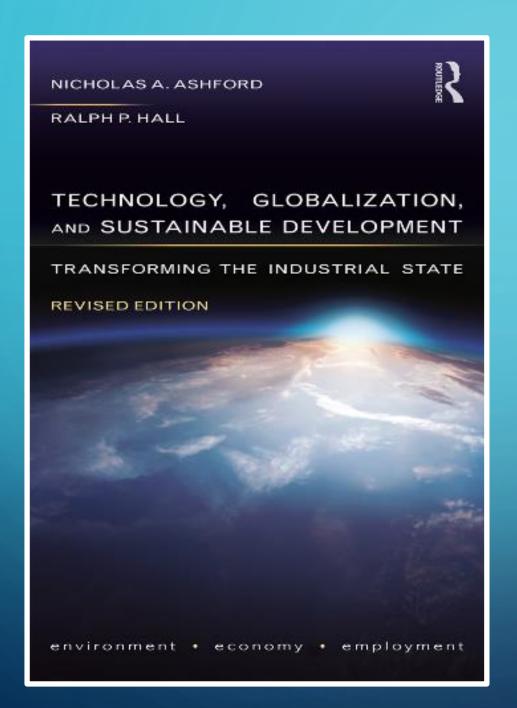
TECHNOLOGY, GLOBALIZATION, AND SUSTAINABLE DEVELOPMENT: TRANSFORMING THE INDUSTRIAL STATE

IDS.437 /15.657/11.466/1.813

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MASSACHUSETTS INSTITUTE OF TECHNOLOGY



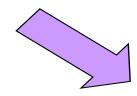
NOT (JUST) A TEXTBOOK A BLUEPRINT FOR CHANGE

ASHFORD & HALL 2018 Revised Edition

How might the modern industrial or industrializing state be envisioned?

i.e., what is the system?

Extraction industries Manufacturing Agriculture Transportation Energy Services Housing ICT





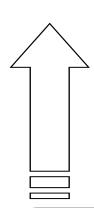


Government Consumption

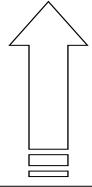


SUSTAINABILITY CHALLENGES

Inadequate Supply of, and Access to, Essential Goods & Services



Toxic Pollution
Climate Disruption
Resource Depletion
Biodiversity/Ecosystem Integrity
Environmental Injustice
Employment/Purchasing Power
Economic Inequity



SOLUTIONS

Education & Human Resource Development Industry Initiatives Government Intervention/Regulation Stakeholder Involvement Financing Sustainable Development Extraction industries
Manufacturing
Agriculture
Transportation
ENERGY
Services

Producer-created demand →

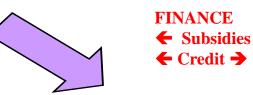


Consumer Consumption



Commercial Consumption

Government Consumption

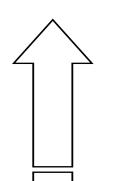


Economic Inequity



SUSTAINABILITY CHALLENGES

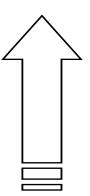
Inadequate Supply of, and Access to, Essential Goods & Services



Housing

ICT

Toxic Pollution
Climate Disruption
Resource Depletion
Biodiversity/Ecosystem Integrity
Environmental Injustice
Employment/Purchasing Power



SOLUTIONS

Education & Human Resource Development Industry Initiatives Government Intervention/Regulation Stakeholder Involvement

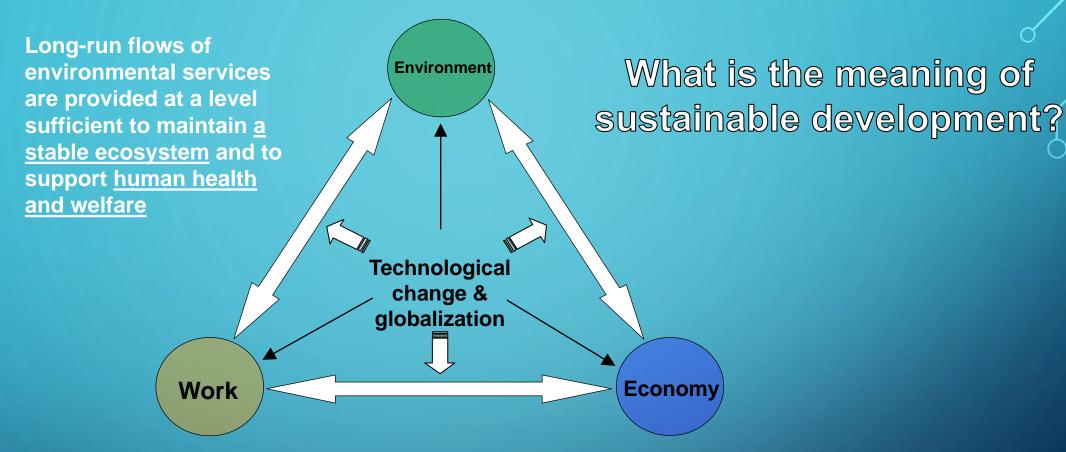
Reform the Financial System

FACTORS OF PRODUCTION: CRITICAL CHALLENGES

- Factors of production do not reflect their full cost failure to internalize negative externalities. This is reflected in contributions to unsustainability.
- Volatility in the price of the factors of production, undermines the use of labor

Expanded List of the Factors of Production

- Land
- Natural and physical capital (material resources)
- Energy
- Labor capable of performing physical work
- Know-how (intellectual human capital)
- · [Innovation systems]
- Built capital (that is, infrastructure, such as railways, bridges, roads, ports, airports, and dams)
- ICT (information and communication technology)
- (Health and the environment)
- Structural capital (knowledge and productive routines held by organizations)
- Networks and outsiders (linking organizations, people, and entrepreneurs)
- Social capital (knowledge held by consumers and citizens)

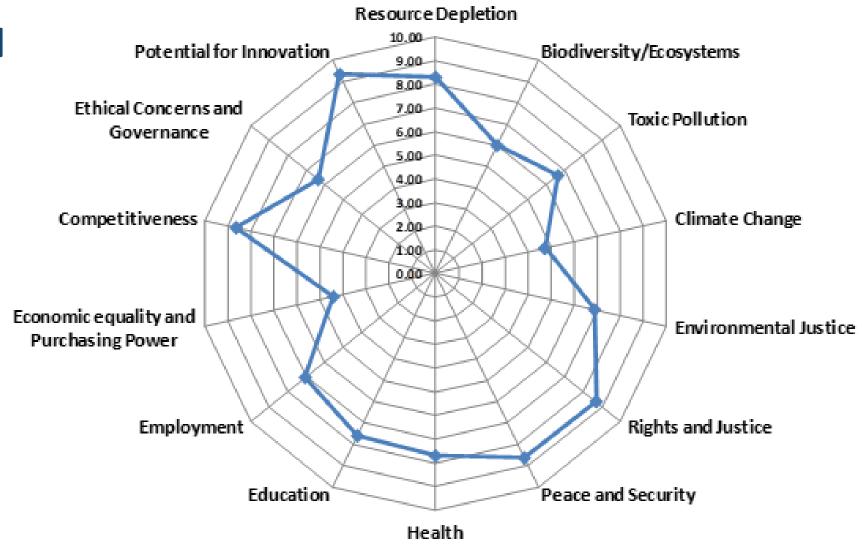


Livelihoods are secure and available that provide satisfying engagement in work and equitable reward for labor, permit the maintenance of a decent standard of living, and are conducted in a safe working environment

The economy provides goods and services adequate to <u>satisfy</u> the basic material needs of all members of society and provides abundant and equitable opportunities for the realization of human potential

A MULTI-DIMENSIONAL REPRESENTATION OF SUSTAINABLE DEVELOPMENT

USA



Source: Nikolopoulos (2014).

