

# Income disparity, technology and globalization

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# Key questions

What are the forces behind the rise in wage inequality throughout the last three decades?

- 1980s/90s
  - Technology
  - Globalization
- 2000s onward
  - **Social intelligence premium**
  - Disparity between workplace establishments

Which policies can reverse/correct this path?

- Short-term/cyclical: labor retraining
- Long-term: education

# Widening inequality gap: Why does it matter?

## Widening inequality gap

↓  
Decline in GDP growth due to inadequate consumer purchasing power

↓  
Low incentive for businesses to expand/hire

↓  
Paralyzed intergenerational upward mobility

↓  
Inequality in outcomes

↓  
Political divisiveness and polarization

↓  
Inefficient/unstable economic policies that further restrain long-term growth

## What

- Some degree of income inequality is inevitable and necessary to reward hard work and innovation
- Widening gap in wage inequality can lead to weak and unsustainable economic growth

## Why

- Technology and digitization are at the core of the widening gap in wage inequality and wage polarization
- The inability of trade schools and educational institutions to keep up with the increasing demand for skilled and educated labor

# Widening inequality gap: Why does it matter?

“In the utopian version of digital consciousness, we humans don’t fight with machines; we join with them, uploading our brains into the cloud and otherwise becoming a part of ‘technological singularity.’”

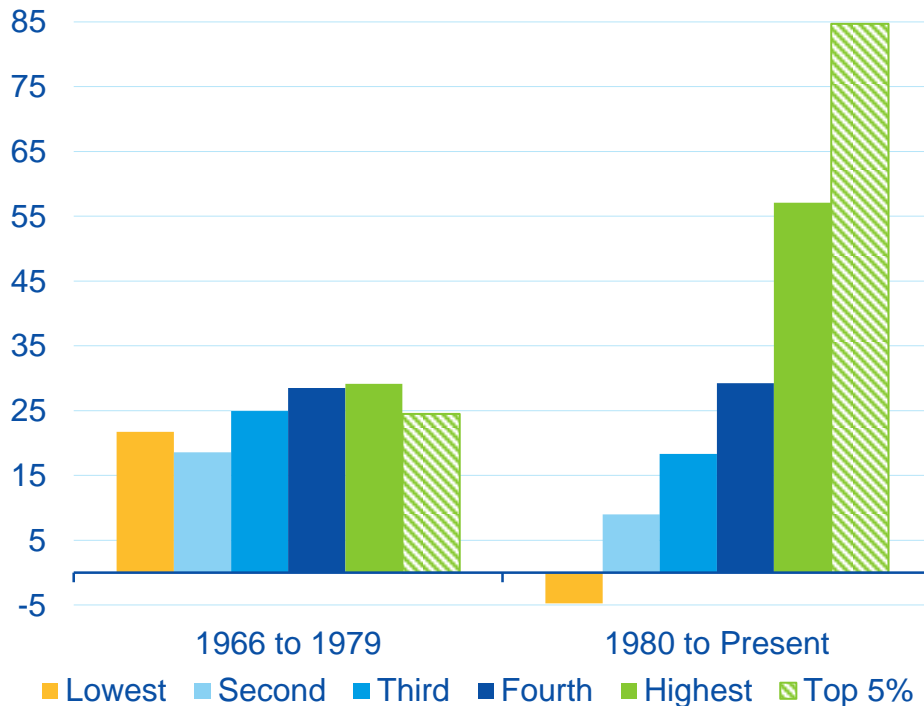
-Brynjolfsson & McAfee, *The Second Machine Age*

We can not fight machines but we can compliment them with our social intelligence and cognitive skills

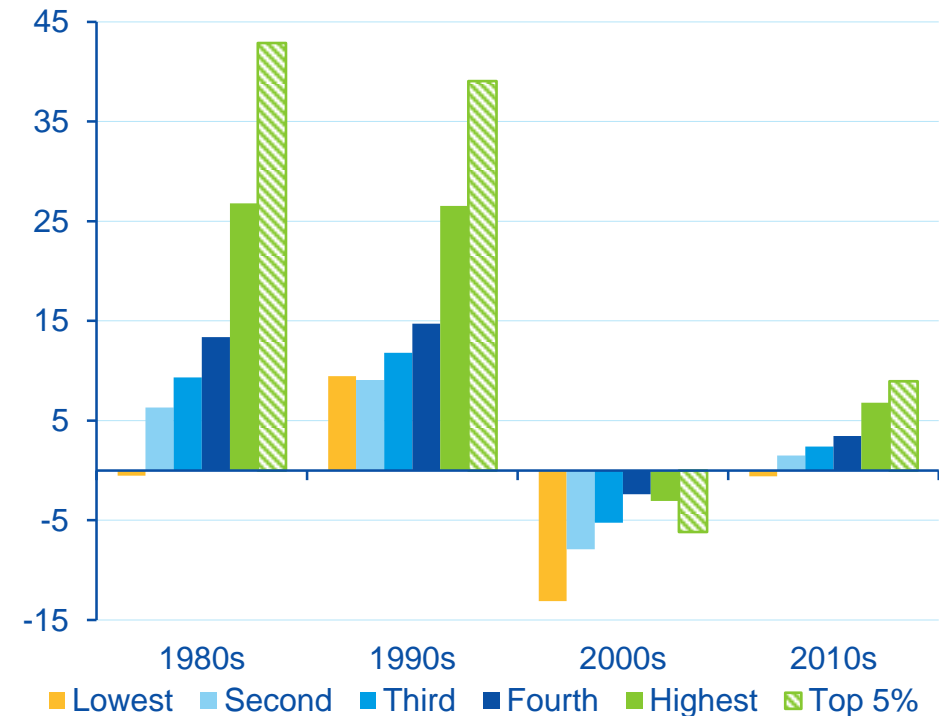
# Income inequality on the rise since 1980

