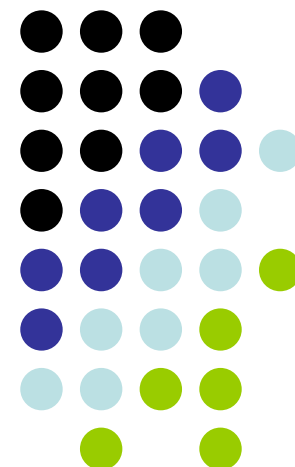


Rebalancing China's Economy: What Does Growth Theory Tell Us?

Jahangir Aziz
International Monetary Fund
ICRIER, December 7, 2007

The views expressed here are those of the author and should not be attributed to the IMF, its Executive Board, or its management.



How permanent is China's rapid growth?

- Recent growth driven by high savings, high investment, and high exports (e.g. Eswar Prasad's paper in this conference).
- Thus, a need to “rebalance” the economy towards consumption (Premier Wen Jiabao in 2007 NPC).
- Many factors for the high savings and high investment and many ways to rebalance growth have been put forward. (references in paper)
- However, we know little in terms of the quantitative importance of these factors and thus it is difficult to prioritize.

Focus of this paper: role of financial frictions

Methodology

- **Benchmark**: the standard one-sector Solow growth model.
- **Comparator**: the benchmark+frictions
- **Why the Solow growth model?**
 - It is general equilibrium
 - Implications of policies and reforms well researched and understood.

The Model

- A representative household chooses consumption and investment to maximize lifetime utility under certainty.

$$\sum_{t=0}^{\infty} \beta^t N_t \log(c_t)$$

- The household owns capital and rents it out to firms, and owns these firms.

$$\sum_{t=0}^{\infty} \lambda_t \left(A_t K_t^{\alpha} L_t^{1-\alpha} - w_t L_t - r K_t \right)$$

- As working hour data is unavailable for China there is no labor choice. (Typically important for developed economies.)

The Equilibrium

$$M R S_{t+1,t} = M P K_{t+1}$$

$$C + I + G + X - M = Y$$

Calibration

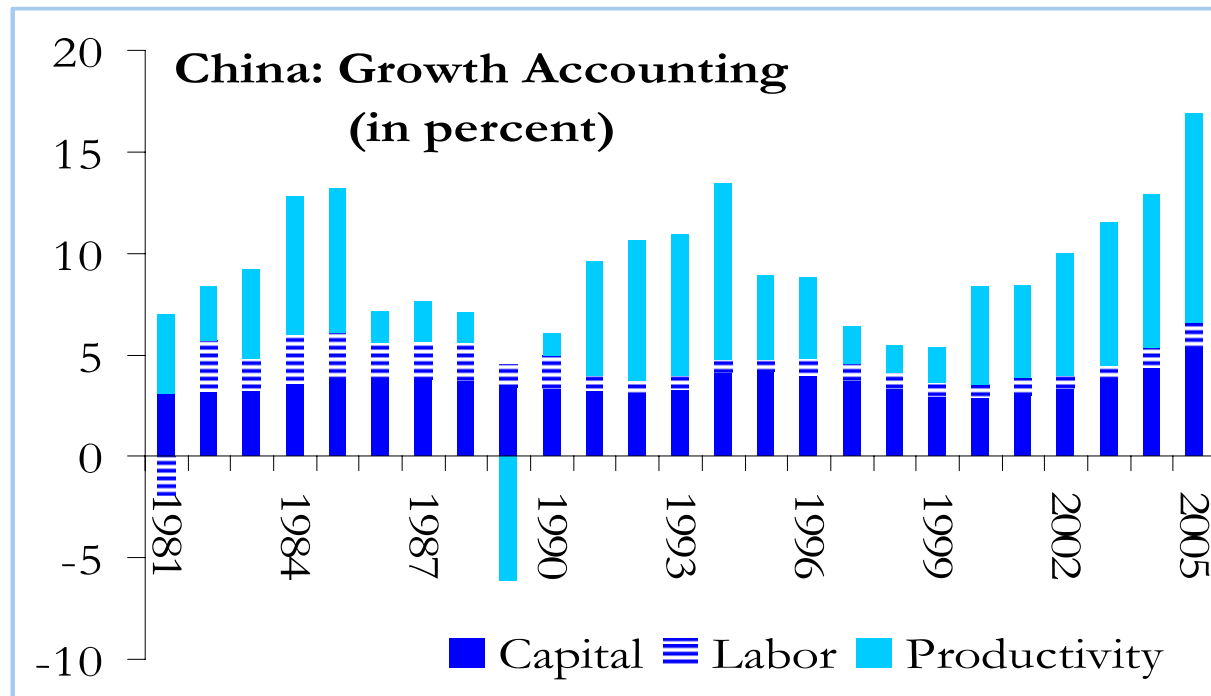
Links with national income:

- **$Y = \text{GNP}$**
- **$C = \text{pvt. Consumption}$**
- **$I = \text{pvt. and public gross investment} + \text{current account}$**
- **$G = \text{govt. consumption.}$**

Calibration

- **Differences in economic performance among countries are due to differences in history, efficiency, market imperfections, and policies.**
- **Alpha=0.35**
- **Capital stock constructed using perpetual inventory**
- **Other data issues discussed in the paper**

Growth Accounting

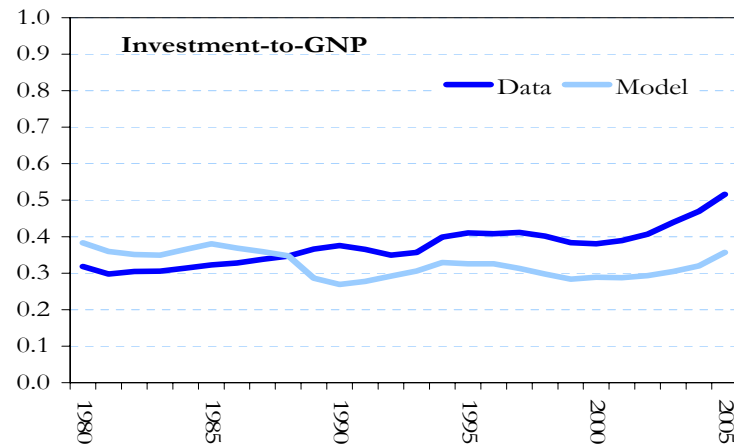
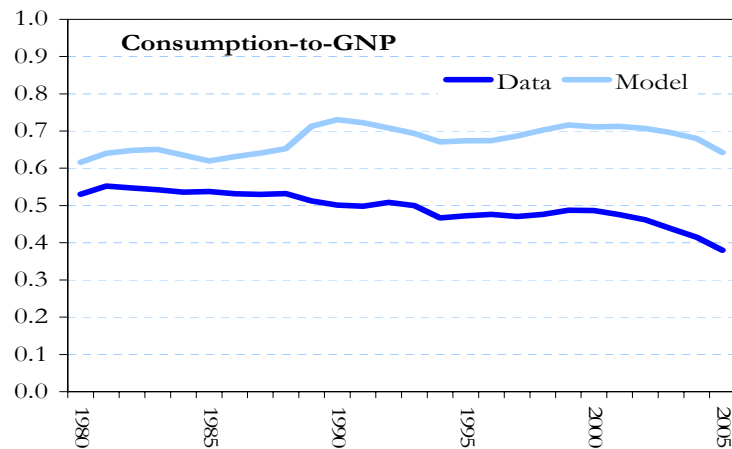
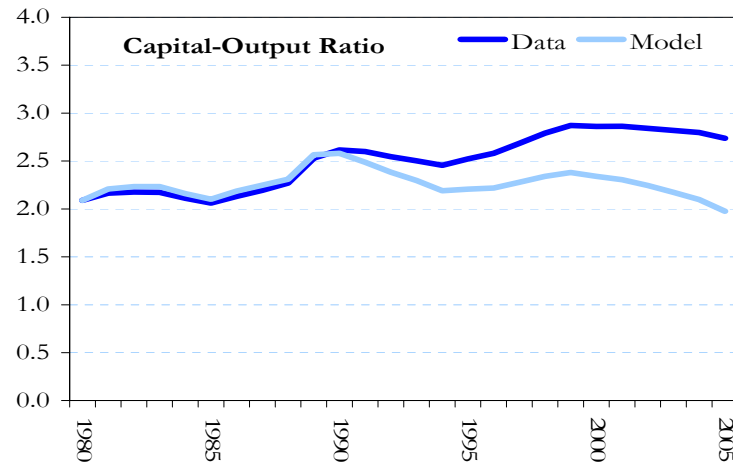
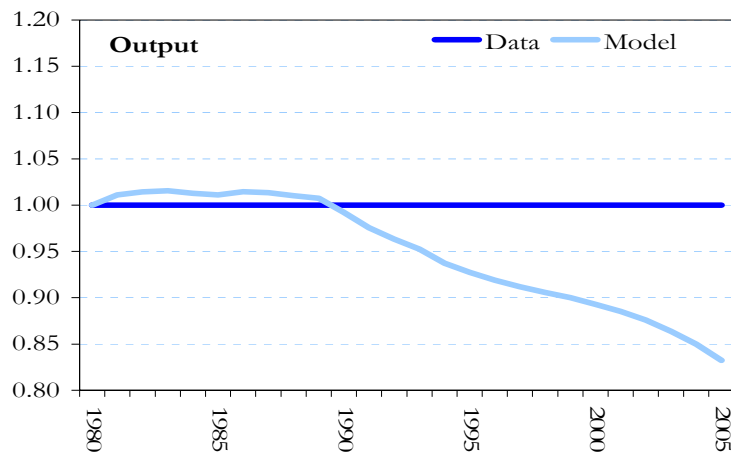


Some Caution

- **The measured TFP is not technological progress, rather just the Solow residual.**
- **The residual could reflect mismeasurement of inputs, prices, and reforms and policies that are not captured by aggregate production functions.**
- **Others have deconstructed the residual to uncover the “true” TFP.**

The standard Solow model does pretty badly in China!

