

# Inequality Dynamics in France, 1900-2014: Evidence from Distributional National Accounts (DINA)

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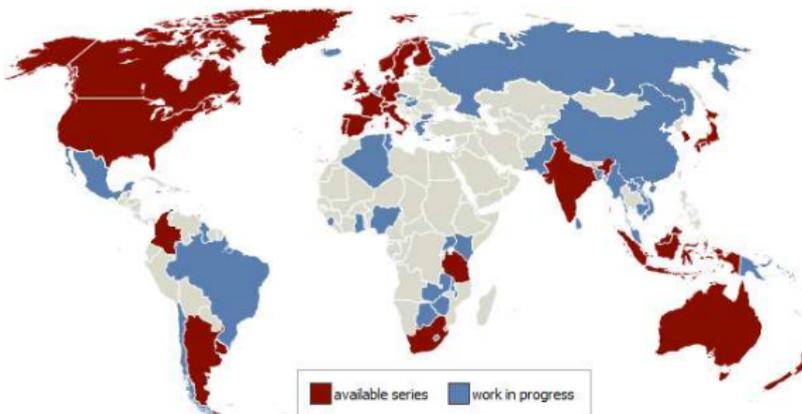
# Motivation

- 1 Previous work on long run income inequality trends in France (Piketty 2001, 2003, Landais 2007) focus on top income shares (top 10%, top 1%) and on fiscal income
- 2 Here we extend existing series up to 2013, and most importantly we combine fiscal data with national accounts and surveys in order to produce 1900-2013 series covering the entire income distribution (from bottom to top) and all forms of labor and capital incomes (taxable and tax exempt)

# The DINA project

- Part of a broader multi-country project: World Wealth and Income database
  - Distributional National Accounts (DINA)
- Provide long-term series on distribution of income and wealth
  - Homogeneous across countries and over time
  - Consistent with National Income and Wealth Accounts
  - Covering all the distribution from bottom to top
  - US: Piketty, Saez, Zucman (2016), Sweden: Lundberg and Waldenström (2016), UK: Alvaredo, Atkinson and Morelli (2016), Spain: Toledano (2016) . . .
- For France: two papers
  - Last month: Wealth
  - Today: Income

# THE WORLD WEALTH AND INCOME DATABASE



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Acknowledgments



PARIS SCHOOL OF ECONOMICS  
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European Research Council  
Established by the European Commission

# Literature

- Previous attempts to combine distributional tax data to national accounts:
  - US: King (1927, 1930), Kuznets (1941, 1953), Piketty & Saez (2003)
  - France: Piketty (2001,2003), Landais (2007), Landais, Piketty and Saez (2011)

Some progress using tax data, but insufficient

- Tax data miss tax exempt income
- Silent on post-tax and transfer income
- Silent on distribution of the bottom 90
- Other attempts to combine surveys with NA: OECD (Fesseau, Wolff and Mattonetti (2012), Fesseau and Mattonetti (2013) ); National level: France: Bellamy and ali (2009), US: Fixler et al. (2015),...

⇒ Need for combining tax data, surveys and National Accounts in a more systematic way: **Distributional National Accounts (DINA)**

# This paper

We combine income tax data covering 1915-2013 period with national accounts, survey data and inheritance tax data 1800-2010 in order to produce:

- consistent unified income inequality series for France 1900-2013 (and 1800-2013 for wealth inequality series)
- detailed breakdown by age, gender, income and asset categories for 1970-2013

# Main Findings

- 1 We confirm and update previous findings about long run inequality dynamics: huge fall 1914-1945, rise 1945-1968, decline 1968-1983, rise 1983-2013. Recent decades: moderate rise, except at the very top; reinforcing impact of missing capital income and changing family structure
- 2 Long run inequality fall: entirely due to fall in concentration of wealth and capital income. But rising inequality of saving rates and rates of return could lead to further increase in wealth concentration in coming decades. Steady-state simulations
- 3 Declining gender inequality. . . but not so much for high wages
- 4 France vs US: much bigger rise in inequality in the US; bottom 50% real income is now much smaller in the US than in France

# Outline of the talk

Data and methodology

The long-run picture

The role of capital income and wealth concentration

Labor income: the limited decline of gender inequality

France vs US and the bottom 50%

Conclusion and perspectives

# Outline

## Data and methodology

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# Data and methodology (1/2)

- **Income tax returns: 1915-2013**

- Income tax created in 1914, first applied in 1915
- Finance Ministry estimate for 1900 and 1910
- Annual exhaustive tabulations from 1915 to 2013
- Microfiles from 1970 to 2012
  - ERFS surveys: 1970, 1975, 1979, 1984 (40,000 tax units)
  - Annual from 1988 (400,000 tax units per year, all top incomes included)
  - Exhaustive for recent years (2010-2012)

- **National account series**

- INSEE (French national statistical institute) annual series 1949-2015
- Historical series since 1820 provided by Piketty-Zucman (2014)

- **Household surveys:**

- Wealth surveys (“Enquete Patrimoine”) 1986, 1992, 1998, 2004 and 2010
- Housing surveys (“Enquete Logement”) 1970, 1973, 1978, 1984, 1988, 1992, 1996, 2001, 2006 and 2013

## Data and methodology (2/2)

- We start from income tax micro-files 1970-2012
- Using income tax tabulations 1900-2013, we apply generalized Pareto interpolation techniques (Fournier 2016; = non-parametric generalization of techniques used in historical income distribution literature: Kuznets 1953, Piketty 2001, etc.) in order to generate series by income percentiles (from bottom to top) : results are quasi-identical to micro-files series over period 1970-2012 [▶ details](#)
- We impute tax-exempt labor and capital incomes (including imputed rent, retained earnings, corporate tax, etc.) using national accounts and wealth and housing surveys
- Preferred series: distribution of pretax national income (before all taxes and transfers, except pensions and unemployment insurance), among adults (equal-split series: income of couples divided by two)
- We also compare with fiscal-income series and tax-units series, and fully individualized series
- Next step: after-tax after-transfers series (to be done)

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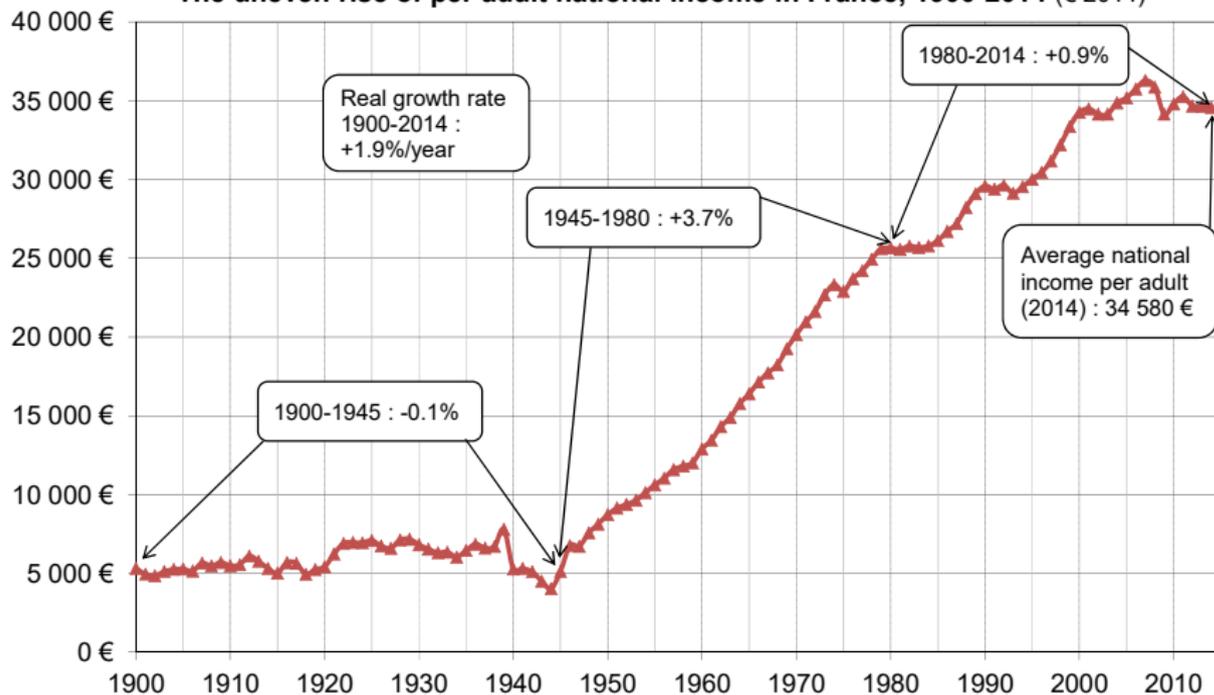
Conclusion and perspectives

## The long-run picture (1/2)

- Long-run fall in inequality: top 10% income share dropped from about 50% in 1910 to about 35% in 2010, to the benefit of bottom 50% share (15% → 20%) and middle 40% share (35% → 45%)
- Uneven and chaotic process: huge inequality fall 1914-1945 (capital shocks), rise 1945-1968 (reconstruction of wage hierarchy and capital share), decline 1968-1983 (compression of wage inequality, steep rise of minimum wage, declining capital shares), rise 1983-2007 (reverse evolution as 1968-1983)
- Rising top income inequality 1983-2013: moderate impact on top 10% income share, but very large impact on top 1% and top 0.1%. Exacerbates the perception of growth slowdown for the rest of the population (The “30 Glorious Years” are not over for everyone). Drop in very top shares since 2008, but in 2013 they are still much higher than in 1980s.

# The long run picture

**The uneven rise of per adult national income in France, 1900-2014 (€ 2014)**



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

**TABLE 1 – Income thresholds and income shares in France, 2013**

<b>Income group</b>	<b>Number of adults</b>	<b>Income threshold</b>	<b>Average income</b>	<b>Income share</b>
Full Population	51 318 000	0 €	34 440 €	100,0%
Bottom 50%	25 659 000	0 €	15 510 €	22,5%
Middle 40%	20 527 200	27 420 €	38 920 €	45,2%
Top 10%	5 131 800	60 970 €	111 230 €	32,3%
<i>incl. Top 1%</i>	<i>513 180</i>	<i>162 400 €</i>	<i>359 290 €</i>	<i>10,4%</i>
<i>incl. Top 0.1%</i>	<i>51 318</i>	<i>536 410 €</i>	<i>1 308 290 €</i>	<i>3,8%</i>
<i>incl. Top 0.01%</i>	<i>5 132</i>	<i>2 064 350 €</i>	<i>5 181 850 €</i>	<i>1,5%</i>
<i>incl. Top 0.001%</i>	<i>513</i>	<i>9 562 310 €</i>	<i>18 990 120 €</i>	<i>0,6%</i>

