

Japan's Lost Decade

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- 1. The Miserable Performance**
- 2. Our Basic Idea**
- 3. Details of the Model**
- 4. Model's Prediction**

1. Miserable Performance in the 90s

- GDP per working-age population (Figure 1)
 - Other Important Stylized Facts
 - Figure 2: Capital/Output ratio went *up*
 - Figure 3: Robust investment
 - Figure 4: hours worked declined sharply
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Figure 1: Japan's GNP per working-age pop relative to 2% trend,
1990=100

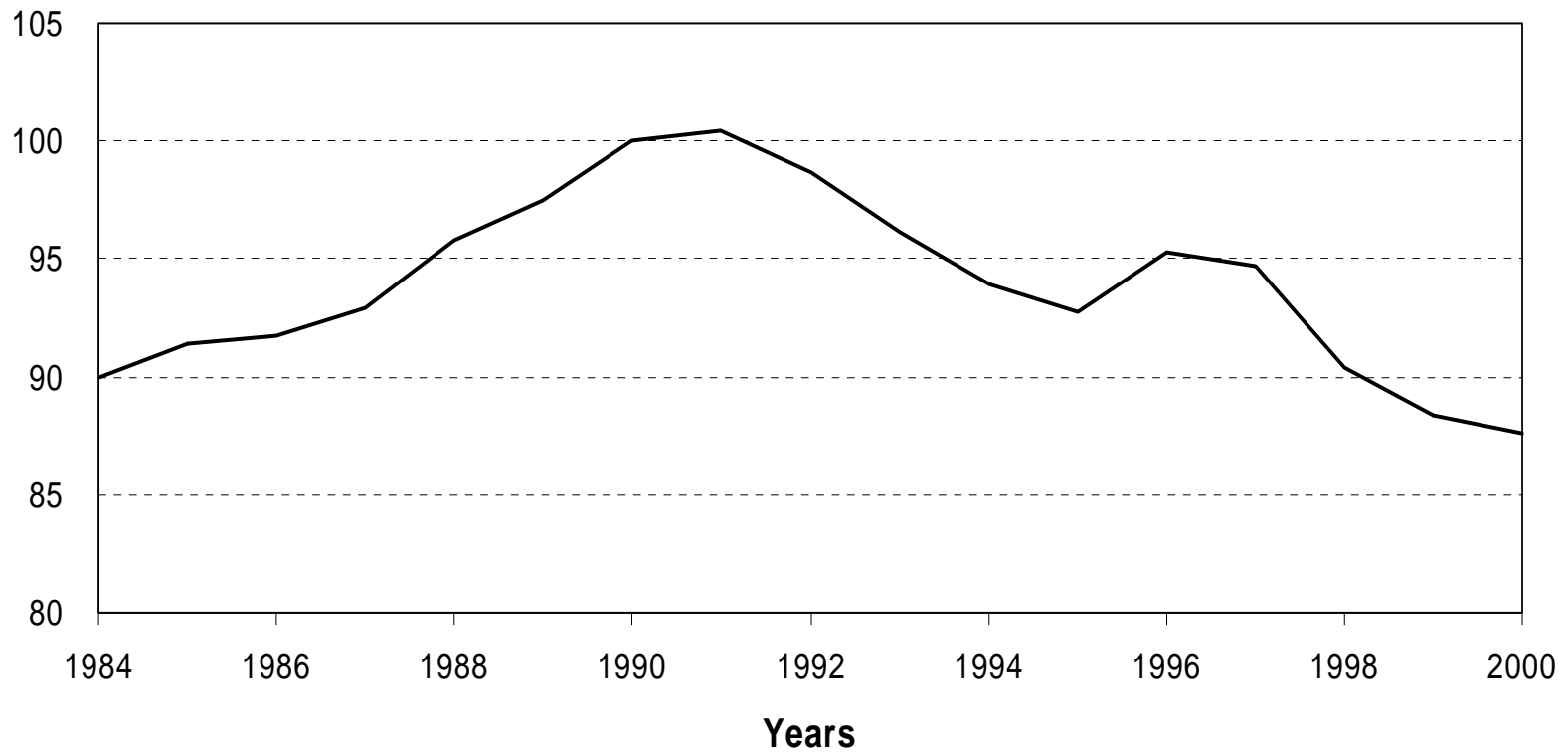


Figure 2: K/Y went up

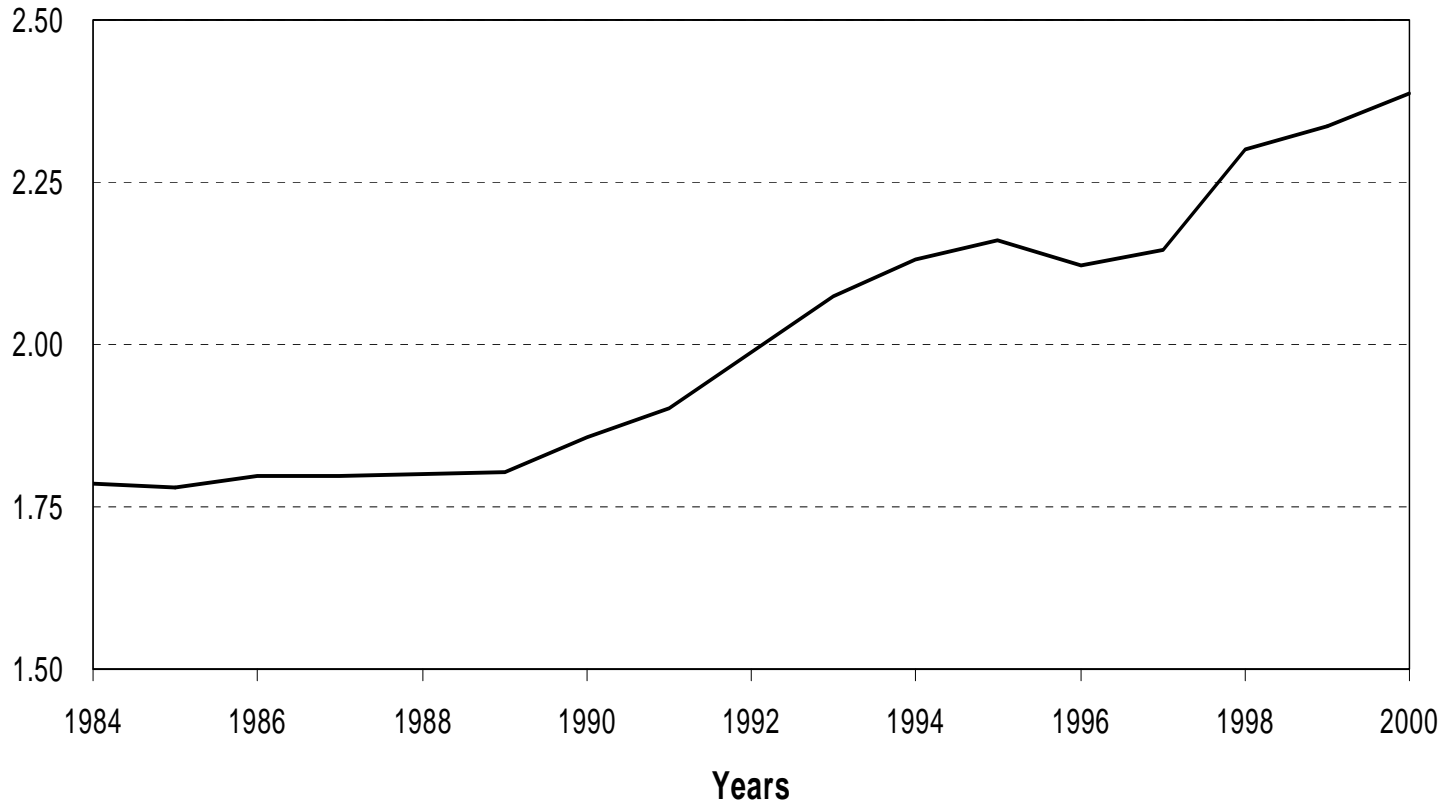


Figure 3: Robust Investment

