The Future of Carbon Pricing

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Policy Analysts Favor Carbon-Pricing

- No other *feasible* approach can provide meaningful emissions reductions
- *Least costly* approach in short term (heterogeneous abatement costs)
- Least costly approach in *long term* (incentive for carbon-friendly technological change)
- Note: carbon pricing may be *necessary*, but is *not sufficient*.
  - Other market failures: *principal-agent* problem (e.g. energy-efficiency investments in renter-occupied buildings)
  - … And *public-good* nature of information spillovers (e.g., Apple & Blackberry)

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Worldwide Status of Carbon Pricing

- Major CO_2 emissions trading regimes in place & announced [9/1/20 prices]
  - European Union Emissions Trading System, $25/ton (2008-)
  - New Zealand Emissions Trading Scheme, $16/ton (2008-)
  - U.S. Regional Greenhouse Gas Initiative, $6/ton (2009-)
  - California's AB-32 GHG Cap-and-Trade System, $17/ton (2013-)
  - Korea's Emissions Trading Scheme, $26/ton (2015-)
  - China's national CO_2 tradable performance standard system (2021? -)
- Selected carbon (and related energy) taxes
  - Finland (1990), Norway (1990), Sweden (1991), Denmark (1992), Costa Rica (1997), British Columbia (2008), Switzerland (2008), Ireland (2010), Iceland (2010), Japan (2012), Mexico (2012), United Kingdom (2013), Chile (2014), France (2014), South Africa (2016)
- Other jurisdictions will *not* employ carbon pricing, but will use *performance standards* and/or *technology standards* instead
  - Less cost-effective than carbon pricing
  - Muted/distorted price signals
  - Still, in some cases will place an implicit shadow-price on carbon

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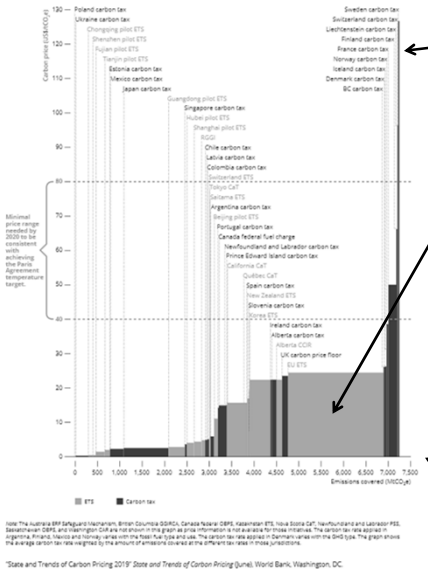
Carbon Prices and Emissions Coverage of Existing Policies



Some carbon taxes at much higher levels that cap-and-trade allowance prices.

But combining stringency (price) with scope (coverage), cap-and-trade more significant in application.

China accounts for about 30% of global CO_2e emissions.

If China's national ETS eventually regulates half of its emissions, this will double global coverage of carbon-pricing policies.

~15% of Global CO_2e Emissions

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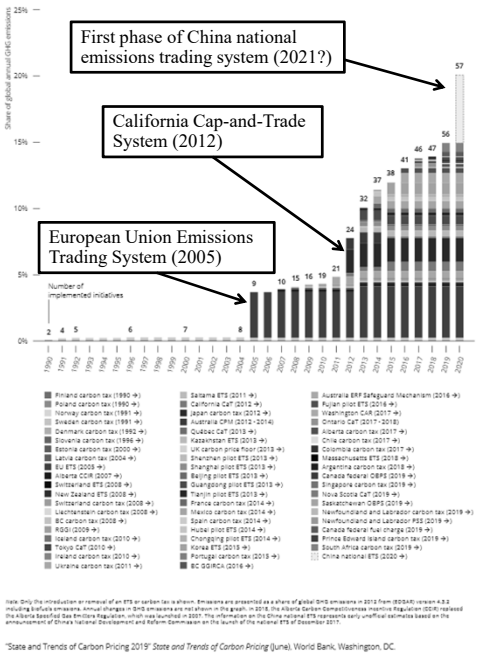
Carbon Pricing Implemented & Scheduled: Share of Global GHG Emissions Covered



Note: Only the introduction or removal of an ETS or carbon tax is shown. Emissions are presented as a share of global GHG emissions in 2012 from (EDGAR) version 4.3.2 including land use emissions. Annual changes in GHG emissions are not shown in this graph. In 2018, the Alberta Carbon Competitiveness Incentive Regulation (CCIR) replaced the Alberta Specified Gas Emitters Regulation, which was launched in 2007. The information on the China national ETS represents early unofficial estimates based on the announcement of China's National Development and Reform Commission on the launch of the national ETS of December 2017.

"State and Trends of Carbon Pricing 2019" *State and Trends of Carbon Pricing* (June). World Bank, Washington, DC.

