

LECTURE 1: FROM WAGES TO WELFARE: DIMENSIONS OF INEQUALITY IN US AND OTHER COUNTRIES: WAGES, EARNINGS, INCOME AND CONSUMPTION

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Outline

- Why macro and inequality?
- A quick primer on inequality measurement
- 50 years of dynamics of inequality in United States
- Some cross country comparisons
- Inequality in the 2009 crisis

Income per capita

- Each year/quarter residents of a country creates value (e.g. cars, books, haircuts) which translate into income
- For example, *on average*, in 2018 each person in the US received around **\$60k** of Gross Domestic Product (GDP)
- Traditional macro studies this quantity over time, or across countries

Traditional Macro Numbers

	Level (2017\$)	Growth, 2017-18	Growth 2008-09
Bottom 5%	2100 (Ethiopia)	-0.7% (Nigeria)	-7% (Mexico)
Bottom 10%	4100 (Cambodia)	0.5% (Brazil)	-6% (Japan)
Median	11300 (Indonesia)	3.9% (Indonesia)	3.2% (Indonesia)
Top 10%	45000 (France)	5.9% (China)	8.5% (China)
Top 5%	61000 (US)	5.9% (China)	8.5% (China)

Sample size: 190 countries, Source: World Bank WDI

- Level: factor of 10 to factor of 30 differences between rich and poor
- Growth: Difference between 7% and 15% between slow and fast growers

Income Inequality

- Income inequality measures how income is distributed across households/persons, within a country

Income inequality in the US

- Income concept: per capita, per household disposable income

	Level (2017\$)	Growth, 2017-18	Growth 2008-09
Bottom 5%	4200	-72%	-70%
Bottom 10%	7200	-55%	-54%
Median	2200	1.4%	-1.4%
Top 10%	56000	115%	92%
Top 5%	74000	226%	171%

Sample size: 60k households, Source: CPS

- Level: factor of 8 to factor of 20 differences between rich and poor
 - ▶ Within US differences almost as large as US and Ethiopia
- Growth: Differences over 200% between slow and fast growers
 - ▶ Household level growth changes orders of magnitude larger than a country level

Macro and Inequality

- Modern macro not only about aggregate dynamics but also **dynamics of distributions across agents** as distributions **matter per se**, **affect** and **are affected** by aggregated events

Key Questions

- Does a macro outcome (i.e. a recession, a period of rapid growth) affect equally households across the distribution?
- Does the shape of the distribution affect the likelihood a given macro outcome?

Macro and Inequality

- Representative-agent business-cycle literature built on well defined set of facts about aggregate variables
- Start with **systematic** stylized facts about cross-sections: reference for HA models

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- Start with **systematic** stylized facts about cross-sections: reference for HA models
- **RED 2010 special issue**: consistently document facts about key dimensions of dynamics of cross-sectional facts in several countries
 - ▶ **USA**, UK, Canada, Italy, Germany, Spain, Sweden, Russia, Mexico

How do we measure inequality?

Simple measures of inequality: 90-10 , 50-10, 90-50 ratios, Gini Index, Variance of Logs, Shares

- 90/10 ratio = $\frac{\text{Characteristic (Income, Wealth, Happiness) of household at the top 10\%}}{\text{Same Char. of household at the bottom 10\%}}$
- Gini index: measure of concentration
 - ▶ 1 if only one household receives has it all (income, wealth..)
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- Measures Matter!

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- Some mechanisms acts as **dampening** forces, others as **amplifying** forces

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Aim of lecture is to shed light on:

- **transmission of inequality** from wages to welfare
- The connection between between dynamics of inequality and aggregate dynamics

Organizing device: household budget constraint

$$c + \mathbf{a}' = \mathbf{a} + \sum_{i=1}^N w_i h_i + I(\mathbf{a}) + T(w_i h_i, \mathbf{a})$$

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- c : consumption (welfare)

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4. **Survey of Consumer Finance (SCF), 1983-> (every 3 years)**
 - ▶ repeated cross section, covers 4000+ families
 - ▶ key strength: wealth data of the rich

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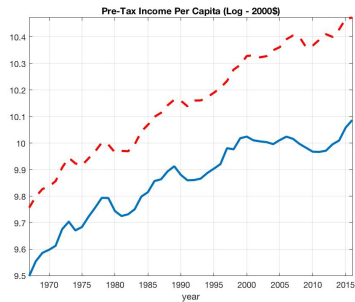
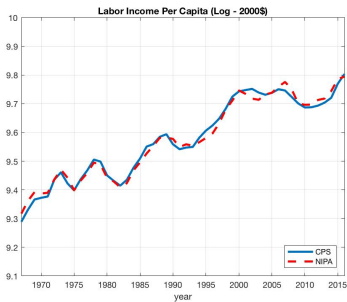
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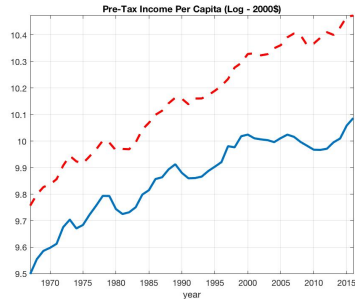
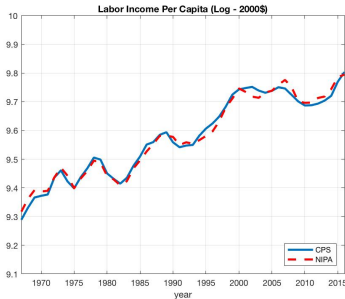
3. Sample C

