Cross-border impacts of worldwide climate effects on effective labour for Finland

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Introduction

- Climate change has already had negative impacts on the labour force in most parts of the world, with a possible exception being Scandinavian countries.
- Previous analysis has found that climate effects on labour are among the most important drivers of total economic costs of climate change.
- We analyse how labour productivity impacts worldwide are transmitted to other countries, focusing on Finland, via trade and allocation of international investments.

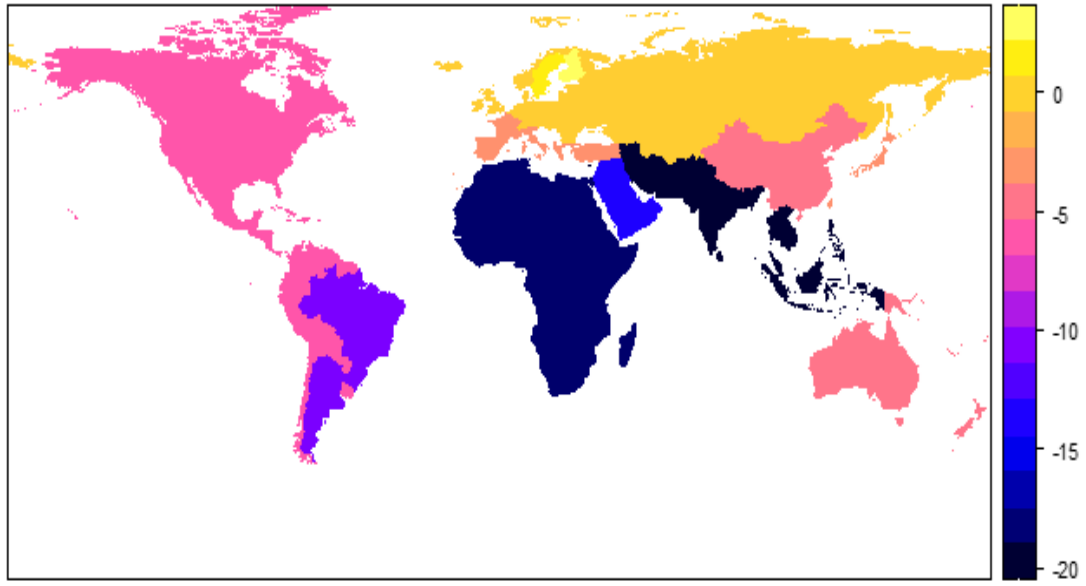
Methods

- Calculations were performed with the global multiregion & multisector GTAP model
- GTAP is an computable general equilibrium (CGE) model that provides long term impacts of the shock after adjustment period
- Labour market assumptions:
    - Labour is perfectly mobile between sectors in given regions but not mobile between regions;
    - wages adjust to balance the supply and demand of labor; no involuntary unemployment
    - Skilled and unskilled labour
- Trade assumptions:
    - Armington assumption: commodities produced in different countries are imperfect substitutes
    - Chages in trade depend on changes in relative prices and values of elasticities (exogenous)
- GTAP database

Effective labour: climate shock fed into GTAP model (preliminary)

- Effect of climate warming on effective labour (=labour productivity + working time)
- Analysis on global grid for present-day and under two future scenarios (1.5 + 3 degC warming)
- Effects distinguish between outdoor and indoor/outdoor in shadow
    - Outdoor: a few sectors, unskilled labour
- No adaptation considered
- Effect of mean changes in climate considered

Source: Dasgupta et al. (2021)



Changes in effective labour for a 3-degC warming scenario for indoor and shaded outdoor work for GTAP analysis (Perrels et al. 2022).