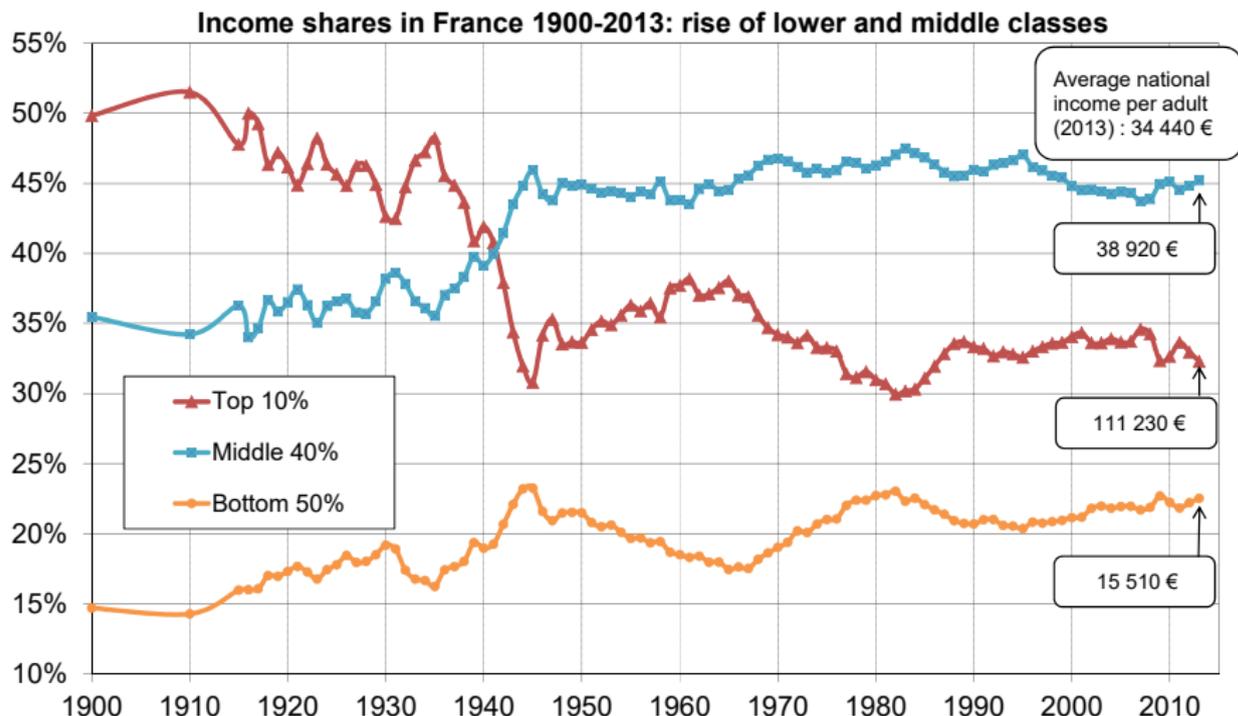
This table reports statistics on the distribution of national income in France in 2013. The unit is the adult individual (20-year-old and over; income of married couples is splitted into two). Fractiles are defined relative to the total number of adult individuals in the population.

# The long run picture



Distribution of pretax national income (before all taxes and transfers, except pensions and unempl. insurance) among adults. Equal-split-adults series (income of married couples divided by two).

# The long run picture



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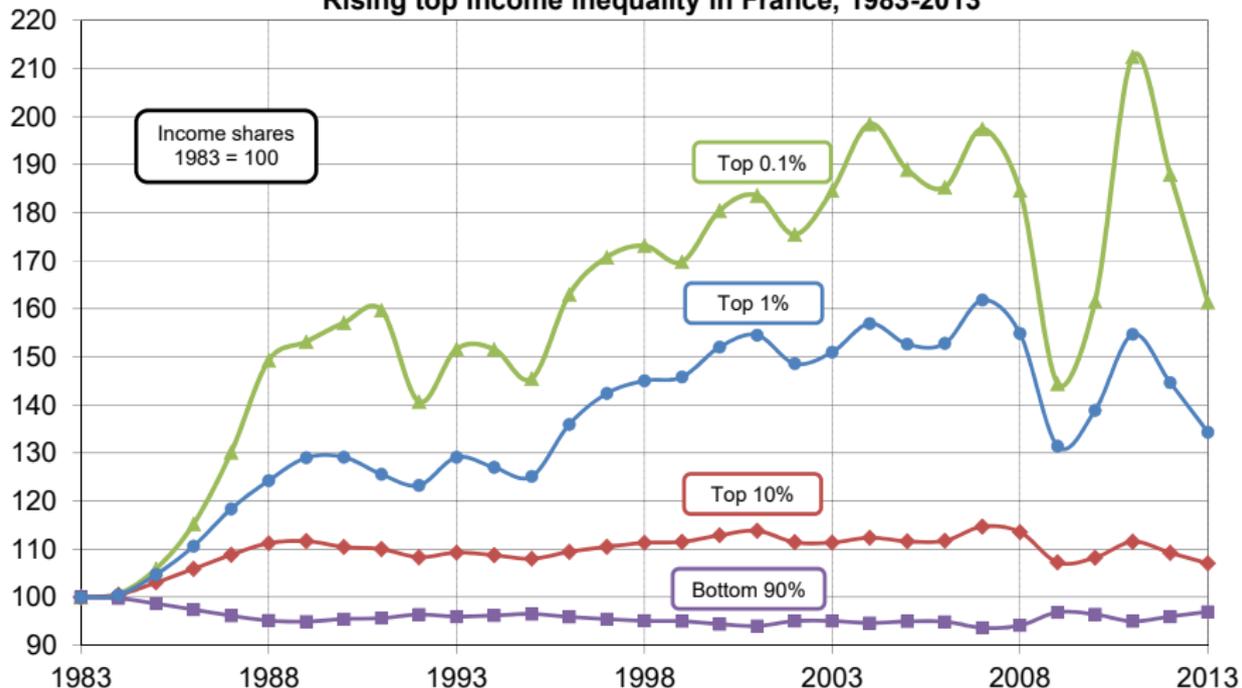
# The long run picture



Distribution of pretax national income (before all taxes and transfers, except pensions and unempl. insurance) among adults. Equal-split-adults series (income of married couples divided by two).

# The long run picture

## Rising top income inequality in France, 1983-2013



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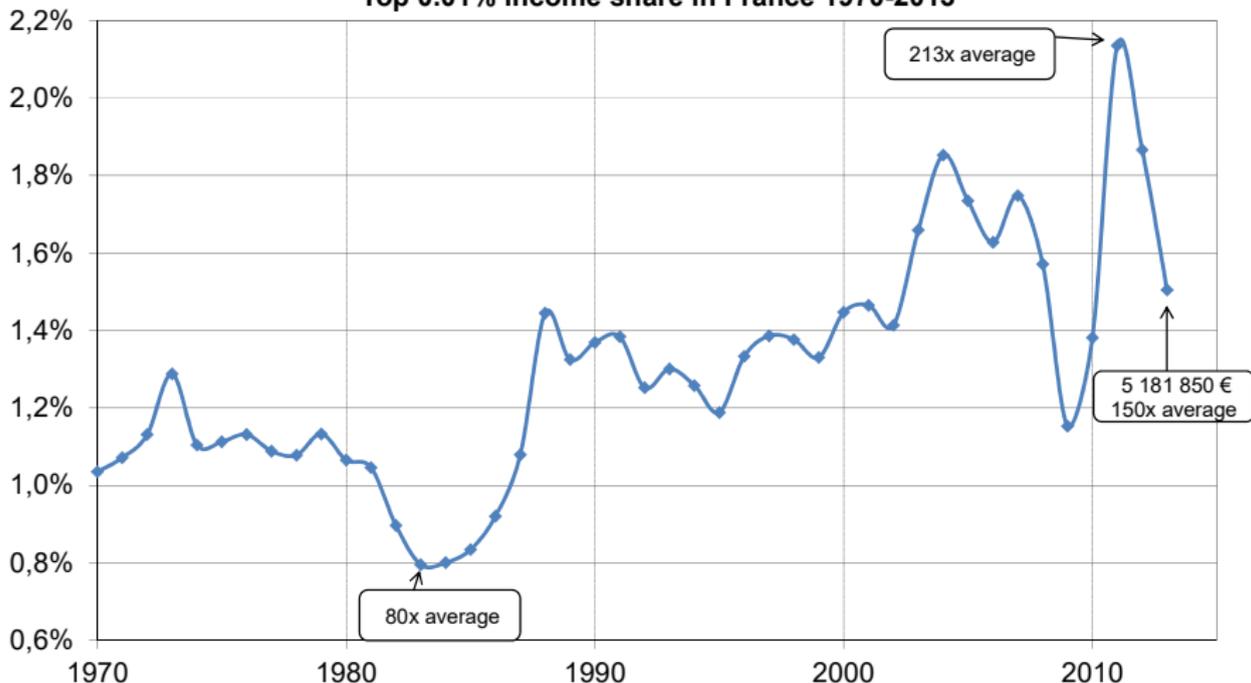
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Distribution of pretax national income (before all taxes and transfers, except pensions and unempl.insurance) among adults. Equal-split-adults series (income of married couples divided by two).

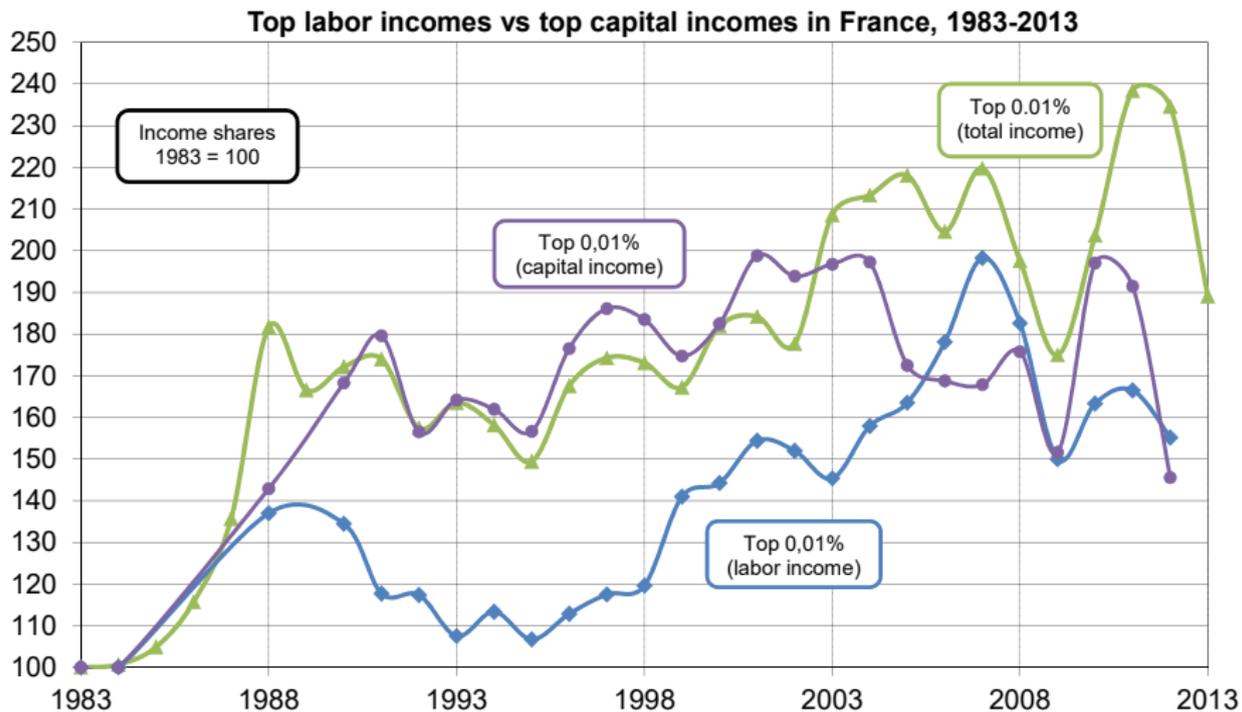
# The long run picture

## Top 0.01% income share in France 1970-2013



Distribution of pretax national income (before all taxes and transfers, except pensions and unempl.insurance) among adults. Equal-split-adults series (income of married couples divided by two).

