A European Climate Bond

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Climate transition is urgent but very costly

- Climate transition is urgent: postponing after 2030 would lead to over 12% real GDP loss by 2050 in the euro area compared to a timely carbon tax introduction
- But it is very costly: global funding needs in the range of $ 4.5tn to 5tn per year (Climate Policy Initiative, 2021) for:
  - climate mitigation: decarbonization. E.g., switch to renewable energy and to electric cars, extend the electric grid, etc.
  - climate adaptation: increase disaster resilience. E.g., coastline defense against sea-level rise, water management to prevent floods, etc.
- This paper: for Europe this challenge is also an opportunity, if faced
  - via joint issuance of EU climate bonds
  - to be funded by EU carbon fiscal capacity

Outline

EU climate investment gap

EU climate investment needs

investment needs = mitigation expenses + adaptation expenses

- Mitigation expenses:
  - €58.4 bn/year to be invested in Europe's electric grid
  - €336 bn/year for energy system investments (excluding transport)
- Adaptation expenses:
  - €158-518 bn/year: wide range due to lack of precise estimates of adaptation investment needs by country and sector (EC 2017)

⇒ Overall investment needs range between €550bn/y and €912bn/y

- The official EU estimate is in the middle of this range: EU-27 must invest over €700 bn/year to achieve Net Zero emissions by 2050 (Green deal target). Source: EC 2023 Strategic Foresight Report

Gap between investments needs and budgeted expenses

- EU budget 2021-2027 + NextGenEU: EU Commission long-term budget of €2 tn at current prices (30% of EU budget) → about €330 bn/year for mitigation, adaptation and cost of natural disasters
- Climate investment gap as of 2023:

$$\text{gap} = \underbrace{\text{needs}}_{\text{€700bn/y}} - \underbrace{\text{budgeted}}_{\text{€330bn/y}} = \text{€370bn/y}$$

- Caution:
  - based on €912bn/y upper bound of needs, gap rises to €582bn/y
  - calculation may omit relevant mitigation and adaptation expenses
- Gap may be partly covered by national member state budgets
- But in 2019 EU governments only spent €90bn on climate investment (OECD, 2022): less than 1/4 of the shortfall!

Why design and fund climate policies at the EU level?

Why designing climate policies at the EU level?

- National standards would lead to inefficient climate policy targets:
  - each country has no incentive to account for cross-border externalities → insufficient spending on mitigation
  - less regulated countries attract carbon-intensive activities → regulatory arbitrage saps climate policies' impact ("carbon leakage": Benincasa et al., 2022; Laeven and Popov, 2022)
- Supra-national monitoring of climate investments limits capture of national authorities by national pressure groups: parallel with prudential bank supervision (SSM vs. national central banks)
- Hence, EU-level cooperation is needed to design an efficient EU climate investment program and monitor its implementation

Why funding climate policies at the EU level?

