Macroeconomic Implications for the Global South of Green Transition Scenarios in the Global North

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DISCLAIMER

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Introduction

- Widespread acknowledgement of the urgent need to reduce material and energy flows for countries to meet their obligations under the Paris climate agreement and operate within Planetary Boundaries) (Rockström et al., 2009; Richardson et al., 2023).
- Controversy around relative contributions of different countries and which strategies should be followed.
- Within academic debate and the environmental movement two broadly defined perspectives are evident:
  - Degrowth
  - Green growth

Degrowth on its own terms

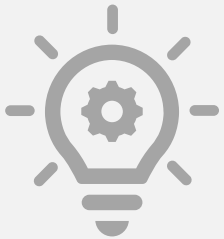
- Degrowth, according to some of its lead proponents, advocates for a planned reduction of energy and resource consumption (Hickel, 2021).
- Degrowth does not necessarily mean a reduction of GDP levels, although it might occur in some cases, as is recognized by Kallis (2020).
- Degrowth should be targeted at high-income countries that need to degrow, as their current levels of energy and resource consumption exceed what would be their per capita fair-shares of resource consumption in a scenario consistent with climate change targets +2o Celsius.
- Degrowth strategies would not be targeted at global south countries, which should be allowed to sustain (or even increase) their resources consumption to develop economically their economies.

Macroeconomic implications of green transition to the global south

- However, several economies in the global south are highly dependent on energy and primary resource extraction.
- Although, agribusiness and extractive industries in many cases may not represent large shares in GDP and in total employment.
- The majority of global south countries trade specialization is on natural resources.
- As such, a reduction in the international demand for natural resources may worsen the trade balance of several countries in the global south.

Research questions

What would be the macroeconomic impacts in the global south of a reduction in material footprint in the high-income countries of the global north?



How would these impacts differ depending on the strategy used to achieve the reduction in material footprint, and what does this mean for the development strategies that are pursued?

Scenarios

Comparison of two scenarios to achieve a 10% reduction in its total material use footprint:

1. **Degrowth scenario:** Reduction in final demand in the Global North for goods produced by all sectors, except services.
   - $\Delta M = s(I - A)^{-1}\boldsymbol{\Delta f_d}$

2. **Green efficiency:** Reduction in technical coefficients, i.e. reduction in inputs required per unit of output, of inputs produced by all sectors except by the Services sector.
   - $\Delta M = s(I - \boldsymbol{A})^{-1}\Delta f_d$

- $M = total\ material\ use$
- $s = material\ use\ coefficient\ vector$
- $I = Identity\ matrix$
- $A = technical\ coefficient\ matrix$
- $f_d = final\ demand\ vector$

$\boldsymbol{\Delta f_d}$ = - 11.76%

$\boldsymbol{\Delta a_{ij}}$ = - 15.76%

Data

- EXIOBASE 3 – Environmentally extended Multiregional Input-Output (MRIO) table (1995-2011, nowcast estimates until 2022).
- 44 countries and 5 rest of the world (RoW) regions.
    - EU-28 and their 16 most important trading partners (representing about 95% of global GDP).
- **Global North definition:** High income economies according to the World Bank classification.

