

Capital Accumulation, Private Property, and Inequality in China, 1978-2015

Thomas Piketty
PARIS SCHOOL OF
ECONOMICS

Li Yang
PARIS SCHOOL OF
ECONOMICS

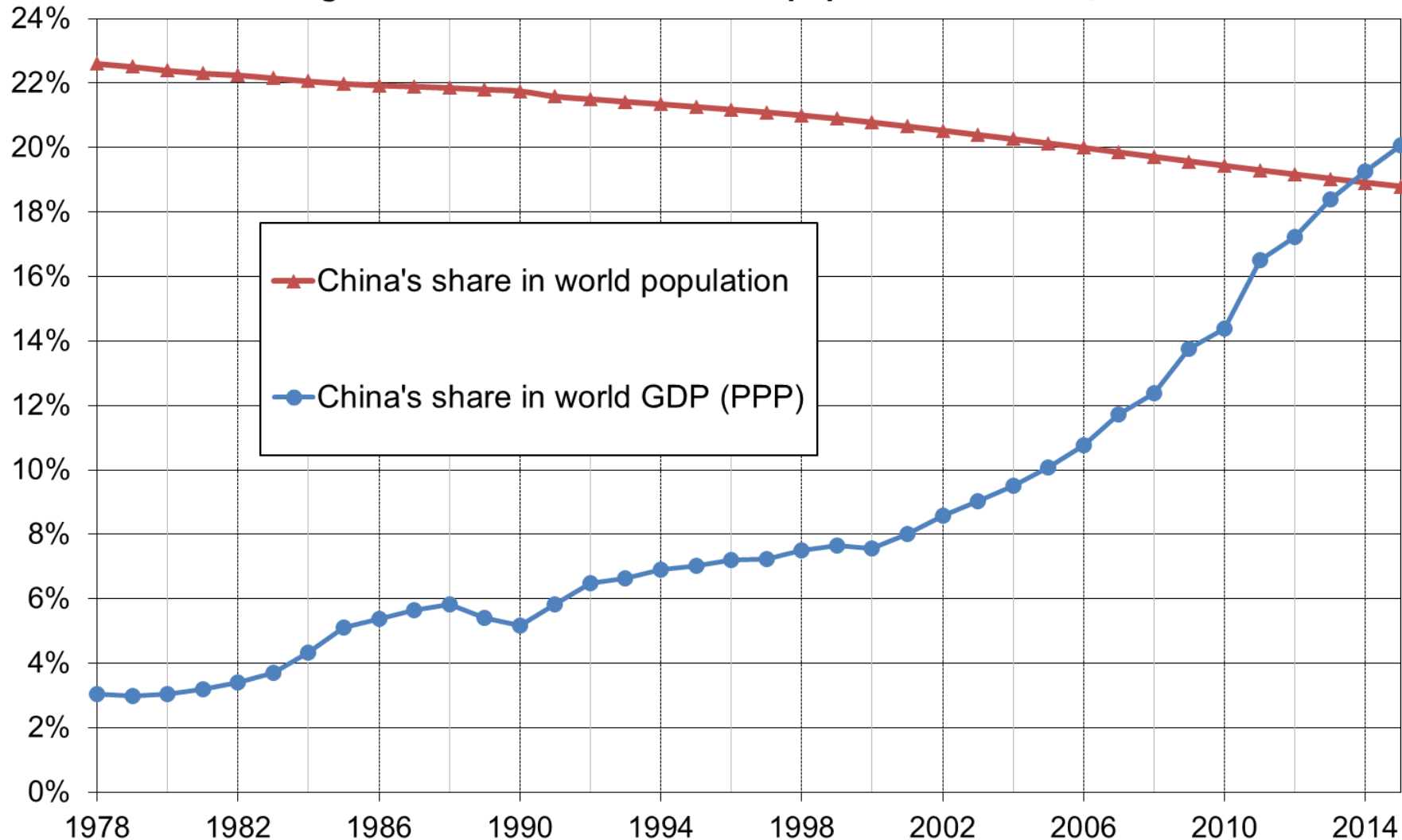
Gabriel Zucman
UC BERKELEY &
NBER

Paris, June, 2017
Paris School of Economics

- The World Wealth and Income Database ([WID](#))
 - Provides insight into a fundamental and global social question: income and wealth inequality
 - Covers more than 30 countries (with detailed inequality and macro data)
 - However the WID has only sparse coverage of China
- Two Questions
 - Dynamics of wealth-income ratio and private wealth in China since 1978?
 - Dynamics of income and wealth inequality in China since 1978?

China Growth

Figure 1: China's share in world population and GDP, 1978-2015



Why this study is important

1. Despite China has experienced exceptional growth, we know little about how growth is distributed in China
 - Who benefits more: private sector vs public sector?
 - What are the income growth rate: bottom 50%, middle 40%, vs top 10% ?
 - How do changes in factor shares impact on inequality?
 2. Contribute to the study of global income and wealth inequality.
 - China accounts for 20% of the world population and 18% of world GDP
 3. Better understood the development of China
 - Look into a fundamental question - how to reconcile economic growth and inequality
- ➔ Reference for searching for a better economic development model for other nations

- **To build a framework following Distributional National Accounts (DINA) guidelines** (see Alvaredo et al 2016)
 - By combining national accounts, household surveys, fiscal data, and historical data
- **To better compare wealth and inequality within China and across countries**
 - Piketty and Zucman, 2014, Piketty, Saez and Zucman, 2016, and Garbinti, Goupille and Piketty 2016, 2017
- **First attempt to connect national accounts with research on distribution (inequality)**
- **Possibility to revise, correct and improve estimates (new raw data sources, better methods)**

Introduction

Literature and Data Source

- Part A: Studies on national wealth of China (National balance sheets)
- Part B: Studies on income and wealth inequality in China

Methodology and Findings

- Part A: The Rise of Wealth-Income Ratio and Private Property in China
- Part B: The Rise of Income Inequality in China
- Part C: The Rise of Wealth Inequality in China

Where We Stand

Studies on national wealth in China

Official national balance sheets

- NBS since 1997, never published (Shi, 2011)

Unofficial national balance sheets

- 2002-2010 (Ma et al, 2012, PBC team)
- 2007-2011, (Li et al 2013, CASS team)
- Limitations:
 - Omit flows, only study stocks
 - No separation of private and public wealth
 - No differentiation of market and book value

Studies on capital or wealth accumulation (no complete balance sheet)

- Capital accumulation by Chow (1993) and Holz (2006)
- Private wealth by Davies et al (2010-2016) using survey data (i.e. CHIP2002)

We will estimate national balance sheets

- Combine national account, survey data, economic census and various data from NBS and PBC
- For a longer period (1978-2015)
- Study flows together with stocks
- Distinguish between private and public wealth
- Estimate market and book value of national wealth

Studies on income inequality in China

Rural and Urban Household Survey from NBS (tabulated data, largest survey, yearly)

- 1980-1992 , income quantiles (Ying, 1995)
- 1986-2003, top 1% income share (Piketty-Qian, 2009)
- Consumption inequality since 1981 (WB ProvcInet)
- Limitation: no correction of top distribution and tax exempt capital income

Other national surveys (CHIP, CFPS, CHFS, micro data, smaller sample, few waves)

- Compare 1988 and 1995 (Khan and Riskin, 1998)
- Compare 2002 and 2010 (Li, 2005, 2013)
- 2011 only (Tan, Zeng, Zhu)
- 2002 only (Luxembourg Income Study (LIS), 2016)

For more details, see WIID 3.4 by UNU-WIDER

We will estimate income distribution

- For the period of 1978 to 2015
- Tabulated data from Rural and Urban Household Survey
- Correct top distribution by using income tax data from high income tax payers
- Correct tax exempt capital income (i.e. private share of undistributed corporate profit) by using national accounts and wealth survey

Studies on wealth inequality in China

National surveys (CHIP, CFPS, micro data, smaller sample, few waves)

- Compare 2002 and 2010, no correction of the top (Li and Zhao, 2009; Li and Wang, 2015; Tan, Zeng, Zhu 2017)
- 2012 only, correction of the top using “Hurun Rich List” (Xie and Jin, 2015)
- Projection of 2010-2014 top 1% and 10% wealth shares using only CHIP 2002, correction of top using “Forbes Rich List” (Davies et al, 2015)

We will estimate wealth distribution

- Yearly and for a longer time period: 1995 to 2015
- Predictions based on more survey waves (CHIP 1995, 2002; CFPS 2010, 2012, 2014)
- Correct the top distribution using all available waves of the “Hurun Rich List” (2002-2015)

Introduction

Literature and Data Source

- Part A: Studies on national wealth of China (National balance sheets)
- Part B: Studies on income and wealth inequality in China

Methodology and Findings

- Part A: The Rise of Wealth-Income Ratio and Private Property in China
- Part B: The Rise of Income Inequality in China
- Part C: The Rise of Wealth Inequality in China

Where We Stand

Part A: The Rise of Wealth-Income Ratio and Private Property in China

1. Concepts and Methodology

2. The Rise of Wealth-Income Ratio and Private Wealth

3. China vs Rich Countries

Private Wealth and Public Wealth

Our concepts and methods generally follow those described in the DINA Guidelines used for WID (Alvaredo et al 2016).

$$\text{National Income } Y_t = GDP_t - KD_t + FY_t \text{ (Net foreign Income)}$$

$$\text{Private wealth } W_t = \text{Private assets} - \text{Private debt}$$

$$\text{Assets} = \text{Non-financial assets} + \text{Financial assets}$$

$$= \text{House} + \text{Agriculture Lands} + \text{Other domestic capital}$$

$$+ \text{Currency, deposits, loans, and bonds} + \text{Insurance} + \text{Equity}$$

We similarly define public (or government) wealth W_{gt}

Market Value of National Wealth

Market-value national wealth W_{nt}

= Private wealth W_t + Public wealth W_{gt}

= Domestic capital K_t + Net foreign assets NFA_t

Domestic capital K_t

= Agricultural land + Housing + Other domestic capital

(including the market value of corporations, and the value of other non-financial assets held by the private and public sectors, net of their liabilities).

Book Value of National Wealth

An alternative measure of the wealth of corporations:

Corporations' book value

= the total value of corporate assets - non-equity liabilities

Residual corporate wealth W_{ct}

= Corporation's book value - Corporation's market value

book-value national wealth W_{bt}

= Market-value national wealth $W_{nt} + W_{ct}$

Remarks:

Tobin's Q=

$$\frac{\text{Corporation's market value}}{\text{Corporation's book value}}$$

Tobin's Q=1 $\Rightarrow W_{ct}=0$.

In our studies, for now we assume Tobin's Q for unlisted corporations is equal to 1

Part A: The Rise of Wealth-Income Ratio and Private Property in China

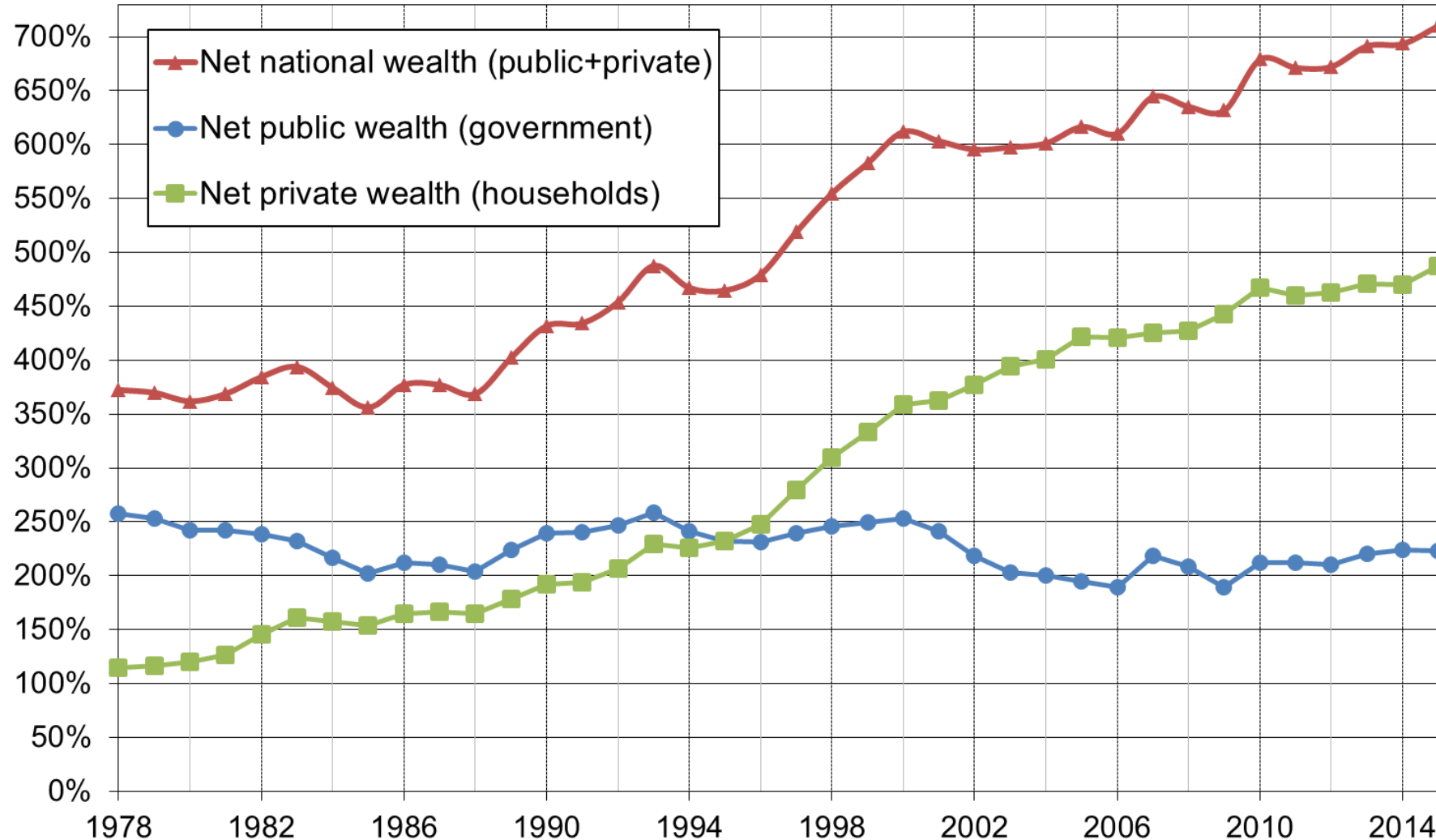
1. Concepts and Methodology

2. The Rise of Wealth-Income Ratio and Private Wealth

3. China vs Rich Countries

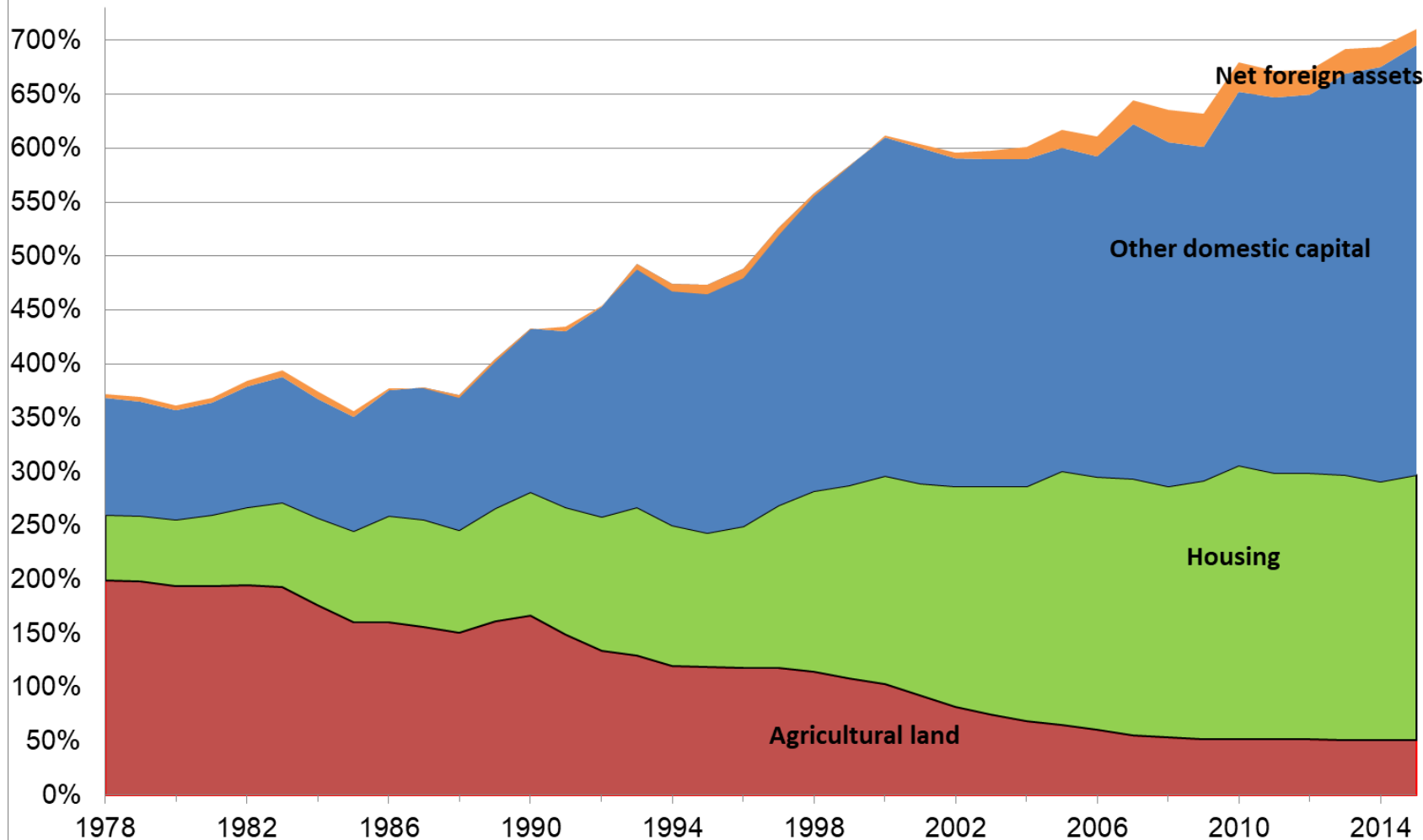
Increase of national wealth-income ratio due to private wealth

