



African economic integration - the effects on climate change adaptation and hunger prevention

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Introduction

- The AU Agenda 2063
 - Climate variability and change among the main challenges threatening the AU to reach its development goals
- AfCFTA launched in 2021
 - CGE studies: Mevel and Karingi 2012, 2013; Jensen and Sandrey 2015, World Bank 2020, Fusacchia et al. 2022
 - [Simola et al. 2021](#):
 - The AU GDP increases 0.4% (by 2035)
 - The AU imports 3.7% and exports 2.3% (by 2035)
 - The intra-African imports and exports 22%
 - Assumes SSP2 baseline

Climate change and Africa

- IPCC – AR6
 - Africa one of the vulnerable climate change hot spots
 - Contributed the least, yet already experiencing widespread loss and damage:
 - 2.3-2.81% of global cumulative CO₂ emissions 2000-2020 (~0.5% for SSA)
 - GDP per capita 13.6% lower due to climate change in 1991-2010 (Diffenbaugh & Burke 2019)
 - Warming between 1.5°C and 2.0°C cause widespread impacts
 - Incomes disproportionately from climate-exposed sectors
- WMO – State of the Climate in Africa 2020
 - Food insecurity increases by 5-20 percentage points with each flood and drought
 - 40% increase in the amount of people affected by food security (2020)

Climate policies in Africa

- Mitigation – 42% total reduction of emissions in 2030
- Adaptation possibilities reaching their limits in many African regions at 1.1°C warming (IPCC AR6)
- Estimated investment need:
 - Total adaptation costs US\$ 30-50 billion (2-3% of regional GDP) per year in next decade
 - 50 billion yearly by 2050 (UNEP; 2°C temperature increase)
- Total 3 trillion USD by 2030 in order to fulfil NDCs (AfDB)
 - 12% adaptation (31% when SA excluded)
 - internally financed: 18% for mitigation and 27% for adaptation

Trade liberalization and climate

- Improved resilience
 - Static - larger output and consumption bundles (Baldos and Hertel 2015; Janssens et al. 2020)
 - Dynamic - improved access to mitigation technologies and FDIs
- Higher incomes
 - Increased consumption and emissions
- AfCFTA: Bengoa et al. (2021): stable CO₂ emissions, increased non-CO₂ emissions and decreased air pollutants

Shared socioeconomic pathways (SSPs)



Research questions

1. How much can economic integration contribute to climate change adaptation and mitigation in Africa?
2. Does more ambitious trade liberalization (on particular sectors) yield additional adaptation gains?
3. How much does the achieved adaptation contribute to hunger prevention?