# The long run picture

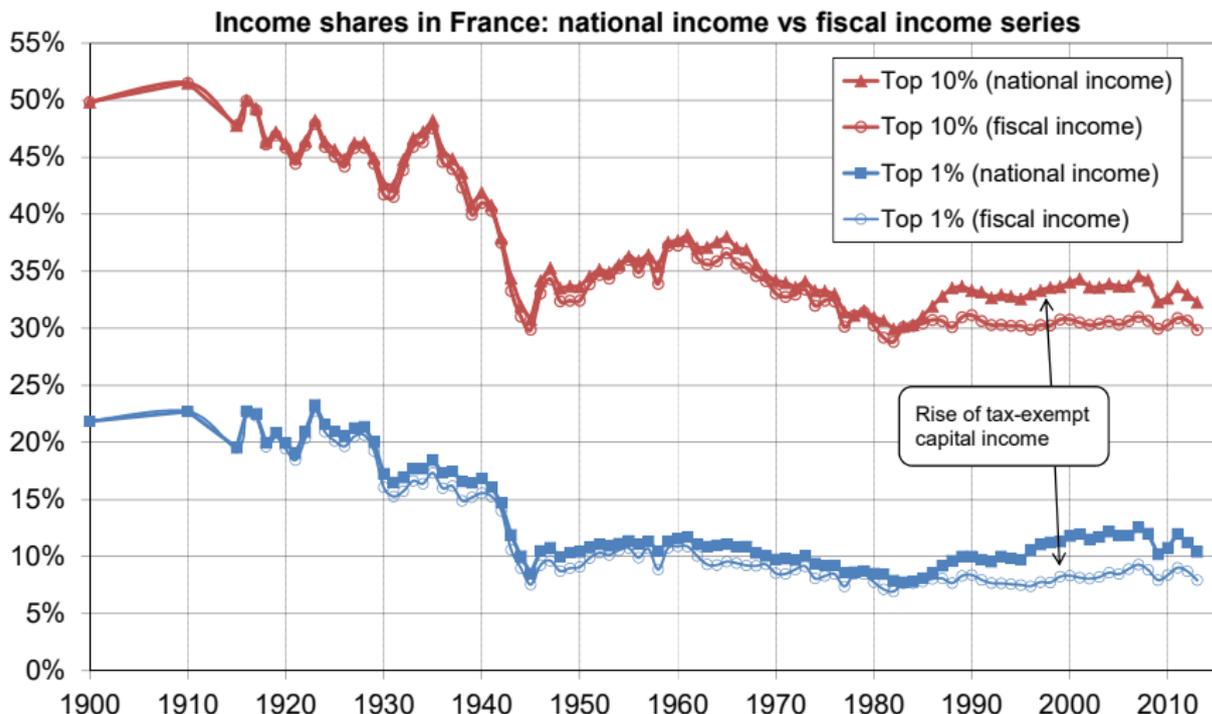


Distributions of total income, capital income and labor income among adults.  
 Equal-split-adults series (income of married couples divided by two).

## The long-run picture (2/2)

- New inequality series using national income show bigger rise in inequality than previous fiscal income series, because of rise of tax-exempt capital income (life insurance, retained earnings, capital gains, rent, etc.)
- Rising inequality would be even higher at the tax-unit level (rise of singles) than in our benchmark equal-split adult-level series (income of couples divided by two)

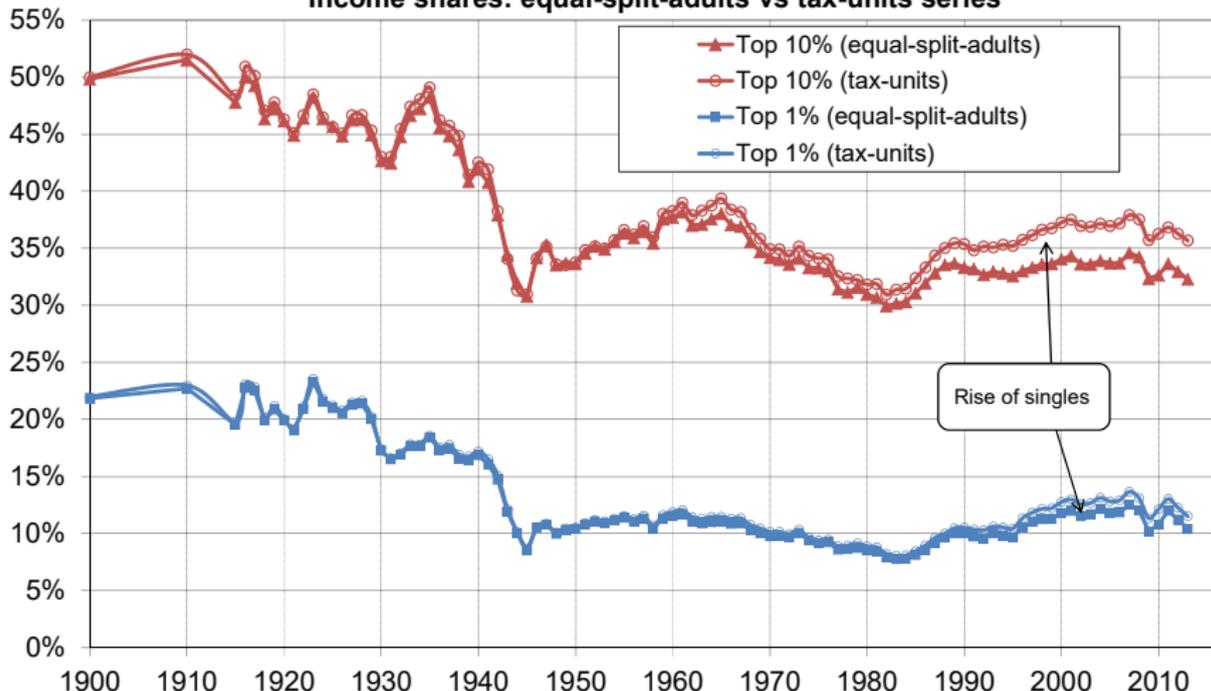
# The long run picture



Distribution of pretax national income (incl. tax-exempt labor and capital income) vs pretax fiscal income (reported on income tax returns). Equal-split-adults series (income of married couples divided by two).

# The long run picture

Income shares: equal-split-adults vs tax-units series



Distribution of pretax national income (before all taxes and transfers, except pensions and unempl. insurance) among adults. Equal-split-adults series (income of married couples divided by two) vs tax-units series (singles and married couples).

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**The role of capital income and wealth concentration**

Labor income: the limited decline of gender inequality

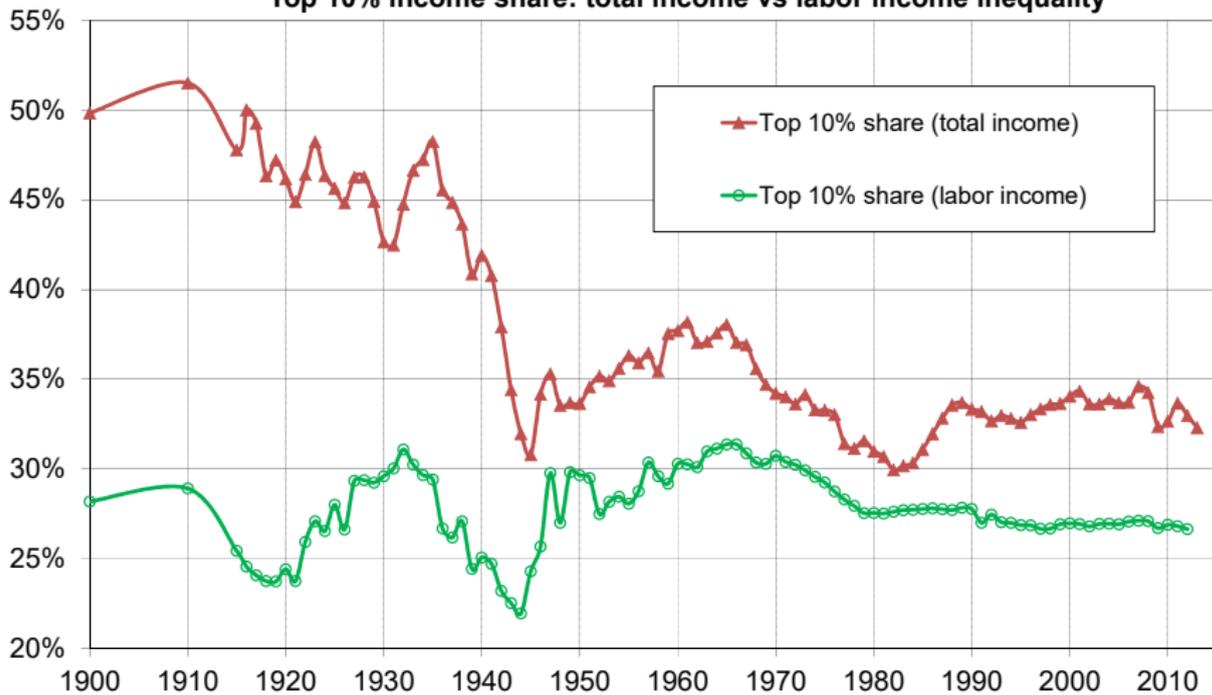
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# The role of capital income and wealth concentration

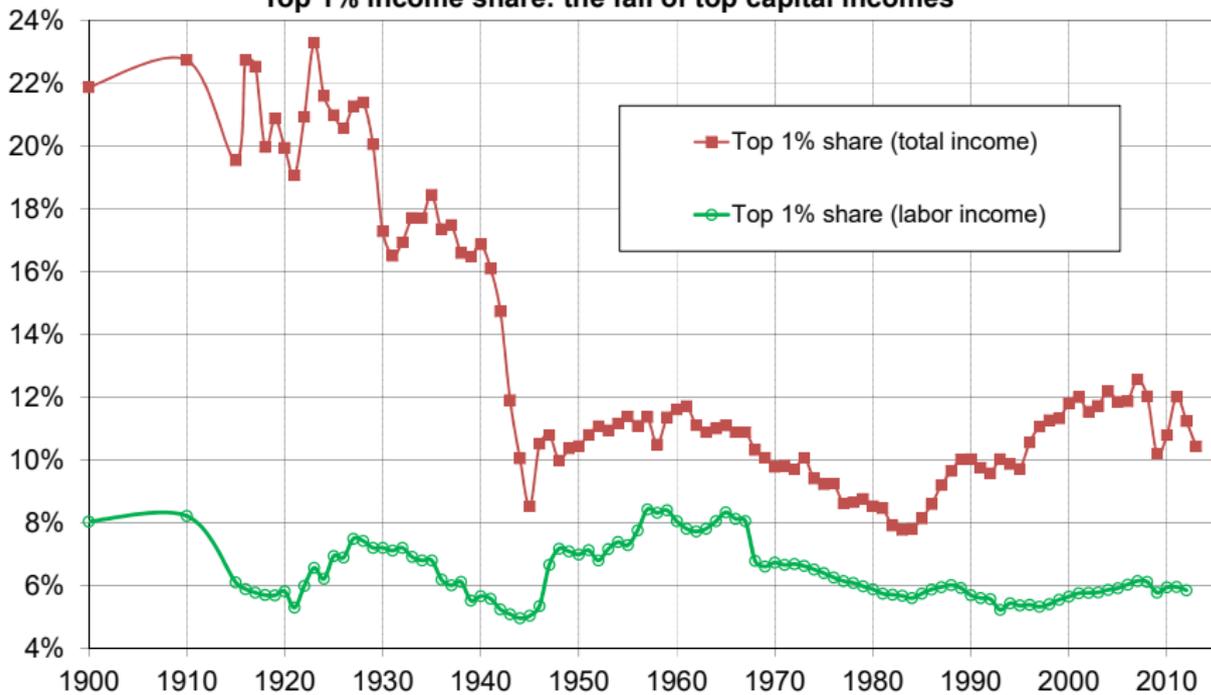
- 1 Long-run fall in income inequality is entirely due to the fall of top capital incomes: inequality of labor income did not change in the long run
- 2 Capital income has always been the main income source for very top incomes (including today); but because of the decline of capital concentration, the level of top capital incomes has dropped
- 3 Wealth inequality is still much higher than income inequality today: top 10% share around 60-70% for wealth and capital income, vs 35% for total income and 25% for labor income