Figure 4: Public vs private property in China 1978-2015 (% national income)



Rise of national wealth-income ratio (Housing and Other domestic capital)

Figure 3. The structure of national wealth in China 1978-2015 (% national income)



Other domestic capital includes

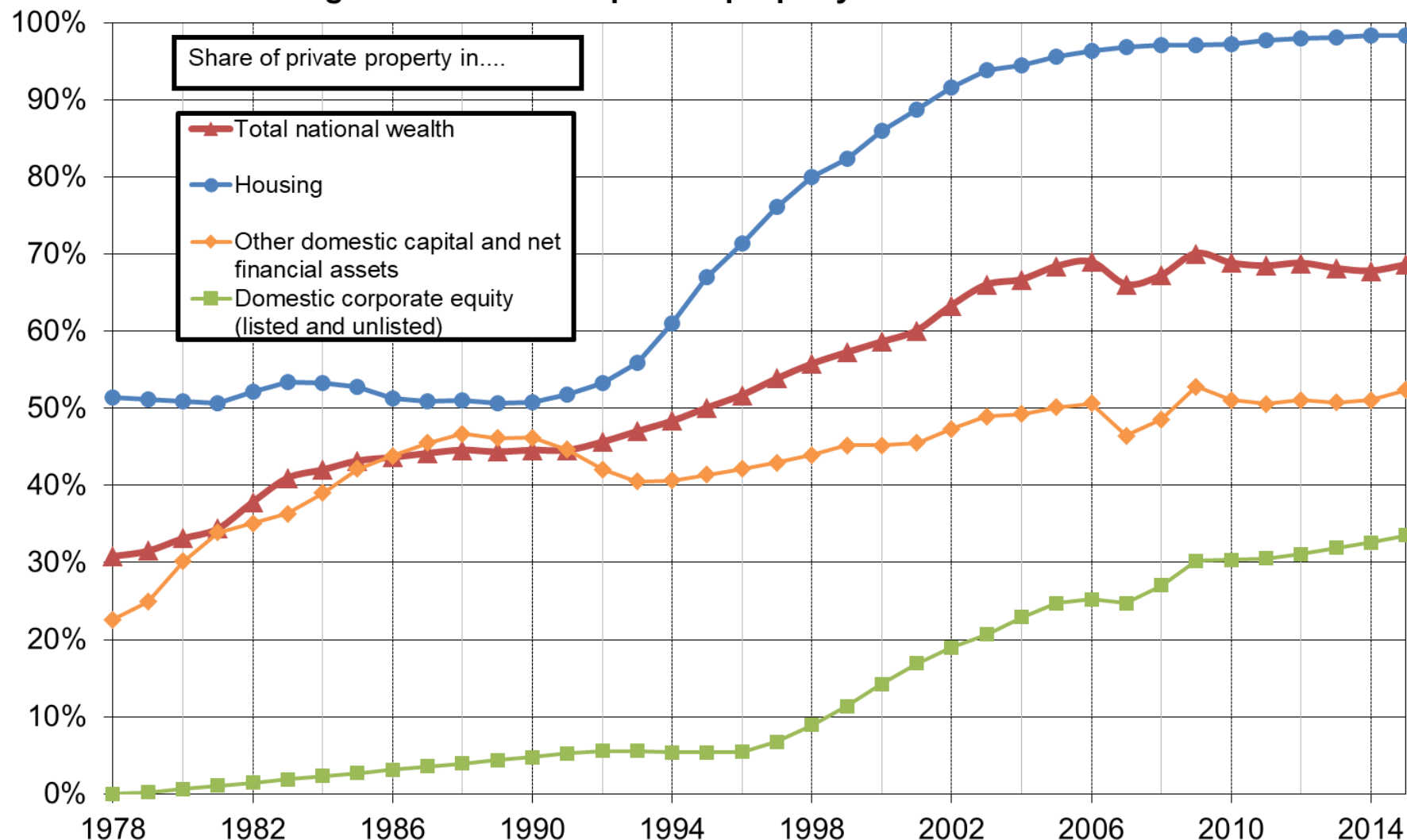
- a. the market value of corporations
- b. the value of other non-financial assets held by the private and public sectors net of their liabilities

Housing

- a. Rural house value + Urban house value
- b. House value
= living area per capita
* population
* market price per sqm.
-KDt

Privatization wave explains rise in private wealth

Figure 5. The rise of private property in China 1978-2015



Privatization

Housing Privatization

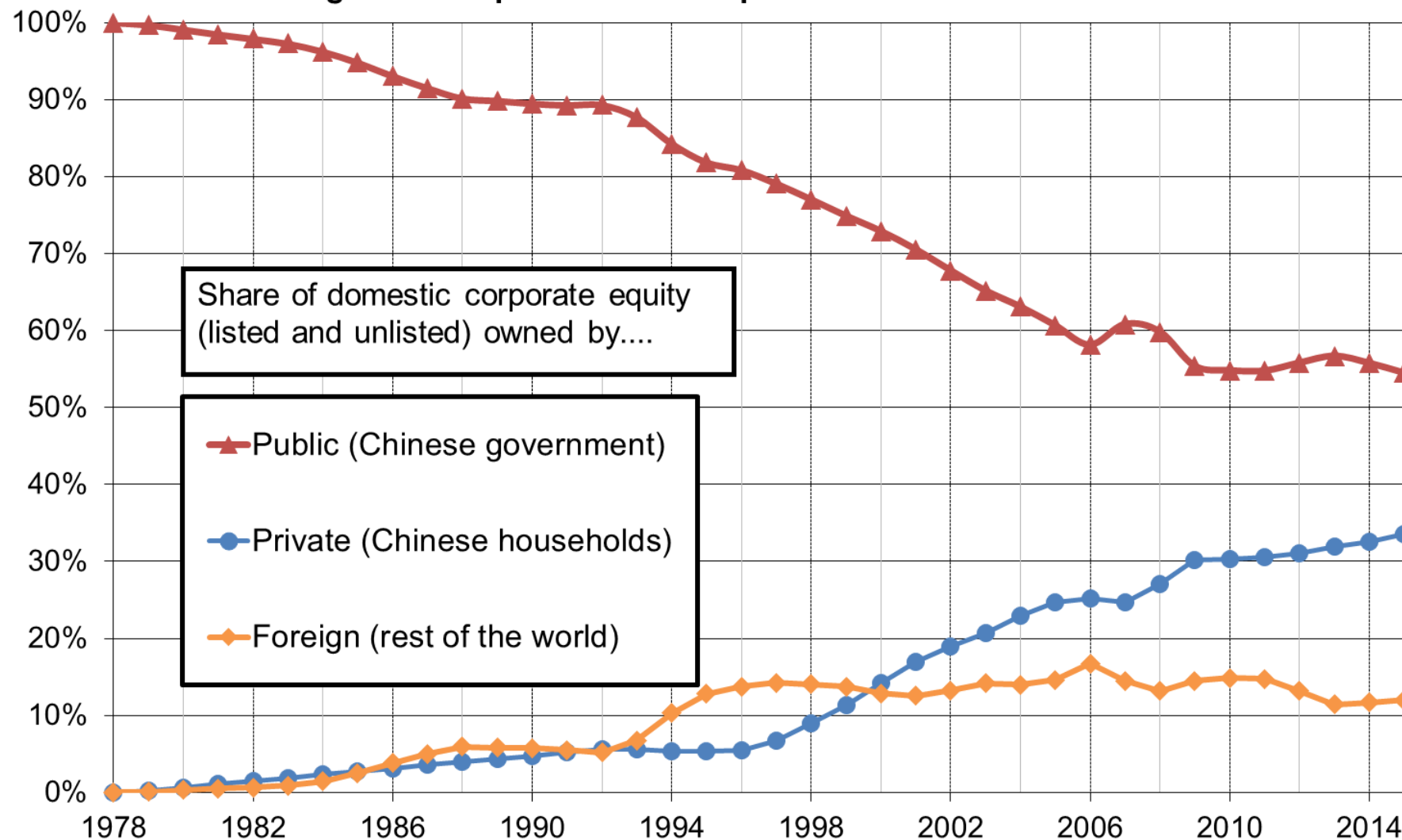
- Starts in 1992

States Owned Enterprises privatized through restructuring, bankruptcy, and acquisition

- 1998-2006

Public share in corporate equity stops decreasing since 2006

Figure 6. Corporate ownership in China 1978-2015



Part A: The Rise of Wealth-Income Ratio and Private Property in China

1. Concepts and Methodology

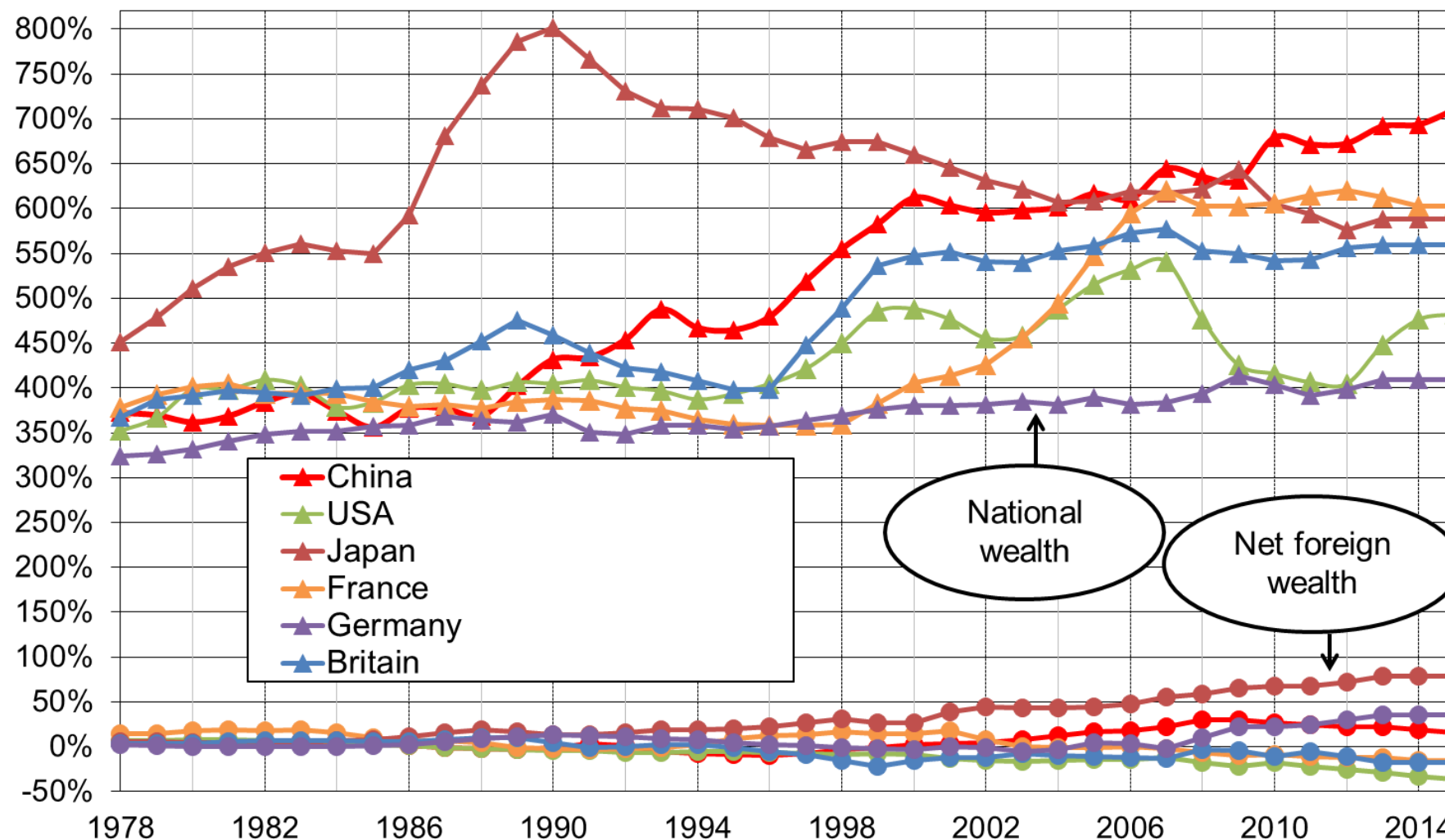
2. The Rise of Wealth-Income Ratio and Private Wealth

