

**DID PUBLIC
INVESTMENT
“CROWD OUT”
PRIVATE
INVESTMENT?**

**EVIDENCE
FROM INDIAN
STATES**

SHRADDHA ANAND

INTRODUCTION

- Increased public spending → increase or decrease private spending.
 - Ricardo: increased taxes → decreased disposable incomes
 - Keynes: increased government borrowing → decreased loanable funds for private investors
- Affects macroeconomic policies & long-term economic growth
- Past: mixed results using national panel data
- This paper: Crowding in in rich (GDP and GDP per capita) and very poor (GDP) states using project level state data to study effects in each state

DATA

- Dataset:
 - project level investment data for Indian states
 - 1996 Q1 to 2019 Q4
- Three variables:
 - I. Indian State Domestic Product

DATA

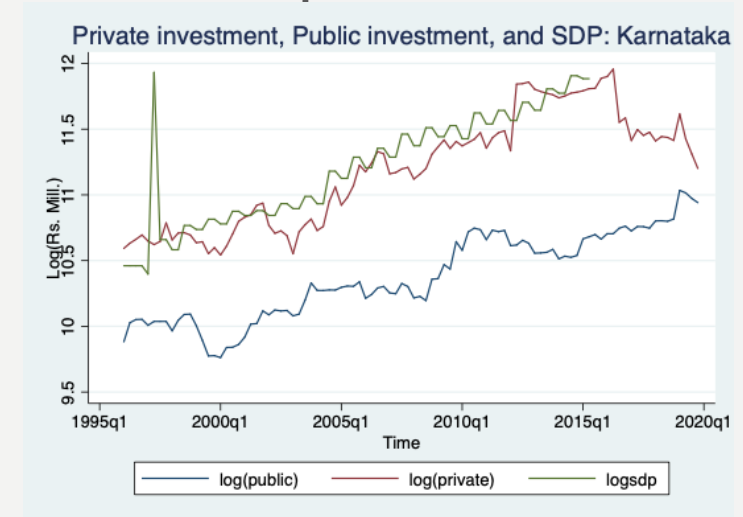
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- Three variables:
 1. Indian State Domestic Product
 2. Public Investments
 3. Private Investments

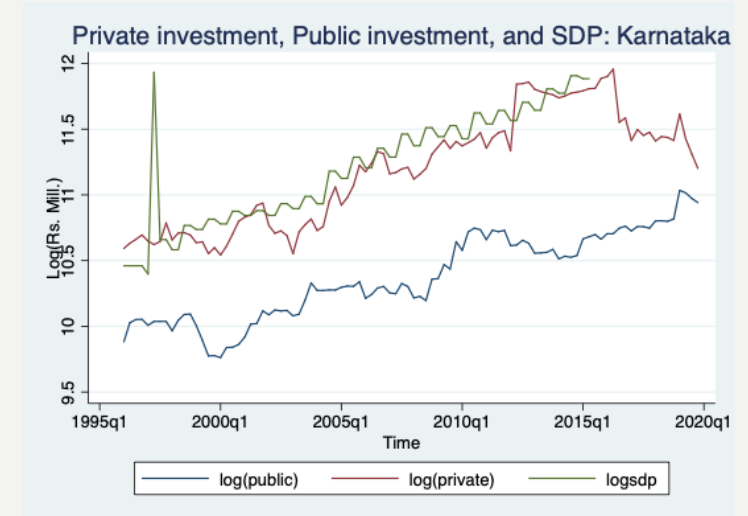
ECONOMETRIC TECHNIQUE I

- Vector Error Correction Model (VECM)
 - Non-stationary : Mean and variance vary over time
 - Cointegrated: long-run relationship



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- 25 VECMs

$$\Delta \text{Public}_t = \delta + \sum_{i=1}^p \beta_i \Delta \text{SDP}_{t-i} + \sum_{j=1}^p \gamma_j \Delta \text{Public}_{t-j} + \sum_{k=1}^p \phi_k \Delta \text{Private}_{t-k} + \lambda \text{ECT}_{t-1} + \varepsilon_{2t}$$

