Share of Household Income in China: Trends and Determinants

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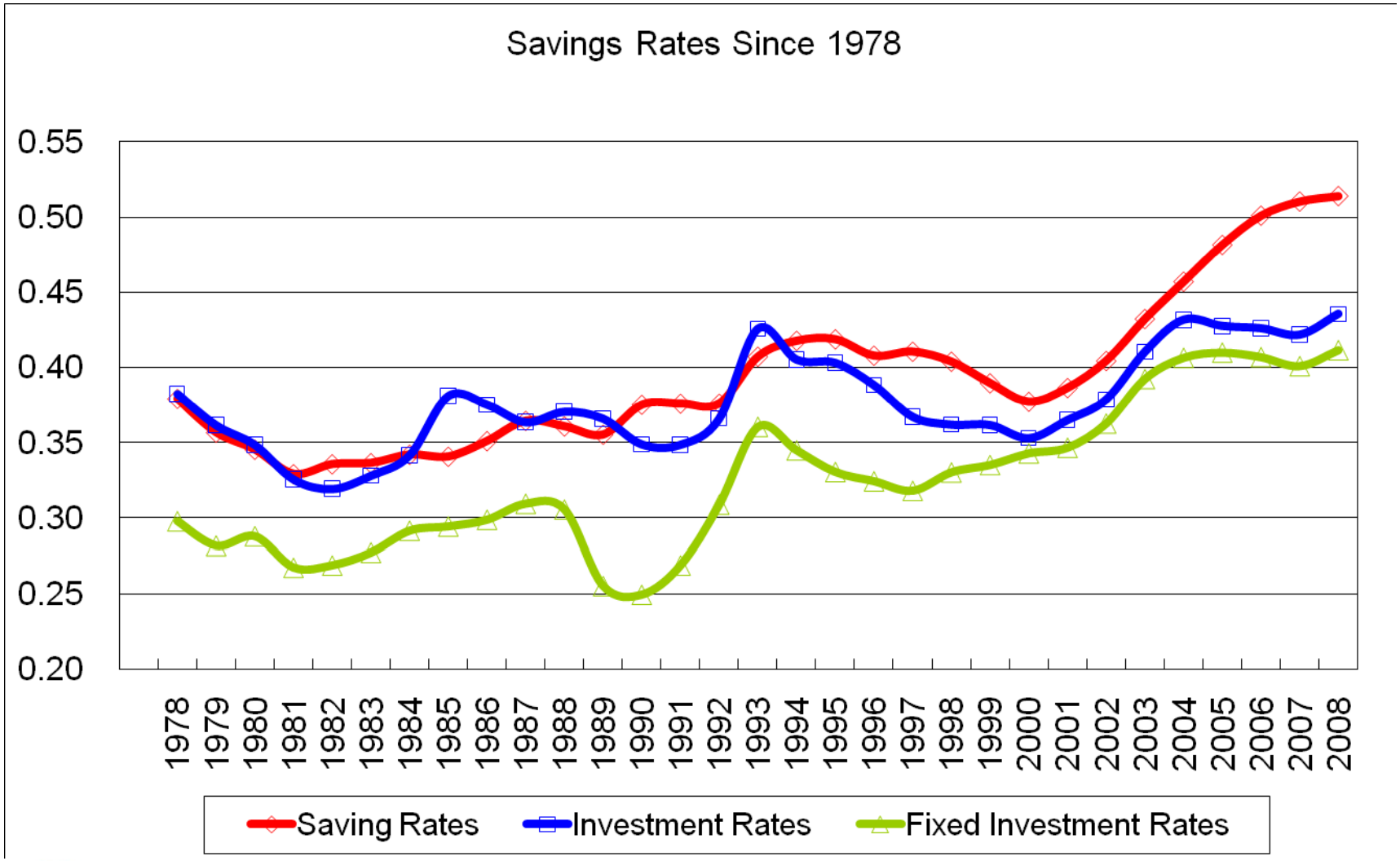
Outline

- Motivation: Savings and the distribution of income among household, corporate, and government sectors
- The reasons for the decline in household disposable income
- The reasons for the decline in labor share
- Policy discussion