3. China vs Rich Countries

National wealth-income ratio rise dramatically since 1990

Figure 8: The rise of wealth-income ratios: China vs rich countries

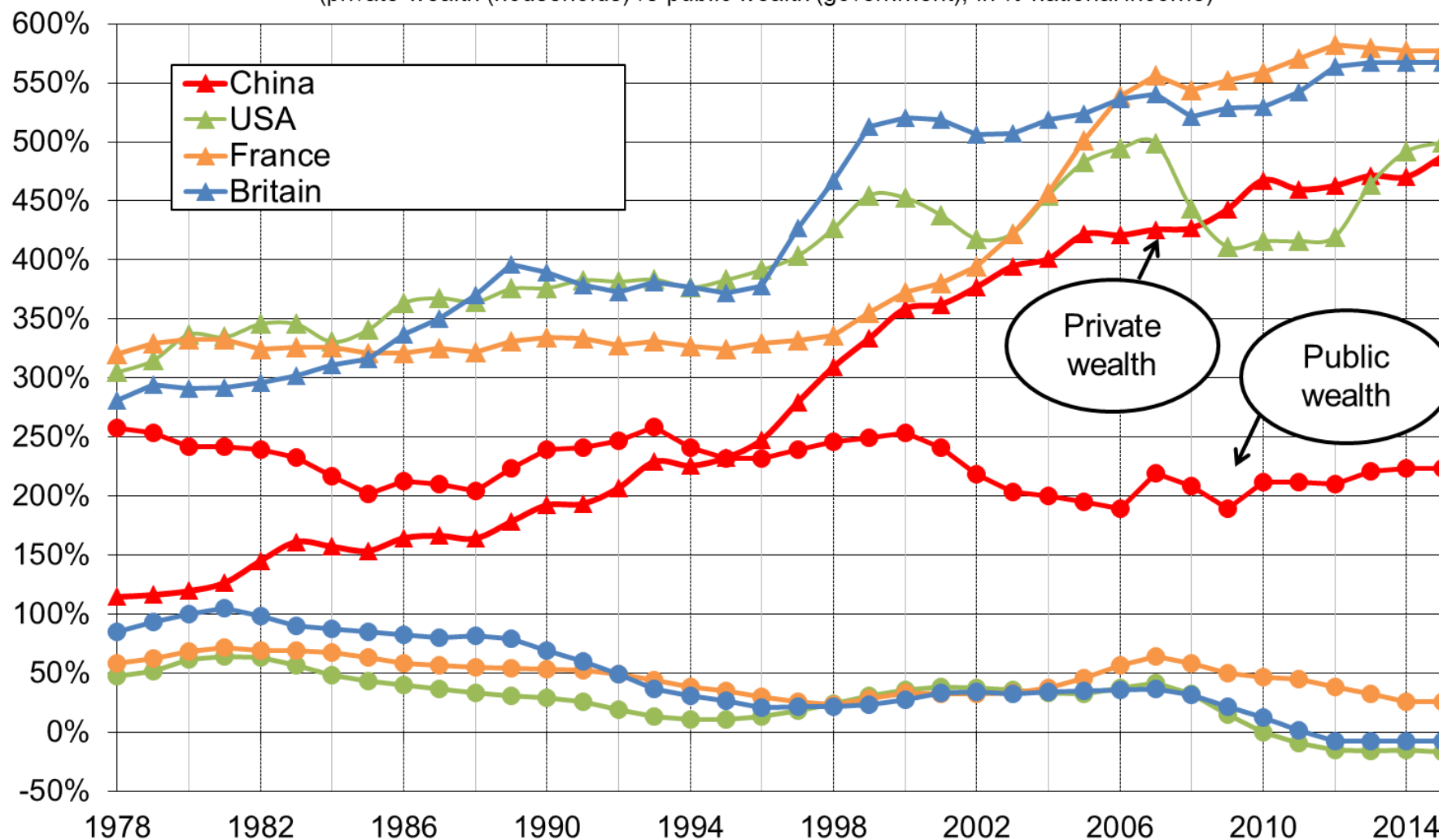
(national wealth (public + private) vs net foreign wealth, in % national income)



Private wealth-income ratio catches up with rich countries

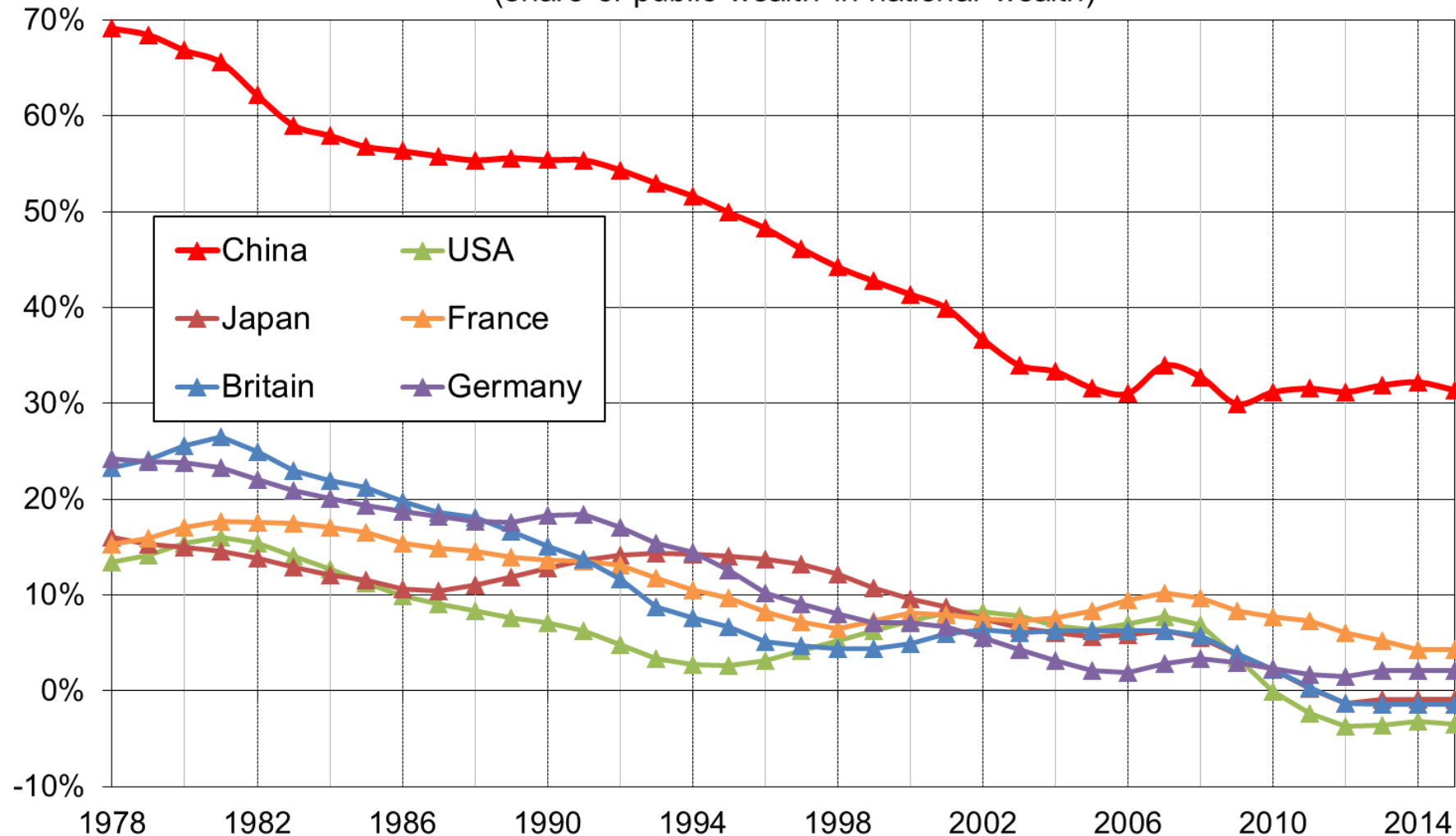
Figure 7b: The rise of wealth-income ratios: China vs rich countries

(private wealth (households) vs public wealth (government), in % national income)



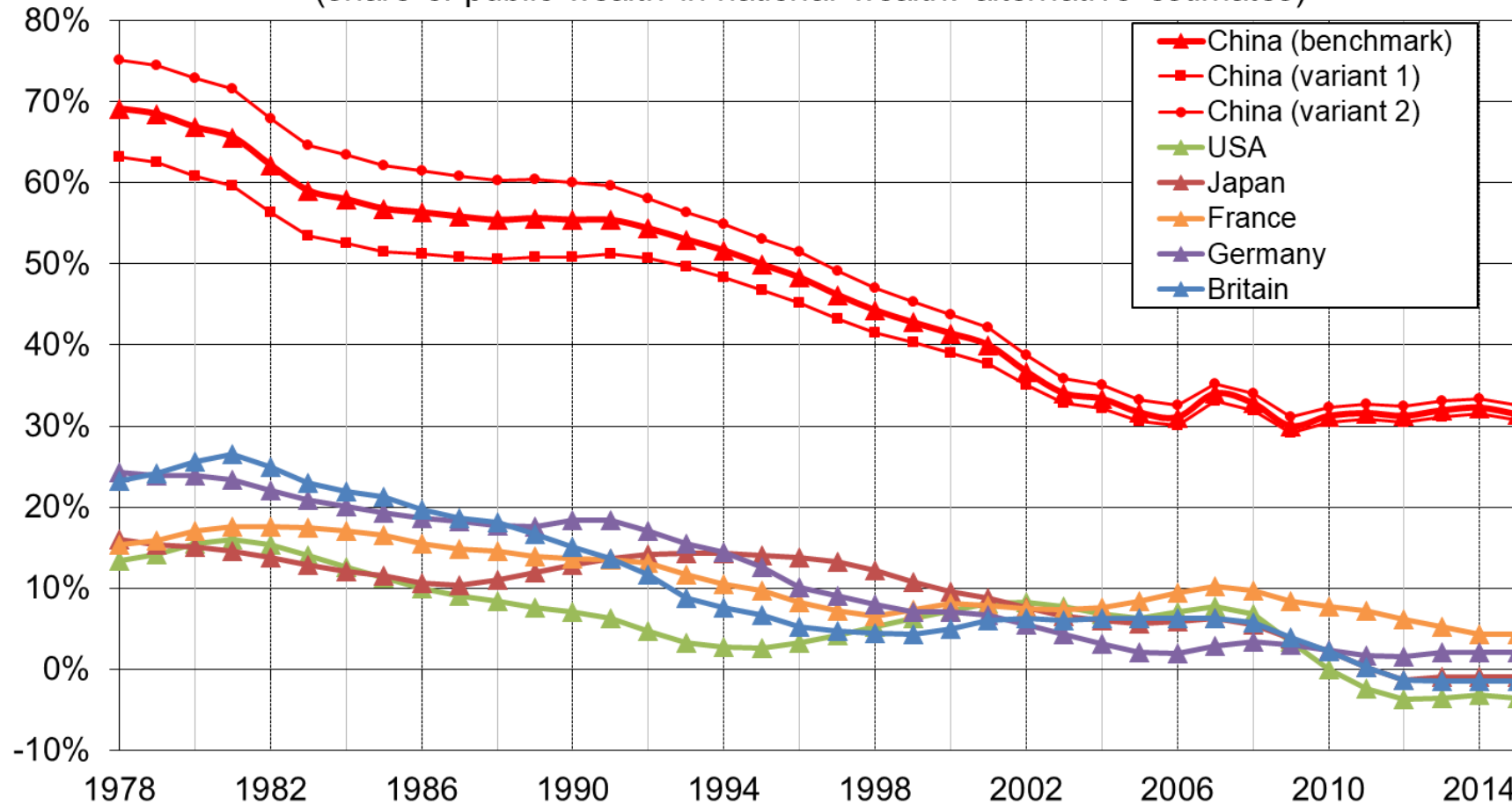
Public wealth share decreases in the world

Figure 7c. The decline of public property: China vs rich countries
(share of public wealth in national wealth)



Public wealth share decreases in the world (robustness check)

Figure 7d. The decline of public property: China vs rich countries
(share of public wealth in national wealth: alternative estimates)



Public share in agricultural land drops from 70% to 40% (benchmark), 60% to 30% (variant 1), 80% to 50% (variant 2).
Public share in rural housing drops from 30% to 0% (benchmark), 20% to 0% (variant 1), 40% to 10% (variant 2).

Part B: The Rise of Income Inequality in China

1. Concepts and Methodology

2. Top 1%, top 10%, middle 40% and bottom 50%

3. China vs Rich Countries

4. Inequality between and within rural and urban China

Estimate distribution of income (y_f)

1. Survey data
 - Rural Household Survey and Urban Household Survey By NBS (1978-2015)
2. Methods
 - Generalized Pareto interpolation techniques (Blanchet-Fournier-Piketty, 2016)
 - Problem of underestimation of the top income share

Correction using Income Tax Data on high-income taxpayers

- In 2006, the Chinese tax administration issued a circular
 - All taxpayers with individual taxable income higher than **120 000 yuan (about 18 000 USD)** to file a special declaration
 - Release the total number and taxable income of these taxpayers (about 0.5% of urban adults)
 - At the **national level** annually for income years **2006 to 2010**
 - The publication at national level was **interrupted in 2011**, although the circular still applies
 - From **2011 to 2015** the publication of the data continued at **the provincial level** in a large number of provinces
- ➔ We collected all these tabulations, which together provide useful information about top incomes in China

Estimate distribution of total personal income (y_p)

$$y_p = y_f + y_{nf}$$

y_{nf} : tax-exempt capital income (i.e. private share of undistributed profits)

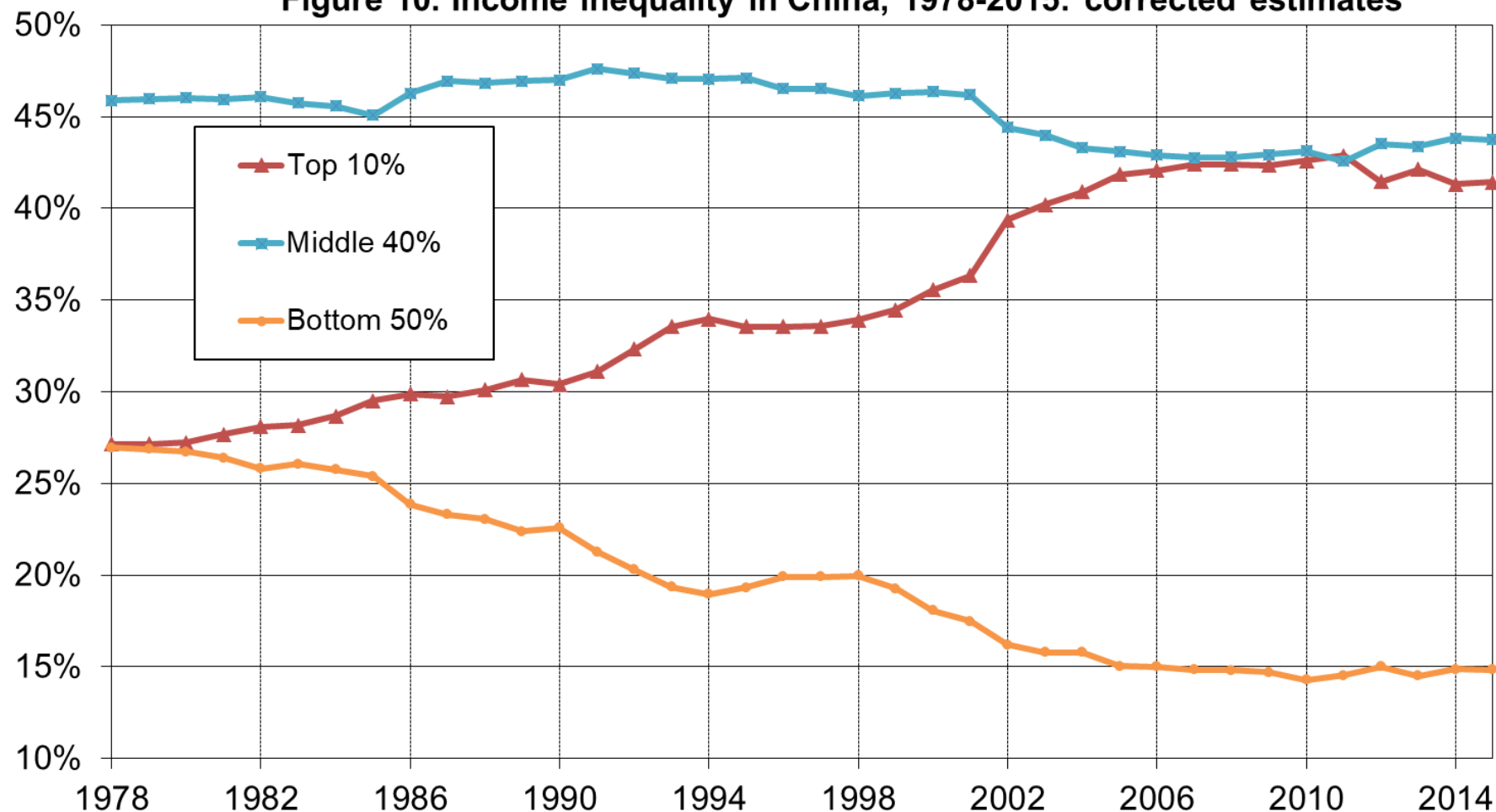
1. Estimate total amount of y_{nf} using national account
2. Estimate distribution of y_{nf} using wealth survey data
3. Estimate distribution of total personal income y_p
4. Transform the distribution of personal income y_p into the distribution of national income y (normalize the distribution by national income)

Part B: The Rise of Income Inequality in China

1. Concepts and Methodology
- 2. Top 1%, top 10%, middle 40% and bottom 50%**
3. China vs Rich Countries
4. Inequality between and within rural and urban China

Increase of income inequality in China

Figure 10. Income inequality in China, 1978-2015: corrected estimates



Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Corrected estimates (combining survey, fiscal, wealth and national accounts data).
Equal-split-adults series (income of married couples divided by two).