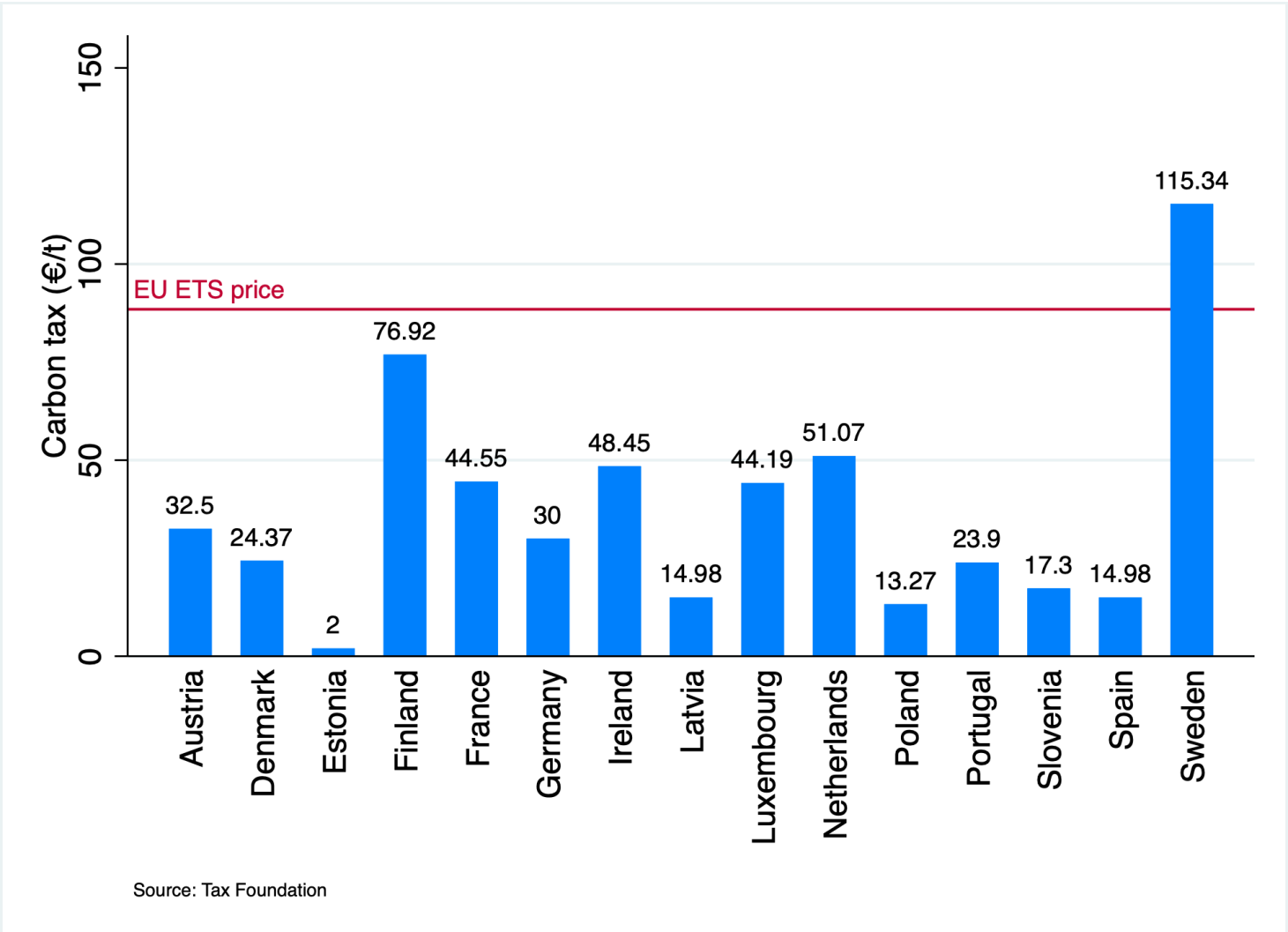
- Fiscal capacity of some EU member states (MS) is insufficient (also considering that the EU fiscal compact will be reinstated in 2024) $\Rightarrow$ MS with lower fiscal capacity will underinvest
- Outcome is inefficient for the whole EU because of:
  - climate spillovers: cross-border impact of emissions
  - economic spillovers: insufficient adaptation investments $\Rightarrow$ lower growth in underinvesting country $\Rightarrow$ lower imports from the rest of EU, potential sovereign crisis

$\Rightarrow$ efficiency requires joint EU-level funding

- Growing consensus: "*Europe must now confront a host of supranational challenges [...] however, Europe neither has a federal strategy to finance them, nor can national policies take up the mantle [...] Without action, there is a serious risk that Europe underdelivers on its climate goals*" (Draghi, 2023)

Joint issuance of a EU Climate Bond?

Status quo in the EU: carbon taxes and ETS price



EU Climate Bond: our proposal

1. The EU strengthens its current carbon pricing framework by
   - extending the ETS to all sectors (in line with planned ETS 2)
   - managing the supply of carbon allowances so as to target a science-based carbon price path
2. The European Stability Mechanism (ESM) issues EU climate bonds: (i) interest and capital to be serviced by ETS sales revenue; (ii) guarantee provided by unused ESM resources (90% of total)

- The cost of servicing the climate Eurobond would benefit from
  - the "green" nature of the bond appealing to ESG institutional investors
  - the "sovereign" nature of the bond $\rightarrow$ favorable treatment by prudential regulation of banks' and insurance companies' exposures
  - the ESM's AAA rating keeping the bond risk profile low

Next Gen EU Bond vs. EU Climate Bond

Next Generation EU bond

- fixed issuance → no rollover
- low volume → low liquidity
- backed by MS → quasi-sovereign asset → not fully safe asset
- funding various programs → no "greenium"
- placed mainly via syndication → high issuance cost