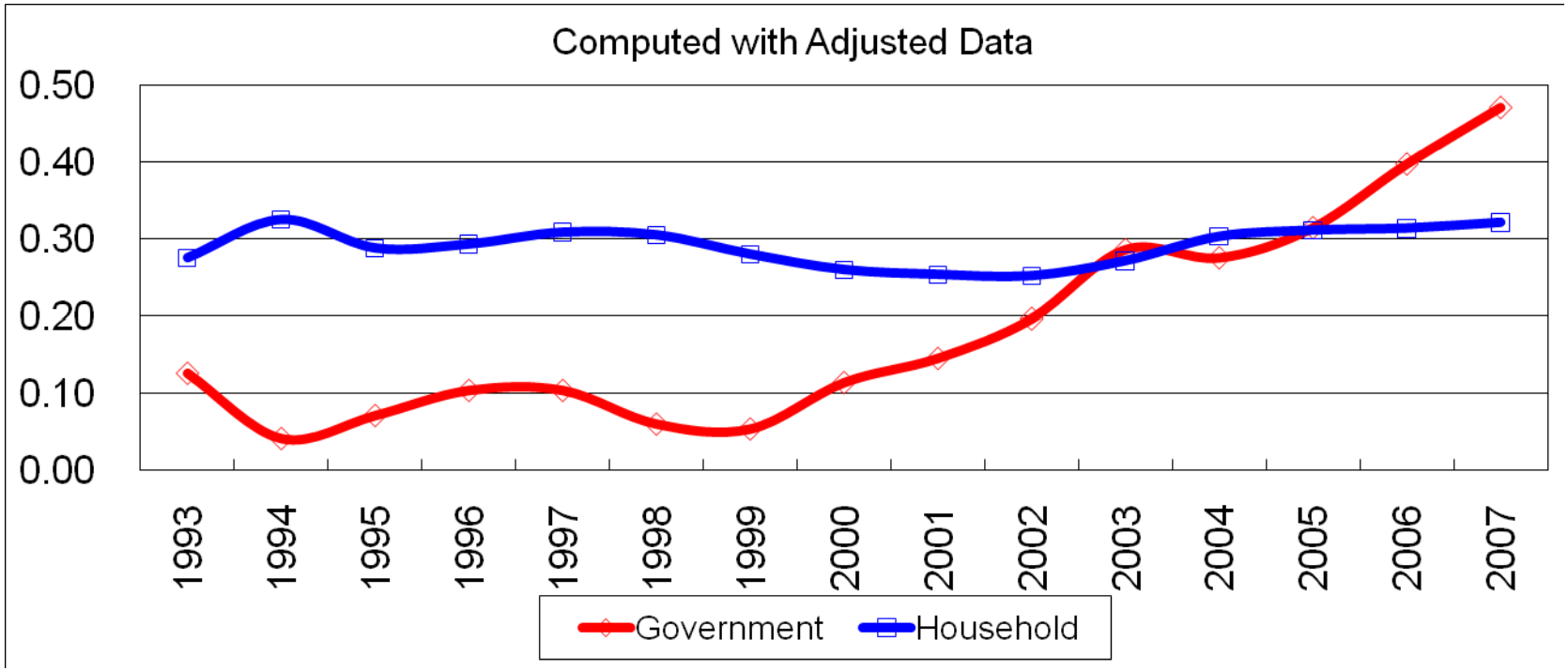
Savings and Investment Rates Since 1978



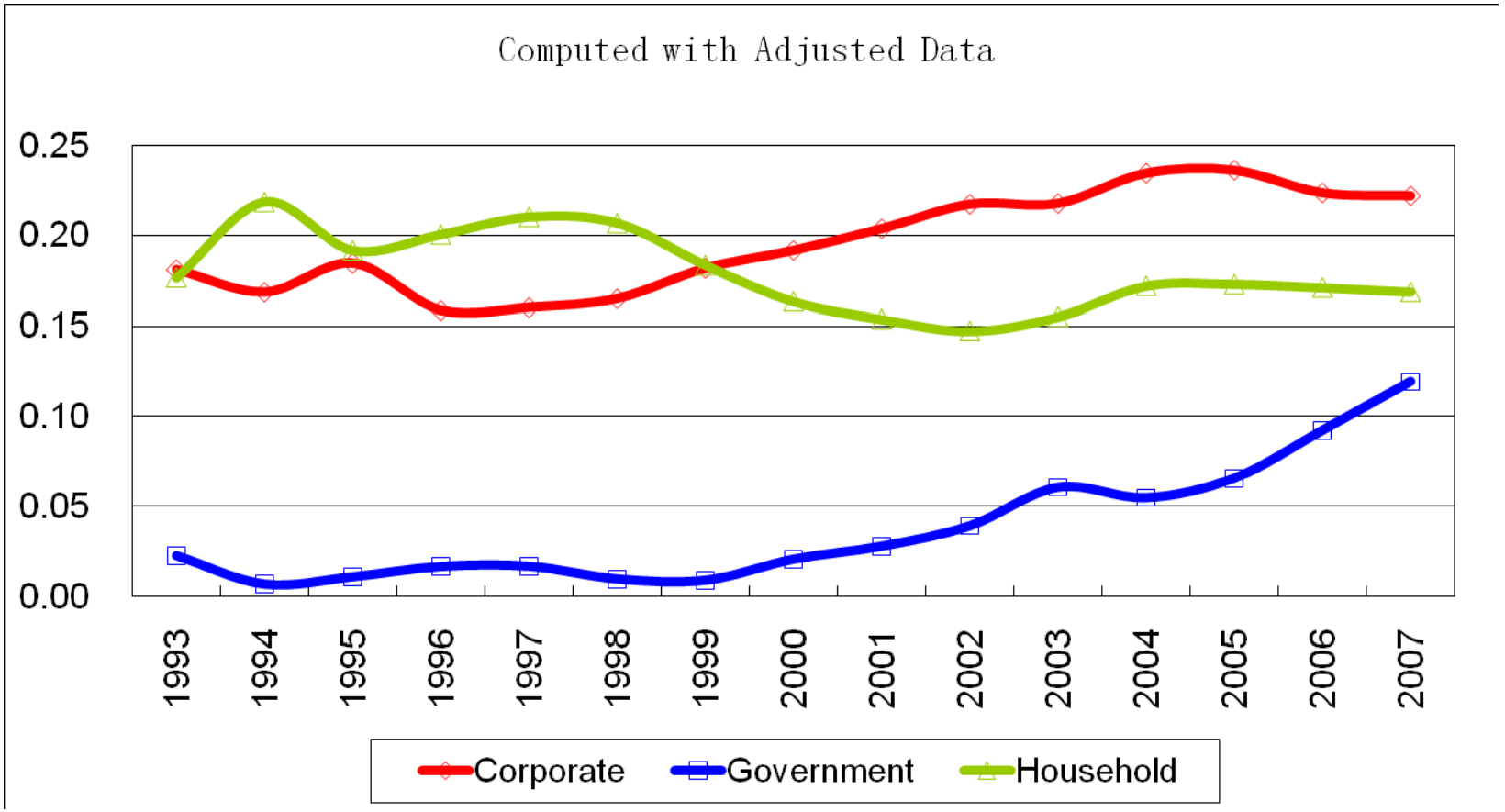
Reasons for Rising Savings Rates

- Rising household savings?
  - Precautionary savings due to poor social security system
  - Bulk consumption and liquidity constraint
    - Housing
    - Education
  - Demographics
  - Income inequality
  - Habit formation
- Rising corporate savings?
- Rising government savings?

