Understanding National Savings

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SED 2017

National Saving Rates

There are large differences in national saving rates

across countries

and

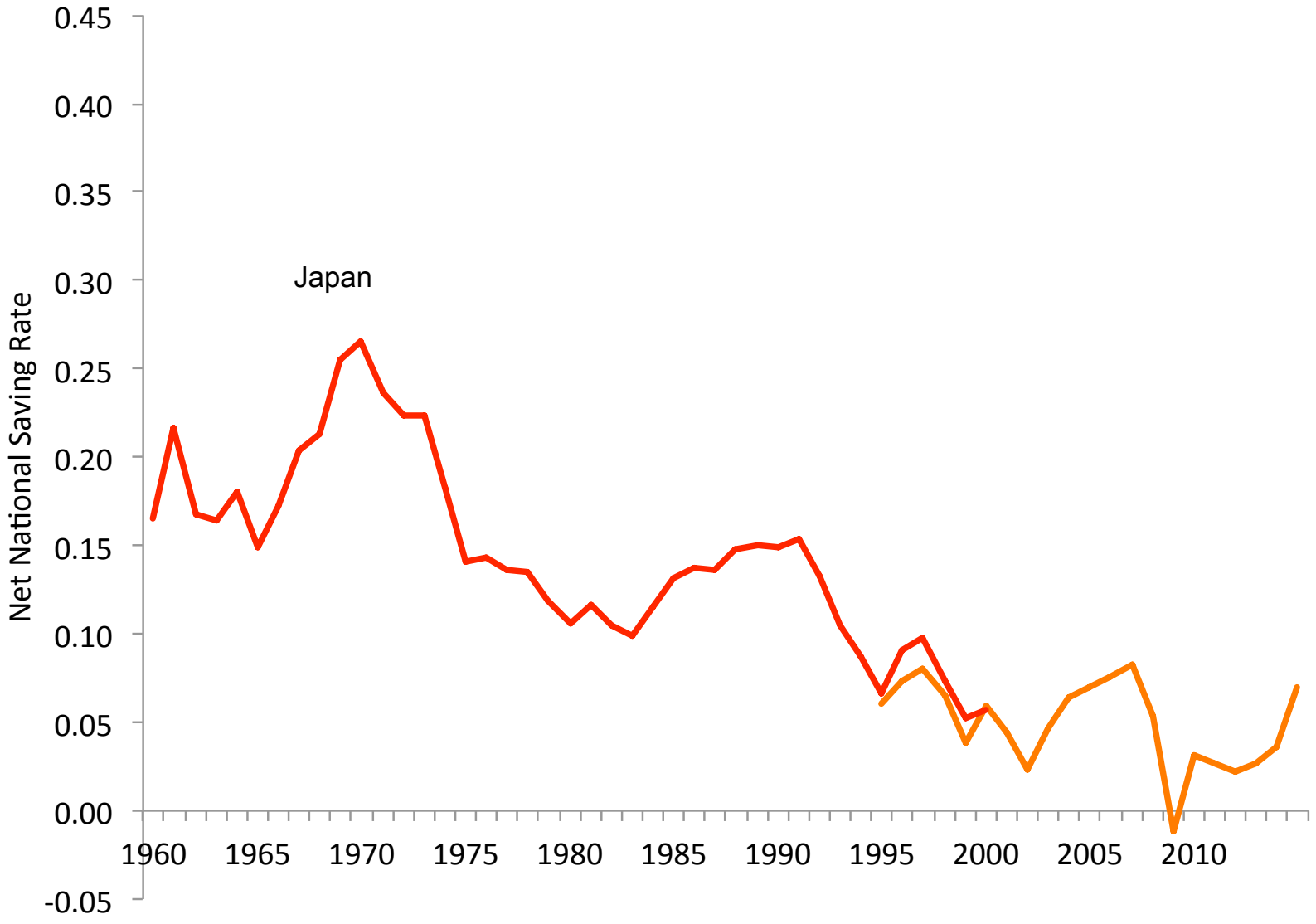
across time

National Saving Rates

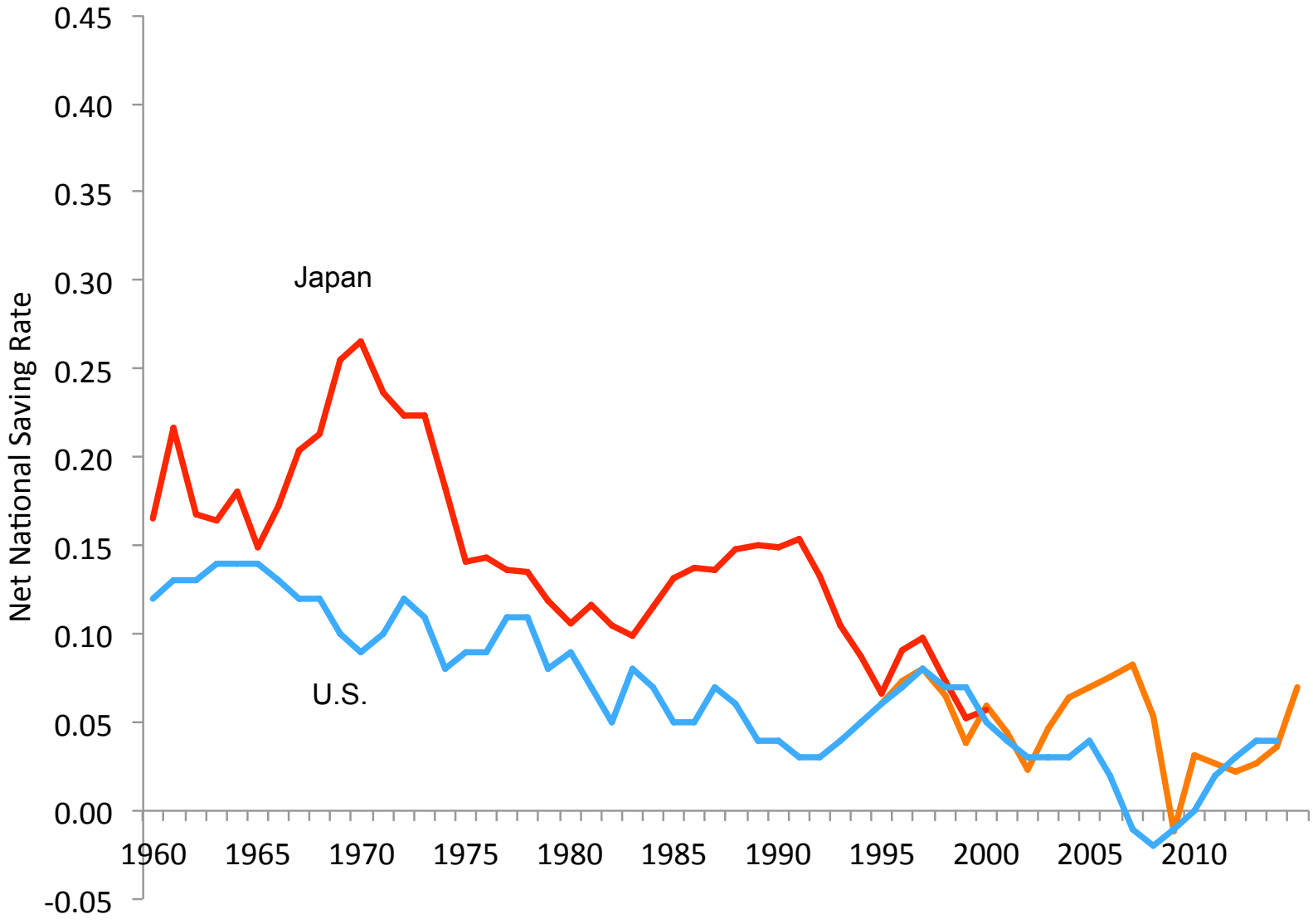
National Saving Rate = Household + Corporate + Government

Net National Saving Rate: $\frac{Y_t - C_t - G_t - \delta_t K_t}{Y_t - \delta_t K_t}$

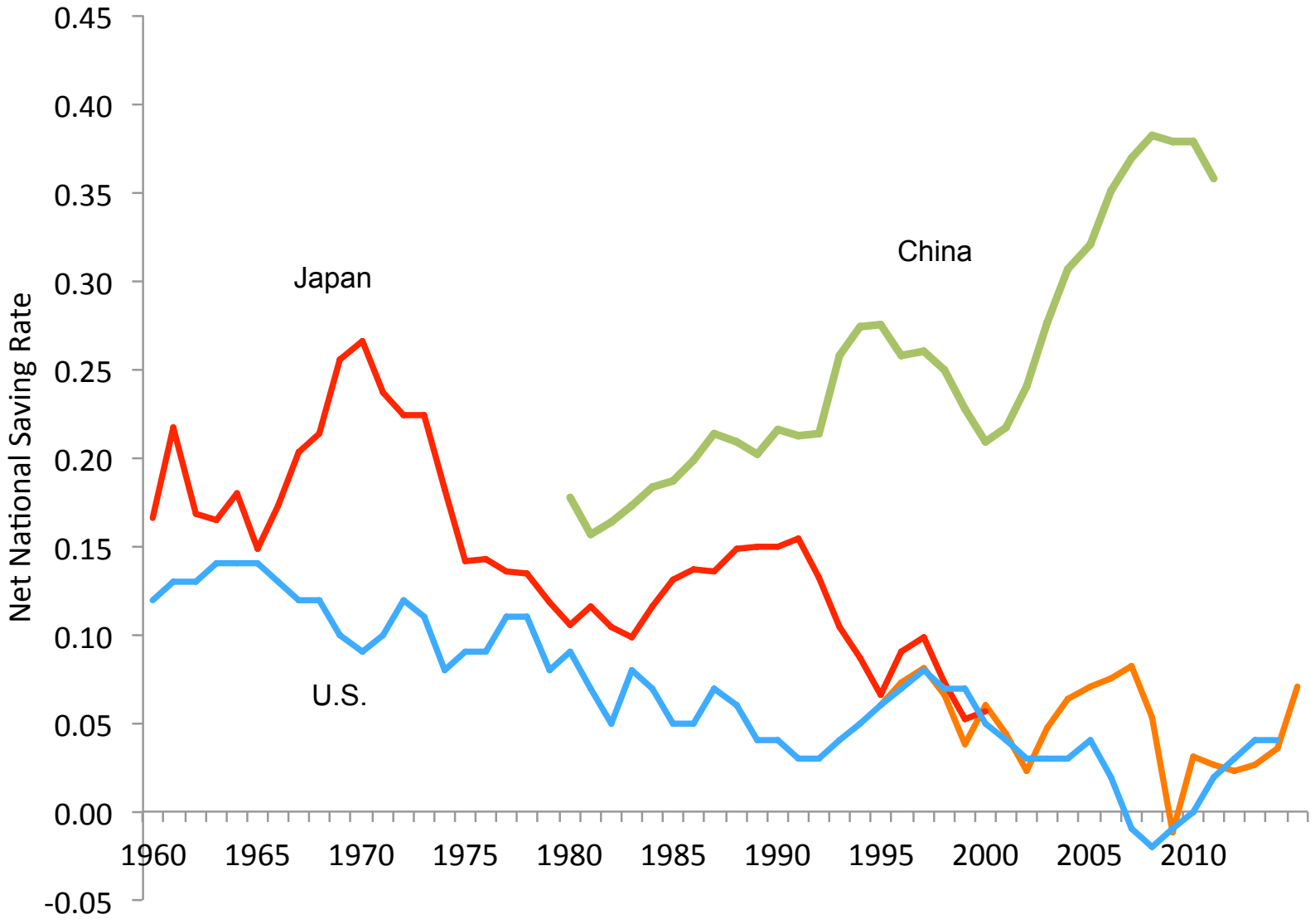
National Saving Rates



National Saving Rates



National Saving Rates



National Saving Rates

Such differences have often been puzzling

This talk:

What do we know (what have I learned) about these differences in saving rates.

National Saving Rates

Sneak Preview

Behavior of the national saving rates

not too puzzling!

Outline

- Examine National Saving Rates in
  - Japan
  - Mexico
  - Chile
  - Colombia
  - China
  - U.S.