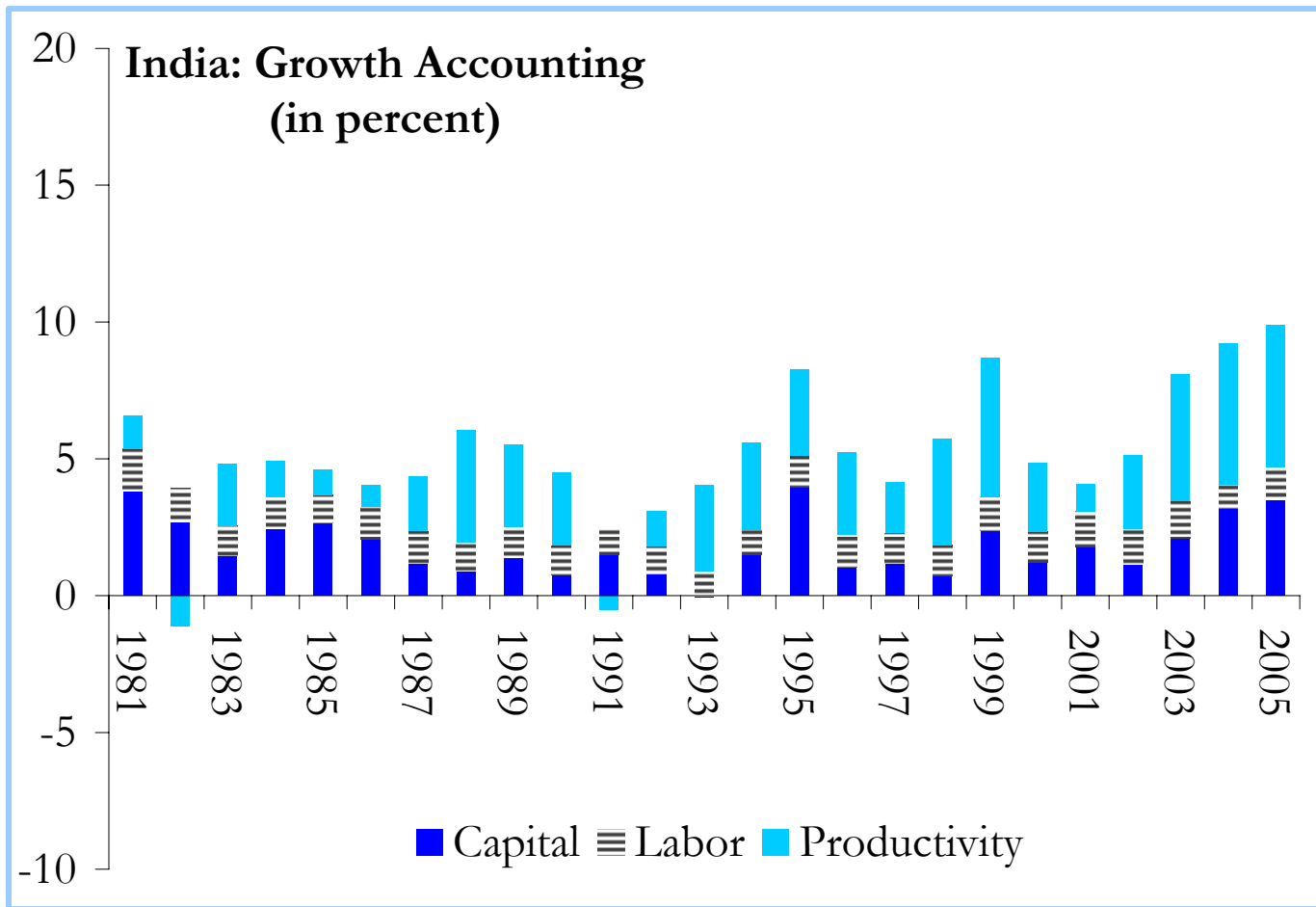
Figure 1. China: Simulation with Efficiency Wedge



In comparison, how does India fare?

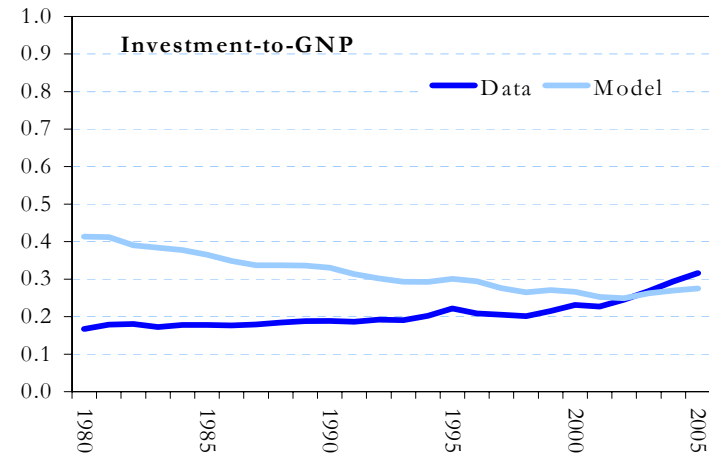
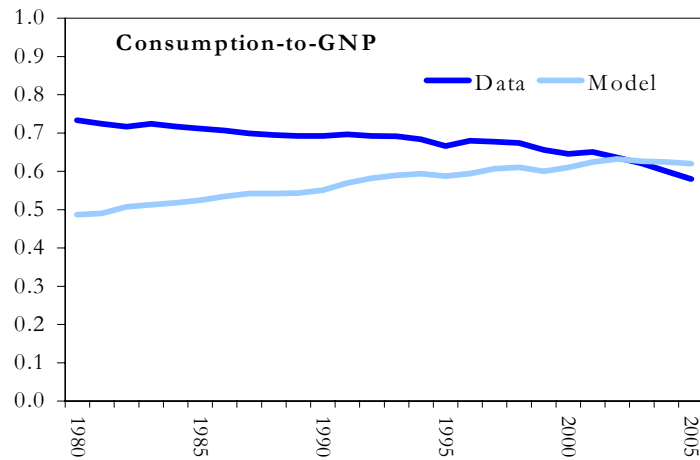
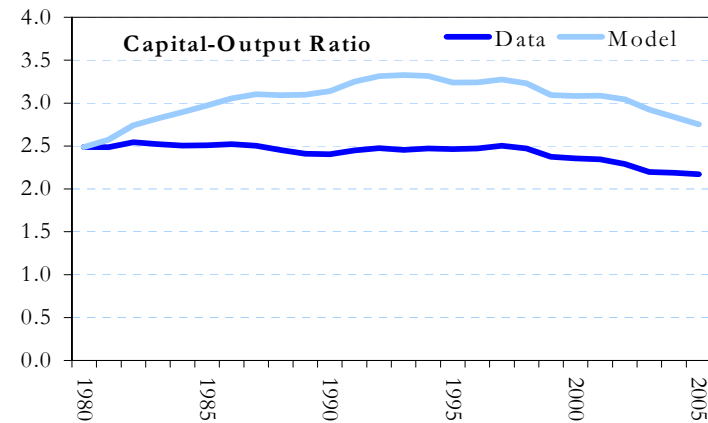
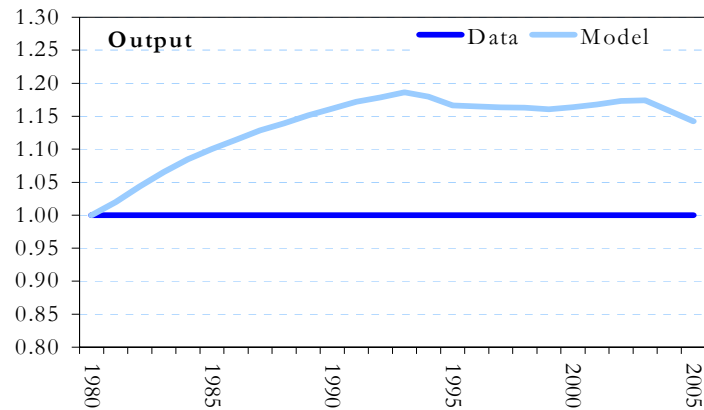
- **Same growth accounting and simulation methodology**
- **Capital stock and depreciation rate taken from official estimates.**

Growth Accounting



... And also badly in India!