Prior to 1980, all quintiles of income distribution grew together, but from 1980 onward, the lower income quintiles grew much slower than the highest

Mean Real Income Growth Received by Each Quintile and Top 5 Percent of Families (%)



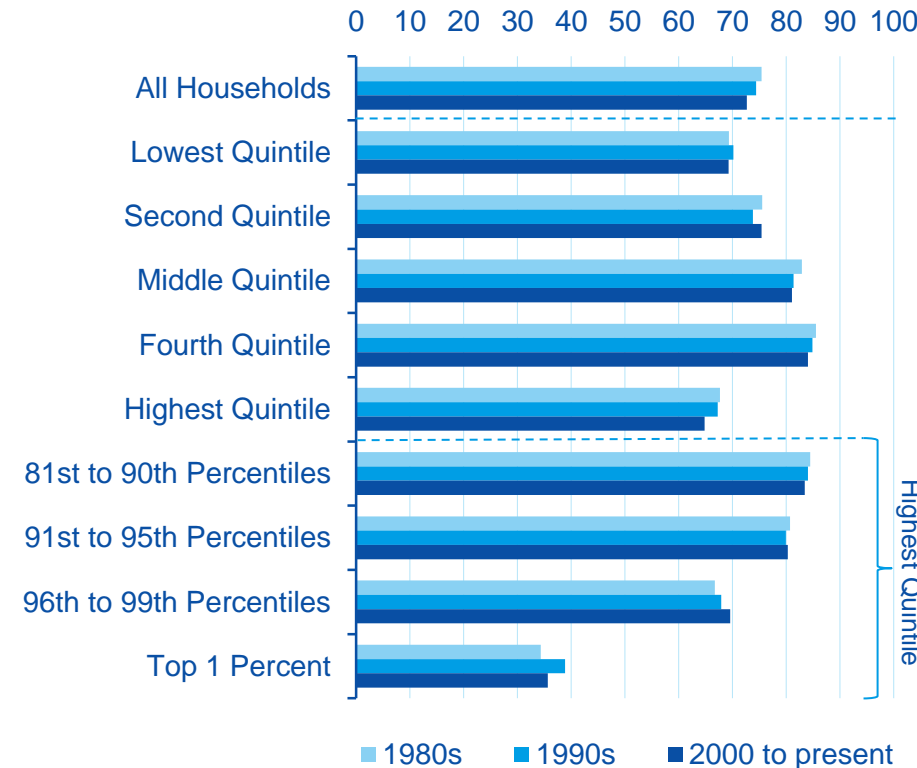
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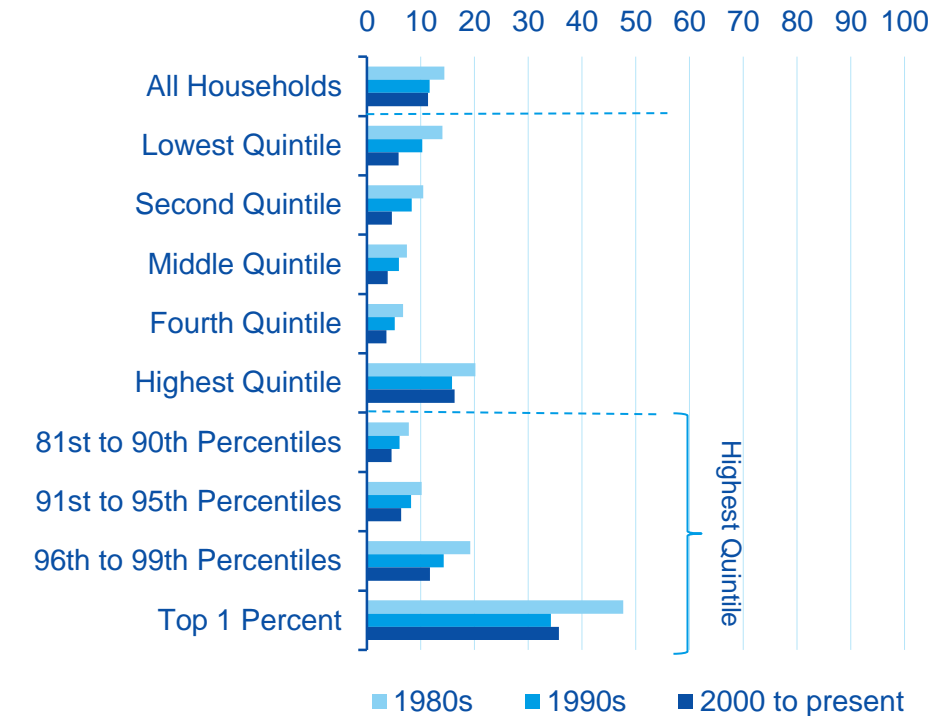
# Income inequality on the rise since 1980