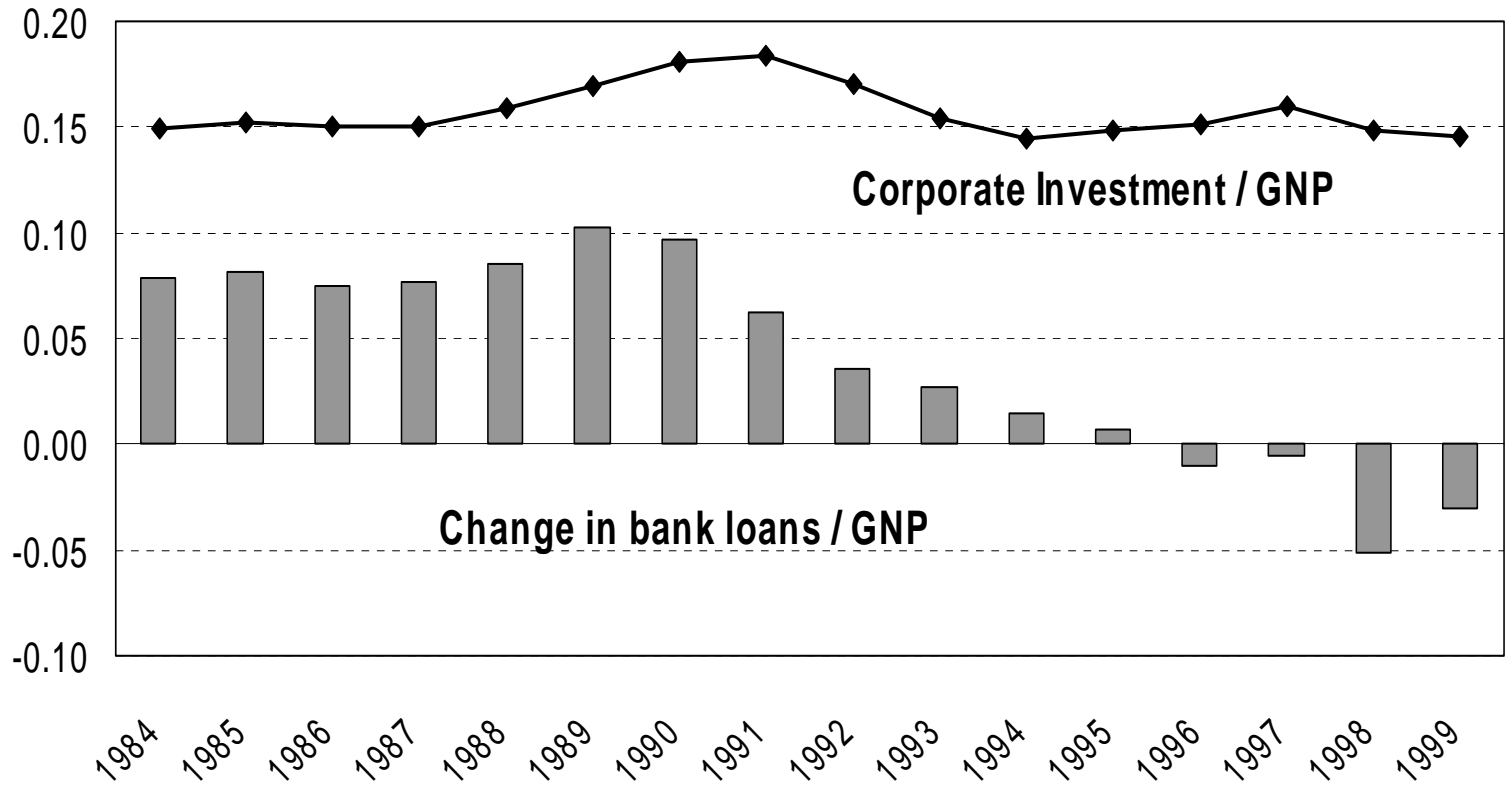
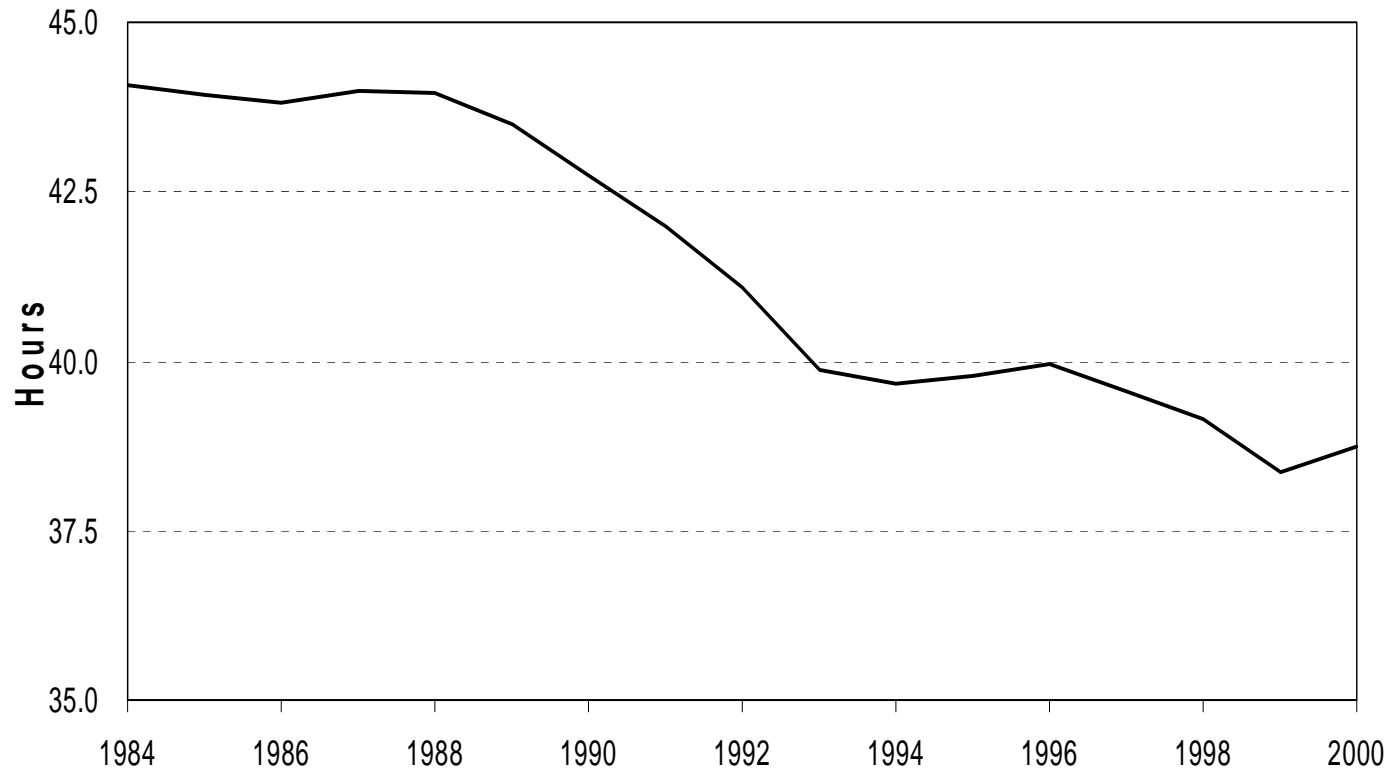


Figure 4: Hours Worked Declined



2. The Basic Idea

- Two Important Developments
 1. Hours worked declined (Figure 4)
 2. TFP growth declined from (Table 1)
 - Basic idea (show visually)
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Table 1: Growth Accounting