Economic channels of global labour effects for Finland

The most important channels impacting the trade and GDP/welfare in the economic model

- Competitiveness: climate change impact raises the labour costs in other countries (more than in Finland) => Finland benefits
- Lower global demand => Finnish exports suffer
- Higher import prices => Finnish producers and consumers suffer
- Relative productivity increases => Finland benefits from increased allocation of international investments

Results from GTAP model

preliminary

at best give information on the sign and magnitude of the effects

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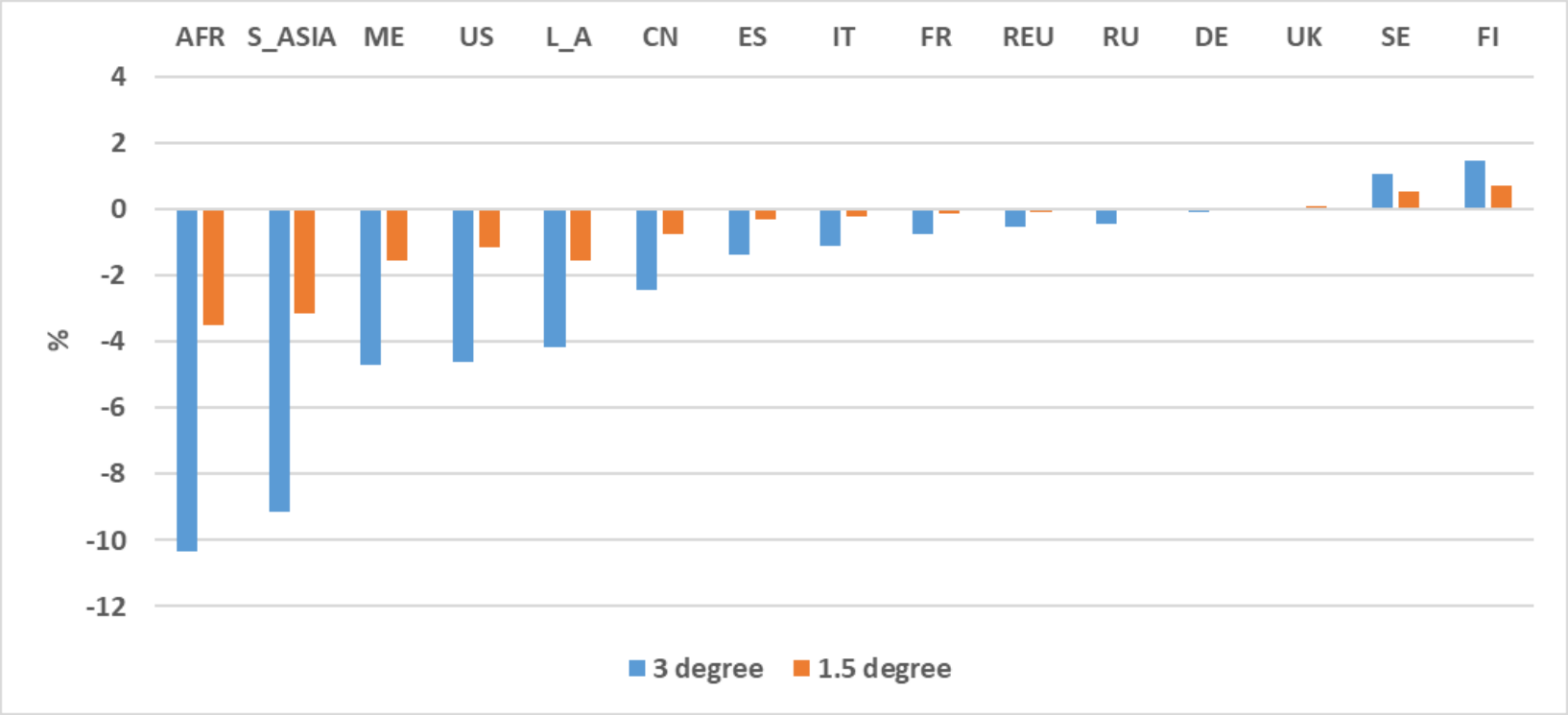
Effect of heat-related labour reductions on GDP

- Largest GDP impacts in southern Asia and Africa
  - Effective labour is reduced most
  - High labour-intensity in production
- Modest impacts in EU-region



