Policy Changes and Growth Slowdown

Assessing the Lost Decade of the Latin American Miracle

Toni, Paniagua & Ordenes (2023)

Replication Code & Analysis

Overview

Research Question: What caused Chile's economic slowdown after 2014?

Key Finding: At least **two-thirds** of Chile's growth slowdown is attributable to **internal policy factors**, with external factors (commodity super-cycle end) playing a secondary role.

Impact:

- ~10% reduction in real GDP per capita over 5 years (2014-2019)
- 1.8% decline in average GDP growth rates

The Chilean Puzzle

The Miracle (1990-2013)

- Poster child of Latin American growth
- GDP per capita growth: 3.5-4.6% annually
- Poverty reduction, wage growth
- Convergence toward developed economies

The Lost Decade (2014-2024)

- Growth rate: 0.6% per capita annually
- Stopped converging, began diverging
- Stagnant real wages
- Productivity sluggishness

Two Concurrent Events

1. **External:** End of commodity super-cycle (copper prices fell ~50%)
2. **Internal:** 2014 policy regime change under Bachelet's second government

The 2014 Policy Regime Change

Six major reforms implemented simultaneously:

1. **Tax Reform** - Corporate tax: 20% to 27% (highest increase in OECD)
2. **Education Reform** - De-privatization, end for-profit entities
3. **Electoral Reform** - Changed electoral system
4. **Constitutional Process** - Attempt to replace Pinochet-era constitution
5. **Labor Market Reform** - Strengthened union bargaining power
6. **Pension Reform** - Increased state role in social security

> "Bachelet vowed to enact multi-dimensional change... 'policies that change cultures'" - Benedikter et al. (2016)

Methodology: Synthetic Control Method (SCM)

Approach: Construct counterfactual "Synthetic Chile" from weighted combination of donor countries

Donor Pool (22 countries)

- **Latin America:** Argentina, Bolivia, Brazil, Colombia, Costa Rica, etc.
- **Commodity exporters:** Australia, China, South Africa
- **Colonial ties:** Spain, Portugal
- **Trade partners:** Canada, USA, Philippines

Key Weights

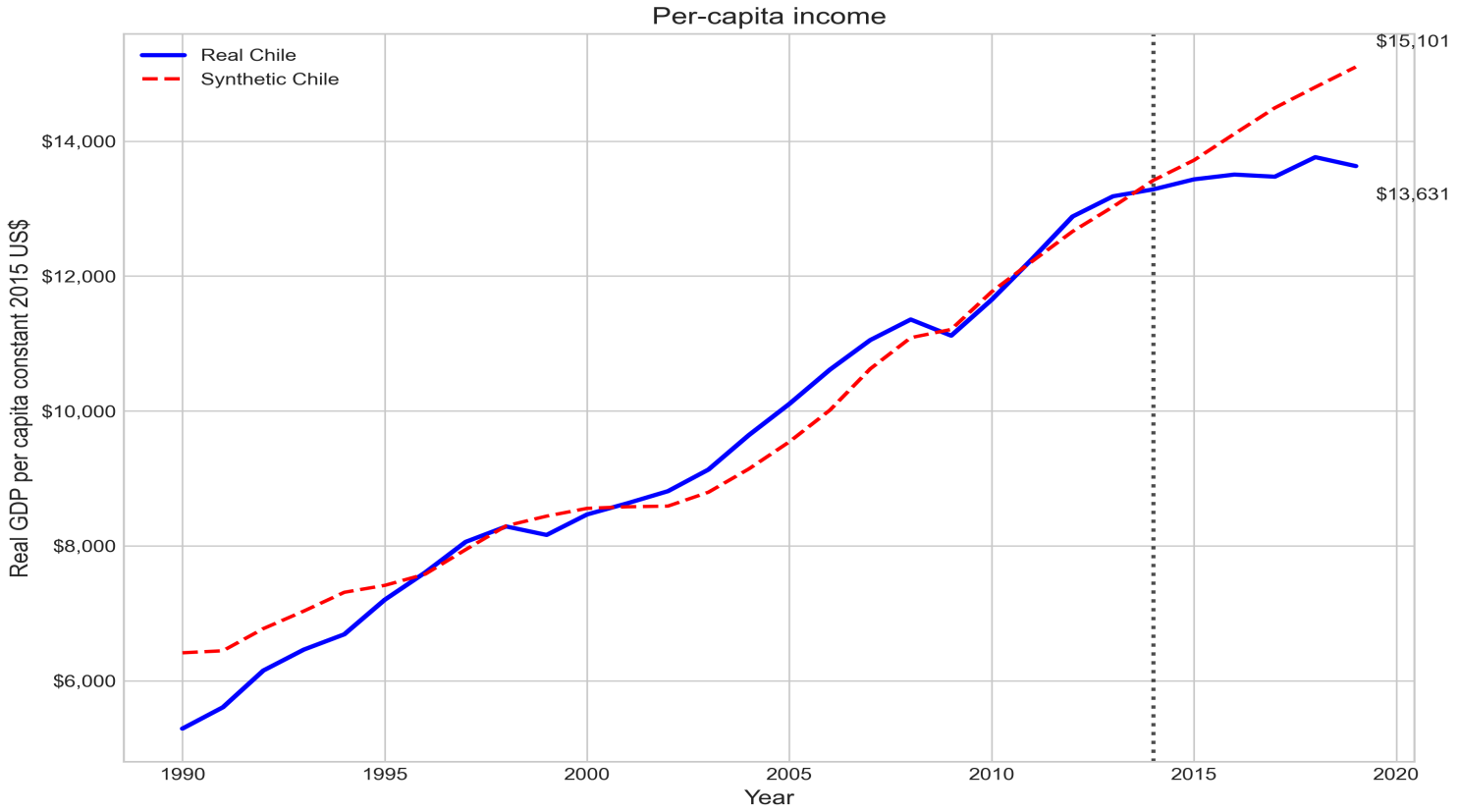
Country	Weight
Costa Rica	0.514
China	0.260
Uruguay	0.170
Australia	0.048