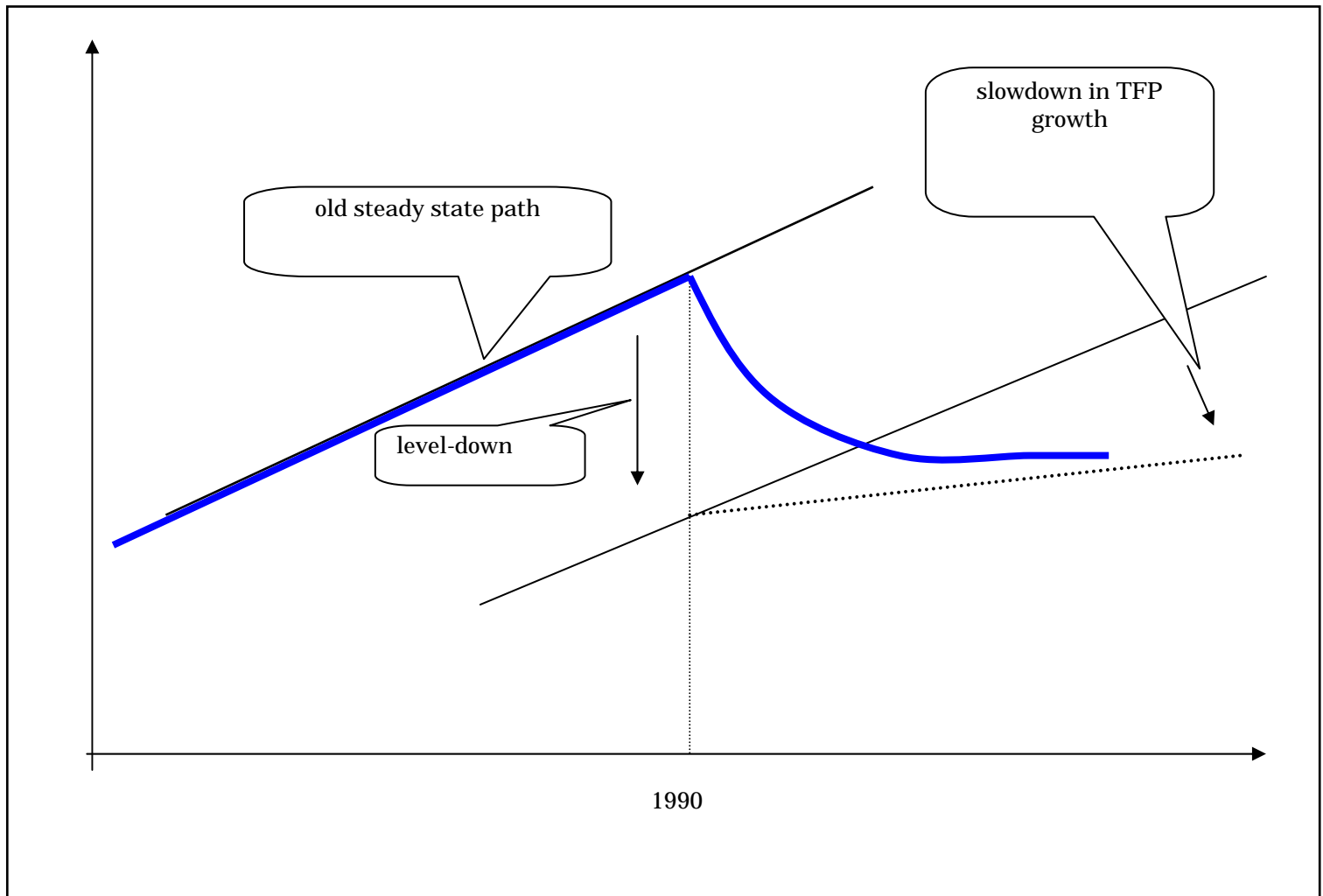
$$Y = A K^\theta (h E)^{1-\theta}$$

where h = hours worked, E = employment, N = working-age population.

$$Y / N = A^{1/(1-\theta)} \times \left(\frac{K}{Y} \right)^{\theta/(1-\theta)} \times h \times \frac{E}{N}.$$

Accounting for Japanese Growth per Person Aged 20-69

Period	Y/N	Factors			
		A	K/Y	h	E/N
1960-1973	7.2%	6.5%	2.3%	-0.8%	-0.7%
1973-1983	2.2%	0.8%	2.1%	-0.4%	-0.3%
1983-1991	3.6%	3.7%	0.2%	-0.5%	0.1%
1991-2000	0.5%	0.3%	1.4%	-0.9%	-0.4%



