Expert Group on Investments in Coal and Petroleum Companies

Strong climatic changes or substantial emission cuts: the future of the fossil fuel industries

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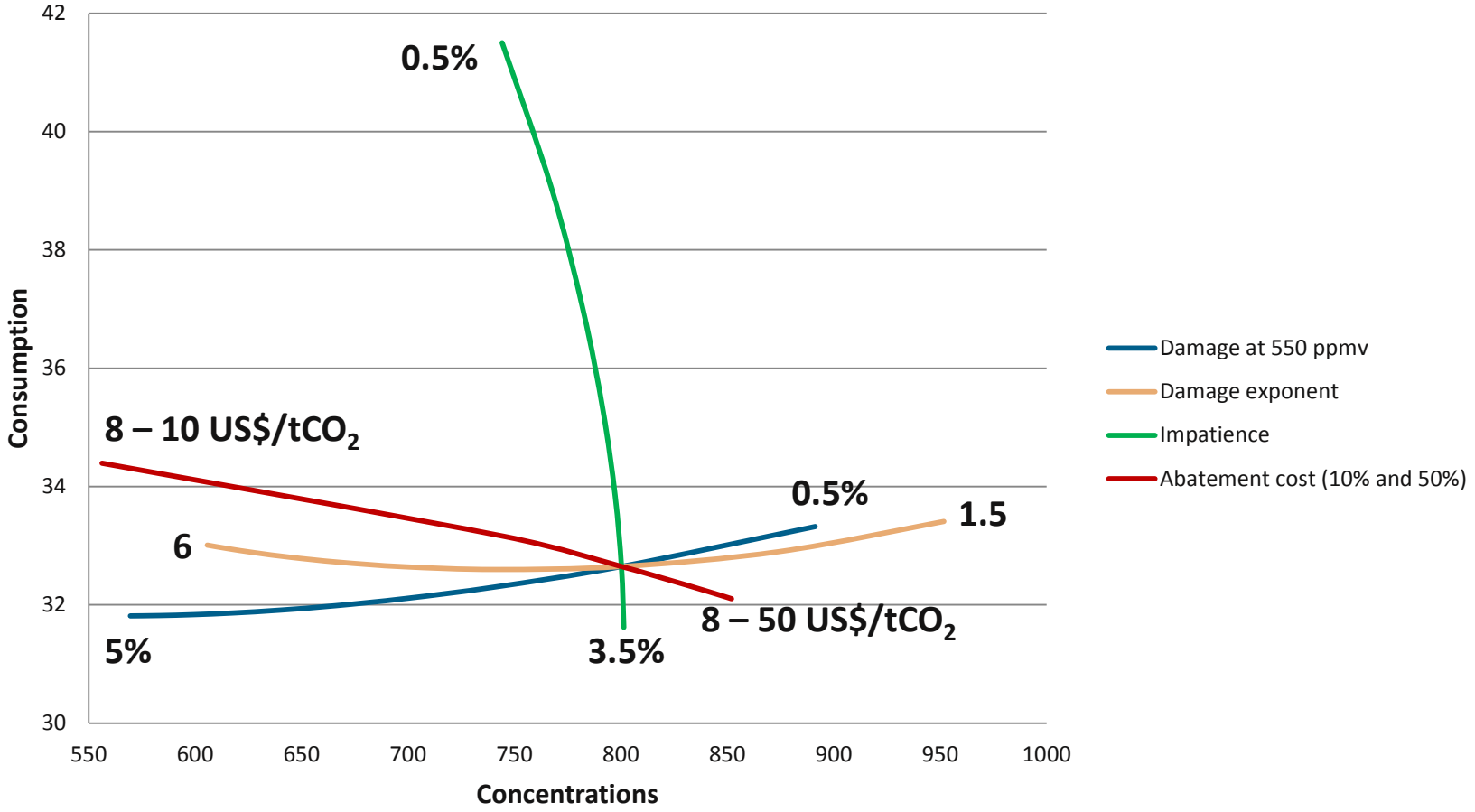
What does the global, long-term perspective of climate change do to economic evaluations?

