

EXPORT-ORIENTED INDUSTRIAL POLICY AND THE EAST ASIAN GROWTH

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Oxford MPhil seminar series

DISCLAIMER



MOTIVATION: THE DEBATE

“THE BEST INDUSTRIAL POLICY IS NO INDUSTRIAL POLICY AT ALL”

- Orthodox vs heterodox
 - Invisible hand / Institutional frictions
 - Market failure / structural change
- Definition
 - Manufacturing vs broader
 - Sector targeting vs horizontal policies

<https://drodrik.scholar.harvard.edu/files/files/industrial-policy-dont-ask-why-ask-how.pdf> PDF

[industrial-policy-dont-ask-why-ask-how.pdf - Dani Rodrik](#)

by D RODRIK · Cited by 481 — The theoretical case for **industrial policy** is a strong one. The market failures which **industrial policies** target — in markets for credit, labor, products, ... 29 pages

<https://cepr.org/voxeu/columns/return-policy-shall-not-be-named>

[The return of the policy that shall not be named: Principles of ...](#)

16 Jun 2019 — Successful policy uses **state** intervention for early entry into sophisticated sectors, strong export orientation, and fierce competition with ...

<https://www.cato.org/policy-report/july/august-2021/industrial-policy-a-bad-idea-is-back>

[Industrial Policy: A Bad Idea Is Back | Cato Institute](#)

Manufacturing jobs cannot justify industrial policy. ... these companies' better products and business models were not rewarded with additional business.

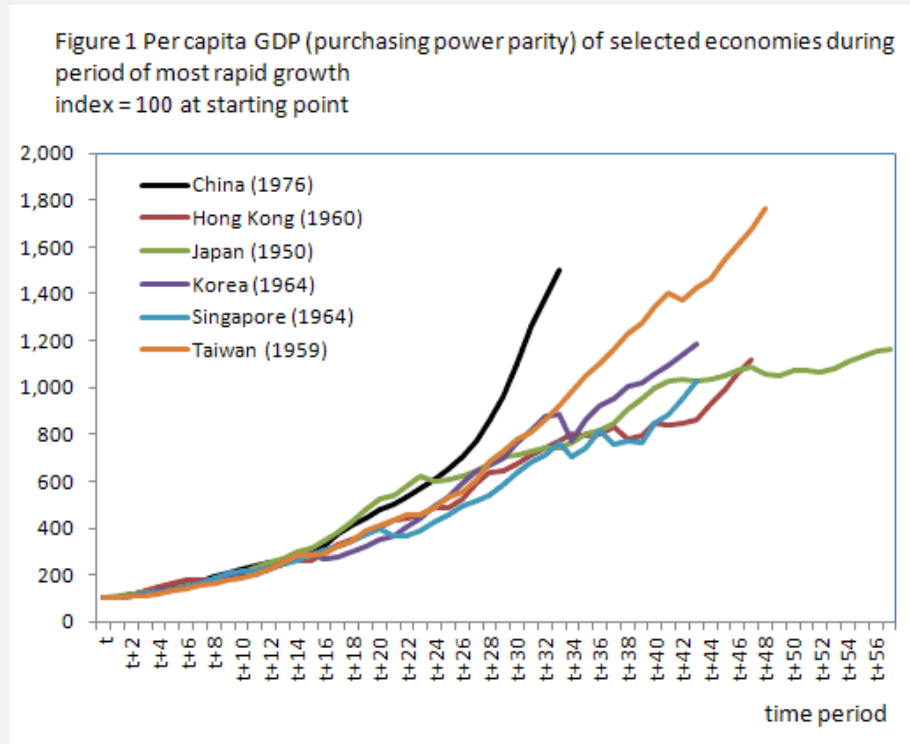
https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/101422/industrial-policy-for-the-medium-to-long-term.pdf PDF

[Industrial Policy for the medium to long-term - GOV.UK](#)

“**Industrial policy** is any type of intervention or government policy that ... Moreover, it appears

MOTIVATION: EAST ASIAN MIRACLE

- Dramatic growth of East Asian countries



Source: Peterson Institute for International Economics



- 1960-2014, 16. Growth despite industrial policy?

RESEARCH QUESTION

- Has industrial policy led to a different growth trajectory in East Asian countries?
- Specifically, we study
 - The major East Asian miracle regions: Japan, South Korea, Singapore, Taiwan
- Export-oriented industrial policy
 - Shifting from Import Substitution Industrialisation (high exchange rate, foreign exchange rationing)
 - Started around the 1960s – devaluation of currency, tax exemptions for export firms, etc.
 - One of the most salient features of East Asian industrial policy (IMF, 2019)
- Main contribution (so far)
 - Literature review on what constitutes East Asian industrial policy, and dating the start of export-oriented industrial policy
 - Empirical analysis on case studies using synthetic control

HOLD ON A SEC!

- Are we just testing for no intervention here?
- Export orientation != Trade liberalization
- Robert Wade (1993)
 - Variations across subsectors
 - “Incentive twist” in both export and import industries

LITERATURE

- Debate on the role of industrial policy:
 - Both theoretical and empirical work (Rodrik 1995; Nelson and Pack 1999; Noland and Pack 2003; Studwell 2013).
- Empirical issues:
 - First-generation economic studies run into omitted variable bias and reverse causality issues (Rodriguez and Rodrik 2001; Lane 2020; Rodrik 2012).
- Empirical case studies:
 - Limit scope to specific cases, sometimes using natural experiments, to study policies such as French textile protection, South Korean petrochemical industrial policies etc. (Juhasz 2018; Lane 2022)
- Synthetic control:
 - Bourgeoning area of both theoretical econometrics and applied empirical work. (Abadie, Diamond and Hainmueller 2012; Springford 2022)

DATING EXPORT-ORIENTED INDUSTRIAL POLICY: SOUTH KOREA

- Pre-policy period:
 - Throughout 1950s, foreign exchange rate kept artificially high to 1) make imports cheaper, 2) fear of inflation.
 - Highly reliant on US aids to fill in reserve deficiency
 - Brief devaluation by Chang government (60-61), overturned by military government
- Reasons for the turn:
 - Cut down of Marshall Plan -> balance of payment situation worsened
- Final turn to devaluation:
 - In 1962, the 5-year plan speaks about export promotion.
 - Park onboarded to devaluation in 1964. The success led to firmer strategic direction towards increasing exports in 1965.

