LABOR MARKET POLARIZATION

ECONOMIC SUMMIT
THE CHALLENGE: KEEPING UP
JUNE 17, 2014

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The opinions expressed are solely those of the presenter and do not reflect the opinions of the Federal Reserve Bank of Dallas or the Federal Reserve System.
What is Labor Market Polarization?
Inequality is increasing as income concentrates at the top of the distribution.

*Figure 1. The Top Decile Income Share in the United States, 1917–2007.*

*Notes:* Income is defined as market income including realized capital gains (excludes government transfers). In 2007, top decile includes all families with annual income above $109,600.

...but actually, wages are polarizing

Source: Autor (2010)
The Disappearance of Middle Class Jobs

Source: Autor and Dorn (2013)
The Disappearance of Middle Class Jobs

Employment share, percentage change 1980-2005

Source: Autor and Dorn (2013)
The Disappearance of Middle Class Jobs

Source: Autor and Dorn (2013)
The Disappearance of Middle Class Jobs

Source: Autor and Dorn (2013)
What are the causes?

- Declining unionization
  - Unions mostly in manufacturing and public sector
- Eroding real value of federal minimum wage
  - But declined in the 1980s and then stabilized
- Globalization/offshoring
- Technological change
- Slowdown in educational attainment
Causes: The Role of Technological Change

- “Skill-Biased Technological Change”
  - New technology is a complement for high-skilled workers and a substitute for middle-skilled workers

- Cost of technology such as microprocessors has plummeted
Which jobs have been automated already?

<table>
<thead>
<tr>
<th>Routine</th>
<th>Non-routine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production</td>
<td>Food service</td>
</tr>
<tr>
<td>Crafts</td>
<td>Personal care</td>
</tr>
<tr>
<td>Operative</td>
<td>Protective service</td>
</tr>
<tr>
<td>Repair</td>
<td></td>
</tr>
<tr>
<td>Clerical</td>
<td>Professional</td>
</tr>
<tr>
<td>Administrative</td>
<td>Technical</td>
</tr>
<tr>
<td>Sales</td>
<td>Managerial</td>
</tr>
</tbody>
</table>

Blue collar (manual)  
White collar (cognitive)  

**low-skill**  
**middle-skill**  
**high-skill**
Which jobs have been automated already?

- **High-skill jobs: complementary to technology**
  - Abstract tasks: problem solving, intuition, persuasion
  - College education

- **Middle-skill jobs: substitute for technology**
  - Routine tasks: follow precise, well-understood procedures, can be carried out by computer
  - High-school +

- **Low-skill jobs: blue-collar non-routine**
  - Manual tasks: situational adaptability, visual/language recognition, in-person interaction
  - Tasks that computers cannot as yet perform
  - High school or less
Which jobs have been automated already?

% change in employment share

Source: Jaimovich and Siu (2012)
Which jobs have been automated already?

% change in employment share

Source: Jaimovich and Siu (2012)
Which jobs have been automated already?

% change in employment share

13% ↑ 17%
58% ↓ 44%
29% ↑ 39%

Source: Jaimovich and Siu (2012)
Which jobs have been automated already?

% change in employment share

Routine Jobs!

Non-routine Manual
13% ↑ 17%

Routine
58% ↓ 44%

Non-routine Cognitive
29% ↑ 39%

Source: Jaimovich and Siu (2012)
When were the jobs lost?

Source: Jaimovich and Siu (2012)
Which jobs are most at risk?

Source: Frey and Osborne (2013)
Which jobs are most at risk?

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Probability</th>
<th>Occupation</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recreational Therapists</td>
<td>0.0028</td>
<td>Economists</td>
<td>0.43</td>
</tr>
<tr>
<td>Oral Surgeons</td>
<td>0.0036</td>
<td>Personal Financial Advisors</td>
<td>0.58</td>
</tr>
<tr>
<td>Computer Systems Analysts</td>
<td>0.0065</td>
<td>Social Science Research Assistants</td>
<td>0.65</td>
</tr>
<tr>
<td>Secondary School Teachers</td>
<td>0.0078</td>
<td>Janitors and Cleaners</td>
<td>0.66</td>
</tr>
<tr>
<td>Mechanical Engineers</td>
<td>0.011</td>
<td>Bus Drivers</td>
<td>0.67</td>
</tr>
<tr>
<td>Chief Executives</td>
<td>0.015</td>
<td>Food Preparation Workers</td>
<td>0.87</td>
</tr>
<tr>
<td>Financial Analysts</td>
<td>0.23</td>
<td>Loan Interviewers and Clerks</td>
<td>0.92</td>
</tr>
<tr>
<td>Medical Assistants</td>
<td>0.3</td>
<td>Telemarketers</td>
<td>0.99</td>
</tr>
</tbody>
</table>
Causes: Globalization

- Exposure to import competition causes unemployment in local labor markets
  - Manufacturing, non-college educated workers
  - Routine tasks are also more affected by globalization
- Areas with a large share of routine task intensive occupations have polarized within each sector
Routine Employment Share in the U.S.

