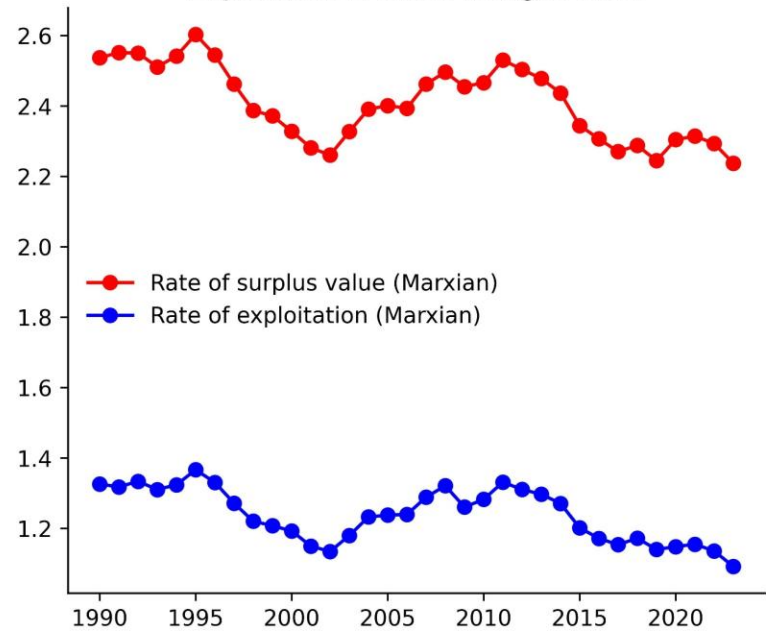
Heterogeneous labour (skills are proportional to relative wages)

Heterogeneous labour (non-linear adjustment of skills to relative wages)

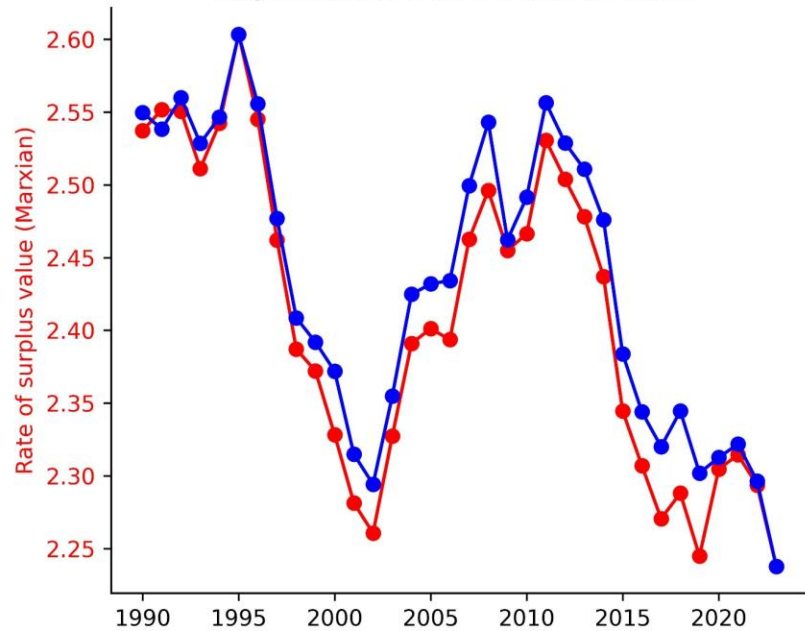
Convergence of global exploitation

Global Averages (1990-2023)

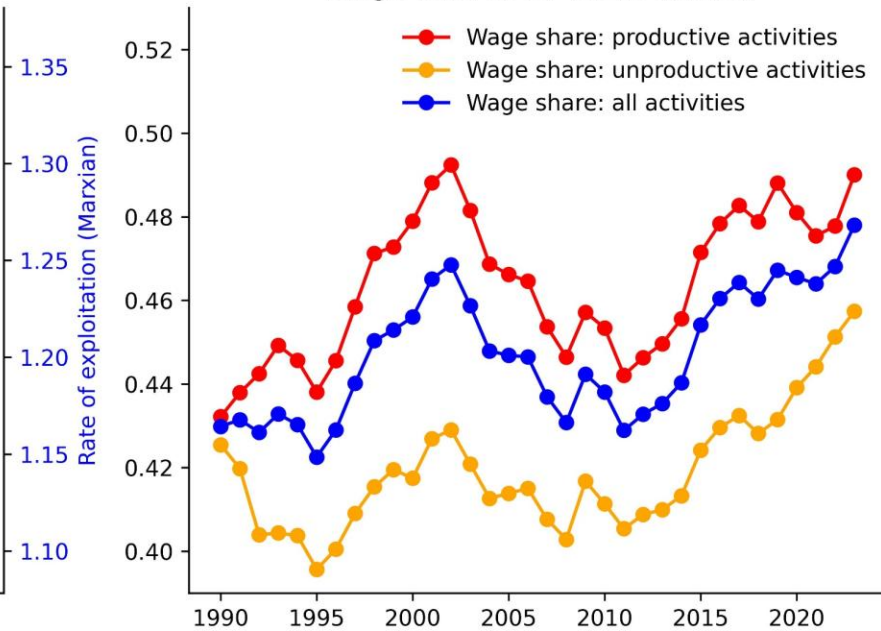
Exploitation rates (single axis)