Predictor Variables

Variable	Actual Chile	Synthetic Chile	Source
GDP per capita	9,200	9,245	World Bank
Population Growth	1.20	1.30	World Bank
Life Expectancy	76.64	76.04	World Bank
Gross Capital Formation	25.46	25.30	Penn World Table
Trade Openness	62.59	63.42	Our World in Data
Mean Years Schooling	9.30	7.34	UNDP HDI

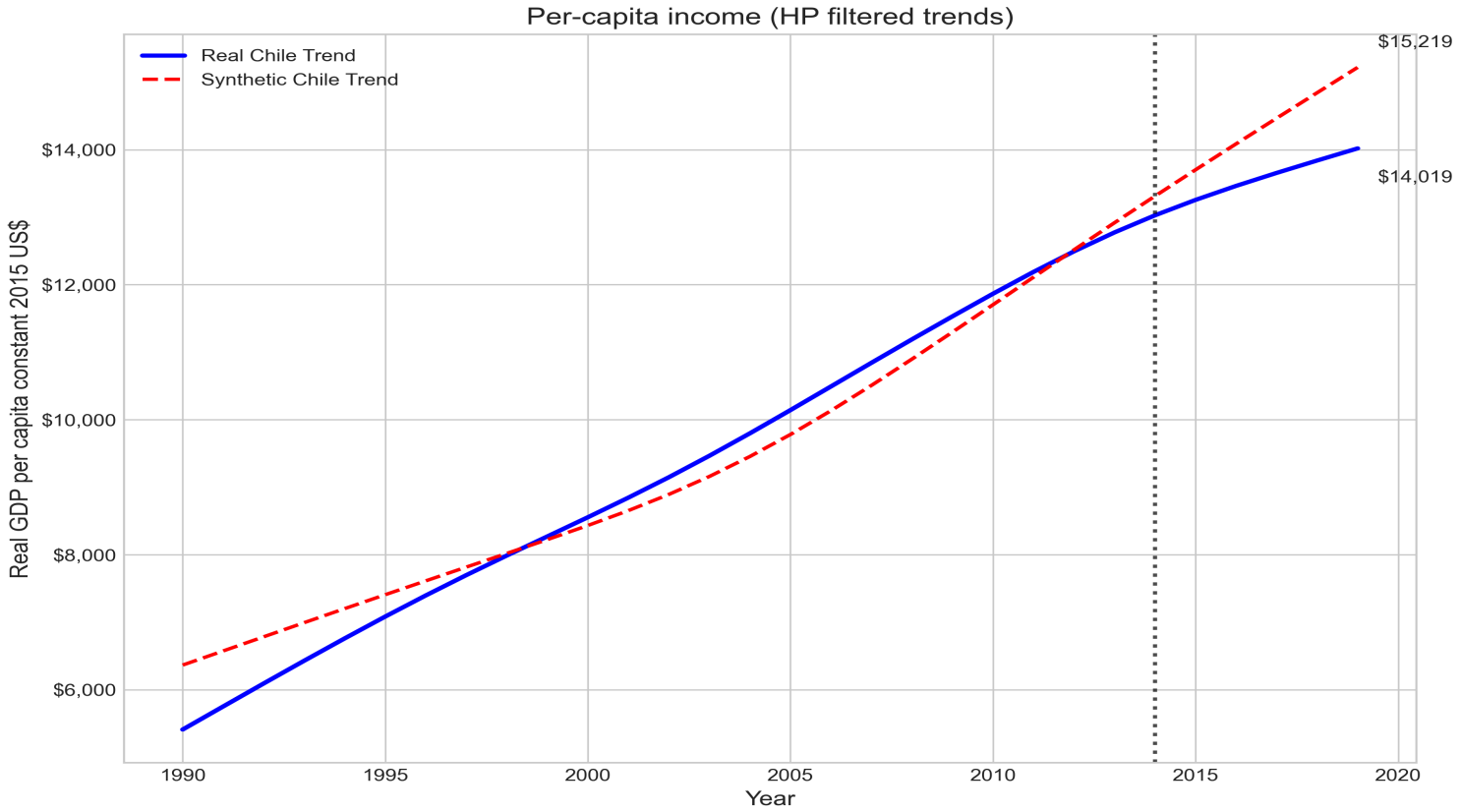
GDP lags included: 1990, 1995, 2000, 2005, 2010, 2013