EU climate bond

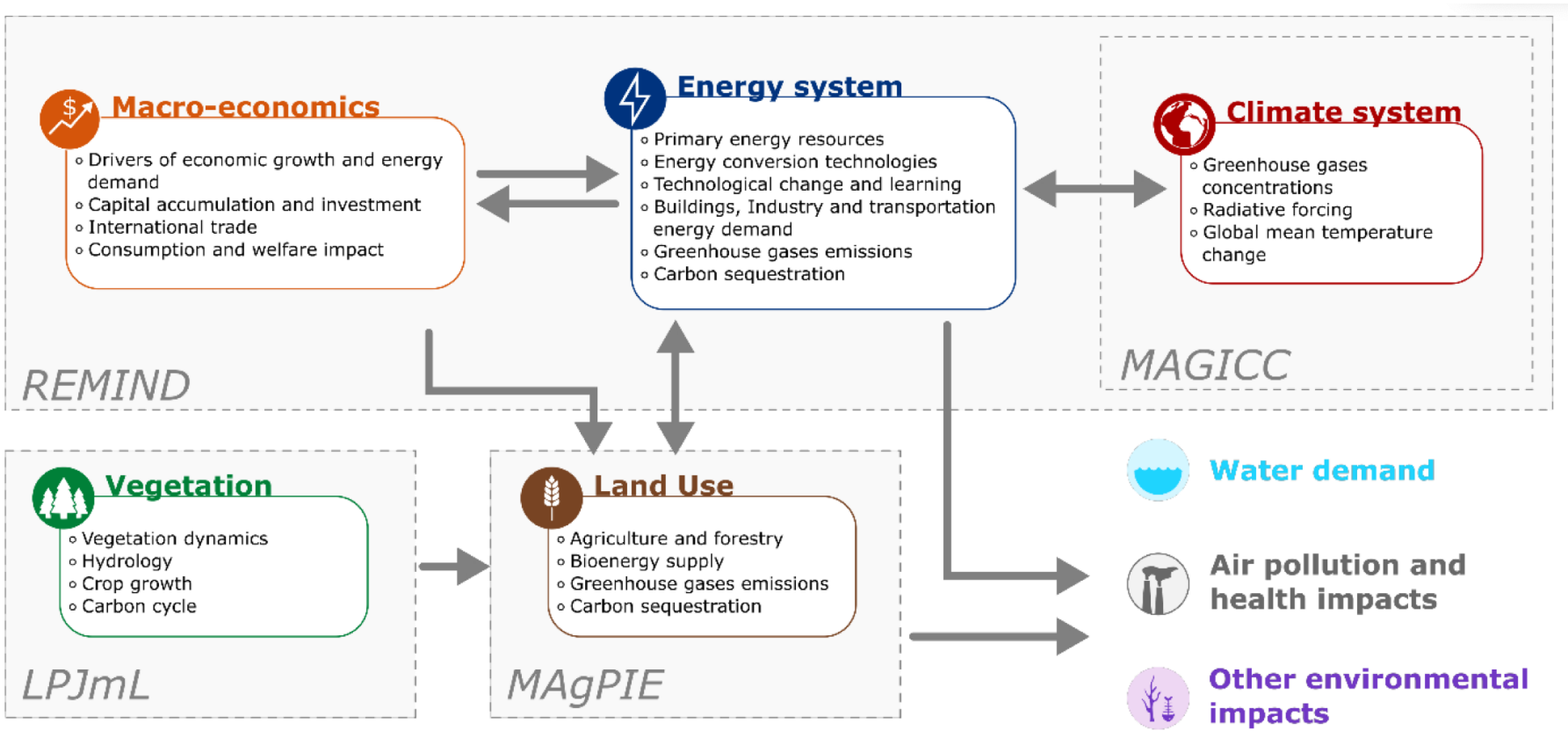
- regular issuance → debt rollover
- high volume → high liquidity
- backed by ETS sales revenues → sovereign asset → safe asset
- only funding climate policy → "greenium"
- placed via auction → low issuance cost

Next Gen EU details

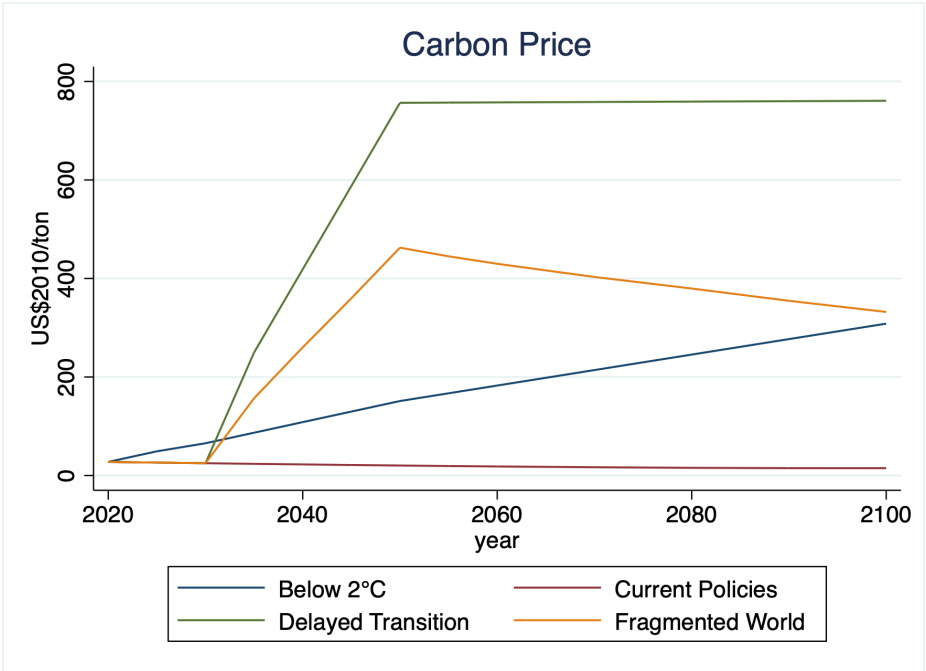
How many climate bonds could the EU issue?