Waves of Creative Destruction

		INSTALLATION PERIOD	TURNING POINT	DEPLOYMENT PERIOD
No., da	ite, revolution, ountry	'Gilded Age' Bubbles	Recessions	'Golden Ages' Maturity/decline
1 st	1771 The Industrial Revolution Britain	Canal mania UK	1797–99	Great British leap
2 nd	1829 Age of Steam and Railways Britain	Railway mania UK	1848–50	The Victorian Boom
3 rd	1875 Age of Steel and heavy Engineering Britain / USA Germany	London funded global market infrastructure build-up (Argentina, Australia, USA)	1890–95	Belle Époque (Europe)(*) 'Progressive Era' (USA)
4 th	1908 Age of Oil, Autos and Mass Production/USA	The roaring twenties USA Autos, housing, radio, aviation, electricity	Europe 1929–33 USA 1929–43	Post-war Golden age
5 th	1971 The ICT Revolution USA	Internet mania, Telecoms 1990s emerging markets Global financial casino&housing 2000s	2008-20??	Global sustainable figolden age? Expectations vs. Reality?

We are here

^(*) Note an overlap of more than a decade between Deployment 3 and Installation 4 when the USA forges ahead

Troublesome Realities

1. Job polarization and the hollowing out of the middle class









2. A three-decade declining labor share of total income

3. Increasing cost of living





4. Growing income and wealth concentration



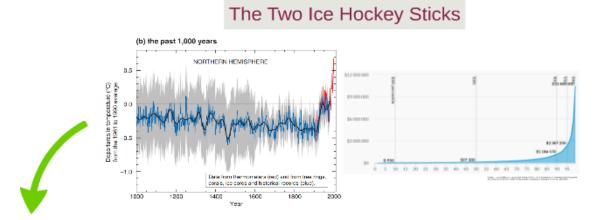


5. The economy has substantial unutilized productive capacity

They Are Connected

The problem is **not** the technological ability to produce more

The problem is to do so **profitably**, **equitably**, and **sustainably**



The currently discussed long-term solution to **sustainability** is **technological advance** (U.S. and EU perspective - is optimism justified?)

Technological advance can eliminate labor that contributes to **effective demand**

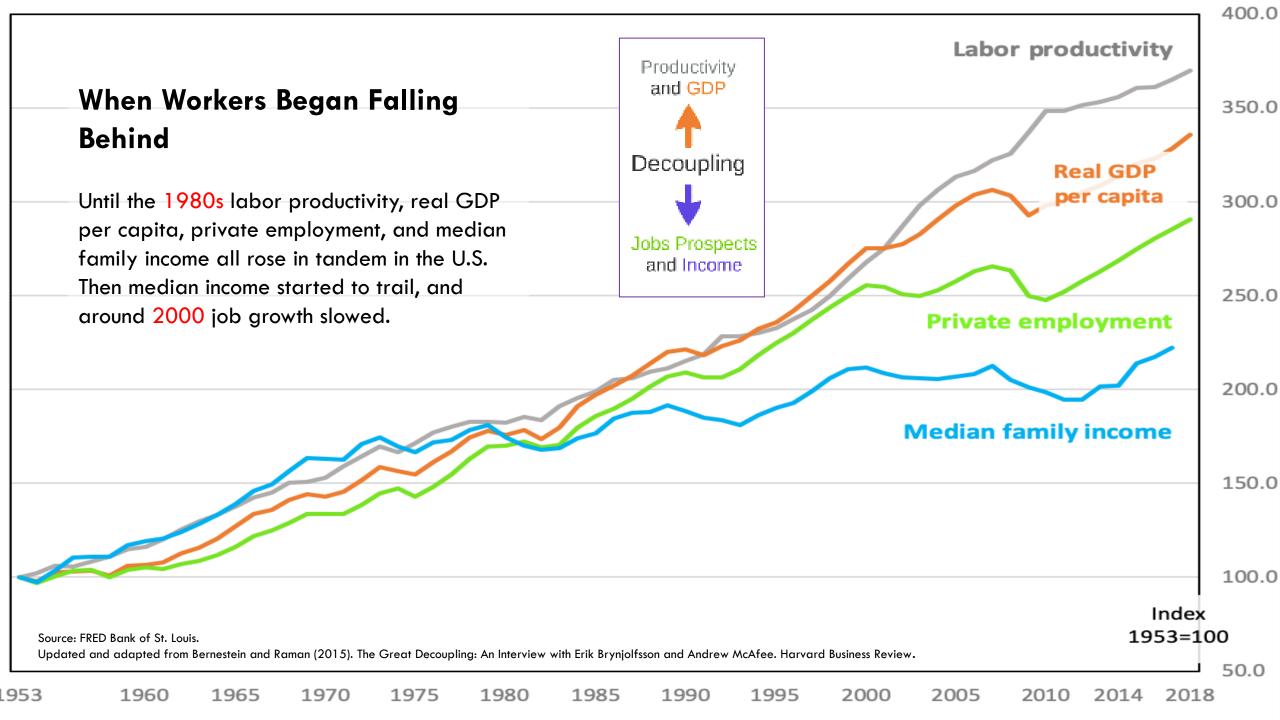
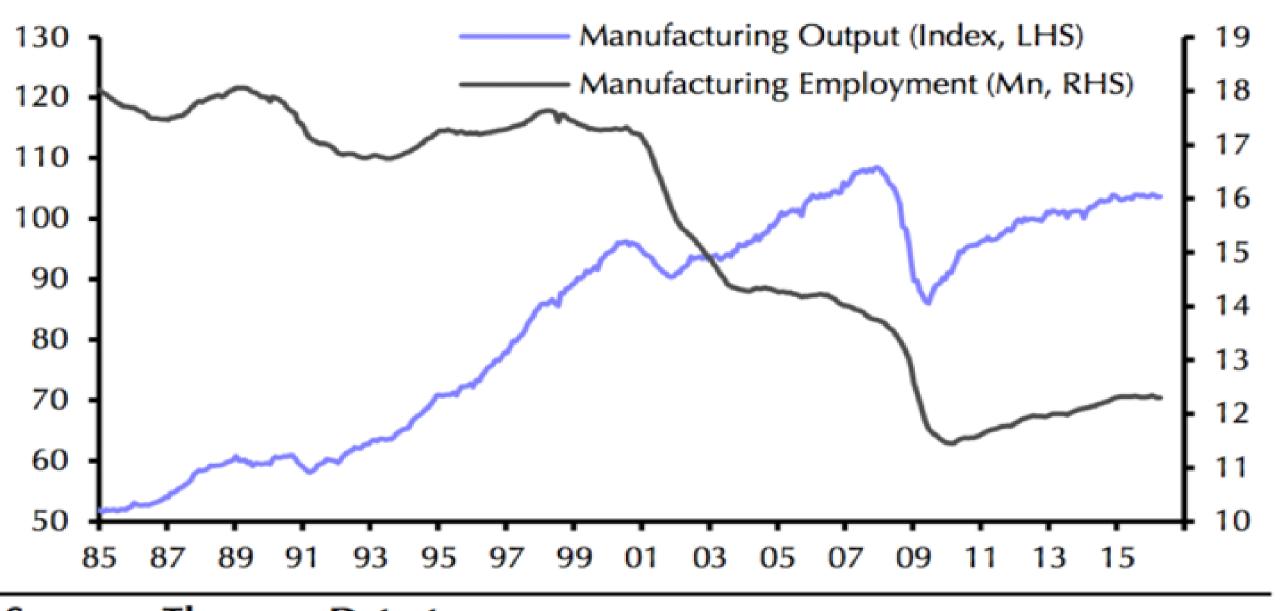
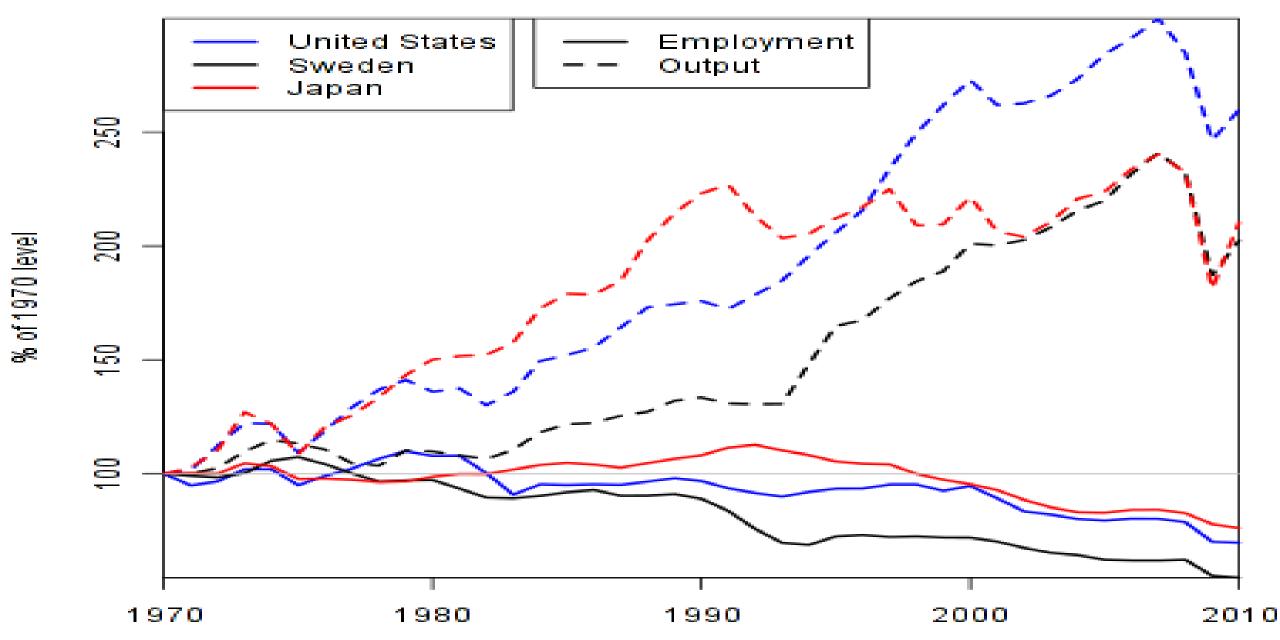