- ▶ individuals age 25-60 who work at least 260 hours per year
- ▶ used for **individual-level** (wages, hours) statistics

Macro facts in micro data

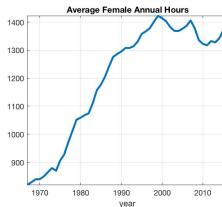
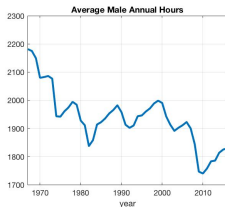
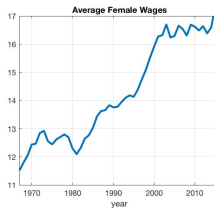


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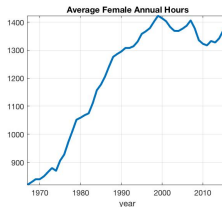
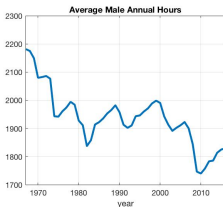
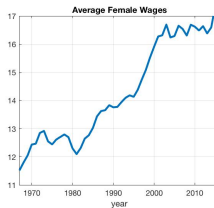
- Wages and Salaries p.c. in CPS **aligns well** with NIPA
- Pre-tax income more **volatile** in CPS, does not track as well. Missing the very rich? Underreporting of capital income? Missing items in CPS (employer provided health insurance)?
- **A macro-micro disconnect?**

Accounting for labor income growth: males/females



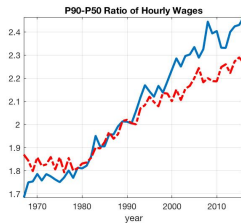
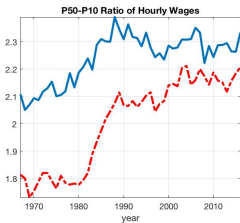
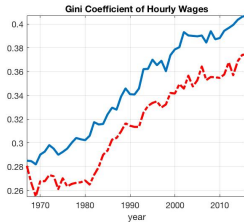
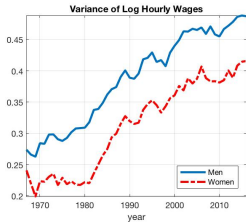
- 2/3 of growth in US labor income attributable to females

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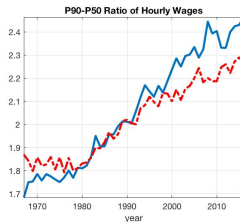
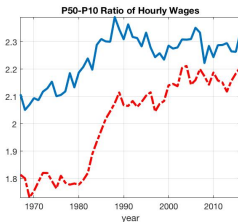
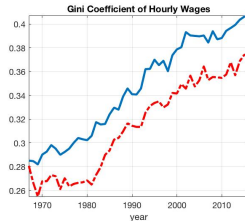
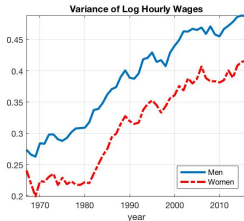
- 2/3 of growth in US labor income attributable to females
- 1/3 due to increased correlation btwn male wage and hours
- Recent stagnation connected to slowdown in gender equality progress?

Inequality step 1. Wages



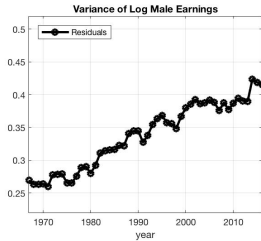
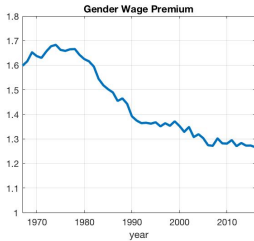
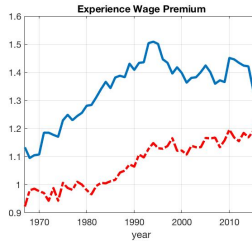
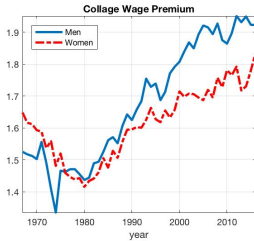
- Steady increase

Inequality step 1. Wages

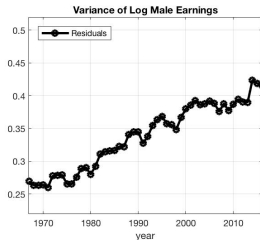
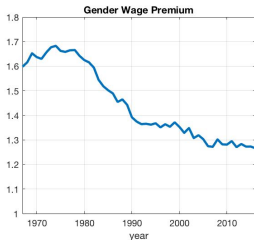
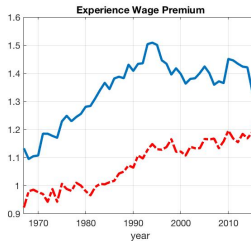
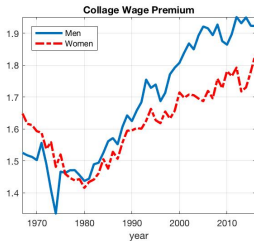