SCM Results: Main Finding



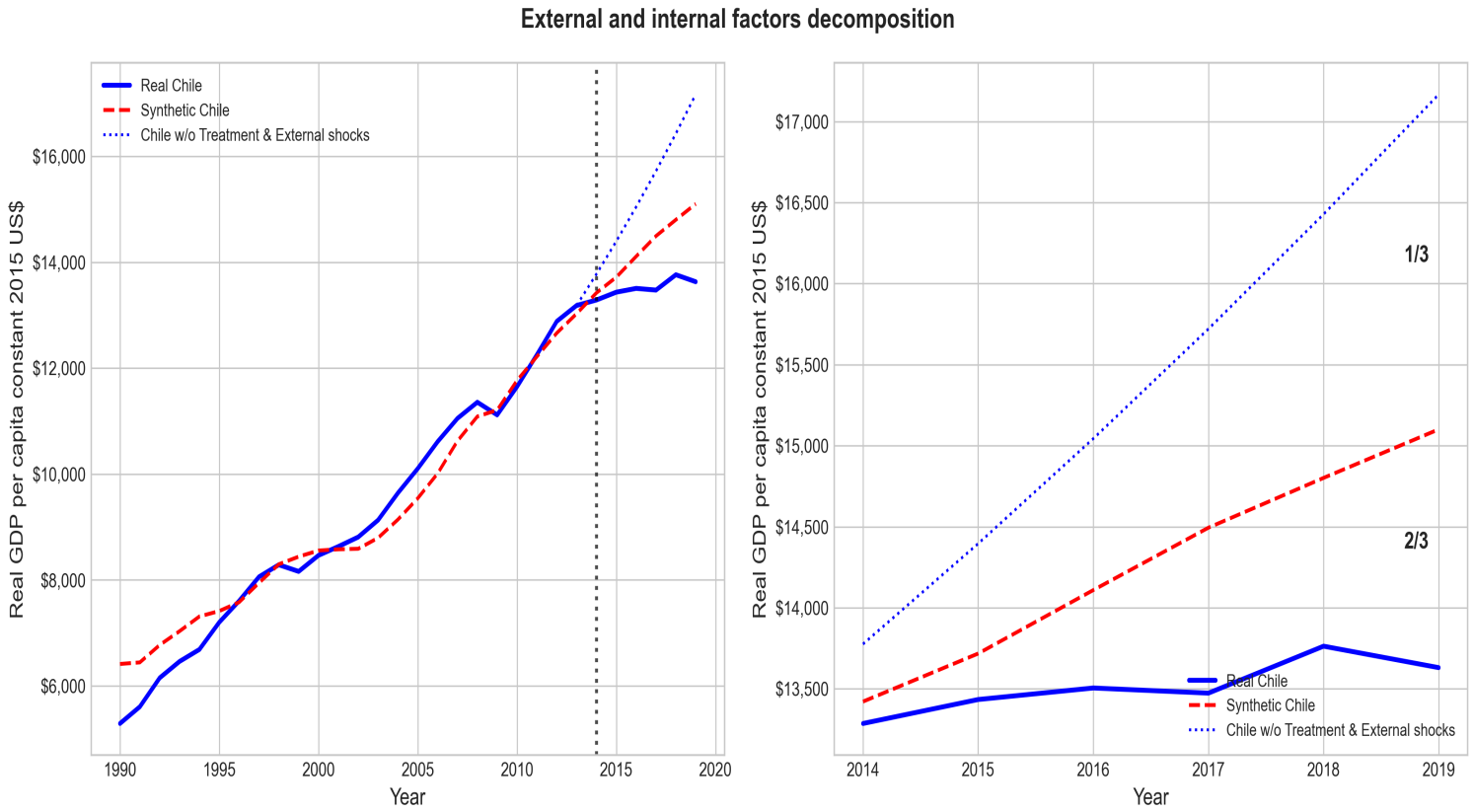
By 2019: Actual Chile $13,761 vs Synthetic Chile $15,106 = **$1,345 gap (~10%)**