Figure 1. India: Simulation with Efficiency Wedges



Introducing Investment Wedge

- **Motivation:** Saving and investment decisions may be distorted by market frictions and policies.
- Such distortions open a gap between measured marginal rate of intertemporal substitution (household's saving decision) and the marginal product of capital (firm's investment decision).

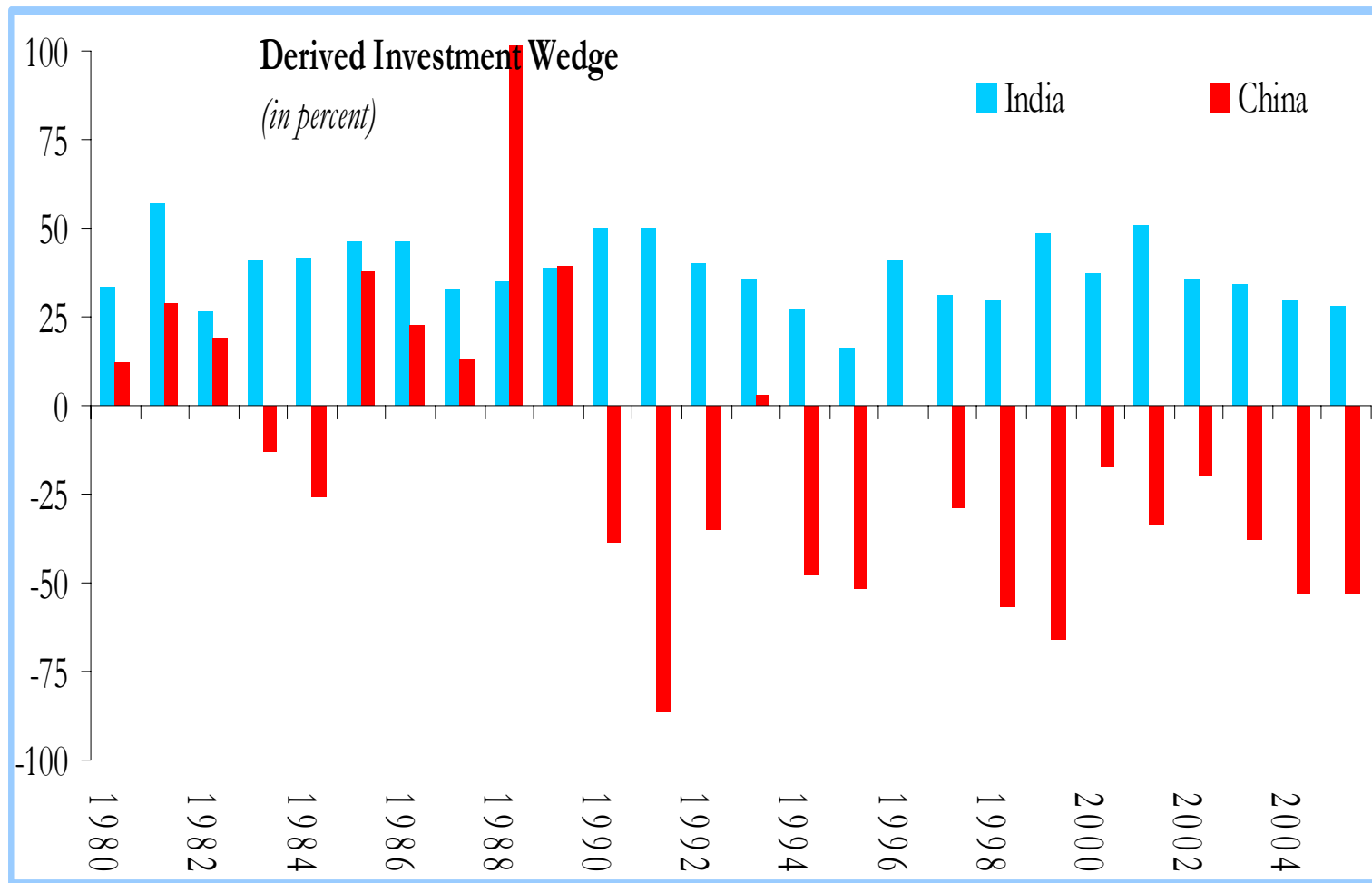
$$MRS_{t+1,t} = (1 - \tau_{t+1}) MPK_{t+1}$$

- Such gaps are equivalent to time-varying “tax” on capital income in the standard Solow model (Chari, Kehoe, & McGratten, *Econometrica*, 2007).

Methodology

- **Compute the “tax” by matching model with data.**
- **Is it quantitatively important? Does it allow other features of the data to be mimicked better?**
- **If yes, then match the “tax” with financial policies or market frictions.**

Derived Investment Wedge

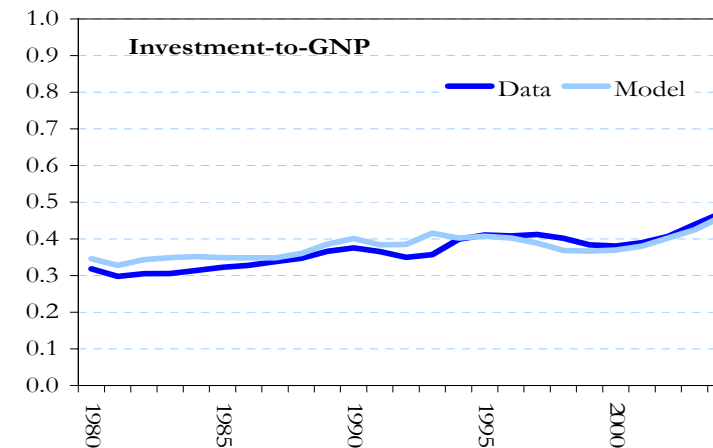
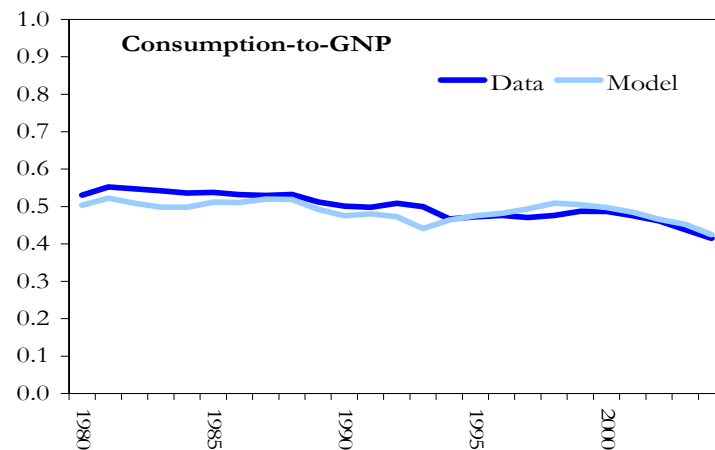
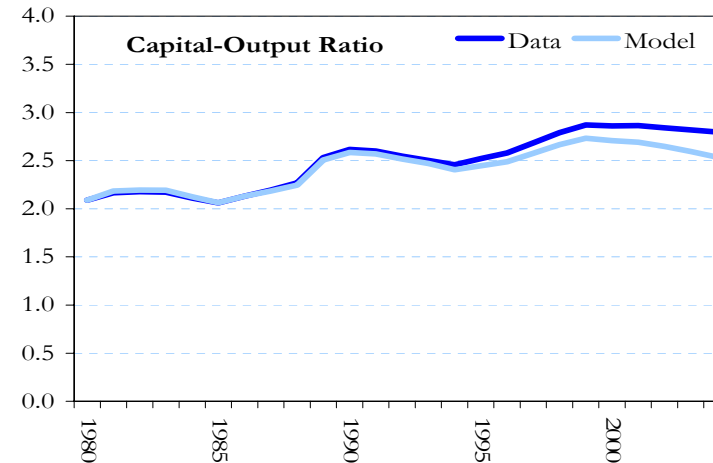
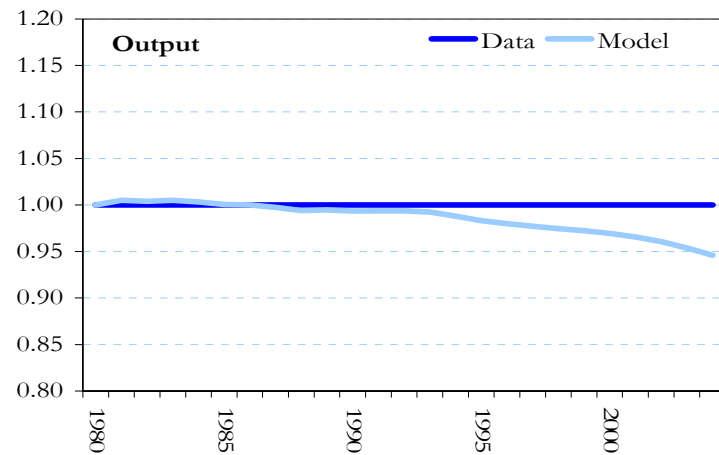