- Error correct term (ECT) speed of convergence of LHS variable back to equilibrium after shock
- Use MLE to estimate coefficients

ECONOMETRIC TECHNIQUE II

Assumptions:

- I. $E(\varepsilon_{it} | \text{SDP}_{t-1}, \dots, \text{SDP}_{t-p}, \text{Private}_{t-1}, \dots, \text{Private}_{t-p}, \text{Public}_{t-1}, \dots, \text{Public}_{t-p}) = 0$

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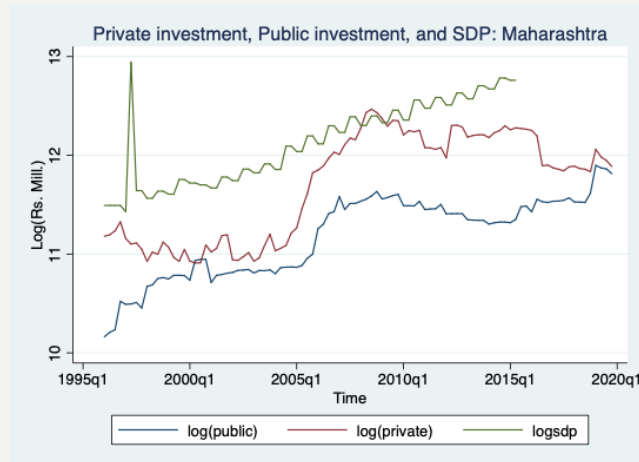
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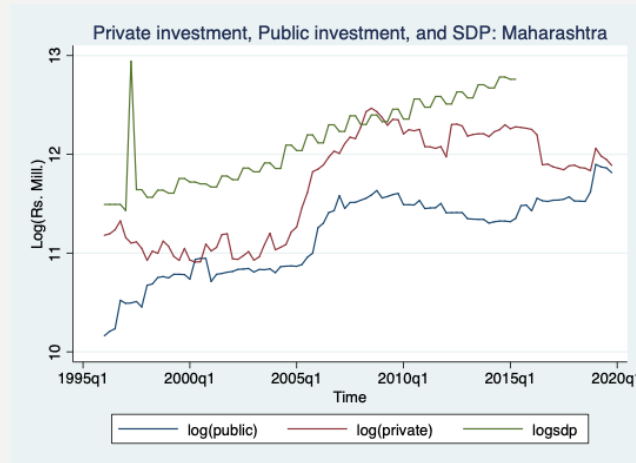
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4. No large outliers
5. No perfect multicollinearity