### Top 10% income share: total income vs labor income inequality



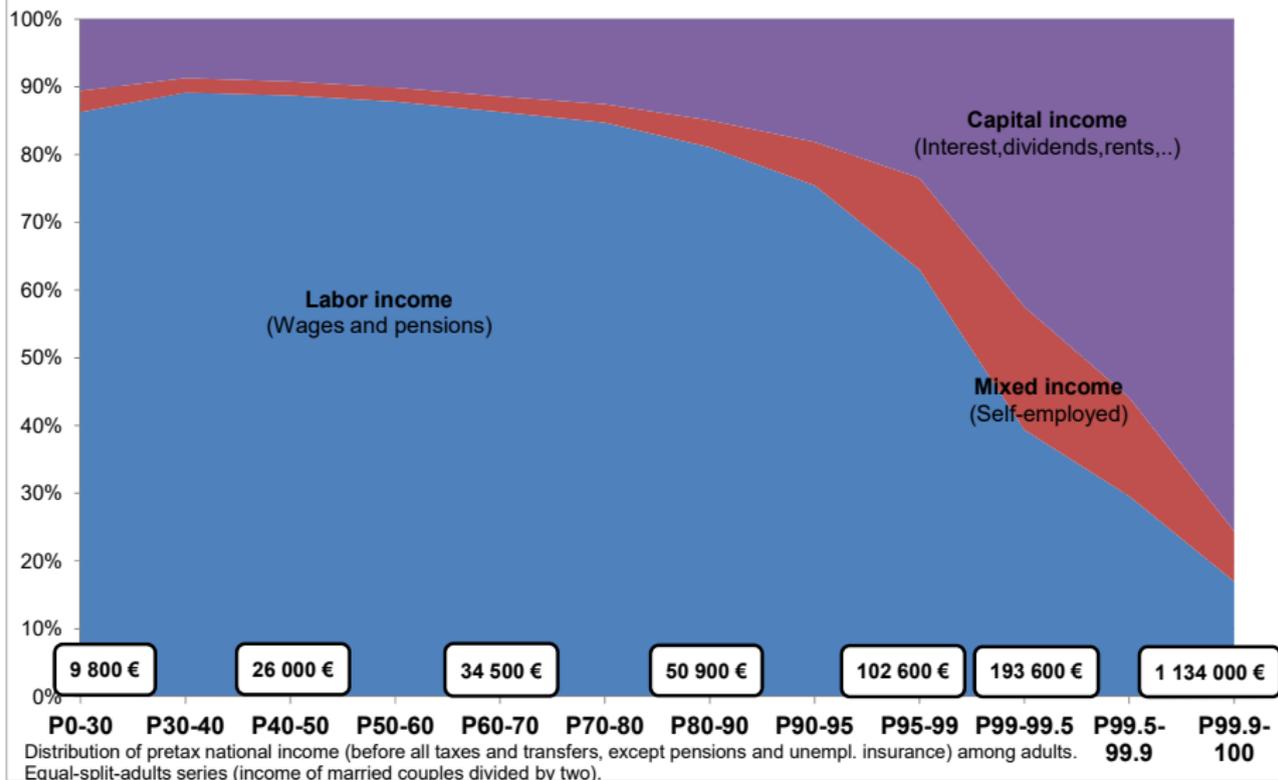
Distribution of pretax national income (before all taxes and transfers, except pensions and unempl. insurance) among adults. Equal-split-adults series (income of married couples divided by two).

### Top 1% income share: the fall of top capital incomes

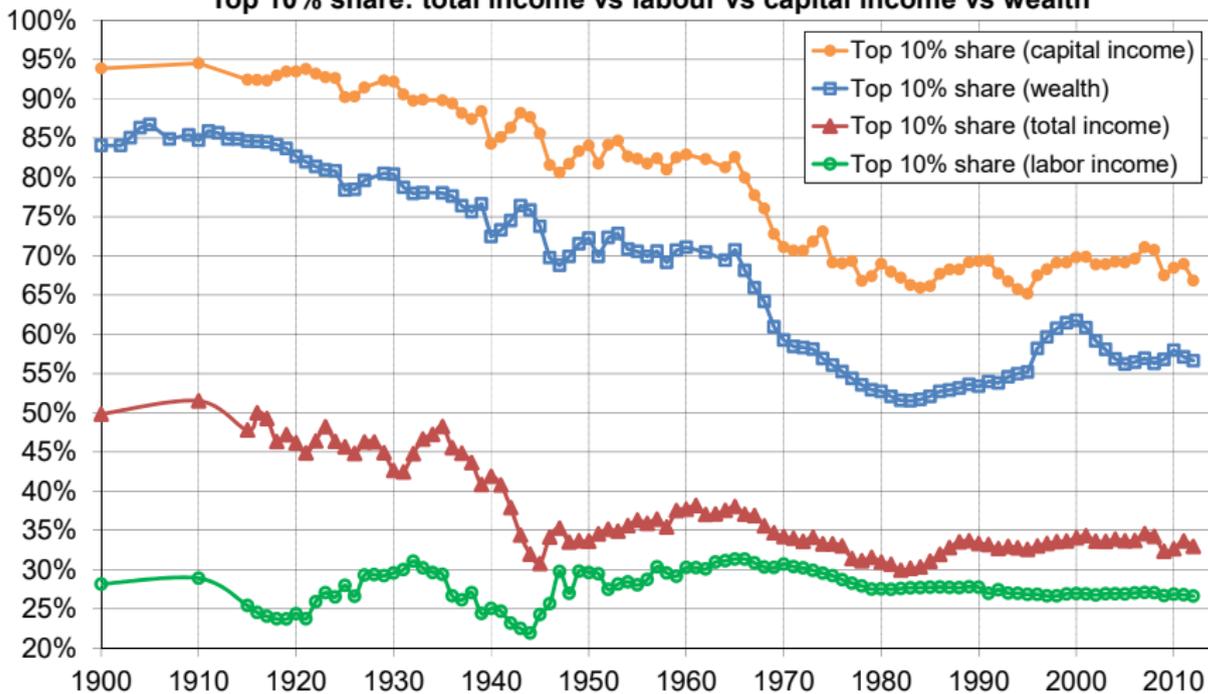


Distribution of pretax national income (before all taxes and transfers, except pensions and unempl. insurance) among adults. Equal-split-adults series (income of married couples divided by two).

## Income composition by income level, France 2012

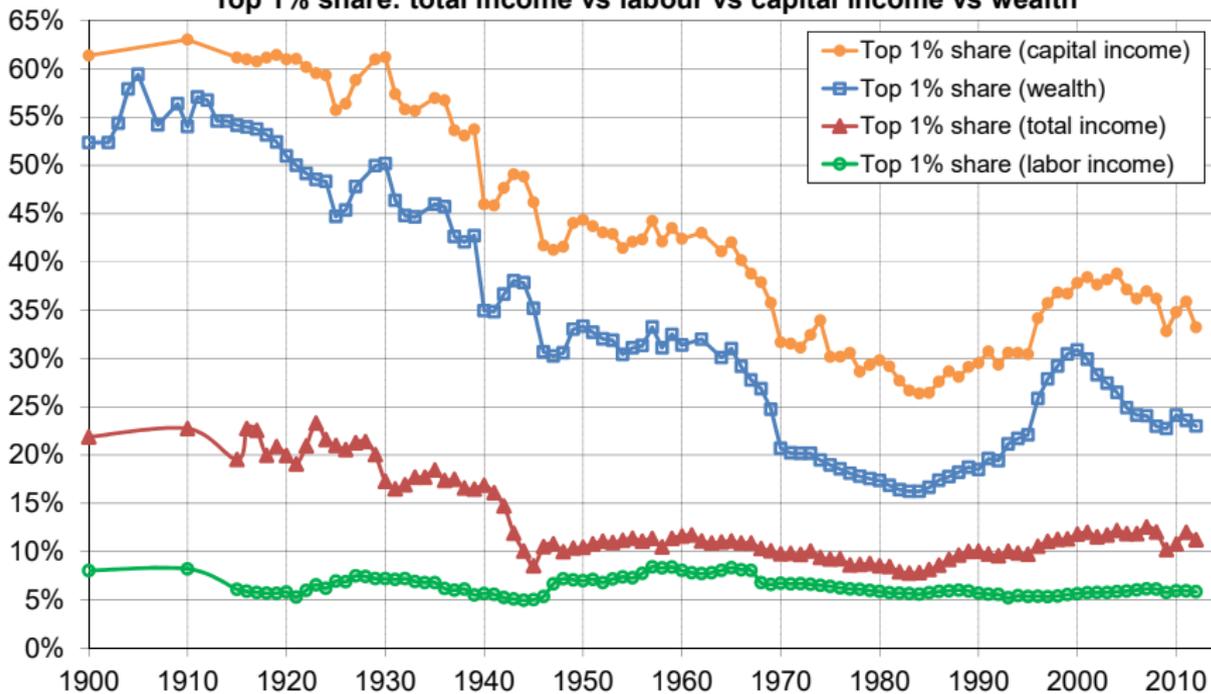


### Top 10% share: total income vs labour vs capital income vs wealth



Distribution of total income, labor income, capital income and net wealth among adults.  
 Equal-split-adults series (income and wealth of married couples divided by two).

### Top 1% share: total income vs labour vs capital income vs wealth



Distribution of total income, labor income, capital income and net wealth among adults.  
Equal-split-adults series (income and wealth of married couples divided by two).