3. Details of the Model

Technology

$$Y = A K^\theta (h e N)^{1-\theta}$$

Households

$$\sum_{t=0}^{\infty} \beta^t N_t U(c_t, h_t, e_t)$$

$$U(c_t, h_t, e_t) = \log c_t - g(h_t) e_t$$

$$C_t + X_t \leq w_t h_t e_t N_t + r_t K_t - \tau (r_t - \delta) K_t - \pi_t$$

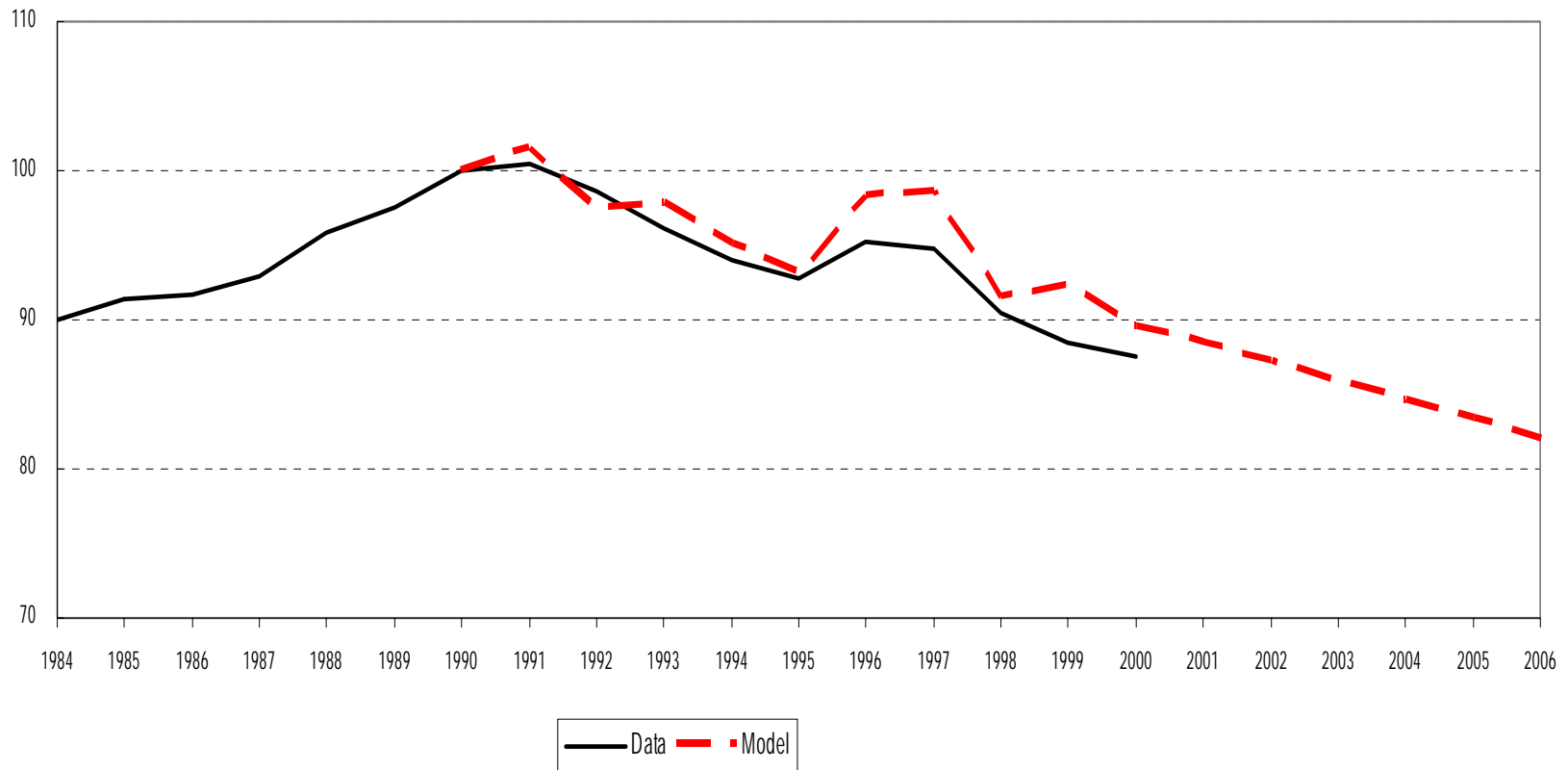
$$i_t = (1 - \tau) (r_{t+1} - \delta)$$

Closing the Model

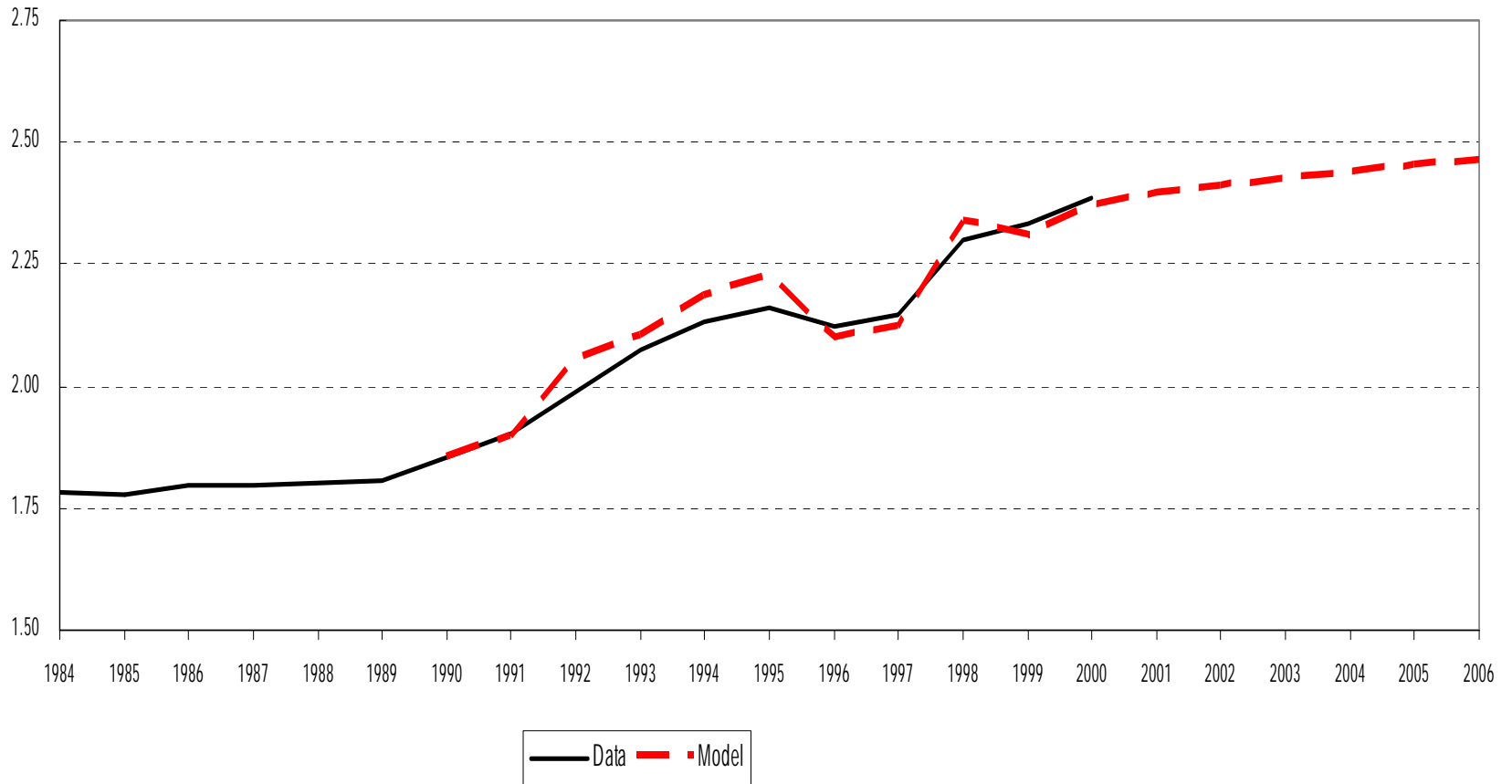
$$C_t + X_t + G_t = Y_t \quad K_{t+1} = (1 - \delta) K_t + X_t$$