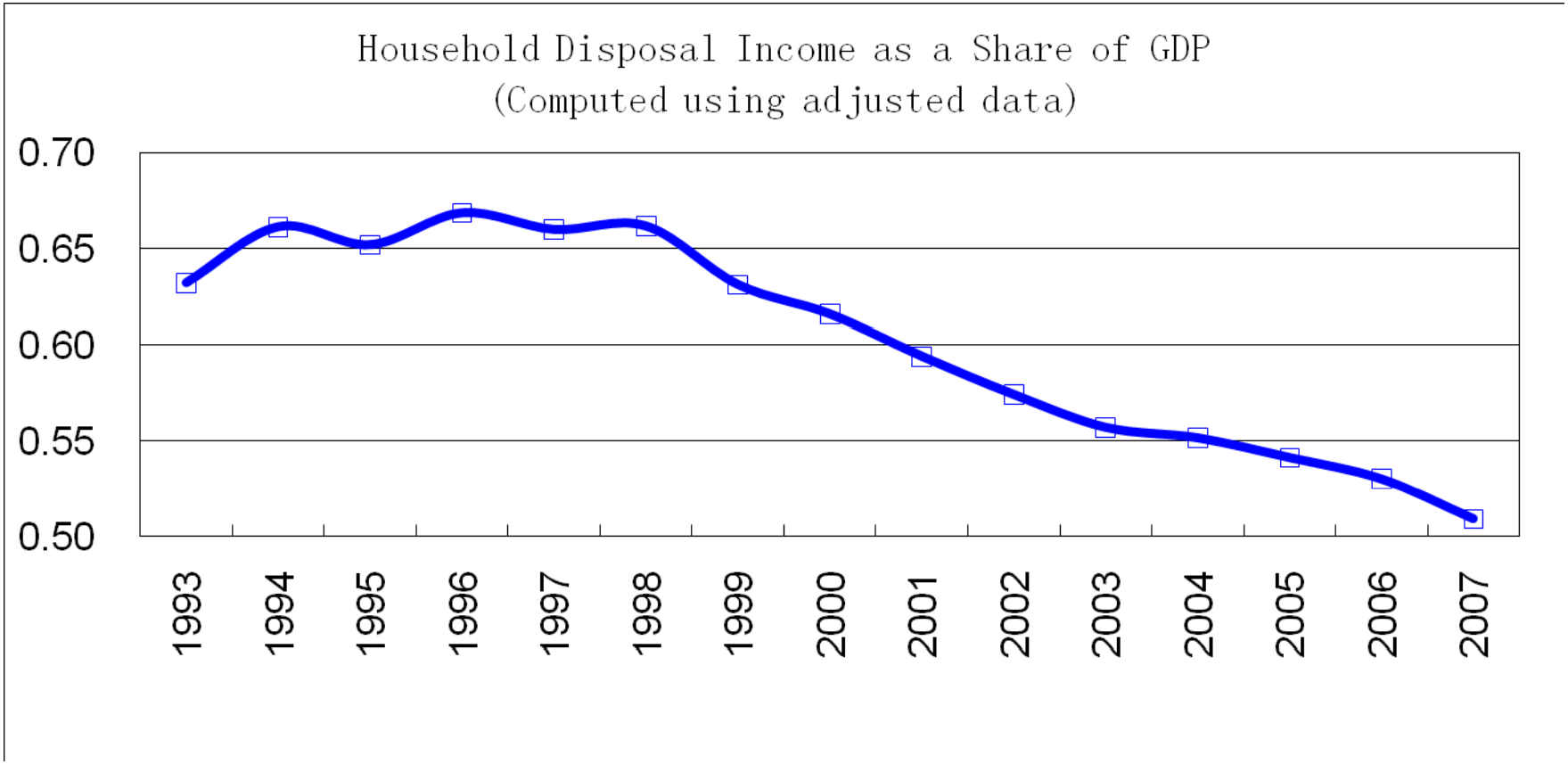
Average Propensity to Save



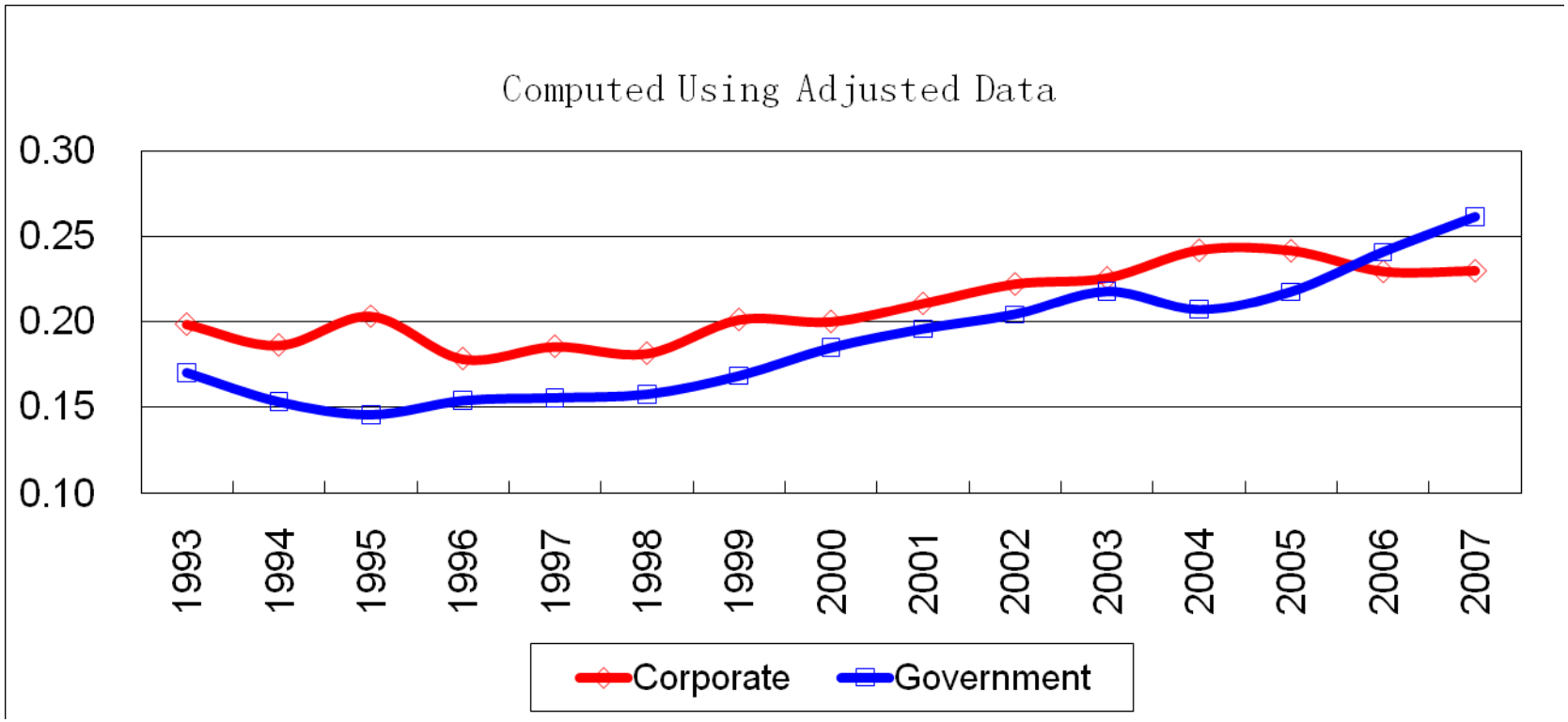
Savings from Different Sectors as Shares of GDP