For the households in the lower 99th percentile of the wage distribution, labor income, dominated by wages, is the primary source of income inequality

**Labor Income Share of Market Income for All Households (%)**



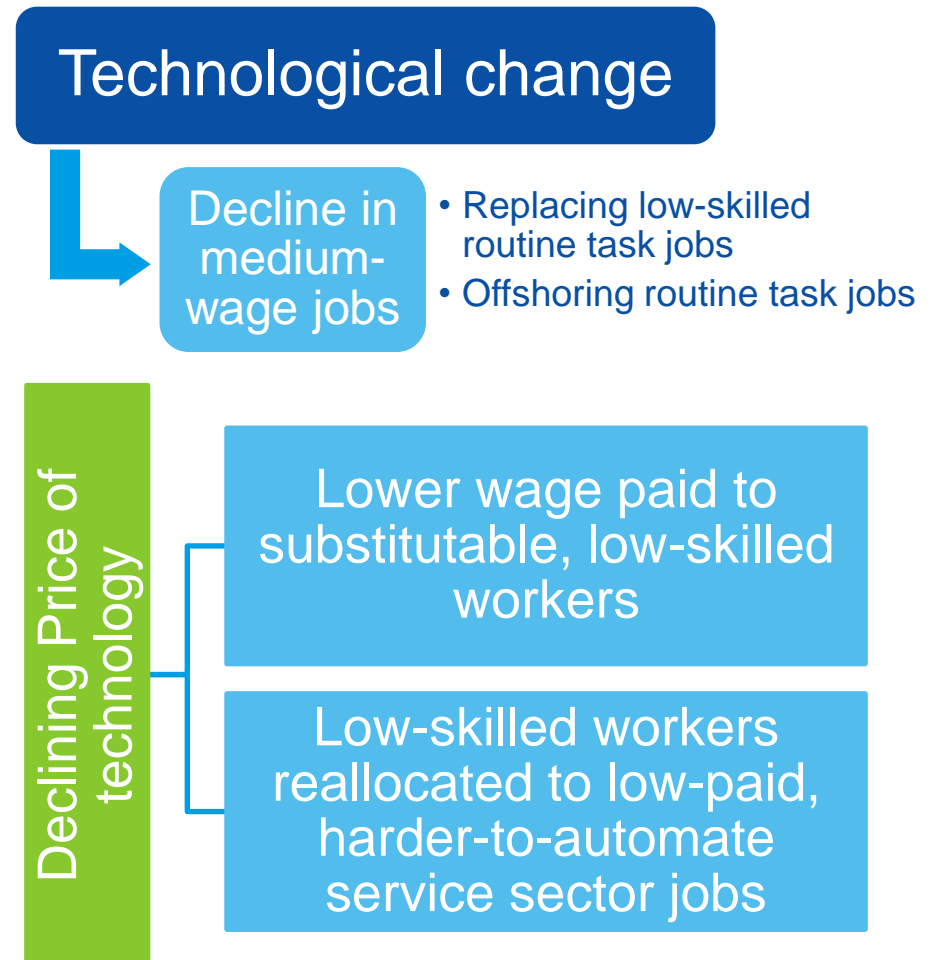
**Capital Income Including Capital Gains Share of Market Income for All Households (%)**