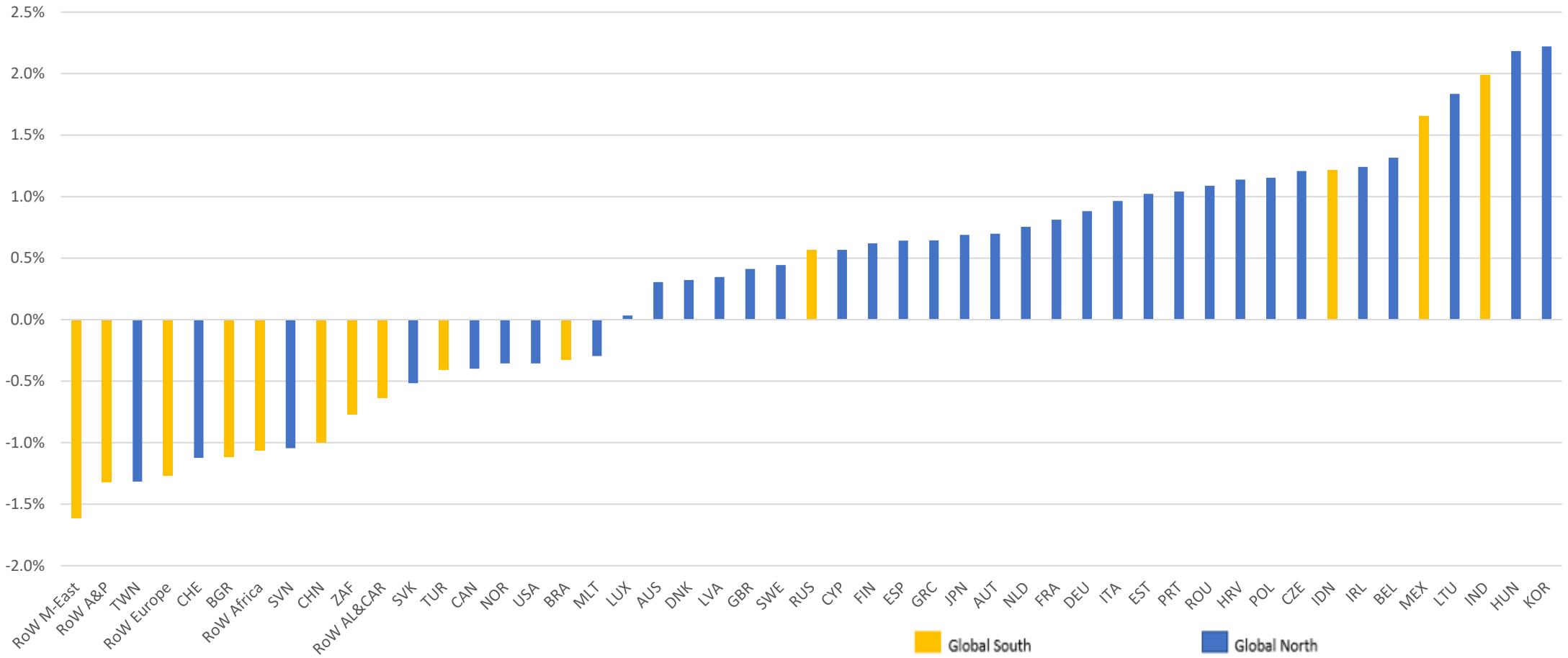
Degrowth scenario

% change in Employment				
	Average	**Std. Dev**	**MIN**	**MAX**
G_North	-3.2%	+/- 1.3%	-6.5%	-0.2%
G_South	-2.4%	+/- 2.3%	-8.1%	-0.2%

% change in GDP				
	Average	**Std. Dev**	**MIN**	**MAX**
G_North	-3.2%	+/- 1.2%	-5.9%	-0.3%
G_South	-2.3%	+/- 2.2%	-6.9%	-0.2%

Trade Balance as % of GDP					
	Average	**Std. Dev**	**MIN**	**MAX**	**TB improve in % of regions**
G_North	0.5%	+/- 0.8%	-1.3%	2.2%	27 out of 35
G_South	-0.3%	+/- 1.1%	-1.6%	2.0%	4 out of 14

Change (p.p.) in the Trade Balance/GDP ratio relative to the baseline



Green Efficiency Scenario

% change in Employment				
	Average	**Std. Dev**	**MIN**	**MAX**
G_North	-4.2%	1.3%	-7.1%	-2.2%
G_South	-1.5%	0.8%	-3.6%	-0.5%

- The impact on GDP and on the Trade Balance, however, would depend on what happens with the reduction in costs, associated with the lower amount of inputs required per unit of output.

- Question is whether these cost efficiency gains are passed through prices or appropriated by firms (and distributed as profits and/or increased wages)?