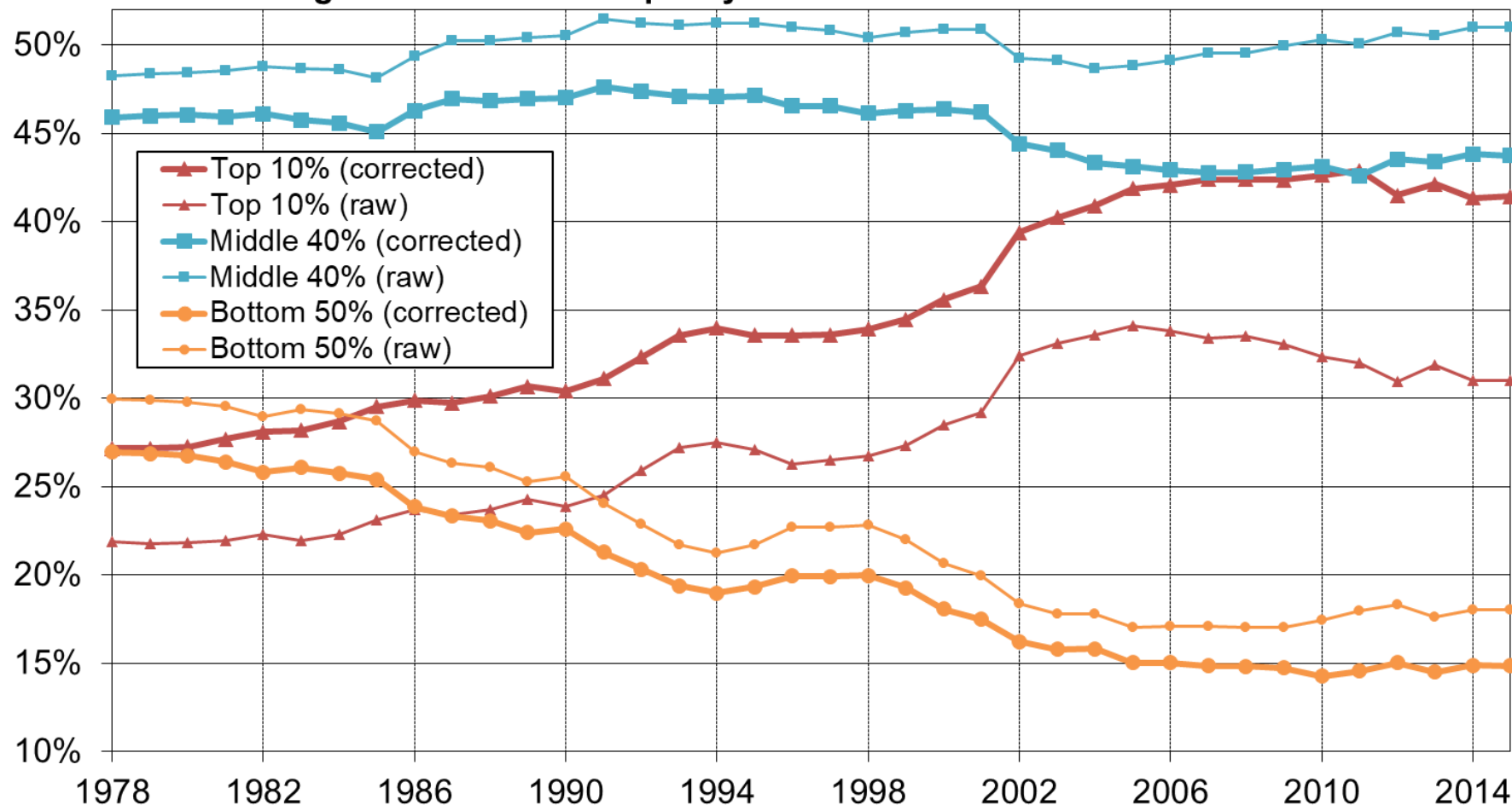
Privatization and Income Inequality

Income inequality increased dramatically during 1998-2006 SOEs privatizing and reforming periods.

It became stable since 2006 after SOEs finished restructuring.

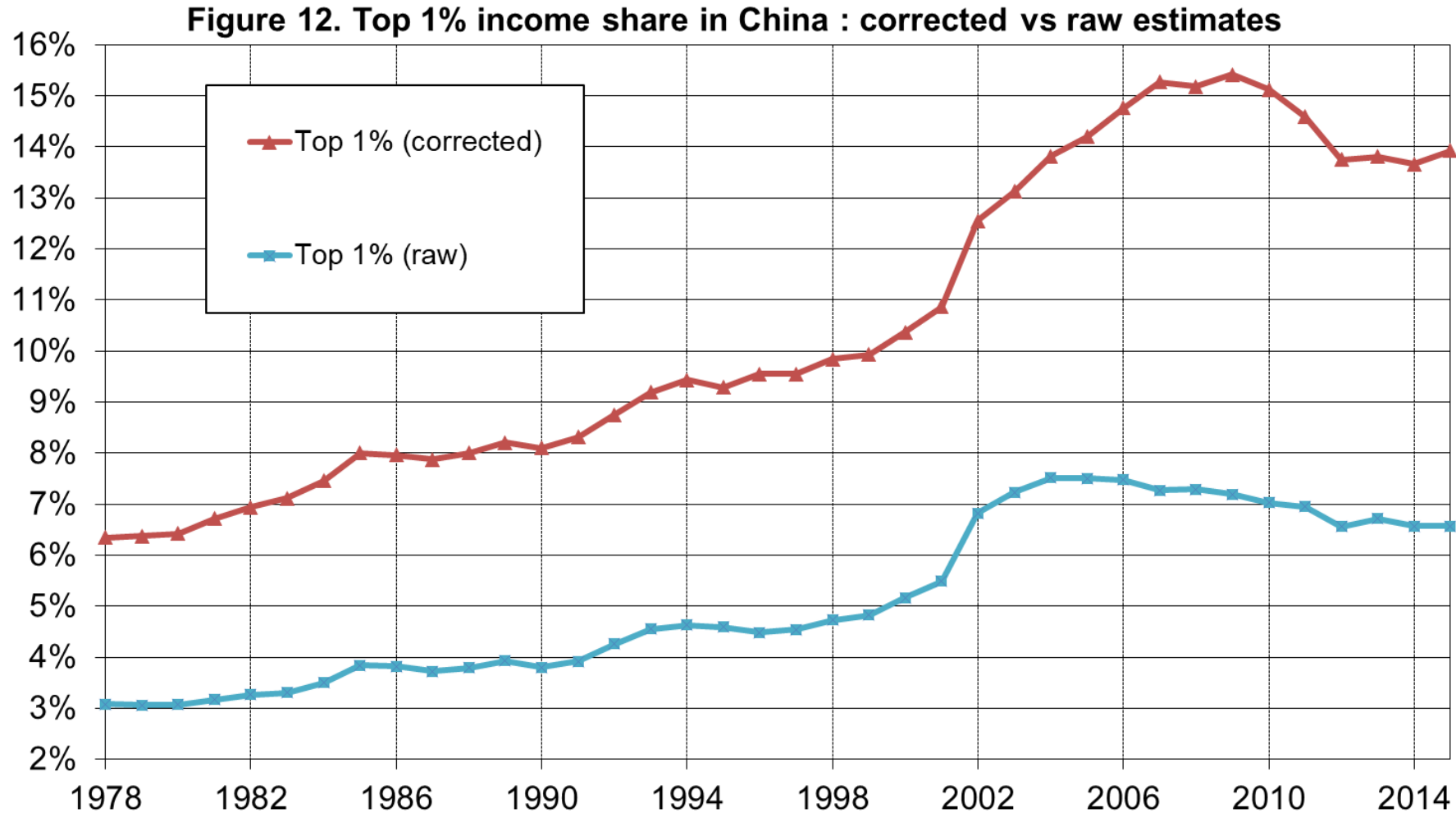
NBS Survey data underestimated inequality

Figure 11. Income inequality in China: corrected vs raw estimates



Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults. Corrected estimates combine survey, fiscal, wealth and national accounts data. Raw estimates rely only on self-reported survey data. Equal-split-adults series (income of married couples divided by two).

Top 1% corrected vs raw estimates



Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Corrected estimates combine survey, fiscal, wealth and national accounts data. Raw estimates rely only on self-reported survey data.
Equal-split-adults series (income of married couples divided by two).

Part B: The Rise of Income Inequality in China

1. Concepts and Methodology

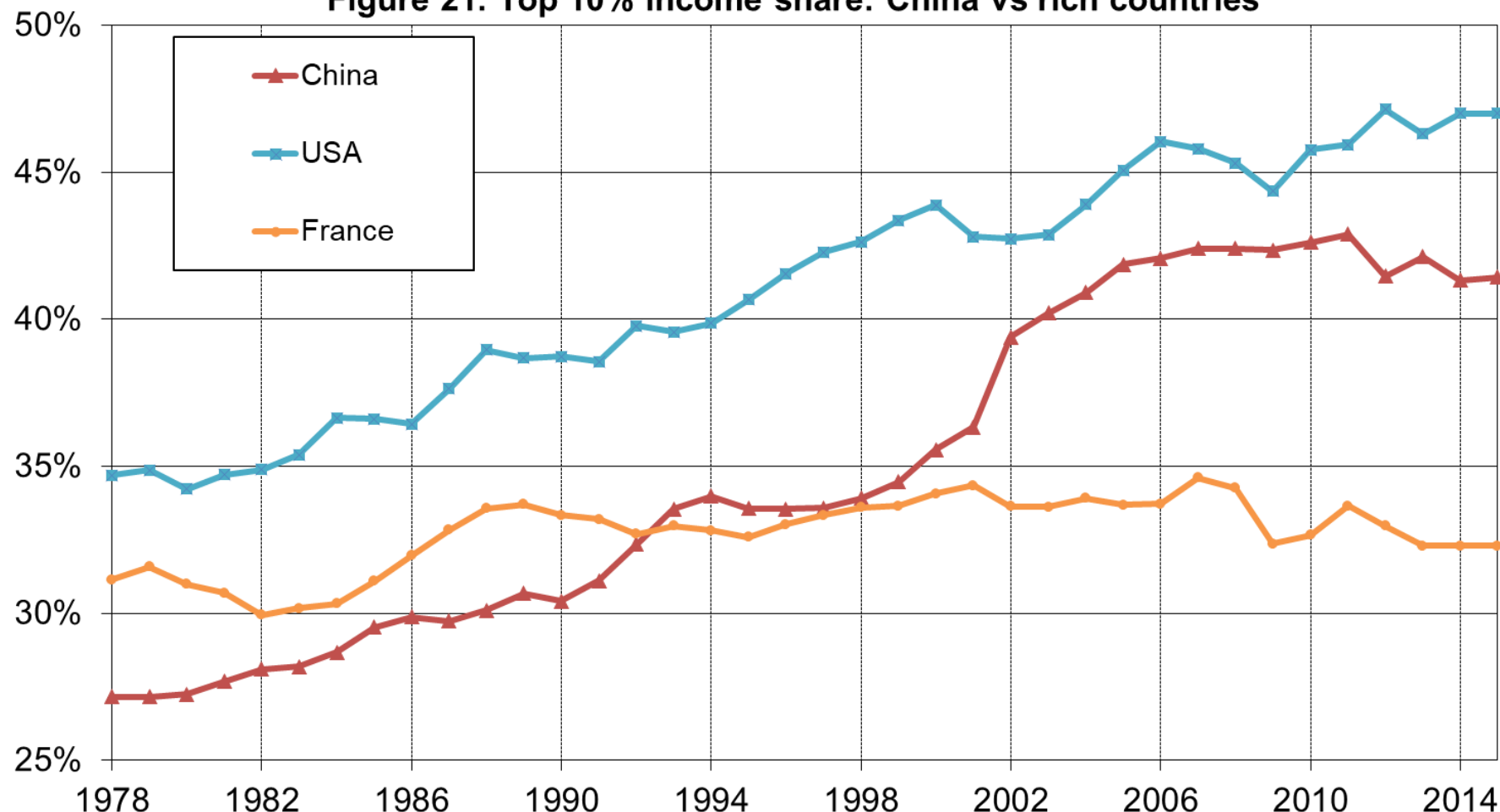
2. Top 1%, top 10%, middle 40% and bottom 50%

3. China vs Rich Countries

4. Inequality between and within rural and urban China

Increase of inequality in China, top 10%

Figure 21. Top 10% income share: China vs rich countries

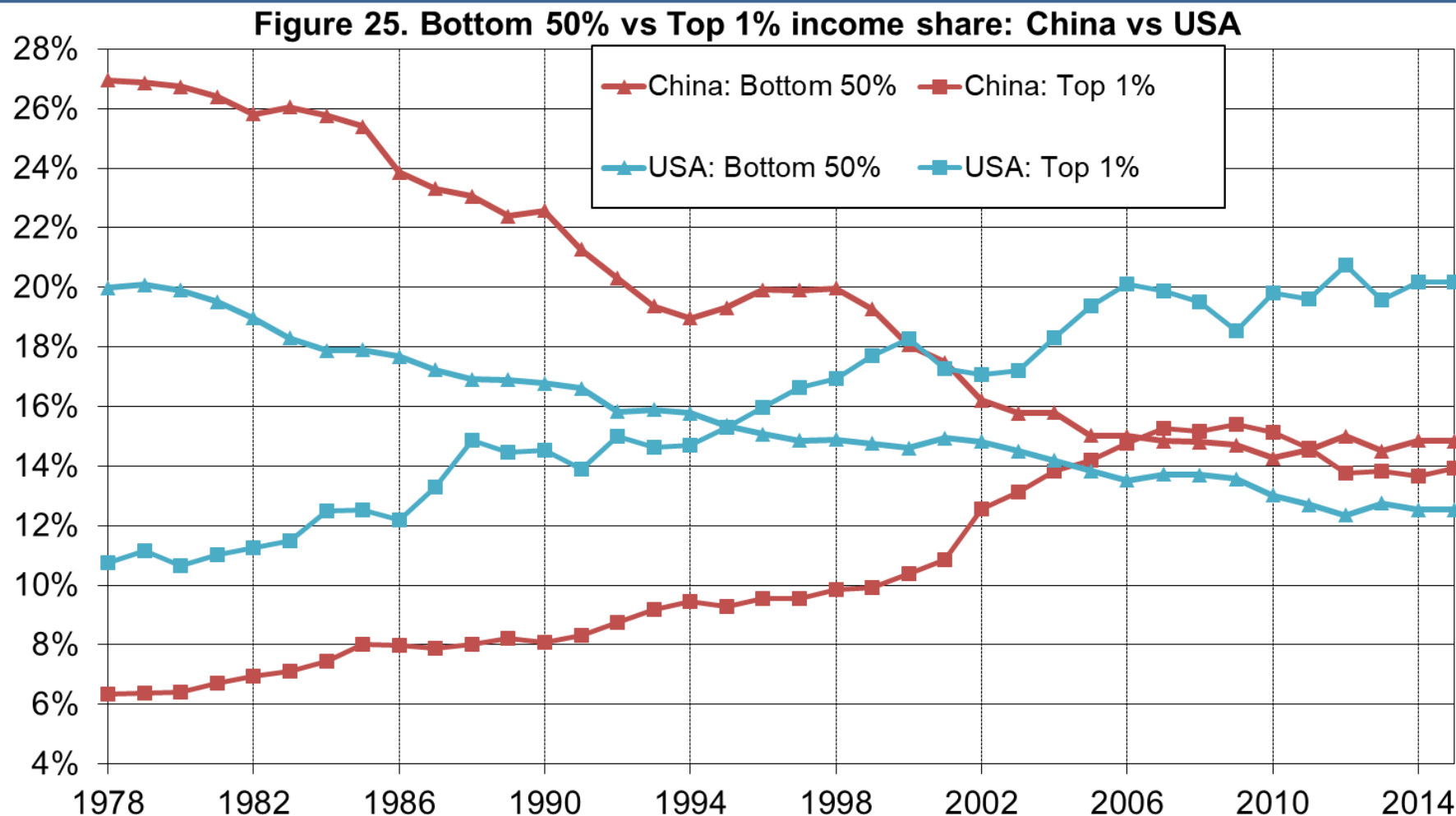


Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Corrected estimates (combining survey, fiscal, wealth and national accounts data).
Equal-split-adults series (income of married couples divided by two).