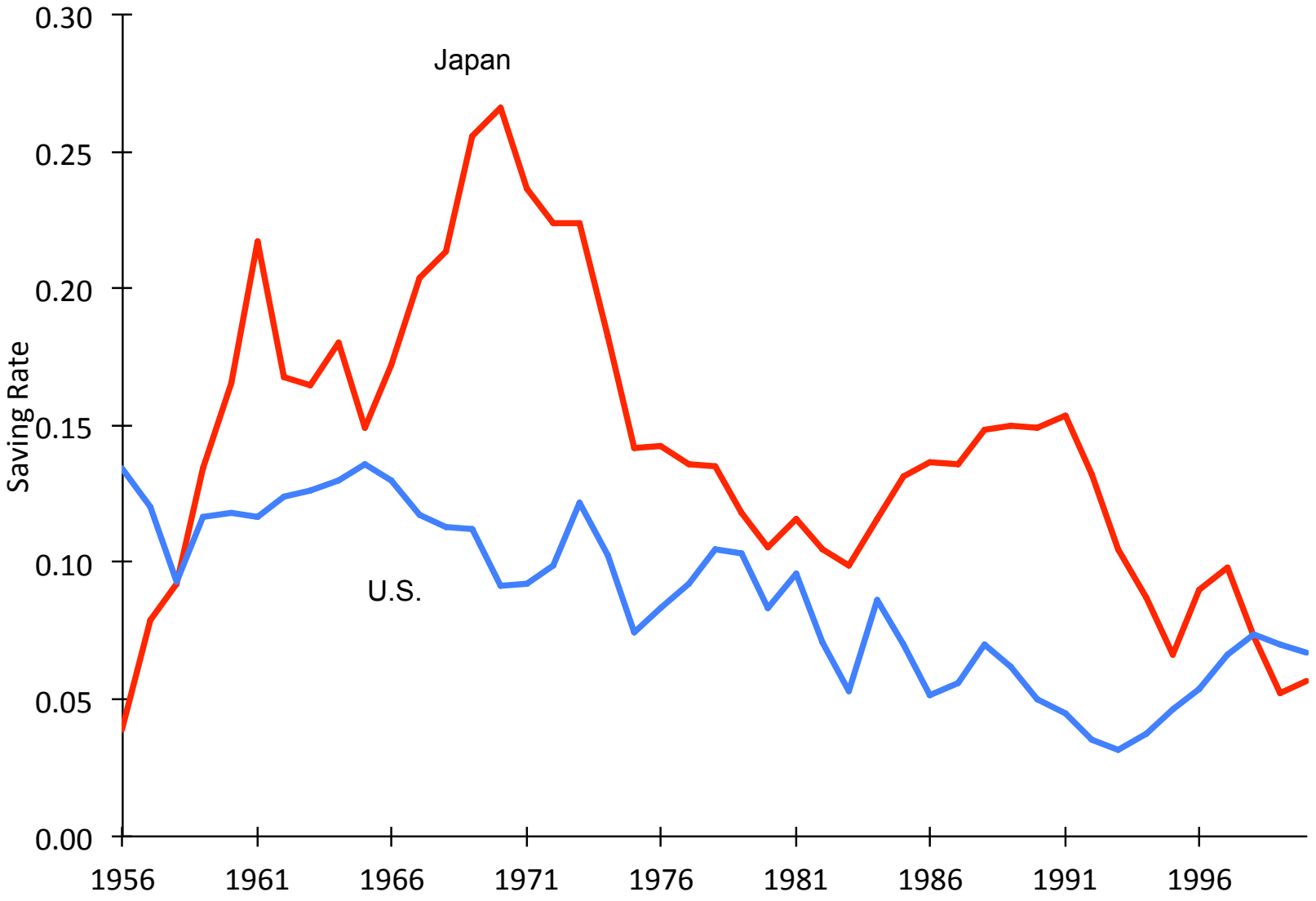
Outline

- Standard Growth Model
- Overlapping Generations Model
- Dynastic Model
- Closed economy and perfect foresight

Japan

JAPAN

Japan versus the U.S



Japan versus the U.S

- Why did the Japanese save so much?
- Many mentioned:
  - differences in preferences,
  - the bonus system,
  - high housing prices,
  - high educational costs,
  - high marriage costs.

Japan

- Hayashi (1986): Reconstruction Hypothesis
  - High savings due to the destruction of the capital stock after WW II
- Christiano (1989): “The standard model fails”

Standard Model

- Let's use a standard model
- See where it fails
- Where it succeeds

Standard Model

Households with N_t members maximize

$$\max \left\{ \sum_{t=0}^{\infty} \beta^t N_t \left[\log c_t + \alpha \log \left(T - h_t \right) \right] \right\}$$

subject to

$$C_t + X_t \leq w_t H_t + \left[r_t - \tau_t \left(r_t - \delta_t \right) \right] K_t + \pi_t$$

Standard Model

- Firms maximize profits

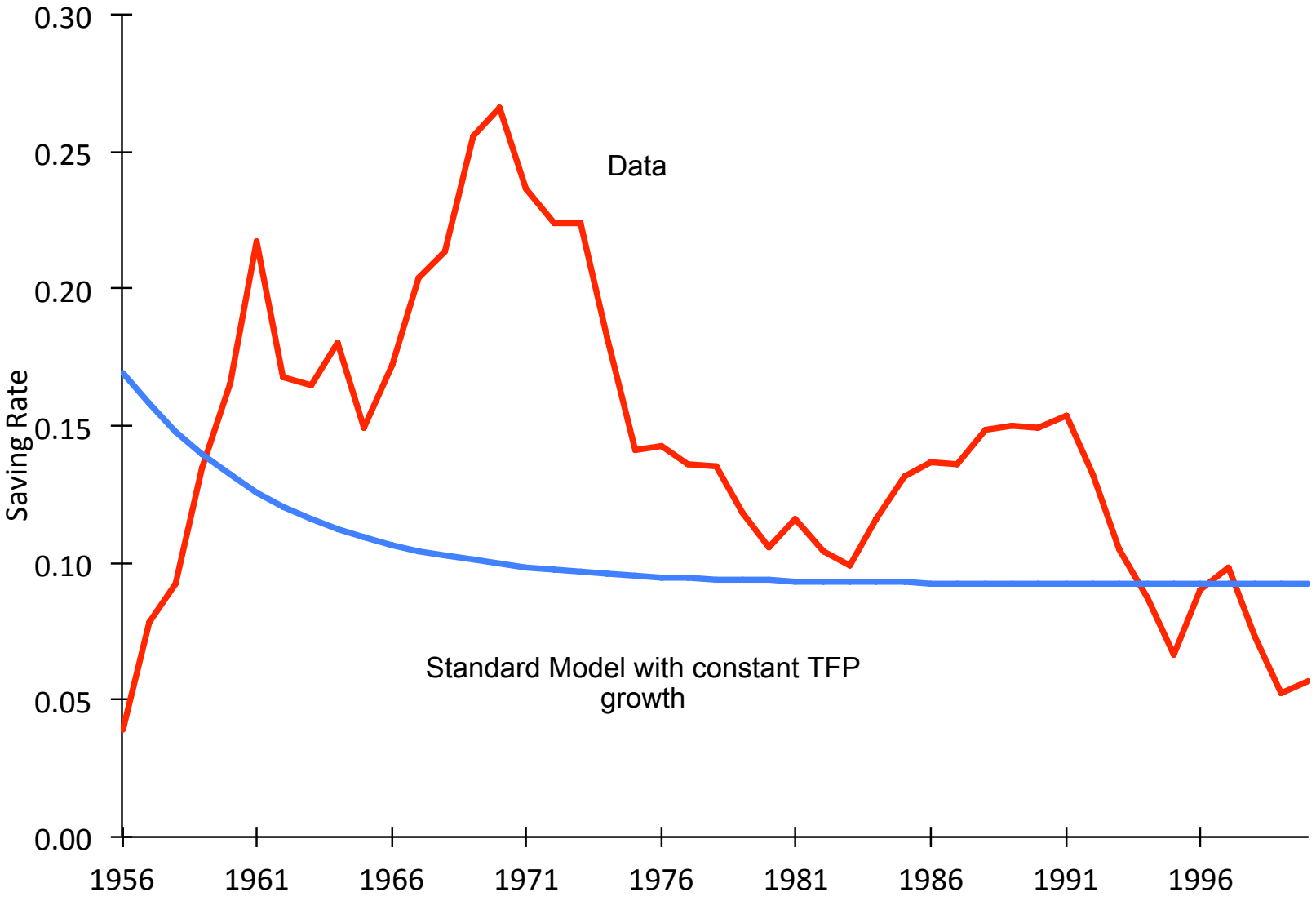
$$Y_t = A_t K_t^{\alpha} H_t^{1-\alpha}$$

- Government
  - Taxes capital income to pay for G_t.
  - Uses π_t to balance its budget.

Japan

- Calibrate to Japan
- Set the initial K/Y ratio to its counterpart in the data
- Set the TFP growth rate to the period average

Japan

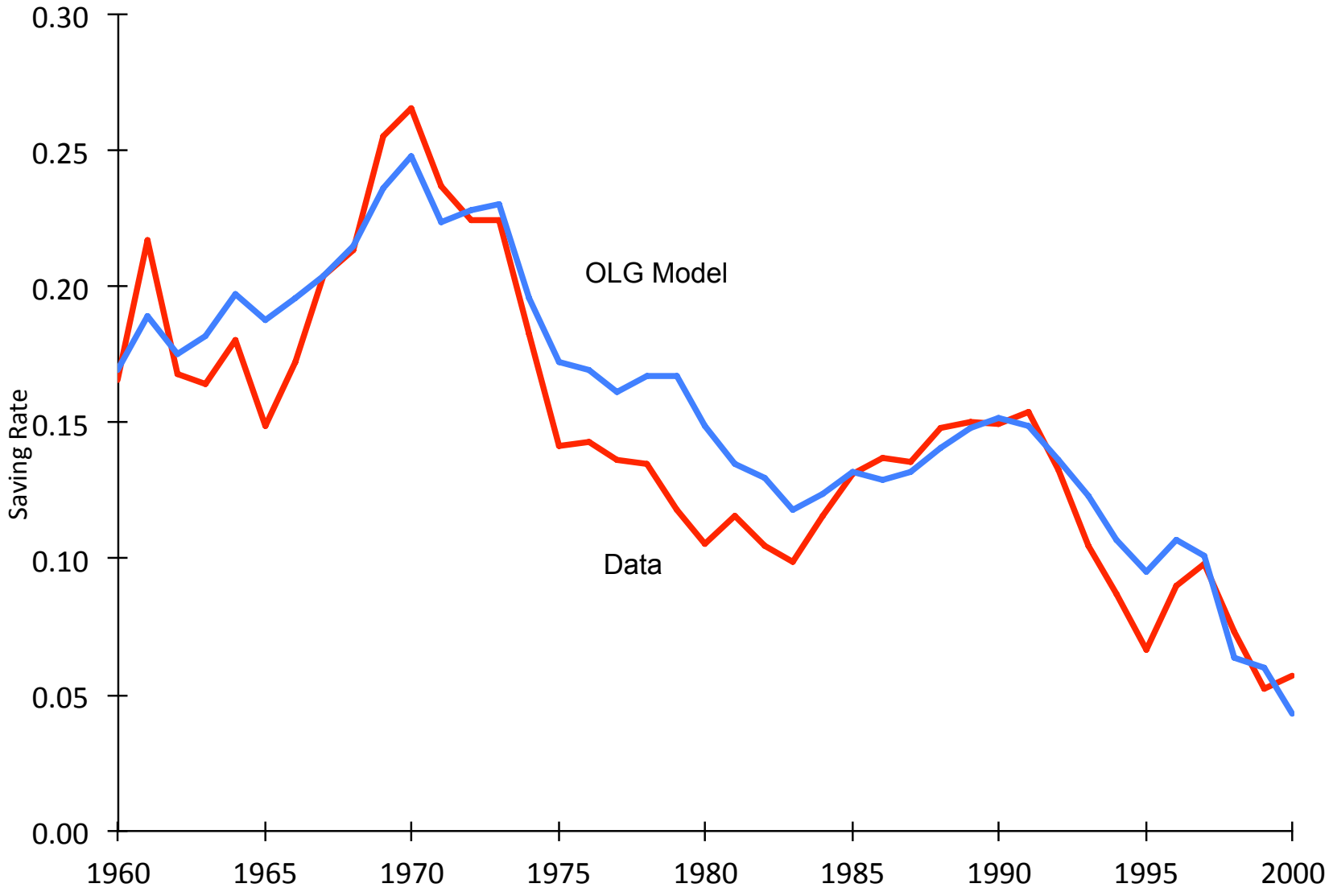


Japanese Saving Rate: Standard Model

Japan

- Perhaps we need demographics, aging, social security.....
  - Overlapping generations model
    - Changing longevity
    - Retirement
    - Borrowing constraints
    - Increased social security benefits
- Feed in exogenous changes in TFP year by year
- Perfect foresight

Chen, İmrohoroğlu, İmrohoroğlu, ET (2007)