1. A part of present emissions will stay in the atmosphere forever, so any choice of a fixed time horizon will exclude benefits of mitigation
   - ➢ Climate policies should not be evaluated by comparing NPV
2. Mitgation affects the growth path of the world economy – and thereby the discount rate. One cannot evaluate alternative mitigation paths by the choice of one single discount rate.
   - ➢ Climate policies cannot be evaluated by comparing NPV
3. Alternative criteria: Optimal stabilization level, where

   Marginal cost of abatement = marginal cost of damage

Sensitivity of optimal level of stabilization to parameter choices

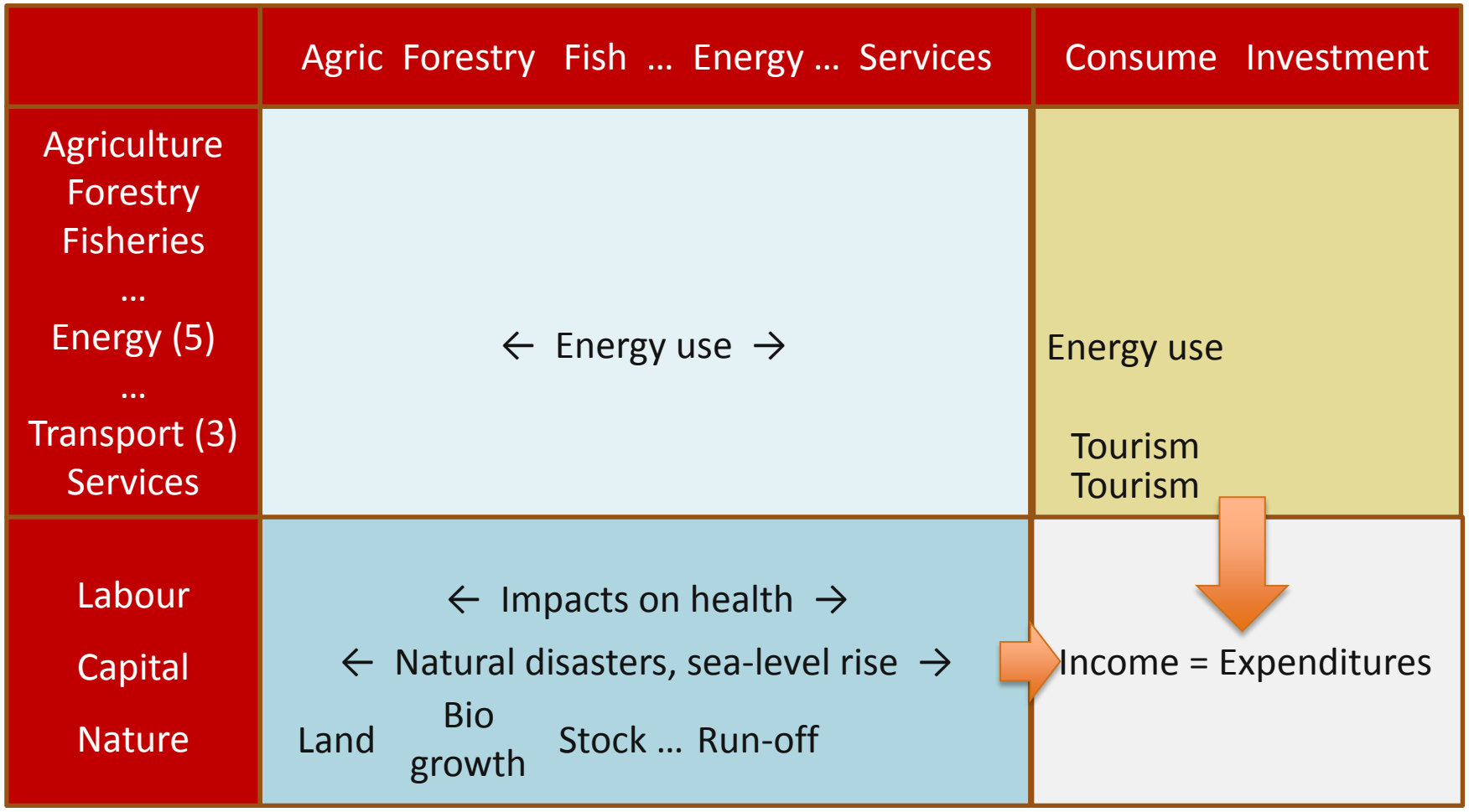


Net present value	Optimal stabilization
Depends mainly on the choice of discount rate	Depends on damage costs and abatement costs