4. Model's Prediction

Output: Data vs. Model

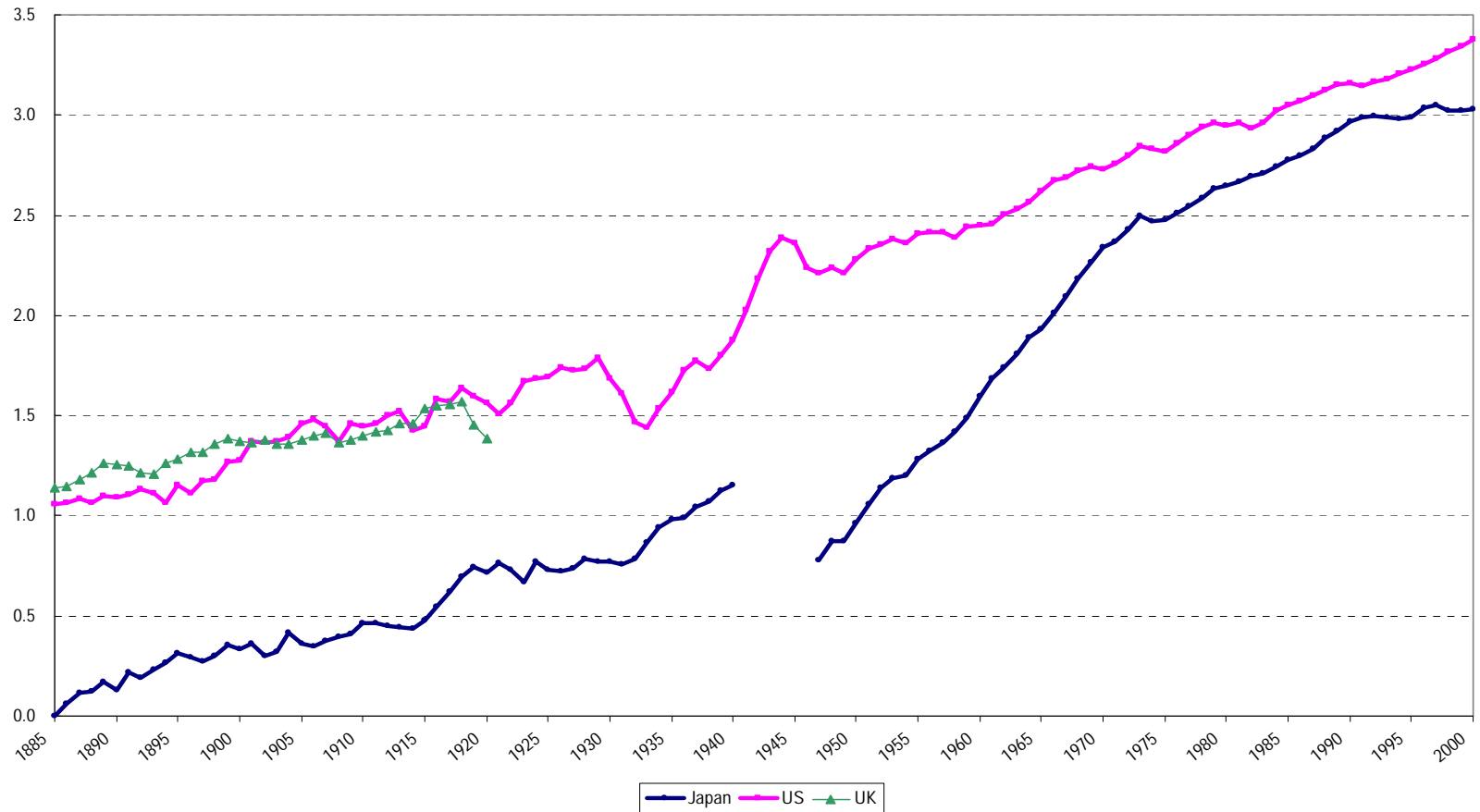


K/Y: Data vs. Model



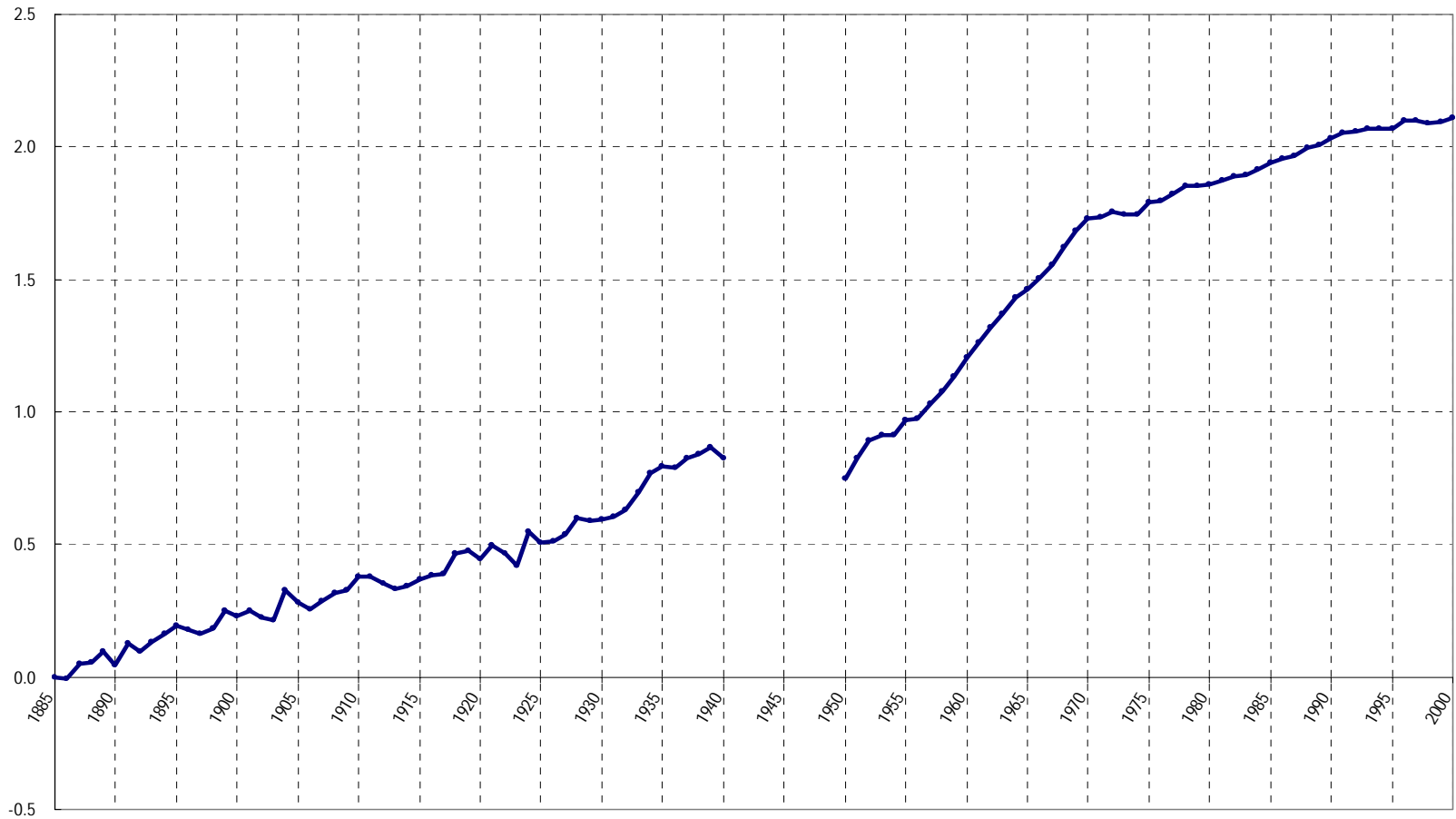
Japan didn't catch up until after WW2

Real Private GNP per Working-age Population, 1885-2000
Japan's log GNP for 1885 = 0