Distribution of Disposal Income



Distribution of Disposable Income



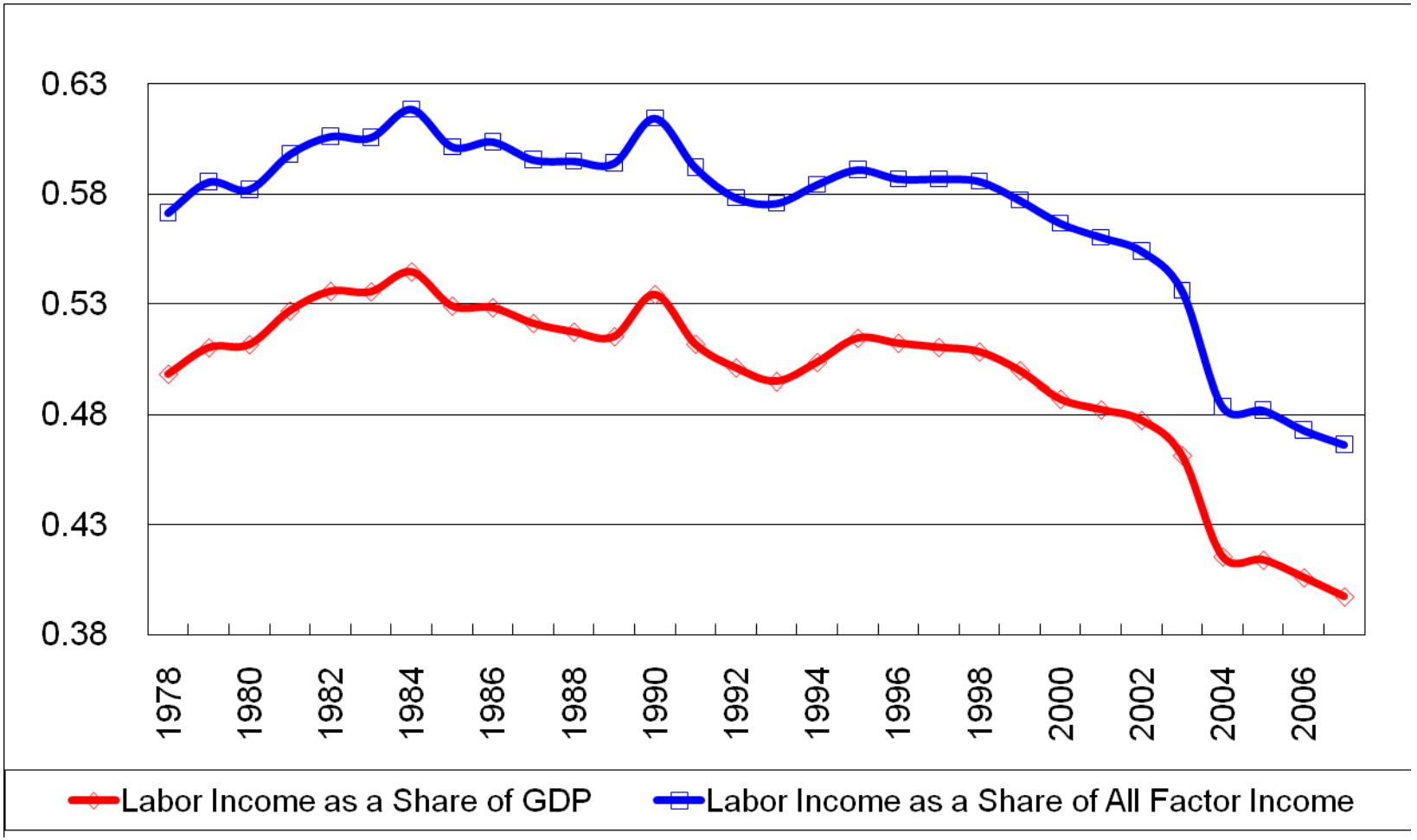
Reasons for the Change in Income Distribution: 1996-2007

	Using Adjusted Data					
	Corporate		Government		Household	
	Value	Share	Value	Share	Value	Share
Labor Income	—	—	—	—	-0.0948	59.57%
Production Tax	—	—	0.0551	51.16%	—	
Property Income	0.0303	58.83%	0.0034	3.15%	-0.0188	11.80%
Operating Surplus	0.0431	83.61%	0.0036	3.33%	-0.0219	13.75%
Total: Primary	0.0735	142.44%	0.0620	57.64%	-0.1355	85.11%
Income Tax	-0.0227	-43.97%	0.0323	30.05%	-0.0097	6.07%
Net SS Payment	—		0.0090	8.34%	-0.0090	5.64%
Payment	—	—	0.0244		-0.0244	
Benefit	—	—	-0.0154		0.0154	
Other Transfer	0.0008	1.54%	0.0043	3.96%	-0.0051	3.18%
Total: Secondary	-0.0219	-42.44%	0.0456	42.36%	-0.0237	14.89%
Disposable Income	0.0516	100%	0.1076	100%	-0.1592	100%

Reasons for the Decline in Household Income Share: 1996-2007

- 60% comes from the decline in labor share
- All items related to household disposable income, including household property income (12%), operating surplus (14%), income tax (6%), net social security payment (6%), and other transfers (3%) moved in the direction of reducing household disposable income.

Labor Share: Different Definitions



Official Statistics of Labor Share

- 1978-1984: slight increase
- 1984-1994: fluctuation
- **1995-: phenomenal decline**
  - 1995-2006: 11.79 percentage points
  - 1995-2004: 10.73 percentage points
  - 2003-2004: an abrupt decline of 5.25 percentage points

Questions

- Facts: What really happened to labor share?
- Reasons:
  - What are reasons for the decline in labor shares since 1995?
  - Can we find a common driver behind the changes in factor income distribution since 1978?

Preview of Main Findings

- The abrupt drop in labor share statistics between 2003 and 2004 is caused by the change in the accounting method.
- The main factors behind the decline in labor share between 1995 and 2003 are:
  - Structural transformation from agriculture to services (61%)
  - SOE reform in industry
  - Increase in market power in industry
- In industry, the change in the relative price of labor and capital and that in technology are not important factors.
- The elasticity of substitution between labor and capital in industry is not significantly different from 1.