CHART 1: MANUFACTURING OUTPUT & EMPLOYMENT

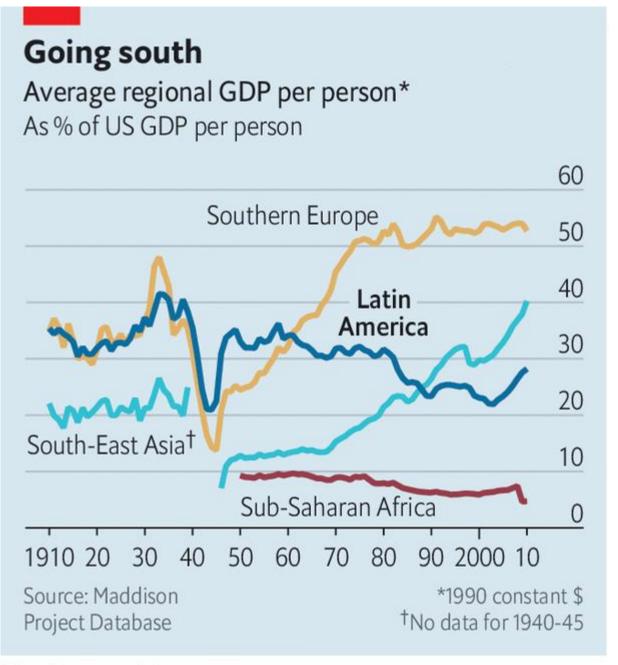


Source - Thomson Datastream https://www.businessinsider.com/manufacturing-output-versus-employment-chart-2016-12

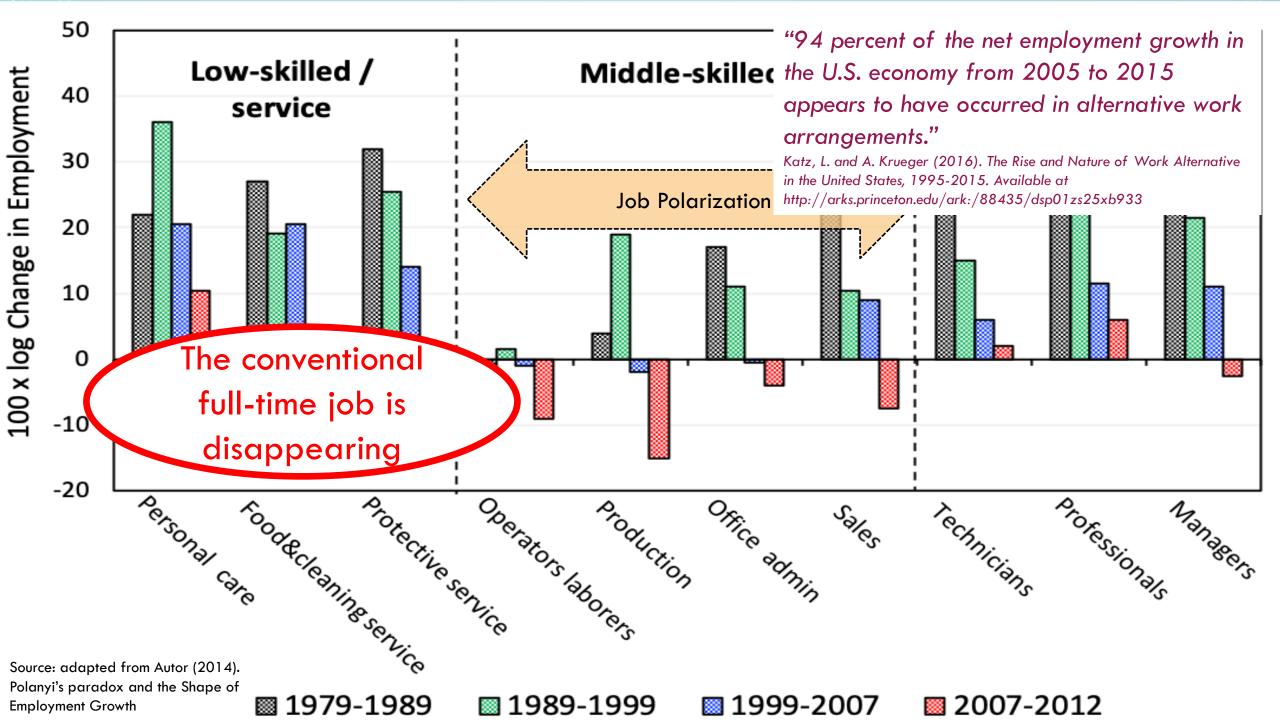
Manufacturing employment and output



Source: Peter Frase. Available at http://www.peterfrase.com/2011/04/manufacturing-output-around-the-world/



The Economist June 1, 2019, print edition page 28



Wealth

America's Millennials Are Waking Up to a Grim Financial Future

Job prospects, savings, safety nets, life expectancy—the data show just how bad a mess they face.

By Ben Steverman

June 21, 2018, 4:00 AM EDT

Of course, it's perfectly normal for people just starting out to have less in the bank. However, the St. Louis Fed warned that, even when taking that into account, young Americans are slipping dangerously behind. For a time, Generation X was also losing out, thanks to the 2008 financial crisis. But its members managed to make up most of the shortfall in the years since, tapping into the longest economic expansion in decades.

For some reason that period of tremendous growth barely helped millennials. The St. Louis Fed called this anomaly "a missed opportunity because asset appreciation is unlikely to be as rapid in the near future." That's pretty bad news for twenty and thirtysomethings who may have been hoping to catch up. But it gets worse.