Exploitation rates (double axes)

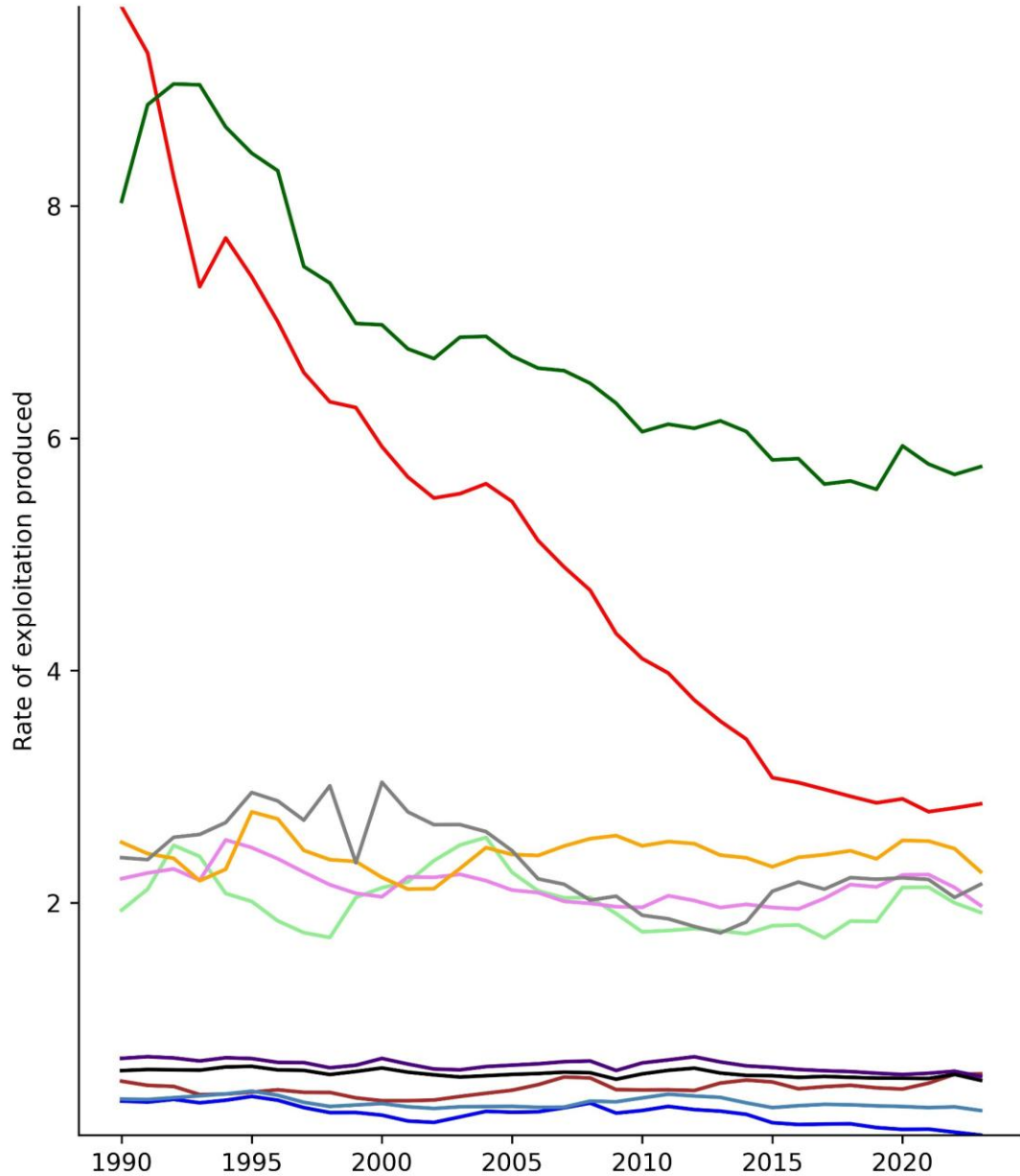


Wage shares of value-added

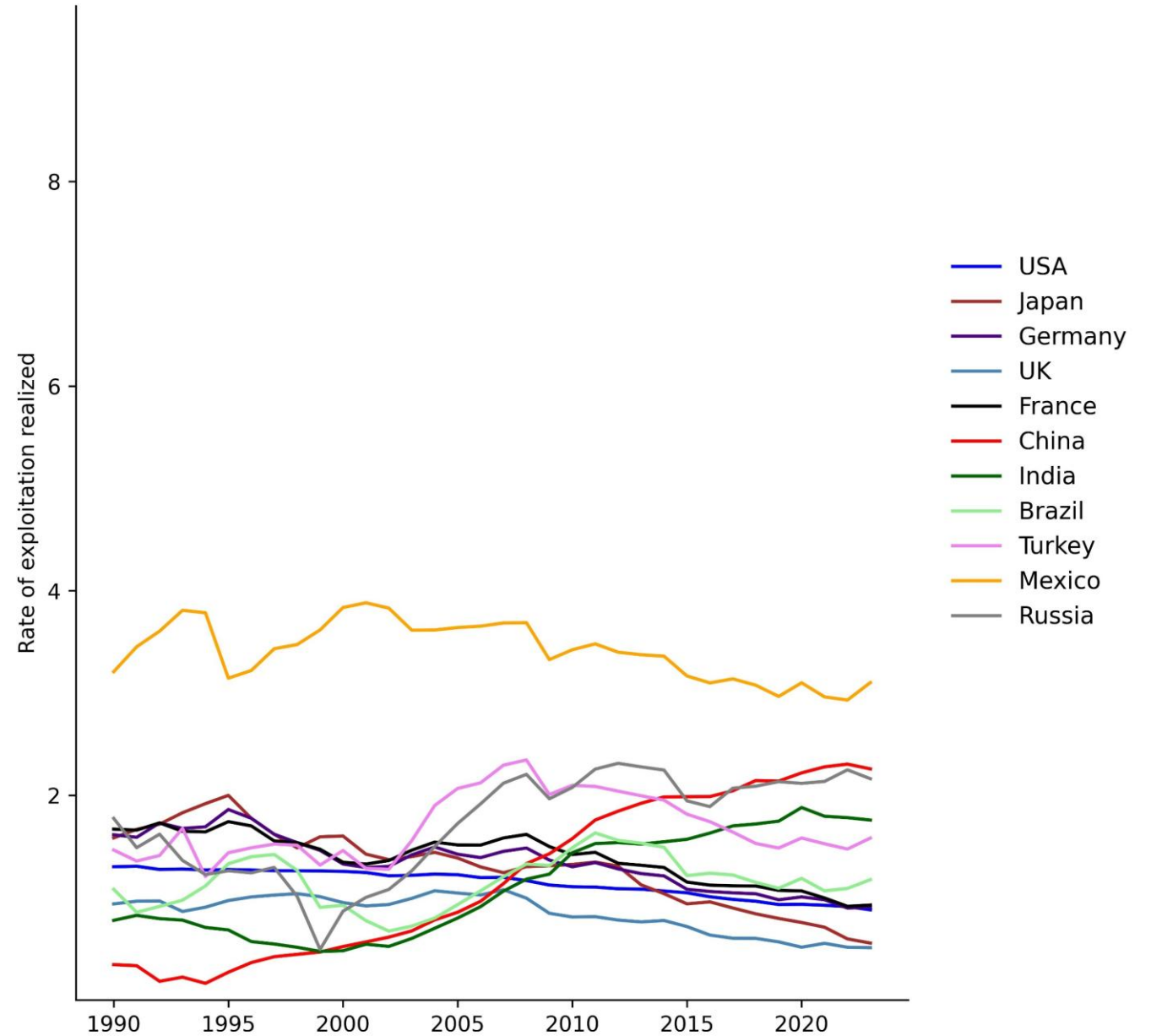


Exploitation Rates by Country (1990-2023)

Produced Exploitation Rates