Long-Run Trend Analysis (HP Filter)



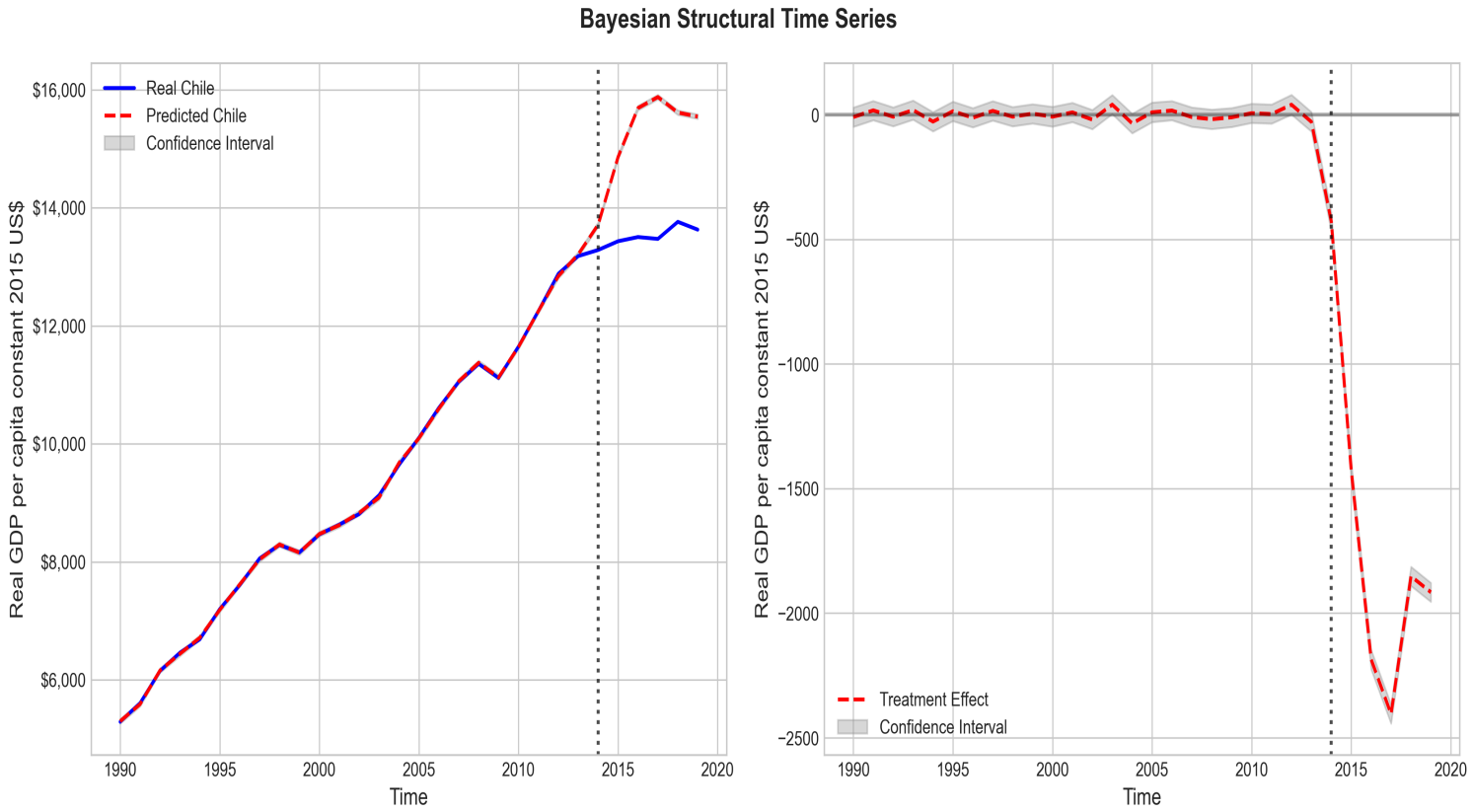
Sharp divergence in long-run growth trend after 2014 treatment