# Yesterday: “Hollowing out” of the middle class

## Late 1970s to 2000:

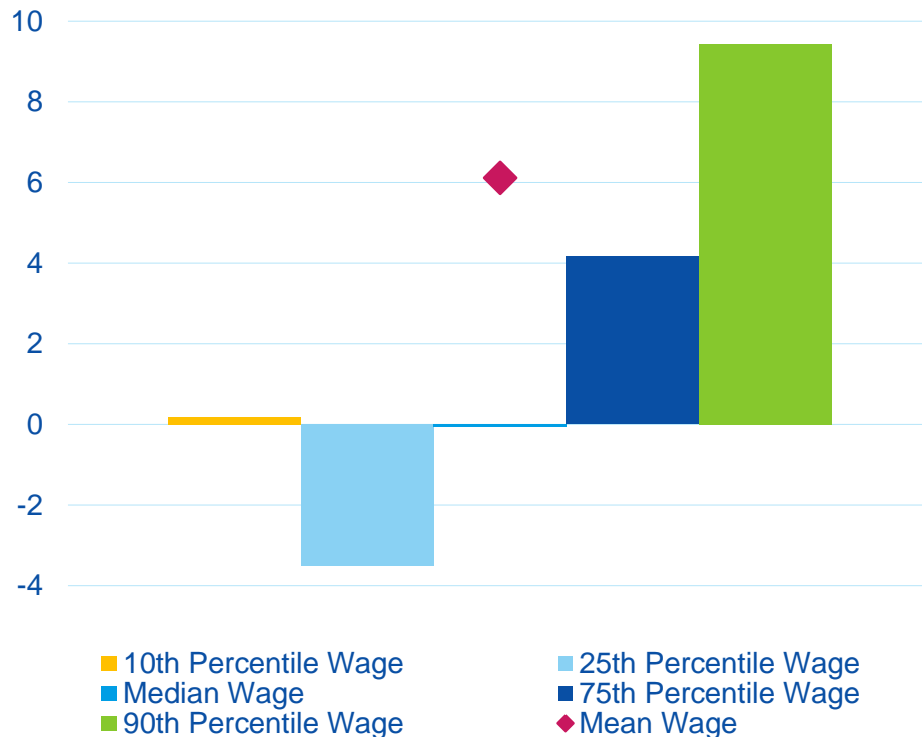
- Trends of computerization, automation, and digitization have been referred to as “skill-biased”
- As much as 90% of the increase in relative demand for college-educated workers from 1970 to 1998 is explained by information technology (Autor et al., 2003)
- Within the theoretical framework, the widened productivity gap has been illustrated to result in two separated equilibriums
  - Higher quality, high-wage jobs designed for the skilled
  - Low-capital, low-wage jobs created for the unskilled



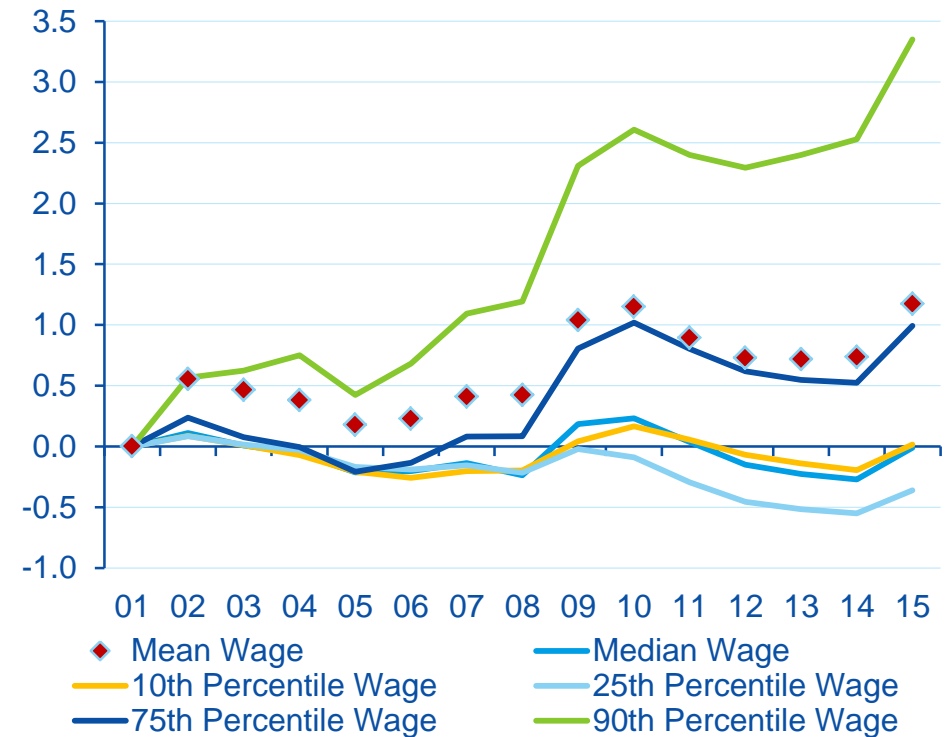
# Today: “Hollowing out” continued

Since 2000 onward, occupational polarization has become less important, while the importance of hard-to-measure wage inequality factors has grown

All Occupations, 2001 to 2015 Annual Wage Growth (%)



Growth of Usual Real Weekly Earnings by Decile/Quartile (2000=100, \$)





# Today: Intra-occupation inequality

Premium on unmeasured skills attributed to the “*able*” worker has grown, with acceleration of embodied technological change

- High social and cognitive intelligence, the ability to innovate, faster adaptability, comparatively more natural talent, and better ability to cope with the uncertainty of rapidly changing technology

## Residual inequality

- Skill-biased wage inequality with a higher premium awarded for unmeasured differences in the skills among workers within occupations and with matching educational attainment and experience

