Assessing the Design of Three Pilot Programs for Carbon Trading in China

Zhongmin Wang
Resources for the Future
Co-authors: Clayton Munnings, Dick Morgenstern, and Xu Liu
• The Context

• Can China successfully implement a fundamentally market-based policy to reduce carbon emissions?
  – Cap and trade basics
  – Challenges
The Context
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Satellite-Derived PM$_{2.5}$ averaged over 2001-2006

Source: NASA 2010
The Context

- China is the world’s largest carbon emitter
- President Xi Jinping: China’s emissions to peak by 2030
- Cap and trade is one of the mechanisms to be used to achieve these goals
- 7 carbon pilots, most of which started to operate in 2013
- China is planning to launch a national carbon cap and trade program in 2016
Our Study

• Founded by Energy Foundation-China

• We assess the design of three pilots (Shanghai, Guangdong, and Shenzhen) from an ex-ante perspective and make recommendations on how/what to improve

• Methodology: (1) interviews with Chinese regulators, and (2) review government documents and the literature

• The discussion paper, over 50 pages long, is available on RFF website.
Can China, with many nonmarket features, successfully implement a fundamentally market-based policy to reduce carbon emissions?

– Consider China’s stock market
Cap and Trade Basics

• Set a binding schedule of emission caps for a number of years

• Allocate emissions to individuals firms
  – Allowance allocation method needs to be transparent
  – Emissions data need to be of quality

• Firms need to retire a unit of allowance for each ton of emissions in each compliance period
  – What if firms refuse to comply?

• Allowance is property worth lots of money

• Firms with high abatement costs will buy allowances, and firms with low abatement costs will sell; least-cost emissions reduction
The pilots have done a lot!

- Especially considering the short time period they have to prepare and the institutional constraints they are facing

- Their efforts should be applauded
Main Challenges

• Legal foundations for cap and trade—non-compliance
• Powerful state-owned enterprises
• Regulated electricity sector
• Relationship with complementary policies
• Monitoring, reporting, and verifying carbon emissions
• Rapidly growing economy
• Leakage
A “typical” compliance penalty requires, for each ton of uncovered emissions, a company to:

- Retire an allowance for that uncovered ton by a certain deadline
- Pay a fine equal to three times the market price of allowances for each uncovered ton

This type of penalty is hard to implement in China

- There is a national cap that prevents environmental fines from exceeding 100 K RMB, around 16 K USD
- The economic value of allowances allocated to a small company in a typical pilot in China is about 250 K USD
- A company in a hypothetical Chinese pilot can therefore sell all of its allowances, retire zero allowances and make a 234 K USD profit
Strategies to overcome weak non compliance penalties

- Taking subsidies away from bad performers.
- Reward companies for complying, instead of punishing for not.
- If available (i.e., in Shenzhen), passing local regulations that supersedes national law.

Strategies are reasonable but not likely to be sufficient.

- A new Environmental Protection Law allows for much stronger penalty, but it is unclear it applies to carbon
- Pilots largely achieved full compliance, but only after great effort: additional allowances allocated and compliance deadlines extended.
State Owned Entities

• Dominant force in many carbon-intensive sectors; top executives may have higher rank than local regulators
  – Some SOEs questioned pilots’ authorities to establish a carbon price in the first place.

• SOEs negotiated allowance allocations with local governments; cap setting is more bottom up than top down

• Hard to out-design this institutional barrier
  – National government has to explicitly tie an SOE’s performance in the pilots to its executives’ performance review. Otherwise, other aspects of the performance review (economic growth, for example, or compliance with other laws) may be prioritized over cap and trade.
Electricity Sector in China

• Theory of carbon pricing in competitive electricity markets
  – Pricing of direct emissions causes electricity prices to rise, whether allowances are freely allocated or auctioned because of opportunity cost.
  – All agents in economy act under higher electricity prices, achieving reductions at least cost.

• China’s electricity markets
  – Electricity prices and dispatch are regulated
  – Coverage of direct emissions places electricity sector under the social price of carbon but prevents pass through of allowance costs to electricity consumers
  – Basically, only a portion of the economy acts as if there is a carbon price.
• Pilots cleverly respond by covering direct and indirect emissions
  – All three pilots cover direct emissions from electricity generation and indirect emissions from electricity purchasers
  – This approximates a cost pass through from the electricity to industrial and commercial sector, extending carbon price to a larger portion of the economy and bringing in some additional cheap reductions
  – A deft tailoring of C&T to China’s circumstances and a promising approach to carbon pricing under severe institutional restrictions.

• But policymakers must remain alert
  – Calculation of indirect emissions must be accurate to avoid over or under estimation.
Complementary Policies

• 12th Five Year Plan: reduce carbon intensity across China 17%
  – Provinces were assigned specific carbon/energy intensity targets. For example, Shanghai’s carbon target equals 19 percent
  – The largest companies were required to achieve firm level carbon/energy intensity targets
  – As a result, many companies face firm level carbon intensity targets as well as carbon trading obligations.
This combination has negative impacts on incentive to trade

- Without firm specific energy/carbon intensity targets, a firm with high abatement costs could buy allowances to satisfy obligations
- Without firm specific energy/carbon intensity targets, such a firm cannot buy allowances even though it has high abatement costs
– Both the quantity and quality of emissions data are a challenge.
– Penalties for misreporting are limited or nonexistent.
– Inaccurate MRV threatens program integrity
– Inaccurate MRV may greatly complicate the prospect of linking, as your partner can not determine whether the allowances in your program represent one ton of carbon emissions.
Rapidly growing economy

- A schedule of cap for a number of years is necessary for firms to make the right investment decisions
- However, rapidly growing economy means greater uncertainty of future GDP/carbon levels
- Cap schedules are non-existent or very short
• Some of the pilots encourage pollution firms to leave (by allowing leaving firms to keep half of its allowances)

• This will be an issue as long as some parts of China are not covered by a carbon trading program.
Conclusion

- Pilots have done a lot, but they face many challenges

- Regulators made deft adjustments (e.g., electricity sector), but some of the institutional challenges are daunting

- These challenges apply to a national program