Decomposition: Internal vs External Factors



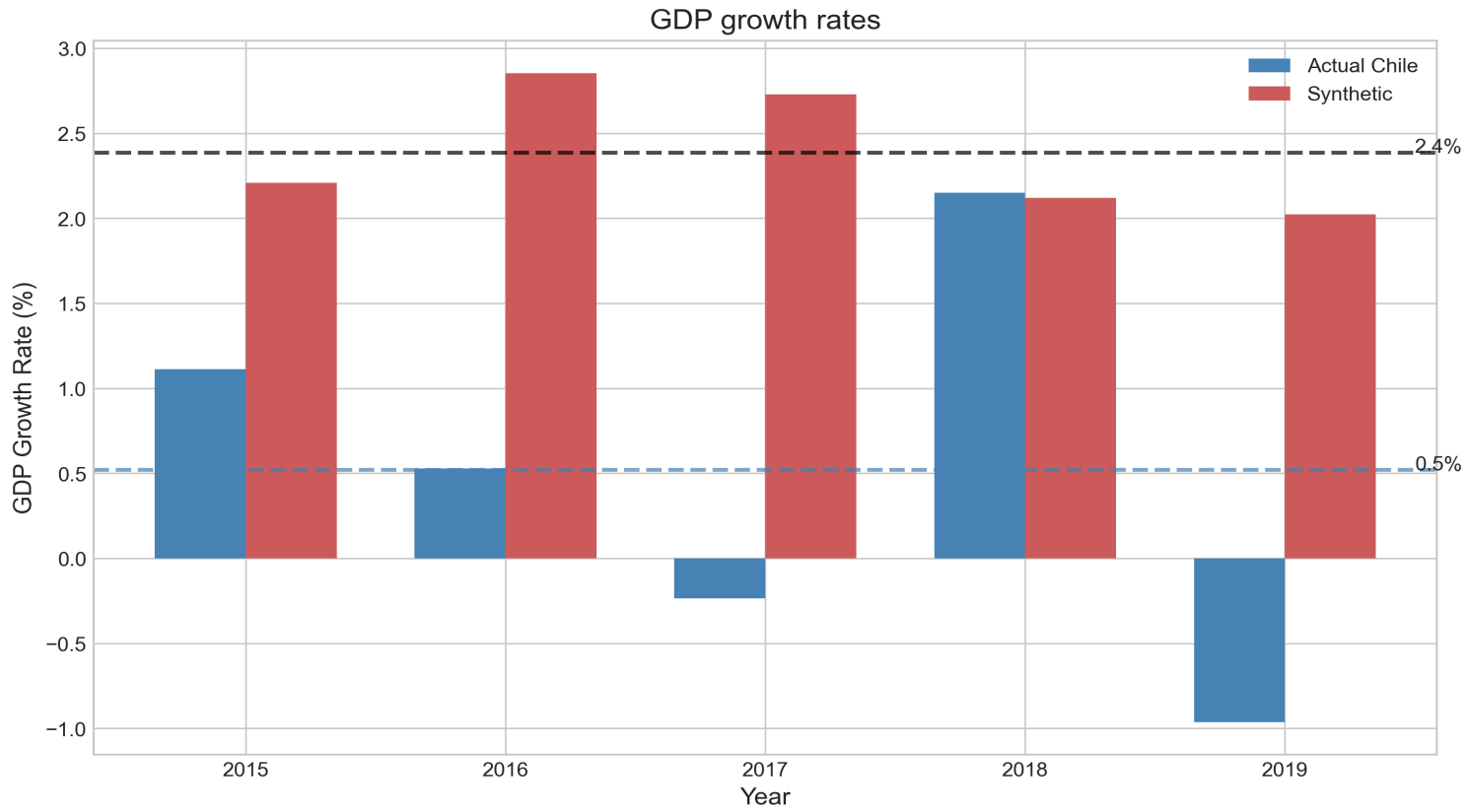
Result: ~2/3 internal factors, ~1/3 external factors

Bayesian Structural Time Series (BSTS)