Timeline

- 1961: first round of devaluation (65 to 130 won/USD)
- 1962: launched the first 5-year development plan
- 1963: reintroduction of a multiple exchange rate system
- 1964: second round of devaluation (130 to 255.77 won/USD)
- 1964: Ministry of Commerce and Industry announced "Comprehensive Export Promotion Programme"

DATING EXPORT-ORIENTED INDUSTRIAL POLICY: TAIWAN

- Pre-policy period:
 - Towards the end of 1950s, Taiwan had overvalued currency (due to fixed exchange rate and inflation) -> reliance on the US aid
 - Prevailing thoughts: devaluation would 1) lead to inflation, and 2) not increase exports due to flat international demand curve in rice and sugar.
- Reasons for the turn:
 - US reduced aid to Taiwan and shift foreign assistance from grants to loans.
 - Factional rivalry + mainland failed to invade Taiwan during 1958 Taiwan Straits crisis -> reduced the sense of military threat.
 - Top government officials (e.g. Yin Chung-jung 尹仲容) influenced by American-Taiwanese economists to support devaluating the currency
 - Domestic market became increasingly limited
- Turn to devaluation
 - 1960 (the 3rd 4-year plan)

Timeline

- 1957: special export loan programme initiated (though the amount was small)
- 1958: start of the foreign exchange reform
 - exchange settlement certificates rate unified
- 1960: 19-point economic financial reform (the 3rd 4-year plan 1961-64)
 - export expansion
 - procedures of settlement of foreign exchanges
 - increase contacts with foreign business organisations
- 1960: Statute for the Encouragement of Investment
 - tax reduction for exports
- 1964: further devaluation of currency (the 4th 4-year plan)

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Japan, Singapore, (and potentially Thailand, Malaysia) working in progress

EMPIRICAL STRATEGY – SYNTHETIC CONTROL

- When the units of analysis are aggregate entities
- Use a combination of comparison units (a “synthetic control”) to represent the counterfactual for a treated unit
 - Weighted average of potential comparison units
 - “Donor pool”: untreated units to serve as controls
- Application
 - Aggregate interventions affecting a small number of large units

EMPIRICAL STRATEGY – SYNTHETIC CONTROL

- Suppose we observe $J + 1$ units in periods $1, 2, \dots, T$
 - Unit one is the intervention of interest; the remaining J are untreated reservoir of potential controls (“donor pool”)
 - Unit one is exposed to the intervention at time T_0
- Y_{it}^I denotes the outcome that would be observed for unit i at time t if exposed to intervention
- Y_{it}^N denotes the outcome that would be observed for unit i at time t in the absence of the intervention
- Then, the effect of intervention on the treated unit is $\tau_{1t} = Y_{it}^I - Y_{it}^N = Y_{1t} - Y_{1t}^N$ for $t > T_0$

EMPIRICAL STRATEGY – SYNTHETIC CONTROL

- Let $W = (w_2, \dots, w_{J+1})'$ with $w_j \geq 0, j = 2, \dots, J + 1$
- Let X_1 be a $(k \times 1)$ vector of pre-intervention characteristics for the treated unit.
- Let X_0 be a $(k \times J)$ matrix of pre-intervention characteristics for the unaffected units.
- Then, we choose vector $W^* = (w_2^*, \dots, w_{J+1}^*)'$ to minimise $\| X_1 - X_0 W \|^2$ subject to the weight constraints
- Thus, our estimated synthetic control estimator is $\tau_{1t} = Y_{1t} - \sum_{j=2}^{J+1} w_j^* Y_{jt}$ for $t \geq t_0$

EMPIRICAL STRATEGY – SYNTHETIC CONTROL

- Which distance to use? Typically,

$$\| X_1 - X_0 W \| = \left(\sum_{h=1}^k v_h (X_{h1} - w_2 X_{h2} - \dots - W_{J+1} X_{hJ+1})^2 \right)^{\frac{1}{2}}$$

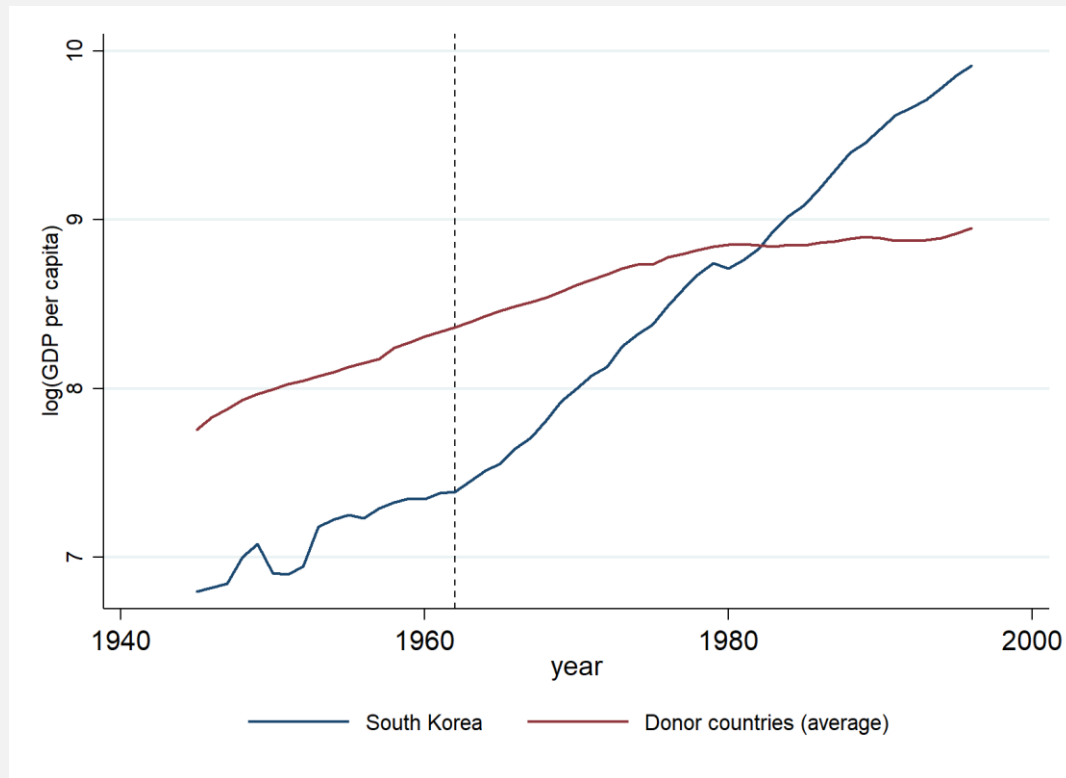
- v_1, \dots, v_k reflect the predictive power of the corresponding predictor on Y_{1t}^N
- In Stata, the weights are chosen to minimise the pre-trend MSPE (mean-squared predicted errors)