Explained by intertemporal elasticity of substitiution (IES) and impatience	Independent on intertemporal elasticity of substitution and hardly affected by impatience

Consequences for evaluation of present policies

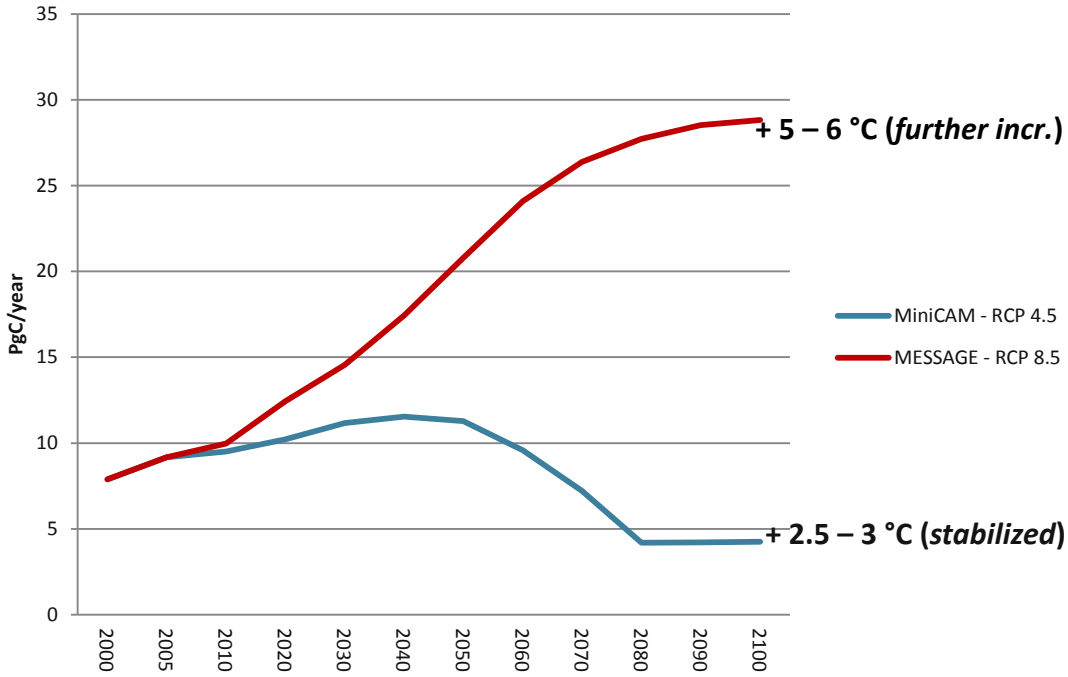
1. With a future stabilization target, the world is given a «budget» for how much to emit before stabilization
2. Before concentrations are stabilized, the economic challenge is to allocate this budget over time in the least costly way
3. How much mitigation to do at present depends critically on how much abatement costs increase at the margin:
   - Stable unit costs of abatement means that it is relatively cheap to postpone actions compared with postponing consumption
   - Rapidly increasing unit costs urge «early action» in order to avoid excessively expensive abatement in the future