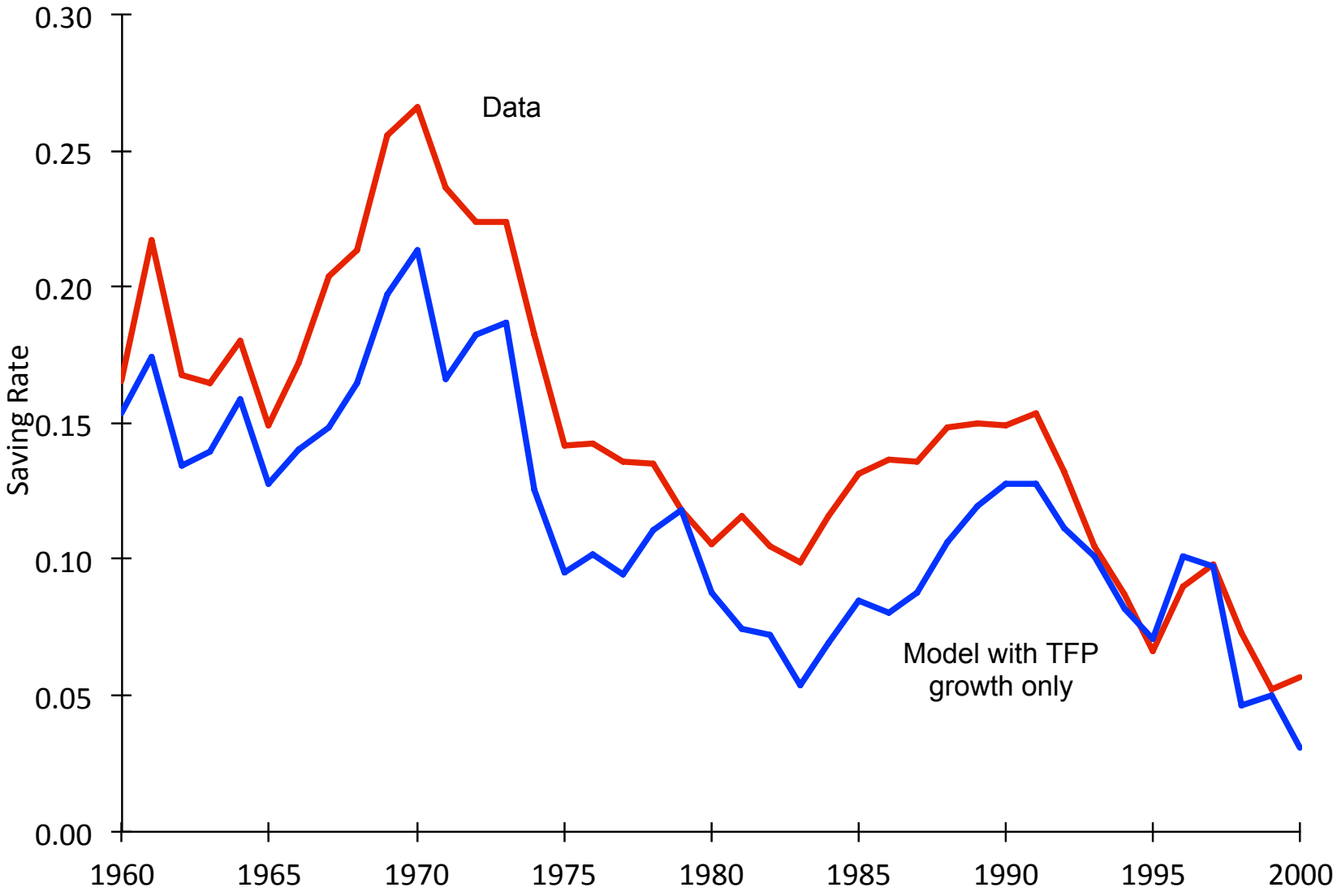


Japanese Saving Rate: Data versus the Model

Decompose the Components

- What made it work?
- Solve the model with one component at a time
  - TFP only
  - Population Growth Rate only
  - Increased longevity only
  - Taxes only

Decompose the Components



Japanese Saving Rate: TFP growth only

Lucas says

- Why do you need all the bells and whistles then?
- Infinite horizon with TFP should do it!
- Re-try the standard model but use annual growth rates of TFP!

Back to the Standard Model

- Households maximize

$$\max \left\{ \sum_{t=0}^{\infty} \beta^t N_t \left[\log c_t + \alpha \log \left(T - h_t \right) \right] \right\}$$

subject to

$$C_t + X_t \leq w_t H_t + \left[r_t - \tau_t \left(r_t - \delta_t \right) \right] K_t + \pi_t$$

- Firms maximize profits

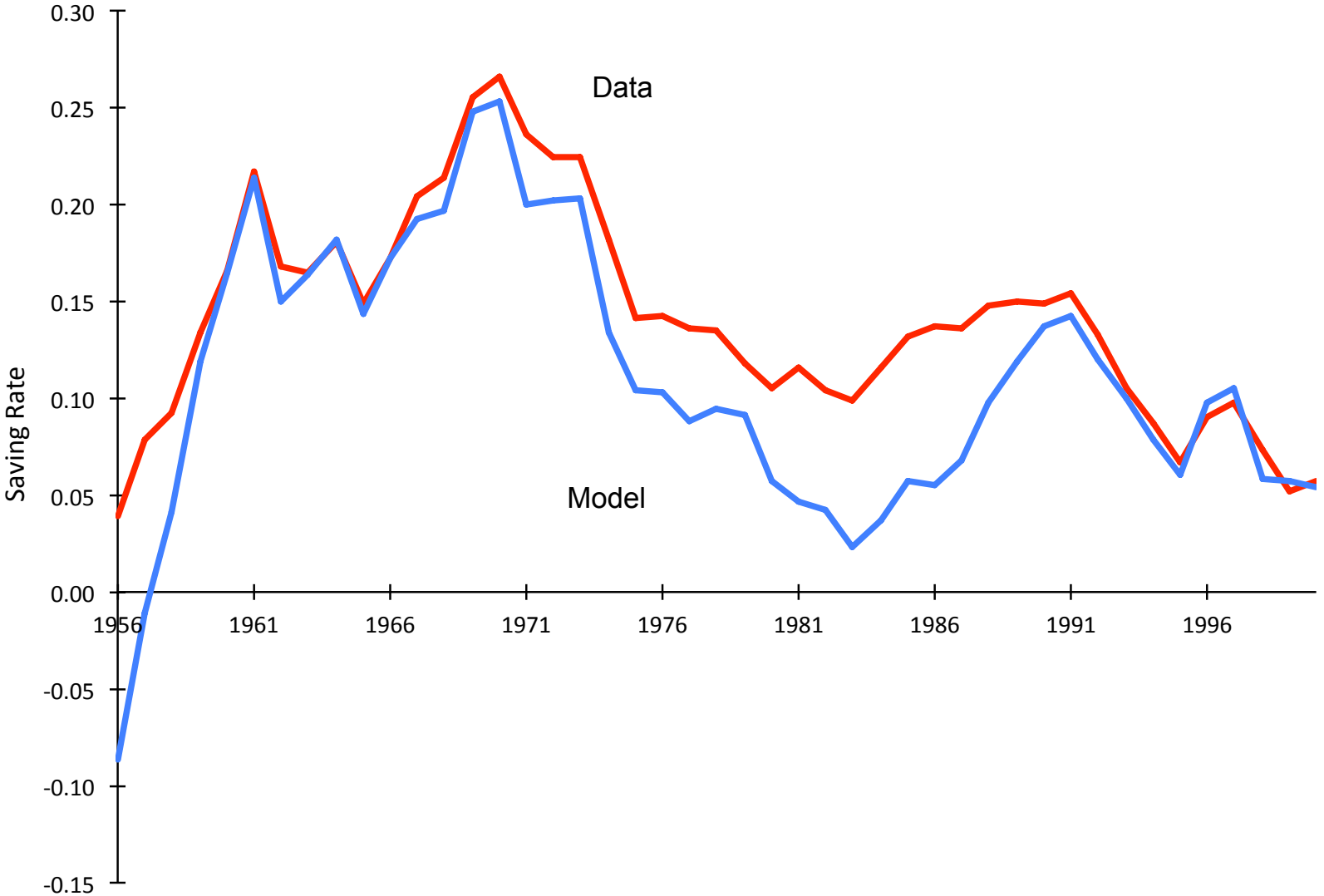
$$Y_t = A_t K_t^{\alpha} H_t^{1-\alpha}$$

- Government
  - Taxes capital income to pay for a fixed stream of government purchases G_t.
  - Uses π_t to balance its budget.

Calibration

- Need
  - Tax rate
  - Population growth rate
  - Depreciation rate
  - Initial capital stock
  - TFP growth rate

Of Course

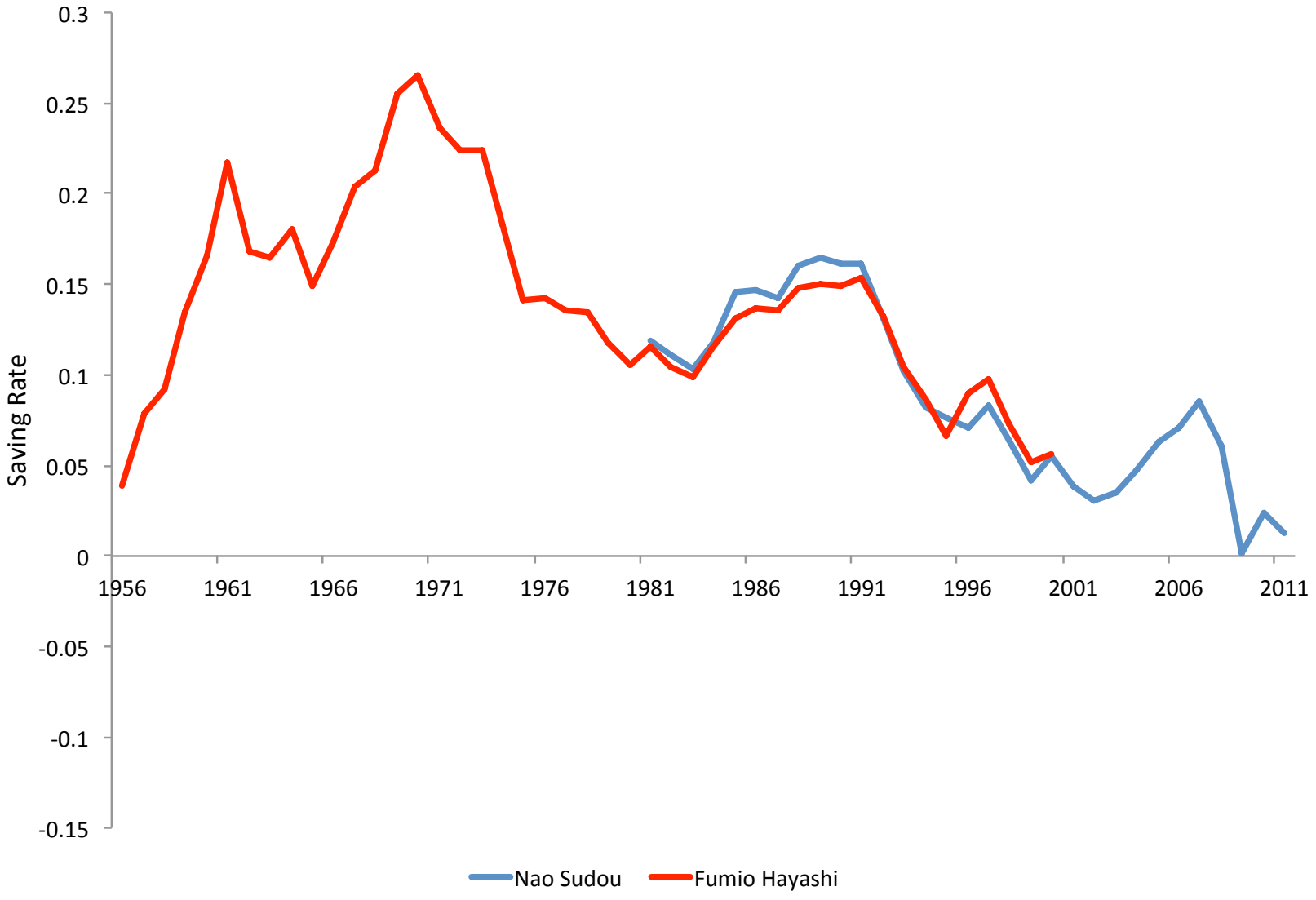


Japanese Saving Rate: Data versus the Model

Chen, İmrohoroğlu, İmrohoroğlu, AER (2006)