- Steady increase
- Early: driven by decline of the bottom. Late driven by takeoff of top

Decomposing wage inequality in CPS



Decomposing wage inequality in CPS



- Trend in residual dispersion **robust** to specification of regression

Wage Inequality in other countries

Country	Level in year 2000				Change				Period
	Var. log w	College premium	Exp. premium	Gender premium	College premium	Exp. premium	Gender premium	Var. log w	
Canada	0.45	1.80	1.32	1.33	0.22	0.31	-0.11	0.17	1978-2006
Germany	0.27	1.38	1.27	1.28	-0.08	0.22	-0.15	0.05	1983-2003
Italy	0.17	1.51	1.34	1.03	-0.08	0.11	-0.05	0.03	1987-2006
Mexico	0.62	1.88	1.23	1.21	0.40	0.22	-0.06	0.04	1989-2002
Russia	0.77*	1.50	1.05*	1.49	-0.06	0.05*	-0.07	-0.13*	1998-2005
Spain ^(a)	0.23	1.48	1.43	1.16	-0.33	0.07	-0.21	-0.18	1985-1996
Sweden ^(b)	0.18	1.61	1.20	1.22	0.14	-0.02	-0.05	-0.09	1990-2001
UK	0.33	1.62*	1.25*	1.32	0.12*	0.20*	-0.21	0.10	1978-2005
USA	0.44*	1.80*	1.38*	1.36	0.40*	0.28*	-0.25*	0.21*	1980-2006
Average	0.38	1.62	1.27	1.27	0.11	0.17	-0.10	0.04	

A * indicates the statistic is from data on males only. Wage premia and wage dispersion for women is typically smaller.

(a) Data on changes refer to after-tax annual earnings

(b) Data on levels is for 1992

Recap: individual wage inequality

1. In US Continuous increase since late 1960s

- ▶ 1970s: concentrated at the bottom
- ▶ 1980s: throughout the distribution
- ▶ 1990s and 2000s: concentrated at the top

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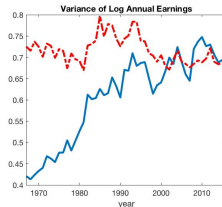
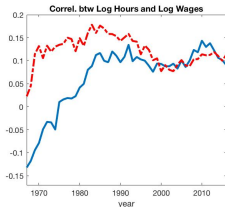
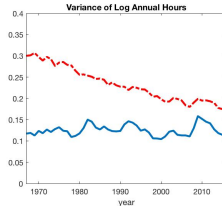
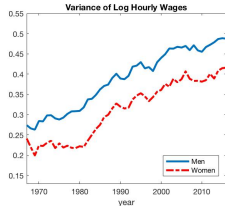
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2. Two-thirds of the increase is residual

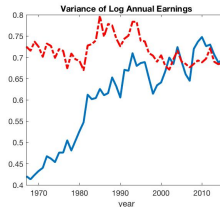
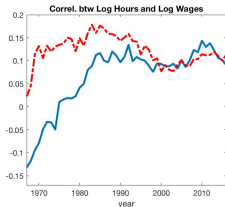
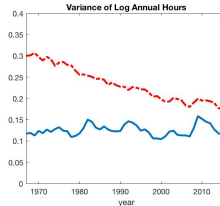
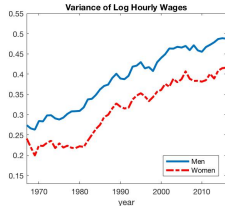
- ▶ virtually 100% residual in the 1970s
- ▶ only about 50% residual after 1980
- ▶ In other countries rather different experiences: points to the important role of national institutions

Inequality Step 2. Individual Earnings



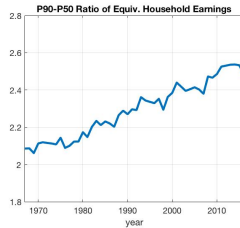
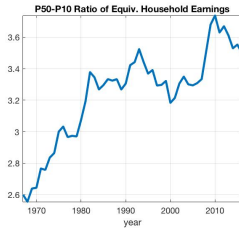
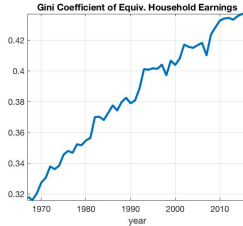
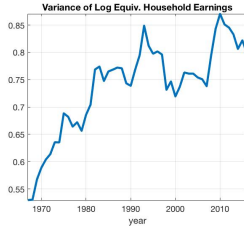
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Increase in earnings ineq < increase in wages ineq

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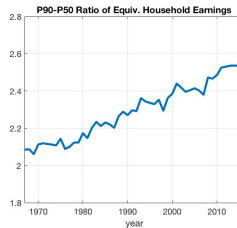
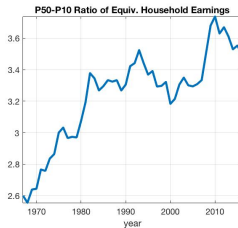
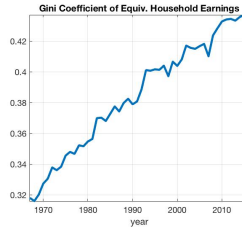
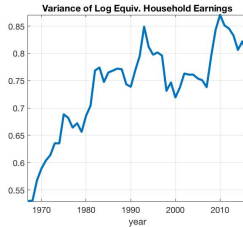