Realized Exploitation Rates

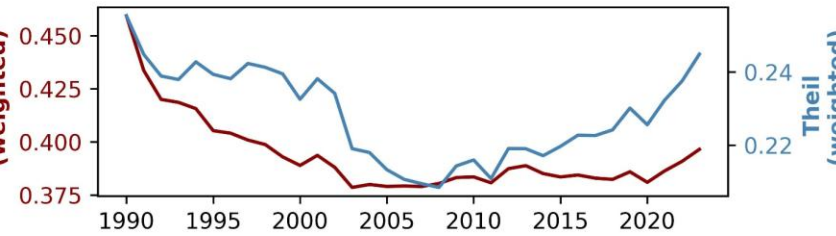
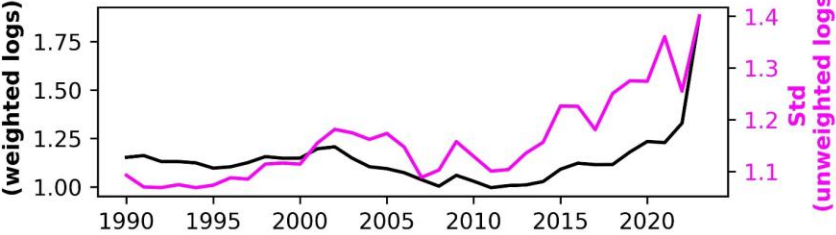
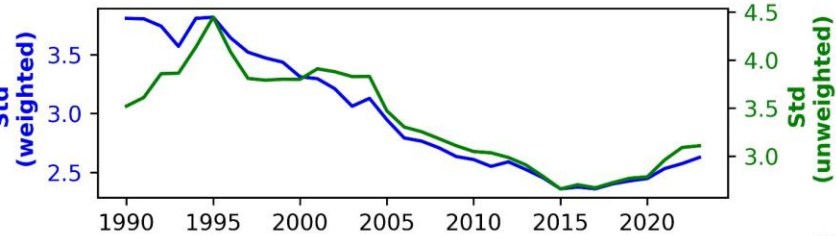
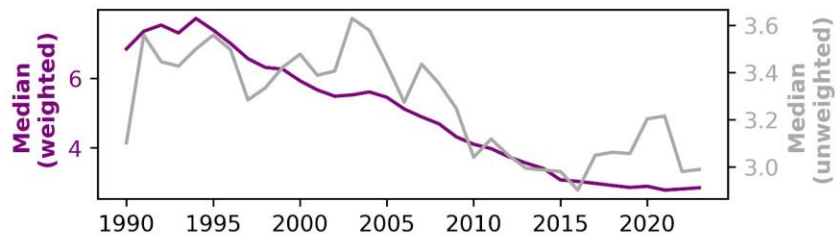
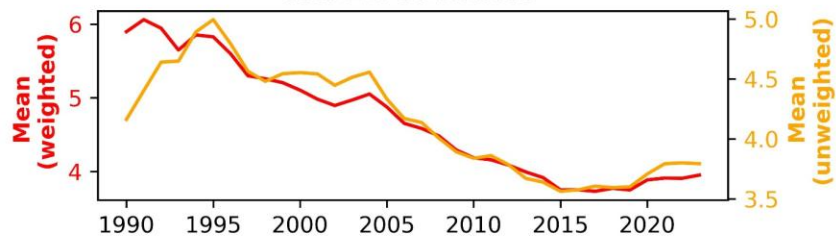