Facts: the 2003-2004 Change

- Changes in accounting methods since 2004
  - The income of self-employed individuals in non-agricultural sector was counted entirely as labor income before 2004 but has since been counted as capital income.
  - Operating surplus of state or collective farms began to be counted as labor income

Facts: the 2003-2004 Change

- Using China Economic Census Yearbook 2004, we make adjustments to the 2004 GDP account by income approach to conform to the pre-2004 accounting methods, and find
  - The adjusted labor share in 2004 no longer shows any decline from that in 2003.
  - Labor share decline between 1995 and 2004 is adjusted from 10.73 to about 5 percentage points.

Reasons: the 1995-2003 Change

- Two different approaches can be taken to analyze movement in factor shares
  - The decomposition method initiated by Solow (1958)
  - The modeling method started by Joan Robinson (1933)
- This research
  - For aggregate factor shares: the decomposition method
  - For the dominant sector (industry sector): the modeling method

Review of the Decomposition Method

- Ricardo (1917): the factor income distribution will change with the development of the economy
- Kuznets (1957): the development of the economy is accompanied by the change in sectoral structure
- Solow(1958): the first one to decompose the change in aggregate factor income share into the change from that in **sectoral structure** and the change in **sectoral factor income share**
- Following the practice of Solow (1958), Serres et al. (2001) find that both changes are important in explaining the decrease in labor share in European countries
- Similar results are obtained in other economies (Morel, 2005; Ruiz, 2005; Young, 2006)

Reasons: Decomposition of the Changes in 1995-2003 Aggregate Factor Shares

- Following Solow (1958), we decompose the change in aggregate labor share into changes from those in sectoral structure and in sectoral labor share

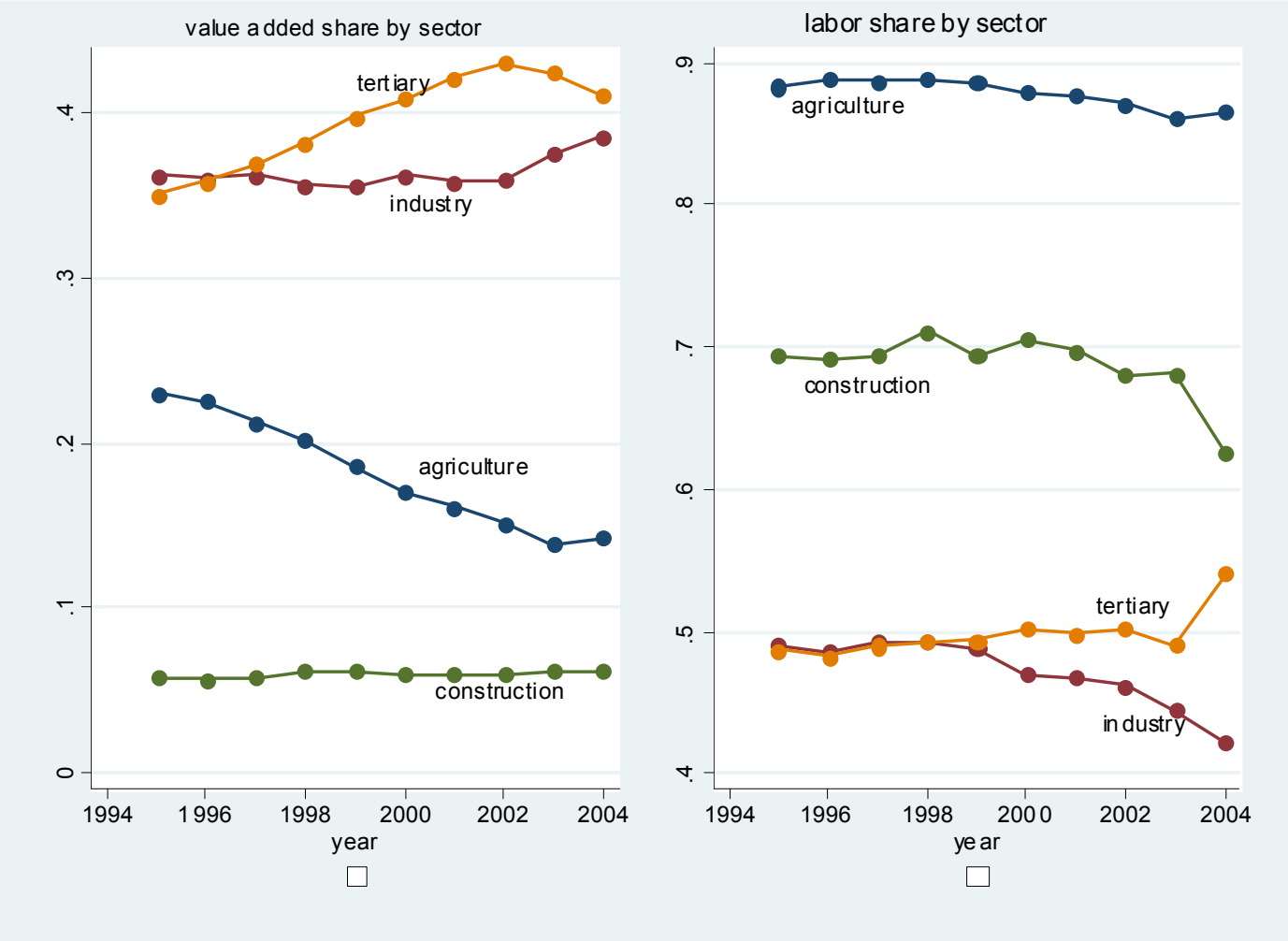
$$\alpha_t = \sum \alpha_{it} \cdot vsh_{it} \text{ (aggregate labor share)}$$

$$\alpha_{t1} - \alpha_{t0} = \sum \alpha_{i,t1} \cdot vsh_{i,t1} - \sum \alpha_{i,t0} \cdot vsh_{i,t0}$$

$$= (\sum \alpha_{i,t1} \cdot (vsh_{i,t1} - vsh_{i,t0})) \text{ (structural effect)}$$

$$+ (\sum (\alpha_{i,t1} - \alpha_{i,t0}) \cdot vsh_{i,t0}) \text{ (within sector effect)}$$