Effect of changes in costs of production and prices

- In the green efficiency scenario the reduction in the technical coefficients influence costs of production (and, potentially) prices.
  - Leontief price model (Miller and Blair, 2009):

$$p = v'(I - A)^{-1}$$

Where $v = [v_1, \dots, v_j]$ is the sector value added coefficient vector:

$$v_j = \frac{va_j}{x_j}$$

- Question is whether these cost efficiency gains are passed through prices or appropriated by firms (and distributed as profits and/or increased wages)?

Two sub-scenarios $\begin{cases} 2a.\ No\ pass-through\ to\ prices \\ 2b. Full\ pass-through\ to\ prices \end{cases}$

- $2a - No\ pass - through\ to\ prices$: $\uparrow$ in value added per unit of output (v) coefficient and constant prices.
- $2b - Full\ pass - through\ to\ prices$: fall in prices $(\downarrow p)$ and constant value added per unit of output (v) coefficient.

Effect of changes in costs and prices on Income

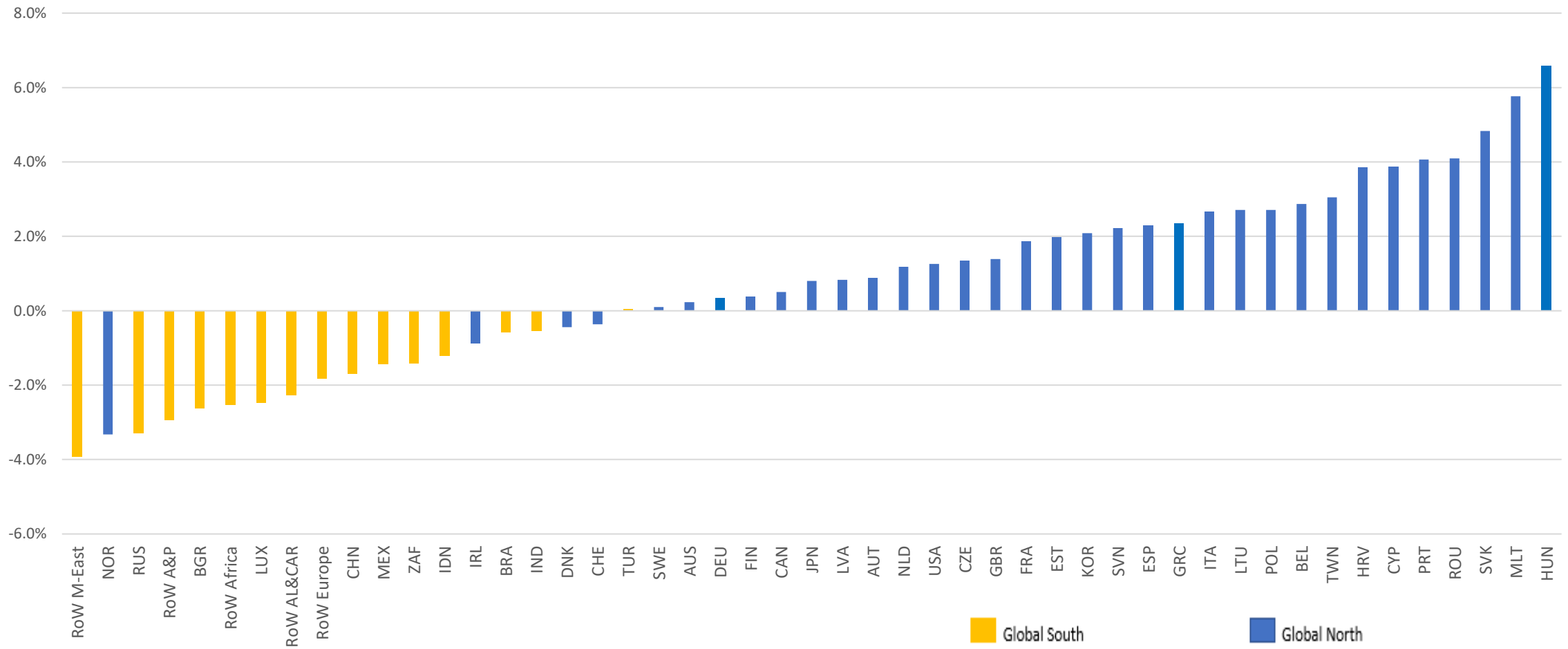
- $Scenario\ 2a - No\ pass - through\ to\ prices$:
  - ↑ in nominal value added per unit of output (v).
    - Lower total output for given consumption, though. Spilling off to lower employment, given labour productivity levels.
    - However, GVA/X ratio translate either into higher wages or higher profits rates. To which is the helm of political economy, the relative power bargaining between social classes within each sector (shareholders, senior management, office and line of production workers).