- USA
- Japan
- Germany
- UK
- France
- China
- India
- Brazil
- Turkey
- Mexico
- Russia

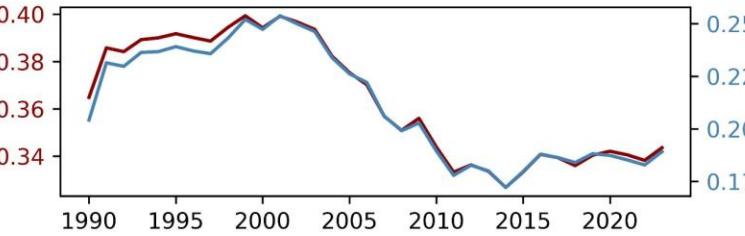
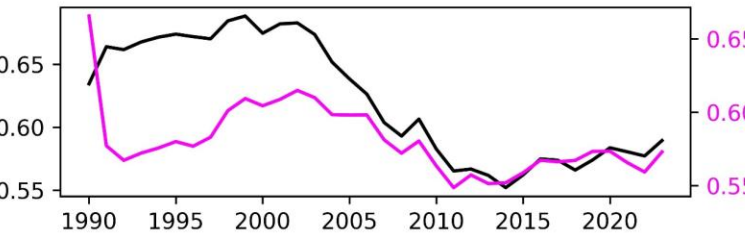
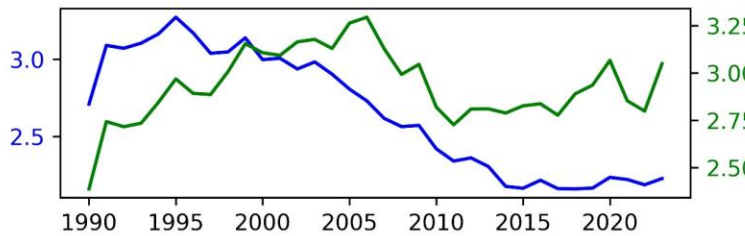
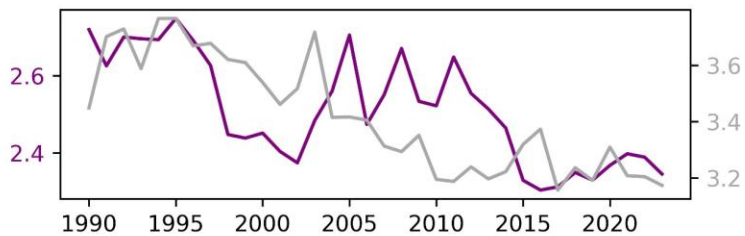
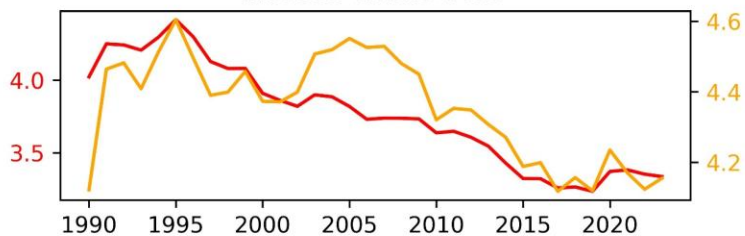
Produced Exploitation Rates: Measures of Dispersion (1990-2023)