## Why is wealth inequality so large?

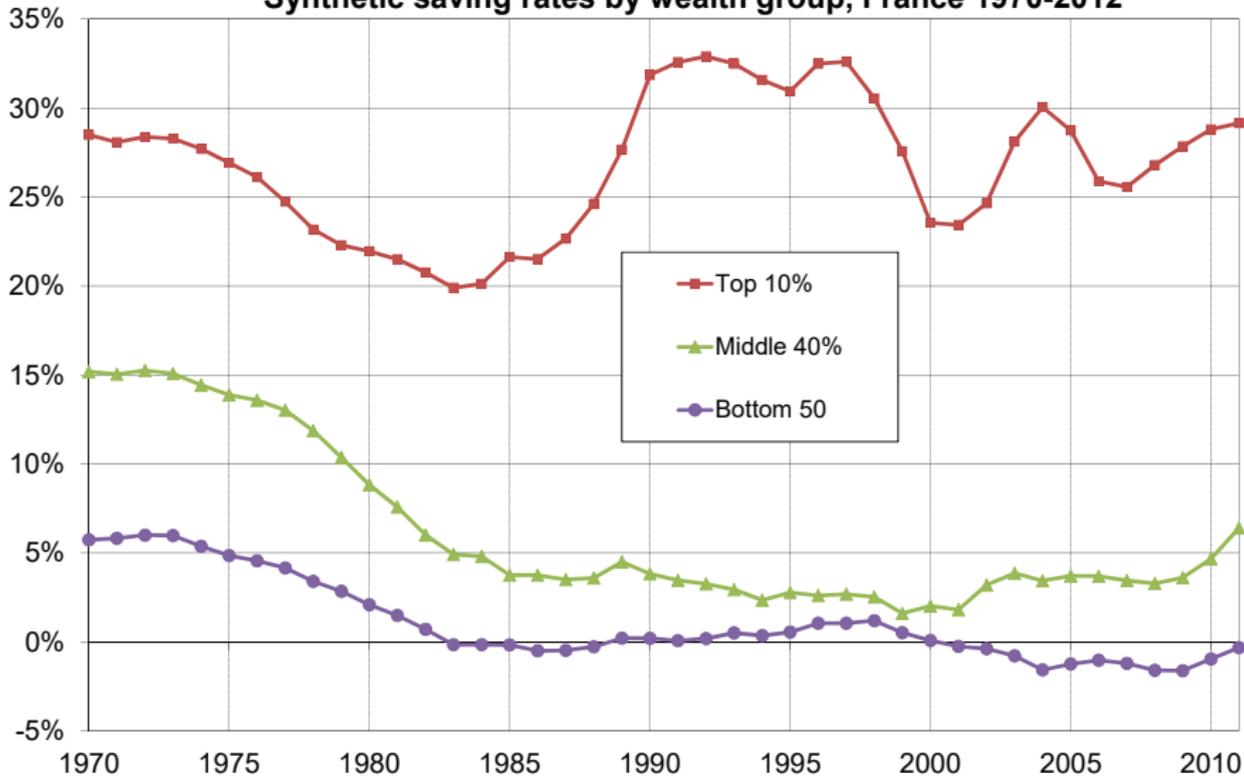
- Cumulative effects of unequal labor incomes, saving rates and rates of return
- Large multiplicative effects, especially with long horizon and inheritance

**Equation of wealth accumulation at time  $t + 1$  for the wealth group  $p$**   
(for instance  $p = \text{top } 10\% \text{ wealth group}$ ):

$$W_{t+1}^p = (1 + q_t^p)[W_t^p + s_t^p(Y_{Lt}^p + r_t^p W_t^p)]$$

- $W^p$  is the aggregate wealth for the wealth group  $p$ ,  $Y_L^p$  labor income
- $q^p$  is the real rate of capital gain
- $s^p$  is the saving rate,  $r^p$  is the after-tax rate of return (for group  $p$ )
- **We infer group-level synthetic saving rates  $s_t^p$  from the observation of  $W_{t+1}^p$ ,  $W_t^p$ ,  $Y_{Lt}^p$ ,  $r_t^p$ ,  $q_t^p$**

## Synthetic saving rates by wealth group, France 1970-2012



## Steady-state formulas for top wealth shares

From the equation of wealth accumulation, with the same notations as above:

$$W_{t+1} = (1 + q_t)[W_t + s_t(Y_{Lt} + r_t W_t)]$$

and assuming  $q_t$  has to be equal to 0 at steady state, we directly derive:

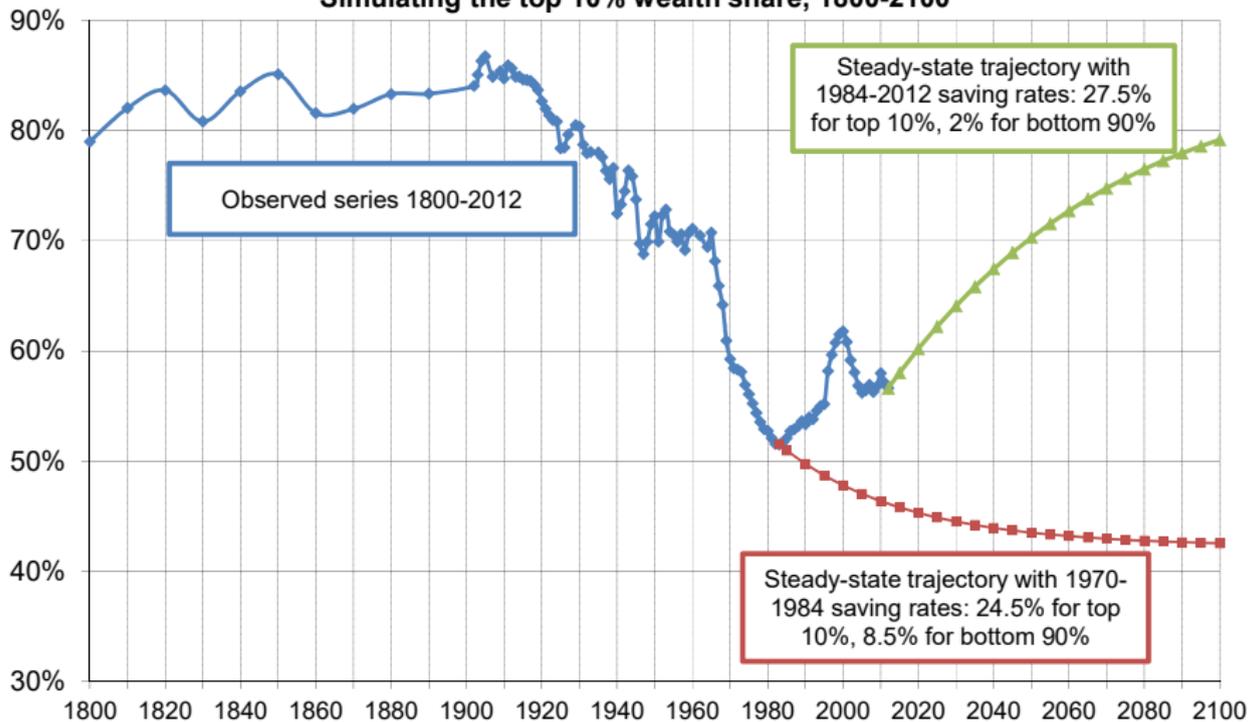
$$sh_W^p = \left(1 + \frac{s^p r^p - sr}{g - s^p r^p}\right) \frac{s^p}{s} sh_{Y_L}^p$$

- $sh_W^p$  (resp.  $sh_{Y_L}^p$ ) is the share of wealth (resp. labor income) held by wealth group  $p$  (for instance  $p = \text{top } 10\% \text{ wealth group}$ )
- $g$  is the growth rate,  $s$  the aggregate saving rate and  $r$  the aggregate after-tax rate of return

If  $s^p = s$  and  $r^p = r$  (i.e. top wealth group has the same saving rate and rate of return as average), then  $sh_W^p = sh_{Y_L}^p$ : wealth inequality = labor income inequality

but if  $s^p > s$  and  $r^p > r$ , then this can generate large multiplicative effects, and lead to very high steady-state wealth concentration

### Simulating the top 10% wealth share, 1800-2100



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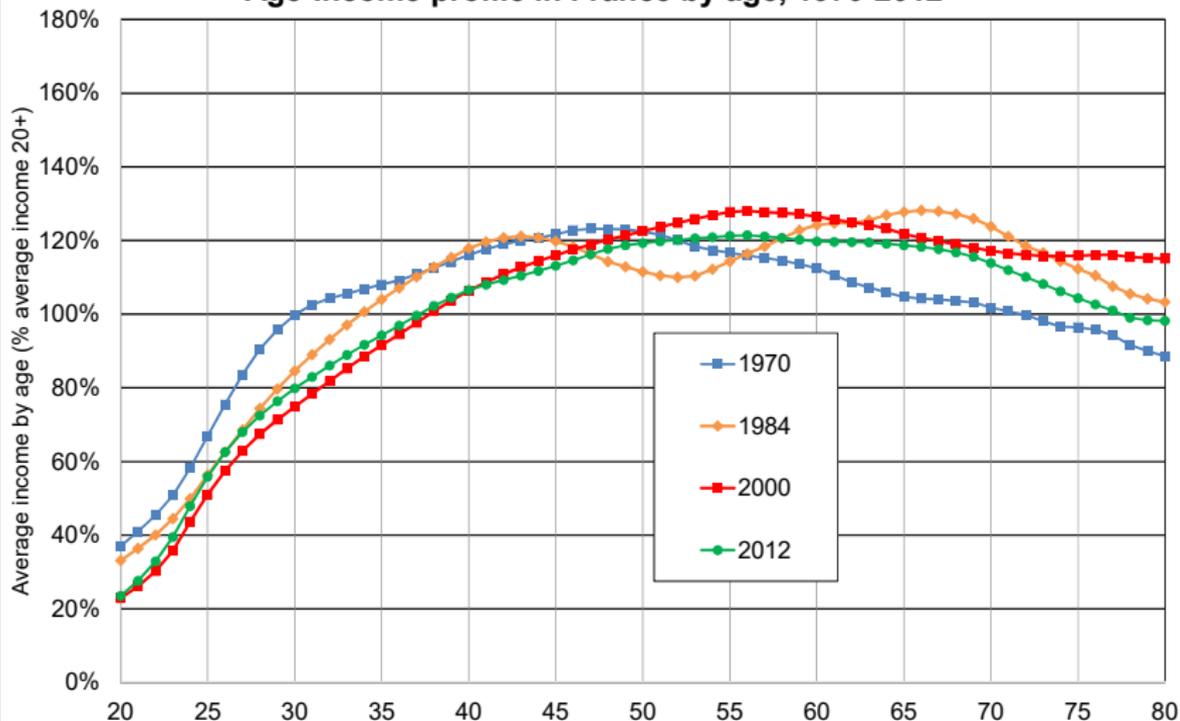
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## Labor income: the limited decline of gender inequality