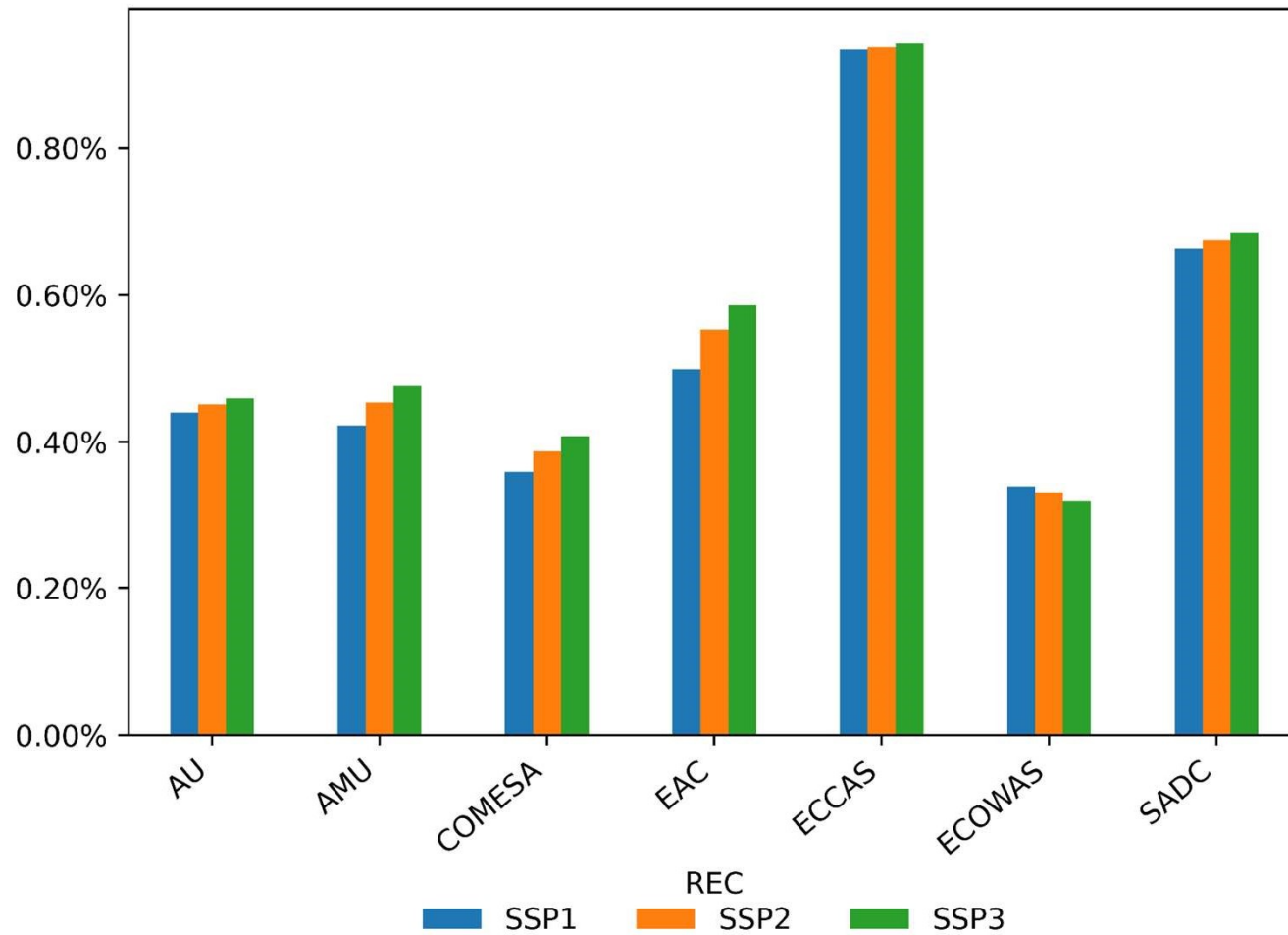
Method

- MAGNET (Woltjer et al. 2014)
 - Dynamic multiregional CGE
 - Based on GTAP (v6 model and v10 data)