Without correction

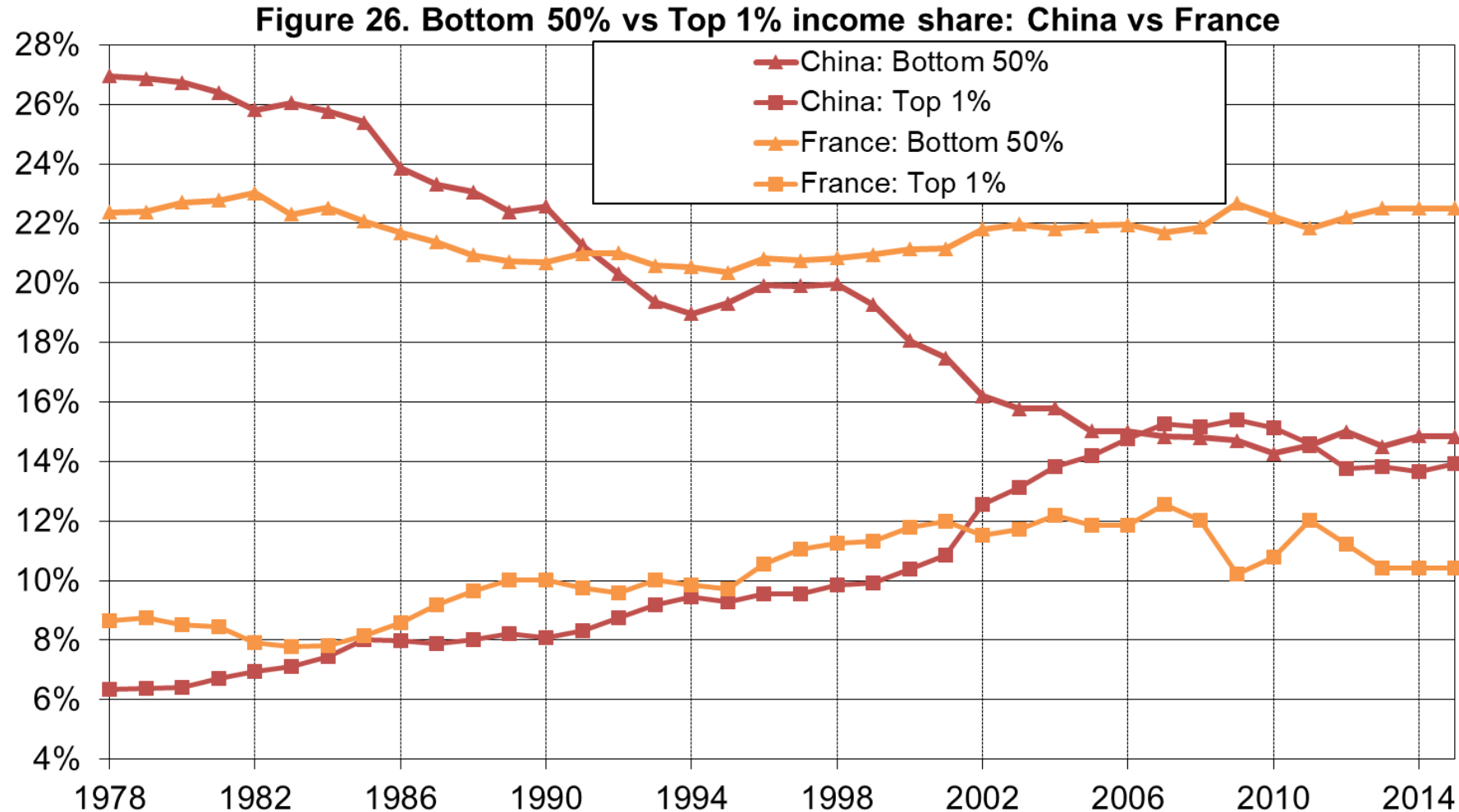
China's top 10% income share varies between 20% and 28%, which is lower than France.

China vs US (top 1% vs bottom 50%)



Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Corrected estimates (combining survey, fiscal, wealth and national accounts data).
Equal-split-adults series (income of married couples divided by two).

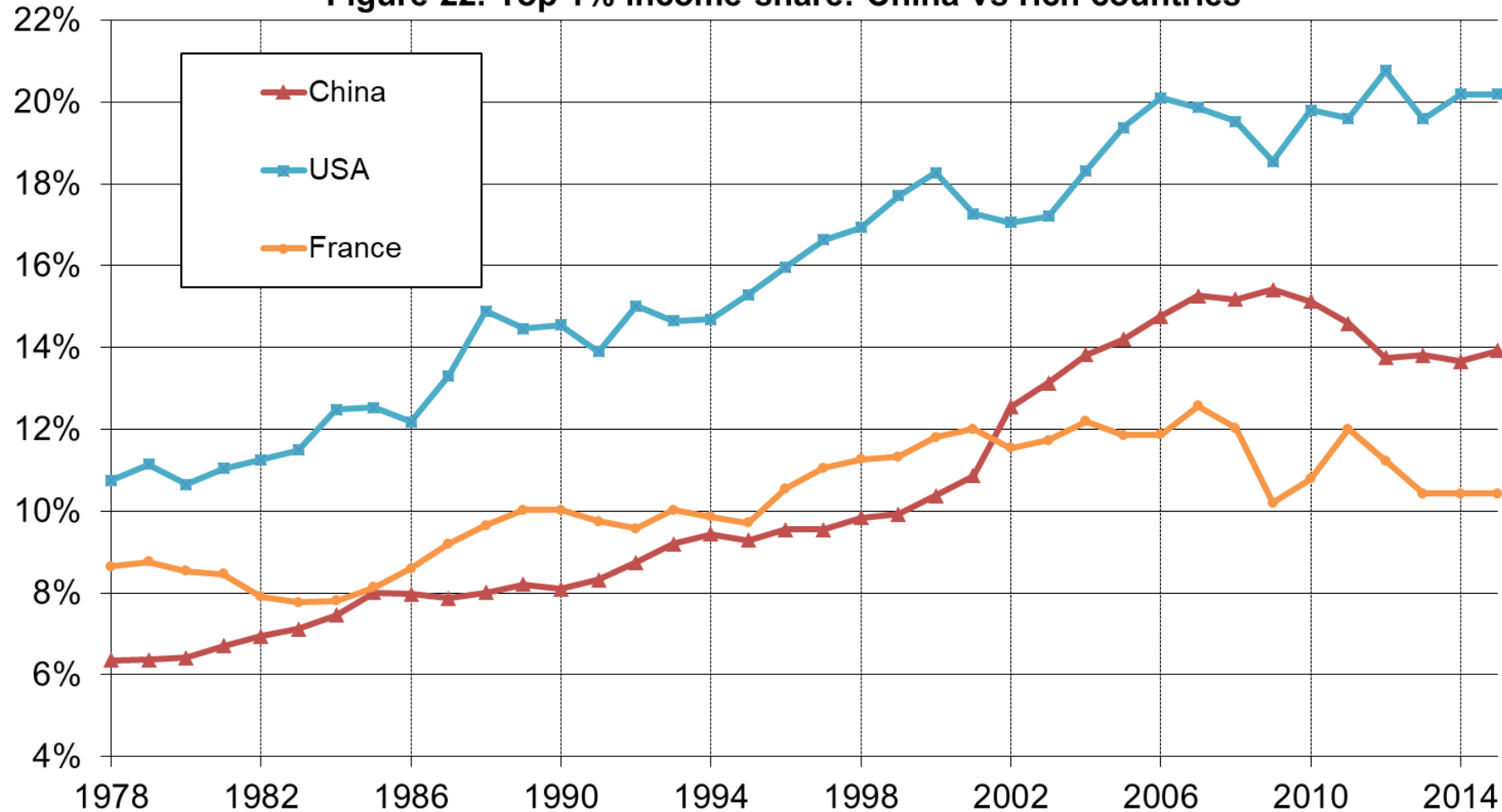
China vs France US (top 1% vs bottom 50%)



Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Corrected estimates (combining survey, fiscal, wealth and national accounts data).
Equal-split-adults series (income of married couples divided by two).

Increase of inequality in China, top 1%

Figure 22. Top 1% income share: China vs rich countries

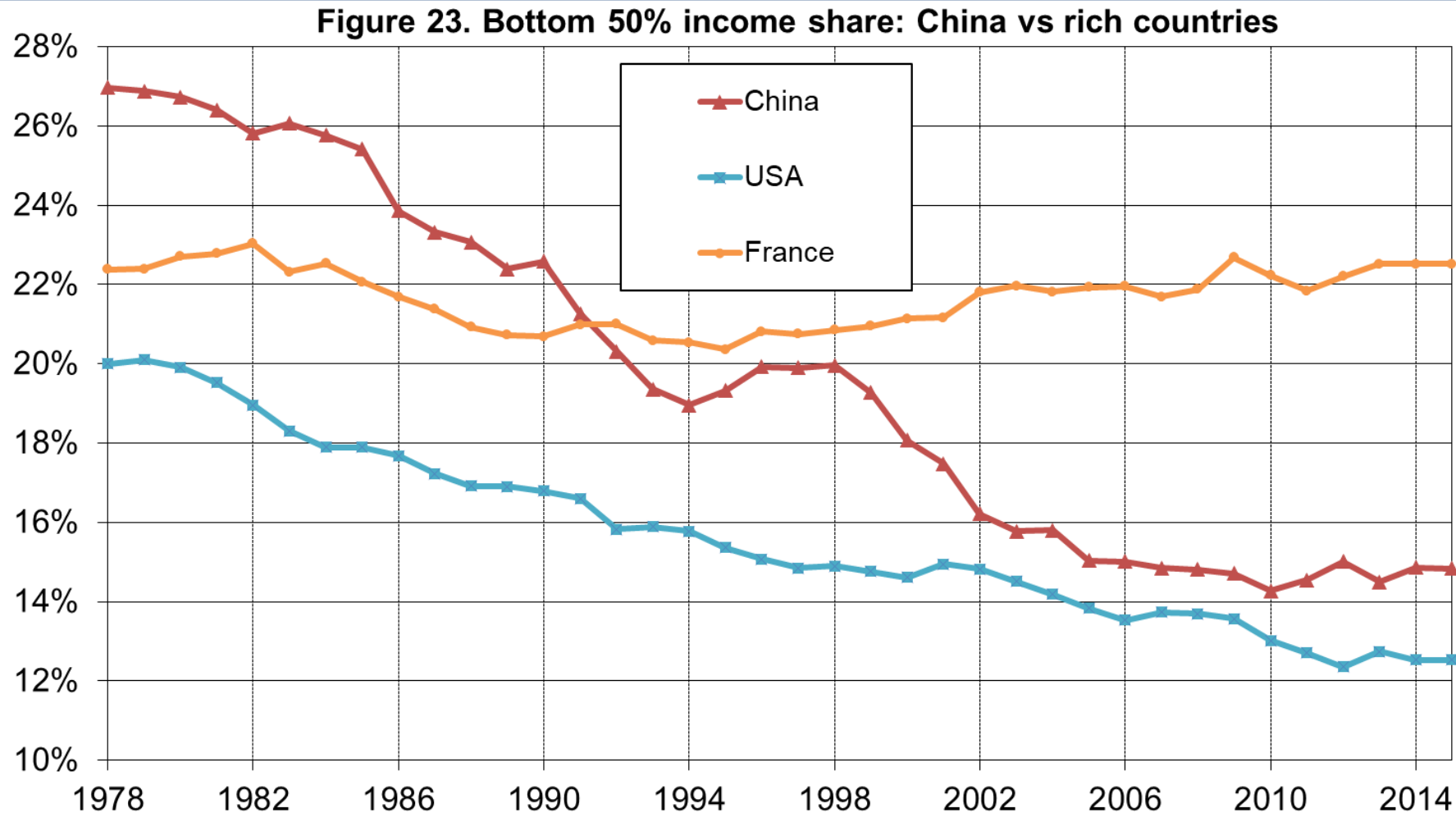


Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Corrected estimates (combining survey, fiscal, wealth and national accounts data).
Equal-split-adults series (income of married couples divided by two).

Without correction

China's top 1% income share varies from 3% to 7%, which is lower than France, much lower than US.

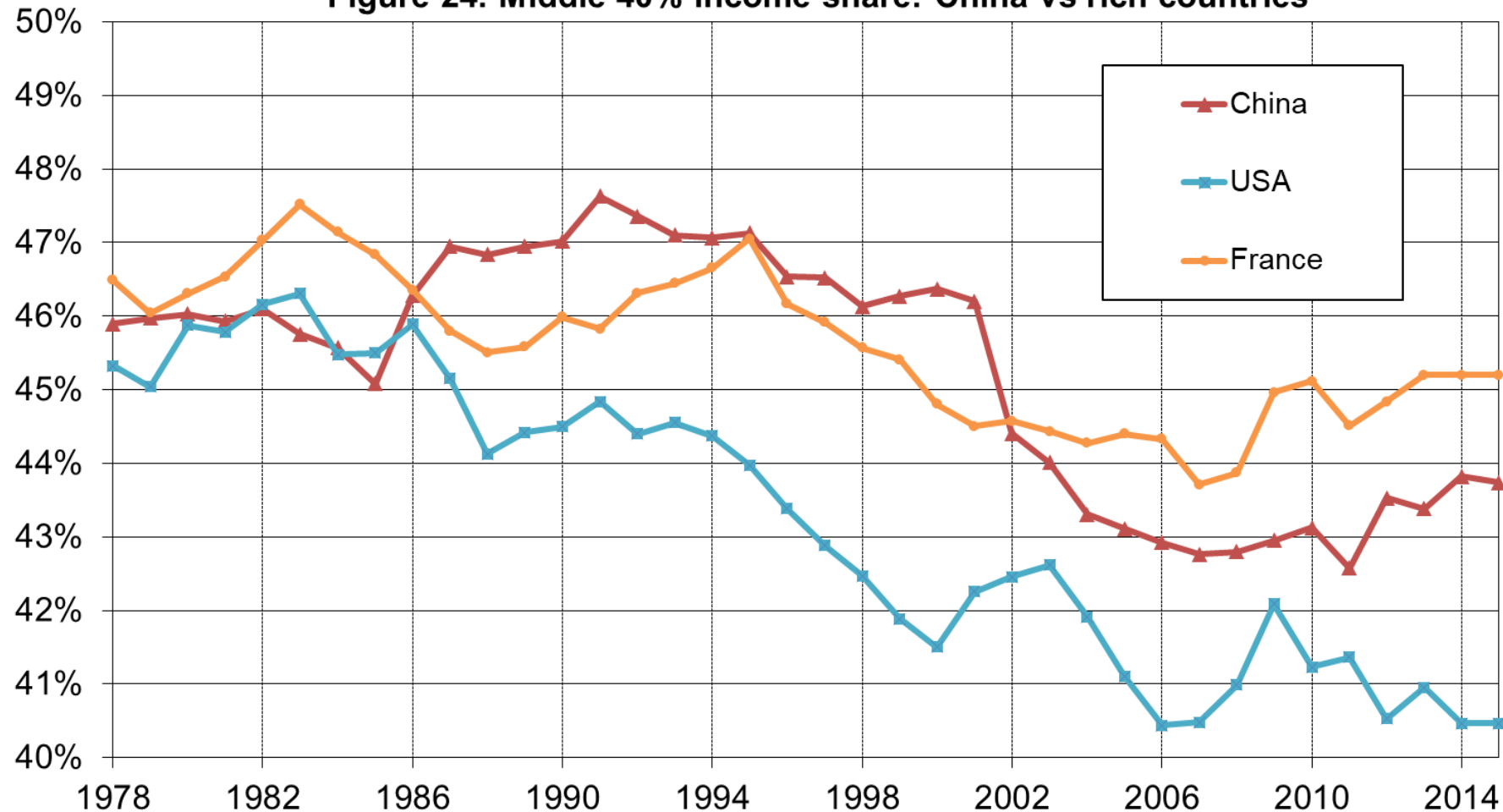
Decrease of income share of bottom 50%



Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Corrected estimates (combining survey, fiscal, wealth and national accounts data).
Equal-split-adults series (income of married couples divided by two).