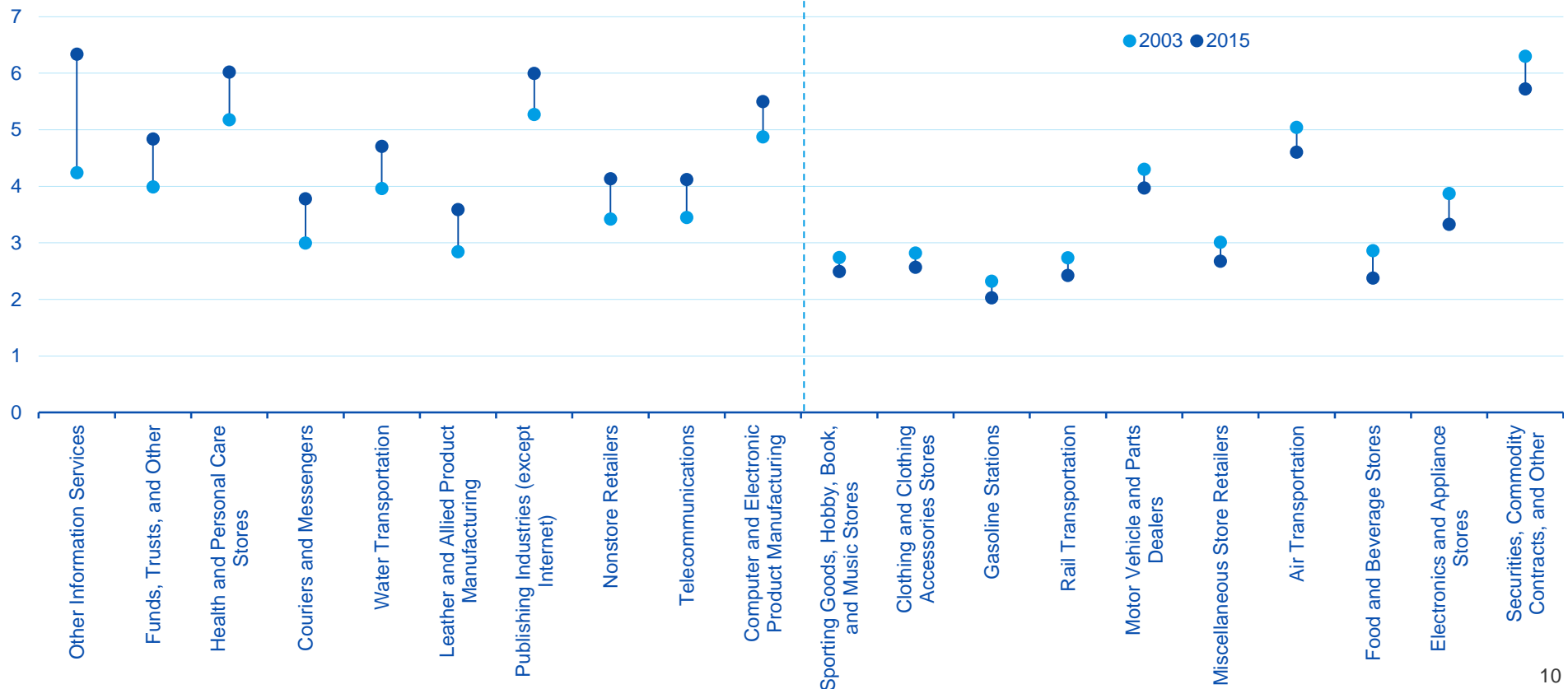
## Establishment inequality

- Pay differences between different establishments employing people in the same occupation have also been a major source of inequality

# Today: Intra-occupation inequality

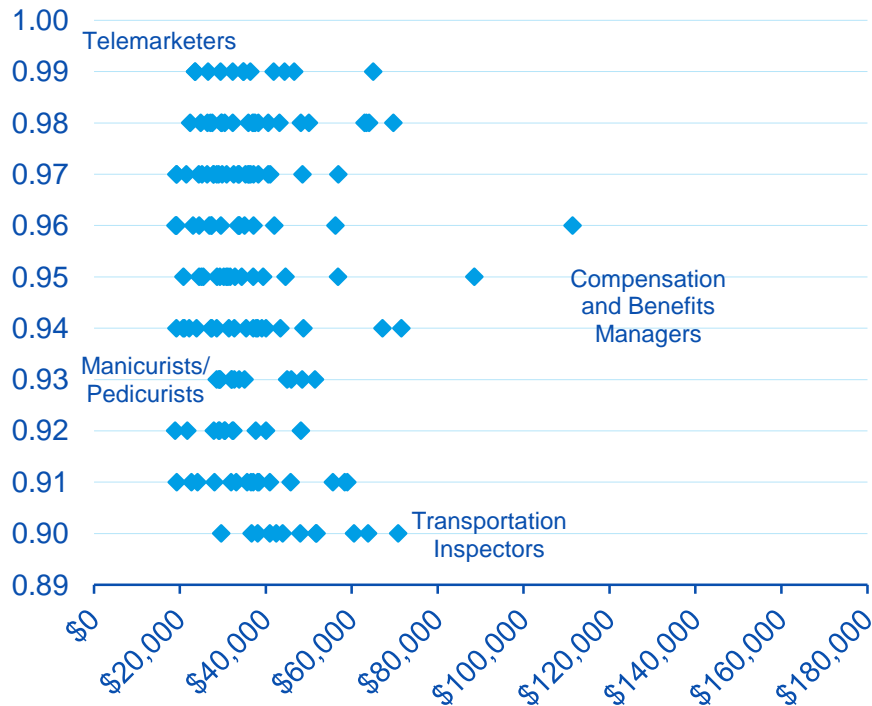
Lowest measure of wage inequality is in service-oriented occupations, while “other information services” sector displays greatest increase