DATA

- GDP and population from Penn World Table 2020
- Economics and social data from Princeton Dataset
 - Economics: TFP, capital stock
 - Social: proportion of population finishing primary, secondary and tertiary education
- Trade data from TRADIST
 - Bilateral trade data

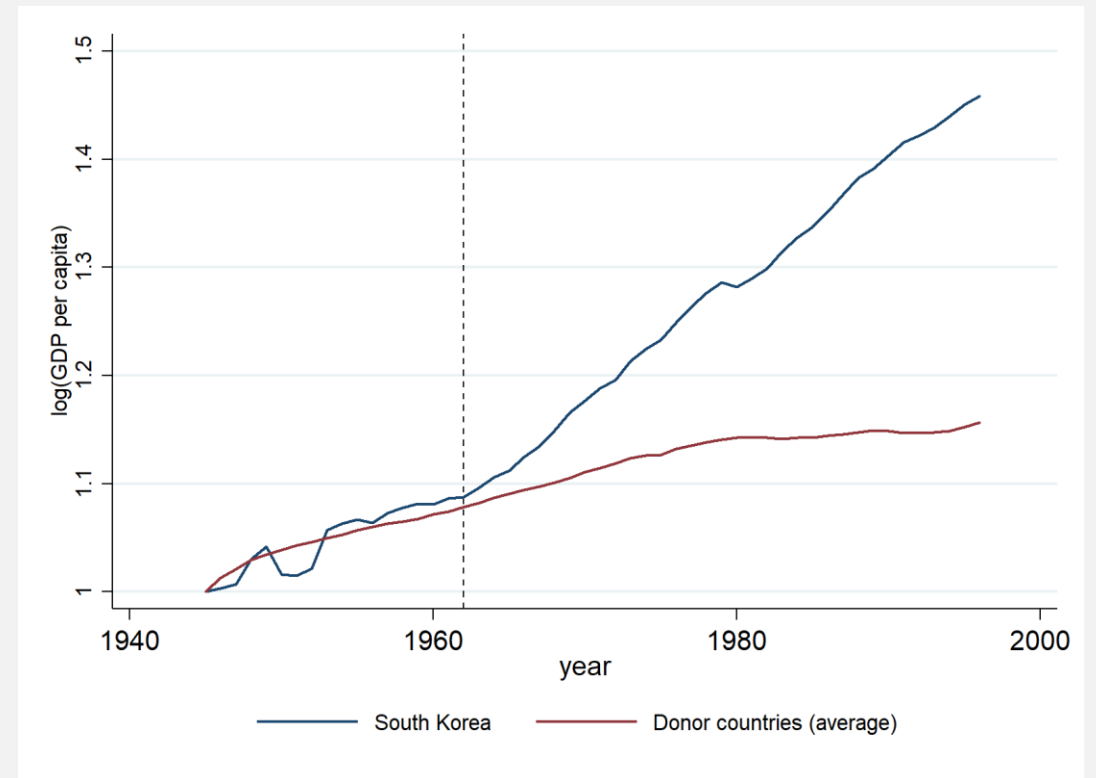
RESULT I: SOUTH KOREA GDP TREND

Graph: GDP trend for South Korea and the average of the donor pool countries



Notes: Chart plots $\log(\text{GDP per capita})$ from 1945-1996, for South Korea and the average of the donor countries. The donor country group corresponds to the countries with available data for all specified characteristics and at least 5 GDP observations in 1950s.

Graph: GDP trend for South Korea and the average of the donor pool countries, normalised to the 1945 level



Notes: Chart plots $\log(\text{GDP per capita})$ from 1945-1996, for South Korea and the average of the donor countries, with data normalised to the 1945 level. The donor country group corresponds to the countries with available data for all specified characteristics and at least 5 GDP observations in 1950s.

RESULT I: SOUTH KOREA SYNTHETIC CONTROL RESULT (A)

Synthetic control (strict condition on data availability)

Characteristics included:

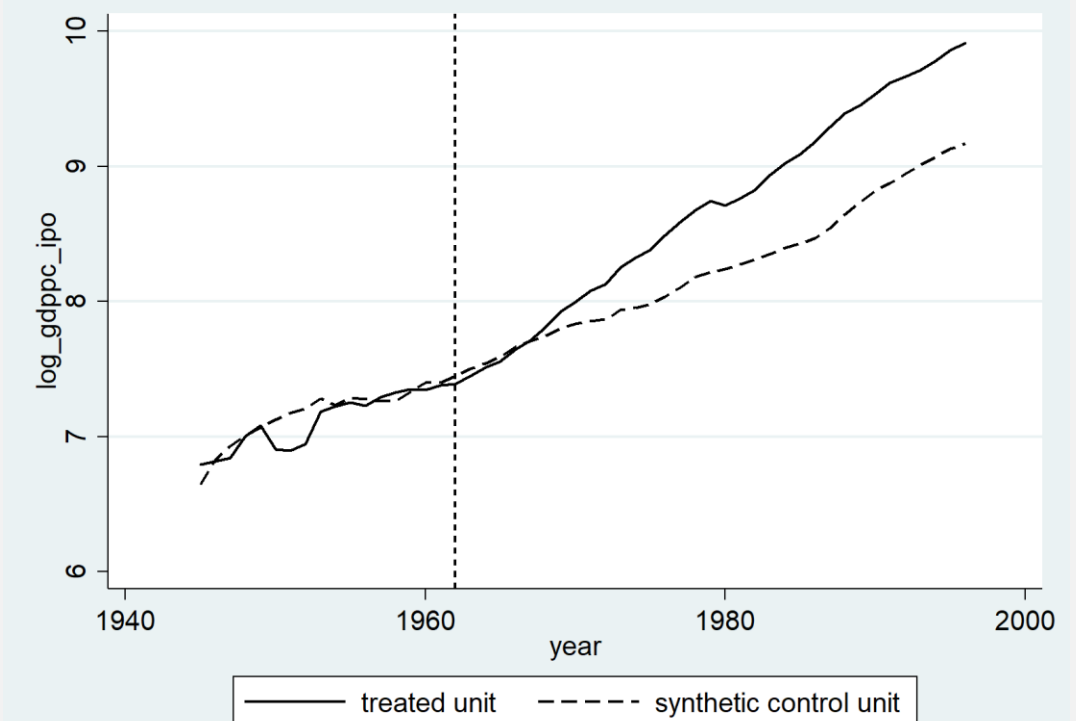
- Log(GDP per capita), 1960, 1957
- Population, 1960
- Capital stock per capita, 1960, 1957
- TFP per capita, 1960
- Primary, secondary, tertiary education, 1960

Table:Weights on optimal donor countries

Table 7: Weight Matrix			
Country	Country Code	Label	Weight
Thailand	THA	179	.903
China	CHN	33	.097

Notes: The table only shows donor countries with positive weights.

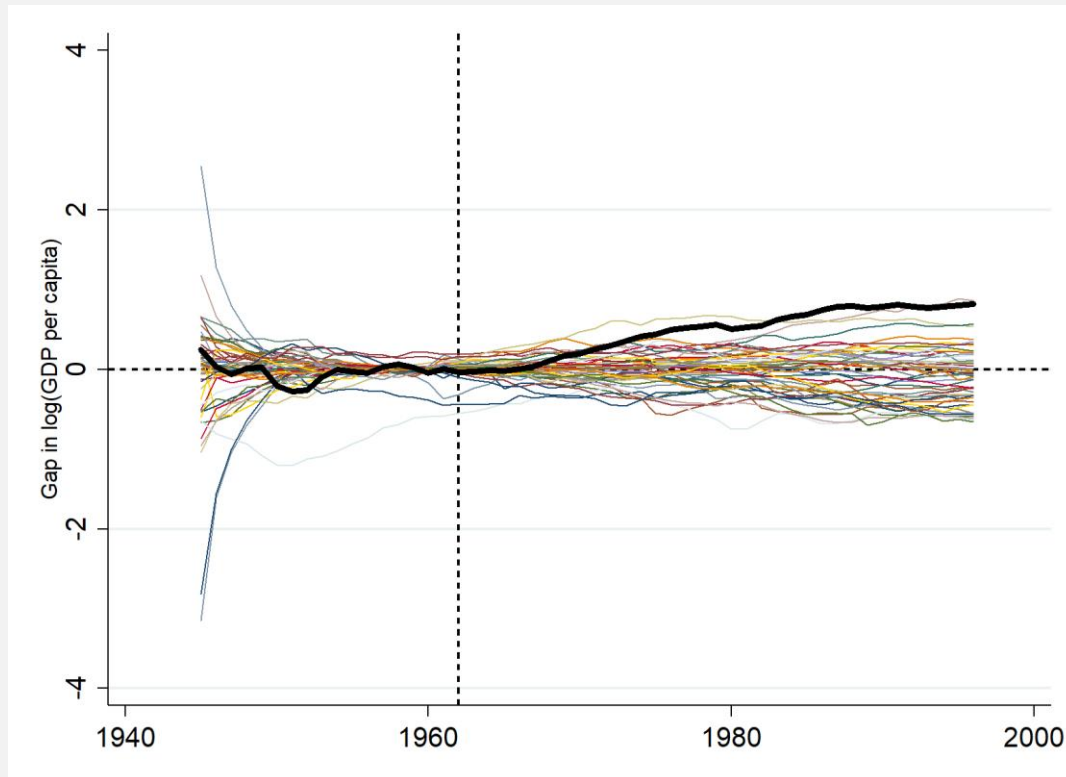
Graph: Log of GDP per capita for South Korea vs synthetic South Korea



Notes: Chart plots log(GDP per capita) from 1945-1996, for South Korea and the synthetic control South Korea.