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Increase in earnings ineq $<$ increase in wages ineq
- **Men:** increase in participation amplifies increase in wage dispersion.
Increase in earnings ineq $>$ increase in wages ineq

Inequality Step 3. Household pooling

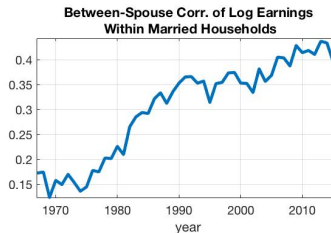
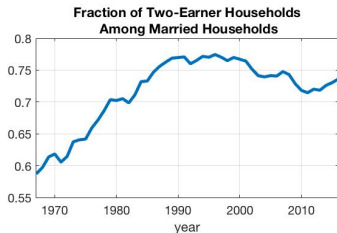
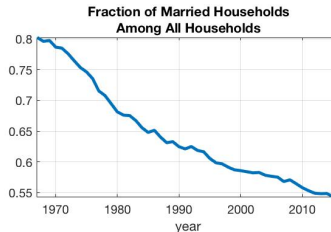
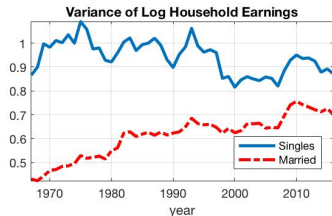


Inequality Step 3. Household pooling

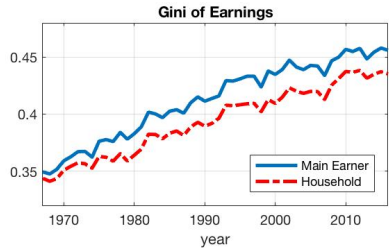
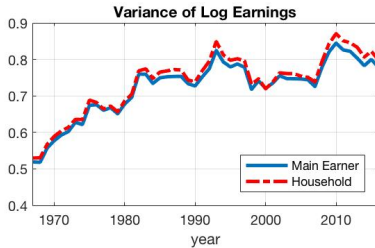


- Var and Gini relate to **bottom and top of distribution**, respectively

Factors affecting within-household earnings pooling



Net effect



- Bigger role for within-household income pooling **at the top?**

Income pooling within the household

- Married households have lower dispersion (income pooling)
 - ▶ but... increasing fraction of singles

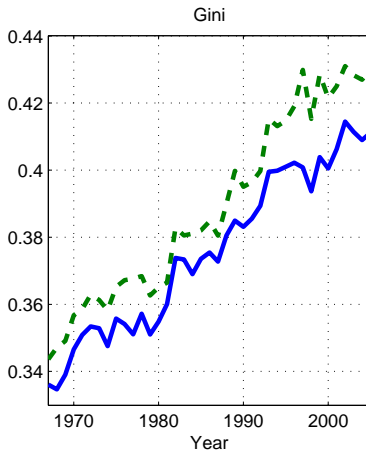
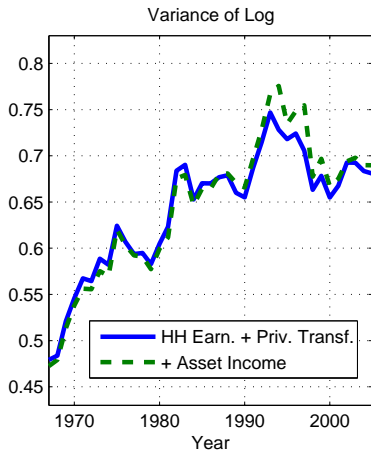
Income pooling within the household

- Married households have lower dispersion (income pooling)
 - ▶ but... increasing fraction of singles
- Rising female labor force participation increases potential role for within-family income pooling
 - ▶ but... increasingly assortative matching

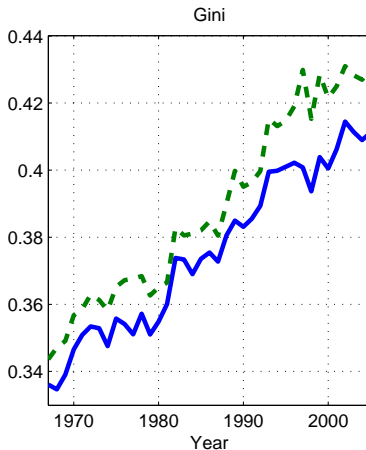
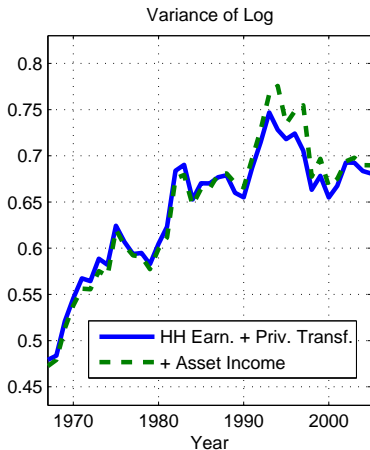
Income pooling within the household

- Married households have lower dispersion (income pooling)
 - ▶ but... increasing fraction of singles
- Rising female labor force participation increases potential role for within-family income pooling
 - ▶ but... increasingly assortative matching
- **Net result:** Small impact of more secondary earners on inequality trends: larger in Gini (top) than in Var. (bottom)
 - ▶ Why so small at the bottom? More singles, fewer working spouses among poor households