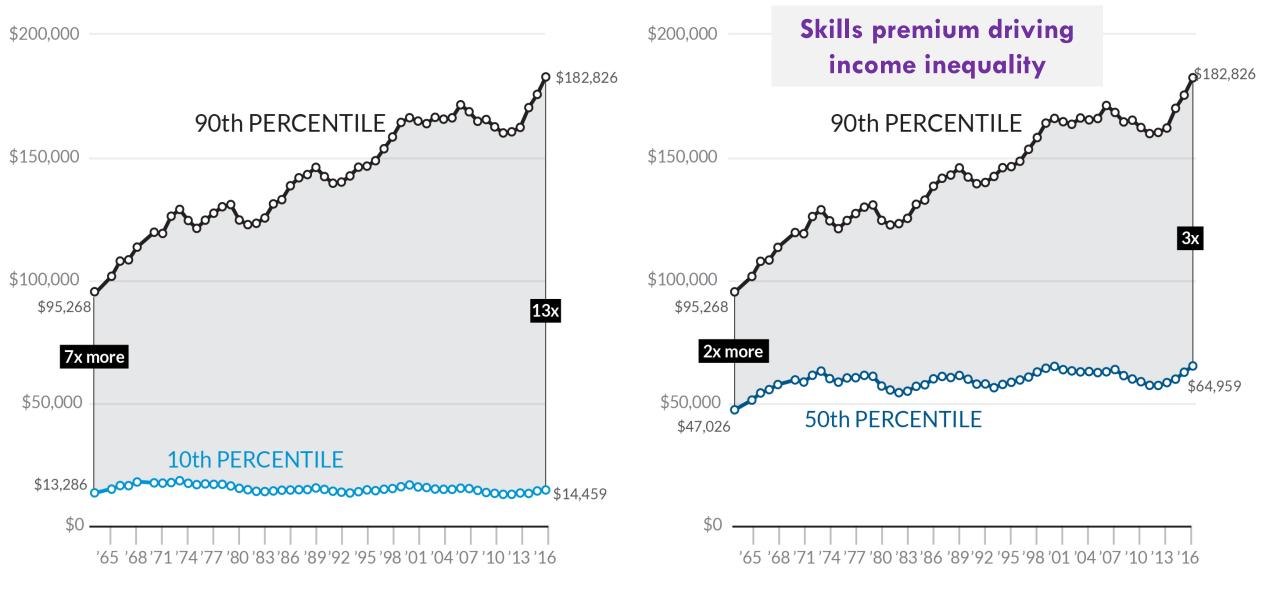
Millennials' Missing Wealth Deviation of 2016 wealth from predicted levels based on age and typical life cycle. 1930s 1970s 1940s 1960s 1980s Decade of birth Source: "A Lost Generation? Long-Lasting Wealth Impacts of the Great

Source: https://www.bloomberg.com/news/articles/2018-06-21/america-s-millennials-are-waking-up-to-a-grim-financial-future

Bloomberg

Recession on Young Families," Federal Reserve Bank of St. Louis, May 2018

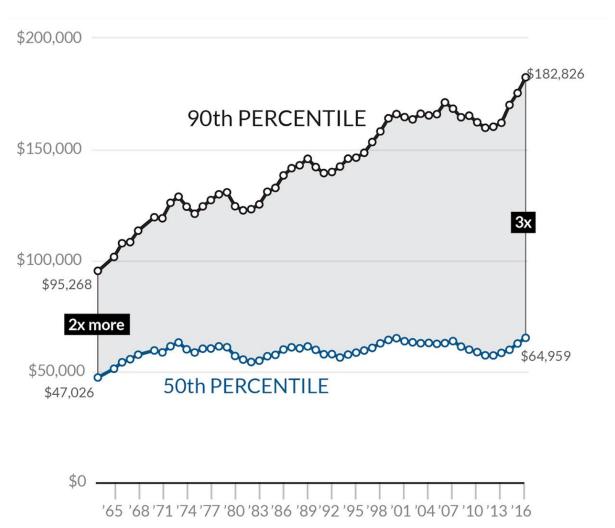
Distribution of Family Income, 1963-2016



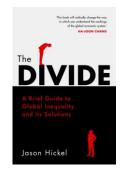
Source: Karen Smith, Urban Institute's tabulations from the Current Population Survey 1963–2017.

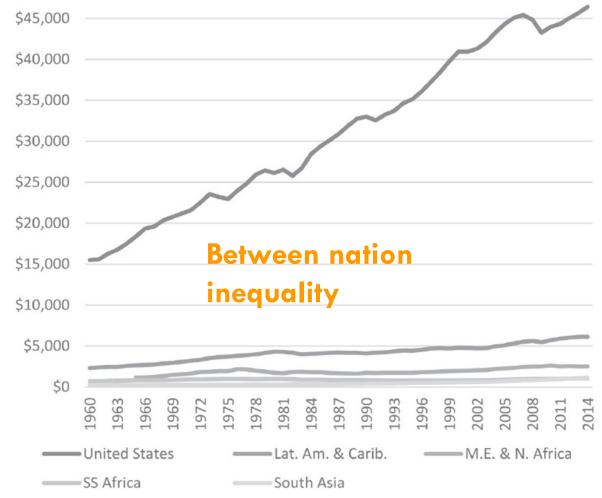
Notes: 2016 dollars. Income here is measured as private income (e.g., earnings and dividends) plus cash government benefits. Income differences narrow when all taxes and transfers—such as health insurance and in-kind government benefits—are included, but private wealth does not change.

Distribution of Family Income, 1963–2016

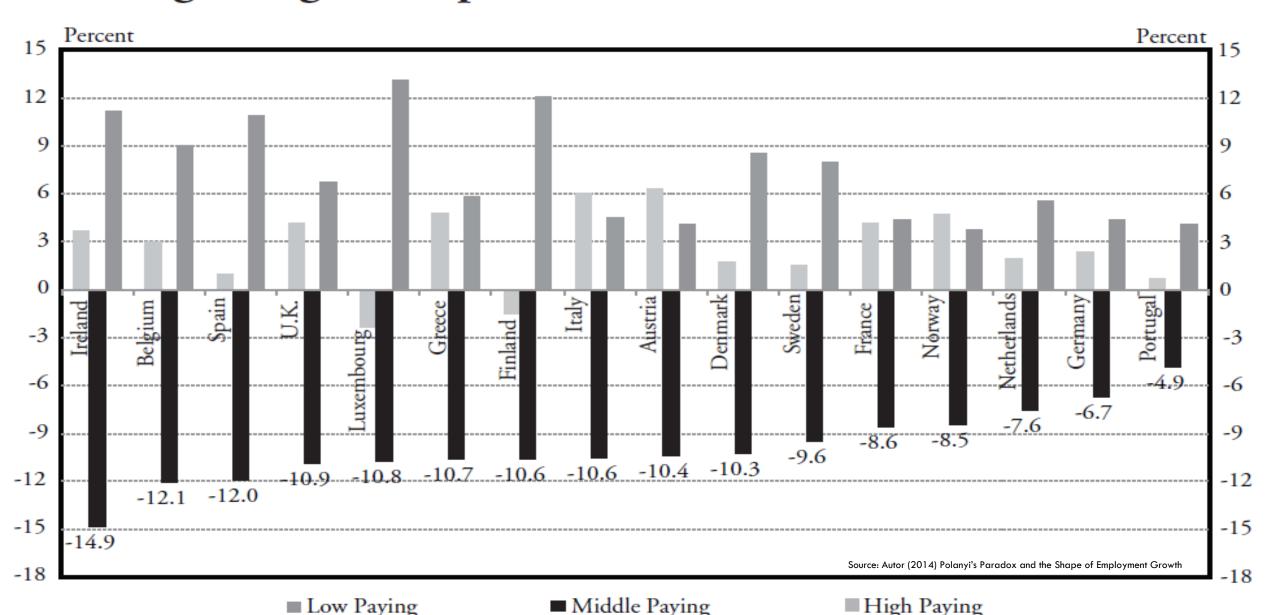








Change in Occupational Employment Shares in Low-, Middleand High-Wage Occupations in 16 EU Countries, 1993-2010

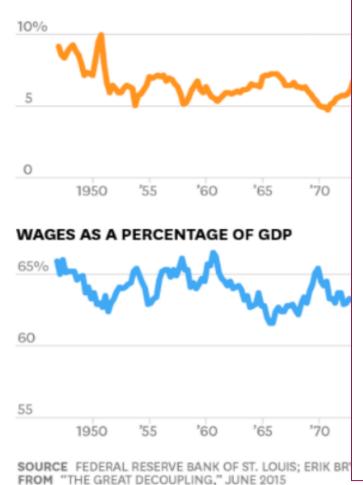


As Profits Climb, Wages Plummet

In the U.S., corporate profits were rising before the 2008 recession and quickly recovered from it. In

contrast, labor's share of GDP, which was he

CORPORATE PROFITS AS A PERCENTAGE O



In the Age of Automation...as production becomes more capital intensive, the distribution of earning will become more capital intensive



10

Openness
Automation
Labor Union Decline
Etc.