Weighted by the Share of Global Employment

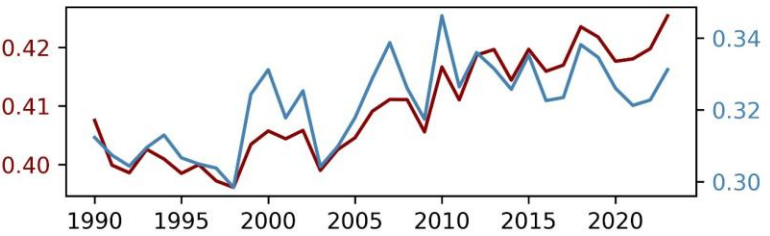
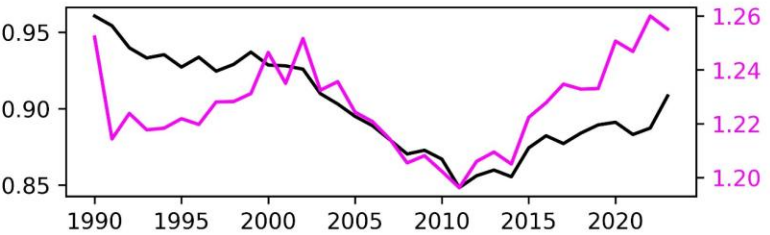
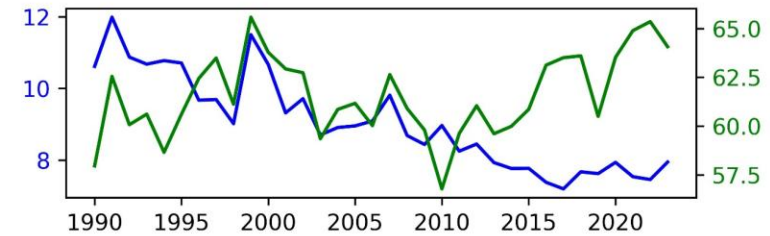
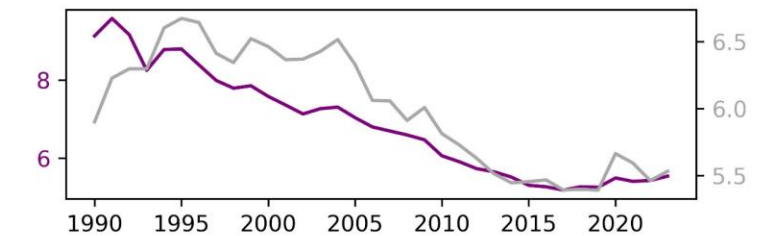
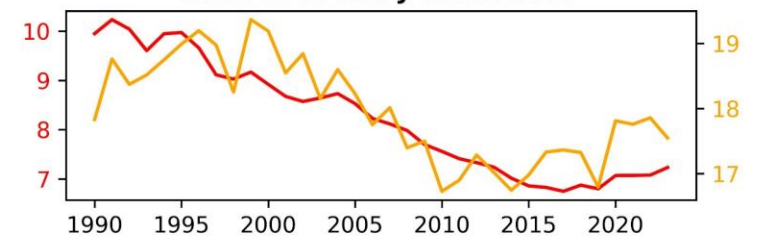
Across countries



Across industries



Across country-industries



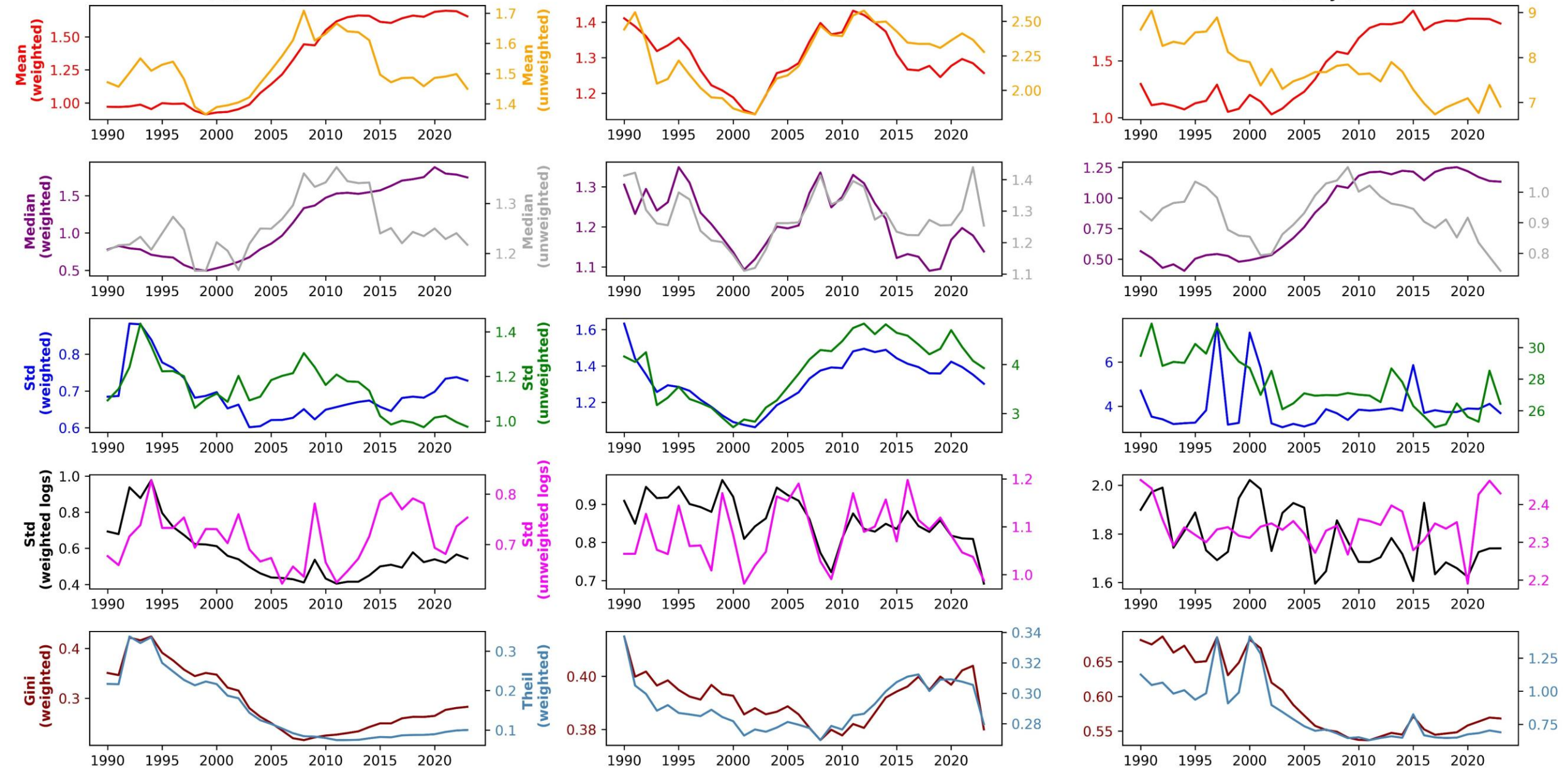
Realized Exploitation Rates: Measures of Dispersion (1990-2023)