Difference in 90-10 Ratios, 2003-15, Top and Bottom 10 Occupations



# Tomorrow: “Hollowing out” will continue

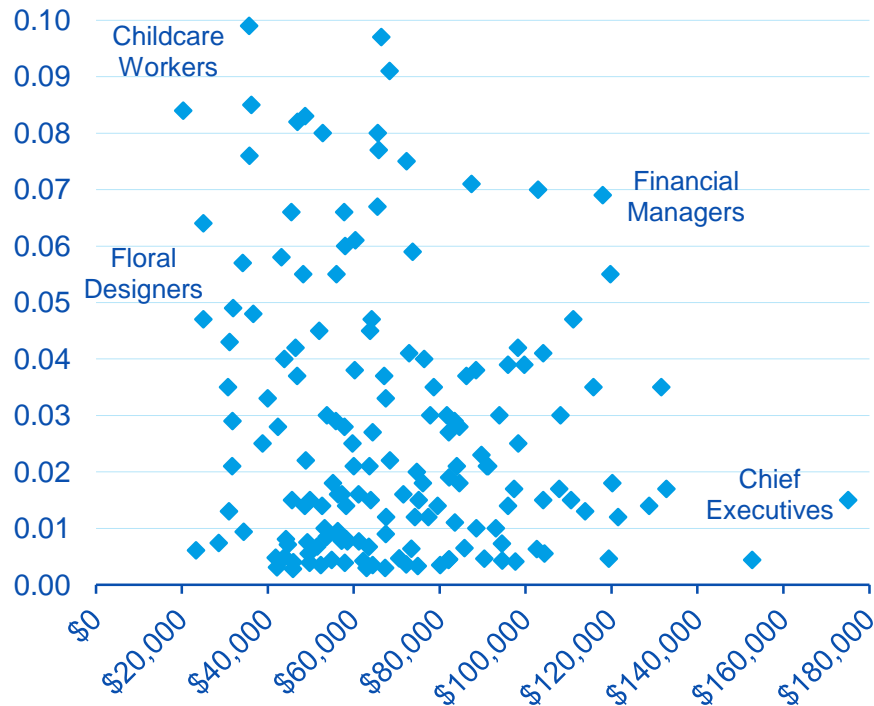
## Occupations with Highest Probability of Automation by Annual Median Wage



- 47% of 702 occupational categories at a high risk of being automated (Frey & Osborne, 2013)
  - Jobs with 99% probability of automation: telemarketers, hand sewers
  - White collar jobs also at-risk: accountants, paralegals
  
- 89% of these high-risk occupations are in low to mid-wage range

# Tomorrow: The social intelligence premium

## Occupations with Lowest Probability of Automation by Annual Median Wage



- Occupations with less than 3% of automation include recreational therapists and emergency management directors
- Occupation at low-risk cover wide range of wage distribution
- Social intelligence: common characteristic among low-risk jobs

# Tomorrow: The social intelligence premium

- 1980-2012: Jobs with high social skills requirements +10pp
  - Jobs which require math but little social skills -3pp
  - Jobs which require mix of social and cognitive skills had especially high wage growth (Deming, 2015)
- 
- Occupations with largest future wage growth are in health and social assistance sector

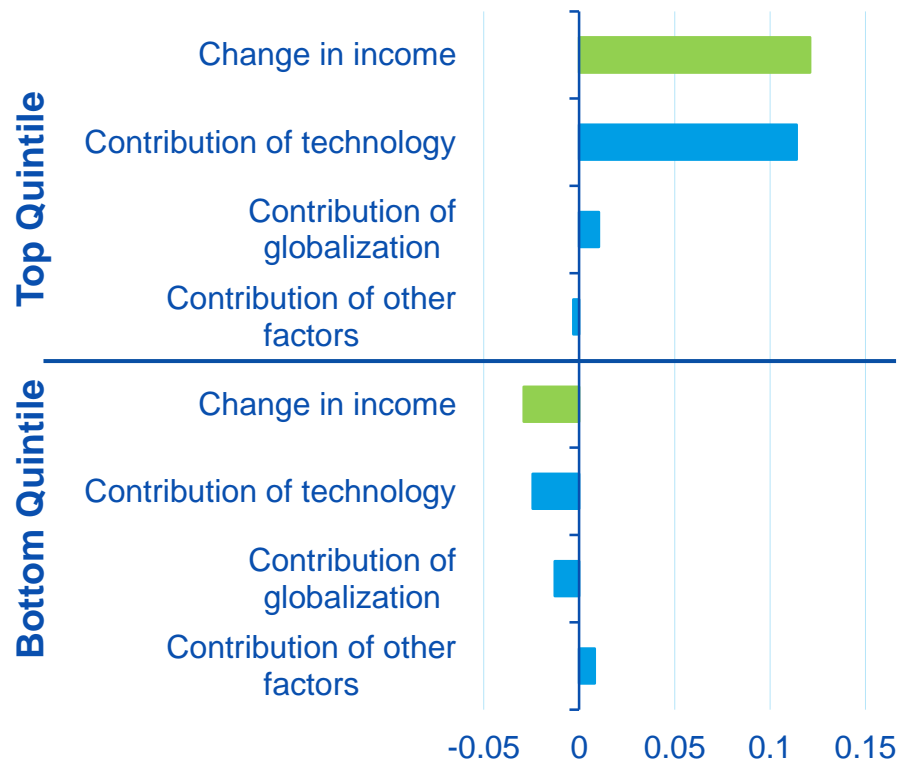
## Industries with the Largest Wage and Salary Employment Growth and Declines