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Comparing Carbon Taxes & Carbon Cap-and-Trade

- **Major Premises**
  - In large economies, carbon-pricing will likely be an essential *part* of any *meaningful long term* climate change policy
  - Less agreement regarding choice of specific carbon-pricing policy instrument: carbon tax or emissions trading (cap-and-trade)
- **Key Question** (among others)
  - Which approach will be *superior* in terms of relevant criteria, including but not limited to cost-effectiveness, efficiency, and distributional equity?
  - Stavins, Robert N. "The Future of U.S. Carbon-Pricing Policy." National Bureau of Economic Research Working Paper 25912. May 2019.
- **One Major Conclusion** (among others)
  - *Specific design* of carbon taxes and cap-and-trade will be *more consequential* than the *choice* between the two instruments.
  - [This presentation omits positive political economy dimensions]

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Comparing Carbon Taxes & Cap-and-Trade: Similarities & Symmetries

- Of 14 issues, some appear at first to be key differences, but differences *fade* on closer inspection (and *depend* on specifics of design)
- **Perfectly Equivalent in regard to:**
  - *Incentives for emission reduction* – both can be upstream on carbon content of fuels
  - *Aggregate abatement costs* – both are c/e, same incentives for tech change, offsets
  - *Effects on competitiveness* – both can lessen impacts via border adjustments
- **Nearly Equivalent**
  - *Possibilities for raising revenue* – cap-and-trade (CAT) can auction, but given Congressional committee structure, revenue recycling more difficult w/CAT
- **Similar**
  - *Costs to regulated firms* – CAT can freely allocate allowances, but tax can provide inframarginal exemptions below specified level of emissions
  - *Distributional impacts* – can be designed to be roughly equivalent

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Comparing Carbon Taxes & Cap-and-Trade: Differences & Distinctions

- **Some Distinctions:**
  - *Transaction costs* – volume discounts on transaction costs can violate *independence property* (Stavins 1995)
- **Subtle Differences**
  - *Performance in presence of uncertainty* – Weitzman rule (1974), *stock* externality (Newell & Pizer 2003), but *persistent effects* of technology shocks (Karp & Traeger 2018) leads to *positive correlation* between benefits & costs (Stavins 1996)
  - *Linkage with other jurisdictions* – easier w/CATs, but taxes can also be linked
- **Significant Differences**
  - *Carbon-price volatility* – problem only for CAT, but price collars & banking
  - *Interactions w/complementary policies* – issue w/CAT; tax eliminates "waterbed"
  - *Market manipulation* – need regulatory oversight for this, and for tax evasion
  - *Complexity and administrative requirements* – CAT more complex, but will a simple tax remain simple as it works its way through a legislature?

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Hybrid Policy Instruments and a Policy Continuum

- Many remaining differences *diminish with implementation*
- *Hybrid policies* that mix features of tax and cap-and-trade *blur distinctions*
- Result: *Dichotomous choice between carbon tax and cap-and-trade can become a choice of design elements along a policy continuum*
- Design of instruments can be *more consequential* than choice between the two
- Note that track record of ***61*** carbon-pricing policies worldwide contrasts with ***176*** countries with renewable energy policies or energy efficiency standards, ..
  - … and another ***110*** national and sub-national jurisdictions with feed-in tariffs.

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Can Carbon-Pricing be Made More Politically Acceptable?

- One promising approach could be through *judicious policy design* (which may *depart* from first-best design):
  - *Phase in* taxes/caps over time (rather than dynamically efficient time path)
  - *Earmark revenues* from tax/auction to finance additional climate mitigation (in contrast to optimizing system via cuts in distortionary taxes)
  - *Use revenues for fairness* purposes, such as with lump-sum rebates or rebates targeted to low-income and other particularly burdened constituencies (tax with "carbon dividends" or "cap-and-dividend")
- Another approach is *better design* of second-best *non-pricing* instruments (such as "clean energy standards").
- But – for the longer term – *ongoing research* on carbon-pricing itself is very much warranted,
  - particularly if it can be carried out in the context of *real-world politics*, and *focuses* on policies that are *likely* at some point to prove politically *feasible*.

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Key Take-Aways

1. Policy analysts tend to favor carbon-pricing instruments
   - Feasibility, short-term cost-effectiveness, incentives for technological change
2. Carbon pricing can take form of carbon tax, cap-and-trade, or hybrid
3. Equal numbers of carbon tax and cap-and-trade systems implemented globally
   - But cap-and-trade systems appear more significant at present (price x coverage)
4. Careful comparison of carbon tax and cap-and-trade systems:
   - Significant differences, similarities, and symmetries
   - Dichotomous choice between the two approaches can become a choice of design elements along a policy continuum
   - So, design of two instruments can be more consequential than choice of either
5. Carbon-pricing instruments can be made more politically acceptable through departures from economists' first-best design

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For More Information

Harvard Project on Climate Agreements
www.belfercenter.org/climate

Harvard Environmental Economics Program
www.hks.harvard.edu/m-rcbg/heep

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Thank You!

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