Weighted by the Share of Global Employment

Across countries

Across industries

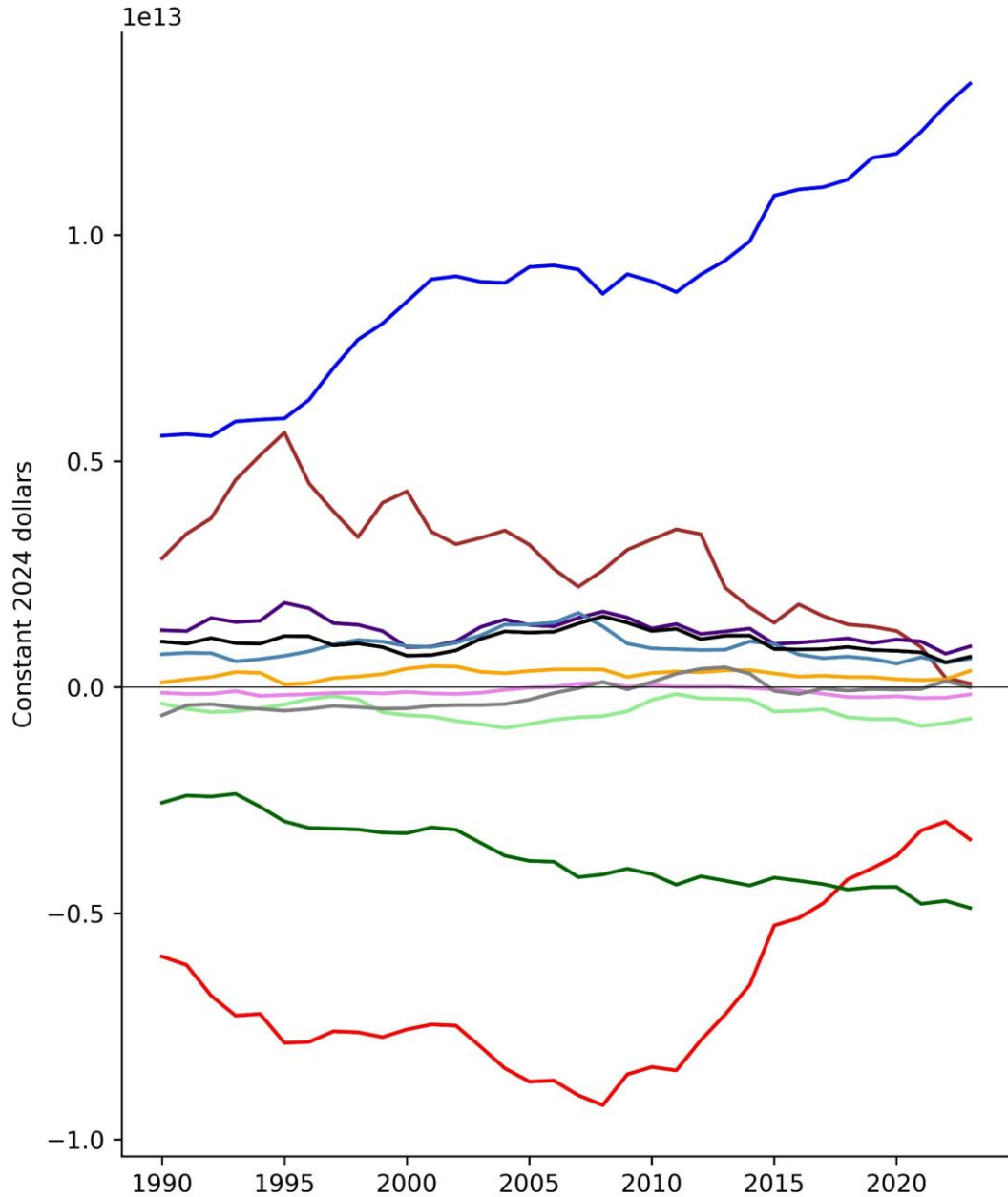