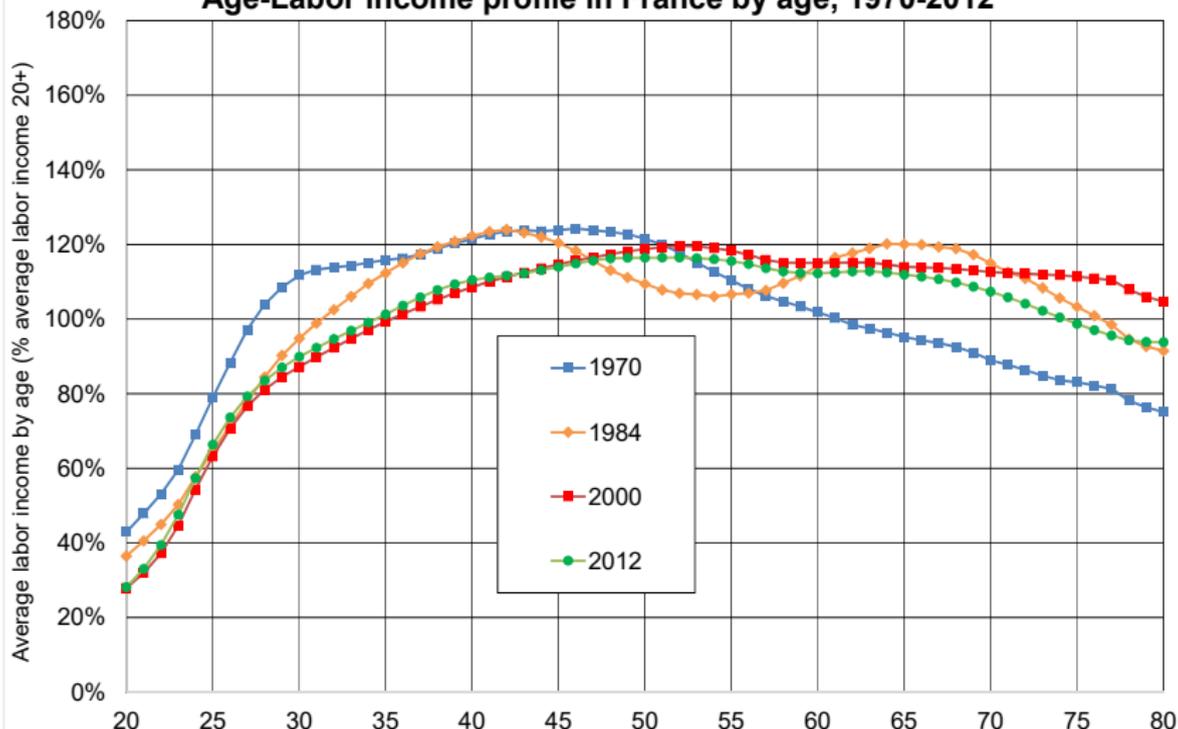
- For subperiod 1970-2012, we have detailed breakdown by age and gender
- Age patterns did not change very much: age-labor income profile is always steeply rising (although less strongly than age-capital income and age-wealth profiles), and income inequality very high within each age group (like wealth)
- Main change over the period: large rise of female labor market participation, decline of gender inequality, but still very high at the top

### Age-Income profile in France by age, 1970-2012

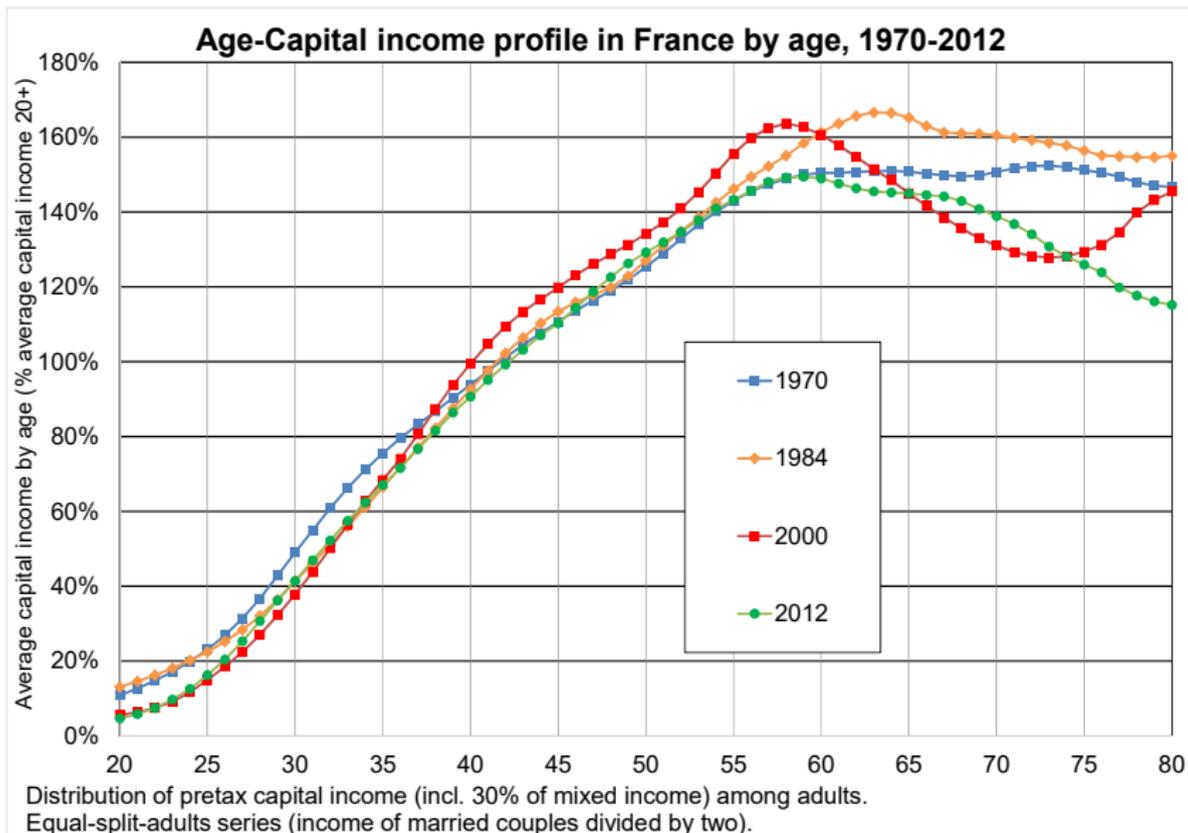


Distribution of pretax national income (before all taxes and transfers, except pensions and unempl. insurance) among adults. Equal-split-adults series (income of married couples divided by two).

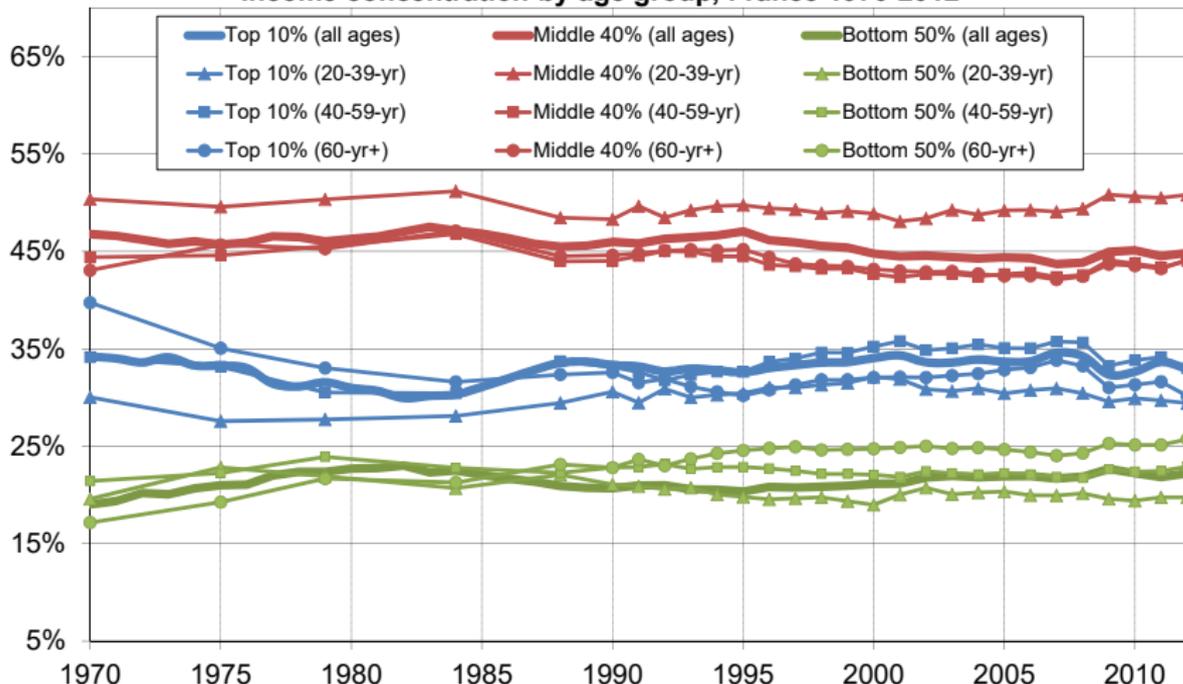
### Age-Labor income profile in France by age, 1970-2012



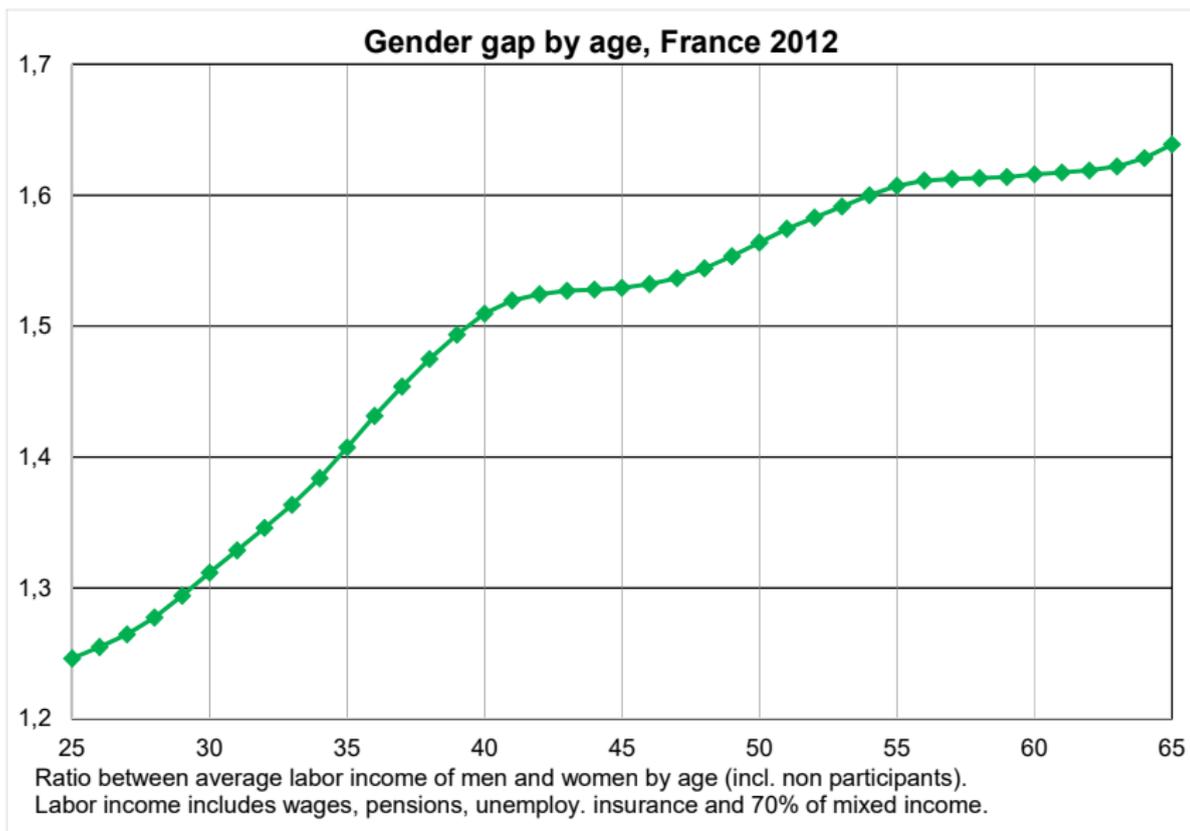
Distribution of pretax labor income (incl. pensions, unempl. insurance and 70% of mixed income) among adults.  
 Equal-split-adults series (income of married couples divided by two).