Trade / Financial



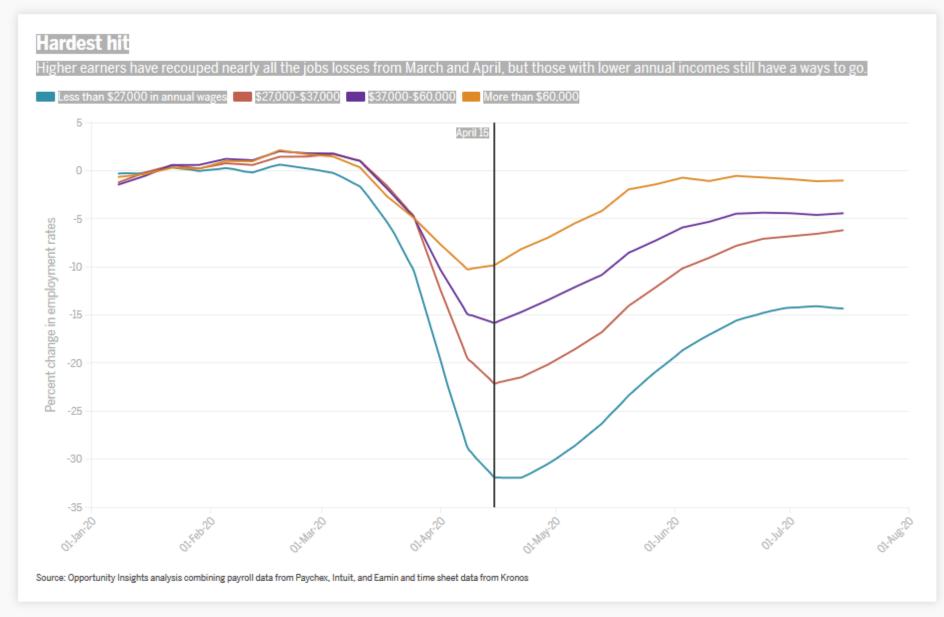
© HBR.ORG

Labor's share of GDP has declined in **42 out** of **59** industrialized countries

Source: Bernstein and Raman (2015) The Great Decoupling: An Interview with Erik Brynjolfsson and Andrew McAfee. Harvard Business Review.

Employment Rates by wage quartile in the COVID-19 crisis

By Shared GraphicsDesign on 4 Sep 2020



Six months into the recession, a 11.5 million jobs deficit remains

When the pandemic hit, health officials and policymakers urged businesses across the country to shutter their doors and mitigate the spread of the coronavirus. Over 22 million jobs were lost and unprecedented numbers of workers filed for unemployment. Job losses disproportionately hit women, <u>Latinx workers</u>, and certain low-wage sectors of the economy, notably leisure and hospitality.

The effects have been particularly devastating for <u>Black workers</u> and their families, who are less able to weather job losses. With the expiration of the <u>extra \$600 unemployment insurance benefit</u>, millions of workers across the country are facing eviction and hunger, and the resulting loss in demand will undoubtedly slow the recovery.

While jobs have started to return—the BLS reported an increase of 1.4 million jobs in August—the U.S. economy is still down 11.5 million jobs from where it was in February, before the pandemic hit. And the 1.4 million jobs added represents a steep slowdown in job growth compared with June and July. With this kind of slowing in job growth, it will take years to return to the pre-pandemic labor market.

Impacts of a Declining Wage

- Only way for low-income families to maintain/enhance their income (without further developing their individual skills) was to increase the number of hours worked:
 - Women entered the workforce
 - Between 1973 and 2002 average workers annual hours increased from 1,679 to 1,851

Both of these outcomes led to an increase in neglected children, worker health problems, and safety risks

What Factors Shape Income Inequality?

- Technological change
- Demand for skilled/educated workers and a shift in the type of skills demanded (i.e., structural changes in the type of skills required to make/use products, processes, and services)
- 3. Trade liberalization and the loss of national jobs to the international economy through multi-nationalization
- Shifts in the mixture of lower-paid 'service' jobs and higher-paid manufacturing jobs due to the single and combined effects of factors 1, 2, and 3

What Factors Shape Income Inequality? cont.

- Supply side shifts in the demographics of the labor market i.e., [a] immigration and the associated influx of unskilled workers, [b] the increased participation of women in the workforce, and [c] the entrance (and pending exit) of the baby boomers into (and out of) the labor market
- Changes in [a] the organization of work, [b] the sources of compensation of employees, and [c] the broader political and institutional environment that impact factors such as the minimum wage and the strength of trade unions

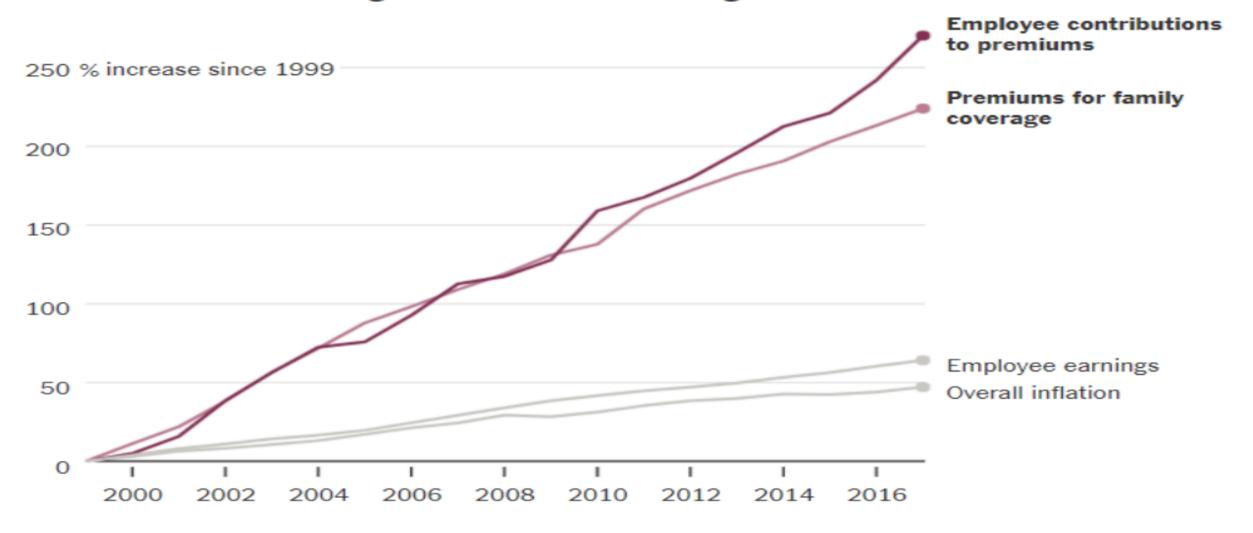
Who Benefits from Economic Growth in the U.S.?

- Freeman (1996): The problem with the economy is not the nation's strong track record of productivity, technological leadership, or rate of economic growth; instead, it is the manner in which the economy distributes the economic benefits from this progress
- Mishel, Bernstein, et al. (2005, p. 5): "Between 2000 and 2003, income shifted extremely rapidly and extensively from labor compensation to capital income (profits and interest), so the benefits of faster productivity went disproportionately, in fact completely, to capital"

Who Benefits from Economic Growth in the U.S.? Cont.

Brynjolfsson and McAfee (2014, p. 131): "Between 1983 and 2009, ... the bottom 80 percent of the income distribution actually saw a net *decrease* in their wealth. Taken as a group, the top 20 percent got not 100 percent of the increase, but more than 100 percent. Their gains included not only the trillions of dollars of wealth newly created in the economy but also some additional wealth that was shifted in their direction from the bottom 80 percent."

