The Impact of China-U.S. Technological Decoupling on the Trade Between Taiwan and Mainland China

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Outline

Introduction

Background

- U.S.-China trade tensions
  - Tariff war started in 2018
  - Huawei and 68 affiliates in Entity List since May 15, 2020
  - Strengthening of U.S. export control regulation in Aug 2018
- Companies trading with China became cautious
  - Increased trade cost due to the need to comply with U.S. regulations if U.S. technology or software is used
  - Other economies strengthened their export control regimes as well, e.g., European countries, Japan, Taiwan
    - Taiwan strengthened export control in Dec 2019

What we do

- identify products that are under Export Control in Taiwan
- examine empirically whether there is an effect of export control strengthening in Dec 2019 on the trade of Taiwan with mainland China
- spoiler: result is opposite to our expectation

Literature review

- ▶ trade effects of political conflict with China (Fuchs and Klann 2013, Heilmann 2016, Du et al. 2017, Li et al. 2021, and Luo et al. 2021)
- ▶ trade effects of economic sanctions
  - ▶ against Iran (Haidar 2017, Crozet et al. 2021)
  - ▶ against Russia (Crozet et al. 2020, 2021)
- ▶ effect of export restrictions on exports (Fuhrmann 2008, Afesorgbor 2019)
- ▶ U.S.-China tariff war (Amiti et al. 2019, 2020, Fajgelbaum et al. 2020, Flaaen et al. 2020, Cavallo et al. 2021, Handley et al. 2020, Egger and Zhu 2020, Blanchard et al. 2019)
- ▶ trade faciliation (Djankov et al. 2010, Freund and Rocha 2011, and Portugal-Perez and Wilson 2012)

Data construction and findings

Export control regime in Taiwan

- export control of dual-use goods complying with international export control regimes (Wassenaar Arrangement, Missile Technology Control Regime, Nuclier Suppliers Group, Australia Group)
- managed/monitored by Bureau of Foreign Trade Ministry of Economic Affairs of Taiwan
  - focus on Strategic High Tech Commodities (SHTC)
- strengthening of export control
  - Regulation first time tightened in December, 2019 after the outbreak of China-U.S trade war
  - Regulation revised in December, 2020
  - Regulation revised in September, 2021
- areas under control: Iran, Iraq, North Korea, Sudan, Syria, and 12 types of semiconductor wafer manufacturing equipment only to mainland China

Data sources

- ▶ Source
  - ▶ Export control items list from Bureau of Foreign Trade, Ministry of Economic Affairs of Taiwan
  - ▶ Trade data from Directorate General of Customs Administration, Ministry of Finance Statistics of Taiwan
    - ▶ quarterly exports for 2012q4–2022q2 at HS 11-digits level (concordance ensured)
- ▶ Partner areas: Mainland China, ASEAN, Europe, NAFTA, Japan, Korea, Singapore

Mapping

Export Control Code	Contents	HS-Code	HS description
3A001	Electronic components and specially designed components as follows: a. General purpose integrated circuits b. Microwave or millimetre wave items c. Acoustic wave devices as follows and specially designed components	854239100	Electronic integrated circuits (excluding such as processors, controllers, memories and amplifiers)
3B001	Equipment for the manufacturing of semiconductor devices or materials, as follows, and specially designed components and accessories therefor	848620900	Machines and apparatus for the manufacture of semiconductor devices or of electronic integrated circuits

▶ Based on our mapping, there are totally 1165 HS 11-digits products were regulated, 10532 HS 11-digits were not regulated.

Identification strategy (1)

- ▶ trade in between Taiwan and mainland China.

$$Y_{p,t} = \beta_1 post_t + \beta_2 regulated_{p,t} \\ + \beta_3 post_t \times regulated_{p,t} + \varepsilon_{p,t} \tag{1}$$

- ▶ Y_{pt} - value of exports at the HS 11-digit level
- ▶ $post_t$ is dummy equal to 1 for 2020Q1 and later
- ▶ $regulated_{p,t}$ is dummy equal to 1 if HS 11-digit product is under export control
- ▶ we are interested in the average treatment effect coefficient β_3. Our hypothesis is that it is negative.

Identification strategy (2)

▶ trade in between Taiwan and seven regions including mainland China.

$$Y_{i,p,t} = \beta_1 post_t + \beta_2 regulated_{p,t} + \beta_3 China_i + \\ \beta_4 post_t \times regulated_{p,t} \times China_i + \varepsilon_{p,t}, \tag{2}$$

▶ Y_{pt} - value of exports at the HS 11-digit level
▶ $post_t$ is dummy equal to 1 for 2020Q1 and later.
▶ $regulated_{p,t}$ is dummy equal to 1 if HS 11-digit product is under export control
▶ we are interested in the triple average treatment effect coefficient β_4. Our hypothesis is that it is negative.

Estimation results

Table 1: Effect of export control

	(1) China only	(2) Seven regions
Regulated	2.265***	2.115***
	(0.3056)	(0.3151)
Post	0.1319	0.251***
	(0.0811)	(0.0510)
Regulated×Post	0.3564*	
	(0.1942)	
China		0.9984***
		(0.0885)
China×Regulated×Post		0.3470**
Constant	6.91***	5.948***
	(0.091)	(0.0918)
Observations	442,065	3,094,455

Notes: Poisson Pseudo Maximum Likelihood estimation. Dependent variable is value of exports. The symbols ***, **, and * show significance at the 1%, 5%, and 10% levels, respectively. Robust standard errors are shown in parentheses. Standard errors are clustered at the product level.

Conclusion

Conclusion

This paper:

- ▶ Overall we find an evidence that export control average treatment effect is positive
- ▶ One possible explanation is that fixed costs associated with licensing are outweighed by cultural proximity and profit opportunities in the mainland China

Next steps

- ▶ Extend to monthly level analysis
- ▶ Extend to all countries in the world
- ▶ Consider trade diversion