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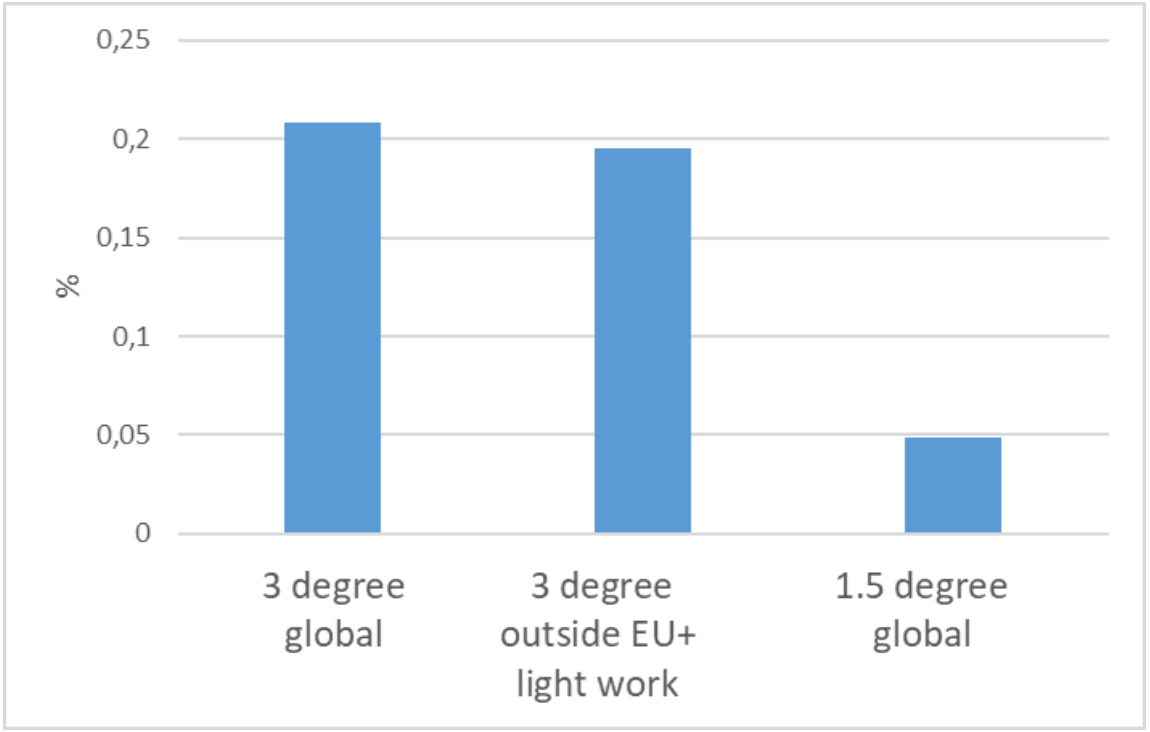
Cross-border effects on Finland's GDP, %

Modest positive cross-border impact was found to Finnish economy

Positive impact was due to the increased allocation of international investments in Finland due to improvements in the competitive position.

Most of the cross-border impact was due to the reduction of labour productivity in light (indoor or outdoor in shadow) work outside the EU

The impact due to1.5°C warming scenarios was clearly smaller compared to 3°C warming scenario.