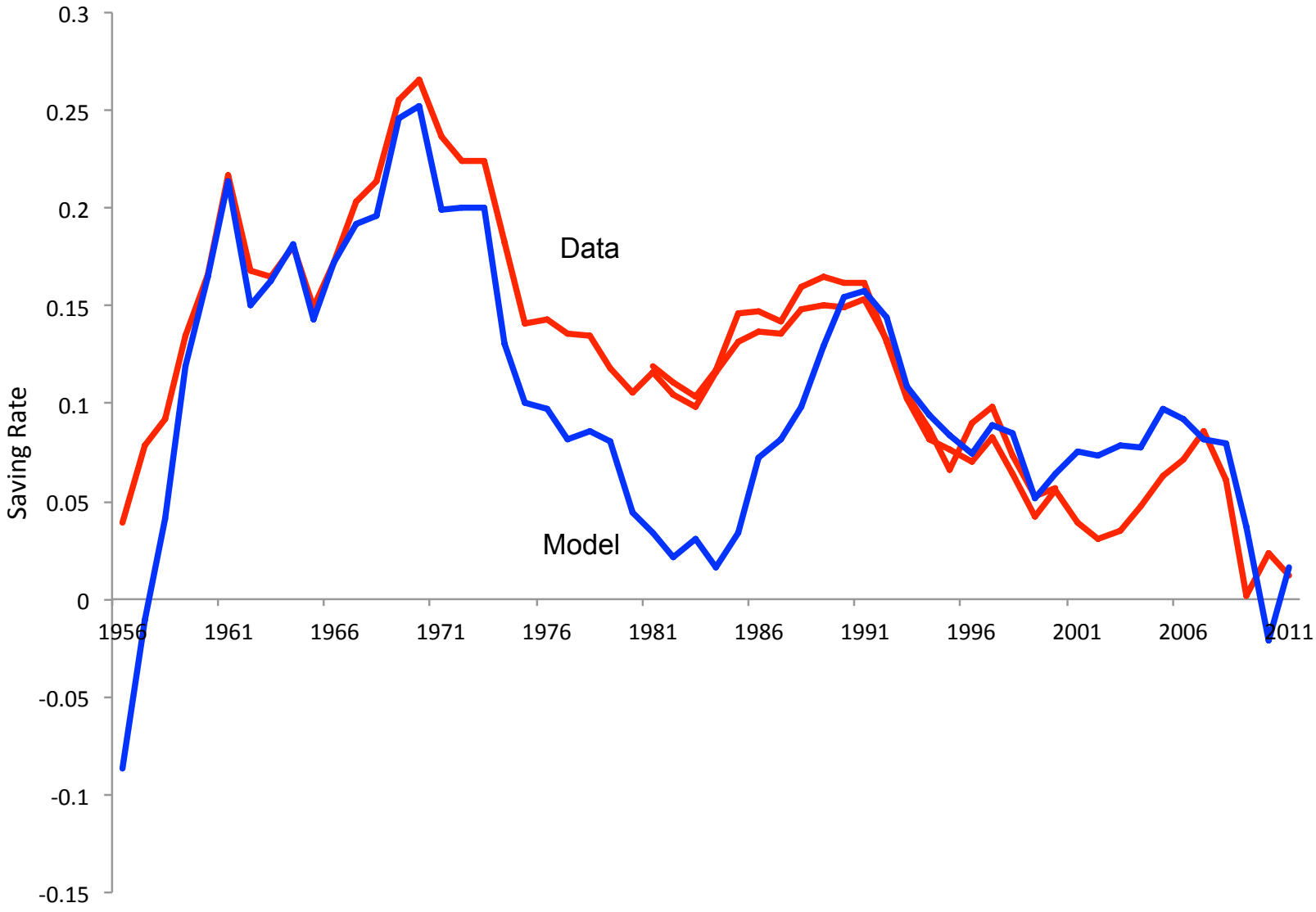
What happened since 2000?

What happened since 2000?



Japanese Saving Rate: Extended Data

Model?

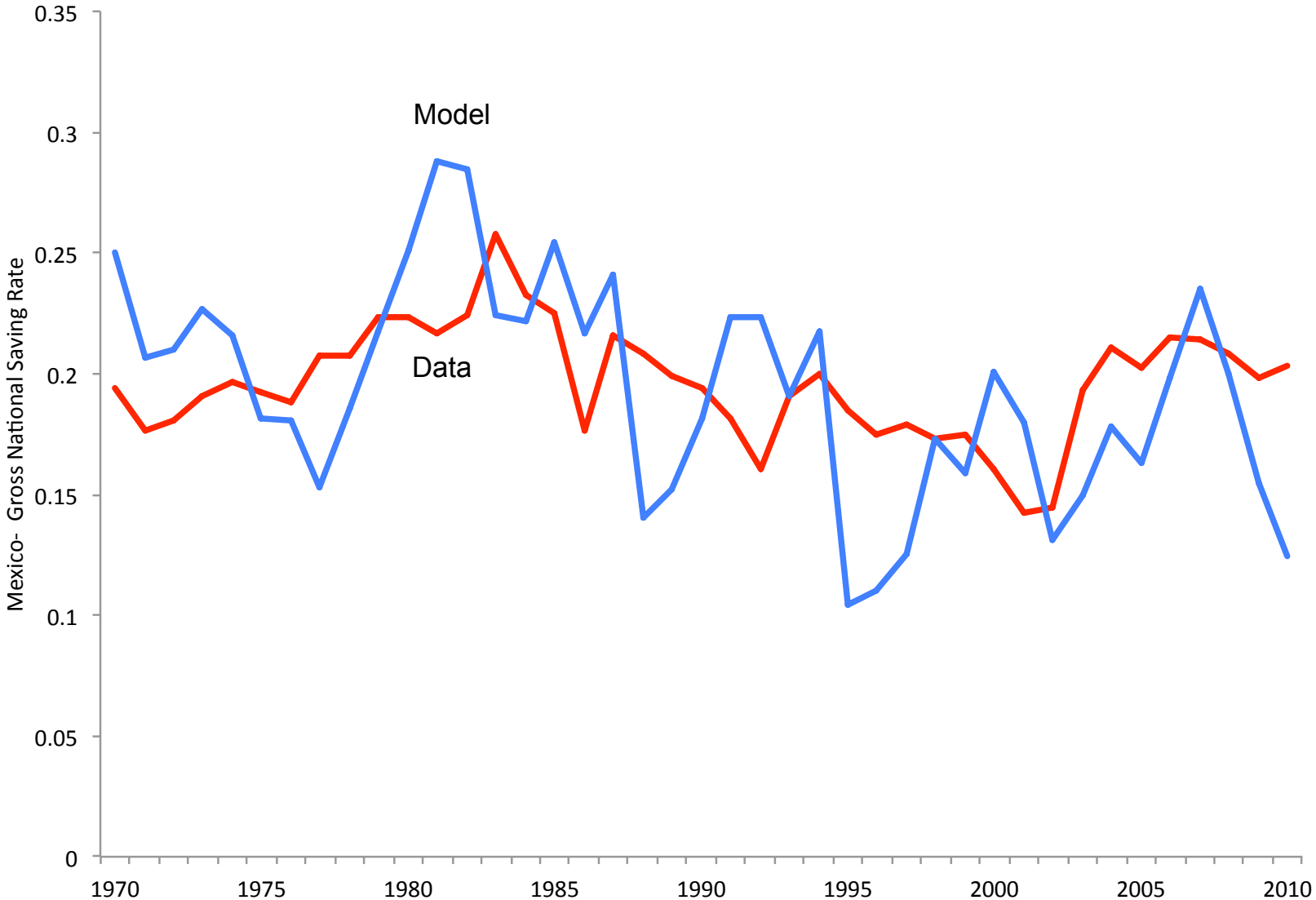


Japanese Saving Rate: Data versus the Model

Mexico

Mexico

Mexico

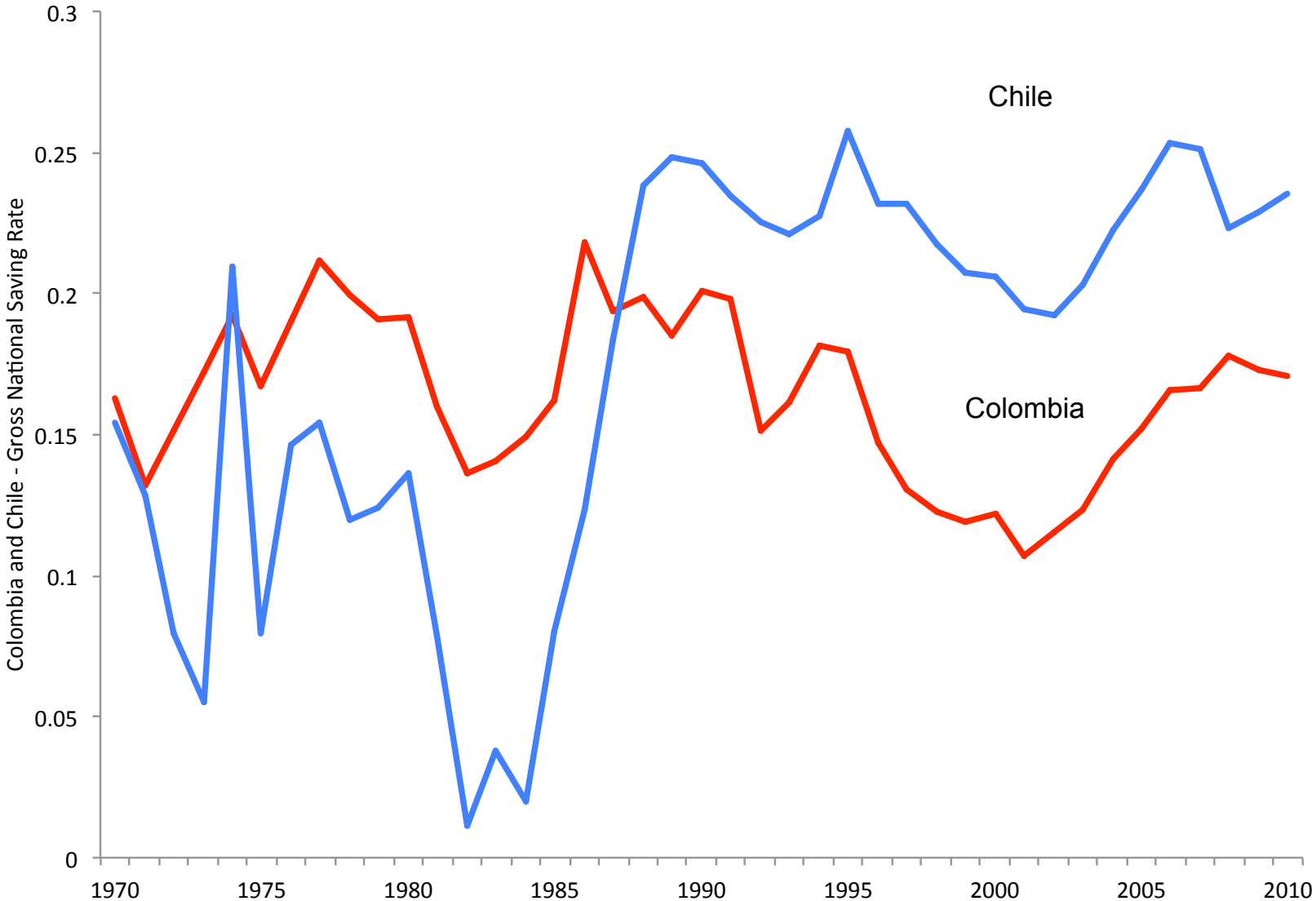


Saving Rate: Mexico
Fernández, İmrohoroğlu, Tamayo (2017)