Interpretation

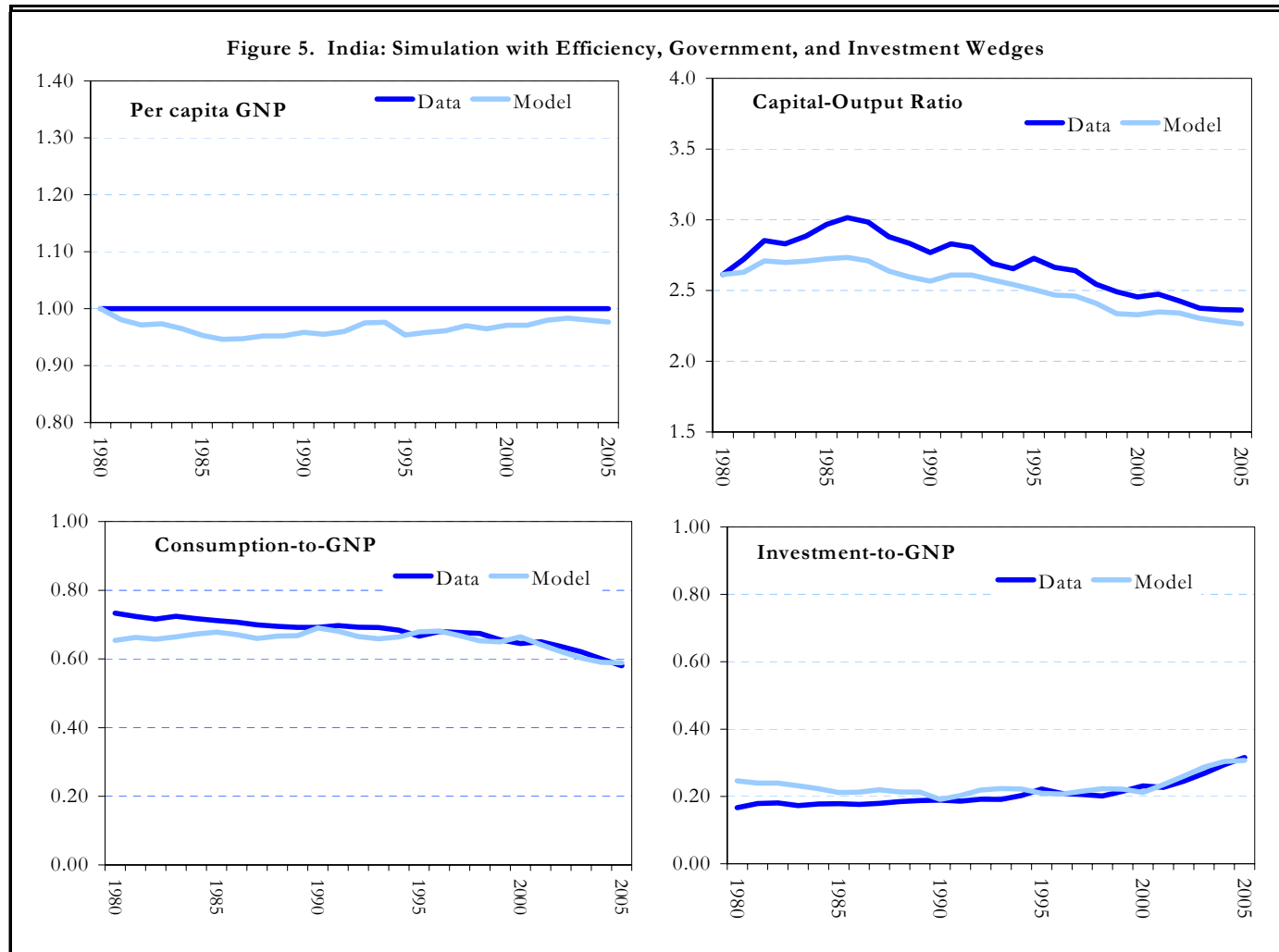
- **China:** capital cost is “low”
- **India:** capital cost is “high”

Simulation with Investment Wedge: China

Figure 2.. China: Simulation with Efficiency, Government, and Investment Wedges



Simulation with Investment wedge: India



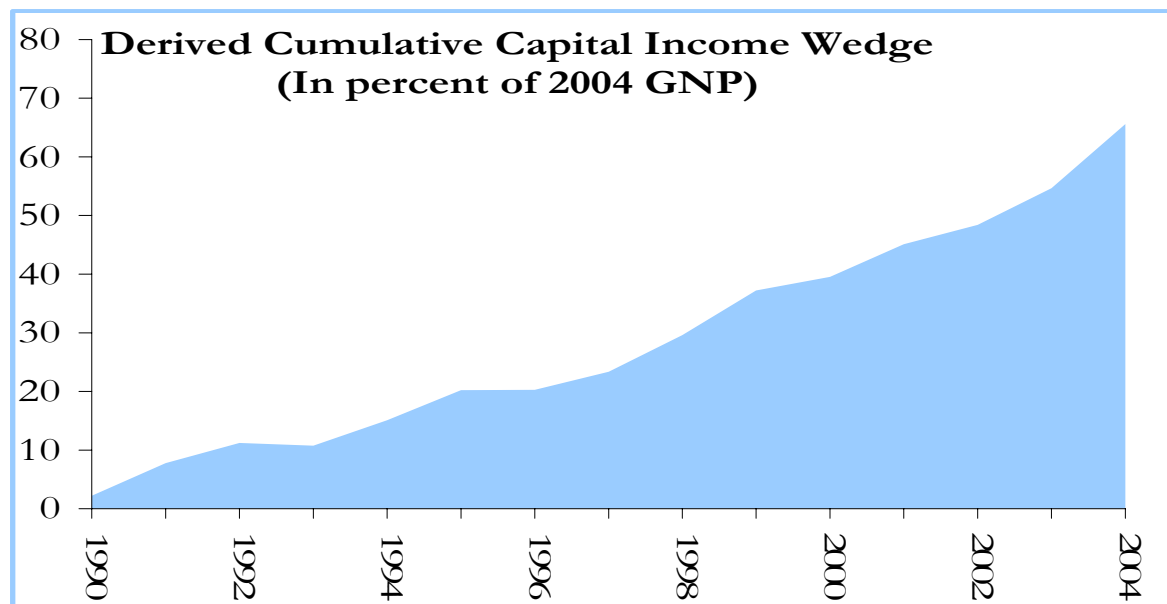
Financial Frictions as Tax

Non-performing loans in China

- **Firms do not repay a fraction of loans (NPLs).**
- **This is equivalent to a “subsidy” on capital income.**
- **Households are “taxed” an equivalent amount.**

Derived Cumulative Investment Wedge

- About 48-50 percent of 2004 GNP assuming 2-year lag between NPL creation and reporting.



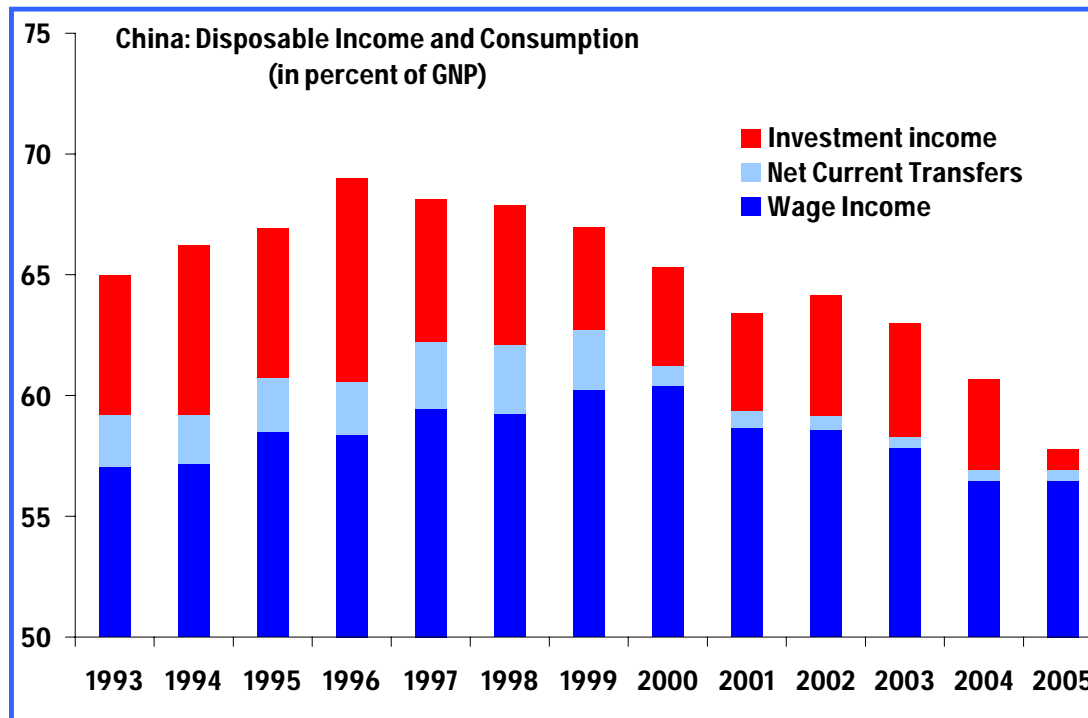
Official NPL Estimates

- **Official NPL (without Agricultural Bank) and special mention loans are 35 percent of 2004 GNP.**