Middle 40% stay comparatively stable

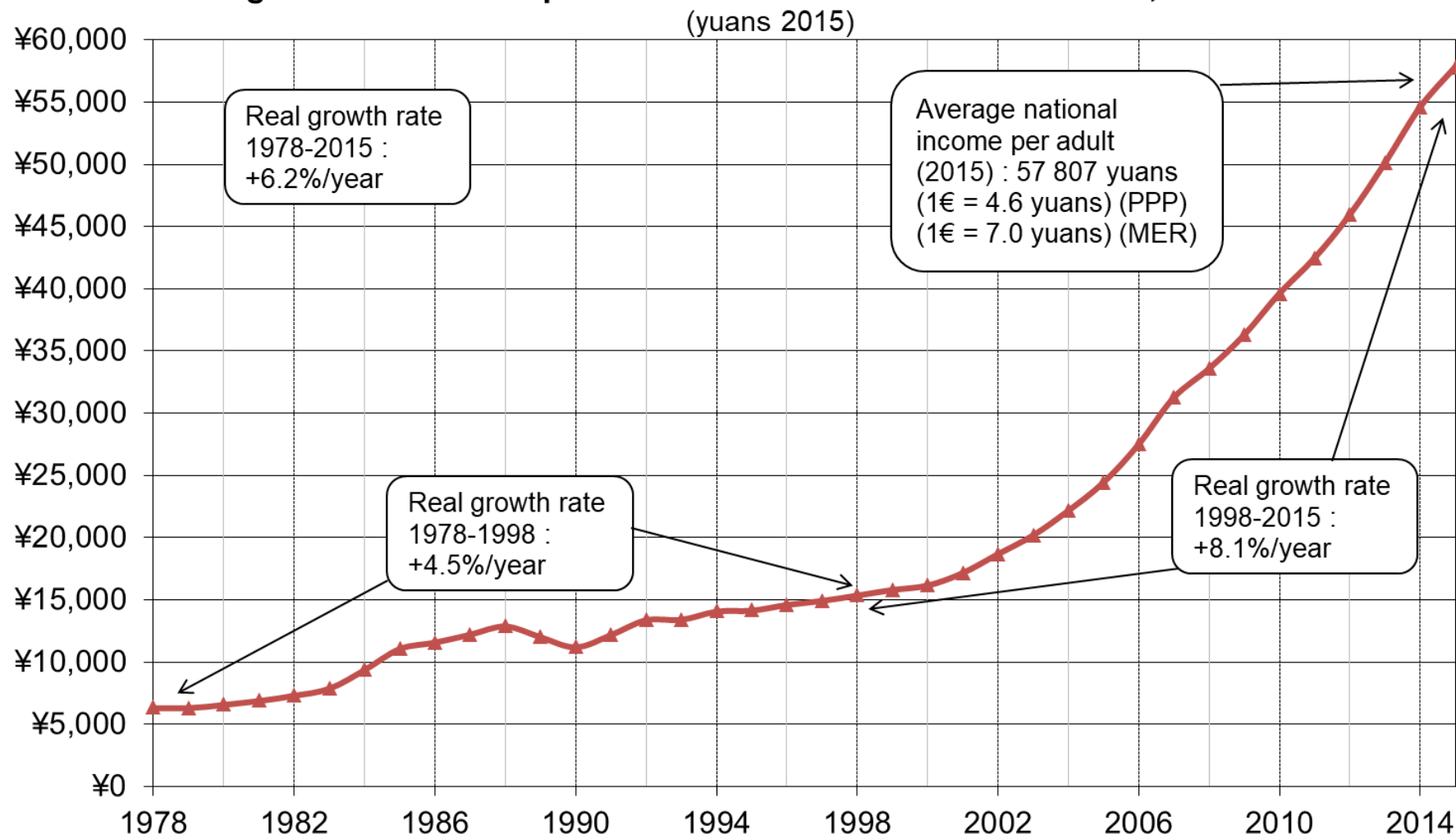
Figure 24. Middle 40% income share: China vs rich countries



Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Corrected estimates (combining survey, fiscal, wealth and national accounts data).
Equal-split-adults series (income of married couples divided by two).

Growth rate of pre-tax national

Figure 2: The rise of per adult real national income in China, 1978-2015



National income divided by adult population. National income = GDP - capital depreciation + net foreign income.

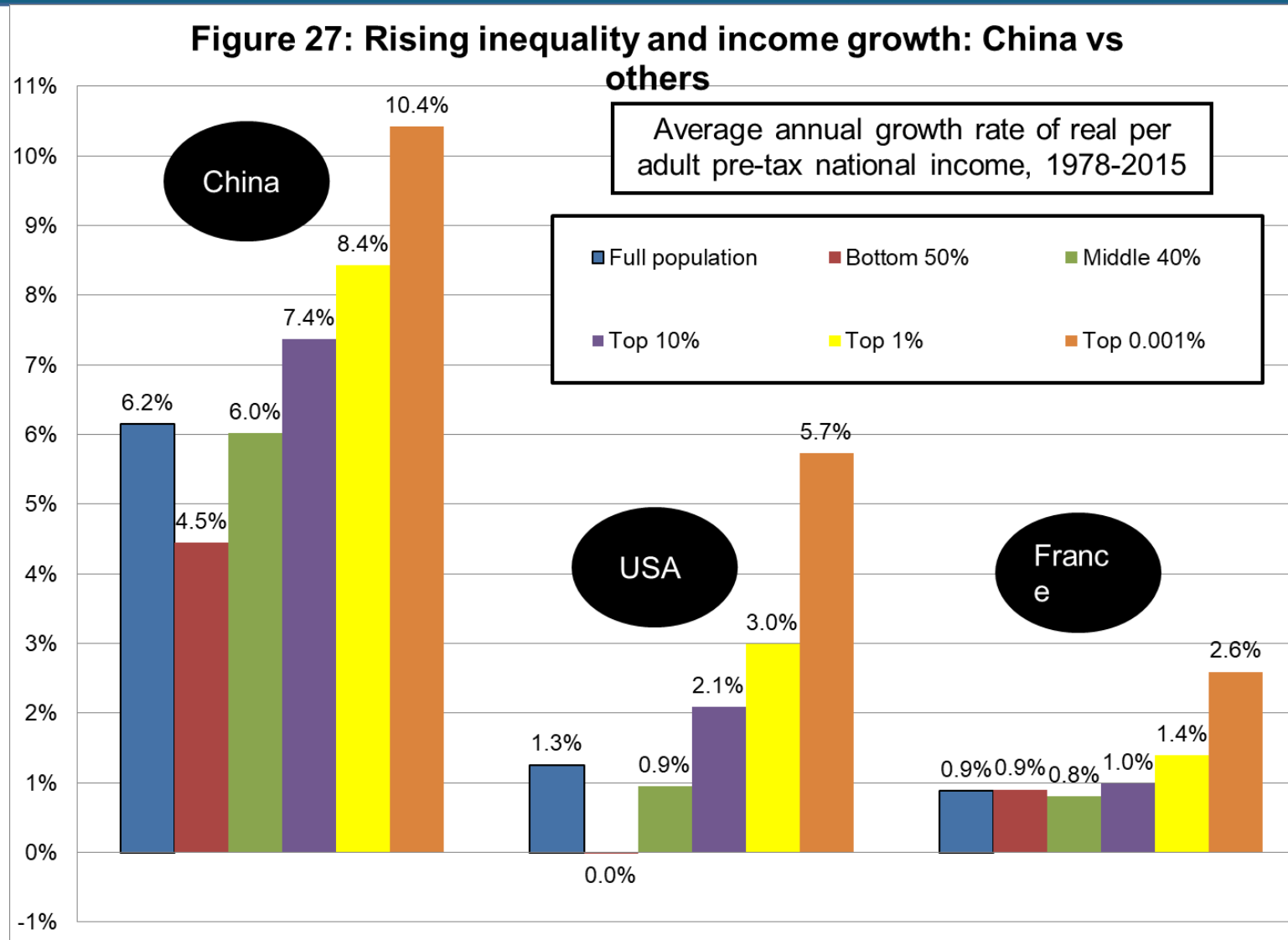
Growth rate of pre-tax national by income groups

Table 3: Income growth and inequality 1978-2015: China vs. rich countries

	China		USA		France	
Income group (distribution of per adult pre-tax national income)	Average annual growth rate 1978- 2015	Total cumulated growth 1978- 2015	Average annual growth rate 1978- 2015	Total cumulated growth 1978- 2015	Average annual growth rate 1978- 2015	Total cumulated growth 1978- 2015
Full Population	6.2%	811%	1.3%	59%	0.9%	39%
Bottom 50%	4.5%	401%	0.0%	-1%	0.9%	39%
Middle 40%	6.0%	768%	0.9%	42%	0.8%	35%
Top 10%	7.4%	1289%	2.1%	115%	1.0%	44%
incl. Top 1%	8.4%	1897%	3.0%	198%	1.4%	67%
incl. Top 0.1%	9.1%	2405%	4.0%	321%	1.7%	84%
incl. Top 0.01%	9.8%	3113%	4.7%	453%	1.8%	93%
incl. Top 0.001%	10.4%	3817%	5.7%	685%	2.6%	158%

Sources: China: this paper. USA: Piketty-Saez-Zucman (2016). France: Garbinti-Goupille-Lebret-Piketty (2017). Distribution of pre-tax national income among equal-split adults. The unit is the adult individual (20-year-old and over; income of married couples is splitted into two). Fractiles are defined relative to the total number of adult individuals in the population. Corrected estimates (combining survey, fiscal, wealth and national accounts data).

Growth rate of pre-tax national income by income groups

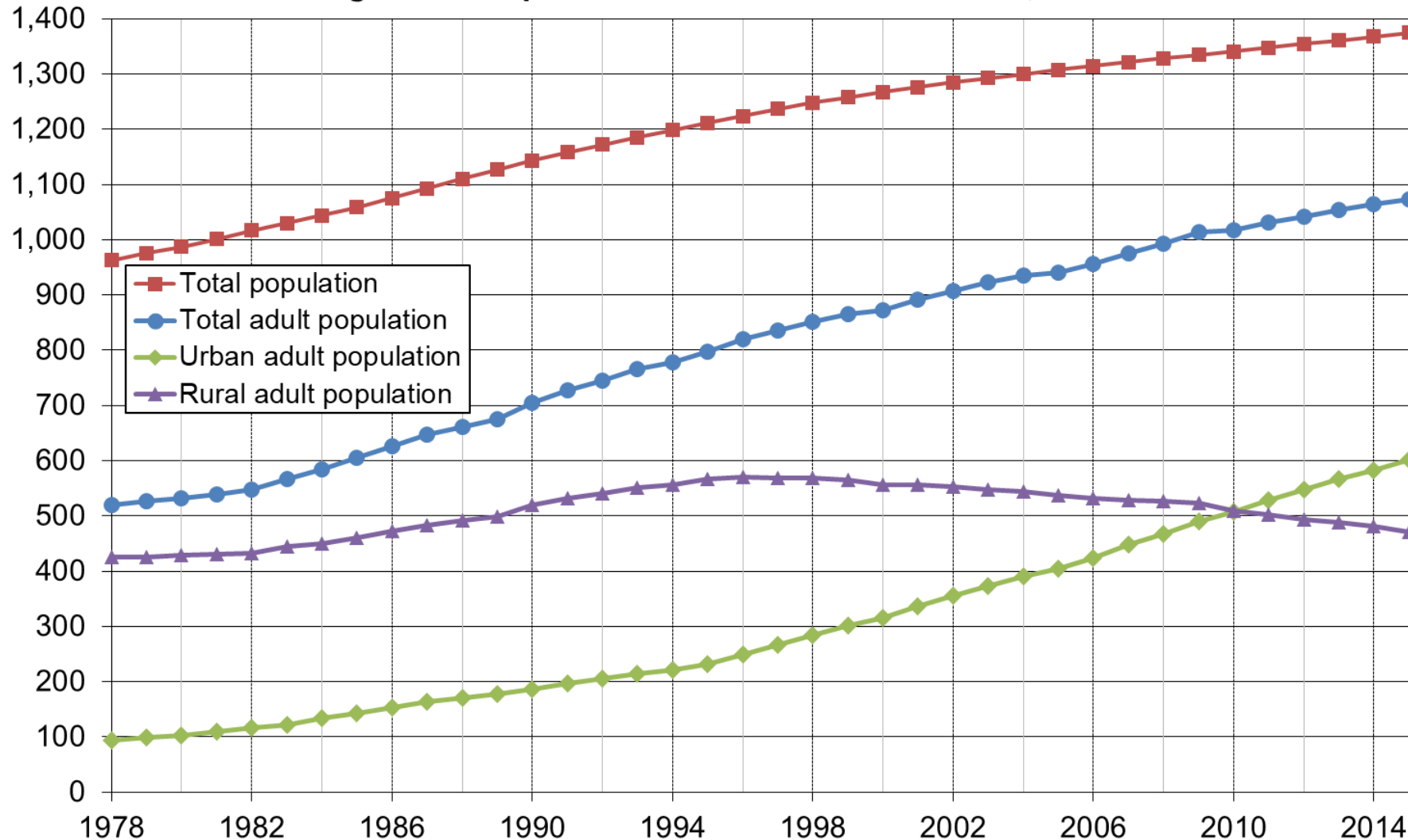


Part B: The Rise of Income Inequality in China

1. Concepts and Methodology
2. Top 1%, top 10%, middle 40% and bottom 50%
- 3. China vs Rich Countries**
4. Inequality between and within rural and urban China