Chile and Colombia

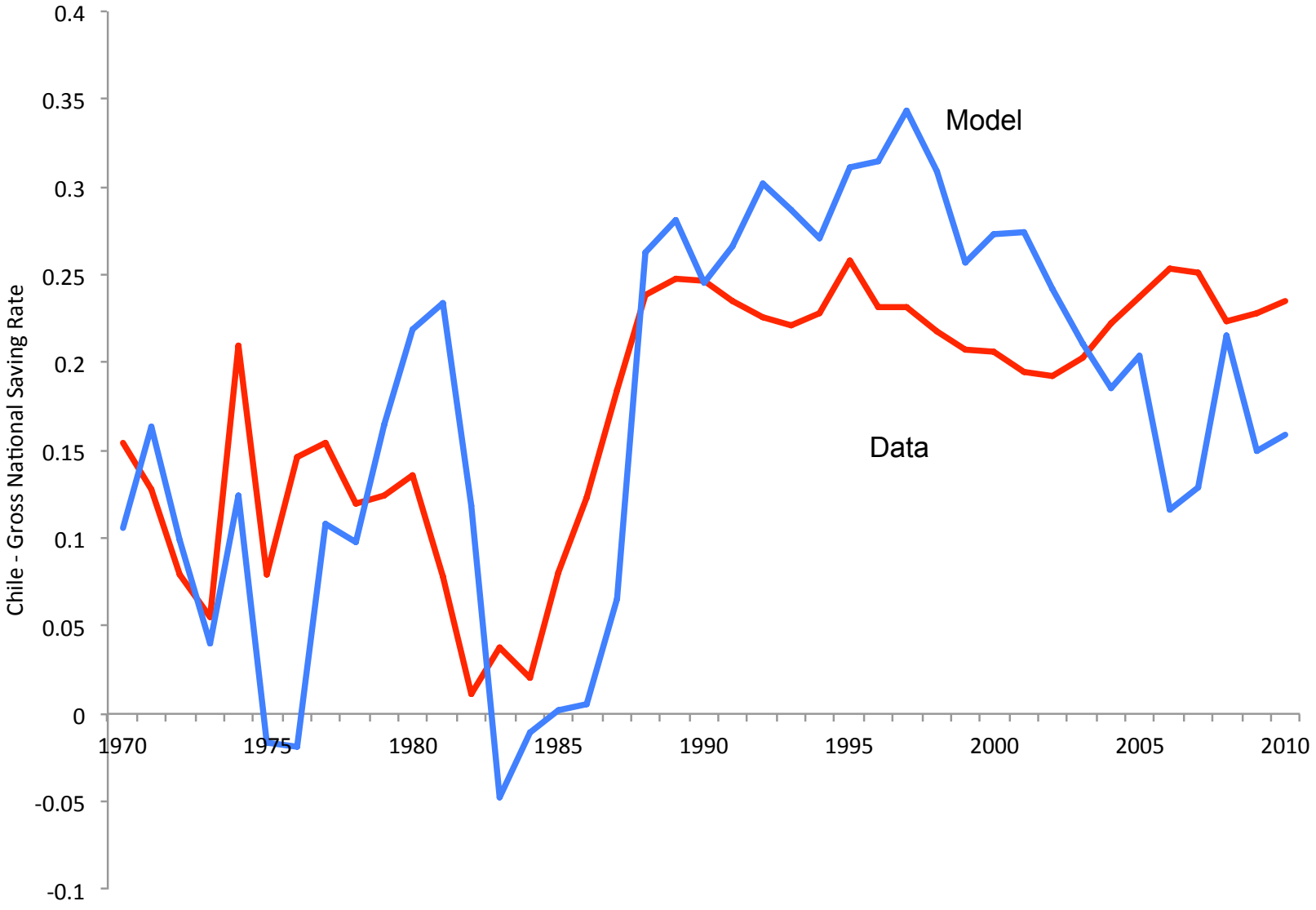
Chile and Colombia

Chile and Colombia



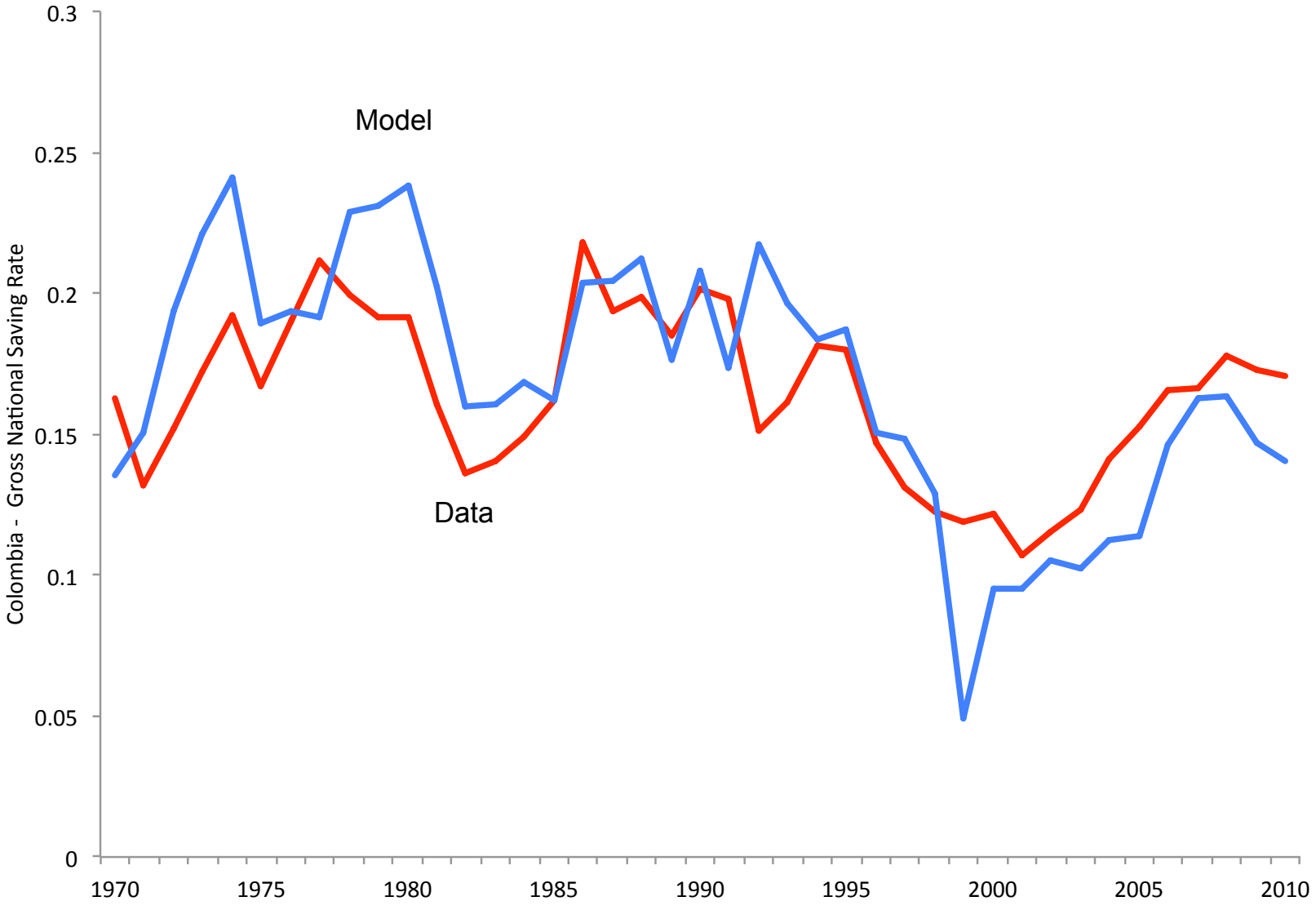
Gross National Saving Rate: Chile and Colombia
Fernández, İmrohoroğlu, Tamayo (2017)

Chile



Saving Rate: Chile

Colombia



Saving Rate: Colombia

Chile and Colombia

- Why the big increase in the saving rate in Chile?
- Two things happen in the mid-1980s
  - TFP Growth rate in Chile increases compared to the past and compared to Colombia

TFP Growth Rate

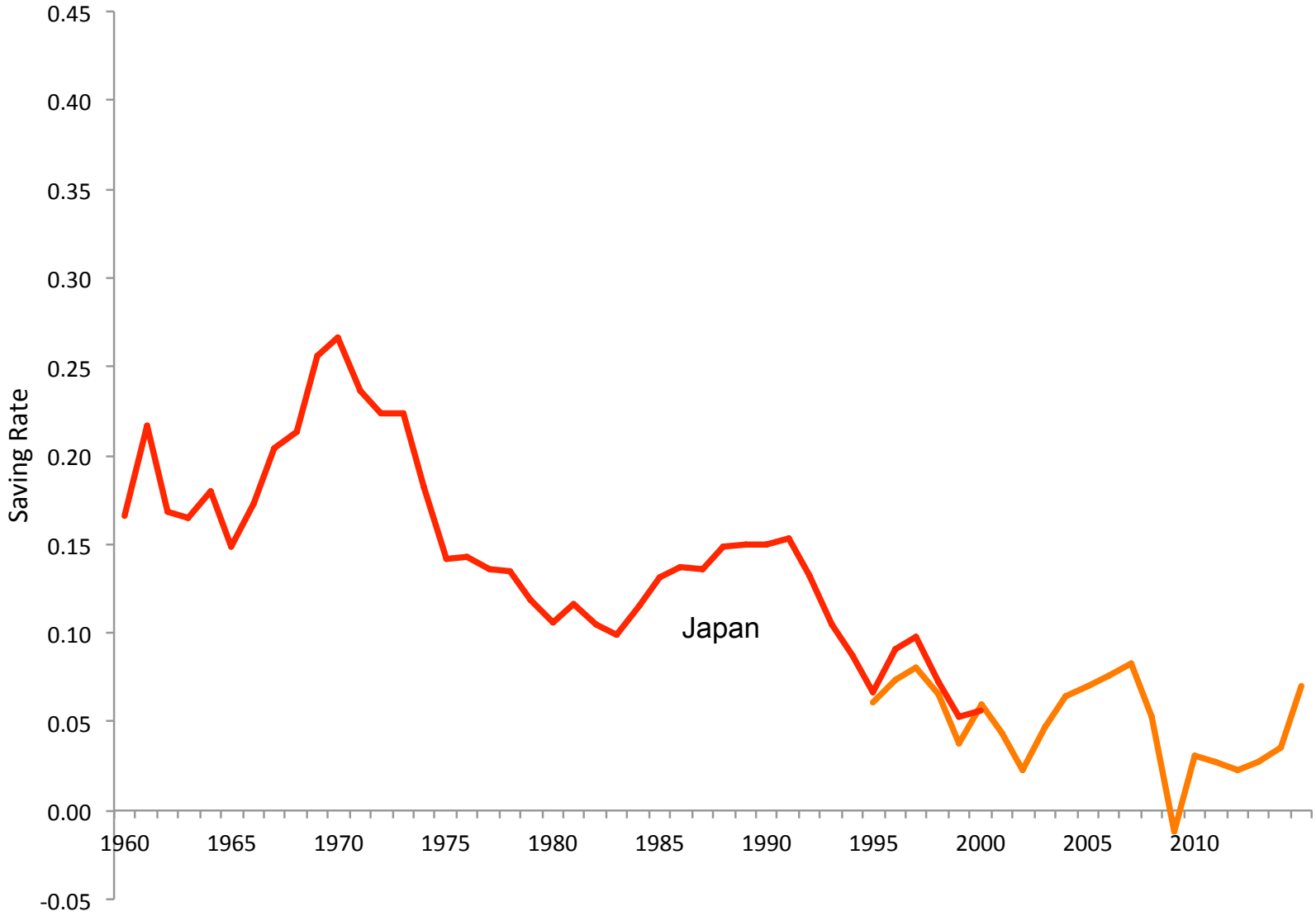
	Chile	Colombia
1970 -1985	1.008	1.012
1986 -1995	1.039	1.002

  - Capital income tax rate in Chile: decline from about 50% to 10%. Bergoeing, Kehoe, Kehoe, and Soto (2002)

