Access to High-Income Countries and Product Innovation: Evidence from China

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Motivation

- New products account for a large portion of output growth in developing countries, such as 25% in India and 12% in China.
- However, the causes of innovating new products (product innovation) in developing countries are not well understood.

Research Question: Does improved access to high-income countries affect firms' product innovation in China, the world's largest developing country?

Approach: Exploit variation caused by a reform that exogenously reduces barriers to access to high-income countries. ⇒Exploit variations in firm-level export activities and the removal of externally imposed export quotas following China's accession to the WTO in 2001.

Key Takeaway

- Improved market access to high-income countries stimulates firms to innovate new products.
- My estimates show that this effect accounts for 26.35% of the increase in product innovation among firms between 2000 and 2007.
- Mechanism: Relaxation of quotas ⇒higher probability of exporting to high-income countries ⇒increased revenue and widened knowledge about the variety of new products ⇒product innovation

Policy Background

- The multifiber arrangement was signed in 1974, allowing high-income countries to place quotas on textile and clothing imports from China and other developing countries.
- In 1994, the agreement on textile and clothing was signed to replace the multifiber arrangement and started integrating textile and clothing products into GATT/WTO rules by removing the quotas.
- The quotas were completely removed over four phases: 1995, 1998, 2002, and 2005.
- China was eligible for quota relaxation during the last two phases (2002 and 2005) after the accession of WTO.
- By January 2005, quotas on 764 HS (at the 6-digit level) products were relaxed.

Empirical Strategy and Identification

- The main challenges for estimating the causal impact of improved access to high-income countries on firms' product innovation are the issues of reverse causality and joint determination, which bias OLS estimates in an ambiguous direction.
- To address these concerns, I explore that firms that exported quota-restricted products before 2005 are more affected by quota elimination than those that did not.
- These differential degrees of firm-level policy exposure and the timing of quota elimination in 2005 allow me to conduct a difference-in-difference estimation, which is as follows:

$$\mathrm{NP}_{ijt} = \beta \mathrm{Exposure}_i \times \mathrm{After}_{2005} + \rho X_{it} + \Omega_i + \Gamma_{jt} + \nu_{ijt} \quad (1)$$

where

- NP_{ijt} : an indicator variable equals to one if firm i in industry j produces new products at year t.
- $\mathrm{Exposure}_i = \frac{1}{N_{i,2004}} \sum_{2000}^{2004} Quota_{it,2005}$
  - $N_{i,2004}$ denote the number of years that firm i existed from 2000 to 2004
  - $Quota_{it,2005}$ be an indicator variable that equals to one if firm i exported a product covered by the list of 2005 quota-free products in year t.
- $After_{2005}$ denotes the post-2005 periods, taking a value of 1 from 2005 onward and 0 otherwise.
- X_{it} controls for quota elimination in 2002 and other time-variant firm characteristics.
- Ω_i is firm fixed effects, which controls for firm-specific and time-invariant variables.
- Γ_{jt} is industry-year fixed effects, which controls for industry-specific shocks that can vary over time, such as industry-level input and output tariffs.
- β is the causal effect of improved market access to wealthy countries on product innovation.

Data

- The annual survey of industrial firms conducted by China's National Bureau of Statistics from 2000 to 2007.
- The Chinese customs trade statistics span from 2000 to 2007.

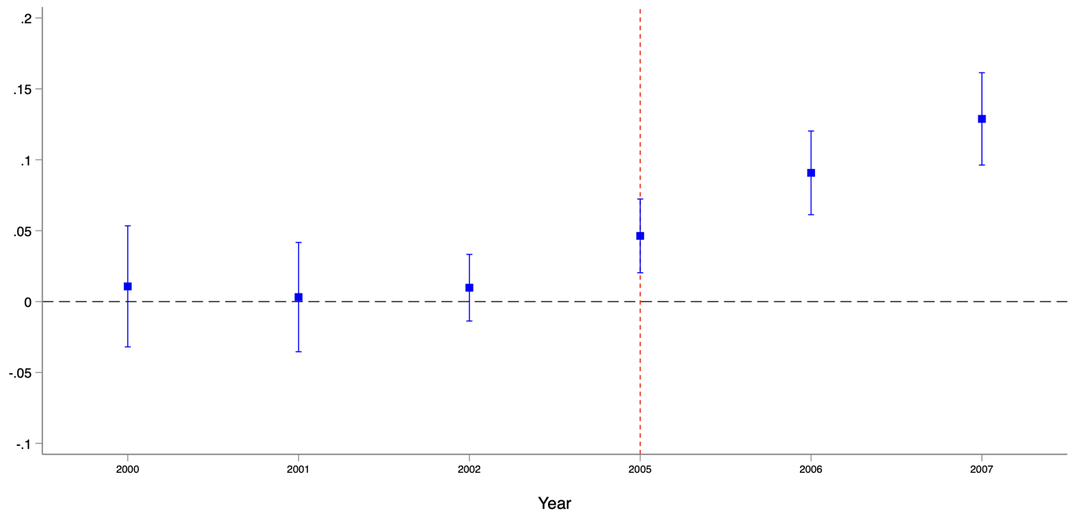
Main Results

- I find that improved access to high-income countries significantly causes firms to launch new products.
- To analyze the magnitude of the effect, a back-of-the-envelope calculation shows that for a privately owned firm with the average level of pre-2005 policy exposure, removing the quotas increases its probability of producing new products by 0.015 percentage points, roughly 26.35% of the actual increase in the probability of product innovation per firm from the pre-2005 to the post-2005 period.

$\mathrm{Exposure}_i \times \mathrm{After}_{2005}$	0.118***	0.084***	0.080***
	[0.013]	[0.013]	[0.013]
Observations	45,254	45,254	45,254
Quota Elimination in 2002	Yes	Yes	Yes
Year FE	Yes	Yes	No
Firm FE	No	Yes	Yes
Industry-Year FE	No	No	Yes

Dynamic Effects

- There are no pre-trends, and the difference in product innovation between firms with high policy exposures and firms with low policy exposures is statistically right after the quota relaxation in the year 2005.



Mechanism

Panel A

	Export	Total Export	Total Revenue
$\mathrm{Exposure}_i \times \mathrm{After}_{2005}$	0.145***	1,003***	18,404***
	[0.020]	[48]	[2014]
Dependent Variable (Mean)	0.615	1,233	39,632

Panel B

	Profit	Short-Term Debt	Long-Term Debt
$\mathrm{Exposure}_i \times \mathrm{After}_{2005}$	510***	15,106***	279**
	[126]	[942]	[114]
Dependent Variable (Mean)	1,310	13,491	852
Quota Elimination in 2002	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Industry-Year FE	Yes	Yes	Yes
Observations	45,254	45,254	45,254

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