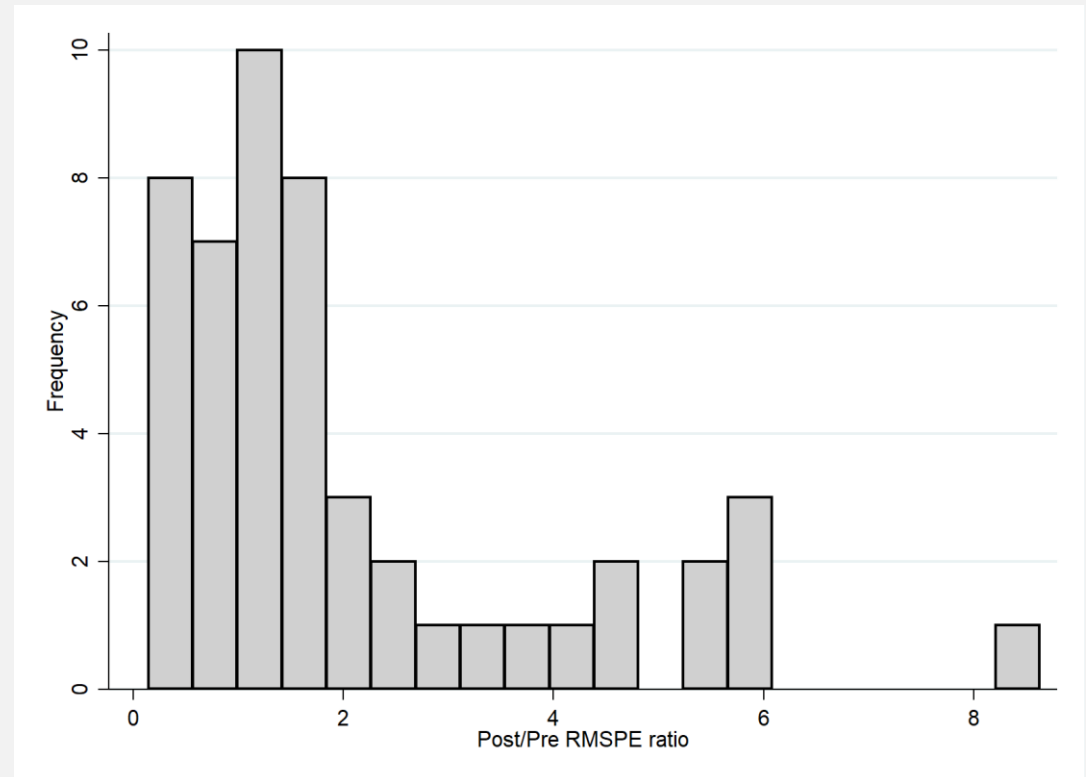
RESULT I: SOUTH KOREA PLACEBO TEST (A)

Graph: Placebo distribution using all units as donor pool



Note: The data shows the gap between actual and synthetic prediction of log(GDP per capita) distributed across South Korea and all donor countries.

Graph: Histogram of post-pre RMSPE of all units



Note: The data shows the distribution of post-pre RMSPE ratio across South Korea and all donor countries.

RESULT I: SOUTH KOREA SYNTHETIC CONTROL RESULT (B)

Synthetic control (full extrapolation)

Characteristics included:

- Log(GDP per capita), 1960, 1957
- Population, 1960
- Capital stock per capita, 1960, 1957
- TFP per capita, 1960
- Primary, secondary, tertiary education, 1960

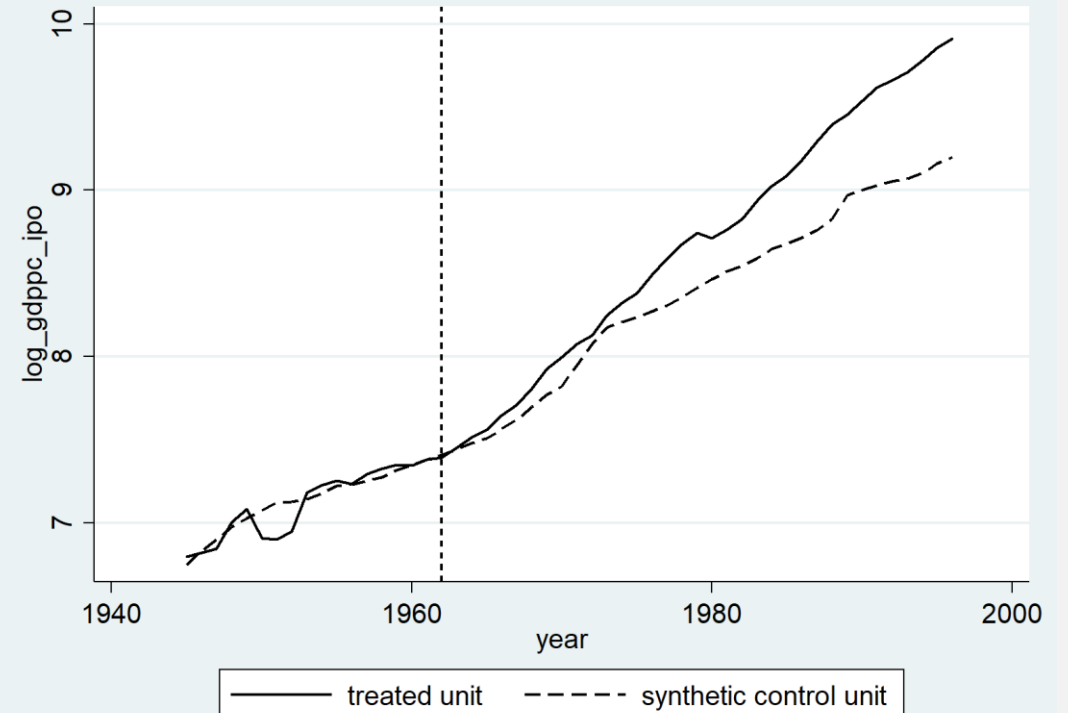
Graph: Weights on optimal donor countries

Table 1: Weight Matrix

Country	Country Code	Label	Weight
Botswana	BWA	28	.511
Israel	ISR	86	.187
Thailand	THA	179	.14
Hungary	HUN	79	.121
Greece	GRC	71	.041

Notes: The table only shows donor countries with positive weights.