Across country-industries



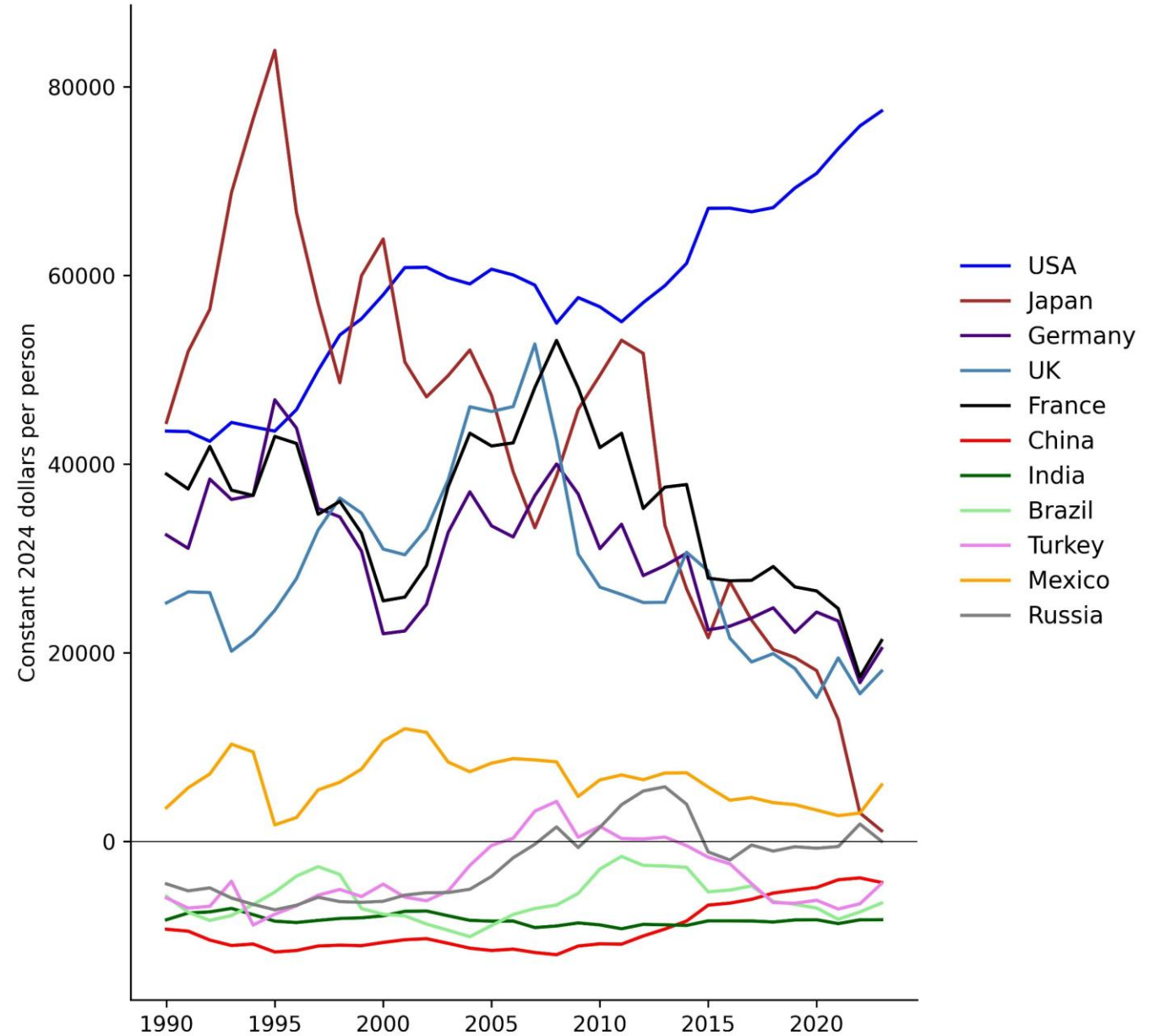
Core vs. Periphery

Value-Added Captured per Employee by Country (1990-2023)