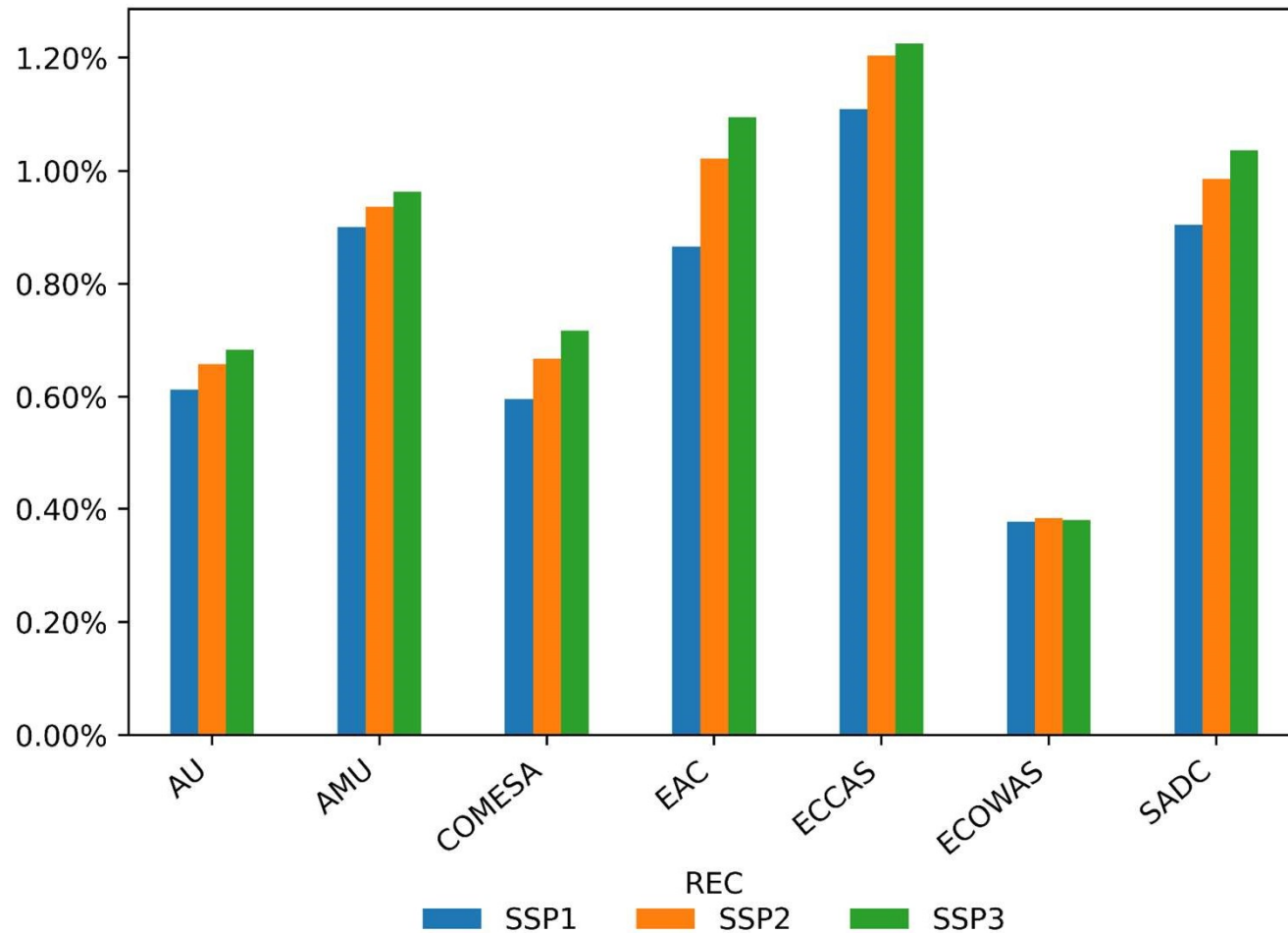
Scenarios

- Baselines for SSP1-SSP5
 - Simola et al. (2021) with the alternative SSP baselines
 - Tariff cuts according to tariff revenues maximization (explicit timeline with respect to the modalities)
 - NTMs cut by 50% within Africa and by 25% in trade with non-African countries
 - NTMs a mix of AVEs and ice berg costs
- Exogenous variables:
 - GDP, population, labour, capital (vary by SSPs)
 - Land productivity (does not vary by SSPs)