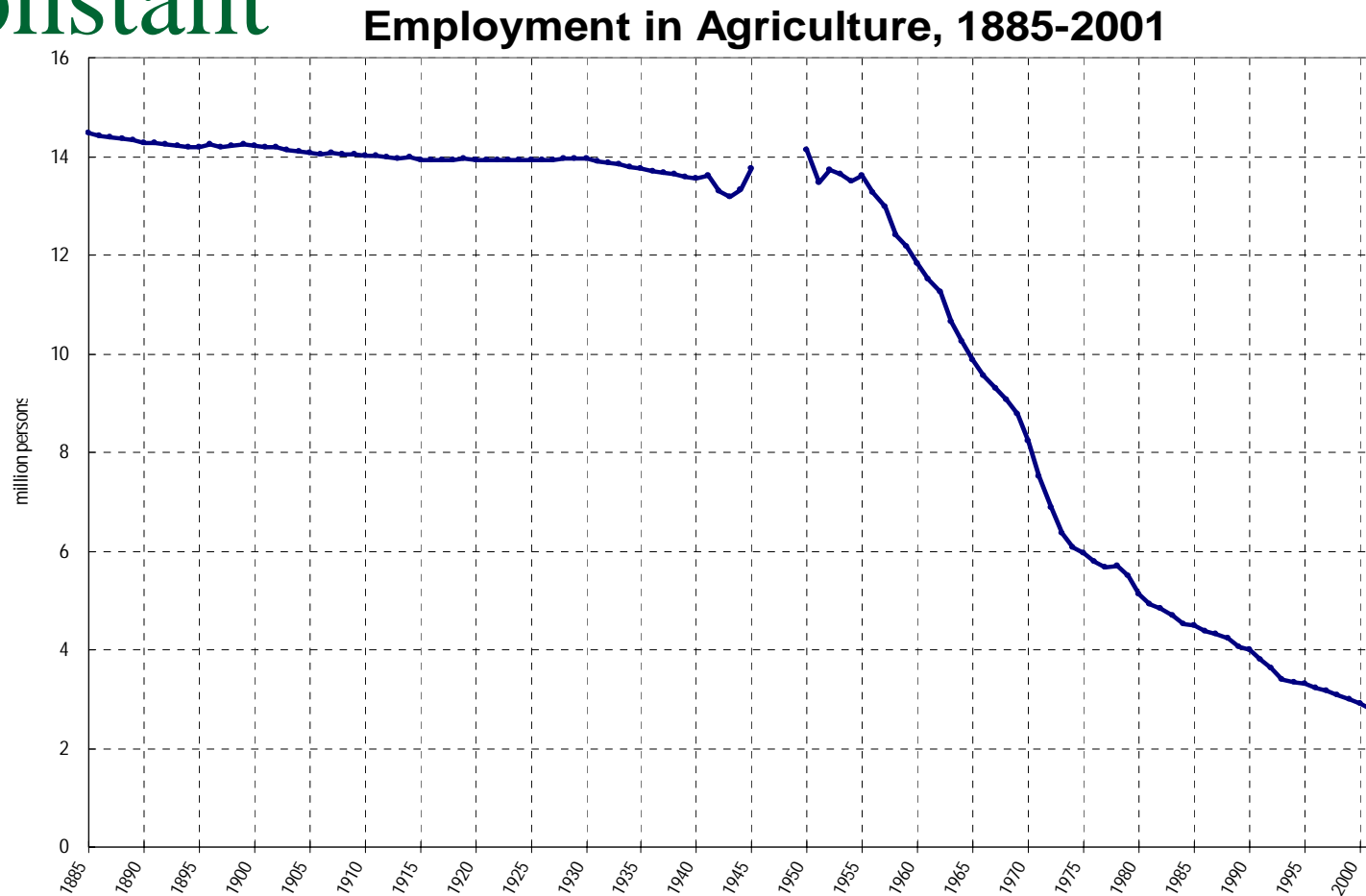


The Reason is TFP

Japan's log TFP (1885=0)

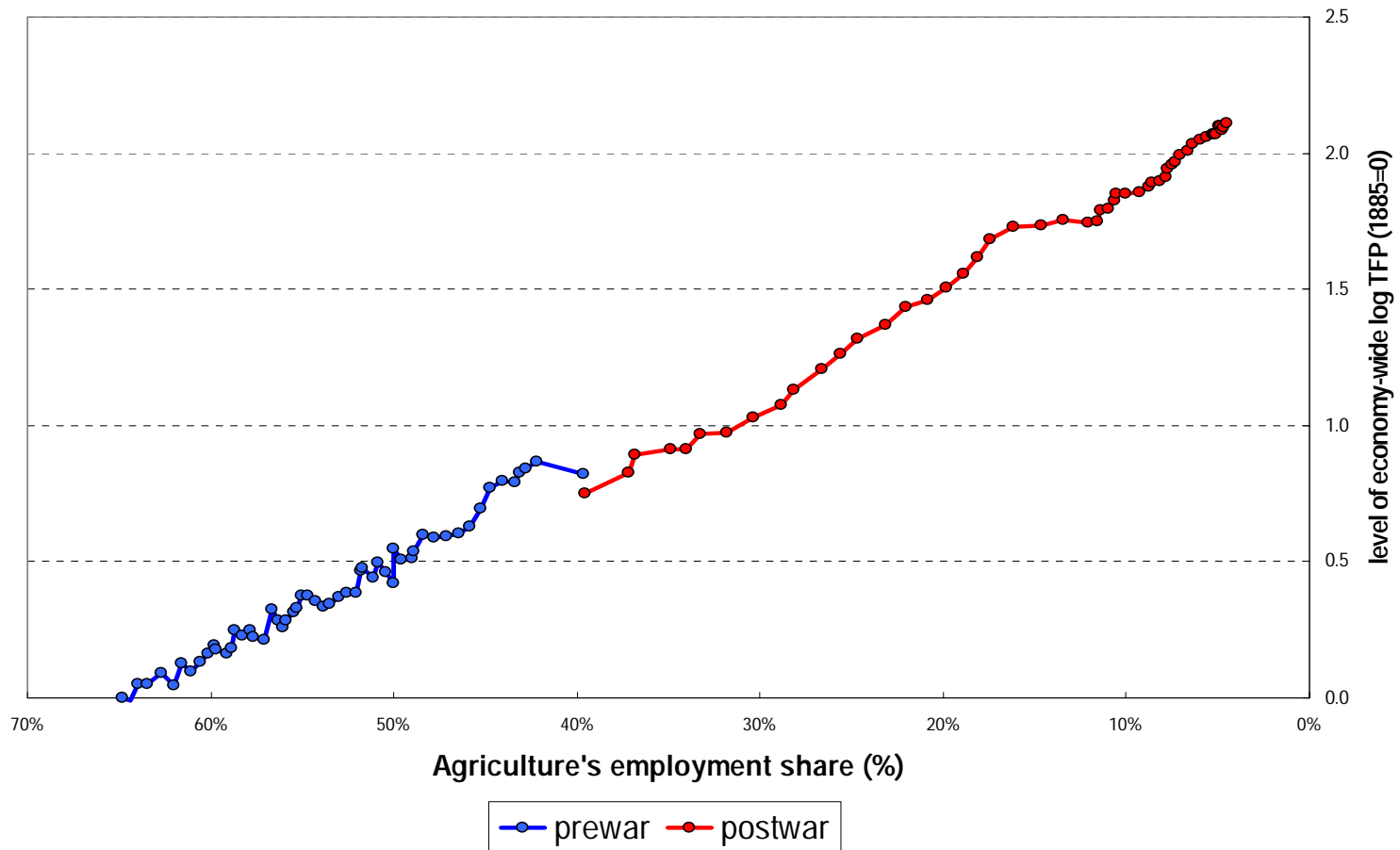


No People in Agriculture was constant



Theory of TFP

Agriculture's Employment Share and Overall TFP: 1885-1940, 1950-2000



It's Banks and Households