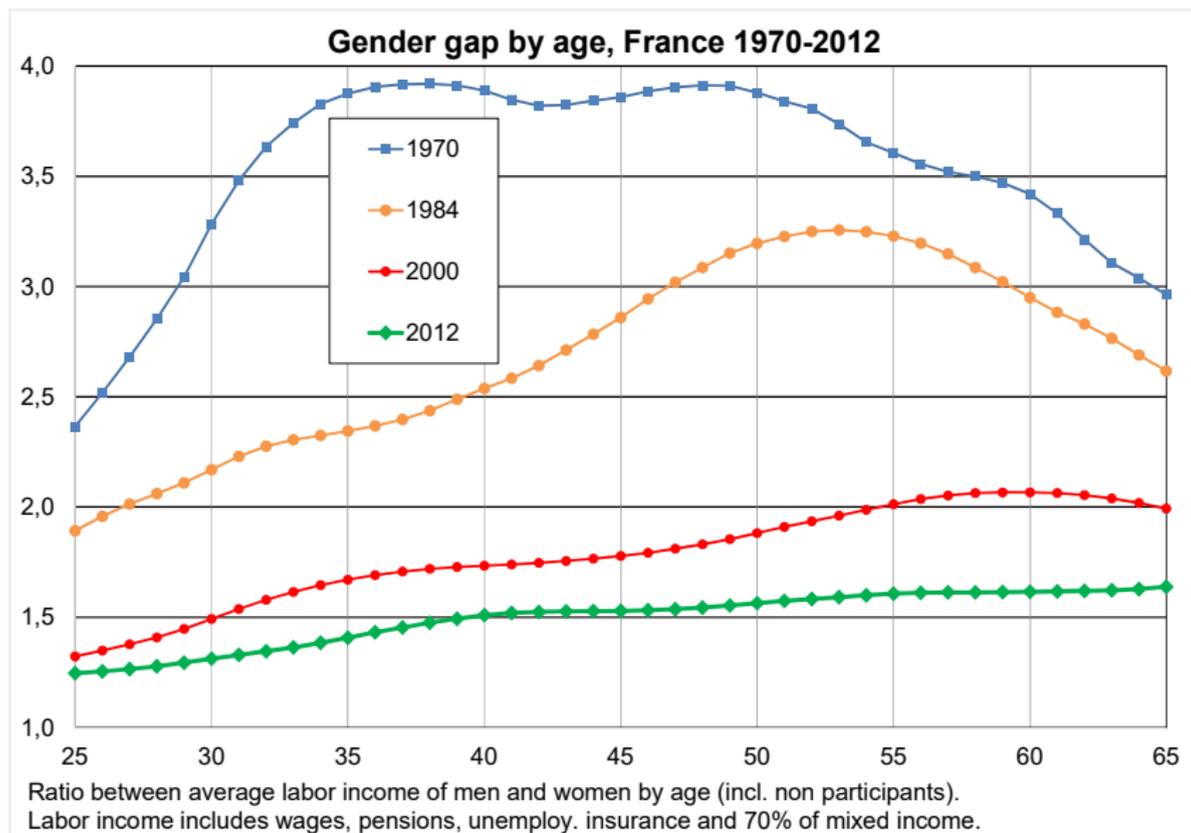


### Income concentration by age group, France 1970-2012

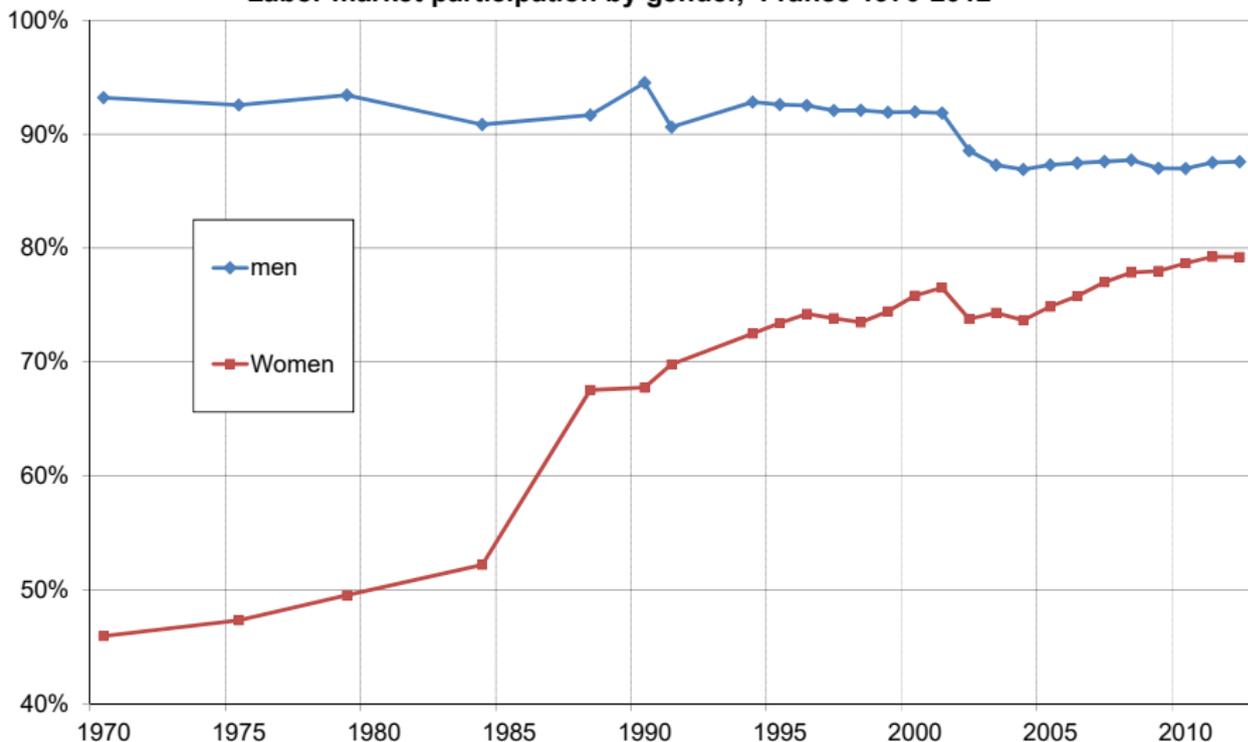


Distribution of pretax national income (before all taxes and transfers, except pensions and unempl. insurance) among adults. Equal-split-adults series (income of married couples divided by two).





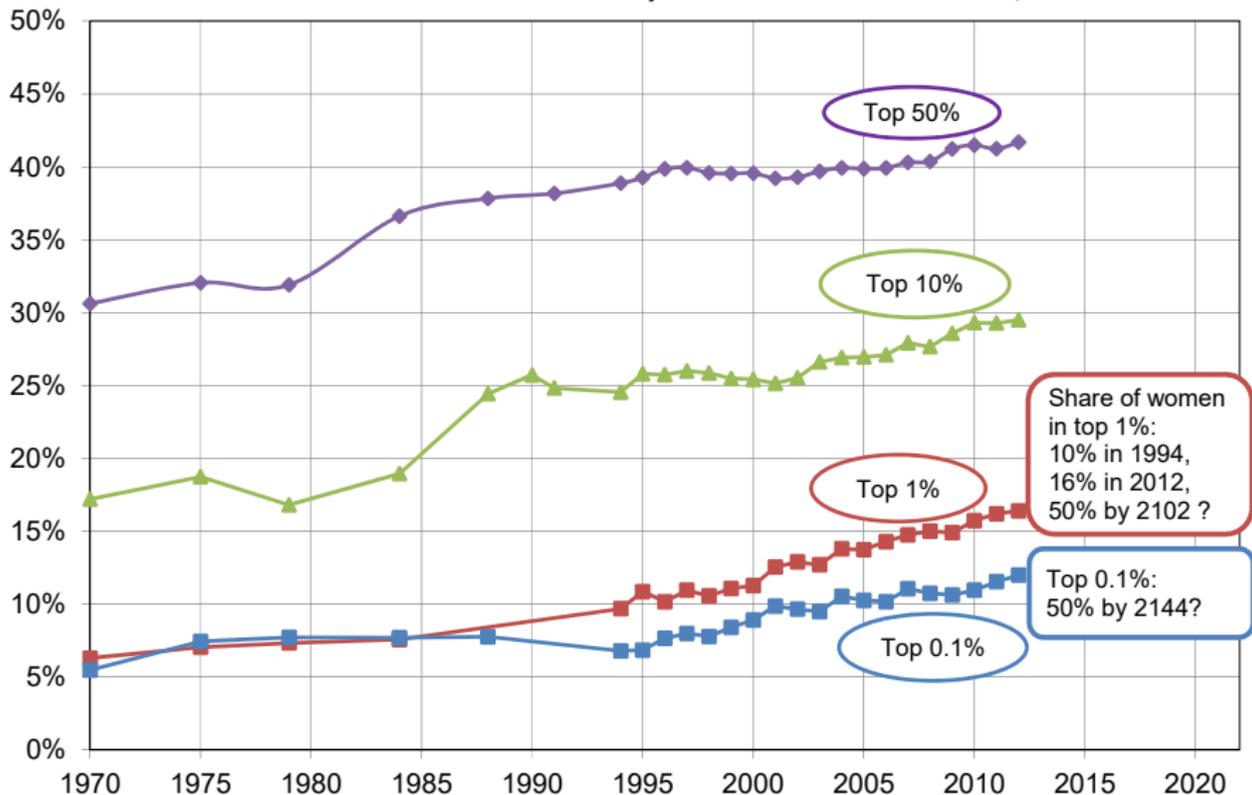
### Labor market participation by gender, France 1970-2012



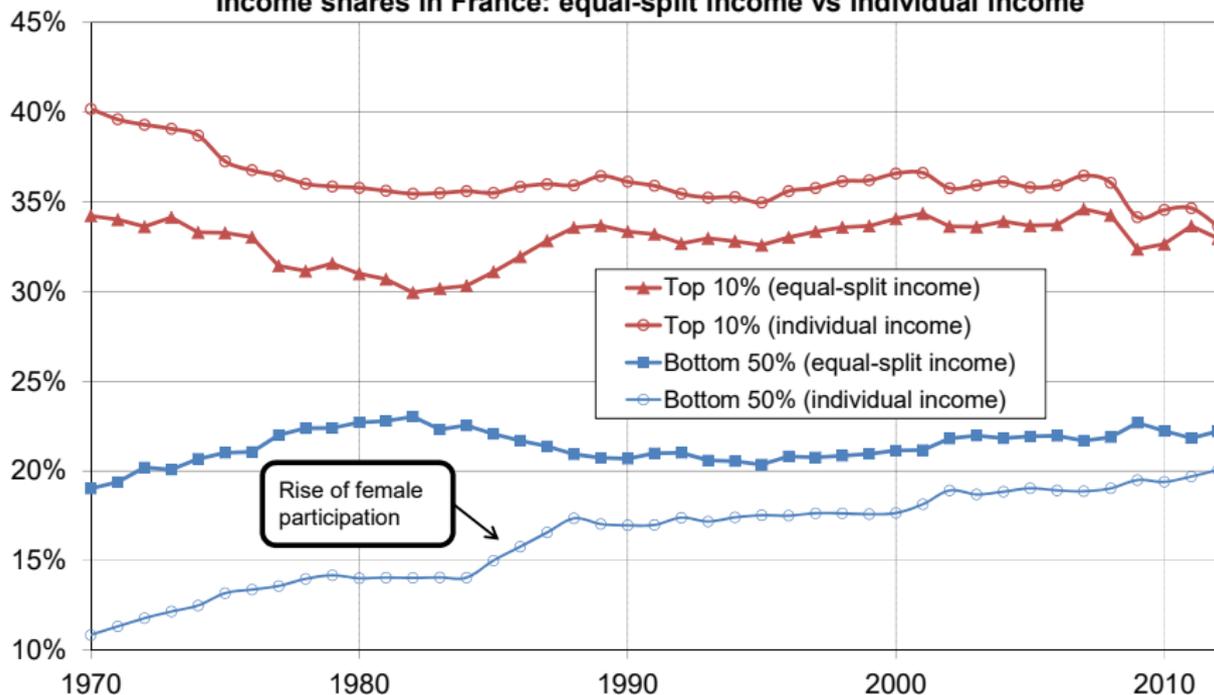
Fraction of men and women 25-to-65-year-old with positive labor income.