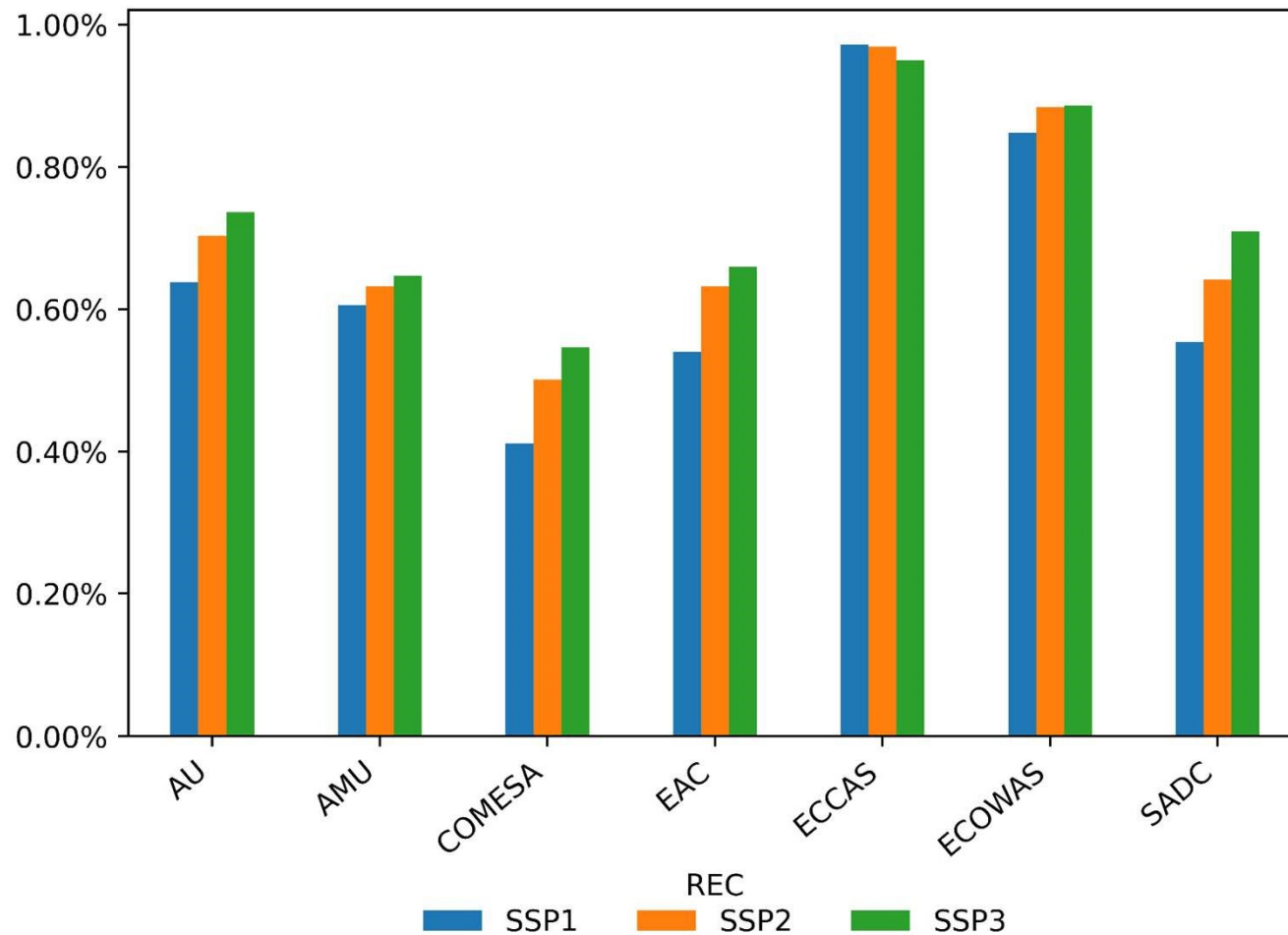
Results - GDP



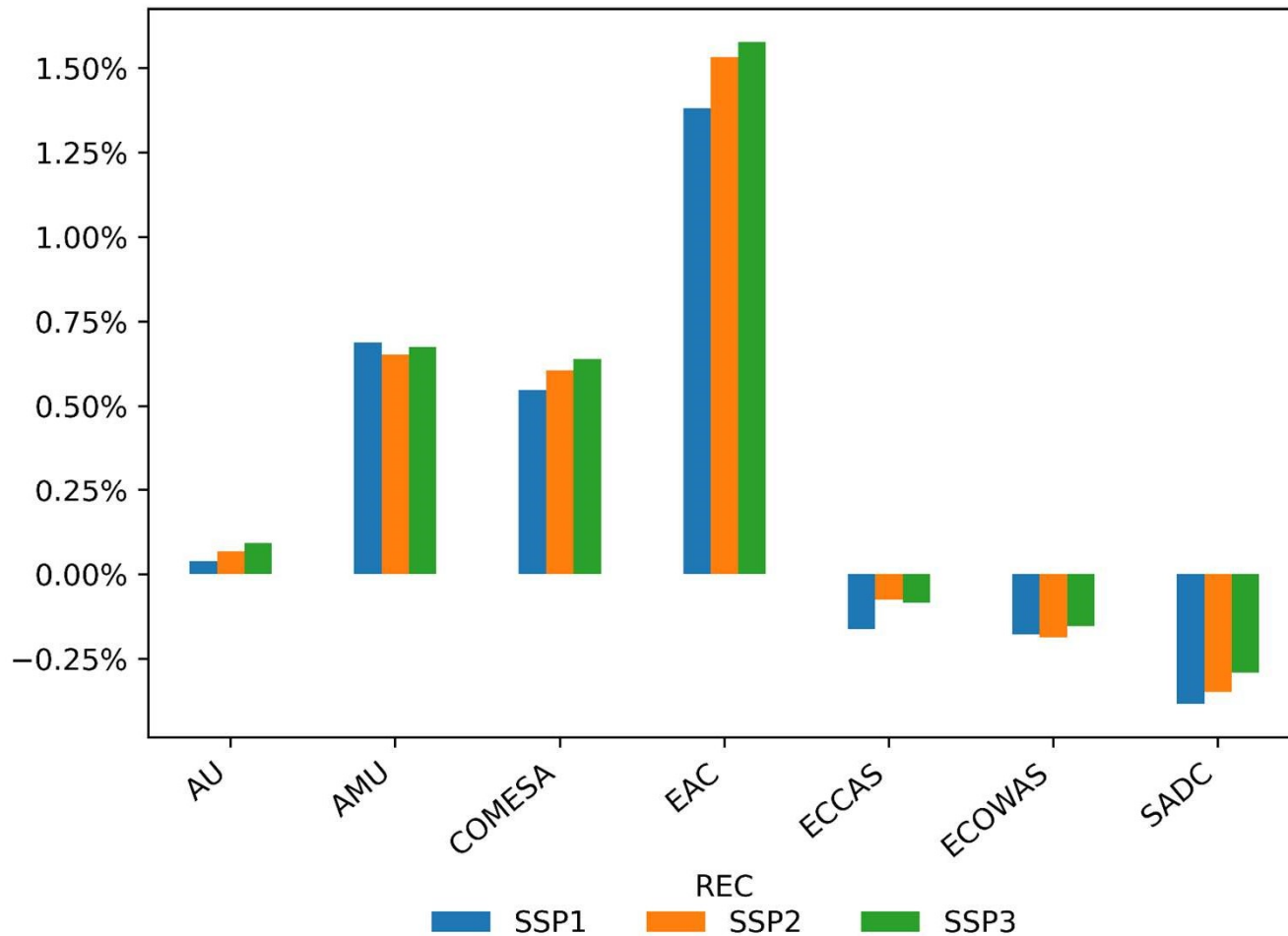
Results – household consumption



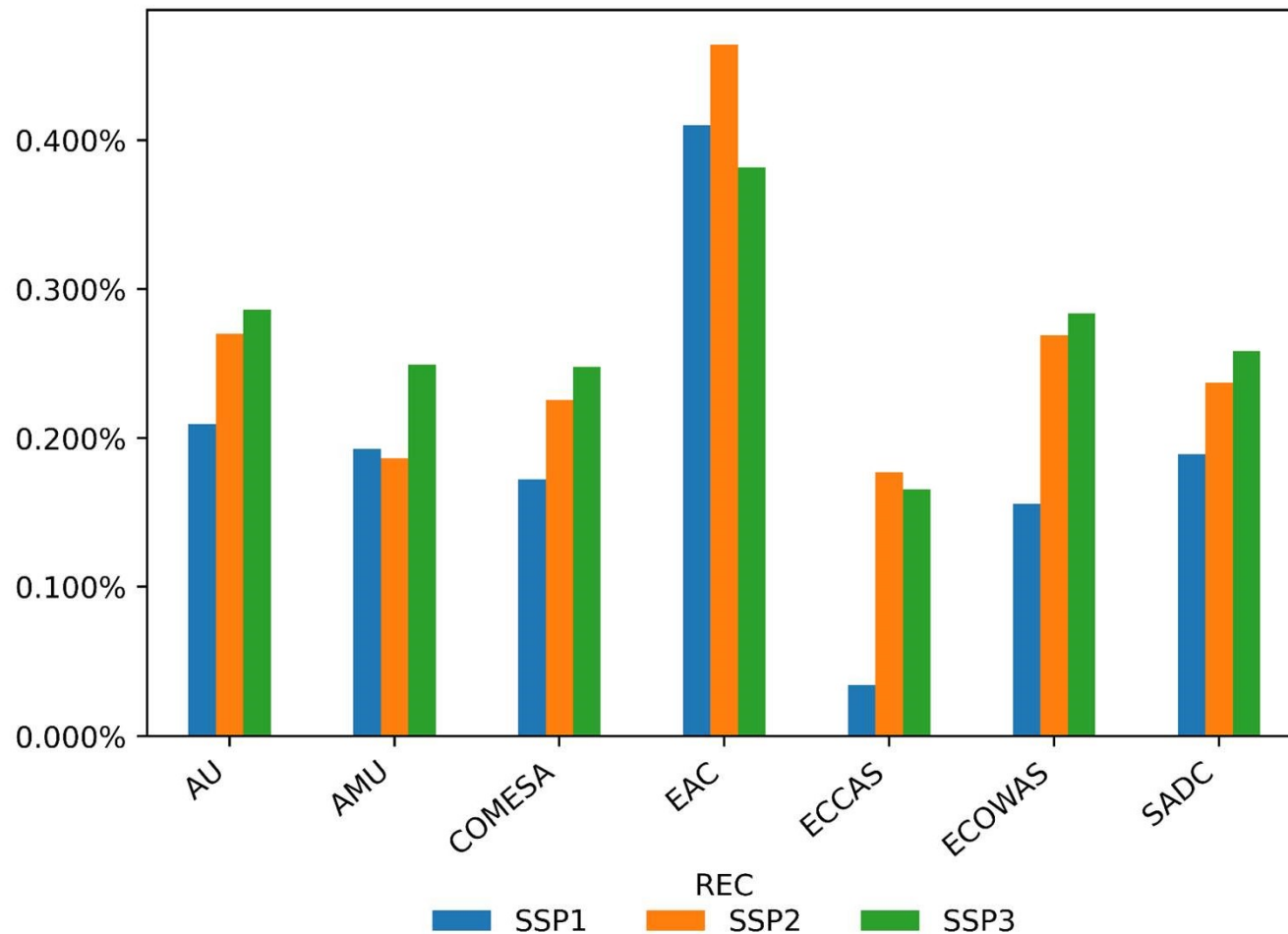