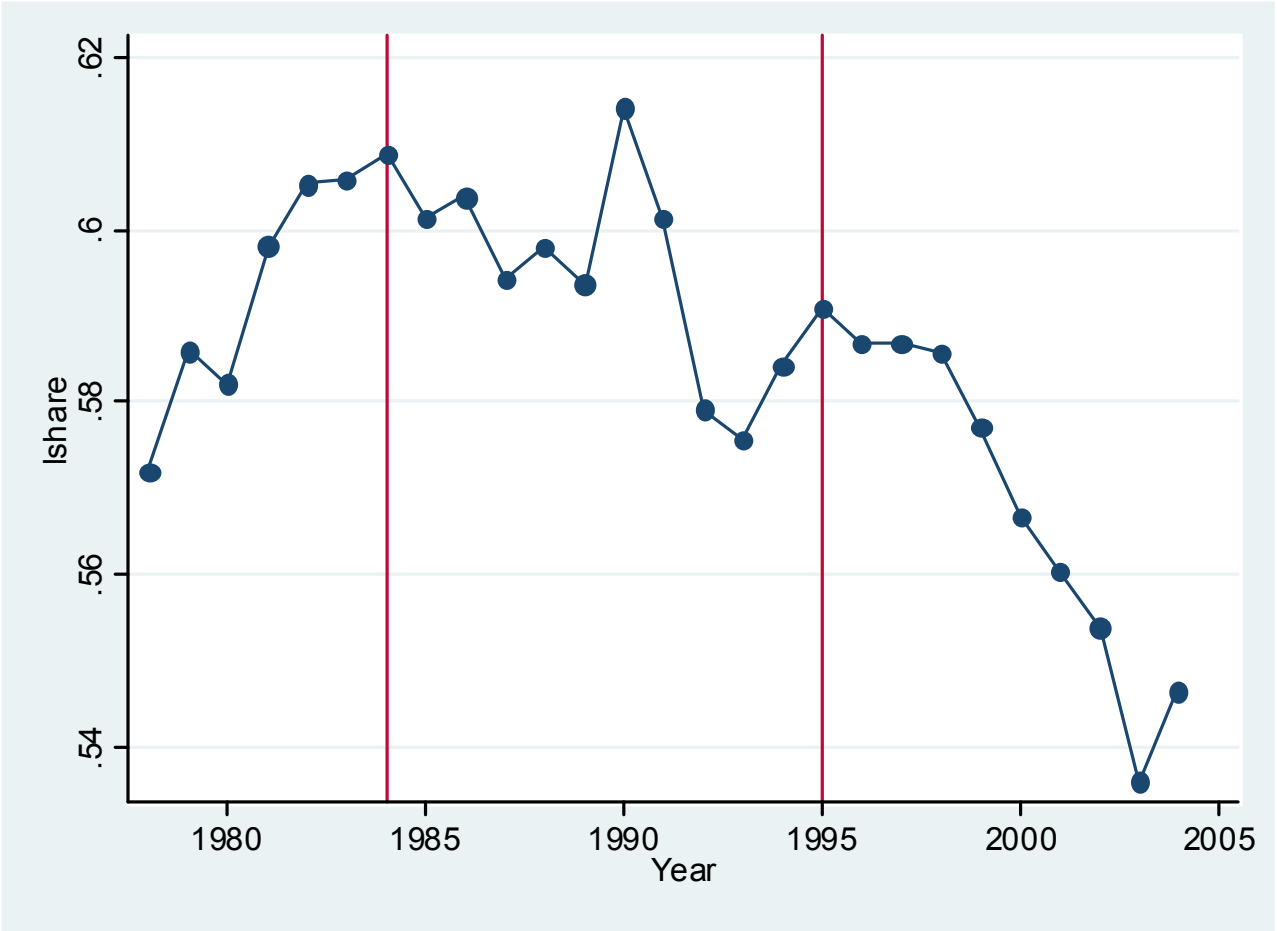
Reasons: Decomposition of the Changes in 1995-2003 Aggregate Factor Shares



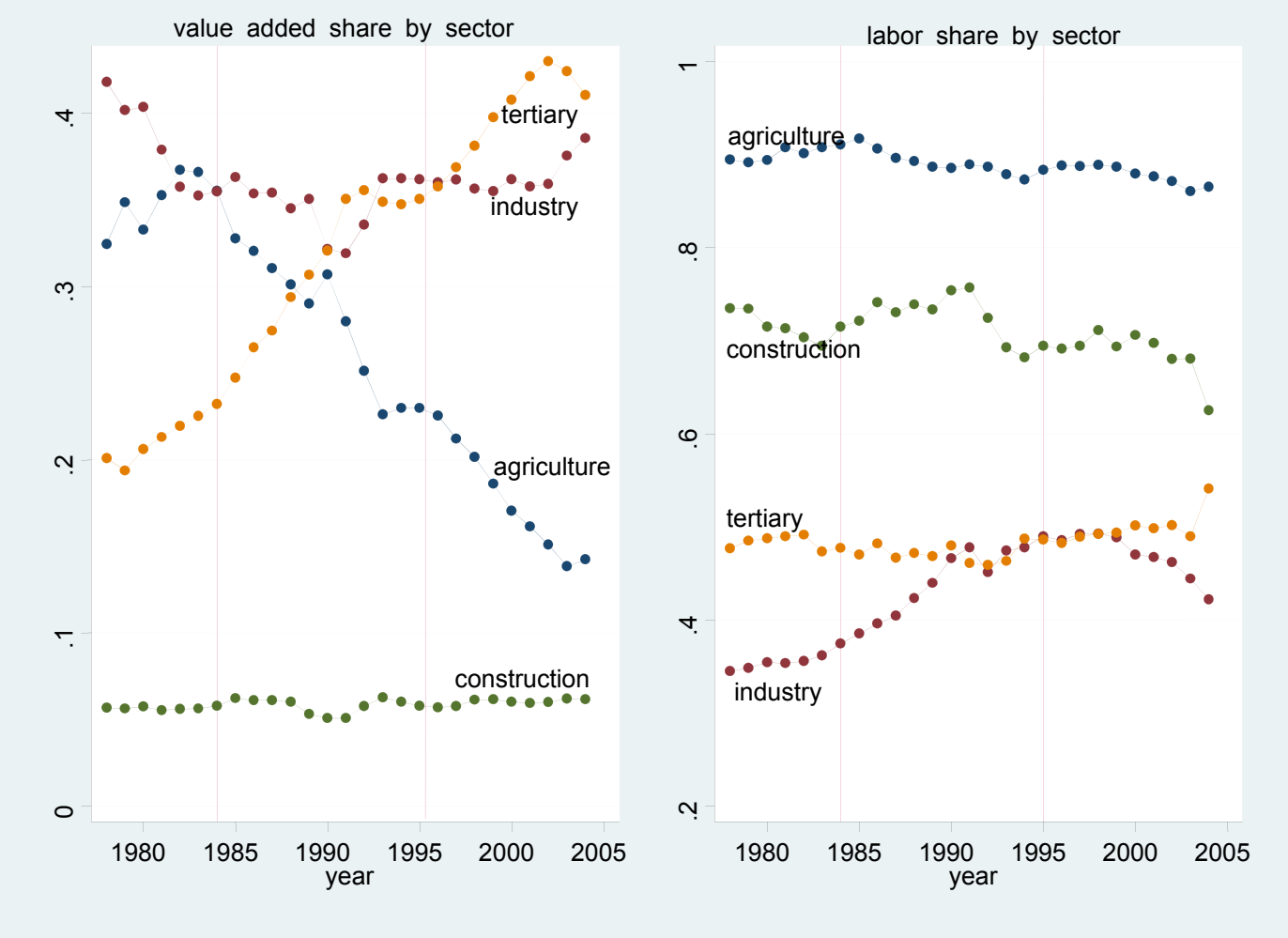
Reasons: Decomposition of the Changes in 1995-2003 Aggregate Factor Shares