Integrating impacts of climate change in a computable general equilibrium model



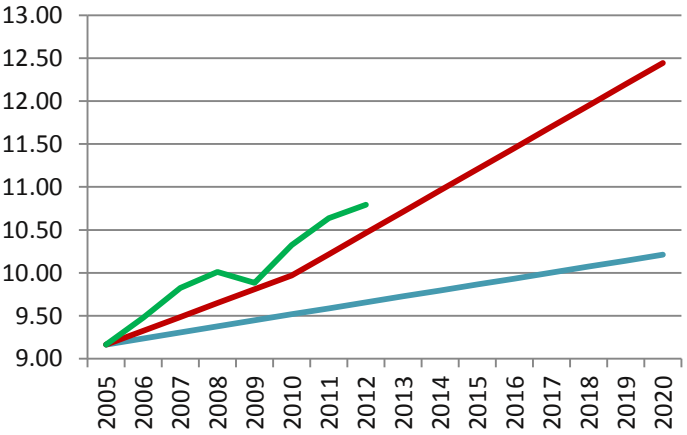
A comparison of high and low emission paths

RCP8.5 (high emissions) versus RCP4.5 (low emissions)



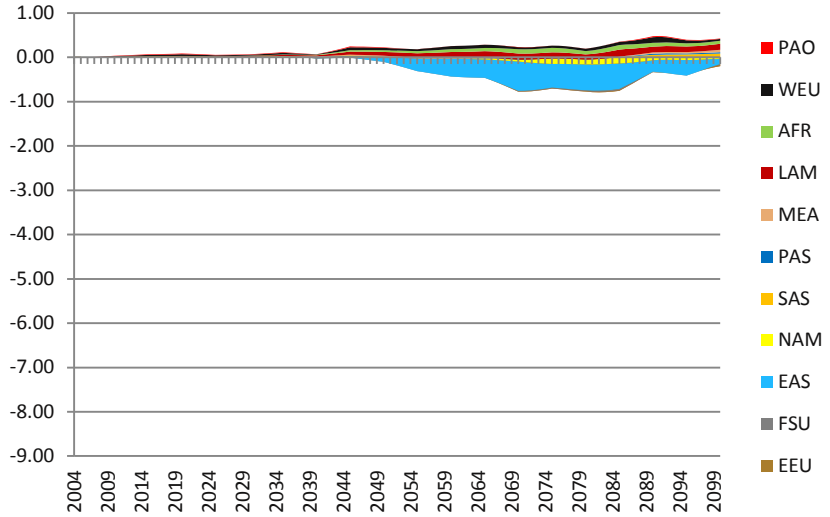
Global CO_2 emissions in RCP4.5 and RCP8.5 2000 - 2100

CO_2 emissions 2005 – 2012 (green curve)