Step 4. Asset income

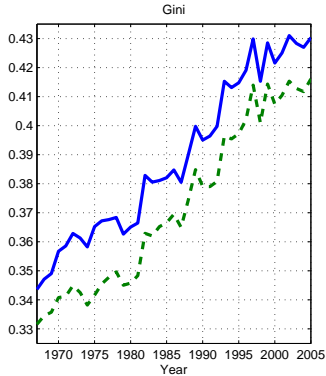
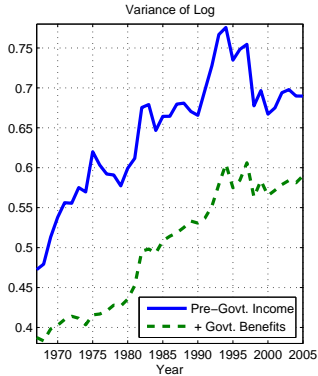


Step 4. Asset income



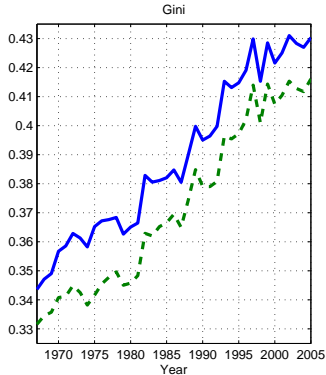
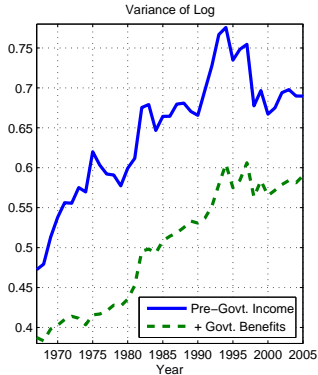
- Asset income increases level and trend of inequality at the top

Step 5. Public transfers



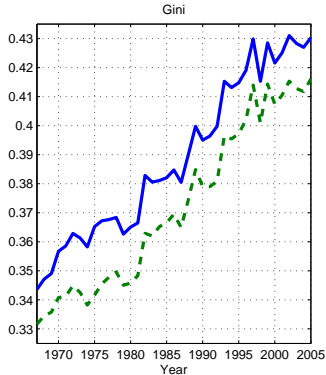
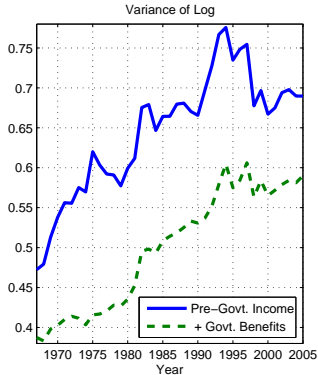
- Public transfers greatly reduce level of inequality at the **bottom**

Step 5. Public transfers



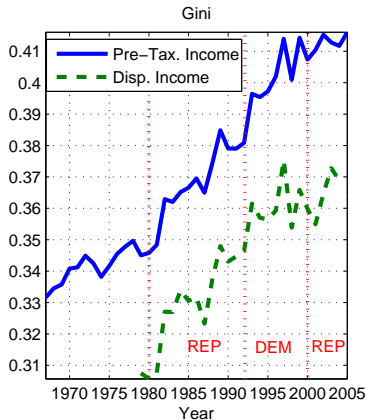
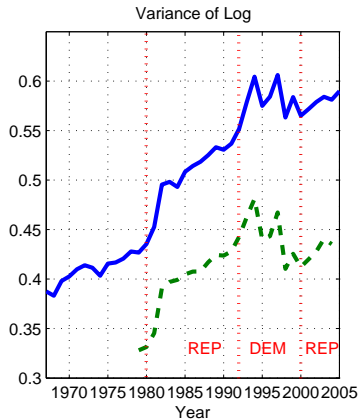
- Public transfers greatly reduce level of inequality at the **bottom**
- Big role in the 1970s, smaller after 1980s, reflecting lower unemployment, more on 2009 later

Step 5. Public transfers

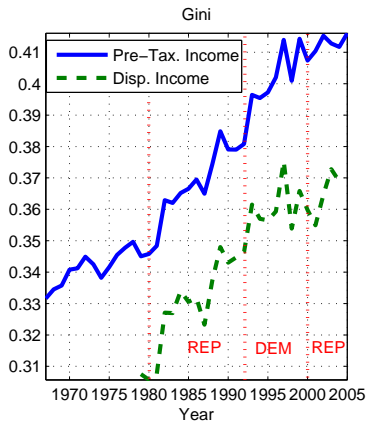
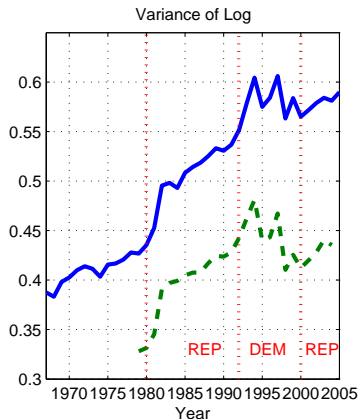