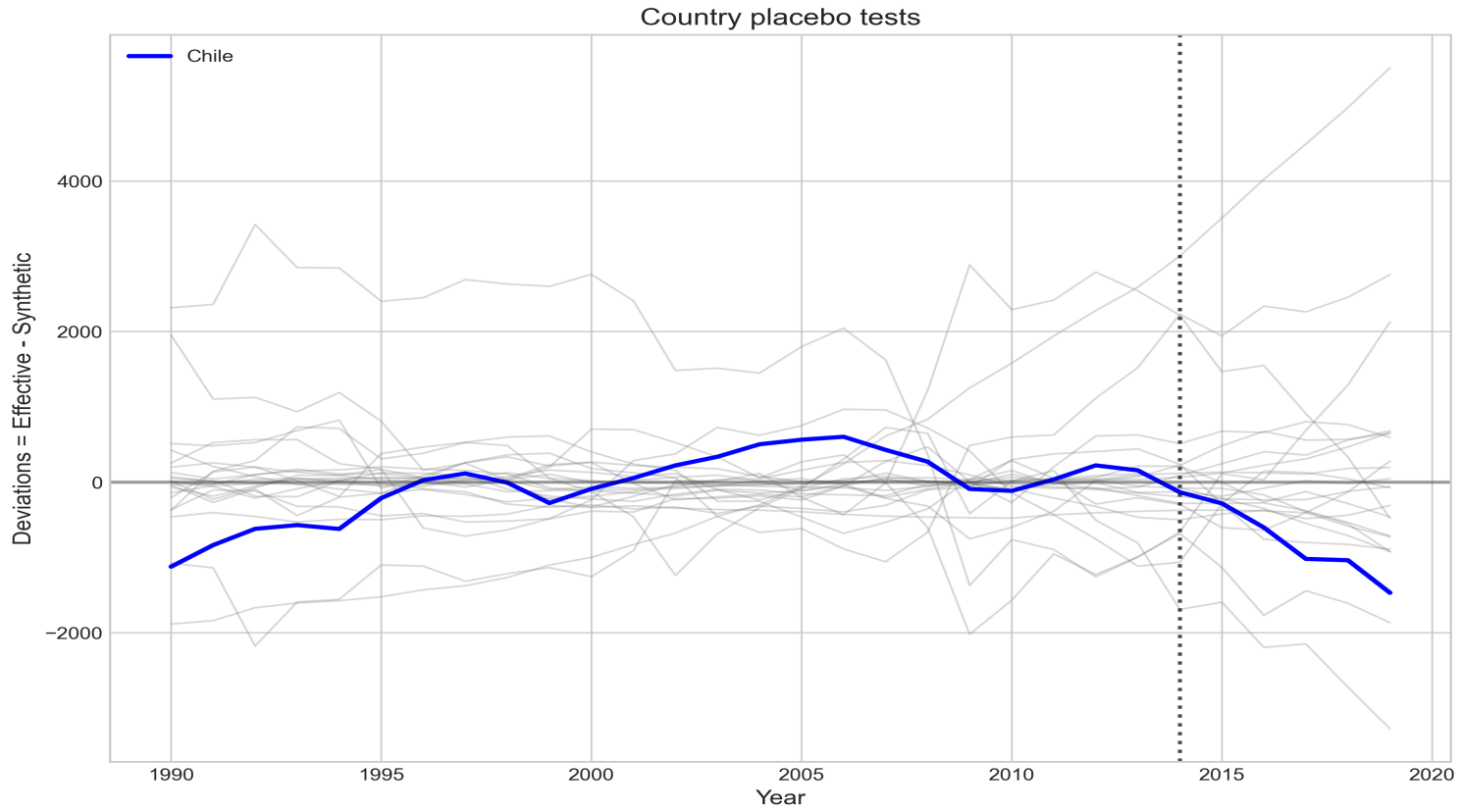
95% confidence intervals from 10,000 MCMC simulations confirm SCM results