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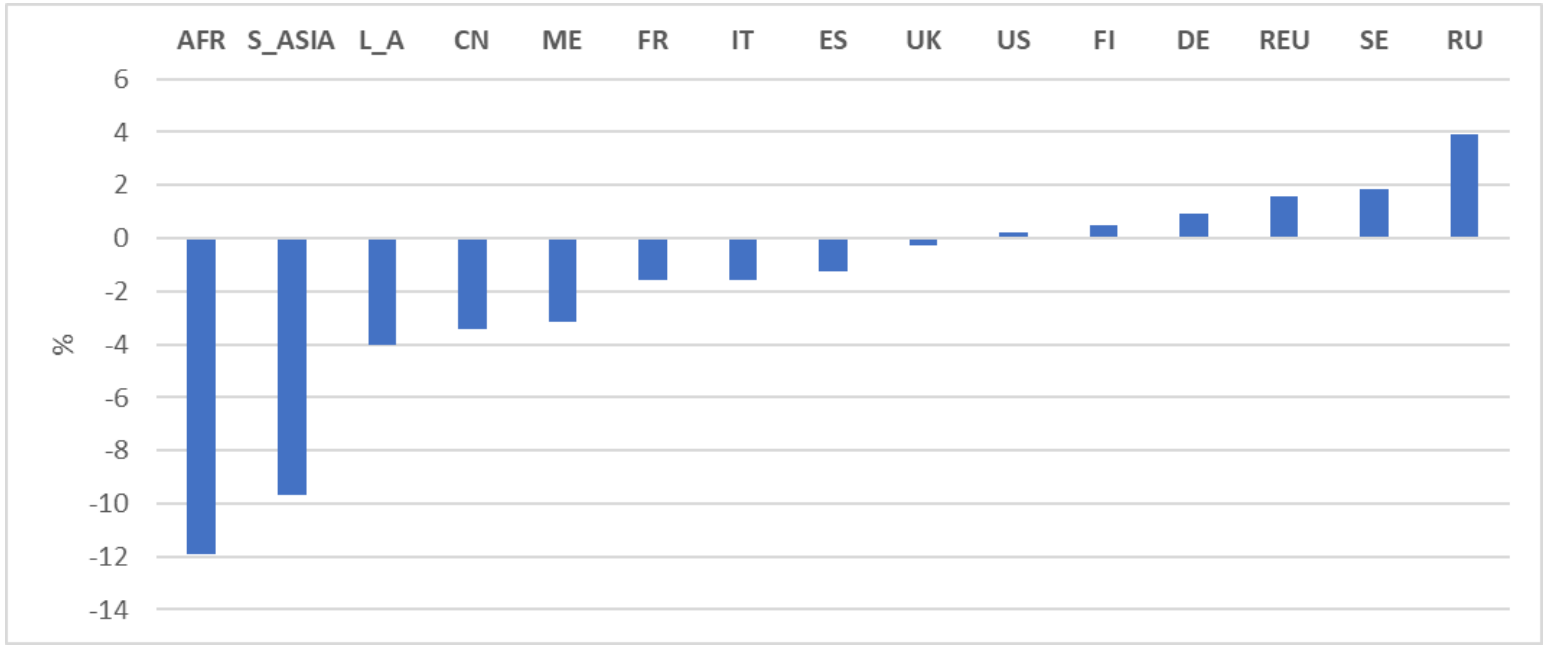
On trade impacts

- Finnish exports are reduced both to EU+ and outside EU
- Imports of labour intensive products decrease as expected
- Imports from most affected regions decrease as expected
- However, the total imports from outside EU+ are increased
- Impacts on Finnish trade are affected indirectly by all adjustments in world markets (e.g. due to the changes in competitive positions),
  - Illustration:

    in global labour productivity shock, Finnish imports from China are slightly increased while in case of labour productivity shock in China only, Finnish imports from China would decrease

On production impacts: example

- Production of textiles decreases by 3.5 % globally
- Relocated to some extent
- Largest reductions in regions with largest reduction in effective labour
- Increased production in regions with increase in effective labour (Finland, Sweden) but also in some other regions



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Conclusions

- Cross-border impacts can be significant if climate change effects considered affect widely to world markets
- In this study, a modest positive impact was found.
    - This study focused only one effect and thus provides an example; total cross-border effects on the Finnish economy are likely to be much larger, other sectors and aspects that could be relevant to include are agriculture, forestry, trade disruptions and migration.
        - However, worldwide estimates of impacts of climate change that could be fed into economic models are available to limited extent and they are (highly) uncertain
    - Overall cross-border impact is the result of both negative and positive effects from various channels and seems to be sensitive to the model assumptions and the data
    - Sudden impacts like heat waves might cause much larger short-term impacts to related commodites.

Thank you!

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