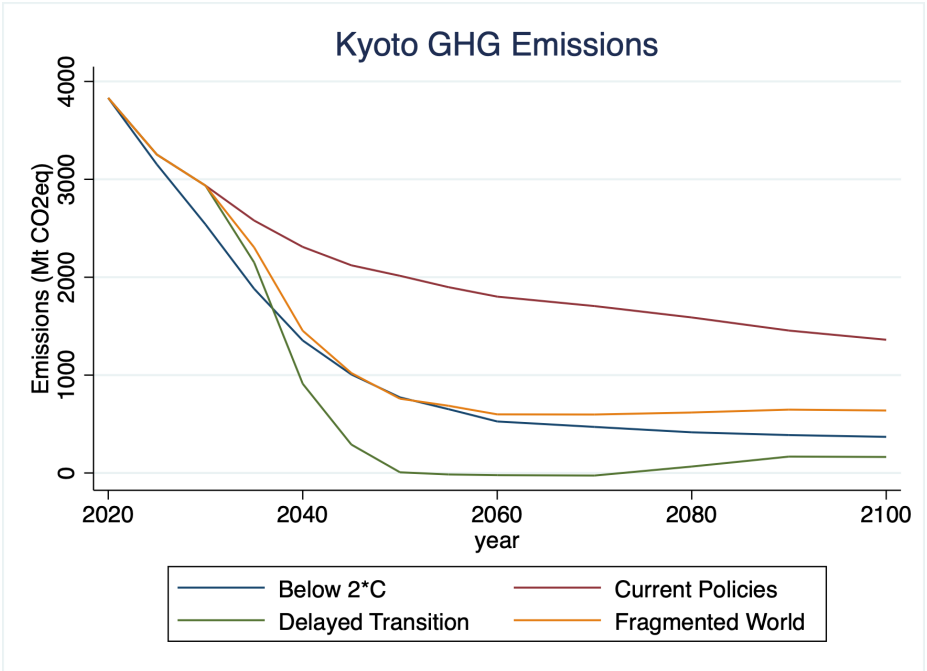
- EU climate bond issuance is determined by the fiscal capacity generated by sales of ETS allowances at the targeted carbon price
- Hence, at each future date: revenue = carbon price $\times$ emissions
- We base estimates of carbon prices and GHG emissions on projections from Integrated Assessment Models (IAM) for 4 NGFS scenarios:
  - Below 2°C (Orderly). Gradually increases the stringency of climate policies, giving a 67% chance of limiting global warming to below 2°C.
  - Current Policies (Hot house world). Only currently implemented policies are kept, leading to high physical risks: 2.9°C end of century.
  - Fragmented World (Too little, too late). Delayed and divergent climate policy responses among countries globally, leading to high physical and transition risks: 2.3°C end of century.
  - Delayed Transition (Disorderly). Annual emissions do not decrease until 2030. Strong policies are needed to stay below 2°C end of century.