China

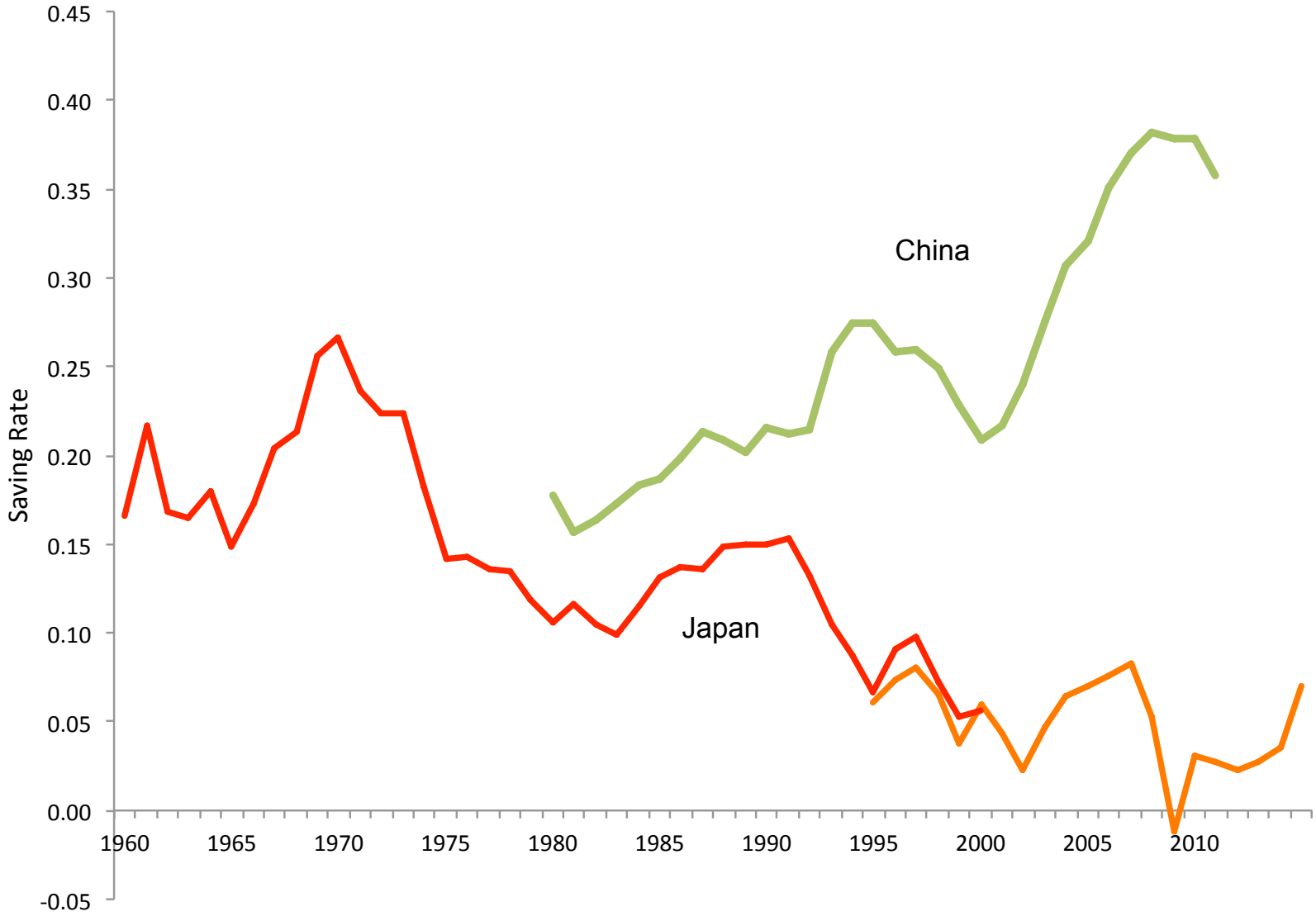
China

China



Saving Rate: Japan and China

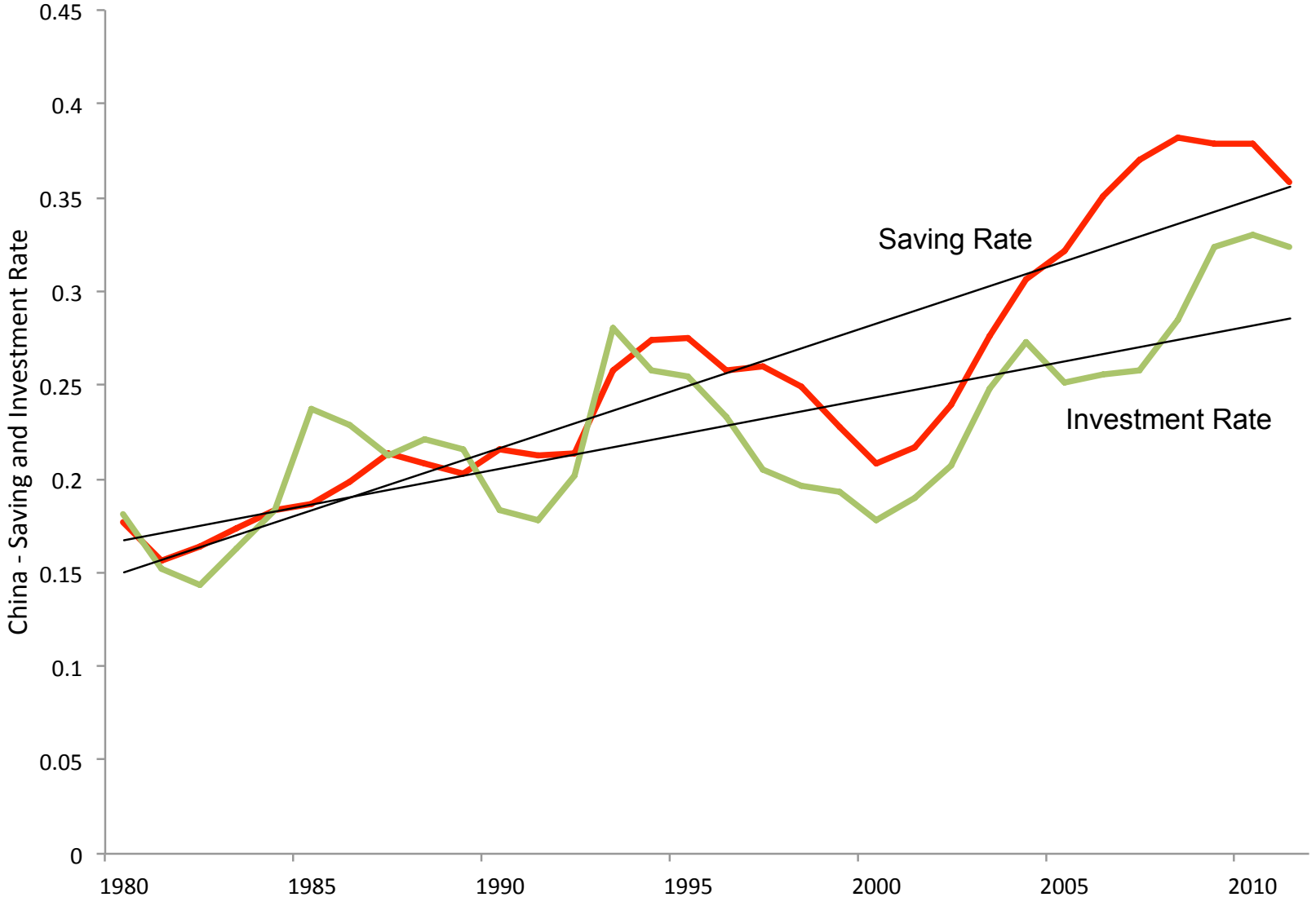
China



Saving Rate: Japan and China

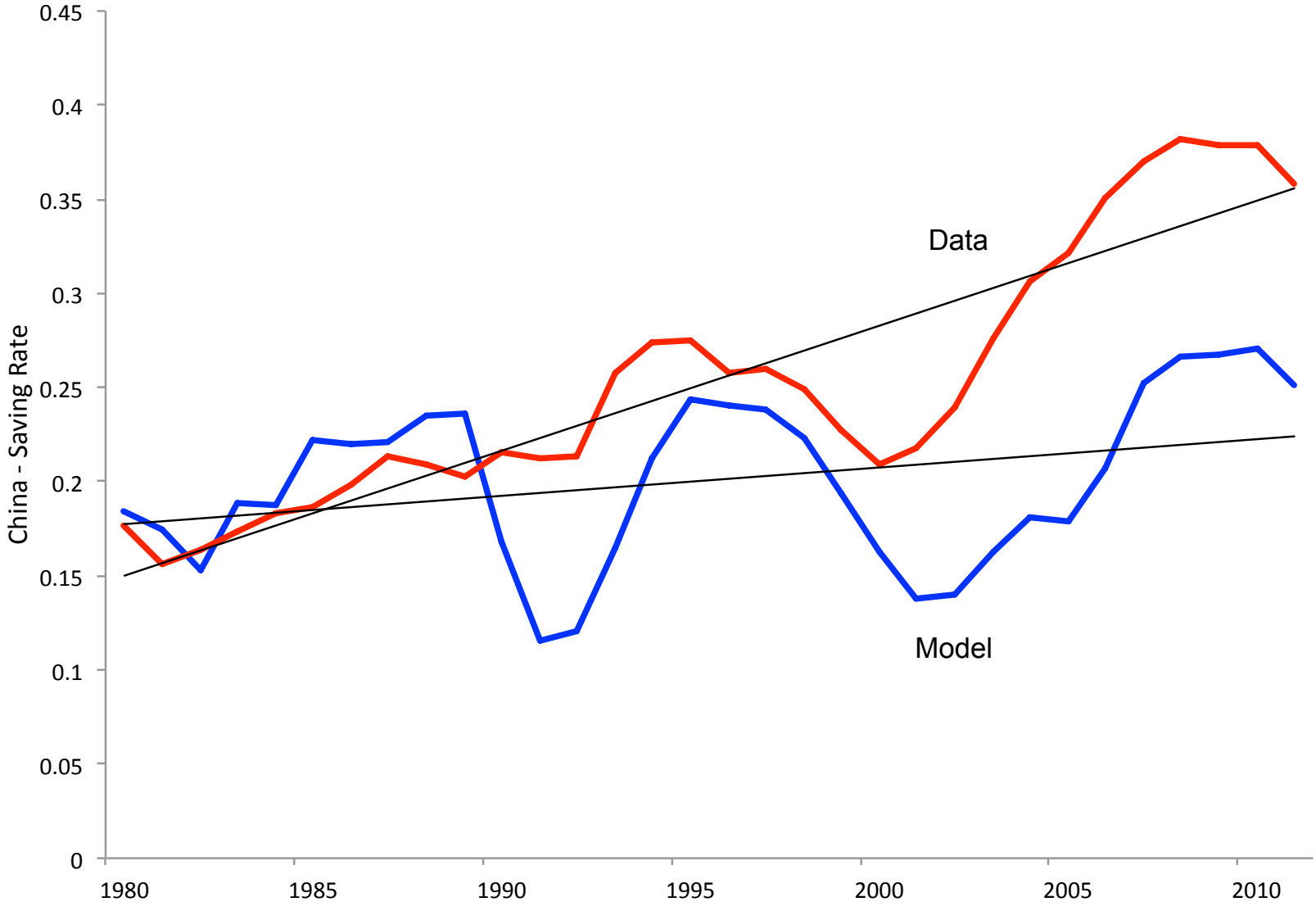
China

China



Chinese Saving and Investment Rate

Standard Model



Chinese Saving Rate: Data versus the Model

What might be going on in China?

- Choukhmane, Coeurdacier, and Jin (2013): The impact of the one-child policy
- Curtis, Lagauer and Mark (2014): Demographics
- Wei and Zhang (2011): The rising sex ratio imbalance
- Wang and Wen (2011): High housing prices
- Song, Storesletten and Zilibotti (2011) : Financial frictions, reallocation of resources across heterogenous firms

Extend the Model: İmrohoroğlu and Zhao (2017)

- We will incorporate some of these components
- In particular
  - Significant amount of family insurance in China
    - Especially Long-Term Care (LTC) mostly provided by families
    - LTC: Disabled in activities of daily living (eating, dressing, bathing, getting in and out of the bed, inside transferring...)
  - One child policy eroding family insurance
  - Government provided social insurance increasing but weak

İmrohoroğlu and Zhao (2017)

- A general equilibrium model with two-sided altruism
  - Laitner (1992), Fuster, İmrohoroğlu, and İmrohoroğlu (2003 and 2007)
- Decision-making unit is the household consisting of a parent and *n* children who pool resources together
- Life cycle of an individual:
  - born at age 20,
  - become parents (of 20 year old kids) at real-age 55,
  - retire at age 60, and
  - live up to age 90.
- An individual's life overlaps with his parent's in the first 35 periods and with the life of his children in the last 35 periods

Households

- Individuals face labor income risks
- Parents face health related risks that necessitate long-term care
  - If LTC needed there is a time (of the children) and money cost
    - Use micro data to calibrate expenditures and time spent on informal care for individuals in LTC
- Social security not great:
  - In 2002 and 2005, 40-50% of the elderly in cities and more than 90% of the elderly in rural areas did not have a pension
- Help for the most destitute not great

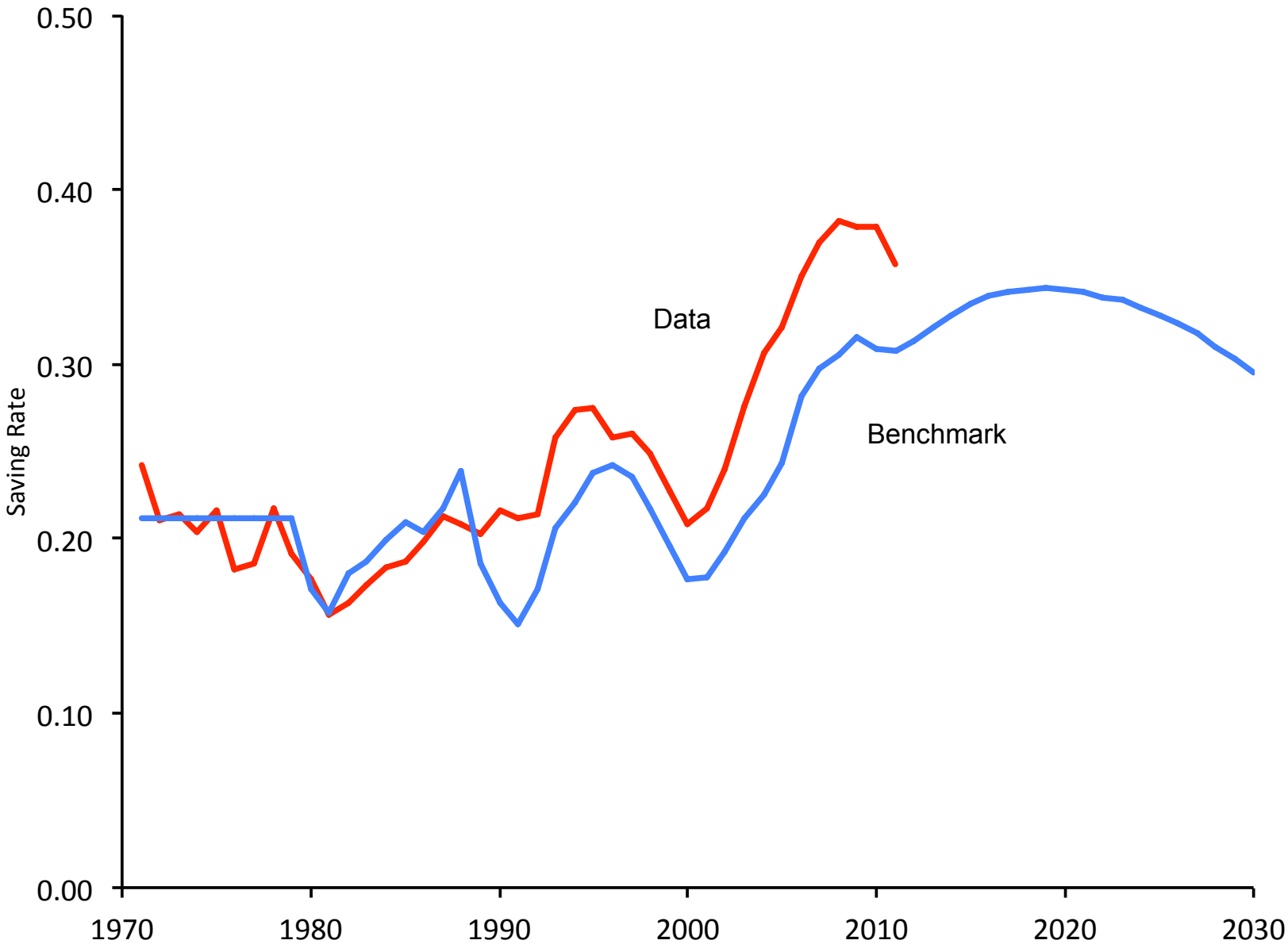
Firms and Government

- A representative firm produces a single good using

$$Y_t = A_t K_t^{\alpha} N_t^{1-\alpha}$$

- The government taxes both capital, and labor income.
- Uses the revenues to finance an exogenously given stream of government expenditures G_t.
- Also taxes to pay for social security