China: Official Estimate of NPLs Created (end-2004)	
<i>(In billions of renminbi)</i>	
Reported NPLs on balance sheet	1575
NPLs transferred to AMCs	1770
Original transfer in 1999-2000	1420
Additional BOC and CCB transfer	350
Write-offs	324
Total	3668
<i>(In percent of 2004 GNP)</i>	25.8
Special mention loans	1140
<i>(In percent of 2004 GNP)</i>	8.0

Implicit tax on household investment income

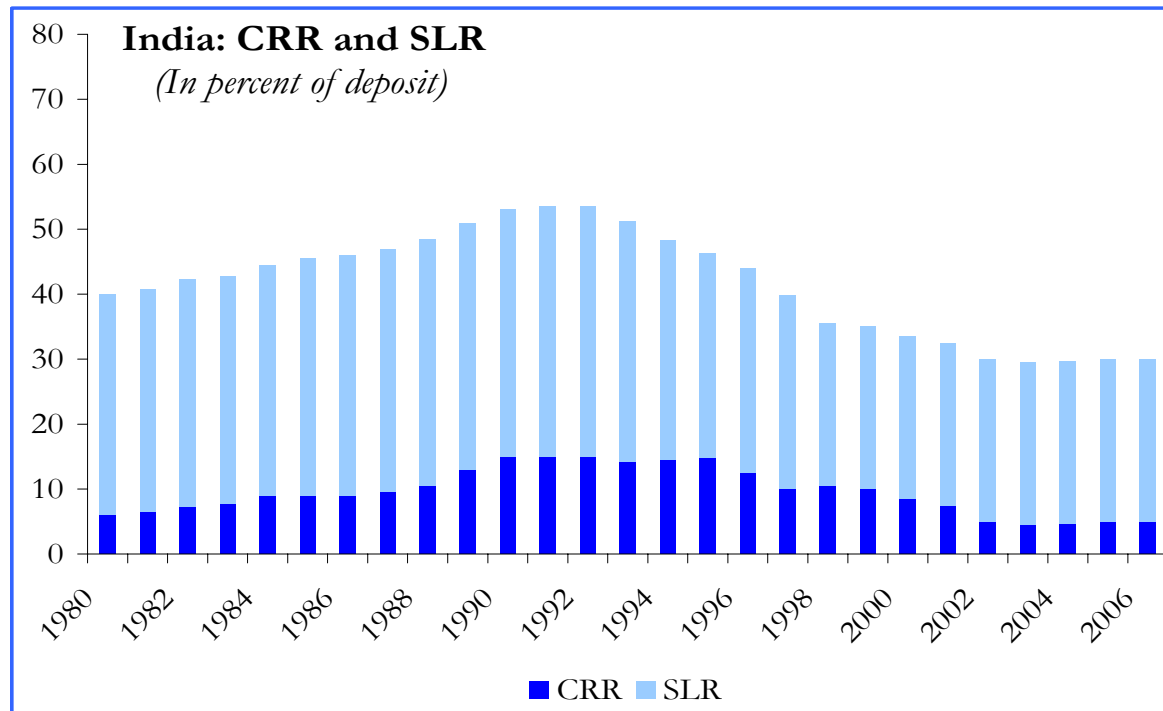
- Cumulative “tax” equivalent to 22 percent of 2004 GNP



Financial Frictions in India

- Financial frictions high
- Reforms have lowered these frictions.
- **A measurable Indicator of frictions:** bank funds preempted by government as cash reserve (CRR) and statutory holding of government bonds (SLR).