REMIND-MAgPIE framework



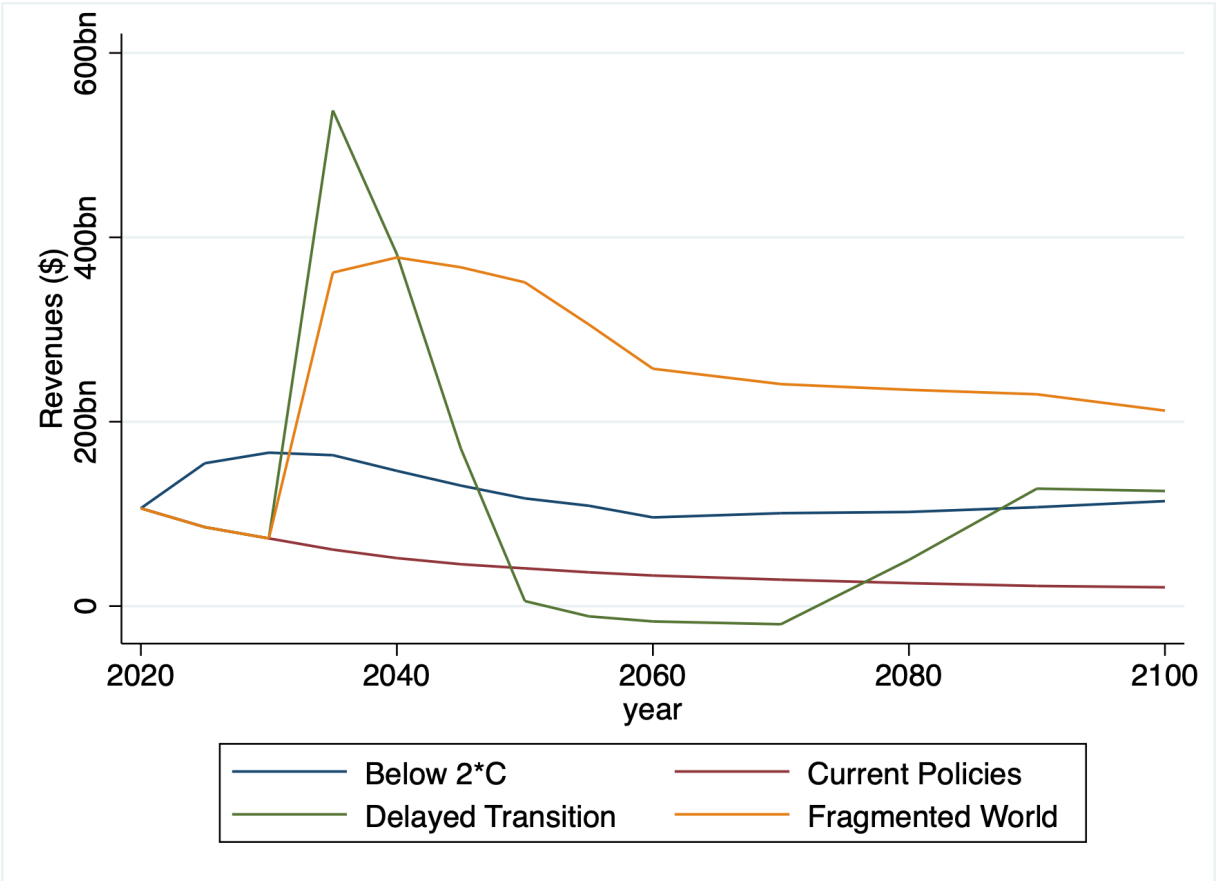
NGFS carbon price and emissions projections (REMIND)





Revenues from EU carbon pricing

Estimated revenues = carbon price $\times$ CO_2e GHG emissions



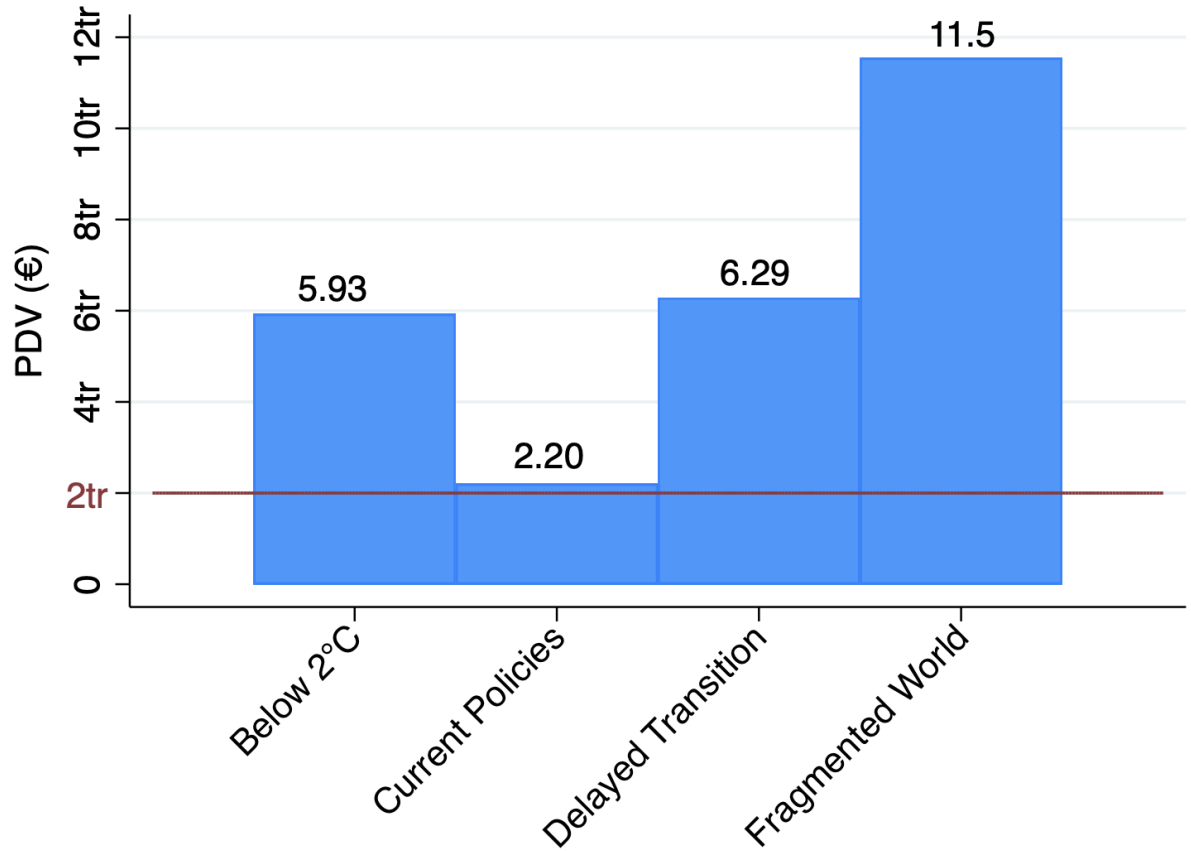
Assessing EU carbon fiscal capacity: five steps