- Public transfers greatly reduce level of inequality at the **bottom**
- Big role in the 1970s, smaller after 1980s, reflecting lower unemployment, more on 2009 later
- Cyclical variation at the bottom **smoother** after public benefits (**UI**)

Step 6. Tax system



Step 6. Tax system



- Taxes greatly reduce **level** of inequality throughout the distribution
- Taxes have reduced **rise** of inequality at the bottom (introduction of EITC)

Role of government in other countries: var logs

Country	Level in year 2000		Change		Period
	Pre-gov. income	Post-gov. income	Pre-gov. income	Post-gov. income	
Canada	0.50	0.25	0.16	0.05	1978-2005
Germany	0.63	0.40	0.42	0.04	1984-2004
Italy ^(a)	0.72	0.73	0.06	0.07	1987-2006
Mexico	2.10	1.70	1.15	0.75	1989-2002
Russia ^(b)	0.86	0.60	-0.11	-0.09	1994-2005
Spain ^(c)	0.73	0.56	-0.20	-0.09	1993-2000
Sweden	0.95	0.38	0.36	0.05	1978-2004
UK ^(d)	0.55	0.32	0.22	0.13	1978-2005
USA	0.67	0.41	0.11	0.11	1979-2005
Average	0.86	0.59	0.24	0.11	

(a) Data on pre-gov. income are already after tax

(b) Data on pre-gov. income are already after tax and refer to working households

(c) Data on pre-gov. income are already after tax

(d) Data refer to households with at least one worker

Role of government in other countries: var logs

Country	Level in year 2000		Change		Period
	Pre-gov. income	Post-gov. income	Pre-gov. income	Post-gov. income	
Canada	0.50	0.25	0.16	0.05	1978-2005
Germany	0.63	0.40	0.42	0.04	1984-2004
Italy ^(a)	0.72	0.73	0.06	0.07	1987-2006
Mexico	2.10	1.70	1.15	0.75	1989-2002
Russia ^(b)	0.86	0.60	-0.11	-0.09	1994-2005
Spain ^(c)	0.73	0.56	-0.20	-0.09	1993-2000
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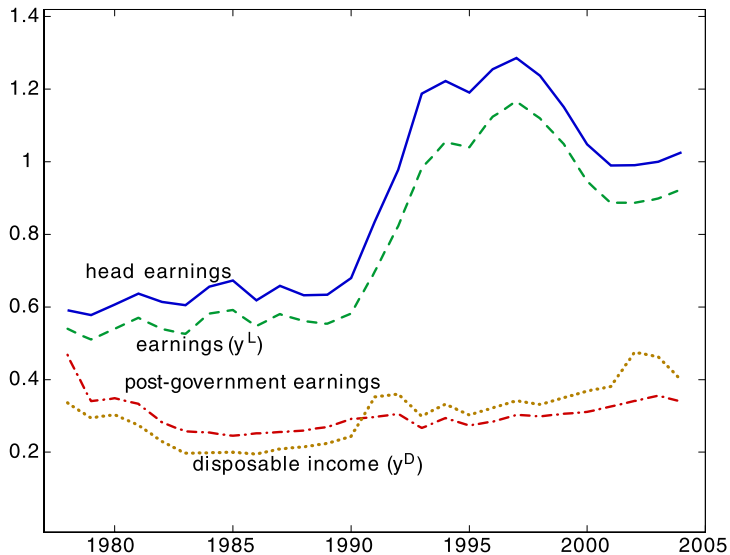
(a) Data on pre-gov. income are already after tax

(b) Data on pre-gov. income are already after tax and refer to working households

(c) Data on pre-gov. income are already after tax

(d) Data refer to households with at least one worker

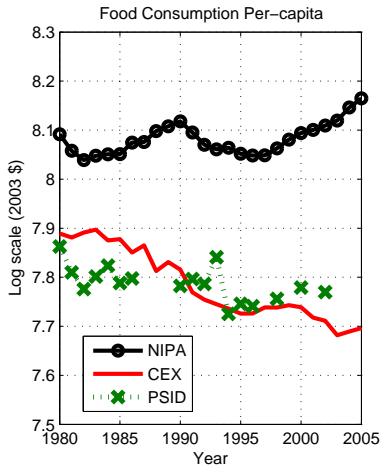
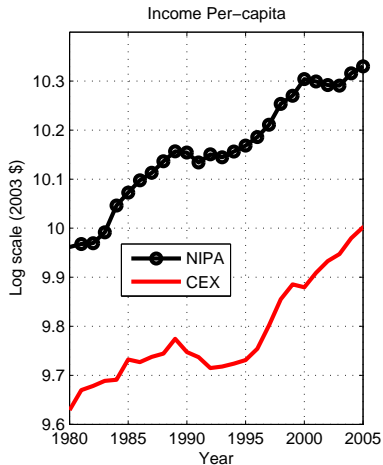
The case of Sweden