Green efficiency 2a. scenario

% change in real GDP					
	Average	**Std. Dev**	**MIN**	**MAX**	**GDP improve in # of regions**
G_North	1.5%	+/-1.7%	-2.7%	7.6%	31 out of 35
G_South	-1.7%	+/-0.9%	-3.8%	-0.6%	0 out of 14

Trade Balance as % of GDP					
	Average	**Std. Dev**	**MIN**	**MAX**	**TB improve in # of regions**
G_North	1.8%	+/- 2.1%	-3.3%	6.6%	30 out of 35
G_South	-1.9%	+/- 1.1%	-3.9%	0.1%	1 out of 14

Scenario 2a: Change (p.p.) in the Trade Balance/GDP ratio relative to the baseline



Effect of changes in costs and prices on Income

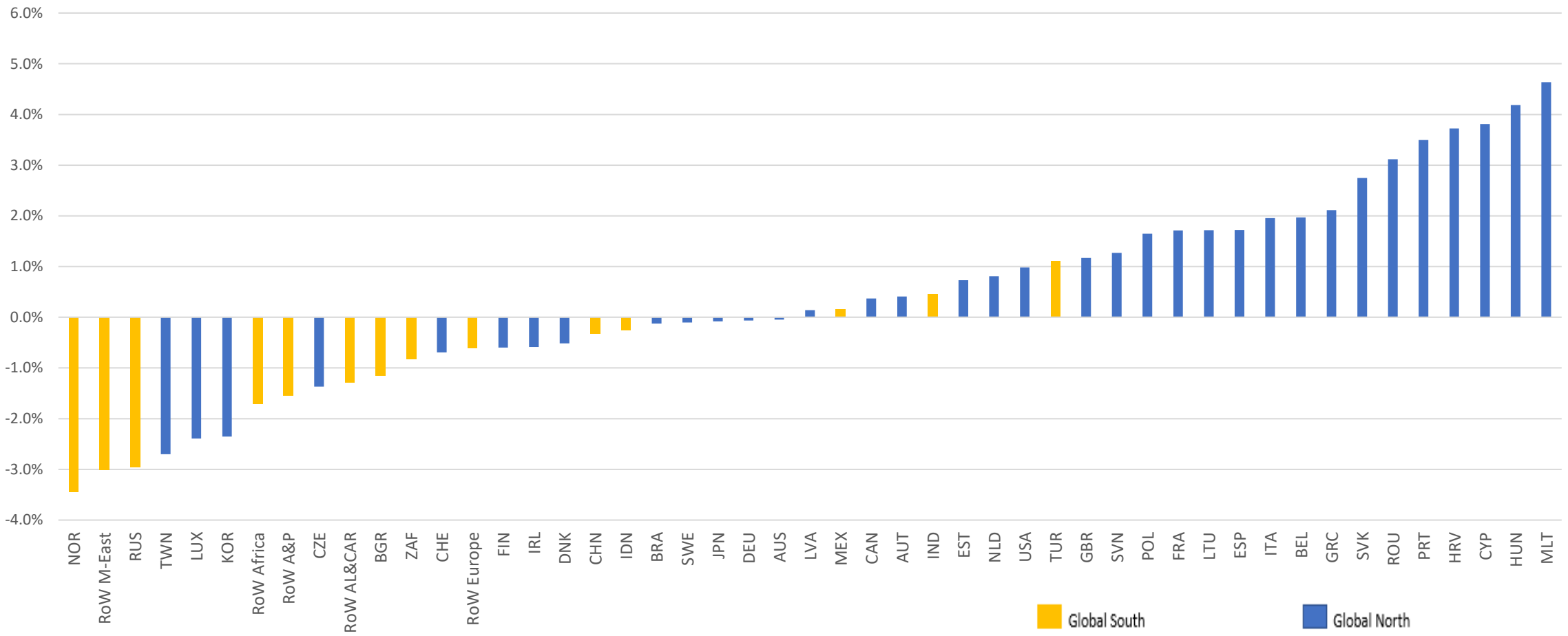
- $Scenario\ 2b$: $Full\ pass-through\ to\ prices$:
  - $Full\ pass–through\ to\ prices$ means that value added per unit of output (v) stays constant.
  - Meaning that lower total output leads to lower nominal income (Value added).
  - However, there is a fall in the price (cost) of the average consumption (investment) basket.
  - Real GVA will increase or decrease if prices fall more than nominal GVA.
  - Using the final expenditure shares as the weights of the price index to deflate total GVA gives an alternating results