1. NGFS provides carbon prices in US$2010/ton Kyoto GHG emissions in Megatons (Mt) CO_2eq, every 5 or 10 years, from 2020 to 2100
2. Turn emissions from Megatons to tons (1 Mt = 1mln t)
3. Convert revenues in US$2023 using the US GDP deflator, and interpolate to obtain yearly observations
4. Compute the present discounted value (PDV) of constant-dollar revenues over the 2024-2100 horizon for each NGFS scenario using the US TIPS rates from FED as discount rates:

$$PDV = \sum_{j=0}^{76} \frac{revenue_{2024+t}}{(1+r_t)^t}$$

5. Convert the PDV into euros using the 2024 exchange rate \$1/€0.9167

EU carbon fiscal capacity

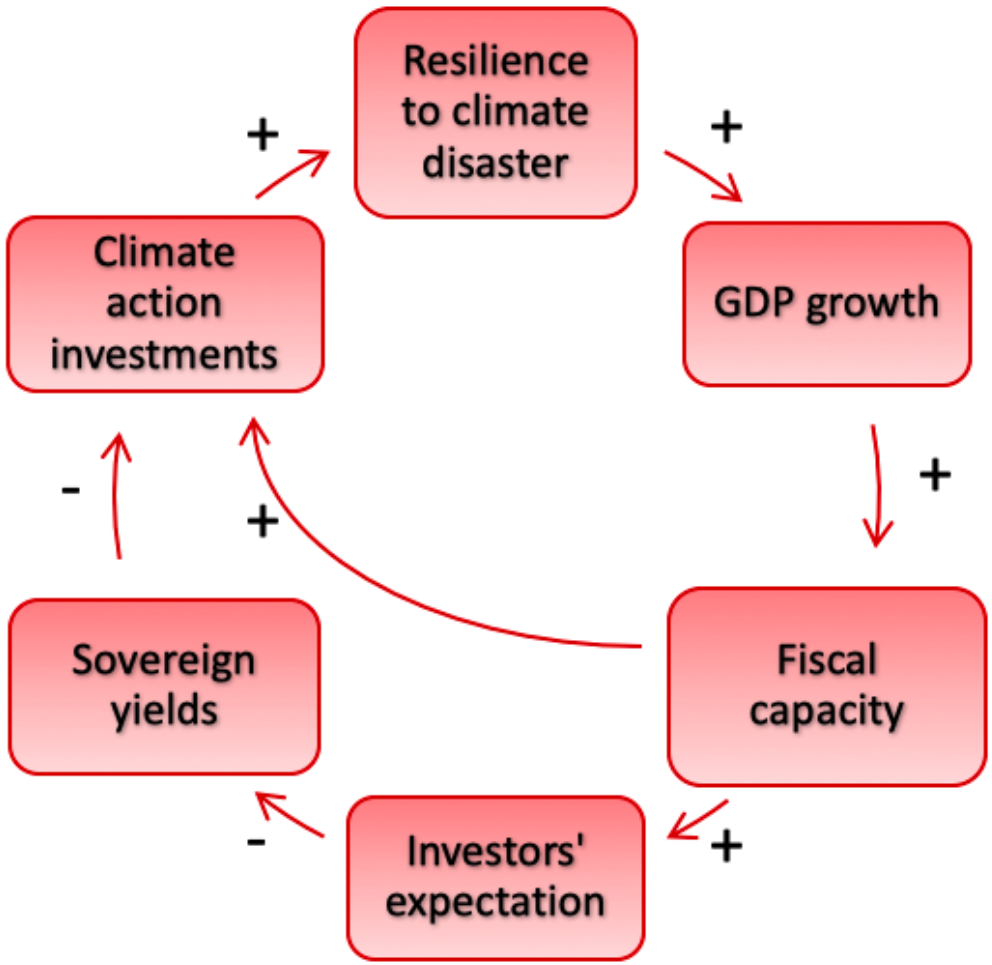


Recall: €2tn is the EC's long-term budget (6y) for climate actions and €2.22tn is the corresponding 6y climate investment gap

Financial benefits of EU climate bond issuance

1. Cost-efficient way to fund EU climate policies:
   - safe: backed by ETS allowances' sales → no need for transfers by MS
   - green: revenue earmarked for EU climate policies
   - liquid: regular issuance, large supply
2. Safe asset: backbone of an integrated EU capital market (CMU)
3. Financial resources to counter competition from US and China attracting investments for low-carbon transition (e.g., IRA)
4. Key policy instrument for monetary policy conduct in the euro area
   - Market neutrality in open market operations and collateral policy
   - Way to green the ECB monetary policy: supports the objective of decarbonization without jeopardizing price stability objective
5. May avoid inefficient equilibria with low climate investments, frequent natural disasters and bad macro performance...

