

TITLE OF PRESENTATION

SUBTITLE OF PRESENTATION

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Introduction

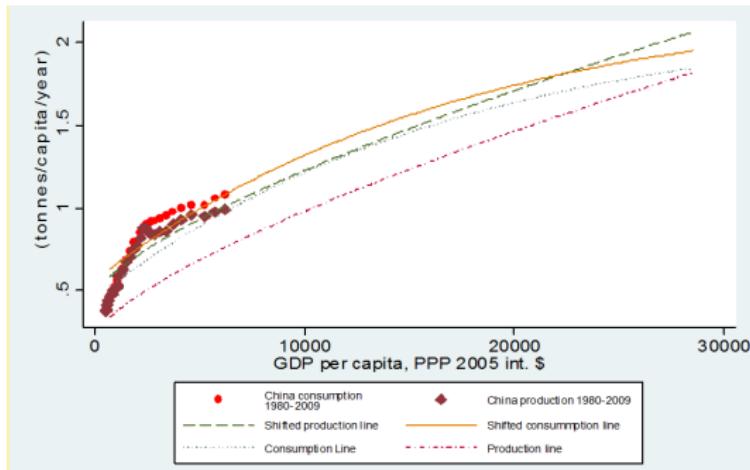
1. Food security and agricultural policies often adjust the allocation of resources to achieve particular objectives – land use, production practices, consumer behavior
2. In the developing world, these adjustments are developed in very complicated settings, involve important trade-offs, and have enormous impacts
3. Decision-makers often lack the ability to properly evaluate trade-offs or impact

Overview

1. Background: China's Farmland Protection Program
2. Data and Policy Evaluation
3. Primary Findings
4. Conclusions and Insights

BACKGROUND: CHINA'S FARMLAND PROTECTION PROGRAM

China Becomes a Net Grain Importer

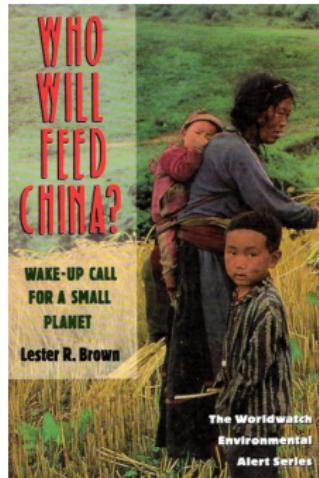


1. Incomes and consumption of cereal equivalents rise in post-reform period
2. China undergoes the most extensive process of agricultural land conversion in the history of the world

Farmland Protection Policy

1. Farmland Protection Policy (1997)

- Objective: increase national self-sufficiency by halting the conversion of agricultural land
- provincial governments must ensure 'no net loss' of farmland within province
- developers can convert existing farmland and pay a fee to reclaim lands elsewhere



Why do we need to evaluate the policy?

Farmland Protection has Become a Highly Controversial Policy

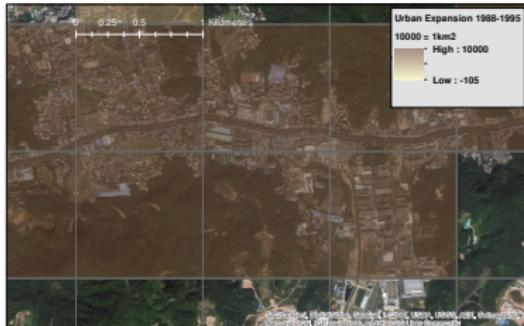
1. Is this the right policy for ensuring food security?
 - What is the expected impact of domestic grain production on poverty/health outcomes?
2. What are the trade-offs associated with these kind of land controls?
 - Possible distortions in/around urban land markets
3. Can we expect the policy to be effective given known corruption issues and black market land transactions?
 - State units and collective organizations are heavily involved in illegal land conversion – official data likely not valid

DATA AND POLICY EVALUATION

Measuring Land Conversion with Landsat TM



- Observations of agricultural conversion (growth/loss) at $30 \times 30 \text{ m}^2$ across China
- 3 periods: 1990-1995, 1995-2000, 2000-2005
- $n = 10,000,000$ observations $\times p = 6$ dimensions



Model of Land Conversion

Land conversion occurs when the value of land in urban use exceeds the value in agricultural use.

$$V_{i,t}^u - \left(\sum_{T=0}^{\infty} V_{i,t+T}^a \right) \delta^T - C_t^a > 0 \quad (1)$$