- The decomposition shows that 61% of the reduction in aggregate labor share between 1995 and 2003 is due to structural change.
- The labor share decline in the industrial sector accounts for 78% of the within sector effect, or about 30% of the reduction in aggregate labor share between 1995 and 2003.

Reasons: Changes in 1978-2004 Aggregate Factor Shares



Reasons: Changes in 1978-2004 Aggregate Factor Shares



Reasons: Changes in 1978-2004 Aggregate Factor Shares

- Value-added share
  - 1978-1984: structural transformation increases labor share because the share of industry shrinks, and those of agriculture and services expand
  - 1985-2004: structural transformation decreases labor share because the share of agriculture shrinks and that of services expands
- Labor share by sector: Industry plays the major role
  - 1978-1995: increase in labor share
  - 1998-2004: decrease in labor share

Reasons: Changes in 1978-2004 Aggregate Factor Shares

- Decomposition results (Solow method)

Year	Aggregate Change	Contribution of change in sectoral labor share					Structural transformation
		agriculture	industry	construction	tertiary	Total	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
1978-1984	0.0368	0.0057	0.0118	-0.0011	0.0002	0.0166	0.0202
1985-1994	-0.0172	-0.0141	0.0327	-0.0024	0.0046	0.0208	-0.0380
1995-2004	-0.0444	-0.004	-0.0245	-0.004	0.0196	-0.0136	-0.0308

- It's the decline of the labor share in industry sector that makes the post-1995 period special

Reasons: Changes in 1978-2004 Aggregate Factor Shares

- Increase in labor share in industry between 1978 and 1995
  - Between 1978 and 1984, the labor share in the non-state sector was greater than that in the state sector, and the size of the non-state sector increased relative to that of the state sector. Furthermore, the labor share in the state sector was increasing.
  - After 1984, data from different sources yield different results.

Reasons: Decomposition of the Changes in 1978-2003 Aggregate Factor Shares

Structural effect	**positive**	**negative**	
Within sector effect	**positive**		**negative**
Period	**1978-1984: slight increase**	**1984-1994: fluctuation**	**1995-: decline**

Reasons: Decomposition of the Changes in 1978-2003 Aggregate Factor Shares

- **1978-1984: slight increase** because the **structural effect** (shift from industry to agriculture and services) and the **within sector effect** (increase in labor share in industry) are **both positive**.
- **1984-1994: fluctuation** because the **structural effect** (shift from agriculture to services) is **negative** but the **within sector effect** (increase in labor share in industry) is **positive**.
- **1995-: decline** because the **structural effect** (shift from agriculture to services) and the **within sector effect** (decrease in labor share in industry) are **both negative**.

Reasons: the Changes in 1995-2003 Labor Shares in the Industry Sector

- To explain the movement of labor share in the industry sector, we introduce product and factor market imperfections into the neoclassical factor shares model.
  - Product market: the monopolistic competition model
  - Factor market: some firms may pursue scale as well as profit and the extent of deviation from profit maximization depends on ownership

Review of the Modeling Method

- The influence of factor prices and factor inputs on factor income distribution can be captured by the elasticity of substitution and the factor ratio, or equivalently, the production function (Joan Robinson, 1933)
- Technological improvement is introduced into factor income distribution models by factor-augmenting production function (Sato and Koizumi, 1973; Ferguson and Moroney, 1969)
- Blanchard and Giavazzi (QJE, 2003) consider distortions in factor and product markets resulting from market regulations
- Bentolila and Saint-Paul (2003) consider both technological improvement and imperfect market

Reasons: the Theoretical Model for Factor Share Determination

- Utility function: σ is a measure of market competition

$$U_{it} = \left(\sum_{j=1}^{J} Y_{ijt}^{\frac{\sigma_i - 1}{\sigma_i}} \right)^{\frac{\sigma_i}{\sigma_i - 1}}$$

- Production function: εis elasticity of substitution

$$Y_{ijt} = \left(a_i (A_{it} K_{ijt})^{\frac{\varepsilon_i - 1}{\varepsilon_i}} + (1 - a_i)(B_{it} L_{ijt})^{\frac{\varepsilon_i - 1}{\varepsilon_i}} \right)^{\frac{\varepsilon_i}{\varepsilon_i - 1}}$$

Reasons: the Theoretical Model for Factor Share Determination

- Firm objectives: SOEs are interested in the size (output and/or employment) as well as the profits of the firm.

$$\max \theta_{jt} p_{jt} Y_{jt} + (1-\theta_{jt})\Pi_{jt}, \quad 0 \le \theta_{jt} \le 1$$

- Formula for capital share

$$\alpha_{Kjt} = 1 - \frac{w_t L_{jt}}{p_{jt} Y_{jt}} = 1 - \frac{(\sigma-1)}{\sigma(1-\theta_{jt})}\left[1 - a\left(\frac{A_t K_{jt}}{Y_{jt}}\right)^{\frac{\varepsilon-1}{\varepsilon}}\right]$$

- The elasticity of substitution between capital and labor is important.