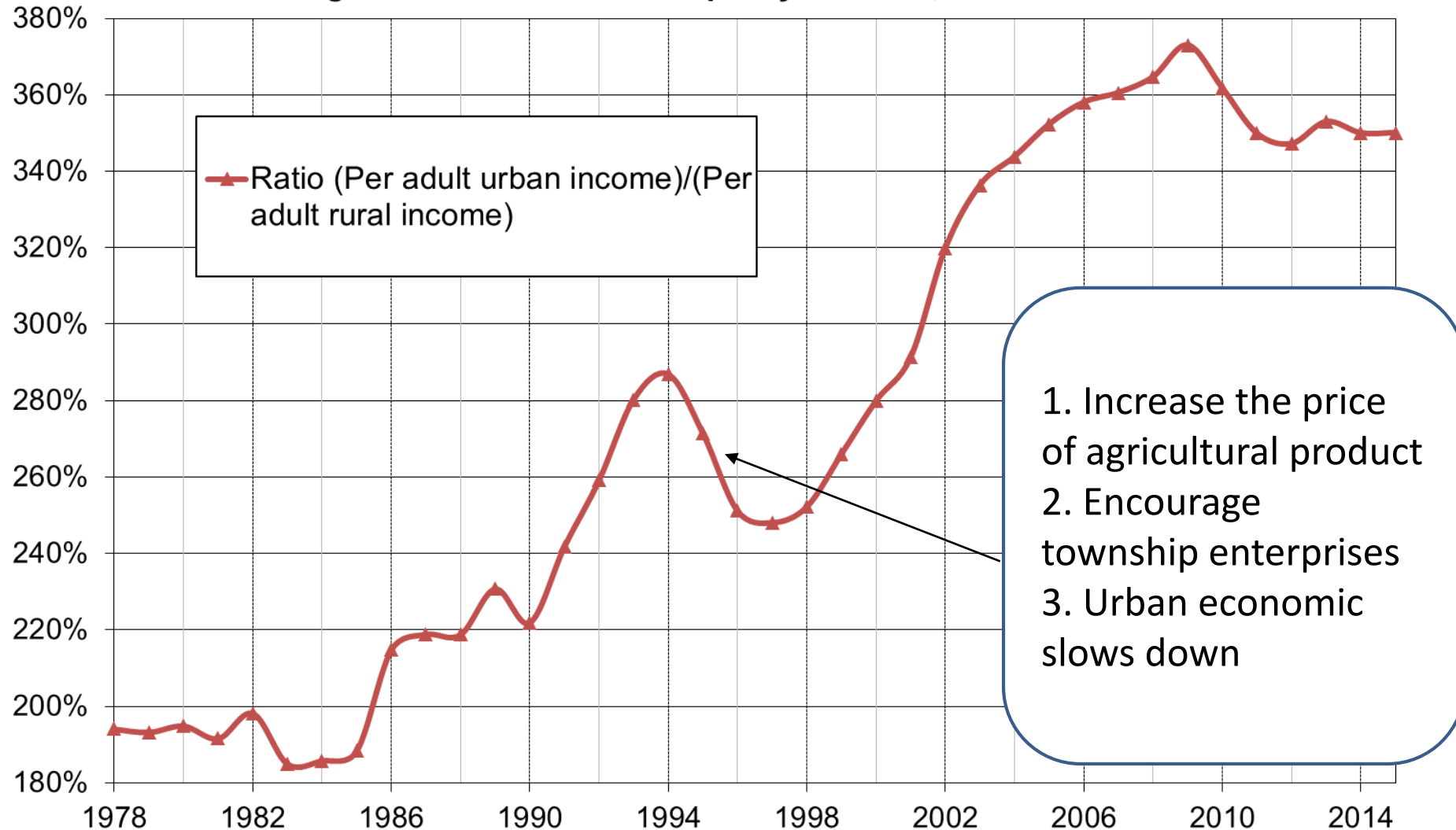
Rural and urban adult population

Figure 13: Population in urban and rural China, 1978-2015



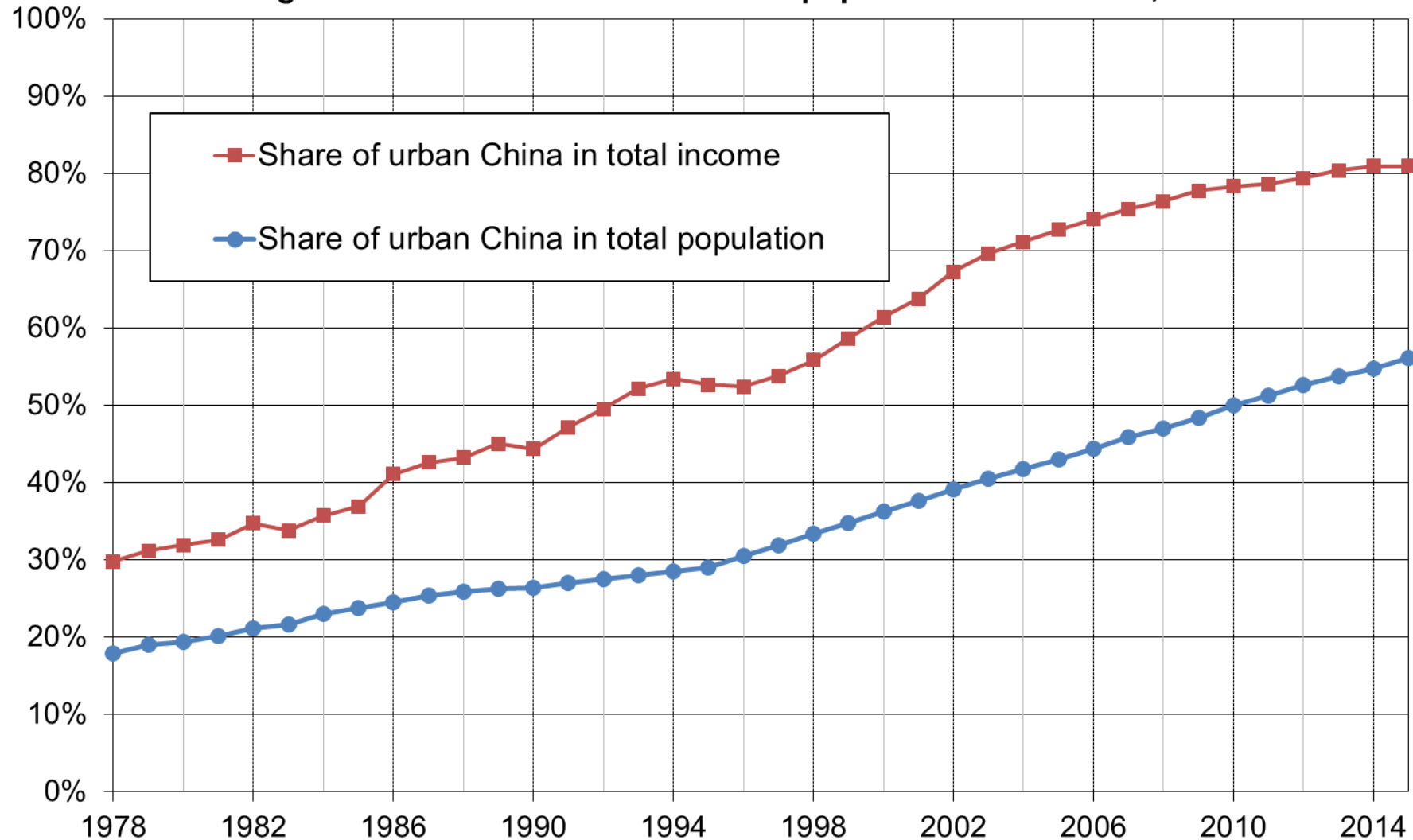
Per adult income: rural vs urban

Figure 14: Rural-Urban Inequality in China, 1978-2015

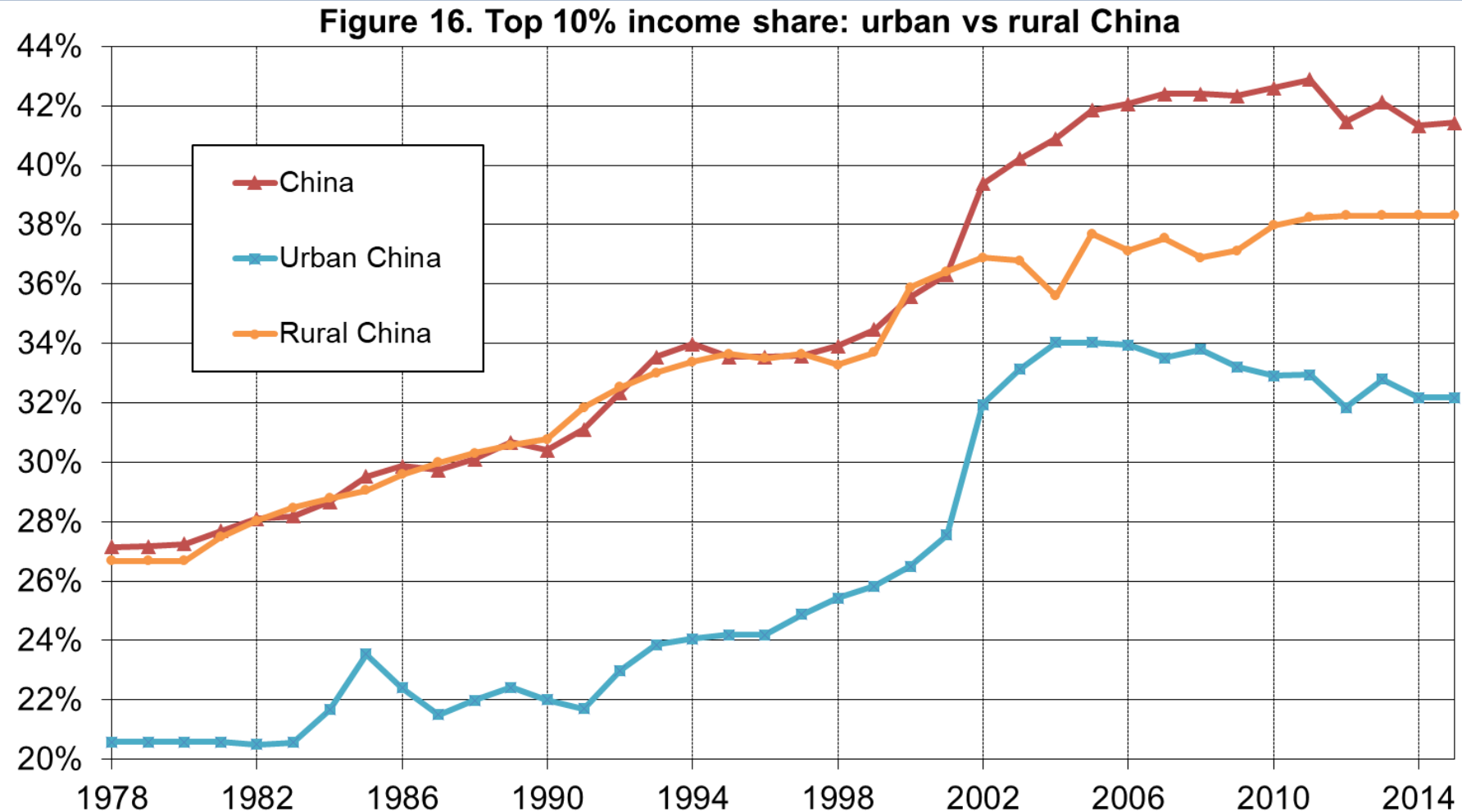


Increase of share of urban in total population and income

Figure 15: Shares of urban China in population and income, 1978-2015



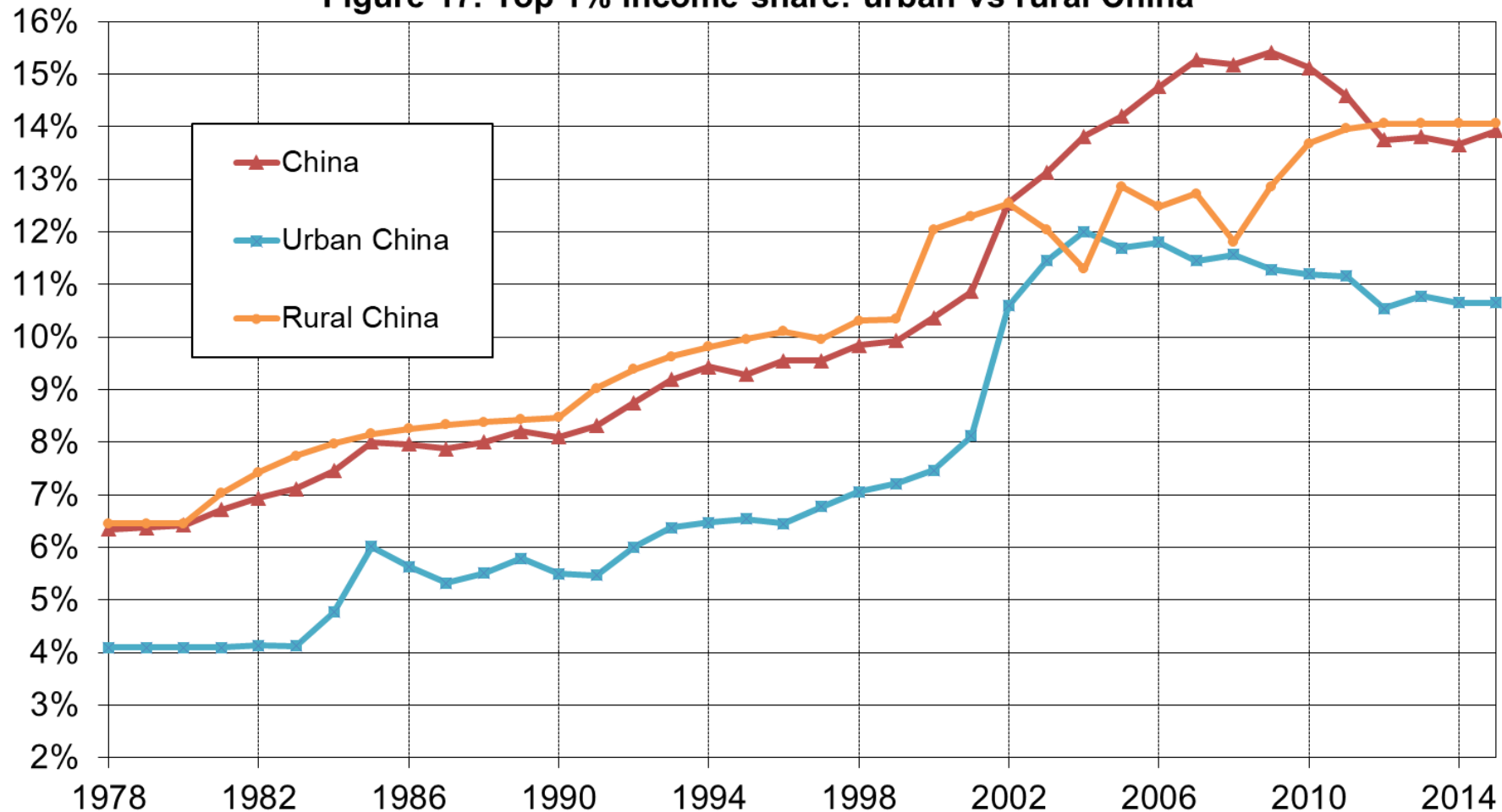
Top 10%: rural vs urban



Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Corrected estimates (combining survey, fiscal, wealth and national accounts data).
Equal-split-adults series (income of married couples divided by two).

