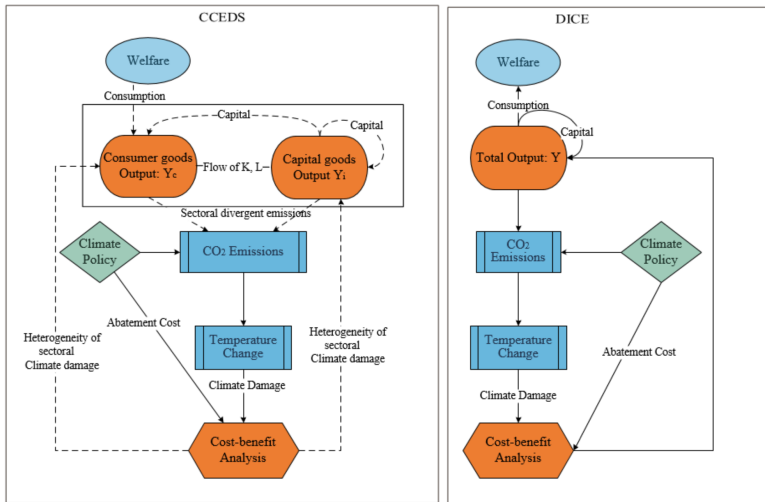# Discussion of Endogenous Economic Structure, Climate Change, and the Optimal Abatement Path
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The BIG Question: Roll the DICE in a multi-sector model?

Summary of the paper

Nordhaus's Standard Dynamic Integrated model of Climate and the Economy:

- ▶ A neoclassical Ramsey growth model with a damage function
- ▶ The key is the integrated climate change damage function into production

A Multi-sector Dynamic Integrated model of Climate and the Economy (DICE):

- ▶ Extend the production into two sectors: I and C
- ▶ Sectors are different in damage function (higher in I)
- ▶ Climate change increases the marginal cost of investment more substantially
- ▶ Further reduces the future capital stock and growth

Comment One: Which Sectors and How?

The model is not complex, but the calibration is the key:

▶ The division of sectors are quite arbitrary: "We take typical consumer goods such as food and the textiles and wearing apparel industries as the consumer goods sector, and industries like coke and refined petroleum products, machinery and equipment products as the capital goods sector."

▶ Suggestions:

　▶ 1. Providing a complete list of sectors and classifications would help a lot.

　▶ 2. Could directly use the World I-O Table to do the classification.

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- ▶ The calibration of key parameters is not very clear. Suggestions:

    - ▶ 1. The climate damage parameters seem quite arbitrary as well:
      $\{a_{c,1}, a_{i,1}, a_{c,2}, a_{i,2}, a_{c,3}, a_{i,3}\} = \{0.00, 0.00, 0.002866, 0.002204, 2.00, 2.00\}$

    - ▶ 2. The carbon intensity parameters θ_c and θ_i are not reported.

Other Comments:

1. The model could be more helpful if consider the investment network itself:

   ▶ Almost no single sector is only-C or only-I (it is always both).

   ▶ There is an easy way to build Investment Network, see Vom Lehn and Winberry (2022 QJE), into the DICE model, which could help to improve the paper further.

2. The model could be more helpful if consider *Emission in Utility* (minor):

   ▶ DICE directly put all damages as damage to reduced-form TFP because in DICE, it is almost isomorphic to do that.

   ▶ In the multi-sector model, however, some damage to utility is not captured directly in C, say uncertainty in extreme weather to housing damage.

Conclusion

▶ An interesting paper with well-executed quantitative model and estimation.

▶ An important question asked and clearly answered.

▶ Will be interesting to look into more detailed sector-level data.