Data versus the Model

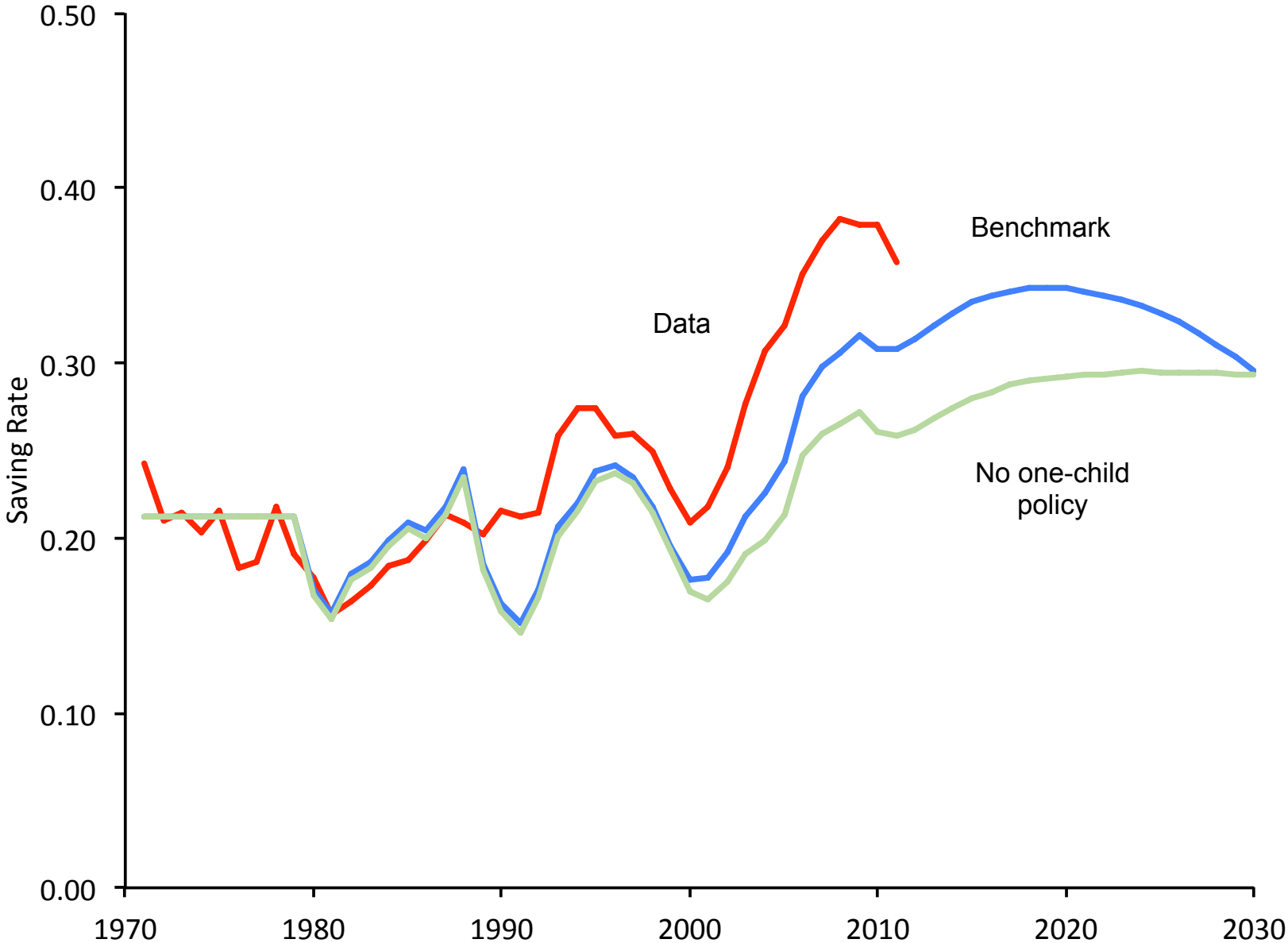


The Chinese Saving Rate: Data versus the Model

Role of the one-child policy

- What if they did not have the one-child policy?
- There would be more family insurance
- Let the fertility rate decline gradually along the transition path
- Fertility rate reaches the replacement rate of one child per parent in 2050

Role of the one-child policy

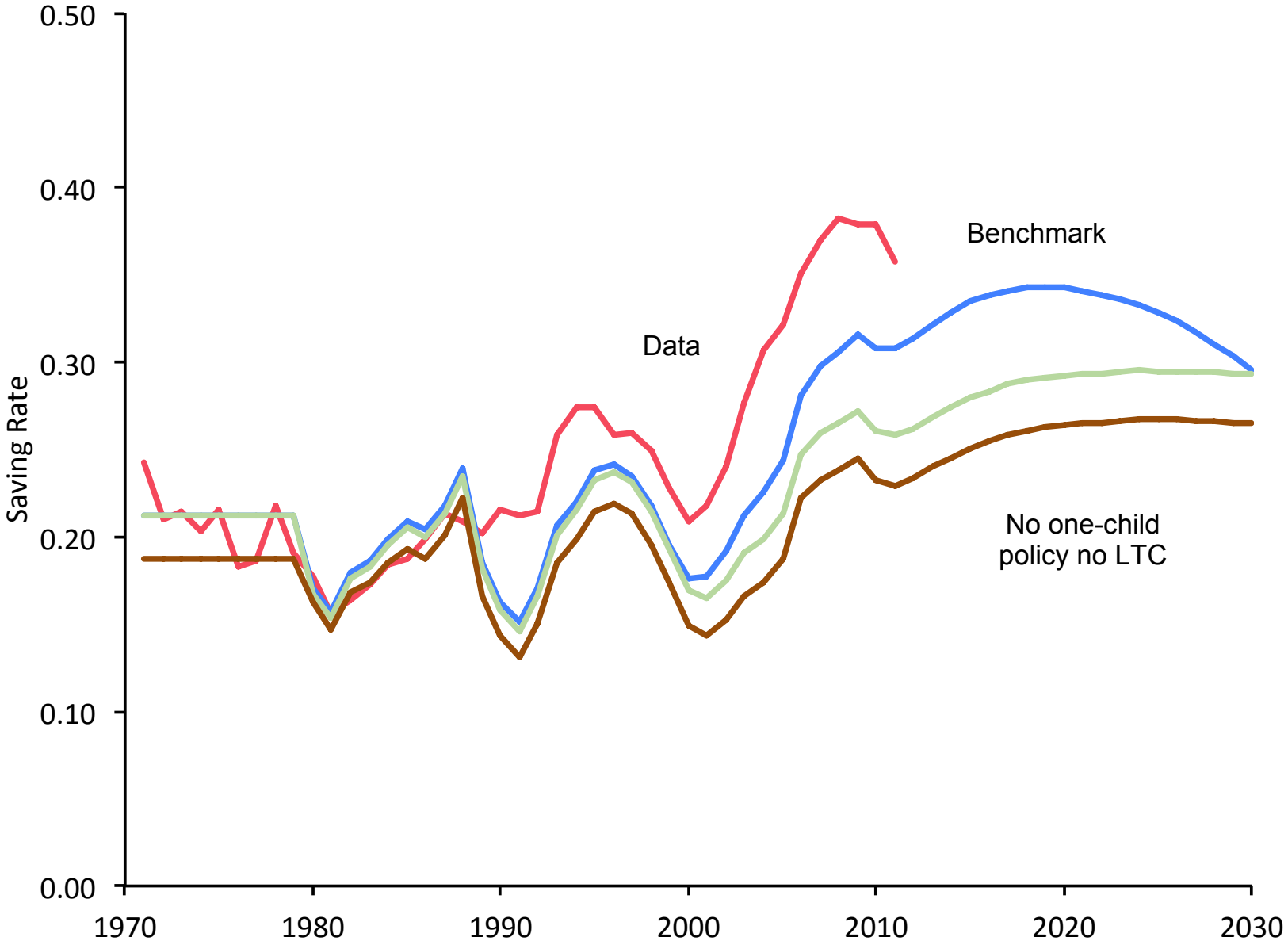


The Chinese Saving Rate: Data versus the Model

Role of the LTC risk

- What if there were no long-term care needs. All healthy families.

Role of the LTC risk



The Chinese Saving Rate: Data versus the Model

Data versus the Model

- Results are sensitive to:
  - What happens to the most destitute
  - Generosity of social security
  - The severity of the risk

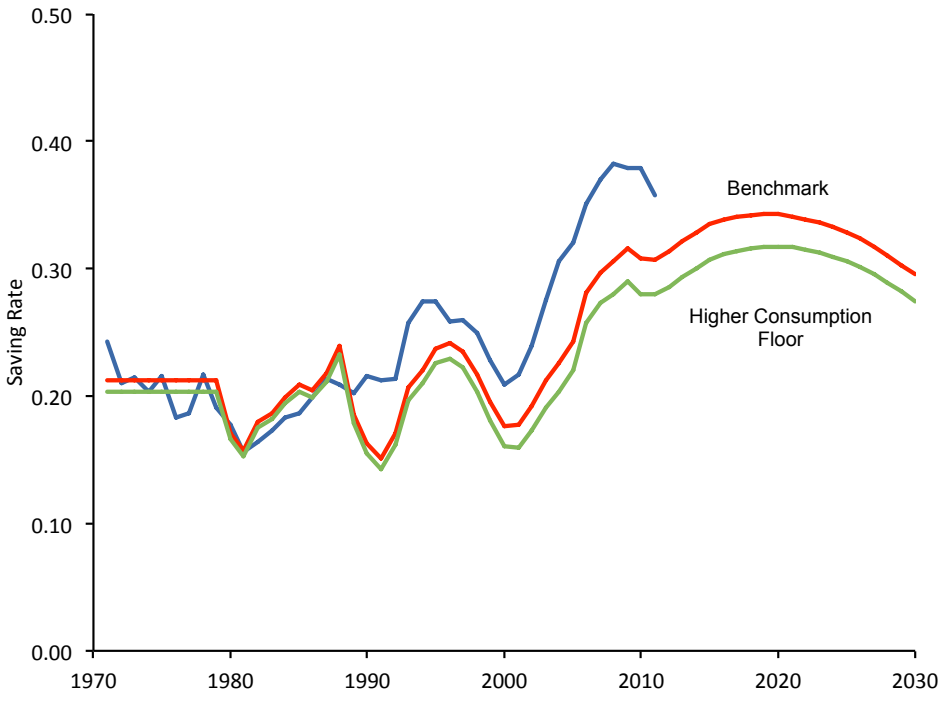
Data versus the Model

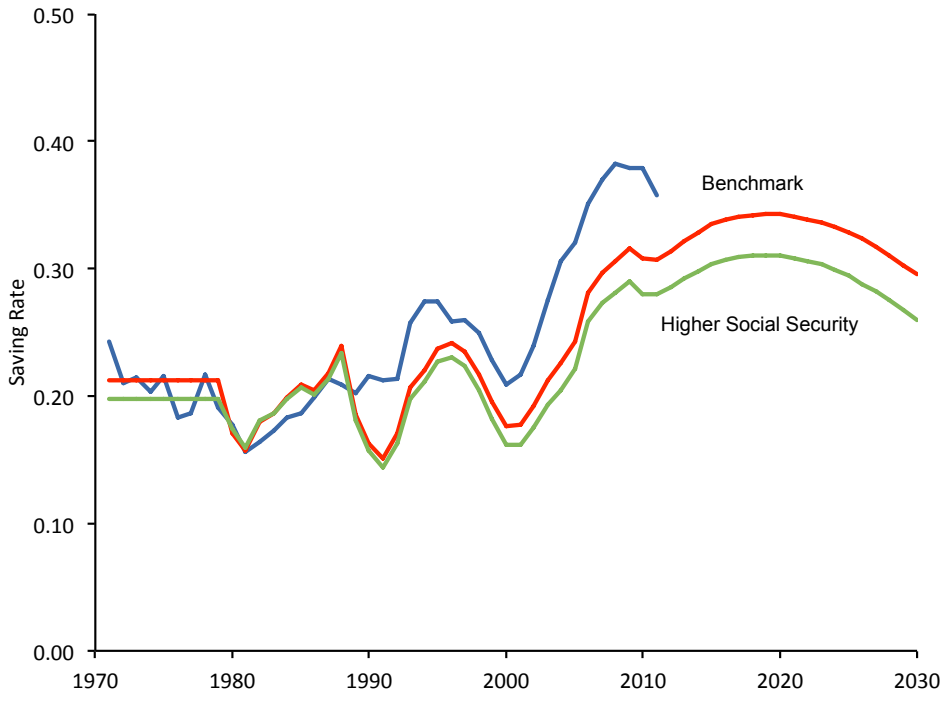
- What happens to the most destitute?
  - De Nardi, French and Jones (JPE 2010) : “Properly accounting for old age expenditure on medical care and for social insurance programs providing a consumption floor are very important to explain the elderly’s savings”
    - In the U.S. Medicaid for the most destitute
  - In China
    - No Medicaid
    - High poverty rate among the elderly