Premiums Are Rising Faster Than Earnings and Inflation

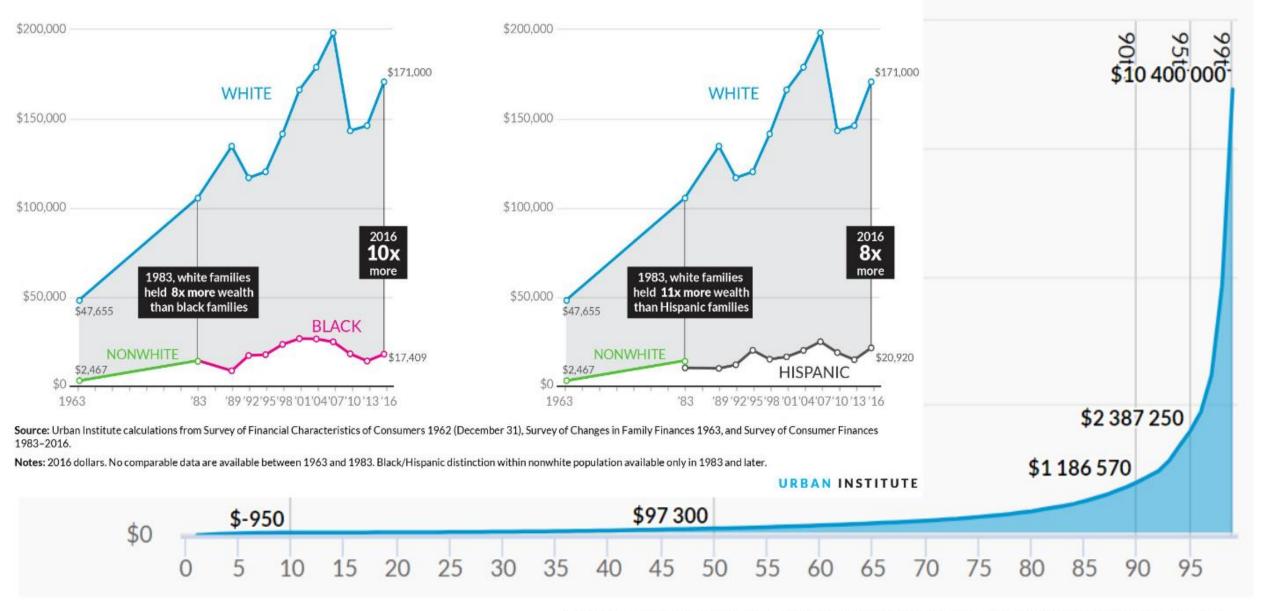


Percent increases in employee earnings are of seasonally adjusted average hourly earnings recorded in April of each year.

By Denise Lu | Sources: Kaiser/HRET Survey of Employer-Sponsored Health Benefits, 1999–2017; Bureau of Labor Statistics

Source: Wingfield et al., (2018). Amazon, Berkshire Hathaway, and JPMorgan Team Up to Try to Disrupt Health Care. New York Times, January 30, 2018.

Median Family Wealth by Race/Ethnicity, 1963-2016

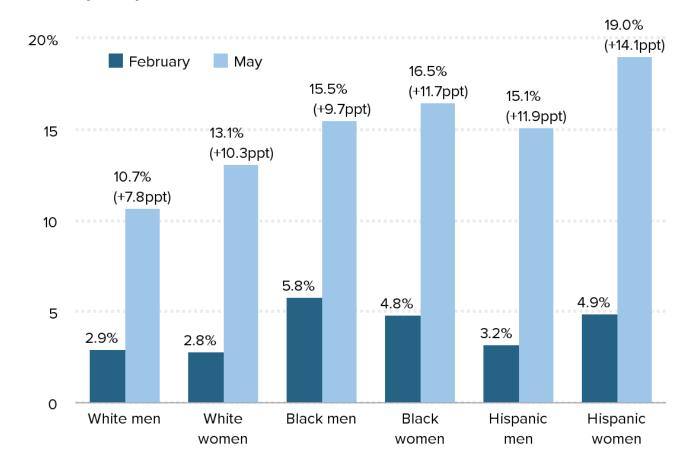


DISTRIBUTION OF WEALTH 2016

Source: Urban Institute calculations from Survey of Financial Characteristics of Consumers 1962 (December 31), Survey of Changes in Family Finances 1963, and Survey of Consumer Finances 1983–2016.

A more comprehensive look at skyrocketing unemployment rates

Unemployment rates for Black, Hispanic, and white workers, by gender, February–May 2020



Note: Workers, age 20 years and over.

Source: EPI analysis of Bureau of Labor Statistics (BLS) Household Data Tables A-2 and A-3.

Richest 1 percent bagged 82 percent of wealth created last year - poorest half of humanity got nothing

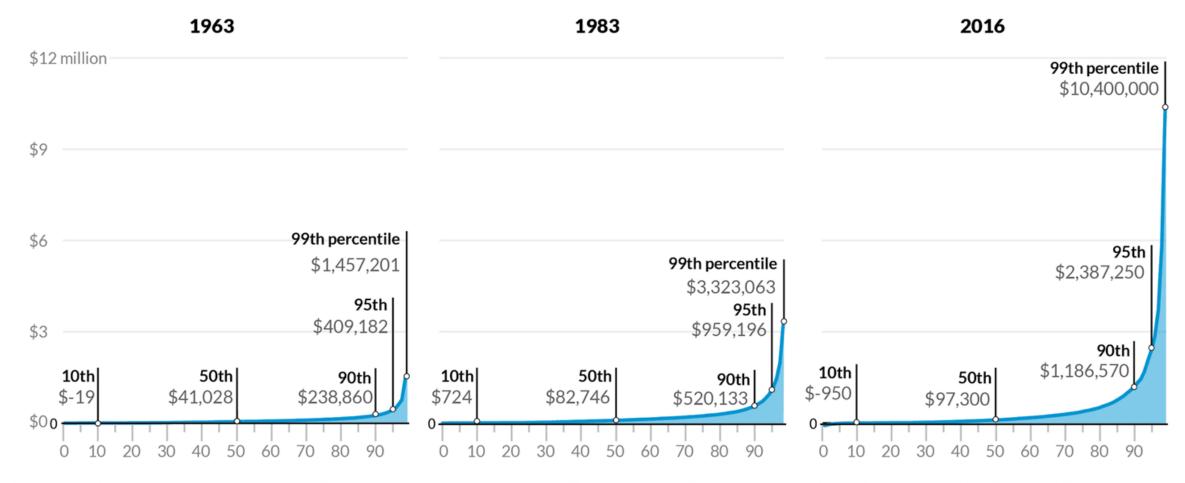
Published: 22 January 2018

Eighty two percent of the wealth generated last year went to the richest one percent of the global population, while the 3.7 billion people who make up the poorest half of the world saw no increase in their wealth, according to a new Oxfam report released today. The report is being launched as political and business elites gather for the World Economic Forum in Davos, Switzerland.

'Reward Work, Not Wealth' reveals how the global economy enables a wealthy elite to accumulate vast fortunes while hundreds of millions of people are struggling to survive on poverty pay.