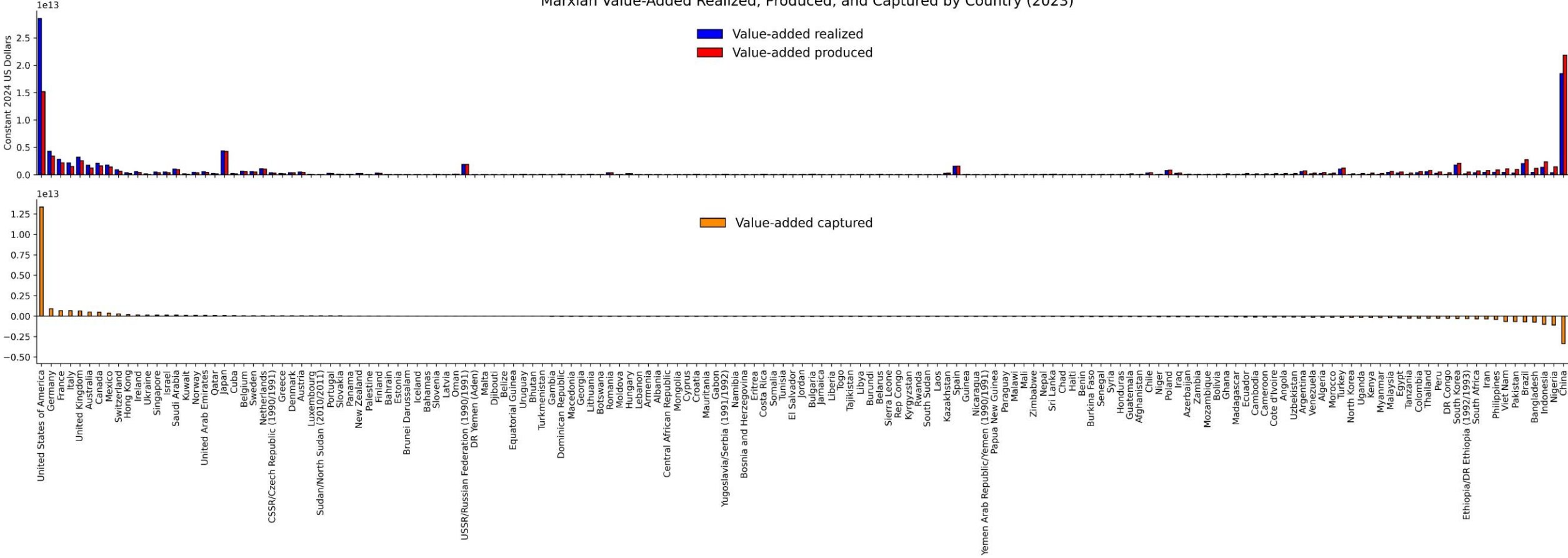
Value-Added Captured



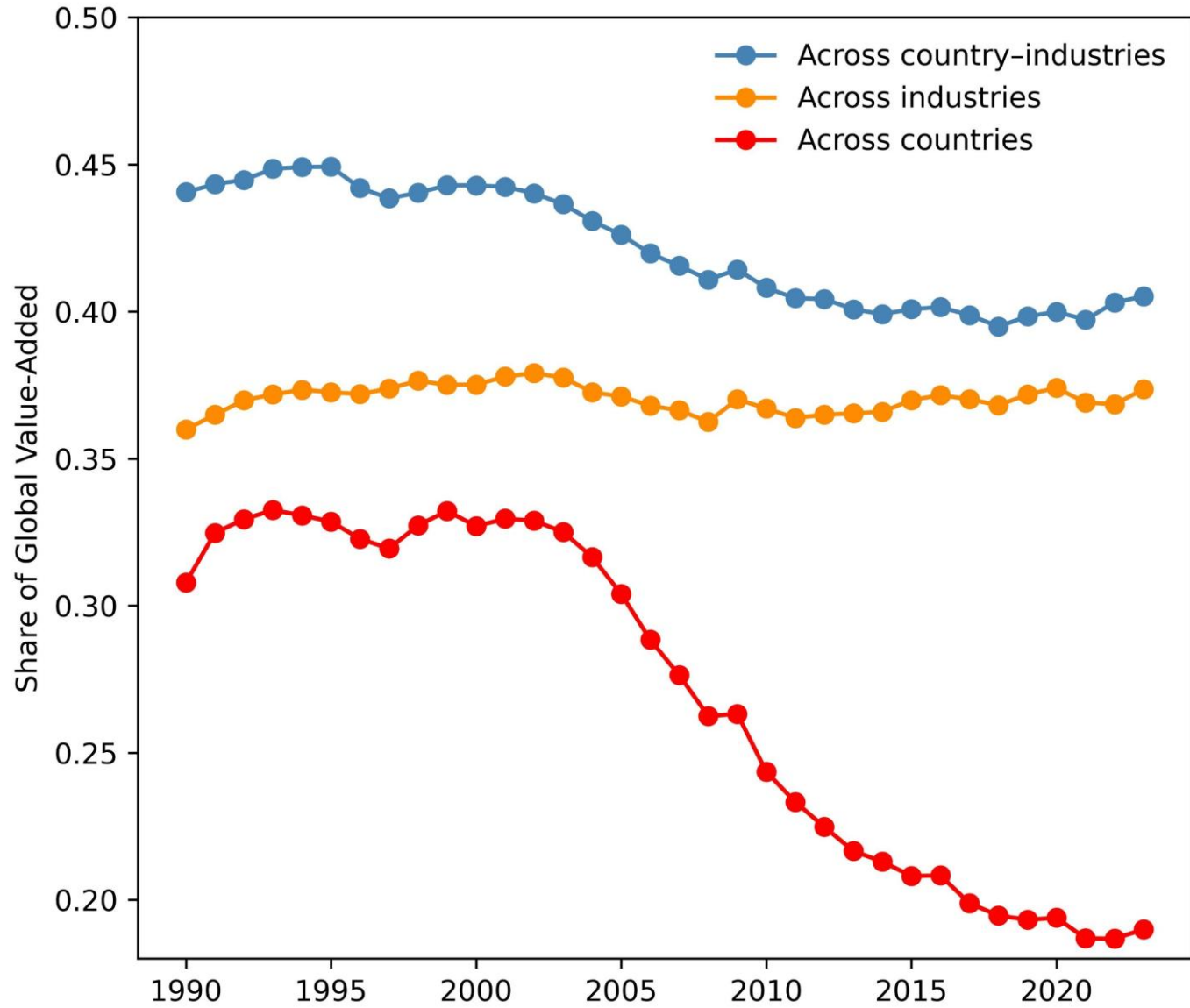
Value-Added Captured per Employee



Marxian Value-Added Realized, Produced, and Captured by Country (2023)



Unequal Exchange of Labor as a Share of Global GDP (1990-2023)



Thank you

Slides available at

tomasrotta.com