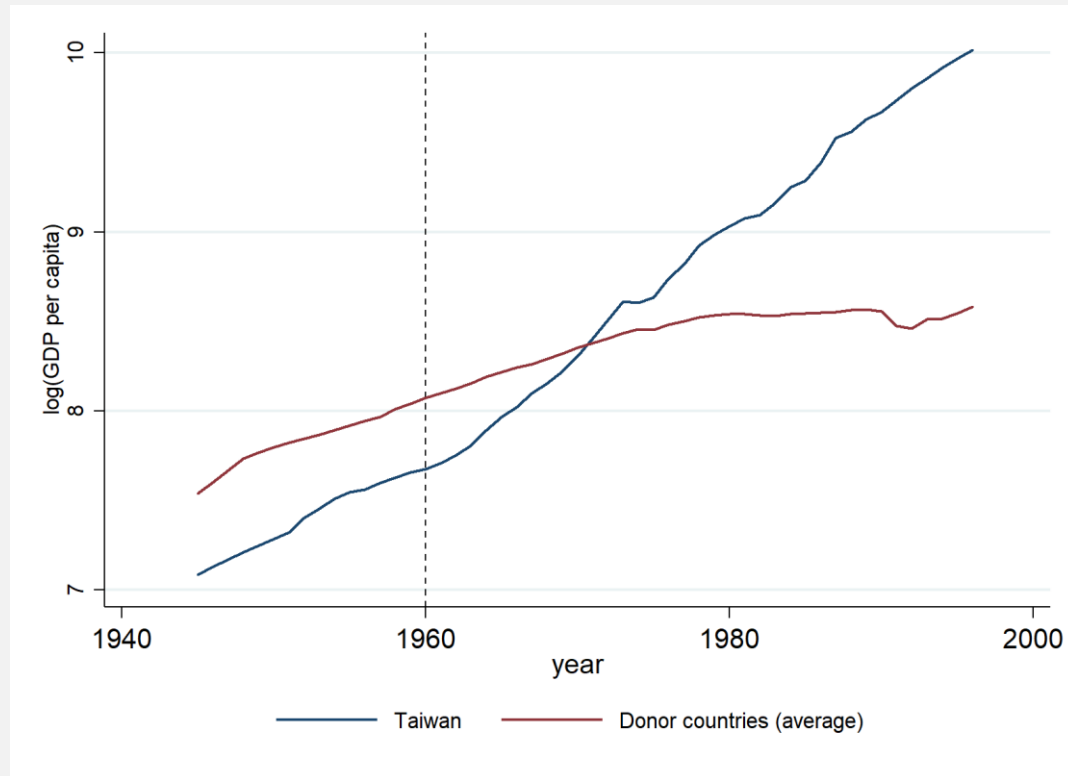
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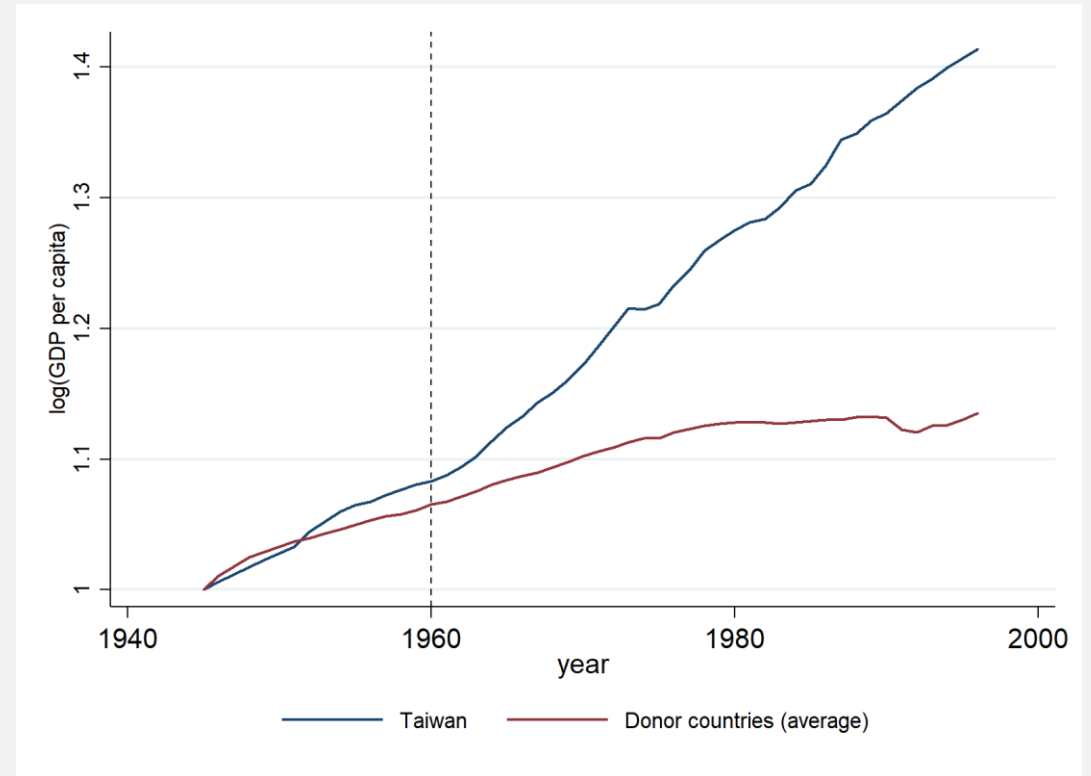
RESULT II: TAIWAN GDP TREND

Graph: GDP trend for Taiwan and the average of the donor pool countries



Notes: Chart plots $\log(\text{GDP per capita})$ from 1945-1996, for Taiwan and the average of the donor countries. The donor country group corresponds to the countries with available data for all specified characteristics and at least 5 GDP observations in 1950s.

Graph: GDP trend for Taiwan and the average of the donor pool countries, normalised to the 1945 level



Notes: Chart plots $\log(\text{GDP per capita})$ from 1945-1996, for Taiwan and the average of the donor countries, with data normalised to the 1945 level. The donor country group corresponds to the countries with available data for all specified characteristics and at least 5 GDP observations in 1950s.

RESULT II. TAIWAN

SYNTHETIC CONTROL RESULT (A)

Synthetic control (strict condition on data availability)

Characteristics included:

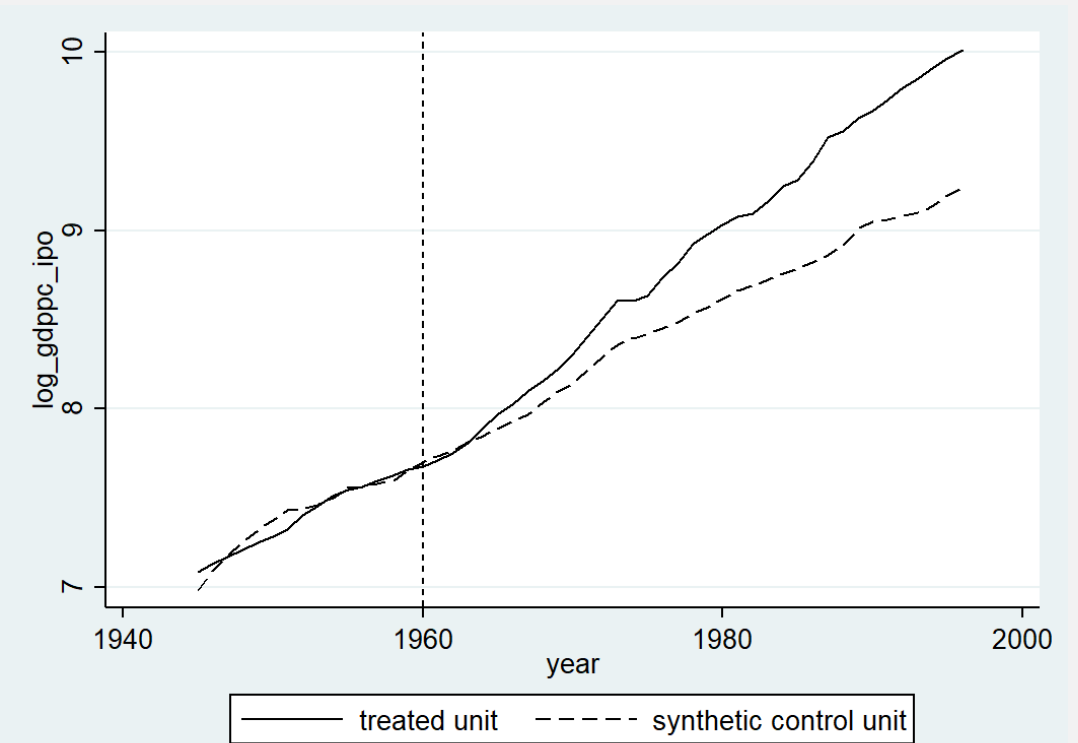
- Log(GDP per capita), 1959, 1956
- Population, 1959
- Capital stock per capita, 1959, 1956
- TFP per capita, 1959
- Primary, secondary, tertiary education, 1955

Table:Weights on optimal donor countries

Country	Country Code	Weight
Thailand	THA	.774
Israel	ISR	.174
India	IND	.053

Notes: The table only shows donor countries with positive weights.

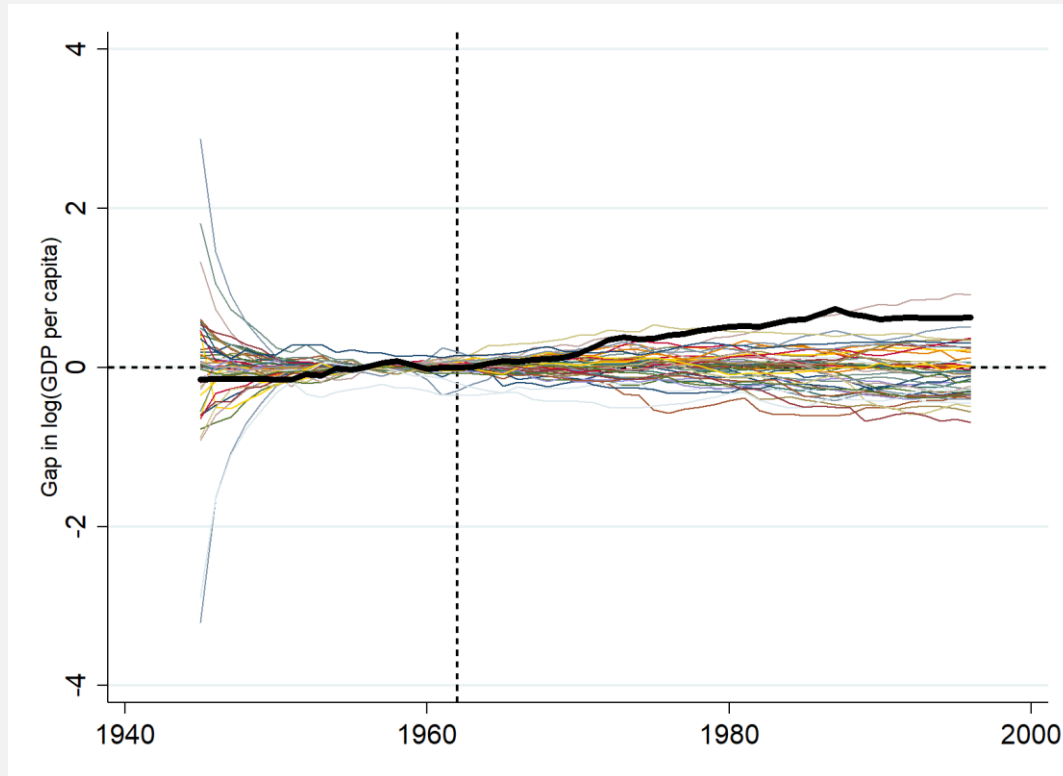
Graph: Log of GDP per capita for Taiwan vs synthetic Taiwan



Notes: Chart plots log(GDP per capita) from 1945-1996, for Taiwan and the average of the donor countries, with data normalised to the 1945 level.