Sensitivity

- Lower /Higher saving rates
  - Higher/lower social security replacement rate;
  - Higher/lower consumption floor

Sensitivity





The Chinese Saving Rate: Sensitivity

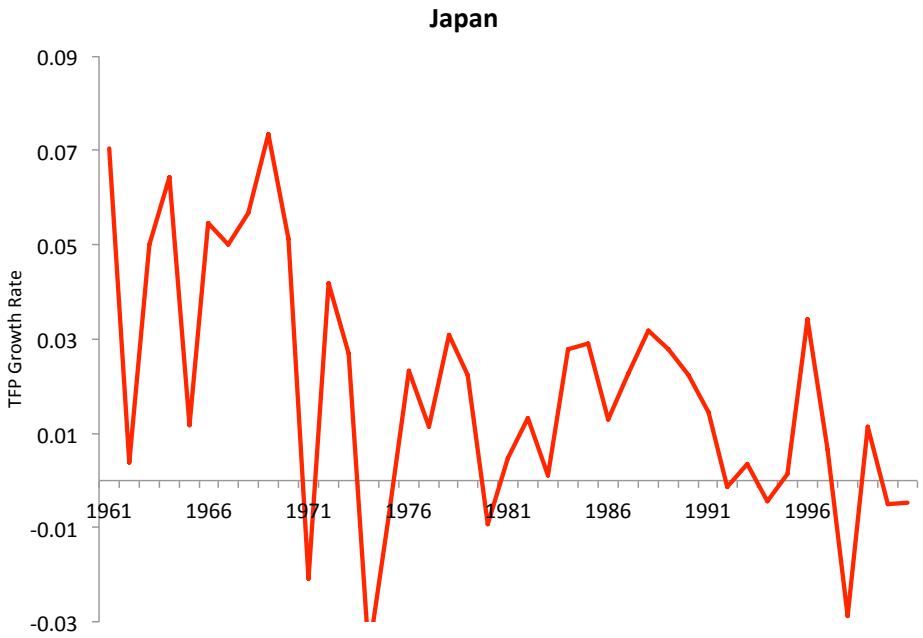
The Case of China

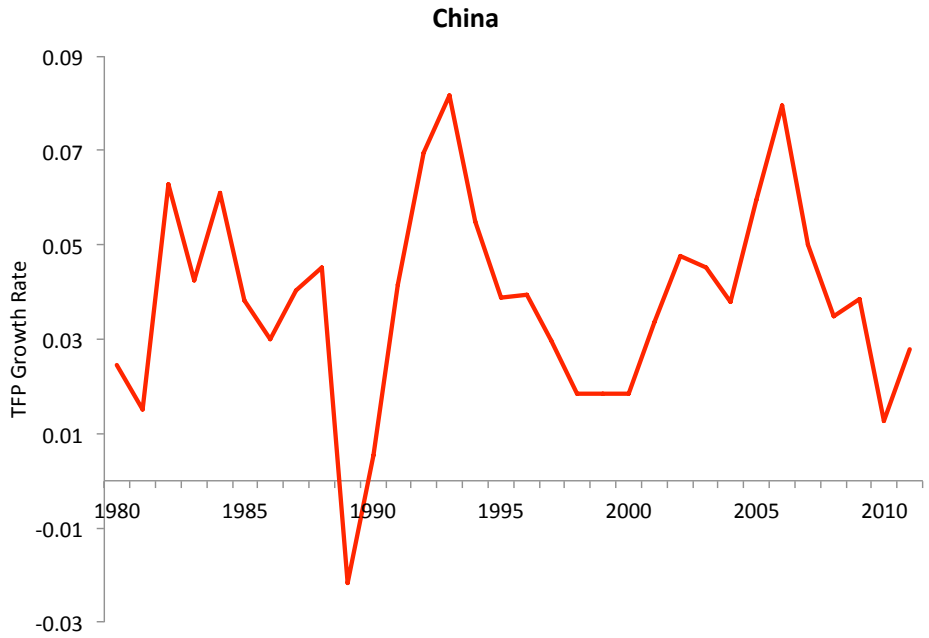
- High saving rates in China
  - Risks faced in old age
  - Decline in family insurance
  - Government provided insurance for old-age risks not so good “yet”

The Case of China

- Why was TFP important in Japan but not in China?

TFP



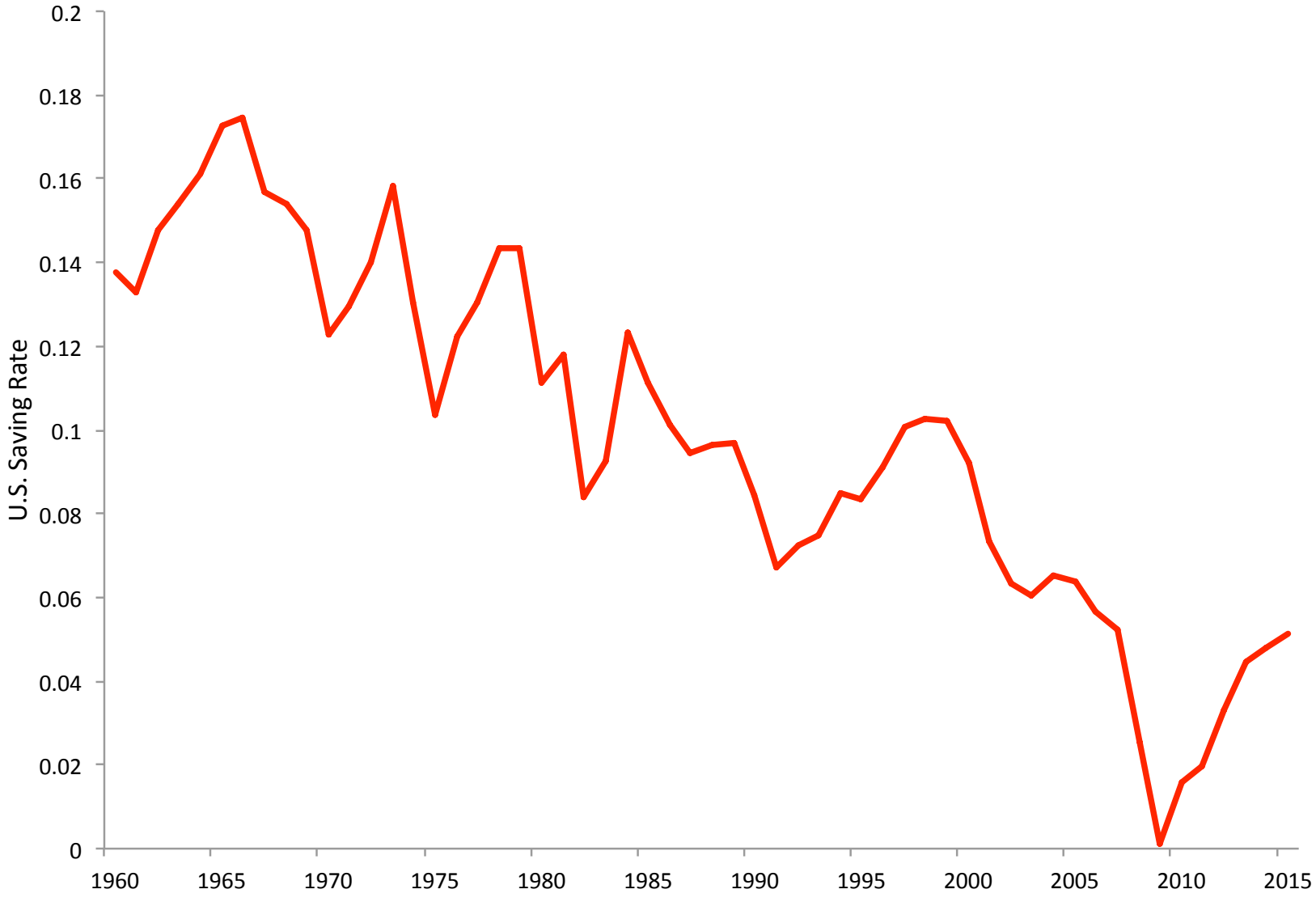


TFP Growth Rates

U.S.

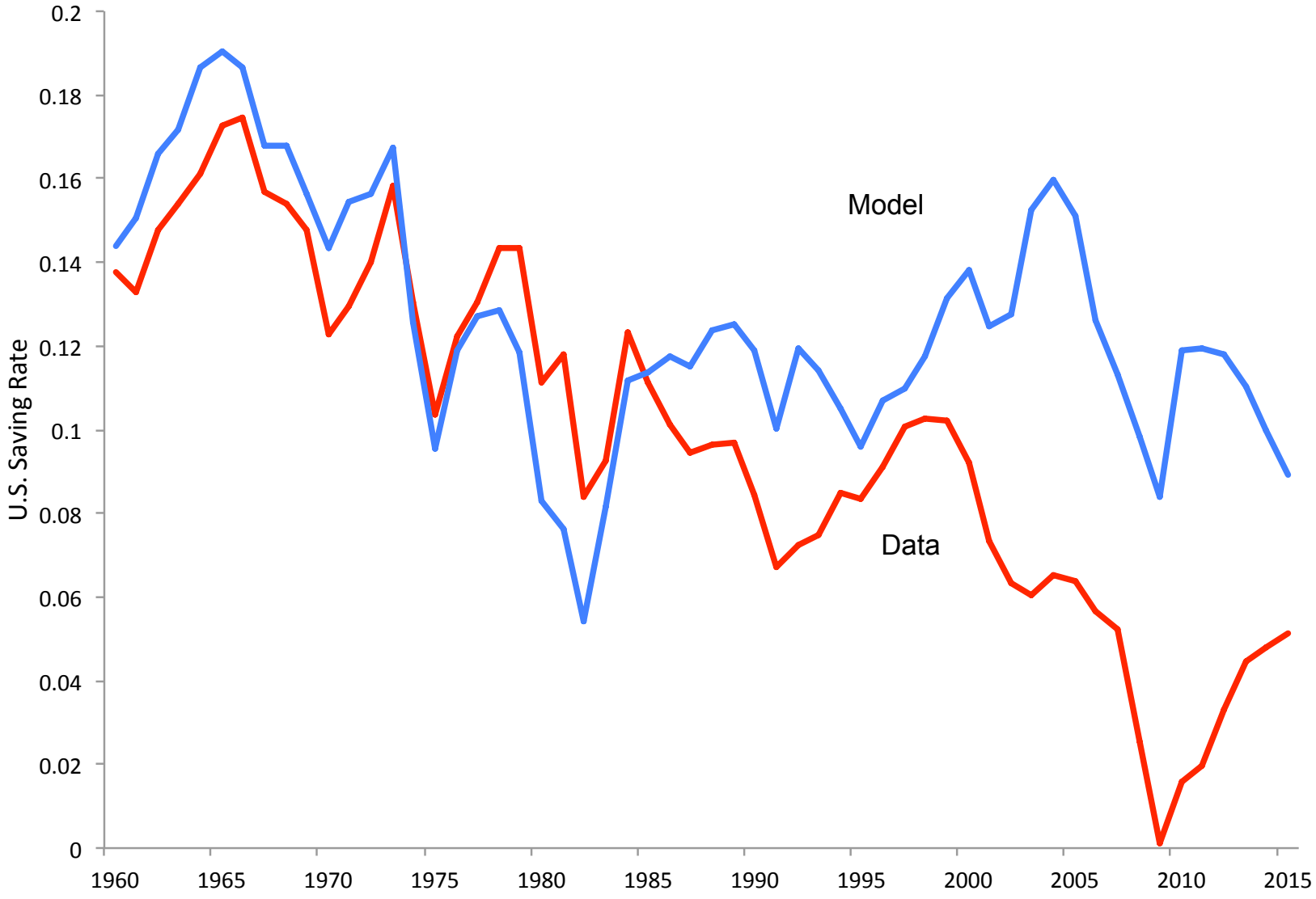
United States

U.S.



U.S. Saving Rate

U.S.



U.S. Saving Rate: Data versus the Model

U.S.

- This is a symptom of other failures
- Standard theory does well until the late 1980s
- But later misses
  - savings
  - and the hours boom

U.S.

- Not so easy to change this
- McGrattan and Prescott (AEJ Macroeconomics, 2010): Intangible Capital
- Hansen and Ohanian (Handbook of Macroeconomics, forthcoming): Home Production
- Mendoza, Quadrini, and Rios-Rull (JPE, 2009): Financial Integration, Global Savings

Conclusions

Conclusions

Conclusions

- Differences in National Saving Rates
  - TFP (especially for the high-frequency fluctuations)
  - Taxes
  - Demographic changes
  - Family Insurance
  - Social Insurance
    - Social Security; Medicaid

Conclusions

- Differences in National Saving Rates
  - Not too puzzling
  - Some mysteries remain

Conclusions

- Looking behind the aggregate savings
- Differences across corporate, household, and government savings
- Differences in saving rates across households
- Differences in returns across households

Conclusions

Thank you!