Industry Description	Change	Compound Annual Rate of Change
	2014-2024	2014-2024
1. Construction	790.4	1.2
2. Home health care services	760.4	4.8
3. Nursing and residential care facilities	735.7	2.1
4. Food services and drinking places	658.0	0.6
5. Offices of physicians	522.7	1.9
6. Local government educational services compensation	426.4	0.5
7. Employment services	424.8	1.2
8. Computer systems design and related services	408.9	2.1
9. Hospitals; private	394.9	0.8
10. Offices of other health practitioners	352.3	3.8

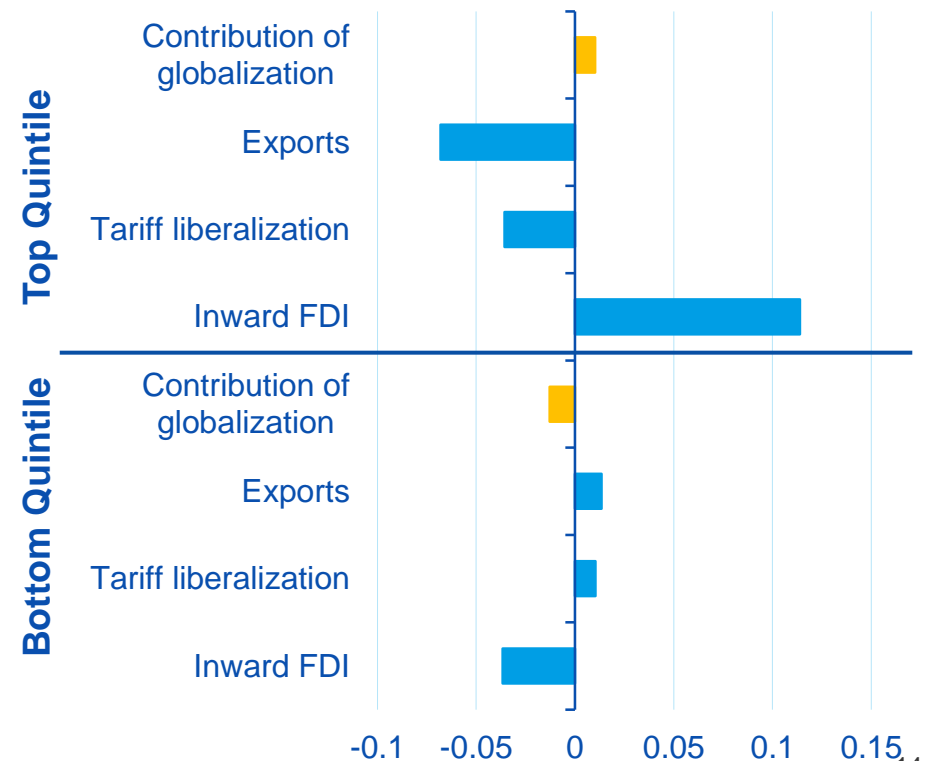
# Is globalization a threat?

Trade openness is associated with lower inequality overall, but financial globalization is associated with higher income inequality