Source: https://www.oxfam.org/en/pressroom/pressreleases/2018-01-22/richest-1-percent-bagged-82-percent-wealth-created-last-year

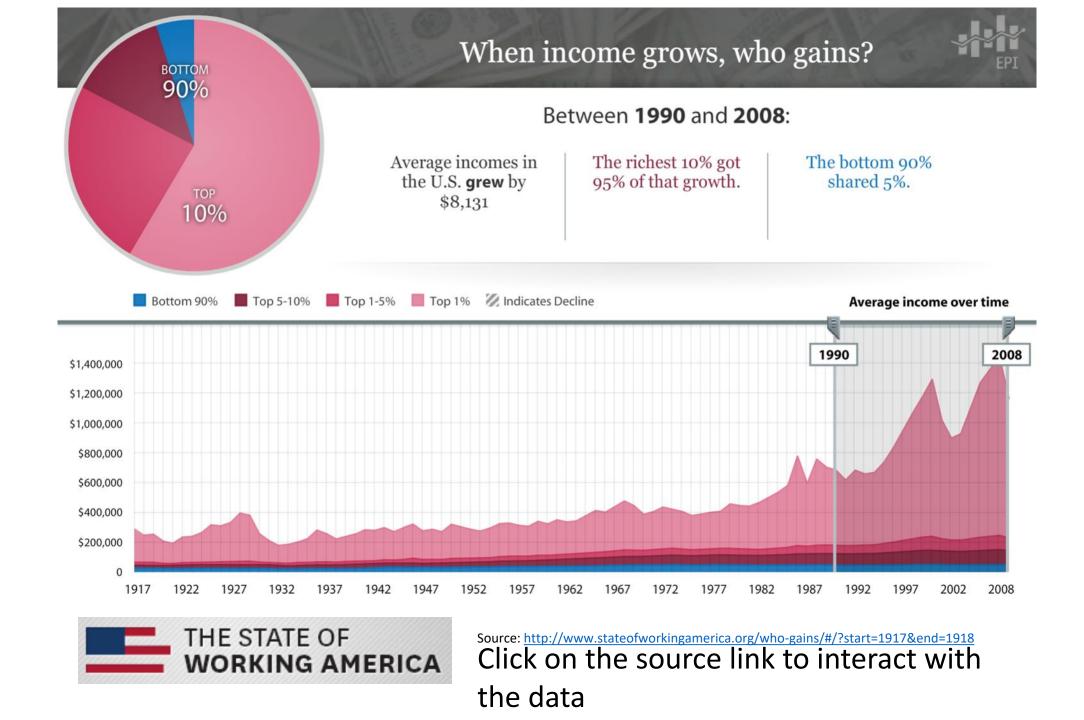
Distribution of Family Wealth, 1963-2016



Source: Urban Institute calculations from Survey of Financial Characteristics of Consumers 1962 (December 31), Survey of Changes in Family Finances 1963, and Survey of Consumer Finances 1983–2016.

Note: 2016 dollars.

URBAN INSTITUTE



JOSEPH E. STIGLITZ



Joseph E. Stiglitz, recipient of the Nobel Memorial Prize in Economic Sciences in 2001 and the John Bates Clark Medal in 1979, is University Professor at Columbia University, and Chief Economist of the Roosevelt Institute. His most recent book is The Euro: How a Common Currency Threatens the Future of Europe. Twitter: @JosephEStiglitz

Joseph Stiglitz Says Standard Economics Is Wrong. Inequality and Unearned Income Kills the Economy

The rules of the game can be changed to reverse inequality

http://evonomics.com/joseph-stiglitz-inequality-unearned-income/

Troublesome Realities

1. Job polarization and the hollowing out of the middle class









2. A three-decade declining labor share of total income

3. Increasing cost of living





4. Growing income and wealth concentration



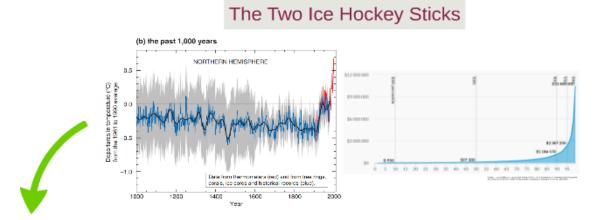


5. The economy has substantial unutilized productive capacity

They Are Connected

The problem is **not** the technological ability to produce more

The problem is to do so **profitably**, **equitably**, and **sustainably**

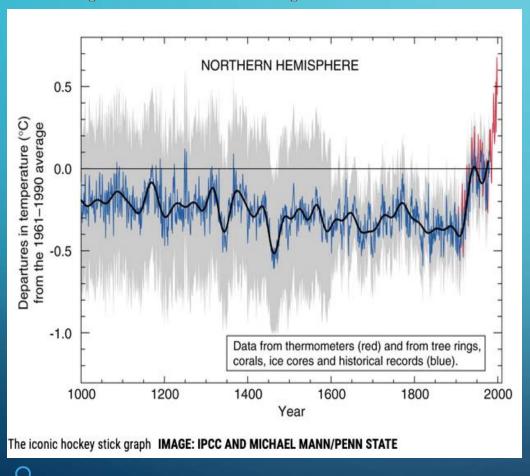


The currently discussed long-term solution to **sustainability** is **technological advance** (U.S. and EU perspective - is optimism justified?)

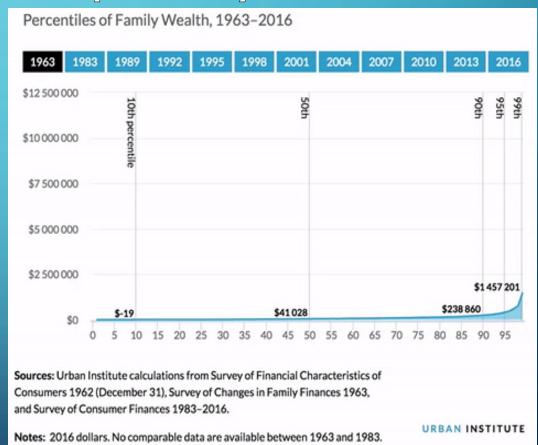
Technological advance can eliminate labor that contributes to **effective demand**

THE TWO HOCKEY STICKS

The past 1,000 years



The past 55 years



OF THE WAY GROWTH IS TAKING PLACE

- **Piketty (2014)** the main driver of inequality is the tendency of capital return in developed countries to exceed the rate of economic growth, which will cause wealth inequality to increase. [Also Atkinson for the UK]
 - Solution: Redistribution through a progressive tax on wealth
- **Stiglitz (2015)** misaligned laws, regulations, and institutions have determined unequal shares in the benefits of prosperity
 - Solution: Strengthen workers' rights, raise taxes on capital gains and dividends,
 and increase transparency in all financial markets
- **Eurofound (2017)** unemployment has been the main driver of growing inequalities during the Great Recession
 - Solution: The welfare state can prevent a greater increase in inequalities by cushioning growing market income inequalities

De [constructing] Growth

Aggregate growth in products and services that consume energy and materials

De-emphasize GDP and Productivity; Decouple physical growth from profit

Growth in profits (tied to subsidies, tax treatment of investment, profit, and the provision of producer and consumer credit)

Change the nature of subsidies, tax incentives, and credit practices;
Anti-monopoly

Growth in trade (externalizing commerce)

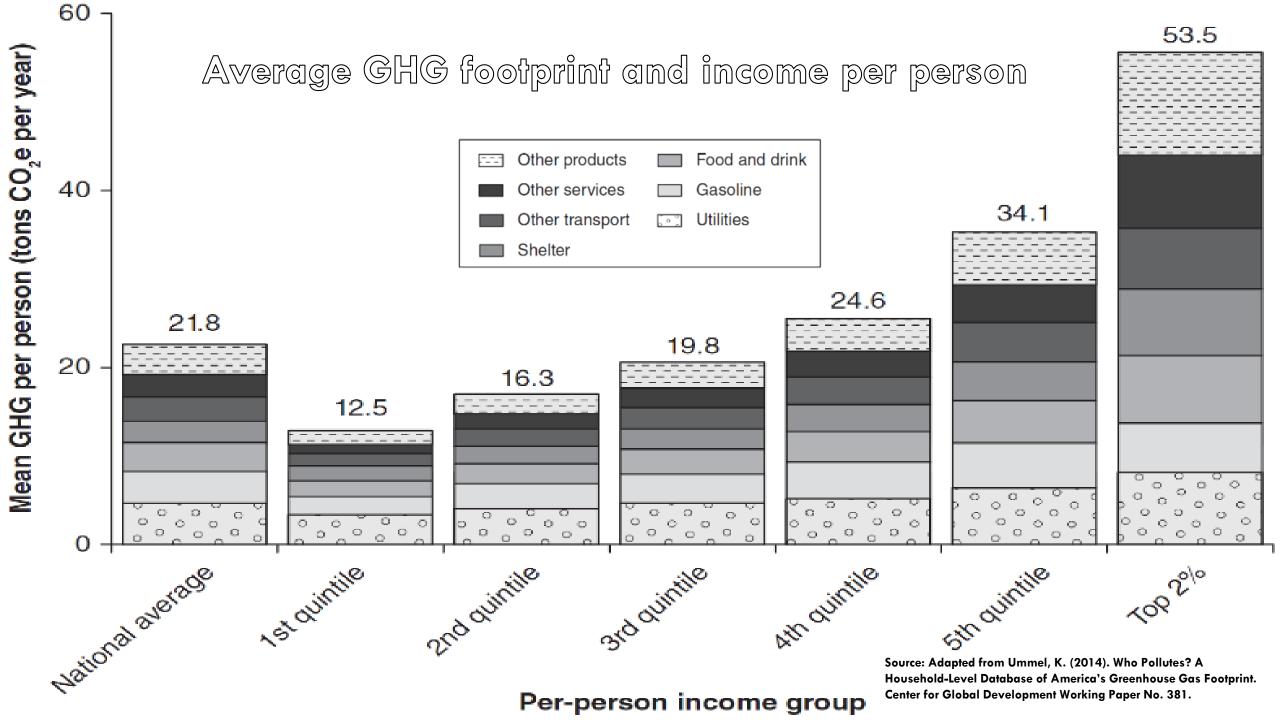
Changes in the trade rules: border adjustments and local investment