Labor income includes wages, pensions, unemploy. insurance and 70% of mixed income.

## Share of women in fractiles of top labor incomes in France, 1970-2012



### Income shares in France: equal-split income vs individual income



Distribution of pretax national income: equal-split income series (income of married couples divided by two) vs individual income series (capital income of married income divided by two, but labor income allocated to each individual).

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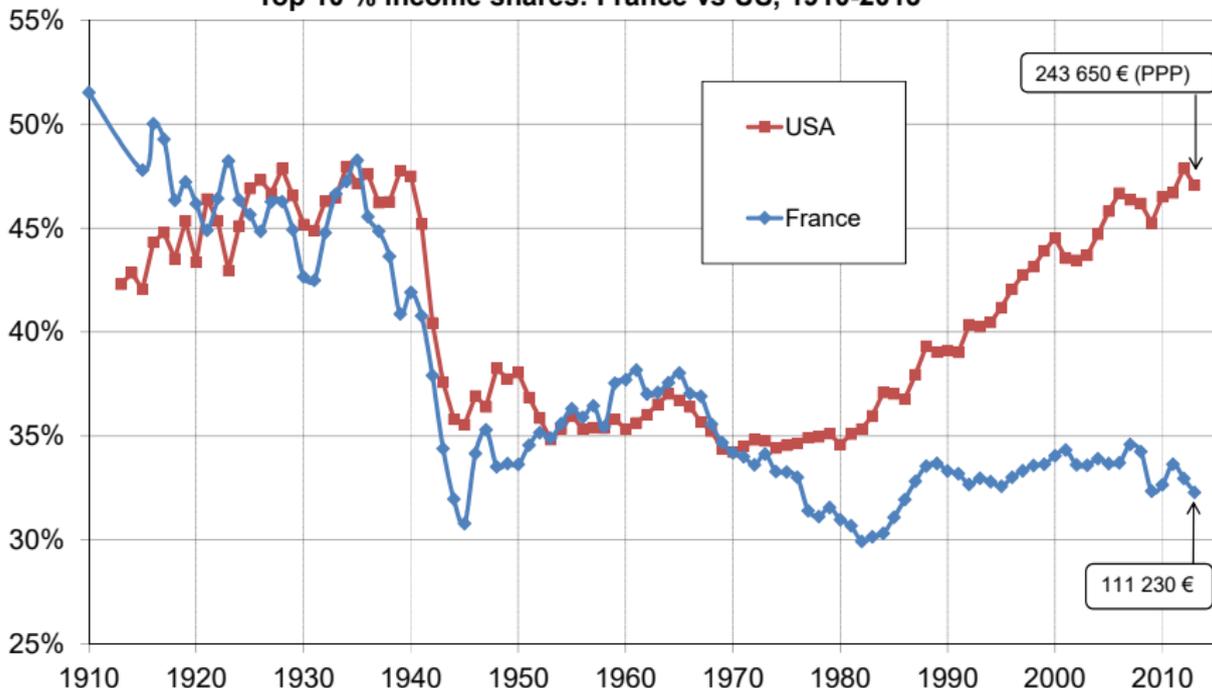
**France vs US and the bottom 50%**

Conclusion and perspectives

## France vs US and the bottom 50%

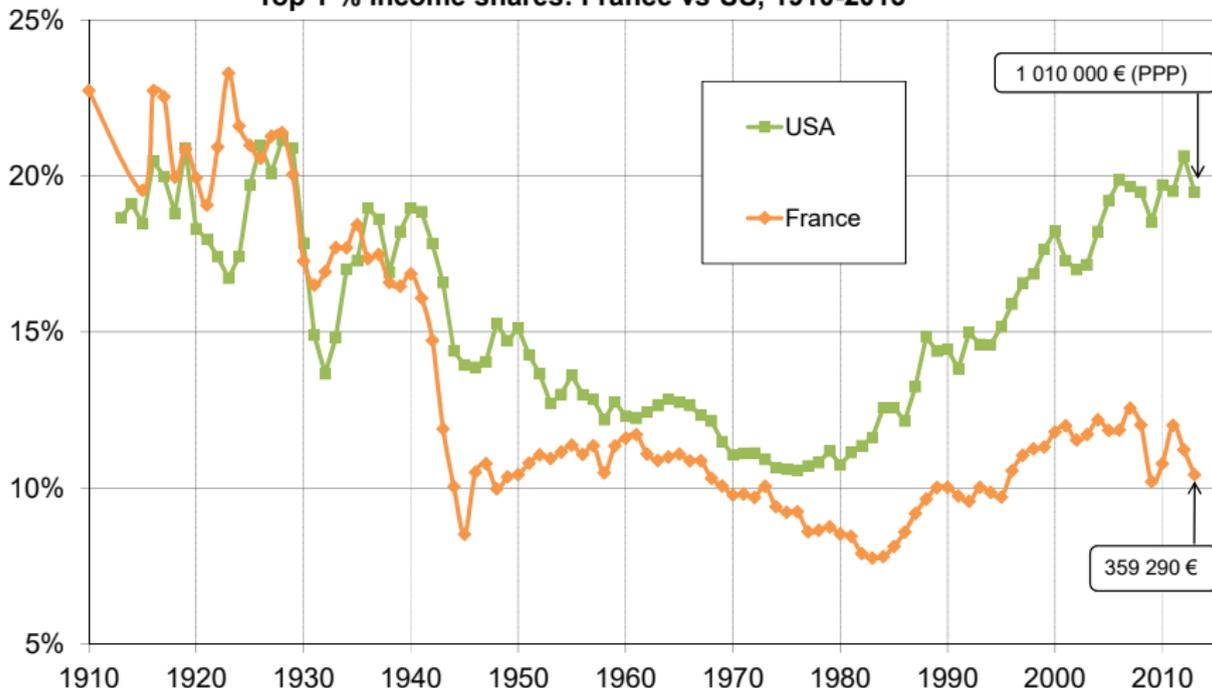
- 1 Top income shares increased much more in the US than in France since the 1980s
- 2 Complex combination of factors: education system (more unequal in the US?), labor market rules (fall in US minimum wage), changing governance and incentives for top executive pay-setting (huge fall in US top income tax rates). Not analyzed here (see Piketty 2014)
- 3 Distribution matters: per adult national income is 25% smaller in France (more hours of work in the US, similar productivity), but bottom 50% average income is 30% higher in France
- 4 This would probably be reinforced if we look at after-tax after-transfer inequality (to be done). But it is interesting to see that this is already the case for pre-tax pre-transfers inequality. More generally, long-term changes in inequality reflect large changes in both pretax inequality (itself influenced by policies and institutions) and after-tax inequality

### Top 10 % income shares: France vs US, 1910-2013



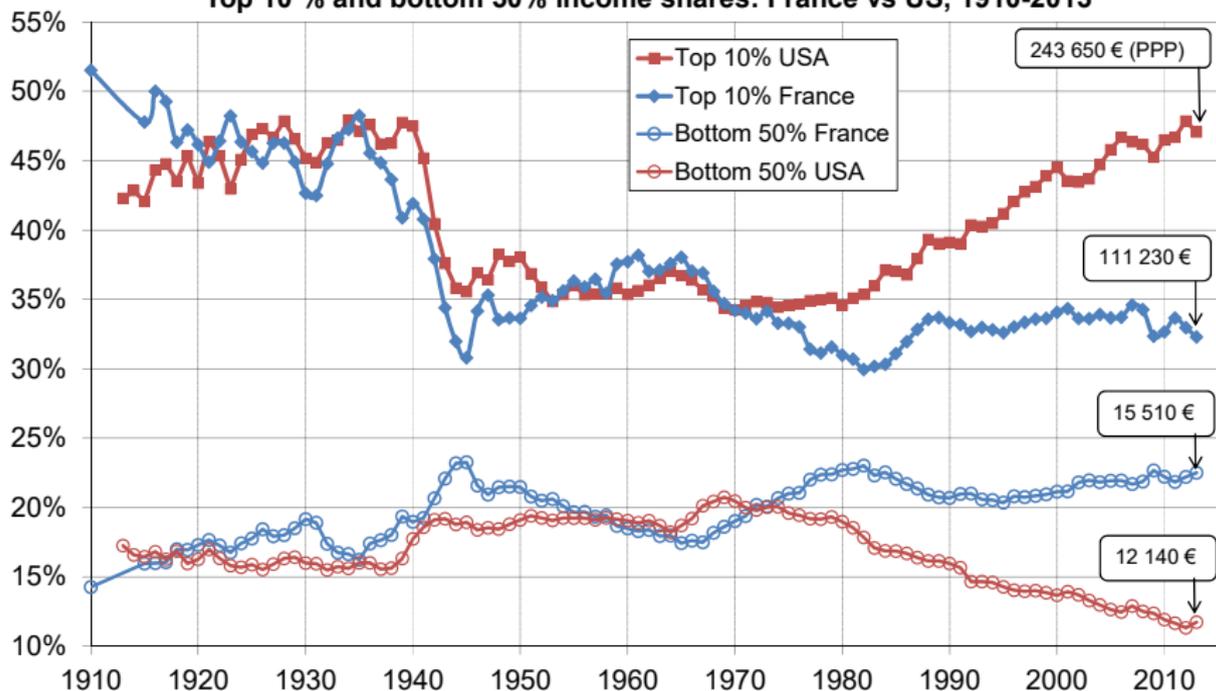
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### Top 1 % income shares: France vs US, 1910-2013



Distribution of pretax national income (before all taxes and transfers, except pensions and unempl. insurance) among adults. Equal-split-adults series (income of married couples divided by two).

### Top 10 % and bottom 50% income shares: France vs US, 1910-2013



Distribution of pretax national income (before all taxes and transfers, except pensions and unempl. insurance) among adults. Equal-split-adults series (income of married couples divided by two).

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- 1 Main contribution: by combining fiscal data, national accounts and survey data, we have constructed "Distributional national accounts" (DINA) for France, i.e. unified series for the distribution of total income, labor income, capital income and wealth over the 1900-2013 period
- 2 We observe large changes in inequality, both over time and across countries, largely due to different institutions and public policies. Inequality is political, not natural
- 3 This work is due to be extended to lots of countries: World wealth and income database

# Appendix

**Figure C3. Income shares: tabulations vs micro-files**  
(equal-split individuals, fiscal income excl. cap.gains)