ECONOMETRIC TECHNIQUE III



Plot Series

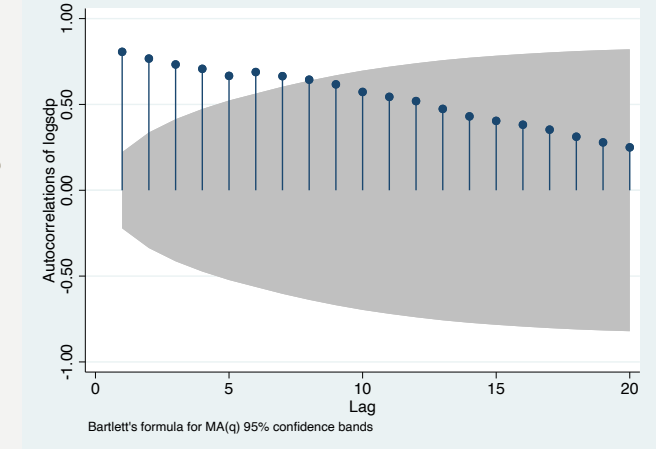
ECONOMETRIC TECHNIQUE III



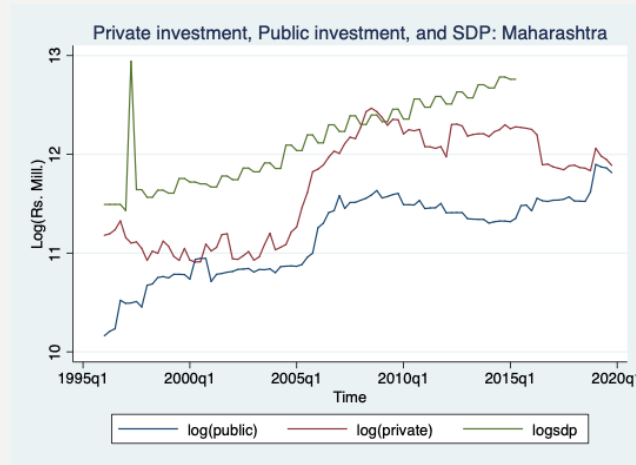
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Stationarity