**Decomposition of Ave. Annual Change in Income Shares (percentage points)\***



**Decomposition of Globalization Effects on Income Shares (percentage points)**



# Can we fix it?

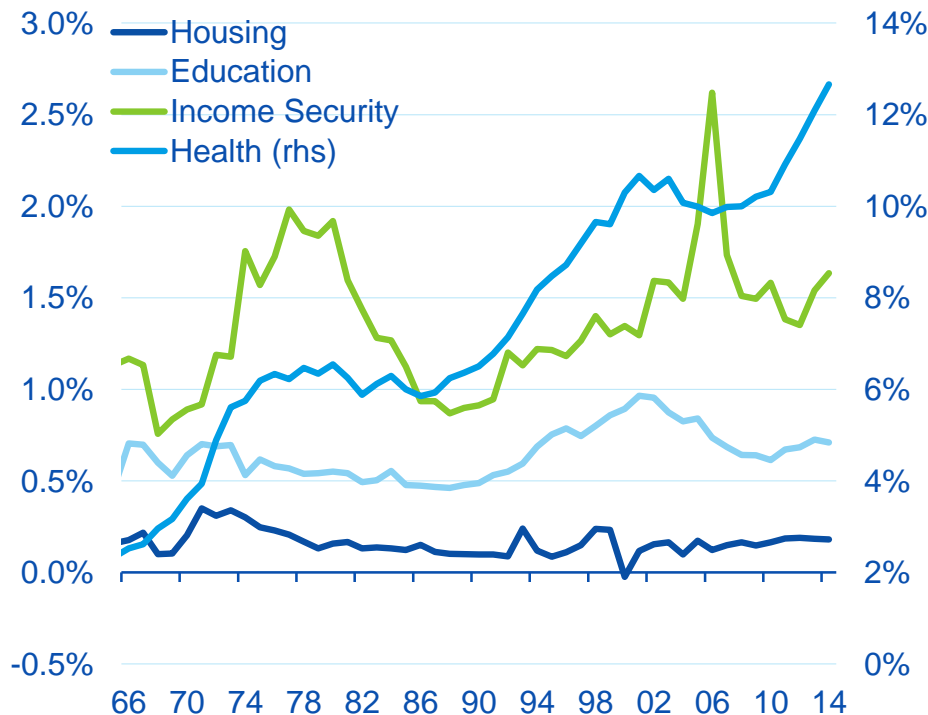
## Policy aimed at short-term cyclical stabilization

- Worker retraining
  - Flexible and comprehensive retraining programs are vital
  - More initiative necessary from private sector
  - Key: provide training for occupations of future, not for vanishing skills of past
- Labor institutions
  - Raising the minimum wage can change inequality outcomes for workers at low end of wage distribution, but ripple effect is possible
  - Do not solve core of inequality problem (technology, globalization)
- Regulation
  - Requiring certifications and licensing can create rent-seeking opportunities
- Protectionism
  - Not effective policy; increases cost of goods sold and could lead to layoffs

# Can we fix it?

## Policy with long-term growth in mind: Education

**Share of Real Federal Expenditures by Selected Functions (%)**



- Educational institutions need to put higher value on social intelligence and interpersonal communications skills
- 1pp increase in public expenditures on education reduced income inequality by 0.13 pp (Martinez-Vasquez et al., 2012)

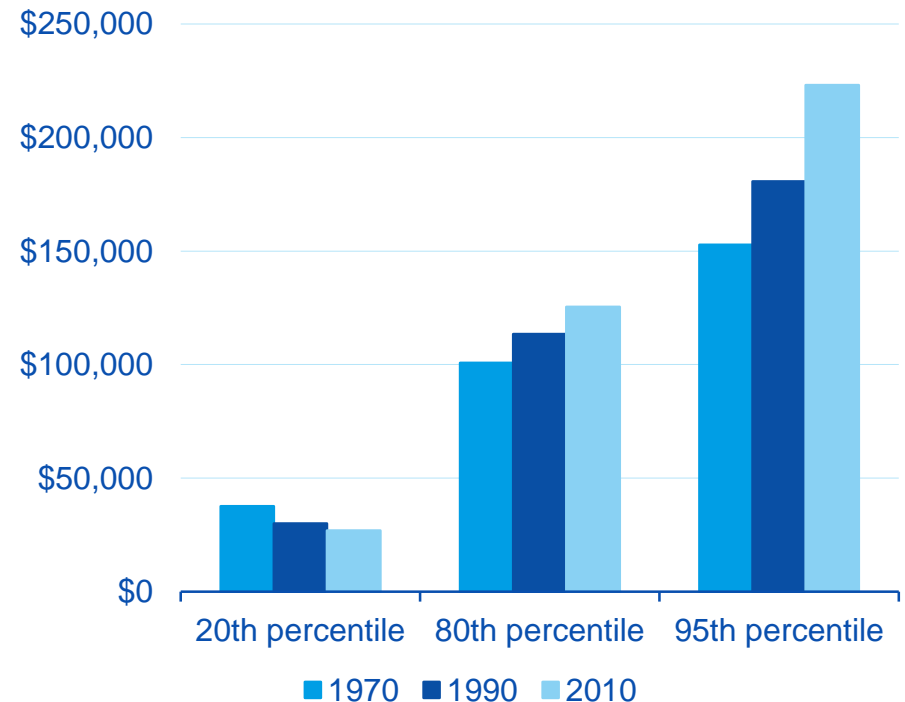


# Can we fix it?

## Policy with long-term growth in mind: Education

- Public institutions should strive for equality in access to and quality of education
  - Highly rewarded skills of future hard to obtain for children from low-income families
- Need to focus on early education
  - By age of 6, children already display differences in educational development

**Children's Families: Real Incomes (\$)**



# Key messages

- Income inequality has been rising over the last three decades due to technological advances and globalization
- Occupations that have resisted automation require combination of cognitive and social skills, and are earning a premium that is further widening inequality gap
- Policy recommendations include long-term reforms to educational institutions and short-term solutions such as comprehensive worker retraining programs

As technology and globalization spur income inequality, investment in human capital is the only way to ease it

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