Growth Rate Impact



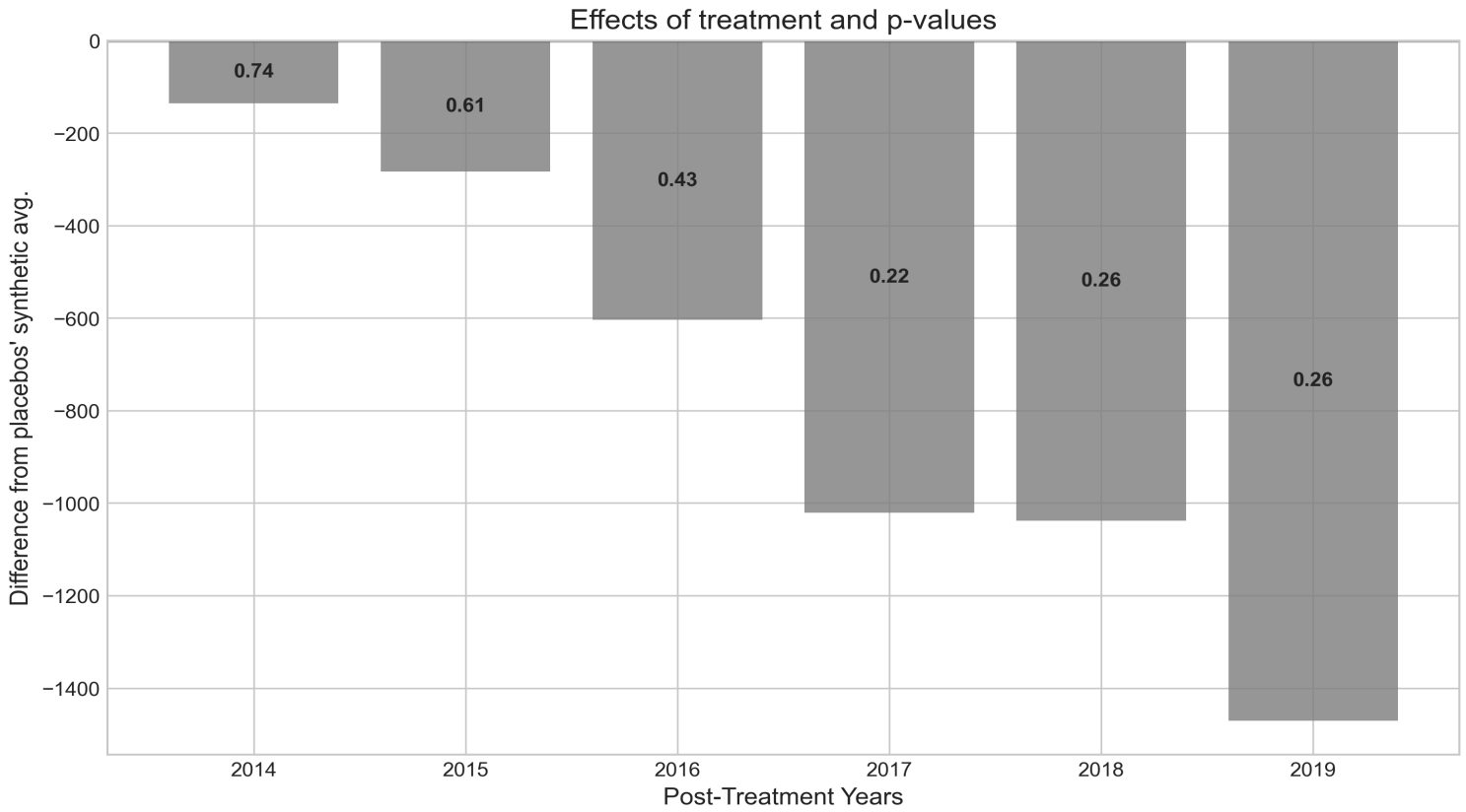
Average Growth 2015-2019: Actual 2.0% vs Synthetic 3.8% = **1.8% gap**