Source: Autor, Dorn and Hanson (2013)
The role of education: are we losing the race between education & technology?

Source: Autor (2010)
Review of National Polarization

- Labor market has been polarizing for 25+ years
- Extraordinary technological change has led to the automation of middle-paying jobs
  - Large swath of current employment vulnerable to further automation
- Routine jobs most vulnerable to automation
- Premium for college education has risen as expansion in the supply of skilled workers has slowed
How has Texas fared?

- Texas has been a leader in job creation, especially since the Great Recession.
- Texas gets an especially large amount of criticism for creating mainly low-paying, low-skilled jobs.
- “If you want a bad job, go to Texas”
## Larger share of low-paying jobs

<table>
<thead>
<tr>
<th>State</th>
<th>% At or Below Min Wage</th>
<th>State</th>
<th>% At or Below Min Wage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Idaho</td>
<td>7.7</td>
<td>Connecticut</td>
<td>2.7</td>
</tr>
<tr>
<td><strong>Texas</strong></td>
<td><strong>7.5</strong></td>
<td>Vermont</td>
<td>2.7</td>
</tr>
<tr>
<td>Oklahoma</td>
<td>7.2</td>
<td>Washington</td>
<td>1.7</td>
</tr>
<tr>
<td>Louisiana</td>
<td>7.1</td>
<td>Montana</td>
<td>1.5</td>
</tr>
<tr>
<td>Arkansas</td>
<td>6.9</td>
<td>California</td>
<td>1.4</td>
</tr>
<tr>
<td>Virginia</td>
<td>6.8</td>
<td>Oregon</td>
<td>1.1</td>
</tr>
<tr>
<td>Georgia</td>
<td>6.4</td>
<td>Alaska</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>NATIONAL AVERAGE:</strong> 4.7</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
…but strong growth across the wage distribution

Job Growth by Wage Quartile 2000-2013

Percent Change in Employment

- Lowest Wage Quartile
- Lower-Middle Wage Quartile
- Upper-Middle Wage Quartile
- Highest Wage Quartile

This pattern persists over a longer time period.

Change in Employment by Wage Quartile 1979-2011

NOTE: Calculations include workers over age 15 with positive wages. Quartiles based on 1980 decennial census, which refers to 1979 wages.
…but Texas is polarizing, too

Change in Employment Share by Wage Quartile 1979-2011

NOTE: Calculations include workers over age 15 with positive wages. Quartiles based on 1980 decennial census, which refers to 1979 wages.
Recession has boosted low-wage job growth relative to high-wage

Change in Employment Share by Quartile 1979-2006

NOTE: Calculations include workers over age 15 with positive wages. Quartiles based on 1980 decennial census, which refers to 1979 wages.
Review: Job Growth in Texas

- Texas has experienced above-average employment growth, especially in the last decade, for a variety of reasons
  - Energy, demographics, abundance of land, light tax/regulatory burden
- But the Texas labor market is also polarizing in the long run, for similar reasons
- The recession has likely exacerbated these trends
Has this happened before?

Source: Brynjolfsson and McAfee, 2014.
Some argue that technological change is bending the curve of human development again.

- In the long-term, we benefit from improved quality of life and new occupations are created.
- In Brynjolfsson and McAfee’s work, the issue is the “bounty” versus the “spread.”
Summer Reading on Polarization

Claudia Goldin & Lawrence F. Katz

The Race Between Education and Technology

Erik Brynjolfsson
Andrew McAfee

The Second Machine Age
Work, Progress, and Prosperity in a Time of Brilliant Technologies

Thomas Piketty

Capital in the Twenty-First Century

Translated by Arthur Goldhammer
THANKS!
## Wage Quartiles and Employment Growth

<table>
<thead>
<tr>
<th>Wage Quartile</th>
<th>Cutoffs (r.2013$)</th>
<th>Change in Employment (thous) 2000-2013</th>
<th>Texas</th>
<th>Rest of U.S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowest</td>
<td>&lt; 11.42</td>
<td>627.9</td>
<td>2,329.6</td>
<td></td>
</tr>
<tr>
<td>Lower-Middle</td>
<td>11.42-16.92</td>
<td>298.2</td>
<td>-731.4</td>
<td></td>
</tr>
<tr>
<td>Upper-Middle</td>
<td>16.93-26.04</td>
<td>512.7</td>
<td>11.4</td>
<td></td>
</tr>
<tr>
<td>Highest</td>
<td>&gt;26.04</td>
<td>618.3</td>
<td>3,398.5</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>-</td>
<td>2,057.1</td>
<td>5,008.2</td>
<td></td>
</tr>
<tr>
<td>Total % Change</td>
<td>-</td>
<td>24.9</td>
<td>4.7</td>
<td></td>
</tr>
</tbody>
</table>