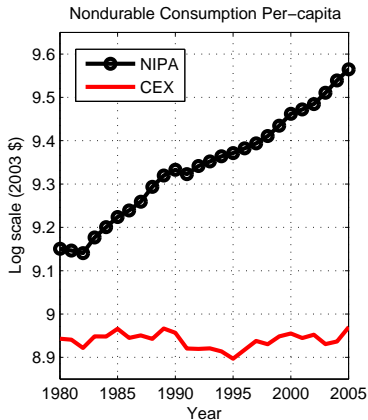
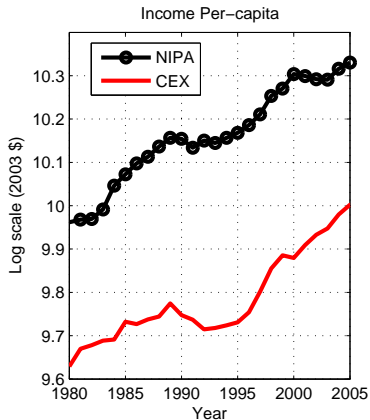
Recap: household income dispersion

- **Private transfers** reduce level and trend inequality at bottom
- **Asset income** increases level and trend inequality at the top (underestimated)
- **Public transfers** play a significant role for redistribution and stabilization
- **Taxes** greatly reduce level and trend of inequality
- The impact of government policies on levels and trends of inequality qualitatively similar but **quantitatively very different** across countries

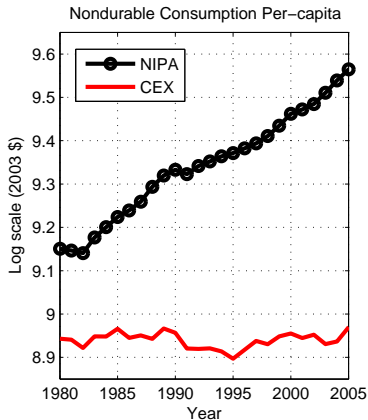
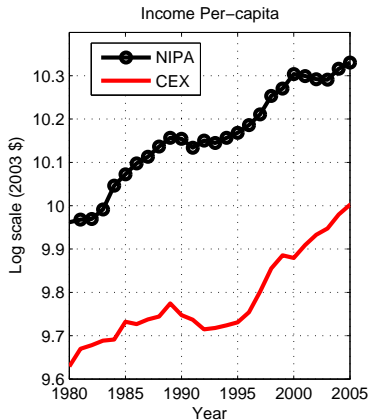
Macro facts in micro data: CEX



Macro facts in micro data: CEX

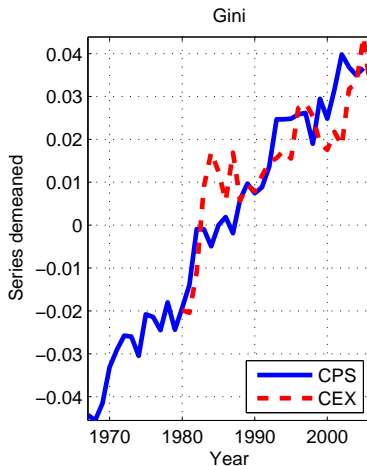
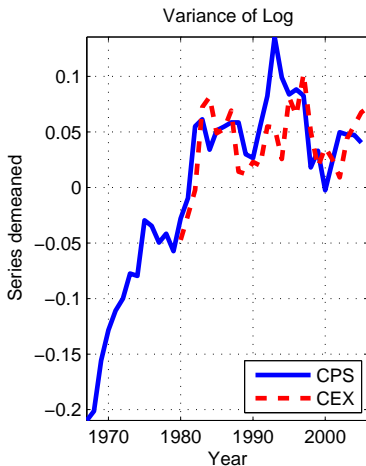


Macro facts in micro data: CEX



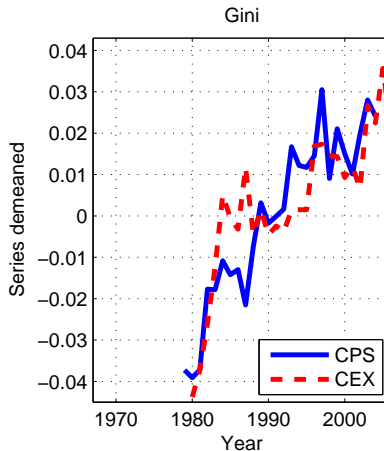
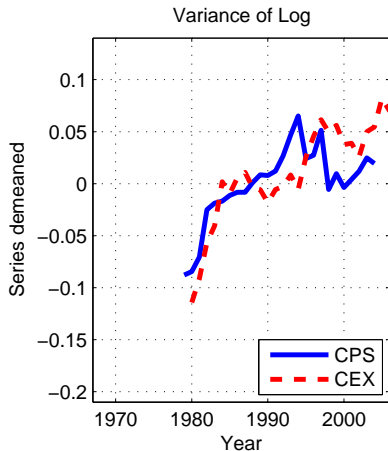
- Trends in consumption p.c. do not align well with NIPA
- Trends align much better in the post 2003 period (will see it later)

Comparison CPS-CEX: household earnings



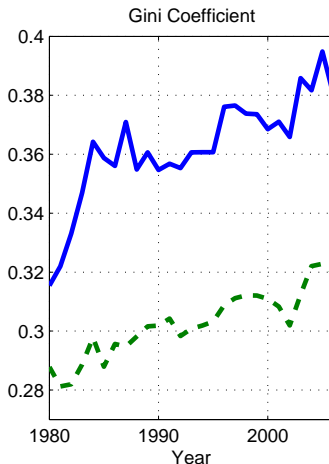
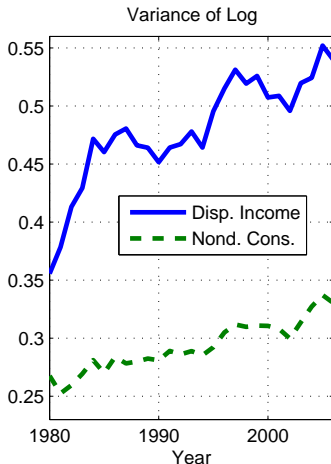
- Earnings inequality trends line up very well