CRR and SLR in India

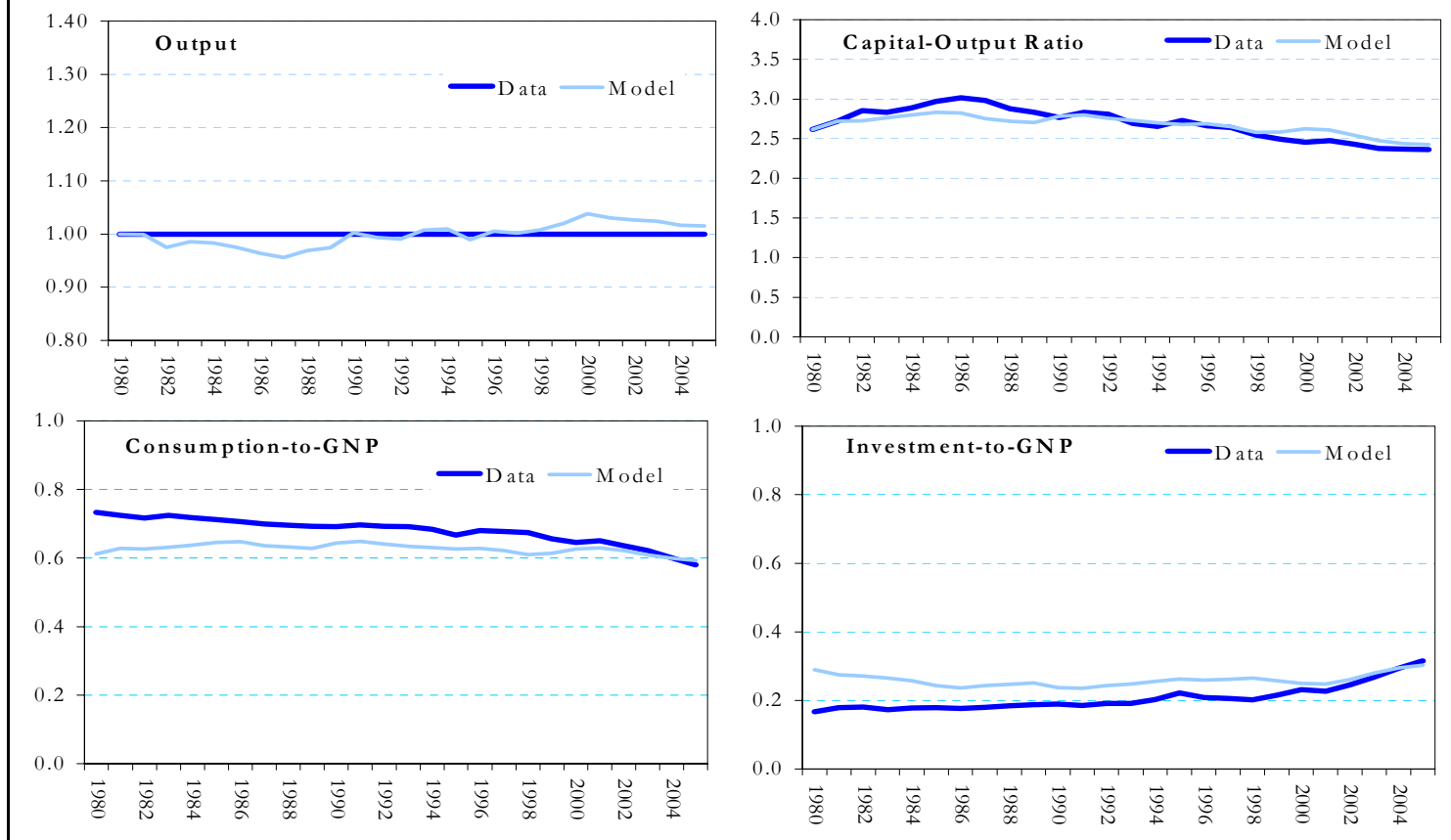


Solow Model with a Banks

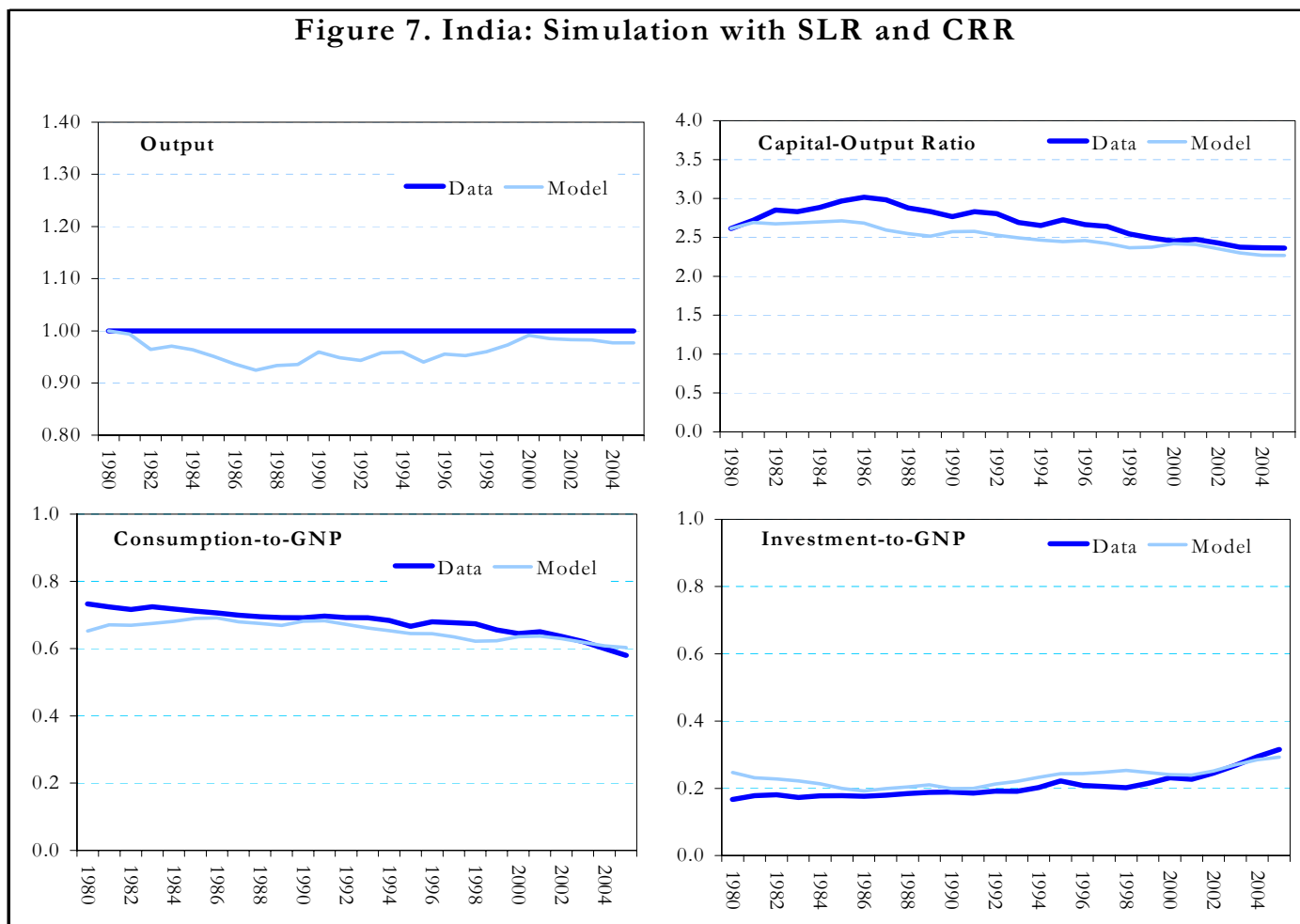
- **Household save through bank deposits only.**
- **Government appropriates a fraction from banks and transfers to households.**
- **Banks lend the remainder to firms.**
- **Firms pay lending rate and return the loans less depreciation to banks**
- **It can be shown that the preempted amount is equivalent to a tax on capital income**

Simulation with SLR: India

Figure 6. India: Simulation with SLR



Simulation with CRR and SLR: India



Conclusions

- **Financial sector frictions and thus reforms are quantitatively important to explain China's (and India's) growth.**
- **Future work:**
 - **Endogenizing external sector**
 - **Incorporating explanations of TFP growth in the model.**

Other Explanations for China

Borrowing Constraint as a Tax

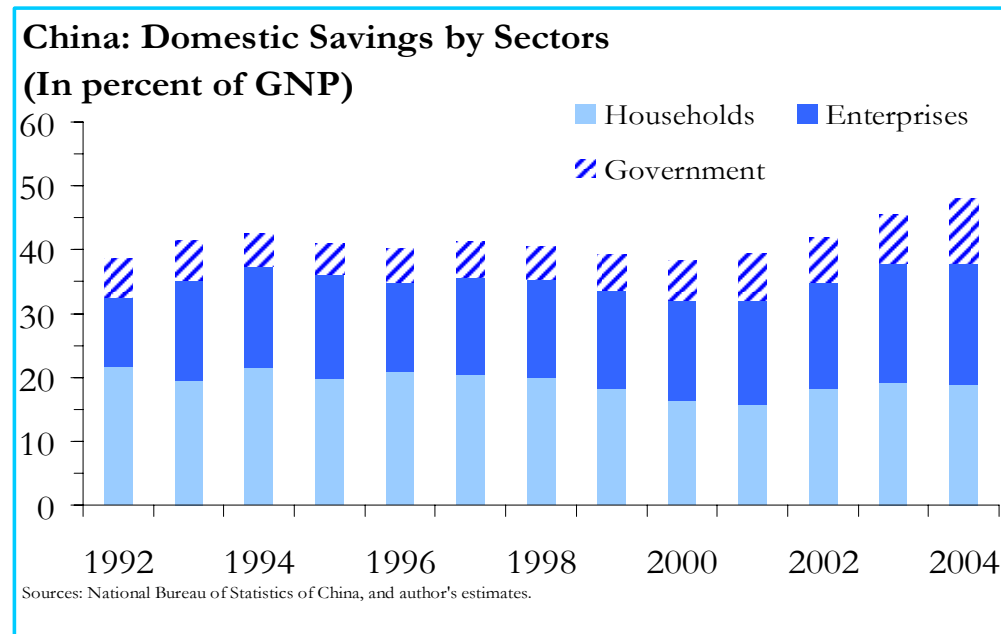
- After reforms new NPLs appear to have slowed.
- Alternative explanation needed
- Bernanke & Gertler (1989); Carlstrom & Fuerst (1997)
- Working capital is borrowed from banks.
- China's private property rules effectively allow only firm's capital as collateral.
- Firms can borrow $0 < \theta_t < 1$ portion of capital.

Theoretical Result

- **The return on one unit of corporate saving is the marginal productivity of capital and the implicit return of easing borrowing constraint.**
- **This acts like a subsidy to capital income.**
- **When borrowing constraint is tightened, firms ease it by increasing savings and capital.**

Empirical Justification

- Rising corporate savings

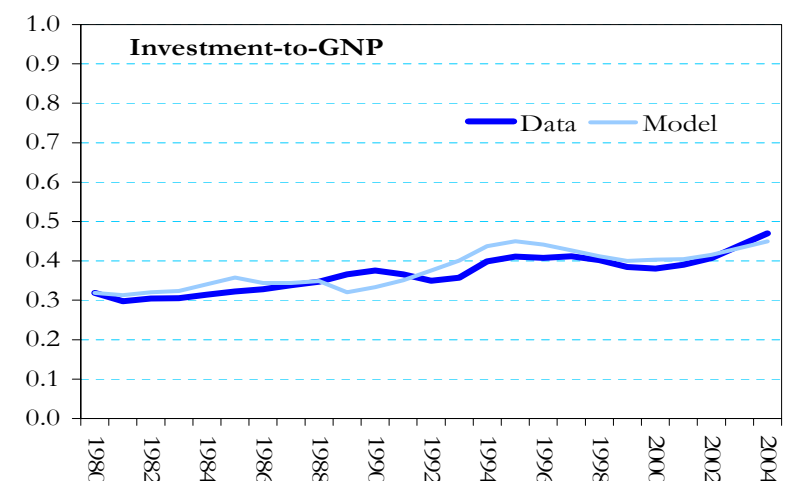
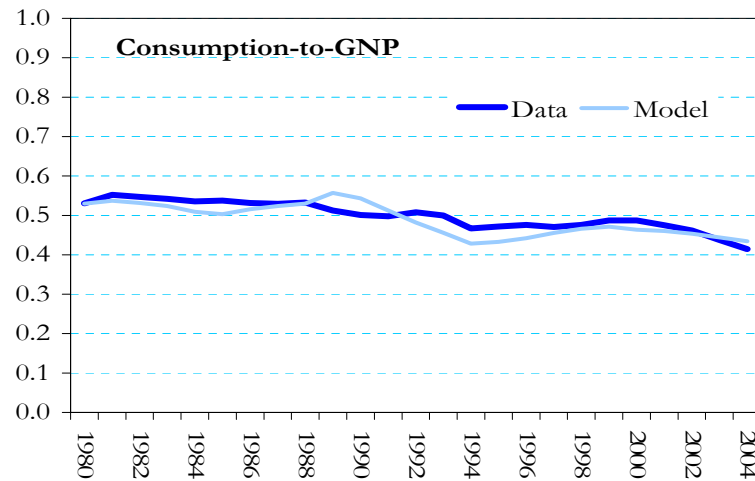
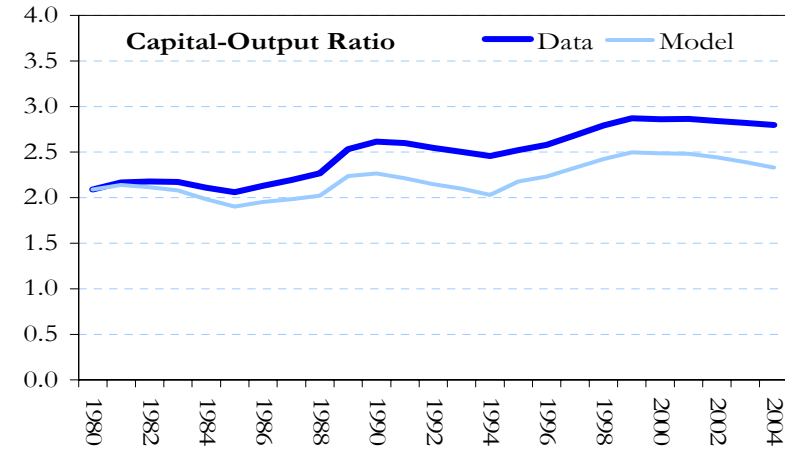
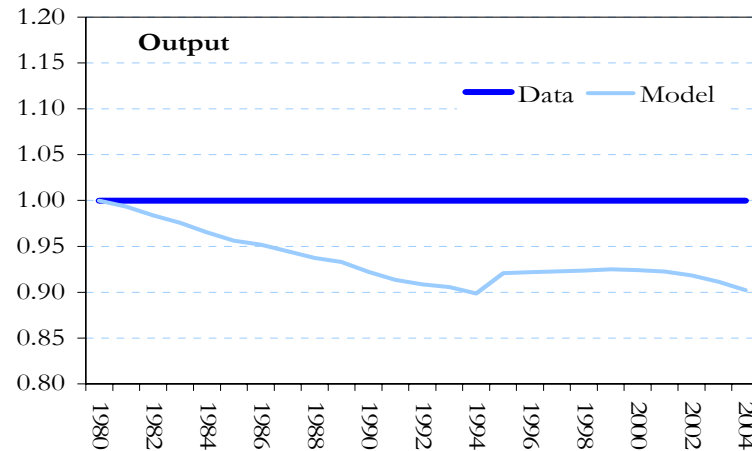