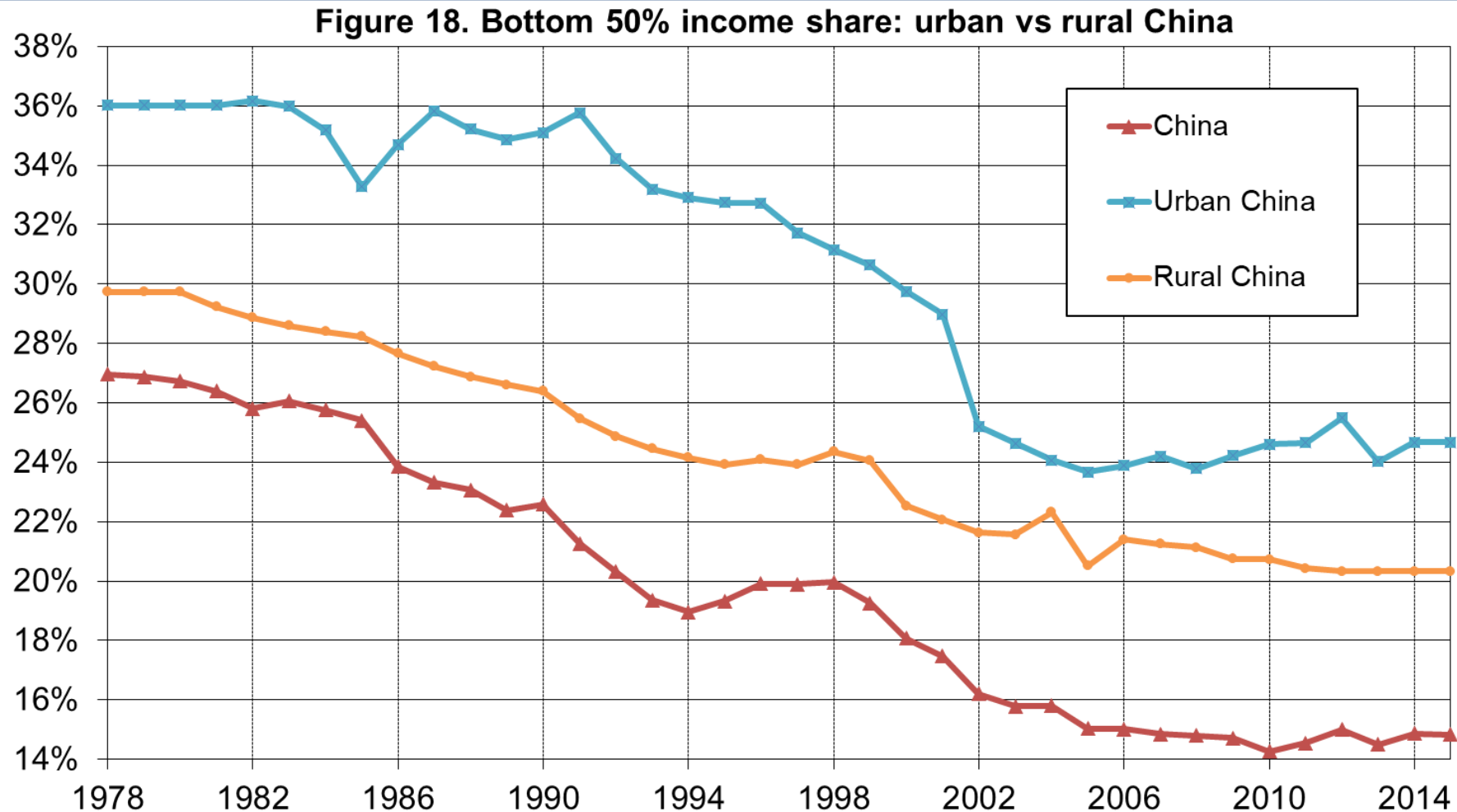
Top 1%: rural vs urban

Figure 17. Top 1% income share: urban vs rural China



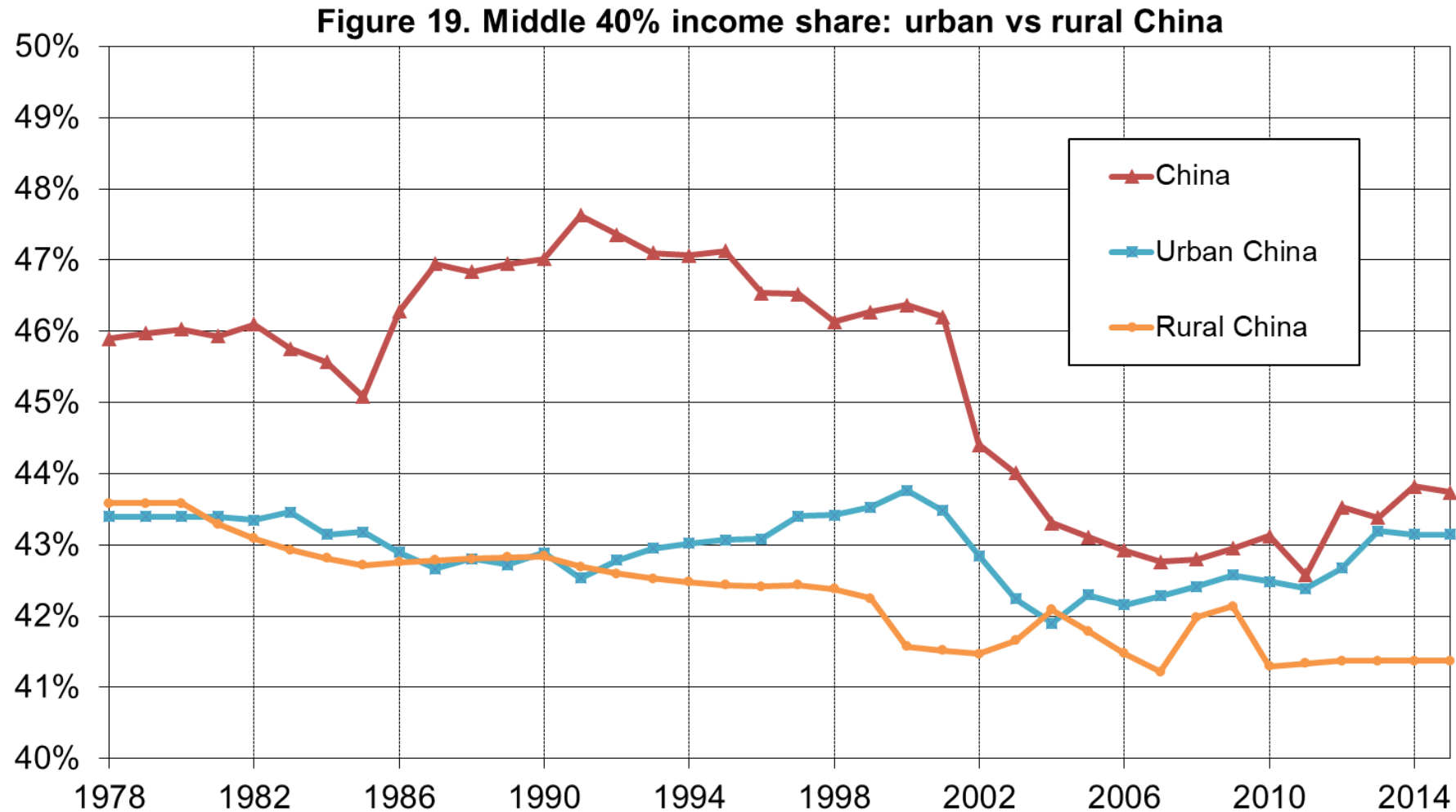
Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Corrected estimates (combining survey, fiscal, wealth and national accounts data).
Equal-split-adults series (income of married couples divided by two).

Bottom 50%: rural vs urban



Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Corrected estimates (combining survey, fiscal, wealth and national accounts data).
Equal-split-adults series (income of married couples divided by two).

Middle 40%: rural vs urban



Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Corrected estimates (combining survey, fiscal, wealth and national accounts data).
Equal-split-adults series (income of married couples divided by two).

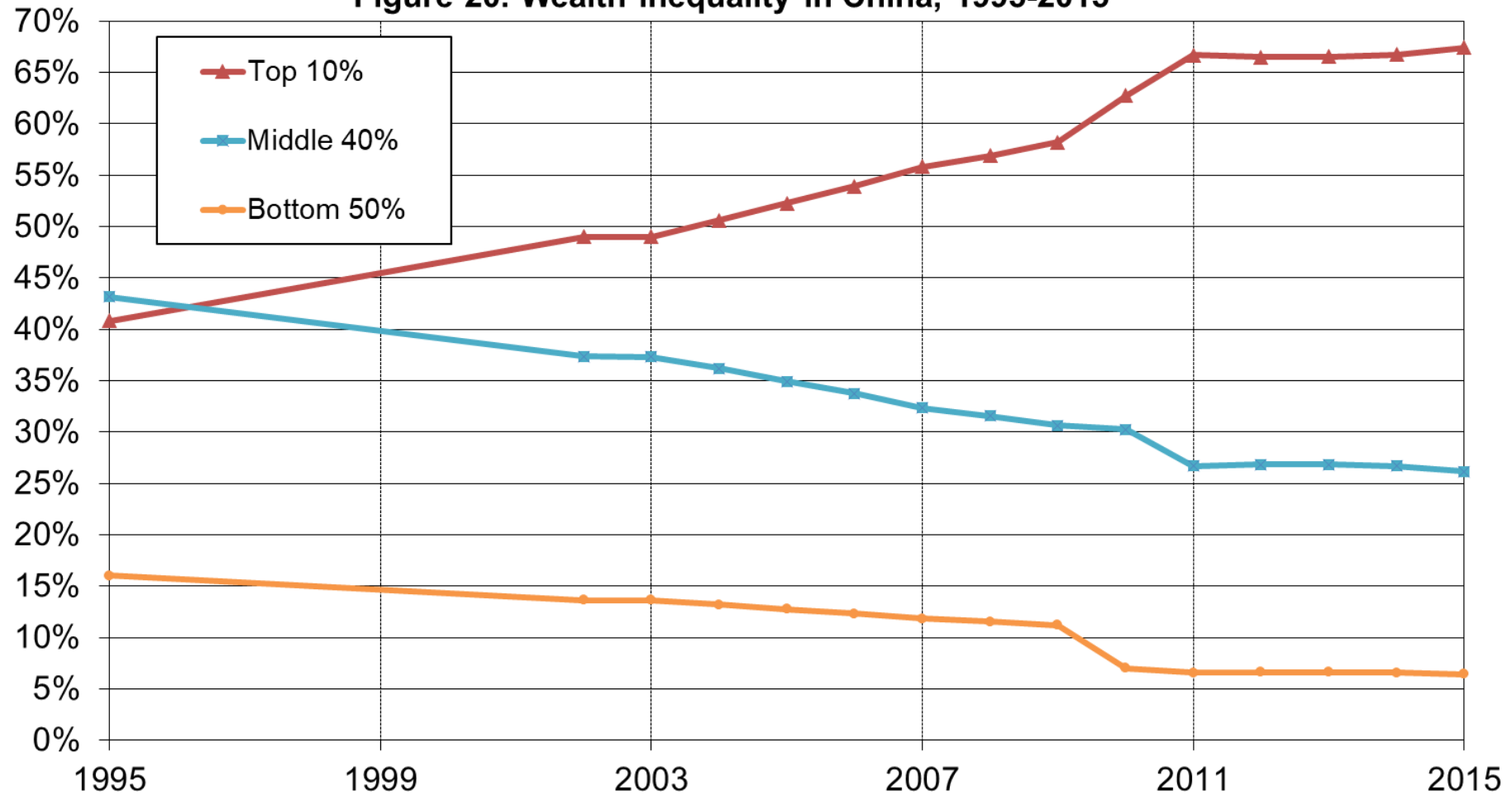
Part C: The Rise of Wealth Inequality in China

Estimate distribution of Wealth (w_f)

1. Survey data
 - CHIP (1995, 2002, 2013)
 - CFPS (2010, 2012)
2. Methods
 - Generalized Pareto interpolation techniques (Blanchet-Fournier-Piketty, 2016)
 - Problem of underestimation of the top wealth share
3. Correct the top distribution using all available waves of the “Hurun Rich List” (2002-2015)

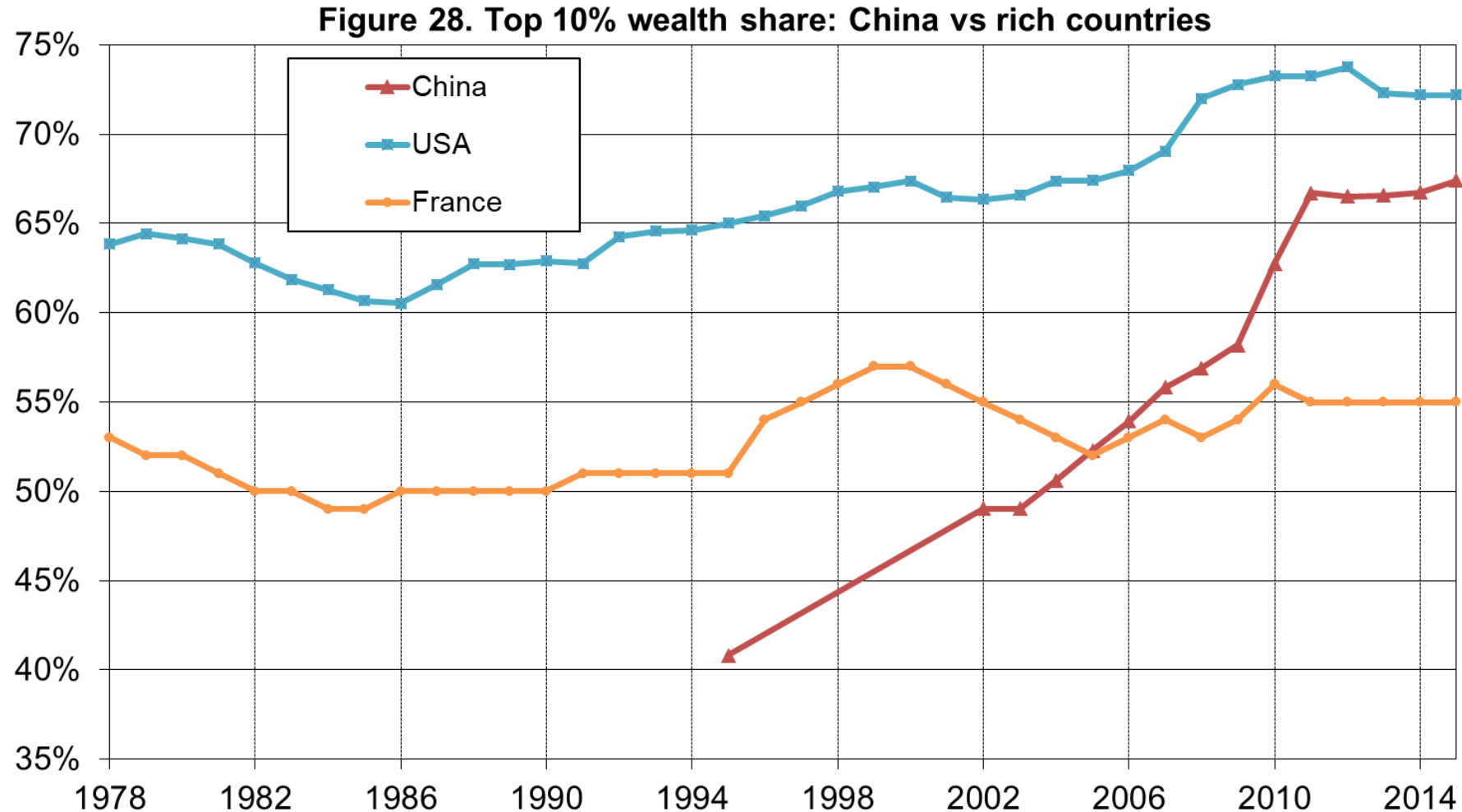
Wealth inequality

Figure 20. Wealth inequality in China, 1995-2015



Distribution of net personal wealth among adults.
Corrected estimates (combining survey data and wealth rankings).
Equal-split-adults series (wealth of married couples divided by two).

Wealth inequality (continue)



Distribution of pretax national income (before taxes and transfers, except pensions and unempl. insurance) among adults.
Corrected estimates (combining survey, fiscal, wealth and national accounts data).
Equal-split-adults series (income of married couples divided by two).

Estimate China's national wealth and inequality 1978-2015

Completed analysis

- Wealth series by assets (Agricultural land, Housing, Other domestic capital, and Net foreign assets, Market value vs Book value)
- Private and public share of national wealth assets
- Capital income and capital return of assets by sector (Housing, Corporate, Government)
- Top1%, top 10%, middle 40%, and bottom 50% income share (corrected using income tax data from high income tax payers)
- Comparison of China's statistics with rich countries

Preliminary working paper and presentations

- Capital Accumulation, Private Property, and Inequality in China, 1978-2015 ([link](#))
- Findings presented in AEA Meeting 2017, "Global inequality dynamics: New findings from WID.world" ([link](#))
- Presentation at Paris School of Economics (February 7th 2017)

Step 1: Improve Estimates on capital share and return 1978-2015

Future work

- Estimate capital income and capital return by industries using macro data from industry statistic year book.
- Estimate labor and capital income share in different income groups (Top1%, top 10%, middle 40%, and bottom 50%)
- Estimate wealth shares for different income groups
- Estimate capital return in different income groups
- Using micro survey data 1988-2013 (CHIP, CFPS)
- How do changes in factor shares impact on inequality?

Next steps (continued)

Step 2: Estimate urban/rural level and provincial level wealth and inequality 1978-2015

Work in Progress:

- Estimate income inequality within and between rural and urban China

Future work

- Estimate provincial level wealth and inequality
- Data requirements
 - provincial level national account data (flows and stocks)
 - Provincial level survey data on incomes
- Required data already partially collected (Statistic Yearbooks of 34 provinces, Economic Censuses)

Step 3: Long term estimates of national wealth income ratio, 1930s-1978

- Required historical data already partially collected

Thank you very much!

thomas.piketty@psemail.eu

li.yang@psemail.eu

zucman@berkeley.edu

Appendix

- **Distributional National Accounts (DINA) →**

- how is national income distributed in different groups (public vs private, top 1%, top10%, middle 40%, bottom 50%)?



- how are labor and capital incomes distributed in different groups?



- what contribute to the change of the wealth (saving or capital gain) in different group?



- what are the capital return of different assets in different group?