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

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RESOURCES FOR THE FUTURE

Outline

- Key elements of emissions trading
- Early Chinese experience with cap and trade
- Climate policy in the Chinese context
- Introduction to our analysis
- Assessment of the three pilots in Shanghai, Shenzhen and Guangdong
- Conclusions on the pilots/future of a national program

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Key elements of emissions trading

- Emissions cap
- Rigorous monitoring, reporting, verification
- Allowance distribution
- Allowance trading
- Stringent, automatic penalties
- Assessment

Early Chinese cap and trade experience

- First water trades in 1987 Minhang district, Shanghai
- Air trading (SO2) pilots initiated in 16 cities in late 1980s , mostly in eastern China, managed locally
- Cap and trade pilots operated alongside modest emissions fees collected by local EPAs
- Pilots hampered by limited monitoring, enforcement capabilities, prevalence of state owned entities (SOEs)
- Penalty caps present major challenge
- Few trades occurred, generally administrated by gov't
- National program never adopted

China's Climate Policies in Context

- Increasing action on climate and air policy
  - Premier Wen Jiabao pledges carbon intensity targets in 2009; in 2014 President Xi Jinping commits to peaking carbon emissions and expanding renewables to 20% around 2030; important linkage between climate and local air policies.
  - 2010-2015: implementation of many C&C policies including: carbon intensity targets, energy intensity targets, energy efficiency targets, air pollution goals and caps on coal. Green dispatch recently announced.
- An initial & increasing commitment to use market mechanisms
  - 2011-2015: establishment and implementation of 7 pilot C&T programs. Continuing discussion of a possible carbon tax.
- Build up to a national program
  - Now slated to start in 2017, covering 6 major industries including power, steel, cement.

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Key Features of China's Pilot Programs for C&T

Pilot	Start date	Estimated emissions coverage (MMT)	Covered entities	Allowance price (USD, current)
Beijing	Nov 2013	50	~490	9.28
Chongqing	Jun 2014	125	242	4.92
Guangdong	Dec 2013	408	211	9.31
Hubei	Apr 2014	324	138	3.76
Shanghai	Nov 2013	160	~200	7.68
Shenzhen	Jun 2013	33	~635	8.96
Tianjin	Dec 2013	160	197	3.79

Analysis by Resources for the Future

From: Bifera (2014)

DISCUSSION PAPER

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Key Features of Three Pilots

Pilot	Cap	Penalties	Coverage	Allowance Adjustment	Allowance Allocation
SHZ	Hybrid cap w/ 3 year schedule.	Make up allowance deficit, pay 3x market price.	Power, manufacturing, water supply & large buildings.	Free pre-allocation upfront and at once for entire 2013-15 period. Regulators can increase firm's allocation, up to 10% of total, or decrease an unlimited amount.	Auction for up to 3%. Free allocation (OBA or GF) for remainder.
GDN	Absolute cap w/ one year schedule.	Make up allowance deficit, pay 3x market price. Reward compliance, name & shame.	Power, industrial & large buildings.	Allowances distributed at beginning of each year. Allowance reserve can increase allocation.	Auction for 3% in 2013 and 10% in 2015, free allocation (OBA or GF) for remainder.
SHA	Overall absolute cap with intensity targets at firm level.	One time fine up to 100K RMB. Cancel subsidies, name & shame.	Power, industrial, large buildings & transportation.	Allowances freely pre-allocated upfront and at once for entire 2013-15 period. Regulators can adjust final allocation at end of each year.	Auction possible in future but entirely free allocation (OBA or GF) now.