- θ_t estimated using short-term bank lending

Simulation with Borrowing Constraint

China: Simulation with Borrowing Constraint

Theta=0.35 for 1980-94 and Theta=0.25 thereafter



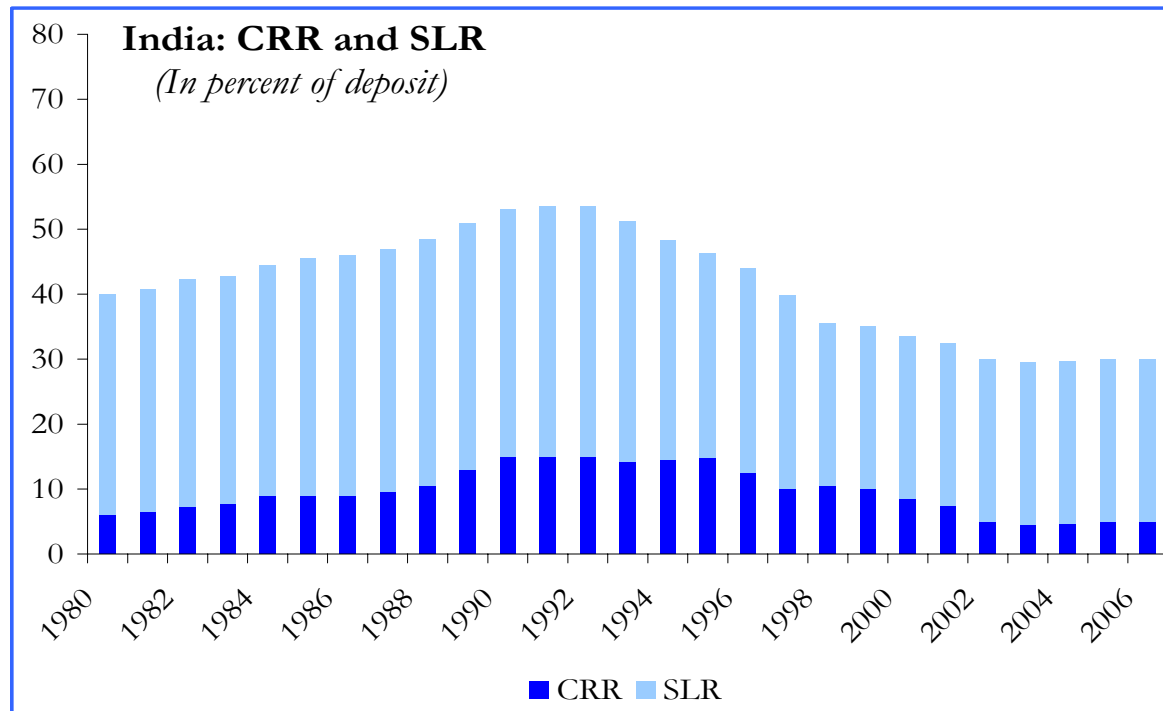
Administrative Controls as Tax

- **Government guides credit allocation.**
- **This depends on changing government priorities.**
- **Firms face uncertainty over whether banks will provide loans.**
- **This uncertainty is uninsurable, so firms self insure by increasing savings.**