Results – food consumption



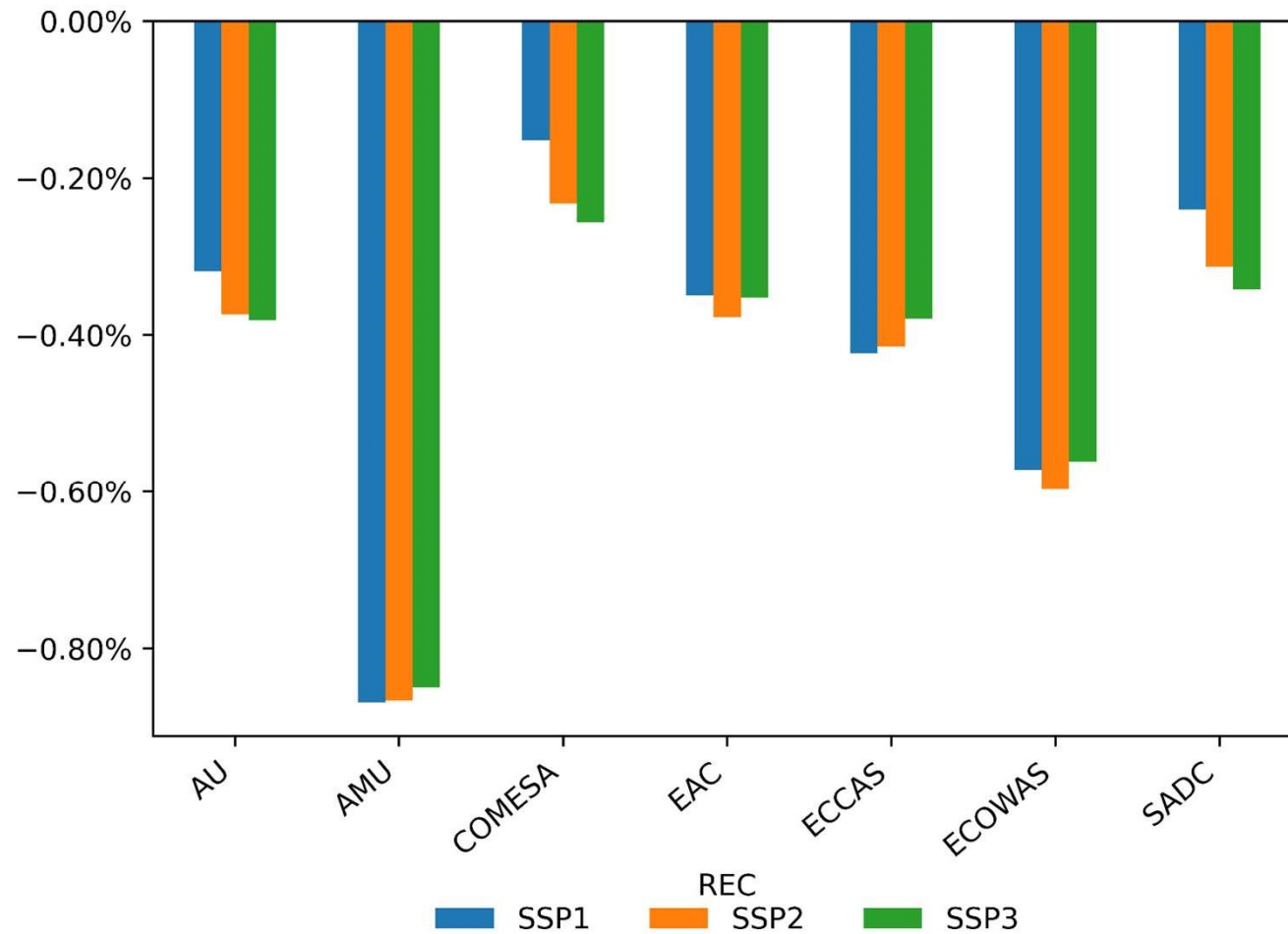
Results – food prices



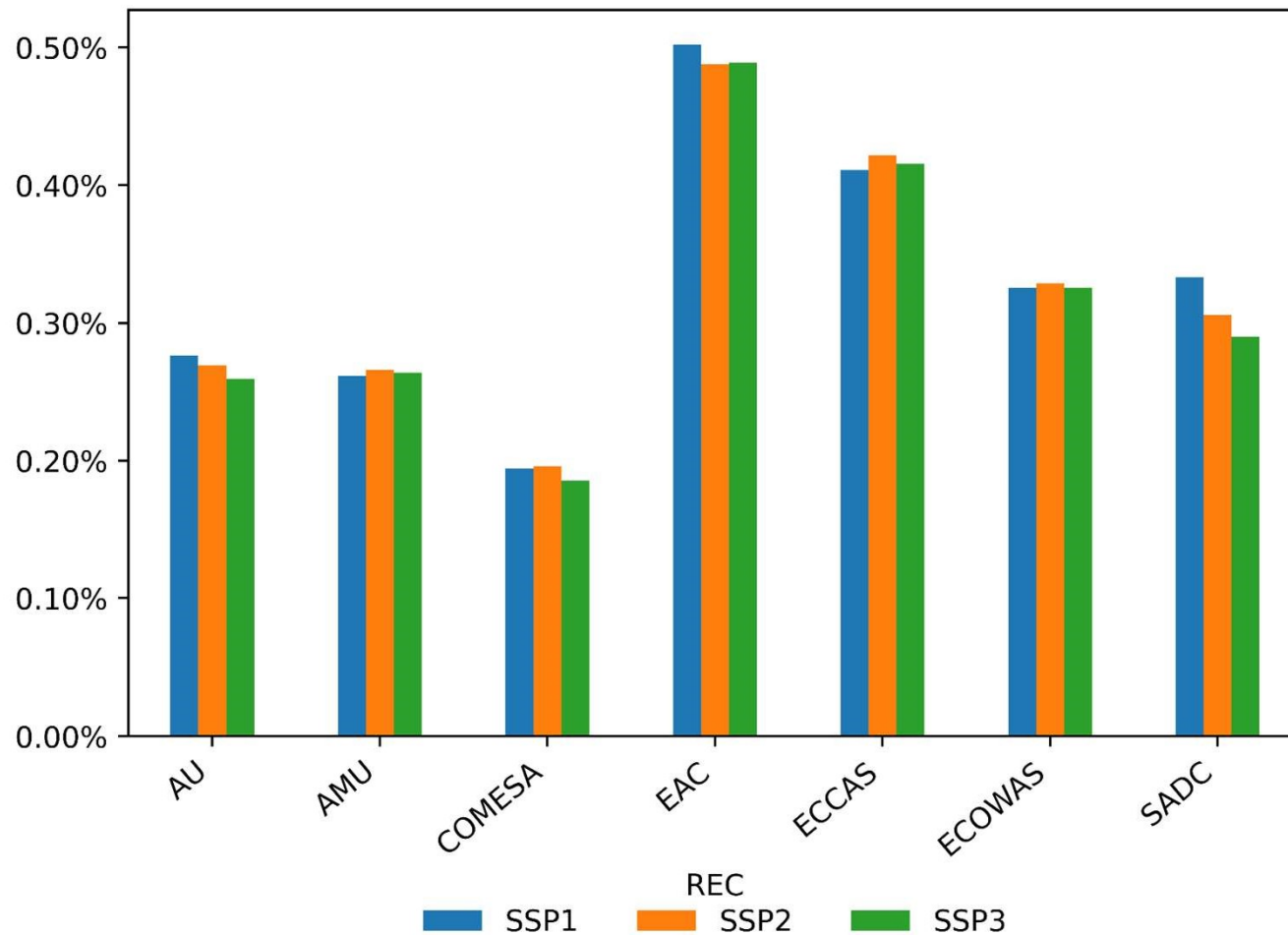
Results – agri wages to cereal prices ratio



Results – number of undernourished



Results – CO₂ emissions



Conclusions

- The AfCFTA gives a small boost for climate change adaptation on each SSP scenario
- The differences in SSPs highlights the dilemma – Africa needs economic growth to improve welfare, but that poses risks for both adaptation and mitigation
- Caveats:
 - Yield effects are not included yet

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Thank you



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