Frame for the Presentation of our Analysis

- Overarching question:
  - Can pilot regulators, whose economy contains many nonmarket features, design and implement a fundamentally market-based policy to reduce carbon emissions?
- Institutional contexts differ markedly from those in the West
  - In some instances, pilot regulators deftly adapt cap-and-trade to these institutions and, in other instances, these institutions result in design deficiencies.
- Organization of discussion
  - Juxtapose the relevant C&T design in China with Western C&T design
  - Describe institutions operating in China's unique political economy
  - Assess how well pilot regulators adapt C&T to a Chinese context

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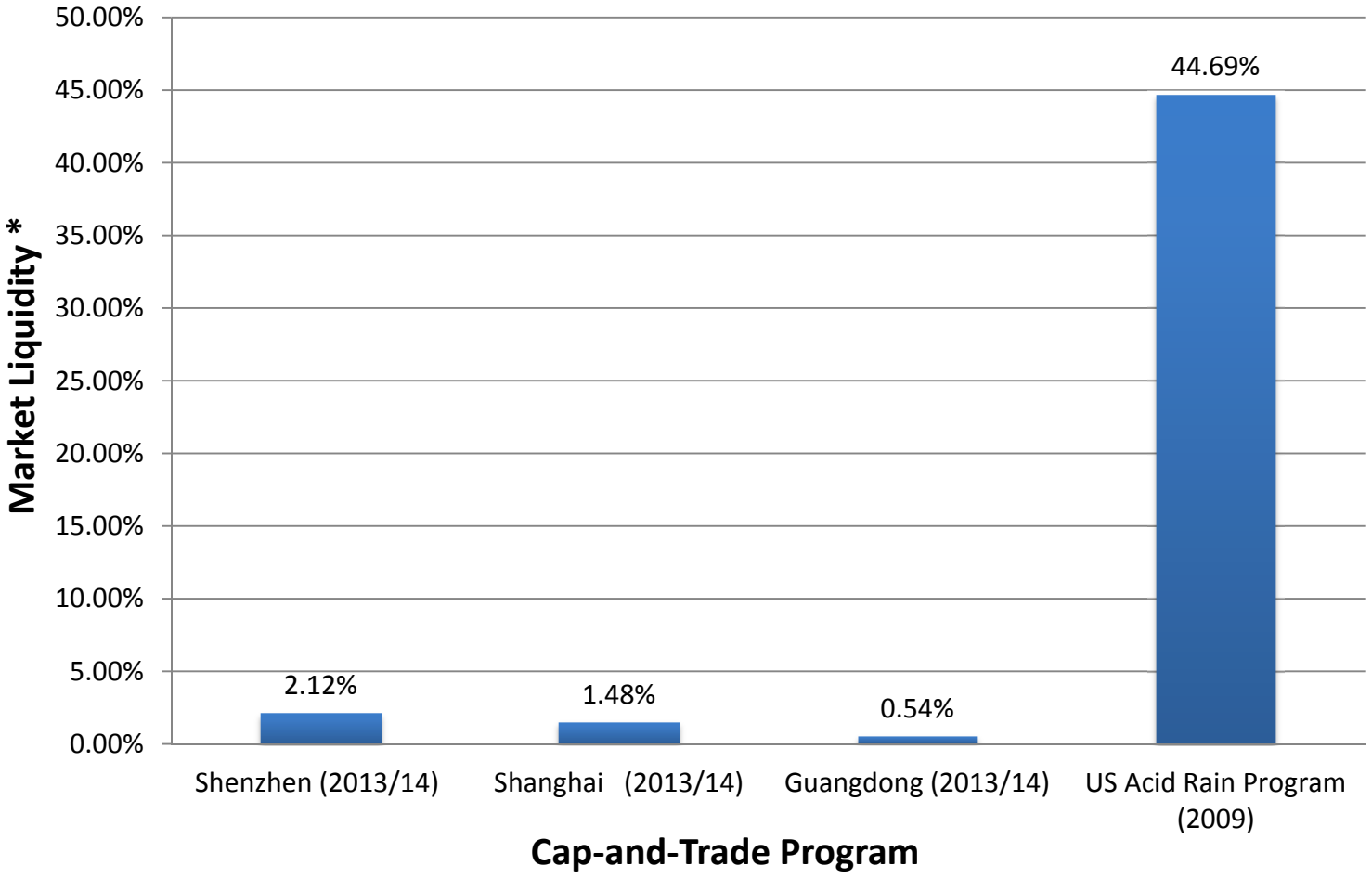
Key Impressions

- The pilots have designed and implemented programs very quickly.
- Yet there are three prominent challenges that pilots have to overcome to continue making progress:
  - Poor quality of information on emissions.
  - Lack of certainty in rules, which can change frequently.
  - General mistrust of the carbon market.
- Our analysis attempts to understand these issues and to recommend possible approaches for addressing them.