Robustness: Country Placebo Tests



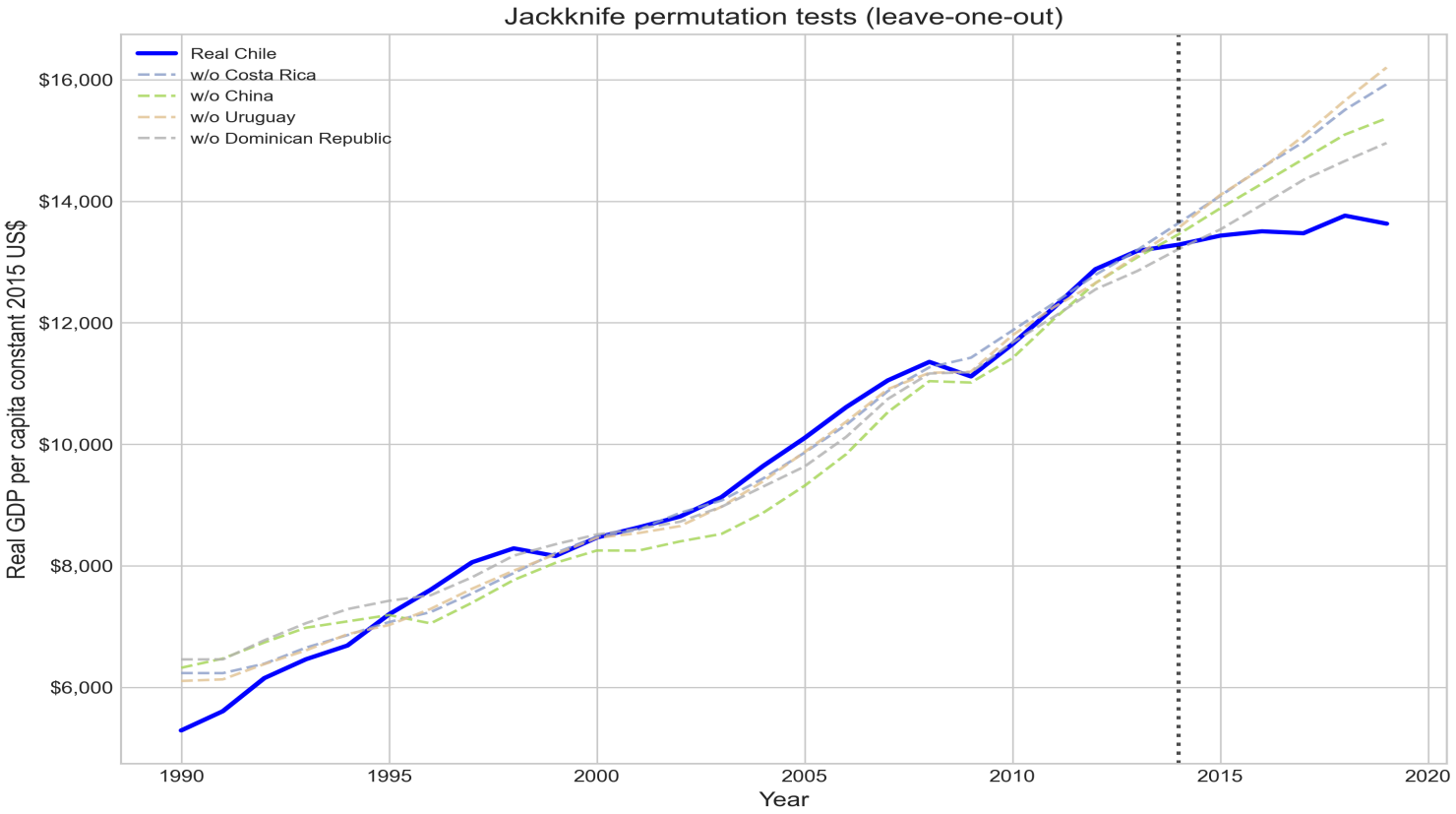
Chile shows largest divergence among all donor countries post-2014

Statistical Significance



Results significant at 90% confidence interval for final post-treatment years

Robustness: Jackknife Tests



Results robust to leave-one-out permutation tests

Code Implementation

```
# Run complete analysis
uv run replicate.py

# Key modules
src/
    synthetic_control.py  # SCM with nested optimization
    causal_impact.py      # BSTS implementation
    visualization.py      # Figure generation
```

Dependencies: cvxpy, statsmodels, scipy, pandas, matplotlib, wbgapi

Key Contributions

1. **Quantitative evidence** for internal vs external decomposition
2. **Methodological rigor** - SCM + BSTS with comprehensive robustness tests
3. **Policy implications** for developing economies

Channels of Impact

- Corporate tax increase hindered capital accumulation
- Political rhetoric generated uncertainty
- Electoral/constitutional changes signaled instability

Conclusions

- Chile's "lost decade" was **primarily self-inflicted**
- Policy regime changes in 2014 cost Chile **~10% of GDP per capita**
- External shocks (commodity prices) explain **only ~1/3** of slowdown
- Results consistent with literature on tax shocks and political instability

> "Economic success is never a given... cases such as Chile highlight how rhetoric and policy shifts could affect the long-run trend in economic growth"

References

- Abadie, A. (2021). Using synthetic controls. *Journal of Economic Literature*
- Brodersen, K. et al. (2015). Inferring causal impact using BSTS. *Annals of Applied Statistics*
- Toni, E., Paniagua, P., & Ordenes, P. (2023). Policy Changes and Growth Slowdown. *SSRN*
- Edwards, S. (2023). *The Chile Project*. Princeton University Press

Data Sources: World Bank WDI, Penn World Table, UNDP HDI, Our World in Data

Code: Python 3.12+ with uv package management

Thank You

Replication Code Available

```
uv run replicate.py
```

Paper: Toni, Paniagua & Ordenes (2023)

DOI: 10.2139/ssrn.4640416