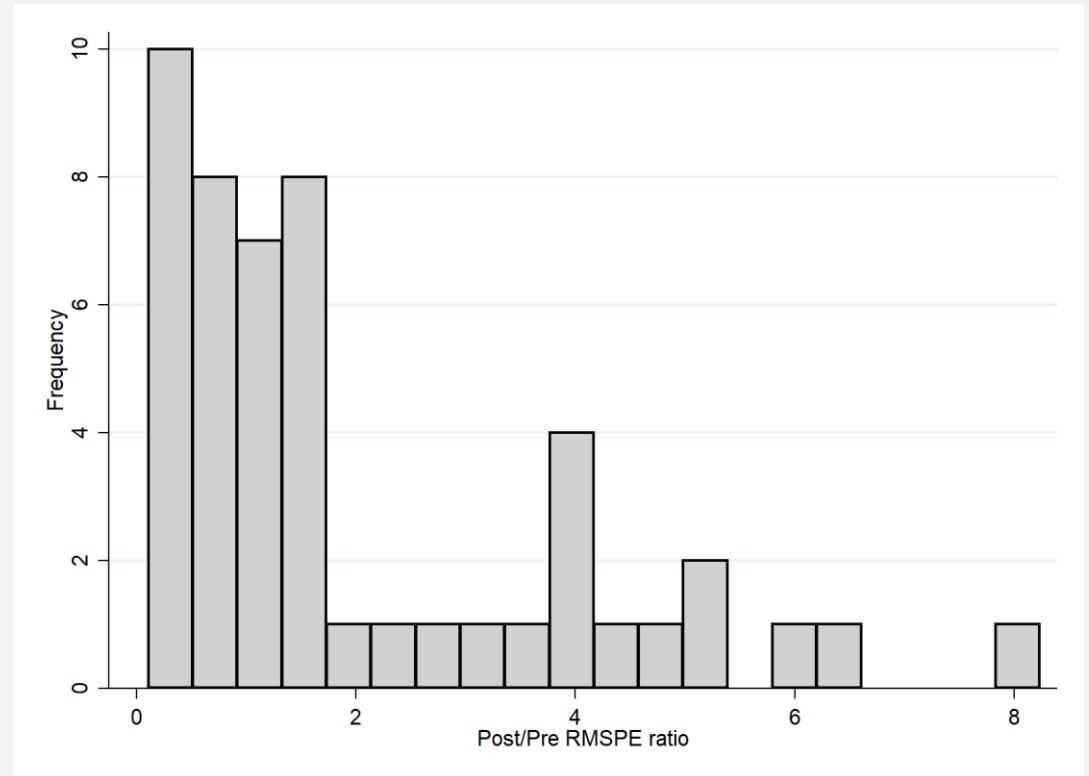
RESULT II: TAIWAN PLACEBO TEST (A)

Graph: Placebo distribution using all units as donor pool



Note: The data shows the gap between actual and synthetic prediction of log(GDP per capita) distributed across Taiwan and all donor countries.

Graph: Histogram of post-pre RMSPE of all units



Note: The data shows the distribution of post-pre RMSPE ratio across Taiwan and all donor countries.

RESULT II: TAIWAN

SYNTHETIC CONTROL RESULT (B)

Synthetic control (full extrapolation)

Characteristics included:

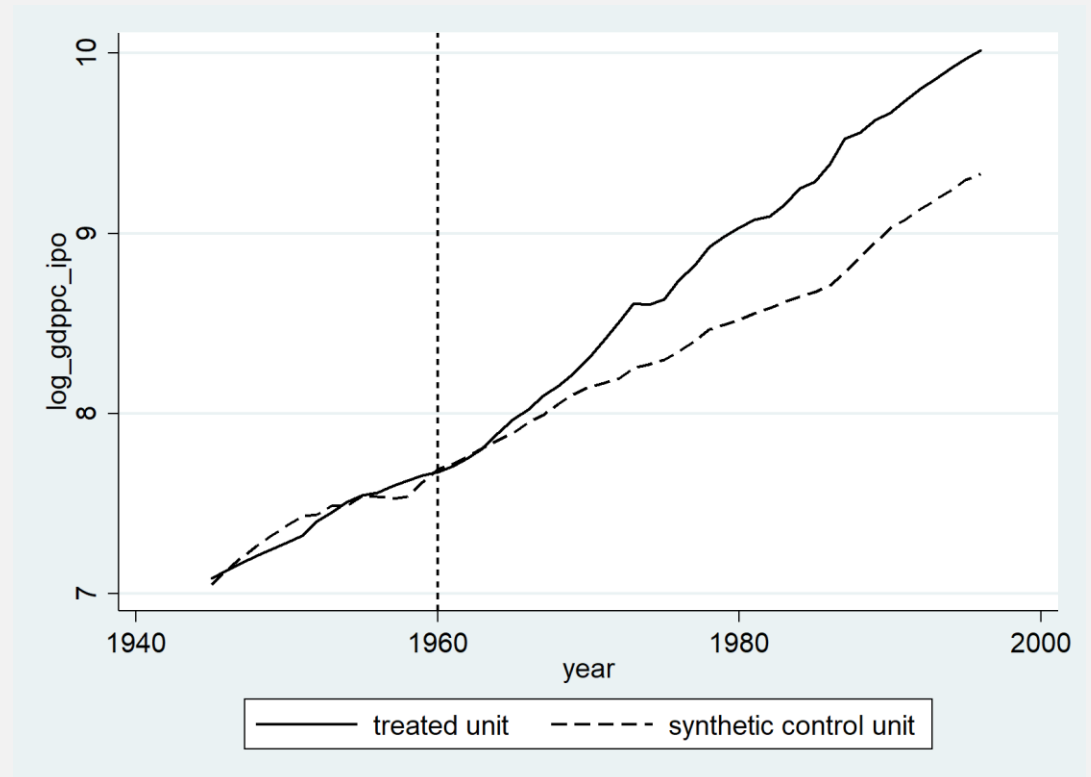
- Log(GDP per capita), 1959, 1956
- Population, 1959
- Capital stock per capita, 1959, 1956
- TFP per capita, 1959
- Primary, secondary, tertiary education, 1955

Graph: Weights on optimal donor countries

Country	Country Code	Weight
Thailand	THA	.354
Israel	ISR	.307
Botswana	BWA	.226
Laos	LAO	.056
Norway	NOR	.03
Estonia	EST	.025
Slovakia	SVK	.002

Notes: The table only shows donor countries with positive weights.

Graph: Log of GDP per capita for Taiwan vs synthetic Taiwan



Notes: Chart plots log(GDP per capita) from 1945-1996, for Taiwan and the synthetic control Taiwan.

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Japan, Singapore, (and potentially Thailand, Malaysia) working in progress

SOME THOUGHTS ON NEXT STEPS...

- Staggered Difference-in-Differences, if possible
- Compare the differential effects of export-led industrial policy and import substitution industrial policy
- Improve on the synthetic control industrial policy identification... somehow?
- Put some structures into the model