Real and financial climate feedback loops



Conclusions

Conclusions

- Climate action is urgently needed: the earlier the action, the lower the social costs
- But addressing and mitigating climate change requires huge commitment of resources
- Even in the EU the resources needed vastly exceed those currently budgeted
- This paper: a uniform carbon pricing scheme on greenhouse gas emissions in the EU would create a sizeable EU-level fiscal capacity
- Issuing a EU climate bond that draws on this additional fiscal capacity would go a long way towards filling the climate investment gap...
- ... and would have the additional benefit of creating a EU-wide safe asset, with regular and sizeable issues, high liquidity and low yields!

Appendix

Next Generation EU: any lessons to be learnt?

- MS empowered the EU Commission to borrow up to €750bn by 2026
- Bonds to be issued at maturities ranging from 3 to 30 years
- Pre-agreed issuance volume, placed via bank-syndicated transactions
- No debt roll over: the EU to repay debt starting from 2028 up to 2058
- MS agreed to increase the EU's debt guarantees by adding 0.6%
- MS might introduce new own EU resources in the future

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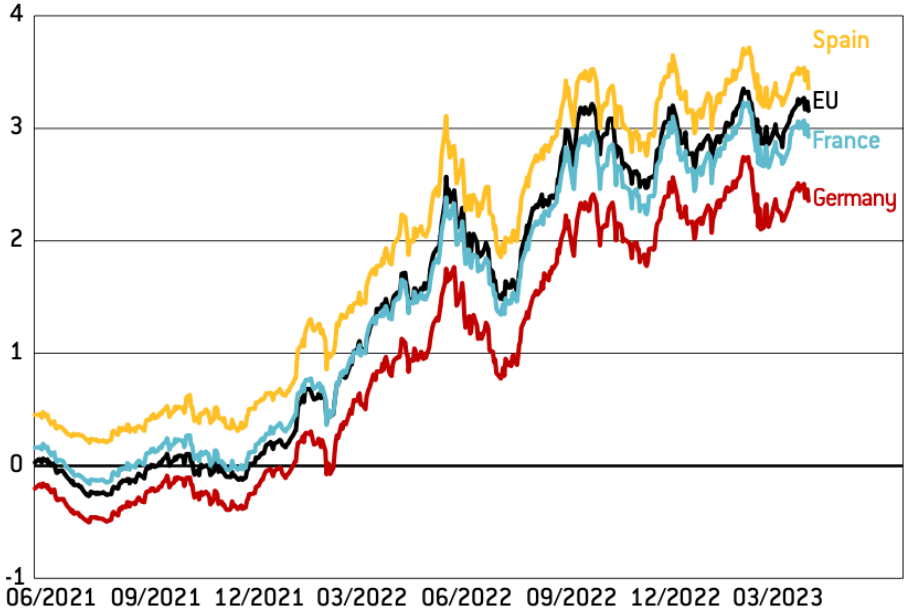
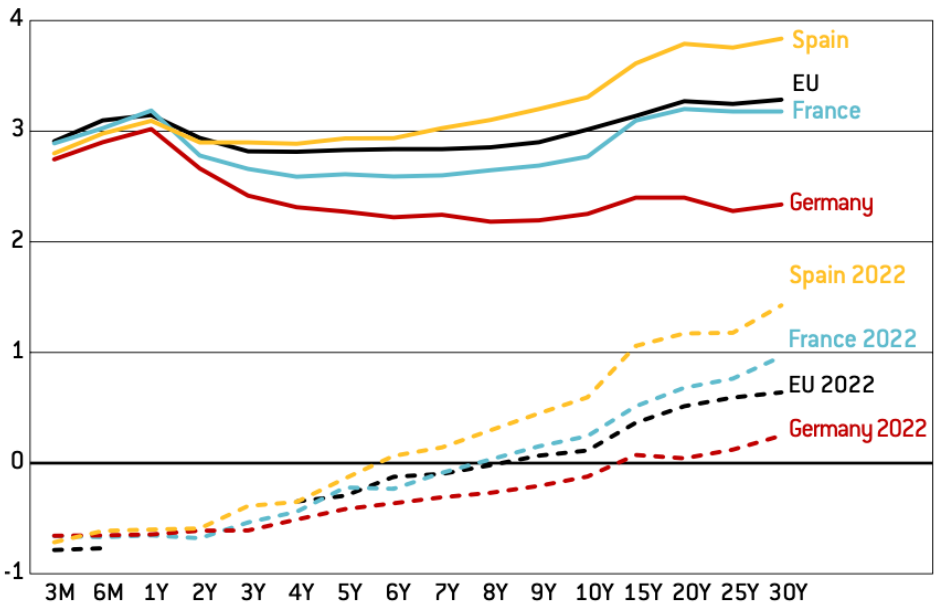
Next Generation EU bonds: borrowing costs