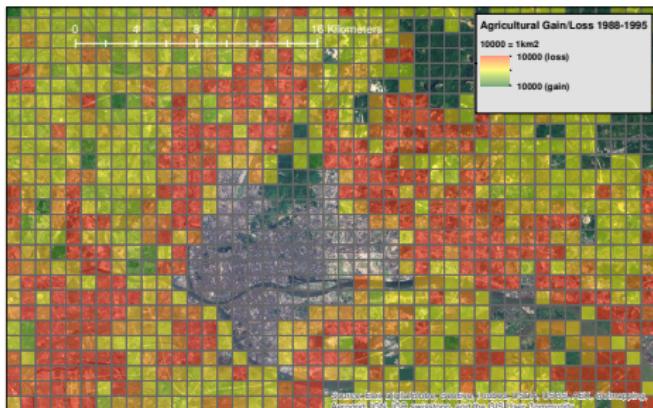
Farmland protection adds an additional cost (C^τ), which should affect the rate at which agricultural land is developed.

$$L_{it}^u = f(V_{it}^a, C_{it}^a, C^\tau) \quad (2)$$

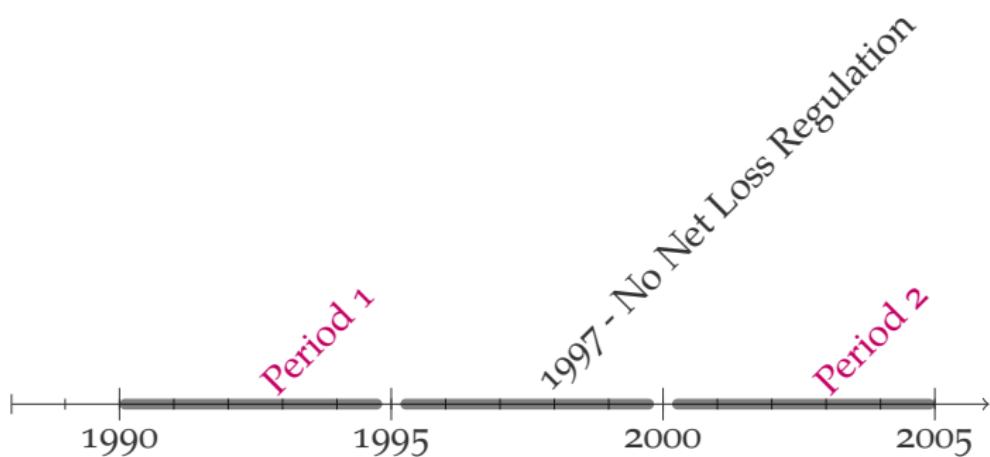
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I estimate the effect of the protection policy by comparing conversion rates in provinces where the policy binds to provinces where it does not.

$$\tau_{ATT(\frac{da}{du})} = \left[\frac{dL^a}{dL^u} \Big|_{it}(1) - \frac{dL^a}{dL^u} \Big|_{it}(0) \right] \quad (3)$$



Policy Timeline



PRIMARY FINDINGS

Results

Primary Findings

1. Was the policy effective in reducing farmland conversion?
 - Overall, regulation had a huge impact on China's land market
 - Province-level rates of farmland conversion fell by 39-56% relative to the policy counterfactual
 - Evidence of non-compliance (full compliance = 100%)

Results

Primary Findings

1. What are the trade-offs and distortions associated with these kind of land controls?
 - On average, the policy reduced urban expansion by 11% relative to the counterfactual.
 - The magnitude is much higher in cities where pre-policy conversion rates were higher (up to 50%).
 - What is the cost in terms of forgone productivity? We're working on that right now...
 - Urban distortions: policy displaced 1% of land that would have occurred within 10km of a city center to outside (effect is 6.7% in high conversion cities)

CONCLUSIONS AND INSIGHTS

Conclusions

Primary Conclusions

1. Land controls are probably not a sensible regulatory tool for food security
 - o Possible deleterious impact on rural incomes
 - o Very high societal costs, particularly in urbanizing regions
 - o Range of unintended consequences
2. New Data for Policy Evaluation
 - o We can monitor the effects of very large programs (ex. national policy, administered at the provincial level)
 - o It is possible to combine these data with (geo-referenced) measures of household income, poverty/health outcomes, consumption behavior to understand nuanced impacts at very large scales
 - o Key – valid statistical model (identification)

Links to More

You can find this working paper and my other publications at www.peterchristensen.net.

If you are interested in learning about the technology that we are building to support our economics and policy research, please come find us on the 3rd floor of the National Center for Supercomputing Applications (NCSA).

Please send questions and comments to: pchrist@illinois.edu