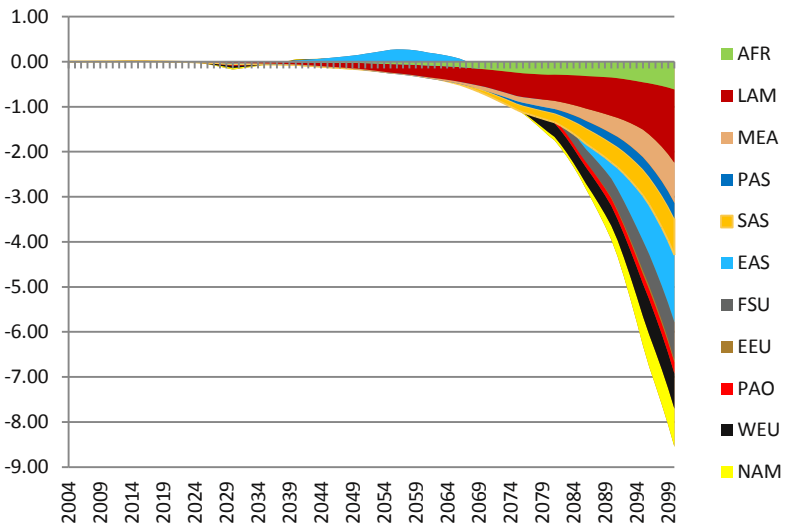


Costs of climate change by region. Trill US$

RCP4.5: low emissions

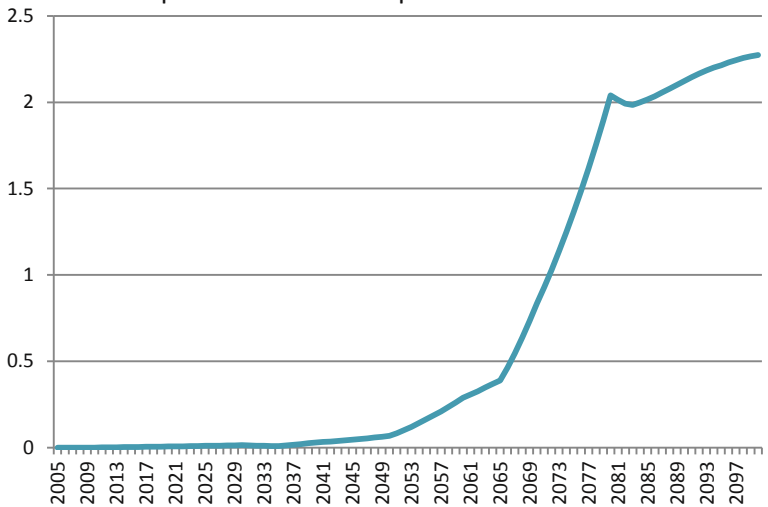


RCP8.5: high emissions

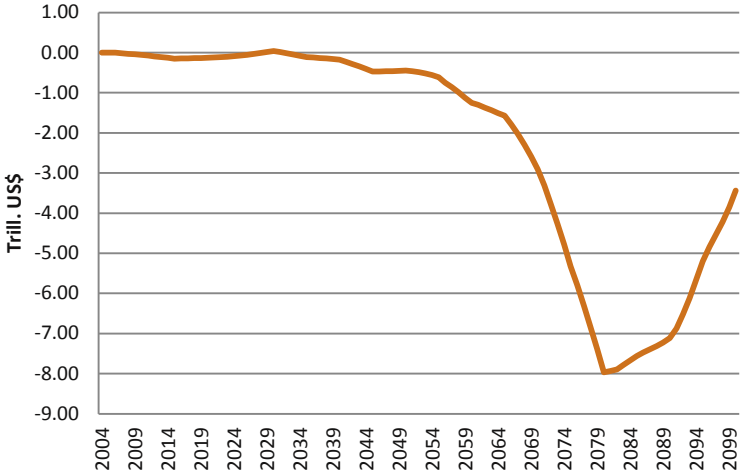


Costs of mitigation

Carbon price needed to keep emission at RCP4.5. 1000 US$

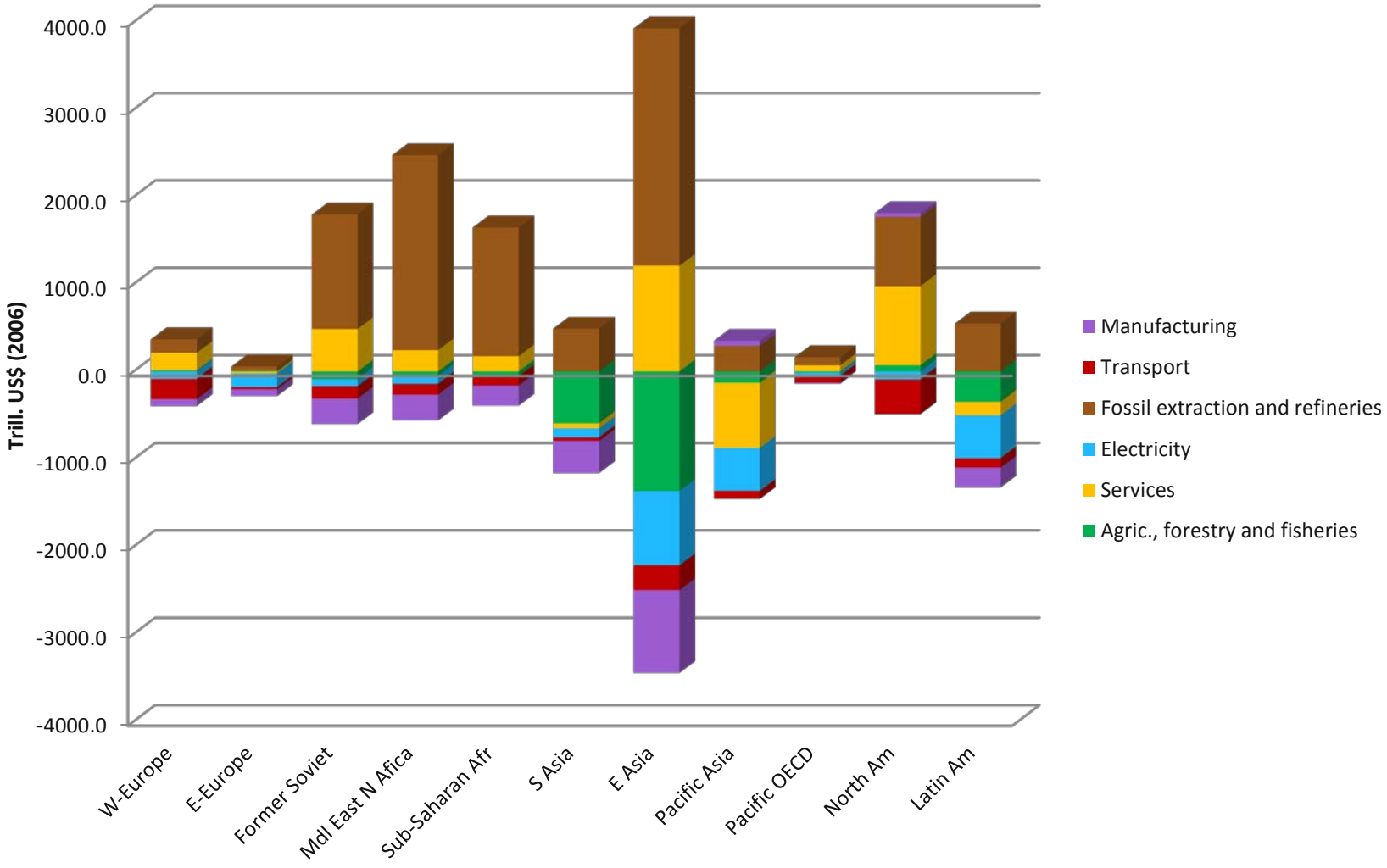


Impacts on global GDP of shifting from RCP8.5 to RCP4.5

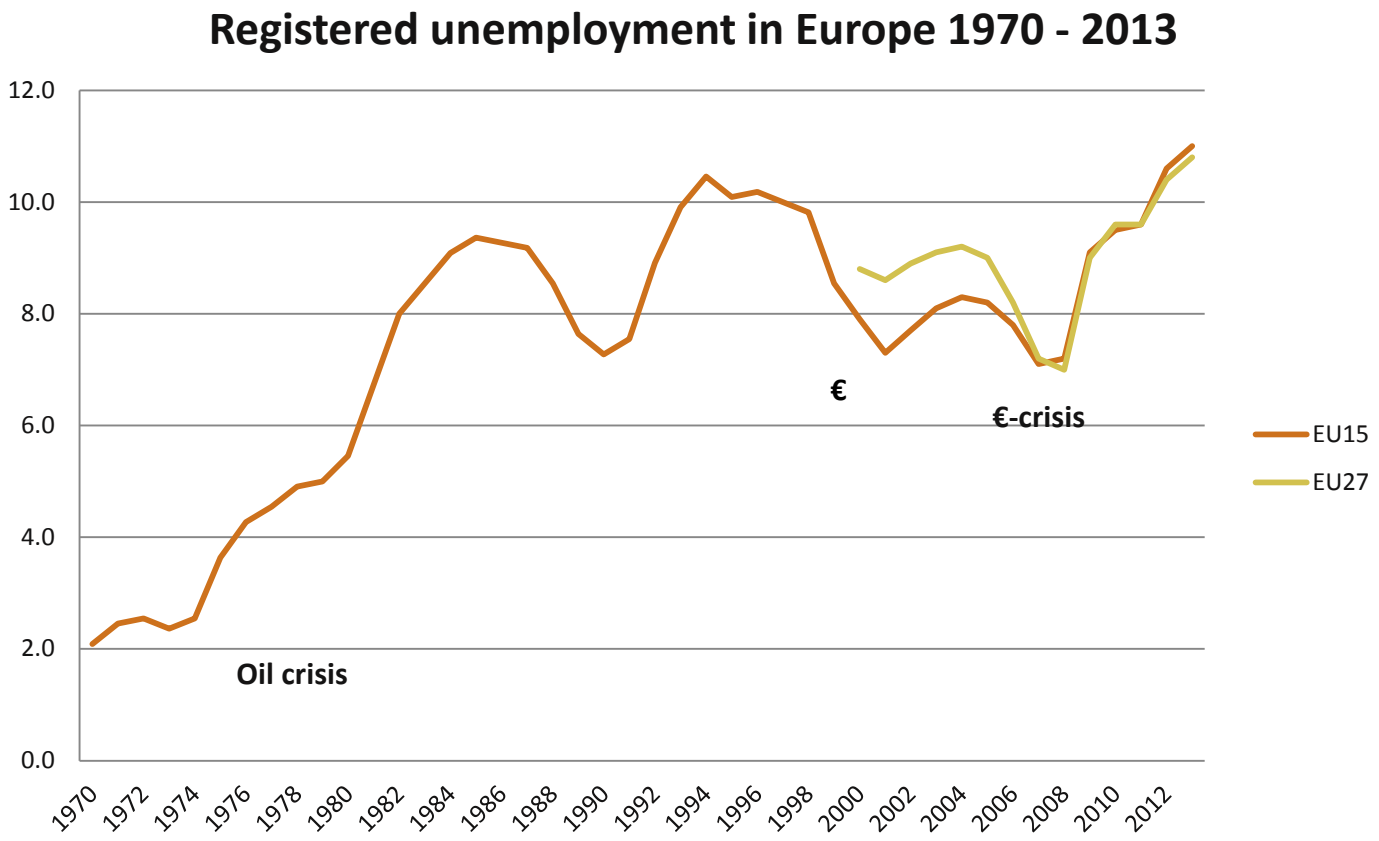


The costs of mitigation (RCP4.5) versus adaptation (RCP8.5) i 2100 by sector.

Reduction in value added. Trillion US$



We have assumed full utilization of all resources:



Private investors recover after a crisis –
but the socioeconomic costs do not seem to disappear

Messages

- From an investor's point of view, «taking climate change into account» implies that the return should be evaluated with reference to the least costly way to achieve an optimal «climate stabilization target», and NOT the maximal net present value.
- The global return on investments is hardly affected by which sector investments are directed towards over the coming 20 – 40 years, but is affected substantially if the time perspective is extended to 100 years.
- In a 100 years time perspective, investments in fossil fuel extracting industries world-wide single out as the sectors that gain at the expense of the return in all other industries world-wide, because of the impacts of climate change
- A shift of time perspective has major implications for the evaluation of sectoral returns on present investment decisions