- EU bond yields exceed German ones by about 80bp
- They were lower than French ones in 2021 & are now higher than 20bp

Panel A: 10-year benchmark yields (in %)



Panel B: yield curves in January 2022-April 2023 (in %)



Source: Bruegel based on Bloomberg. Notes: dashed lines represent data as of 3 January 2022 while unbroken lines represent data as of 11 April 2023. For January 2022, the EU yield curve was incomplete so the values for the 1- and 3-year maturity yields are extrapolated.

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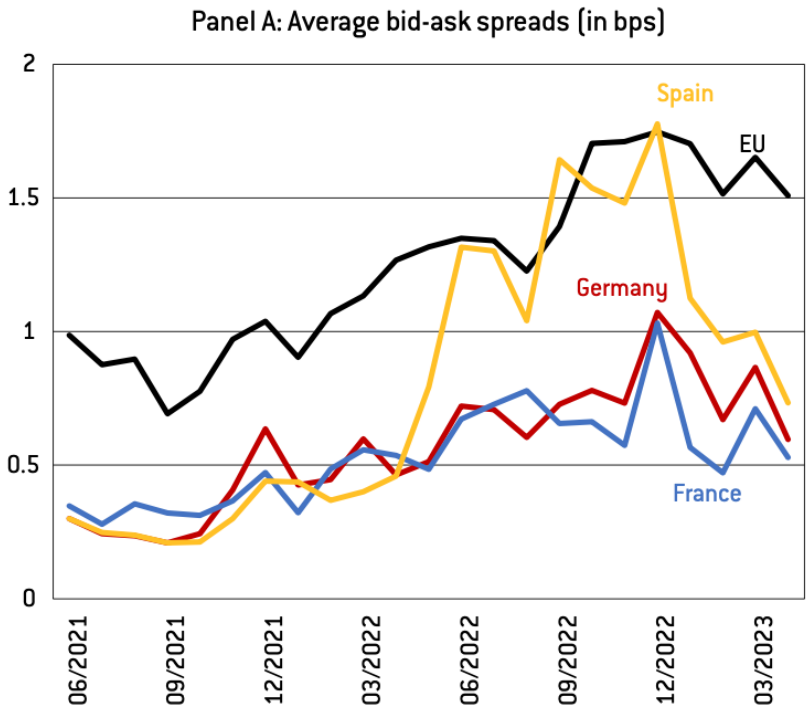
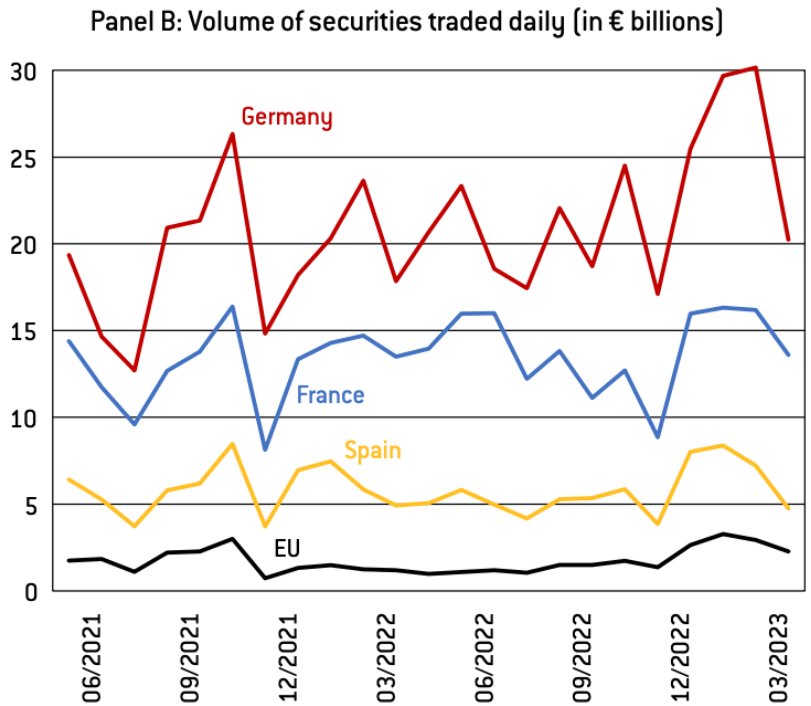
Next Generation EU bonds: market liquidity

- Bid-ask spread for EU bonds exceeds that for France and Germany





Source: Bruegel based on Bloomberg. Notes: Panel A: Monthly average of bid-ask spreads for 10-year bonds for selected issuers in basis points. Panel B: Monthly average of daily volume of security trades by issuer in € billions.

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