Liquidity in the Trading Markets



*Turnover Ratio = # of traded allowances in a given year / annual cap

Outline of Designs to Discuss

- Motivation
  - Choose three different designs of a C&T program.
  - We address many more designs in our full paper.
- Key design issues
  - Emissions coverage
  - Enforceability
  - Cap setting

Emissions Coverage: Complications in China

- Who is covered? A fundamental question.
- Western C&T programs cover electricity producers.
- The pilots cover electricity producers *and* consumers in an attempt to adapt to a controlled electricity market.
  - Unique approach
  - Represents double counting but not double taxation
  - Conceptually powerful design

Emissions Coverage: Pilots Respond

- Assessment: deft tailoring of C&T to China's controlled electricity market.
- Recommendation: improve monitoring of electricity consumed (MWh) and grid emissions factors (CO2/MWh).
  - The product of these two variables determines free allocation.
  - Chai (2013) finds an inaccurate grid emissions factor in Shenzhen.
  - Under free allocation, inaccurate variables can cause over-allocation of allowances.

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Enforceability: Complications in China

- How to convince polluters to comply? Another fundamental question.
- Western C&T programs rely on financial penalties to ensure compliance.
- Two institutions make financial penalties insufficient to ensure compliance: (1) national environmental law, and (2) state-owned entities or “SOEs”.

Enforceability: Pilot Regulators Respond

- Pilots regulators do not solely rely on financial penalties:
  - Reward companies for complying, instead of punishing for not.
  - Name and shame, and/or threaten to revoke subsidies for non-compliance.
- Assessment: strategies are reasonable but likely insufficient.
- Recommendations: write a national law that increases financial penalties for non-compliance & incorporate achievement of goals established by pilots into performance reviews of SOEs.

Caps in the Three Pilots

- Western C&T programs:
  - Typically determine annual caps for years out into the future.
  - Typically calculate and publicize business-as-usual emissions.
  - Sometimes calculate the emissions impact of complementary policies.
- Benefits include:
  - A long cap “schedule” sets a long term signal to reduce emissions.
  - Transparent BAU emissions allows regulators & polluters to predict whether the cap will bind.
  - Calculations of the emissions impact of other policies helps regulators & polluters understand the role of C&T.

Caps in the Three Pilots

- Three pilot C&T programs generally do not follow the Western approach to cap setting.
  - Risk aversion from regulators.
  - In some pilots, regulators reserve the right to take away or add allowances to achieve carbon intensity targets.
- Recommendations to pilot regulators: eliminate within period allowance adjustments and clarify the cap setting process, from setting a longer cap schedule to calculating & publicizing BAU emissions and the impact of complementary policies.
- Recommendations to national regulators: put C&T regulators on equal footing to complementary policies.

Conclusion

- Pilot regulators have done a great deal of work in a short amount of time.
- Pilot regulators have adapted C&T to China's unique economy to varying degrees of success, sometimes deftly (electricity sector) and sometimes insufficiently (enforceability and caps).
- Many of the design deficiencies do not require greater innovation by pilot regulators, but rather require support from regulators, lawmakers and officials at the national level.
- These design deficiencies will have to be resolved as a requisite for successful nationalization of C&T in China.

Discussion Issues

- Challenges in moving to national system
  - Absolute vs intensity caps
  - Transparency on BAU emissions
  - Transparency on contributions of complementary policies
  - Treatment of electric sector emissions: trading between direct and indirect sources
  - Allocation of allowances: grandparenting vs auction
  - Non-compliance penalties
  - Treatment of EITE industries
  - Regional development strategies
- Prospects for carbon tax