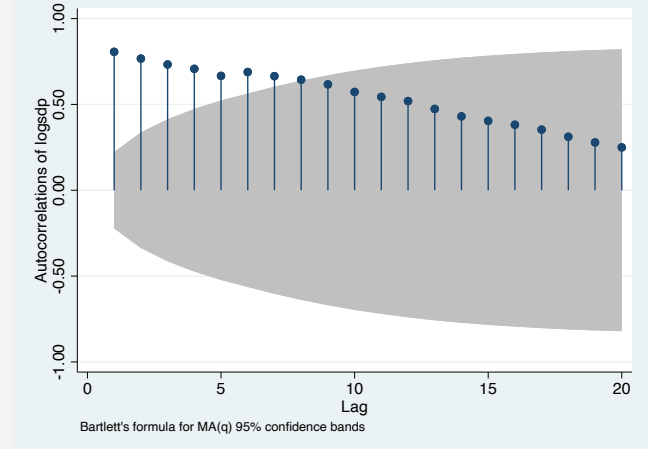


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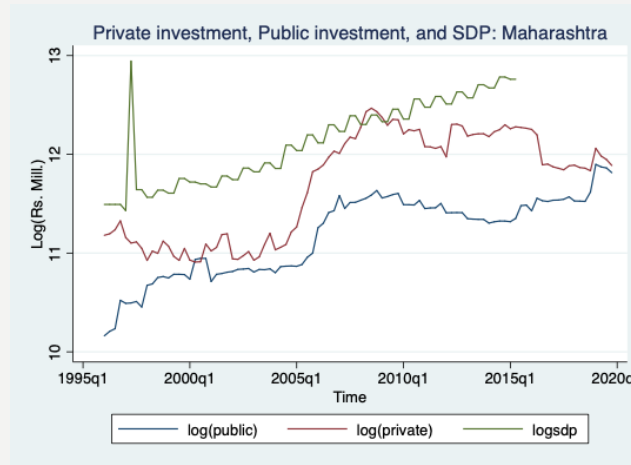
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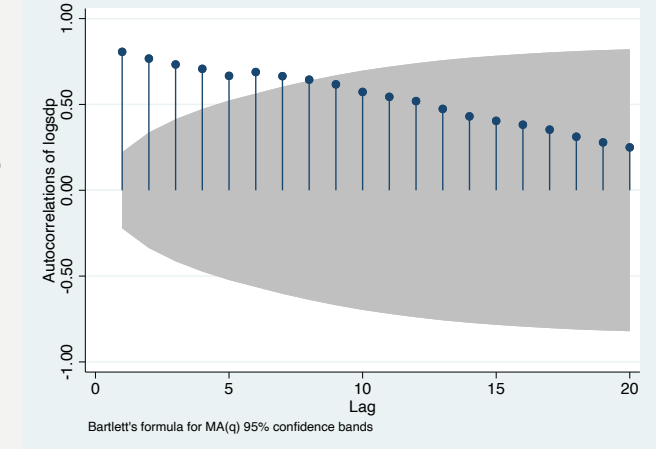
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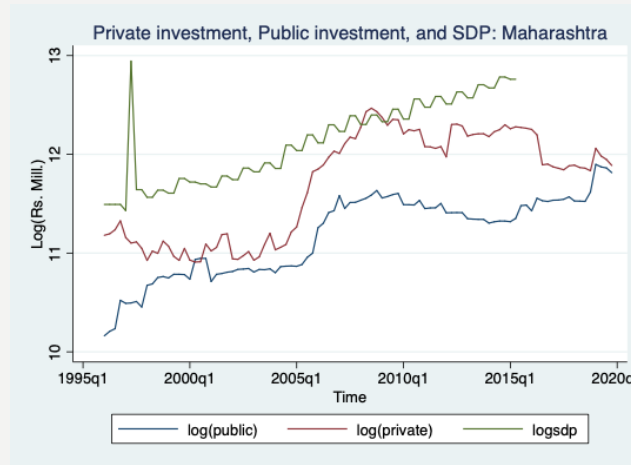
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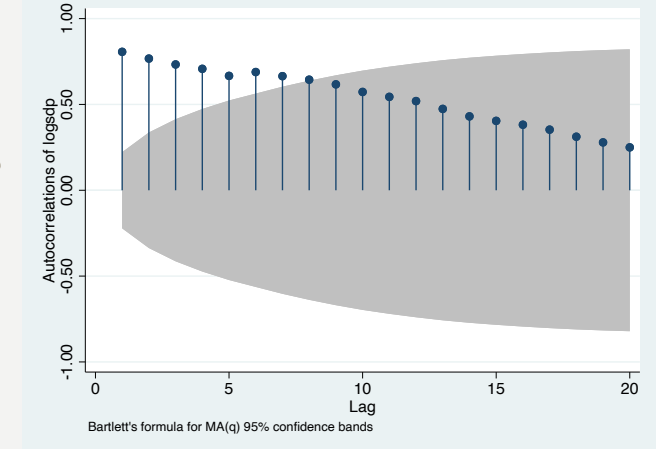
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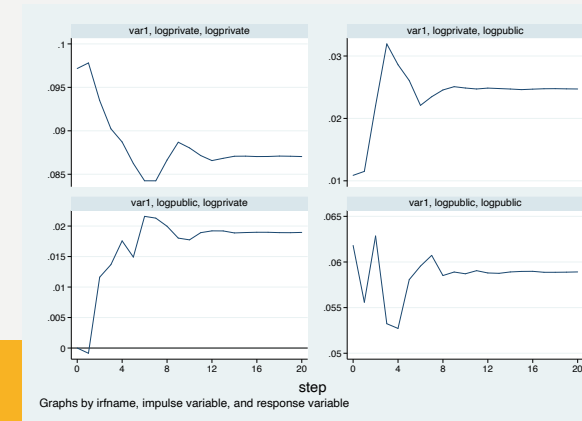
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Plot Impulse
Responses

RESULTS

- Individual states

VECM Result for Maharashtra

Beta	Coef.	Std. Err.	z	P > z	95% Conf. Int.
_cel					
logprivate	1				
logpublic	-.959	.136	-7.03	0.000	[-1.226, -.691]
D.Logprivate					
_cel	-.181	.068	-2.65	0.008	[-.315, -.047]
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- “Crowding in”
- Adjustment term (private) : 18.1%
 - disequilibrium is halved in about 3.5 years
- Adjustment term (public): 5.3%
 - disequilibrium will be halved in about 12.8 years

RESULTS

- Rich vs. Poor States (GDP):

- Rich:

- Maharashtra

- Tamil Nadu

- Gujarat

- Uttar Pradesh

- Poor:

- Meghalaya

- Chandigarh

- Puducherry

- Goa

RESULTS

- Rich vs. Poor States (GDP per capita):
 - Rich:
 - Delhi
 - Goa
 - Chandigarh
 - Haryana
 - Poor:
 - Bihar
 - Uttar Pradesh
 - Assam
 - Jharkhand

CONCLUSION

- Rich, and very poor states: Crowding In
- Medium GDP states: Crowding Out
- Limitations:
 - Data not originally quarterly
 - Using national deflator for series, not state deflators

THANK YOU!