International Carbon Price Floors: Design and Impacts

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Rationale/Design Issues
Coordination Regimes to Reinforce the Paris Accord

2030 Gaps to Address

*Ambition*: Pledged reductions only 1/3 to 2/3 of needed

*Policy*: Global CO$_2$ price >$75/ton needed

Difficulties in Paris Agreement

*Negotiation*: too many parties/parameters

*Unilateral policy*: deterred by competitiveness

Elements of Coordination Regimes

*Small number of large emitters*

*Minimum carbon price*

Recent Proposals

*Climate Club*: Germany

*International Price Floor*: IMF
Coordination Regimes Need Pragmatic Design

Differentiated Responsibilities
Differentiate floors/transfer mechanisms.
$75/50/25 floor price aligns global emissions < 2°C with 6 participants

Accommodate other Approaches
CPAT maps other approaches to CO₂ reductions/carbon price equivalents

Sequencing
Start with power/industry

CO₂ Reductions by Sector Under $75 Global Carbon Price, 2030
- Power sector 51%
- Industry 38%
- Transport 7%
- Residential 4%

Source. IMF CPAT.
**Price Floor vs. other International Regimes**

**Pure Carbon Price**
- Limited scope to address equity
- Precludes countries without pricing

**Global Carbon Market**
- Must accommodate countries without ETS
- Address equity
- Needs prices/caps aligned with temp. goals

**Border Carbon Adjustments**
- Ineffective for global mitigation
- Limited scope to address equity

**Embodied carbon in EITE exports as percent of domestic CO₂ emissions**

BCA as Enforcement Mechanism for Price Floor?

BCA provides some incentive to join price floor but

- Complicates negotiation
- All participants would need to price industry emissions
- Common BCA limits scope for differentiated pricing
Impacts
Impacts of $75/50/25 Price Floor

**CO₂ Reductions by Country, 2030**

- **Percent reduction in CO₂ below baseline, 2030**
  - Australia, Canada, France, Germany, Italy, Japan, Korea, United Kingdom, United States
  - Argentina, Brazil, China, Mexico, Russia, Saudi Arabia, Turkey
  - India, Indonesia, South Africa

- **Fiscal**
  - Revenue, percent of GDP

**Welfare**

- **Percent of GDP**
  - Australia, Canada, France, Germany, Italy, Japan, Korea, United Kingdom, United States
  - Argentina, Brazil, China, Mexico, Russia, Saudi Arabia, Turkey
  - India, Indonesia, South Africa

- **Efficiency costs**
- **Domestic environmental co-benefits**
- **Net welfare gains**

Source: IMF CPAT.
Macroeconomic effects
Emissions and macro: an ICFP increases substantially global emissions reductions without harming seriously growth.

CO2 emissions in 2030 (percent deviation from 2019)

- ICPF (deviation from baseline)
- Baseline

Real GDP in 2030 (percent deviation from baseline)

- ICPF (deviation from baseline)

Real GDP in 2030 (percent deviation from 2019)

Source: IMF-ENV model
HIC=high-income countries; MIC=middle-income countries; LIC=low-income countries
Small aggregate impact hides large sectoral shifts that in turn will imply movement of labor force across sectors.

ICPF and baseline scenarios: global employment in 2030, by aggregate sector
(percent deviation from 2019)

Aggregate sectors

Energy sectors detailed

Source: IMF-ENV model
Changes in energy prices drive the reallocation of resources

Global energy supply prices 1/
(percent change from baseline)

Household consumer prices in 2030
(percent change from baseline)

Source: IMF-ENV model
Note: 1/ Supply price are calculated as a world average of production price of the sector.
Burden sharing: ICPF achieves fairer burden sharing than a uniform global carbon tax with only small global efficiency costs

CO2 emissions in 2030 (percent deviation from baseline)

Real GDP in 2030 (percent deviation from baseline)

Source: IMF-ENV model
A sectoral carbon pricing agreement could offer a cooperative alternative to BCA

Real GDP in 2030 for middle-income countries (percent deviation from baseline)

Real GDP in 2030 for low-income countries (percent deviation from baseline)

Global market share of energy intensive industries 1/ (percentage point deviation from baseline)

Source: IMF-ENV model
EITE scenario=HICs apply ICPF; other countries apply carbon price floor to EITE sectors only.
Backup slides
Setting the stage

Compare in single framework various scenarios to raise global climate action:

- International carbon price floors (ICPF) proposal (Parry, Black, and Roaf 2021)
  - ICPF:
    - Carbon price floors differentiated by income level: $75/tCO2e for HICs, $50 for MICs and $25 for LICs
    - Carbon price floor: do max of carbon price floor and what is needed to reach NDC
  - Macro effects
  - Burden sharing –comparison with global uniform carbon price

- Unilateral climate action by HICs with Border Carbon Adjustment (BCA)
  - Competitiveness effects
  - Alternative of a sectoral carbon pricing agreement for energy-intensive and trade-exposed sectors (EITE)
Description of the IMF-ENV model

- Recursive-dynamic, multi-regional, and multi-sectoral computable general equilibrium (CGE) model
  - Ideal to look at structural transformation, trade and competitiveness effects, decarbonization and development which are long-run issues

- Mainly neo-classical but features vintage capital (implying different degrees of substitution across inputs in short and long run)

- Each source of emissions is directly associated to the corresponding economic activity (ex. CO₂ emissions from coal burning in power sector or N₂O emissions associated to fertilizer use in crop sectors).

- Money is absent, agent expectations are not forward-looking, no labor market frictions.
But BCA is useful to address competitiveness effects in EITE sectors

Real gross output of energy intensive industries in high-income countries in 2030 (percent deviation from baseline)

- ICPF
- HIC only
- HIC with max BCA on all goods
- HIC with std BCA on all goods

Global market share of energy intensive industries in 2030 1/ (percentage point deviation from baseline)

- HIC
- LIC
- MIC
- Oil exporters

Source: IMF-ENV model
Note: 1/ Market share for a given commodity is the value of exports of a country as a percentage of world total exports.
Partial action and BCA: If only HICs join the ICPF, global emissions reductions are insufficient

**CO2 emissions in 2030**  
*(percent deviation from baseline)*

- HIC with std BCA on all goods
- HIC with max BCA on all goods
- HIC only
- ICPF

**Real GDP in 2030**  
*(percent deviation from baseline)*

- HIC with std BCA on all goods
- HIC with max BCA on all goods
- HIC only
- ICPF

Source: IMF-ENV model
Max BCA: the BCA is calculated on foreign carbon content and complemented by an export subsidy.
Standard BCA: the BCA is calculated on domestic carbon content.
Conclusions

1. An international carbon price floor
   - Enhances strongly global climate mitigation at moderate macro costs
   - Contributes to improve the international burden sharing with limited competitiveness effects

2. Border carbon adjustment mechanisms have only limited impacts
   - Limit competitiveness losses for EITE industries and reduce carbon leakages
   BUT
   - Do not deliver a strong additional reduction in global emissions
   - Do not provide sufficient incentives to join the carbon price floor

3. An ICPF for EITE sectors
   - Cooperative way to address competitiveness concerns
   - Can be a first step to introduce carbon pricing in other countries