Growth in disparity in consumption, wealth, and income

Embody sufficiency in law; Tax and inheritance reform; Guaranteed income

Growth in under- and un-employment

Shorter workweek with maintenance of wage parity; Incentivize employment; Design work back into the production and service system



Is inequality an inevitable by-product of economic growth?

Will growing inequalities eventually hinder growth?

WHY IS GROWTH TAKING PLACE IN ITS CURRENT FORM?

Gilens (2005) "Inequality and Democratic Responsiveness." *Public Opinion Quarterly* 69(5): 778–796.

- Actual policy outcomes strongly reflect the preferences of the most affluent - there is "virtually no relationship" between policy outcomes and the preferences of poor or middle-income citizens
- Put differently, there is a vast discrepancy in government responsiveness to citizens with different levels of income
- The research revealed the negative effects of inequality on democracy and governance

NEW ECONOMICS

- 2008 financial crisis has created an opportunity to rethink models of economic development
- Emerging ideas under the 'new economics':
 - Selective growth
 - Conditioned growth

- Sustainable de-growth
- GDP de-growth
- Post growth
- A-growth
- Provision of a basic income (Goodwin; Brynjolfsson)
- Greening the Economy
- Sustainable Consumption

NEW ECONOMICS CONT'D

- Approaches focus on promoting environmentally and socially sustainable development through:
 - Dematerlization and energy efficiency
 - Decreased consumption of environmentally destructive products and services
 - Reductions in the workweek i.e., redistribution of work hours without a decline
 in income
 - Redistribution of wealth through income guarantees
 - Community-based, people-led services (rather than product-based services) i.e.,
 'people serving people'
- CRITICAL POINT: Need to ensure that labor is not shed or deskilled through the (green) innovation process



"By "degrowth", we understand a form of society and economy which aims at the well-being of all and sustains the natural basis of life. To achieve degrowth, we need a fundamental transformation of our lives and an extensive cultural change."

"The current economic and social paradigm is "faster, higher, further". It is built on and stimulates competition between all humans. This causes acceleration, stress and exclusion. Our economy destroys the natural basis of life. We are convinced that the common values of a degrowth society should be care, solidarity and cooperation. Humanity has to understand itself as part of the planetary ecological system. Only this way, a self-determined life in dignity for all can be made possible."

NEW ECONOMICS NEEDS: A BROADER VIEW

Five areas that require major reforms/efforts:

- 1. Finance
- 2. Trade
- 3. Energy
- 4. Population control
- 5. Developing countries

DE[CONSTRUCTING] GROWTH

- While cultural changes [i.e., demand] are needed, fundamental changes in law are indispensable to achieving degrowth and growth where it is needed
 - These changes include reforms to the financial system (credit, wealth and income) as well as control of monopoly (in products, energy, and media); environmental, health and safety regulation; the economic treatment of investment, profit, and labor; and trade rules
 - Change the reward structure for profit and investment

INTERESTING QUESTIONS

- If the system does not change, how large is growth likely to be in industrialized economies? In industrializing economies?
- Is degrowth as a deliberate strategy likely to be accepted?
- Is inclusive green growth the answer? A partial answer?
- How can we reconcile growth policies with energy policies, trade and finance reform, population and immigration strategies, and cultural changes?

GOVERNMENT IS ESSENTIAL

- As a collector of revenue and redistribution (tax and social-security)
- * As a supporter of basic education and skills acquisition
- As a provider of physical/legal infrastructure
- * To invest in path-breaking science and technology development for increased productiveness, environmental improvement, and job design & creation
- * As an facilitator or arbitrator of competing interests to ensure a fair process
- * As a trustee of worker and citizen interests to ensure a fair outcome in commerce (e.g., thru banking, labor protection, and trade regulation)
- * As a trustee of new technologies & dynamic change
- * Regulation (finance, antitrust, safety, health, environment, labor markets, and trade).
- * As a force to integrate, not just coordinate policies
- * To change the basis of development (degrowth; de-energize; dematerialize; increase earning capacity thru ownership).

FUNDAMENTAL QUESTIONS IN APPROACHING SUSTAINABLE TRANSFORMATIONS

What are the causes of unsustainable industrial systems?

What are the visions for a sustainable future? (open up the 'design space' to achieve multiple goods)

What or who is standing in the way of achieving that future? (open up the 'participatory and political space' for ensuring that all relevant voices have influence in the processes of change?

What are the carrots and sticks that need to be fashioned to achieve that future?

ALTERNATIVE WAYS OF INCREASING EARNING CAPACITY AND IMPROVING THE ENVIRONMENT

- income and wealth transfers to facilitate an equitable increase in disposable income
- changes in worker and citizen ownership of the means of production and supply of services
- changes in the supply of essential goods and services for more citizens
- changes in the demand for more sustainable goods and services desired by people
- stabilizing and securing employment and the workforce
- reducing the disproportionate power of corporations/the very wealthy on the market & politics
- government provision of essential goods/services: education, health care, housing, and food
- a reallocation of government spending between military operations and domestic social needs
- suspending or restructuring debt from emerging and developing countries

ALTERNATIVE WAYS OF INCREASING EARNING CAPACITY <u>AND</u> IMPROVING THE ENVIRONMENT

- income and wealth transfers to facilitate an equitable increase in disposable income
 - 👉 Increase the minimum wage
 - Progressive changes in personal income tax
 - Pay those doing unpaid work
 - Tax pollution and energy; reduce tax on labor
 - Keynesian spending (~ Green New Deal)
 - Tax corporations that shift production abroad and redistribute
- changes in worker and citizen ownership of the means of production and supply of services
 - Promote and Invest in B or Benefit Corporations
- changes in the supply of essential goods and services for more citizens
 - Encourage anchor institutions

ALTERNATIVE WAYS OF INCREASING EARNING CAPACITY AND IMPROVING THE ENVIRONMENT (CONTINUED)

- changes in the demand for more sustainable goods and services desired by people
 - Strengthen health, safety, and environmental regulation
- stabilizing and securing employment and the workforce
 - Discourage the elimination of jobs/supplement wages during downturns
 - Adopt a four-day workweek
 - Train Workers for the New Digital Economy
- reducing the disproportionate power of corporations/the very wealthy on the market & politics
- government provision of essential goods/services: education, health care, housing, and food
- a reallocation of government spending between military operations and domestic social needs
- suspending or restructuring debt from emerging and developing countries

POLICIES TO REDUCE IMPACTS FROM TRADE AGREEMENTS

 Use domestic policy to compensate (offset the losses to) negatively affected workers.

• Stop pursuing new trade agreements that protect returns to capital while undercutting wages

 Re-orient international policy away from regressive trade agreements and toward measures that will benefit workers in the U.S. and in other countries.