Financial Frictions in India

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CRR and SLR in India

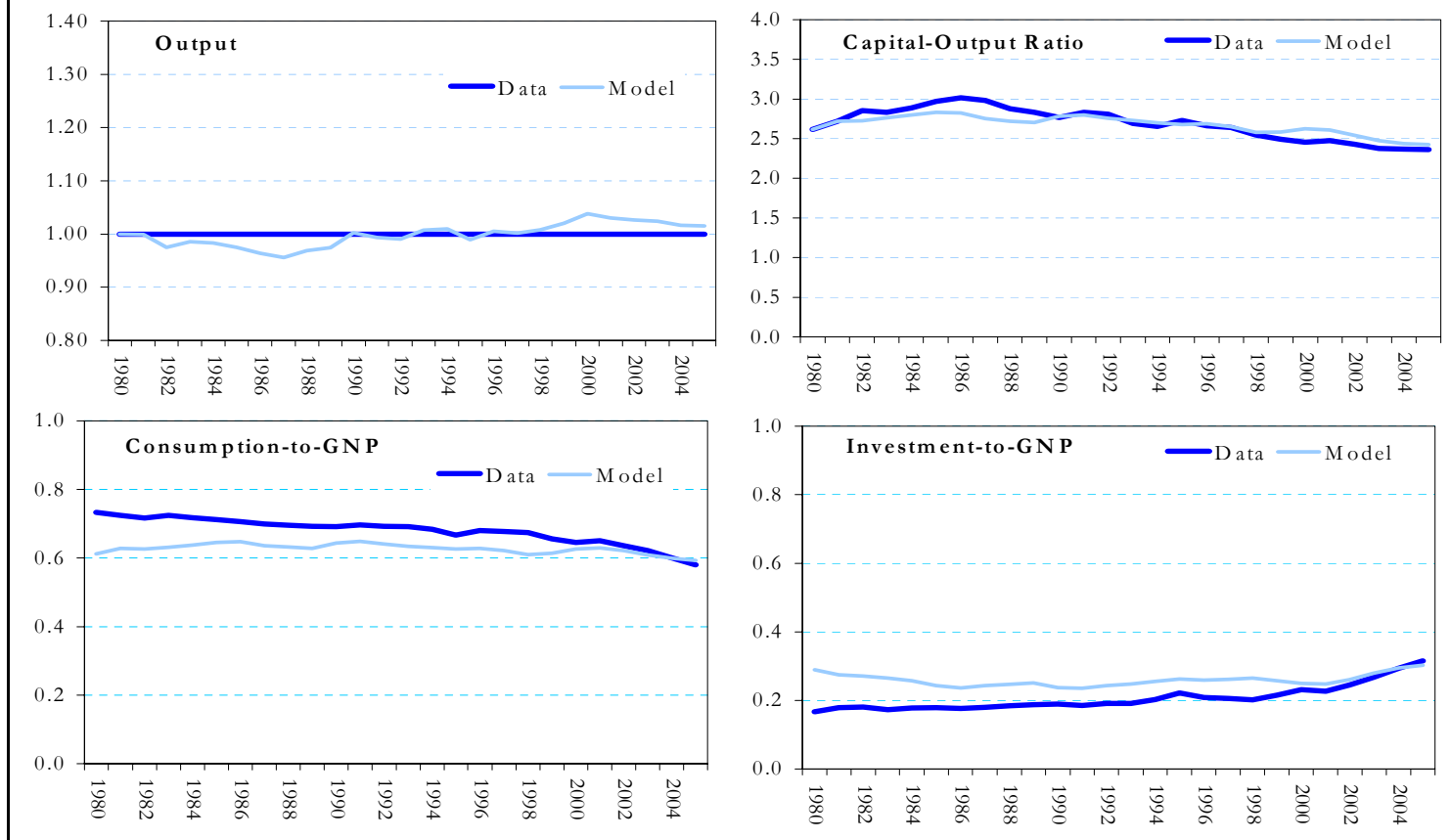


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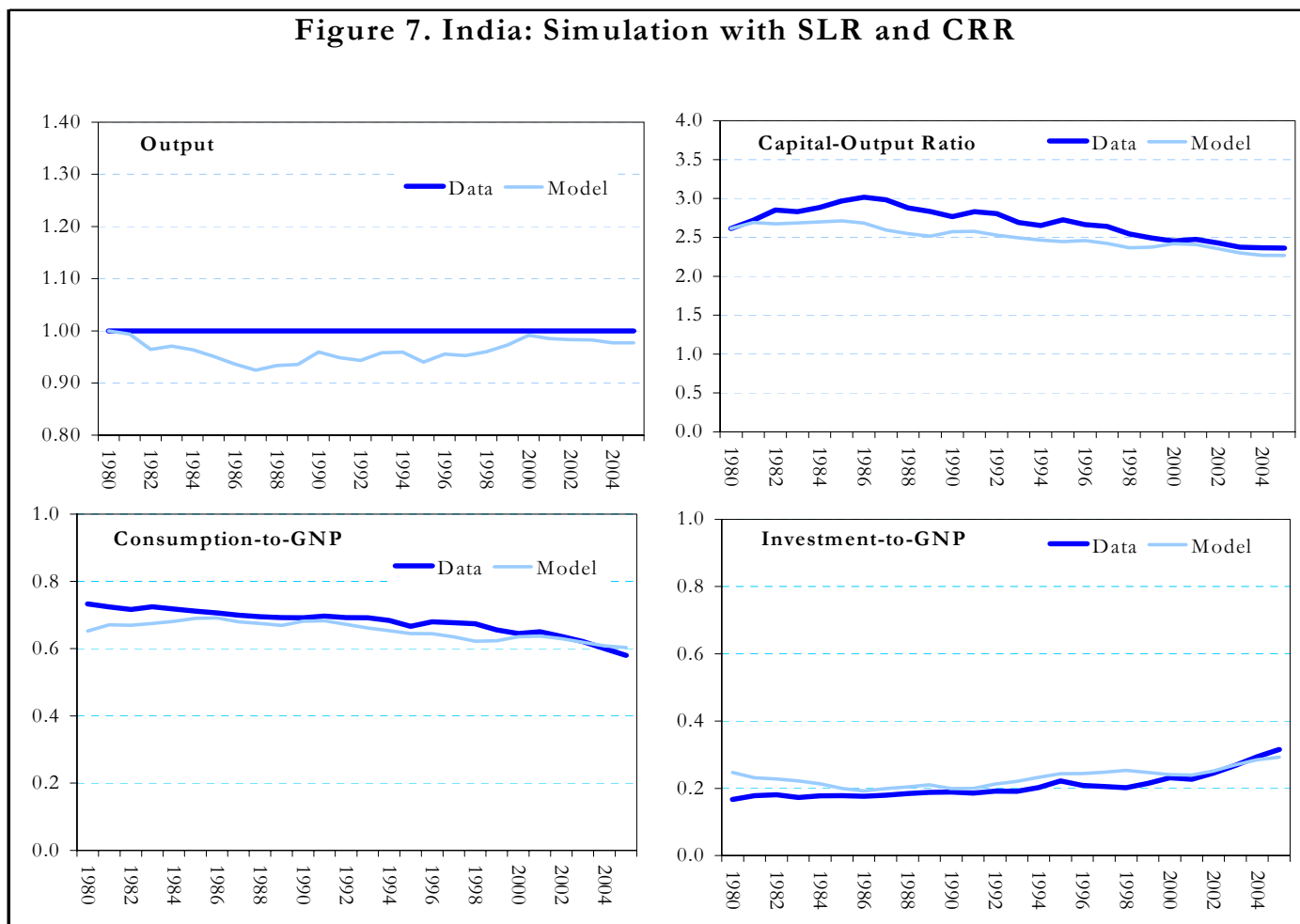
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Simulation with SLR: India

Figure 6. India: Simulation with SLR



Simulation with CRR and SLR: India



Removing the investment wedge

Figure 8. China: Simulating Policy Change

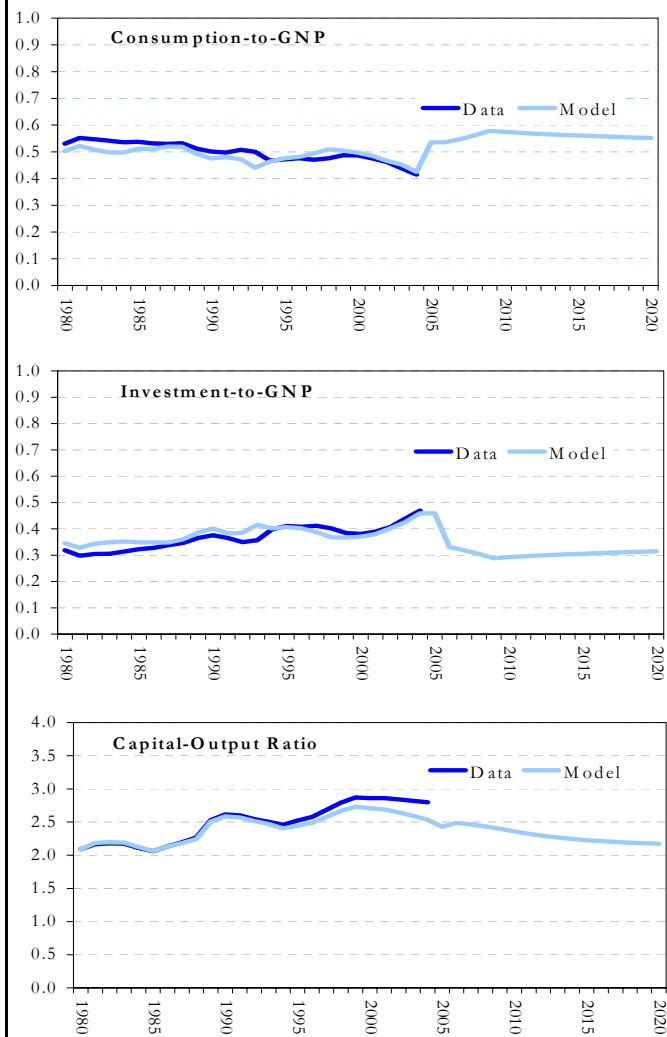
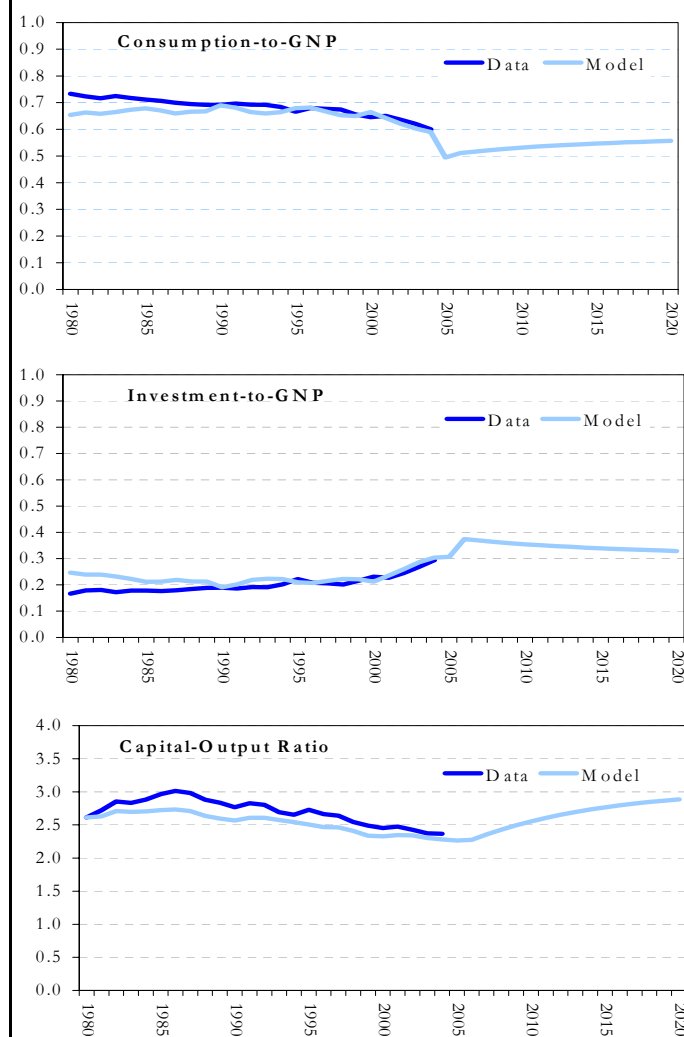


Figure 9. India: Simulating Policy Change



Conclusions

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