Comparison CPS-CEX: disposable income



- Somewhat larger increase in CEX (taxes reported differently)

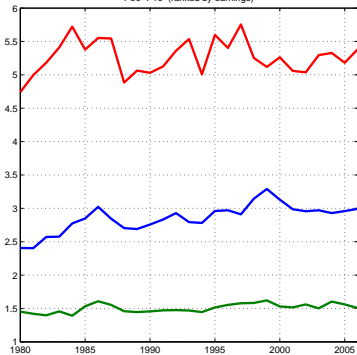
From disposable income to consumption



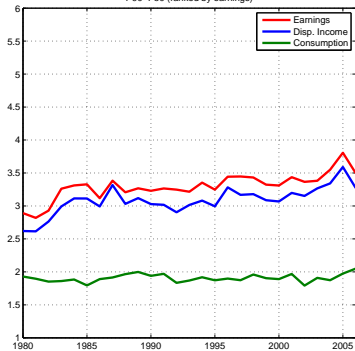
- Level con ineq. much lower than disposable income
- Δ cons. ineq. **less than half** than Δ disp. income ineq.

Contrasting compression at top and bottom

P50-P10 (ranked by earnings)

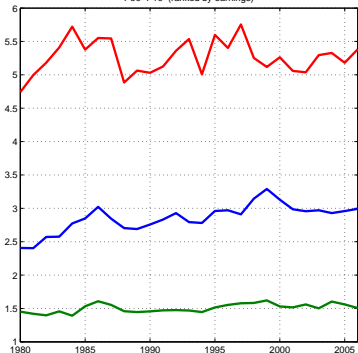


P90-P50 (ranked by earnings)

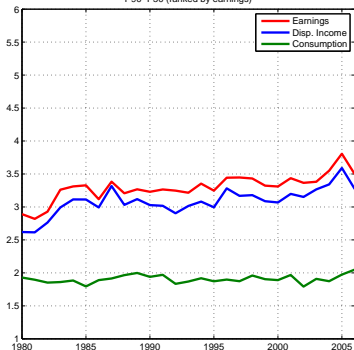


Contrasting compression at top and bottom

P50-P10 (ranked by earnings)



P90-P50 (ranked by earnings)



- More compression at the bottom than at the top, both from earnings to disp. income, and going from disp. income to consumption

Compression at the top and bottom in other countries

Country	Bottom (50/10)			Top (90/50)		
	Disp Inc.	Cons.	Gap	Disp Inc.	Cons.	Gap
Canada	2.21	1.95	0.26	2.00	1.85	0.15
Germany	2.05	1.70	0.35	1.80	1.81	-0.01
Italy	2.45	1.91	0.54	1.93	1.88	0.05
Mexico	8.00	5.10	2.90	4.75	4.00	0.75
Russia	3.02	2.70	0.32	2.60	2.60	0.00
Spain*	2.04	1.82	0.22	2.00	1.90	0.10
Sweden	1.58	1.62	-0.04	1.64	1.73	-0.09
UK	2.82	NA	NA	2.08	NA	NA
USA	2.64	2.00	0.64	2.21	2.0	0.21
Average	2.98	2.35	0.65	2.33	2.22	0.15

* The level for Spain refers to year 1996

Why more consumption compression at the bottom?

- Shocks that cause inequality at the bottom are more temporary
- More informal insurance
- Still an open research question

Changes in disposable income and consumption: top/bottom and other countries

Country	Bottom (50/10)			Top (90/50)			Period
	Disp. Inc.	Cons.	Gap	Disp. Inc.	Cons.	Gap	
Canada	0.38	0.20	0.18	0.10	0.07	0.03	1978-2006
Germany	0.35	0.00	0.35	0.15	0.10	0.05	1983-2003
Italy	0.22	0.09	0.13	0.05	0.01	0.04	1980-2006
Mexico	5.81	0.80	5.01	1.12	1.08	0.04	1989-2002
Russia	0.10	0.05	0.05	-0.16	-0.10	-0.06	1994-2005
Spain	-0.16	-0.13	-0.03	-0.18	0.01	-0.17	1985-1996
Sweden	0.13	0.02	0.11	0.21	0.10	0.11	1985-1998
UK	0.86	0.58	0.28	0.27	0.12	0.15	1978-2005
USA	0.55	0.25	0.30	0.40	0.15	0.25	1980-2006
Average	0.91	0.21	0.71	0.22	0.17	0.05	

Disposable income and consumption: a summary

- Disposable income inequality is higher and has increased more at the bottom than at the top
- Consumption inequality is smaller and has increased less than disposable income inequality

Disposable income and consumption: a summary

- Disposable income inequality is higher and has increased more at the bottom than at the top
- Consumption inequality is smaller and has increased less than disposable income inequality
- The gap ("risk sharing") in level and growth is larger at the bottom than at the top