Green efficiency 2b. scenario

% change in real GDP					
	Average	**Std. Dev**	**MIN**	**MAX**	**GDP improve in # of regions**
G_North	0.42%	+/- 0.97%	-2.59%	2.33%	28 out of 35
G_South	-0.65%	+/- 0.84%	-2.84%	0.37%	4 out of 14

Trade Balance (TB) as % of GDP					
	Average	**Std. Dev**	**MIN**	**MAX**	**TB improve in % of regions**
G_North	0.8%	2.0%	-3.5%	4.6%	21 out of 35
G_South	-0.9%	1.1%	-3.0%	1.1%	3 out of 14

Scenario 2b: Change (p.p.) in the Trade Balance/GDP ratio relative to the baseline



Take aways from the different scenarios

Despite limitations, the results of the 3 scenarios (degrowth and the 2 green-efficiency sub-scenarios) provide some important insights regarding macroeconomic effects of alternative strategies to the transitions to a more sustainable economy:

- **Negative impacts in the trade balance for the Global South** as it tends to specialize in the exports of raw materials.
    - Specially, in the green efficiency scenario where there is no pass-through to prices of the cost efficiencies (scenario 2a.), as the prices of goods produced in the Global north and imported by the global south don't fall.
- **Negative employment impacts**, on average, in both scenarios **in both regions.**
- **Negative GDP impacts for the Global South**, while **GDP impacts in the Global North can be positive** in a **Green Efficiency** scenario, specially gains in efficiency are appropriated by firms (and distributed as wages or profits), i.e. scenario 2a.

Caveats

- Analysis conducted with a static Leontief Input-Output model:
  - Exogenous changes in final demand and technological change.
  - No (neoclassical) feedback between prices and demand.
  - No (Keynesian) income induced effects.

No rebound effects

- To try to remain agnostic, changes in final demand and technical change across sectors were linear.

Caveats

- To try to remain agnostic, changes in final demand and technical change across sectors were linear.
- **In the degrowth scenario**, the fall in final demand for goods were not diverted to services. Nor impact of increased propensity to save was modelled.
- **In the green efficiency scenario**, no increase in investment in new more efficient capital goods or in R&D /consultancy, which could justify how the innovations which increase material efficiency emerge is accounted for.

Final Remarks

- Although, both scenarios are highly idealized and some macroeconomic feedback effects are not accounted for, these **preliminary** findings highlight the **potential negative macroeconomics effects on the Global South of a transitions towards a more sustainable economy in the Global North.**
  - Worsening of the trade balance in the global south countries can lead to exchange rate devaluation, which can lead to inflation on agricultural commodities (priced in US$).
  - Fall in GDP can exacerbate poor living conditions.
- **Structural change in the global south is a must to ensure a just transition towards a more environmentally sustainable economy.**
  - Development policies, such as industrial policy, may once again become central for global south countries.