Reasons: Theoretical Predictions about Factor Share Determination

- The change in the relative price between capital and labor is reflected in capital-output ratio in efficiency terms
- The elasticity of substitution between factors determines the relationship between capital share and capital-output ratio
- Ownership effect: capital share is lower when the firm has a stronger scale preference
- Market power: capital share is higher when the firm has stronger market power

Reasons: Empirical Estimation of the Factors behind Capital Share in Industry

- Data: All SOEs and all non-state owned industrial firms with annual revenue over 5 million yuan
- Dependent variable: α (capital share in value added at factor price)
- Explanatory variables:
  - *mkp* (price markup, concentration ratio, HHI) as proxy for market power
  - *KtY_fc*: capital-output ratio to control for changes in relative price and factor input
  - *Obj_x* (equity shares by ownership or control right status by ownership) to control for differences in objectives across firms
  - *g* (product of Obj_x and year) to control for the effect of SOE reform
  - *Dt* (*i, p*): year (industry, province) dummies

Reasons: Empirical Estimation of the Factors behind Capital Share in Industry

- Model Specifications

$$(\text{model 1})\ \alpha_{k,jt} = a \cdot mkp_{jt} + \beta \cdot KtY\_fc_{jt} + \sum_{x=s,c,lp,f,hmt} \gamma_x Obj\_x_{jt} + g + \sum_{y=t,i,p} \theta_y Dy + c + a_j + v_{jt}$$

Reasons: Empirical Estimation of the Factors behind Capital Share in Industry

- Model Specifications

$$(\text{model } 2)\ \alpha_{k,jt} = a \cdot mkp_{jt} + (\beta_1 + \beta_2 \cdot T) \cdot KtY\_fc_{jt} + \sum_{x=s,c,lp,f,hmt} \gamma_x Obj\_x_{jt} + g + \sum_{y=t,i,p} \theta_y Dy + c + a_j + v_{jt}$$

Reasons: Empirical Estimation of the Factors behind Capital Share in Industry

- Model Specifications

$$(\text{model 3})\ \ln\alpha_{k,jt} = a\cdot\ln mkp_{jt} + \beta\cdot\ln KtY\_fc_{jt} + \sum_{x=s,c,lp,f,hmt}\gamma_x Obj\_x_{jt} + g + \sum_{y=t,i,p}\theta_y Dy + c + a_j + v_{jt}$$

Reasons: Empirical Estimation of the Factors behind Capital Share in Industry

variables (parameters)	Model (1)	Model (2)	Model (3)
mkup (α1)	0.1795***	0.1609***	0.2449***
KtY_fc (β1)	-0.0011	-0.0047**	-0.0088
KtY_fct (β2)		0.0028***	
req_c (γc)	0.0054***	0.0058***	-0.0087*
req_lp (γlp)	0.0077***	0.0046***	-0.0011
req_f (γf)	0.0637***	0.0622***	0.1886***
req_hmt (γhmt)	0.0356***	0.0330***	0.1129***
req_s (γs)	-0.1259***	-0.1096***	-0.6302***
rs_t (γ2s)	0.0043***	-0.0031**	0.0335***
yr_1999 (θ1999)	-0.0027***	-0.0107***	-0.0090**
yr_2000 (θ2000)	-0.0022*	-0.0191***	-0.0076**
yr_2001 (θ2001)	0.0013	-0.0246***	0.0101**
yr_2002 (θ2002)	0.0072***	-0.0273***	0.0348***
yr_2003 (θ2003)	0.0139***	-0.0272***	0.0534***
yr_2004 (θ2004)	0.0005	-0.0429***	0.0171**
yr_2005 (θ2005)	0.0286***	-0.0179**	0.1040***
constant	0.3444***	0.3761***	-0.8504***
Region dummies	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes
Observations	982245	982245	973358
Instruments	94	98	94

Notes: N1, base model; N2, log model; Legend: * p<.1; ** p<.05; *** p<.01

Reasons: Empirical Estimation of the Factors behind Capital Share in Industry

- Estimation results are consistent with theoretical predictions
  - Market power has positive effect on capital share
  - State-owned firms have much lower capital share than non-state-owned firms
- Elasticity of substitution between capital and labor is unitary
  - Changes in the relative price and input ratio do not show significant effect on capital share
- There are obvious differences in factor income distribution across industries and provinces
- Estimation results are robust to variable selection, model specification and sample selection

Reasons: Simulation with Estimated Model for the Industry Sector

- With estimated model 1, we simulate changes in factor shares between 1998-2003 in the industry sector with firm-level data and find that the model can explain 70% of actual change in factor shares, of which:
  - 42% from ownership restructuring
  - 21% from the increase in market power
  - 7% from technology improvement, the restructuring of industry across regions or two-digit industries and the change in relative factor input or price

Reasons: Summary of Results about Changes in 1995-2004 Labor Shares

	points	contribution		
Reasons for the decline in labor share: 1995-2004	**-10.73**	**100%**		
1995-2003	**-5.48**	**51.1%**	**100%**	
(1) structural transformation	-3.36		61.31%	
(2) sectoral labor share change	-2.12		38.69%	100%
(2.1) industry sector	-1.65			77.83% 100%
Of which: SOE restructuring	-0.70			42%
Product market monopoly power	-0.35			21%
Other modeled factors	-0.12			7%
Unexplained residual	-0.48			30%
(2.2) agriculture, construction and tertiary sector	-0.47			22.17%
2003-2004	**-5.25**	**48.9%**	**100%**	
(1) accounting method	-6.29		120%	100%
(1.1) individual owners' income	-7.09			113%
(1.2) state or collective owned farms	0.81			-12.9%
(2) structural transformation	0.28		-5.33%	
(3) sectoral labor share change	0.77		-14.7%	100%
Of which: (3.1) agriculture	0.11			14.29%
(3.2) industry	-0.81			-105%
(3.3) construction	-0.32			-41.6%
(3.4) tertiary sector	1.79			232%

Policy Responses: Primary Distribution

- At least in industry:
  - Increasing wage does not increase labor share because the elasticity of substitution between capital and labor is 1. It reduces employment and does not increase total labor income.
  - Reducing market power in the product market can increase labor share.
  - Besides the increase in market power in the product market, there is no increase in labor market distortion nor the bargaining power of capital vs. labor.
  - Technological development has not played a significant role in the change of factor shares, but employing more labor-intensive technology may help increase labor share.

Policy Responses: Primary Distribution

- Developing the tertiary sector takes time
  - Tax reform
  - Reduce entry barrier

Policy Responses: Secondary Distribution

- Capital Income
  - Interest rate
  - Dividend payment
- Labor Income
  - Payroll tax

Thank You!