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# The Future: Jobless Growth

Andy Stern – Senior Fellow Richman Center

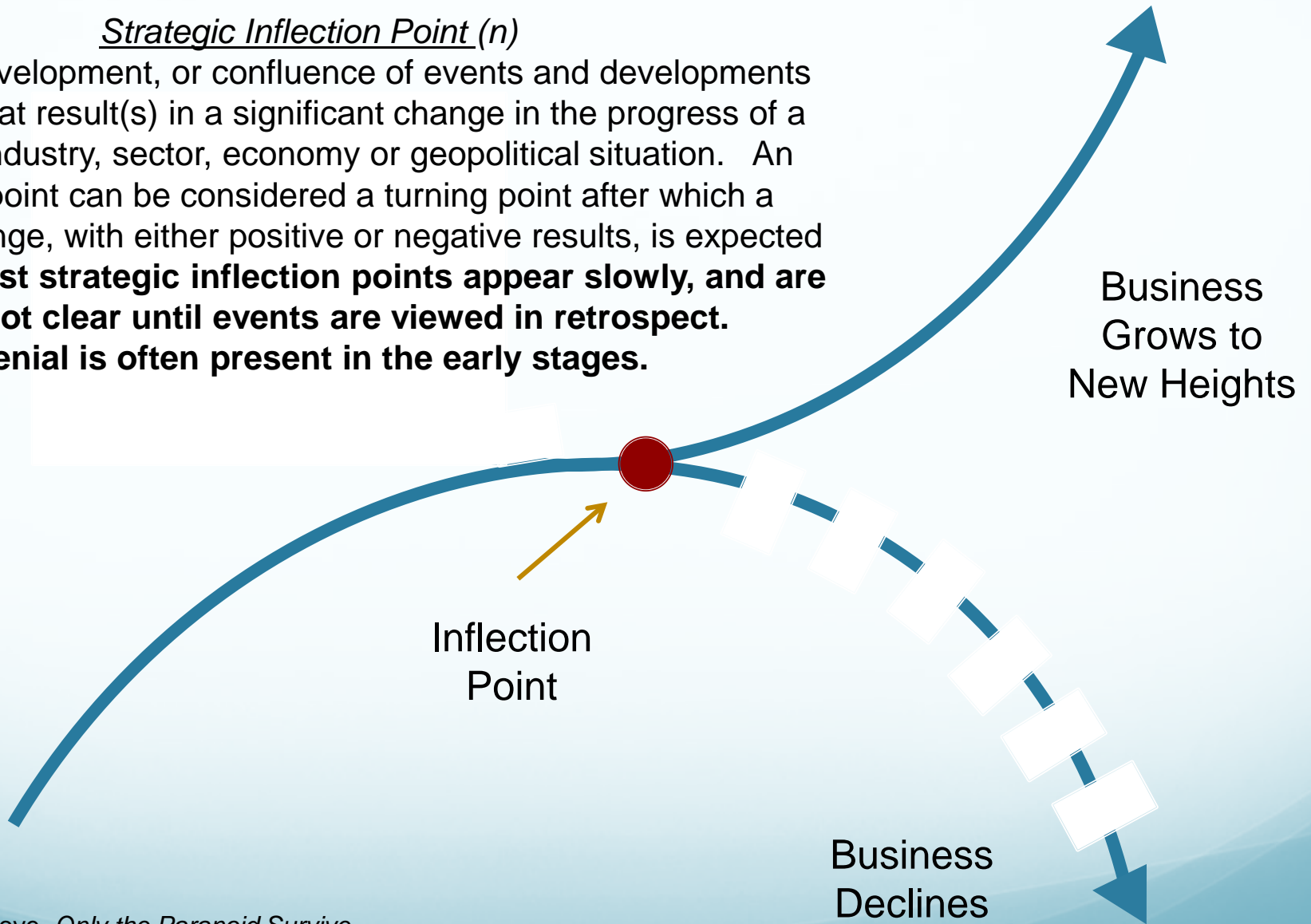
# Machines – Lothar & The Hand People

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# Strategic Inflection Point

## Strategic Inflection Point (n)

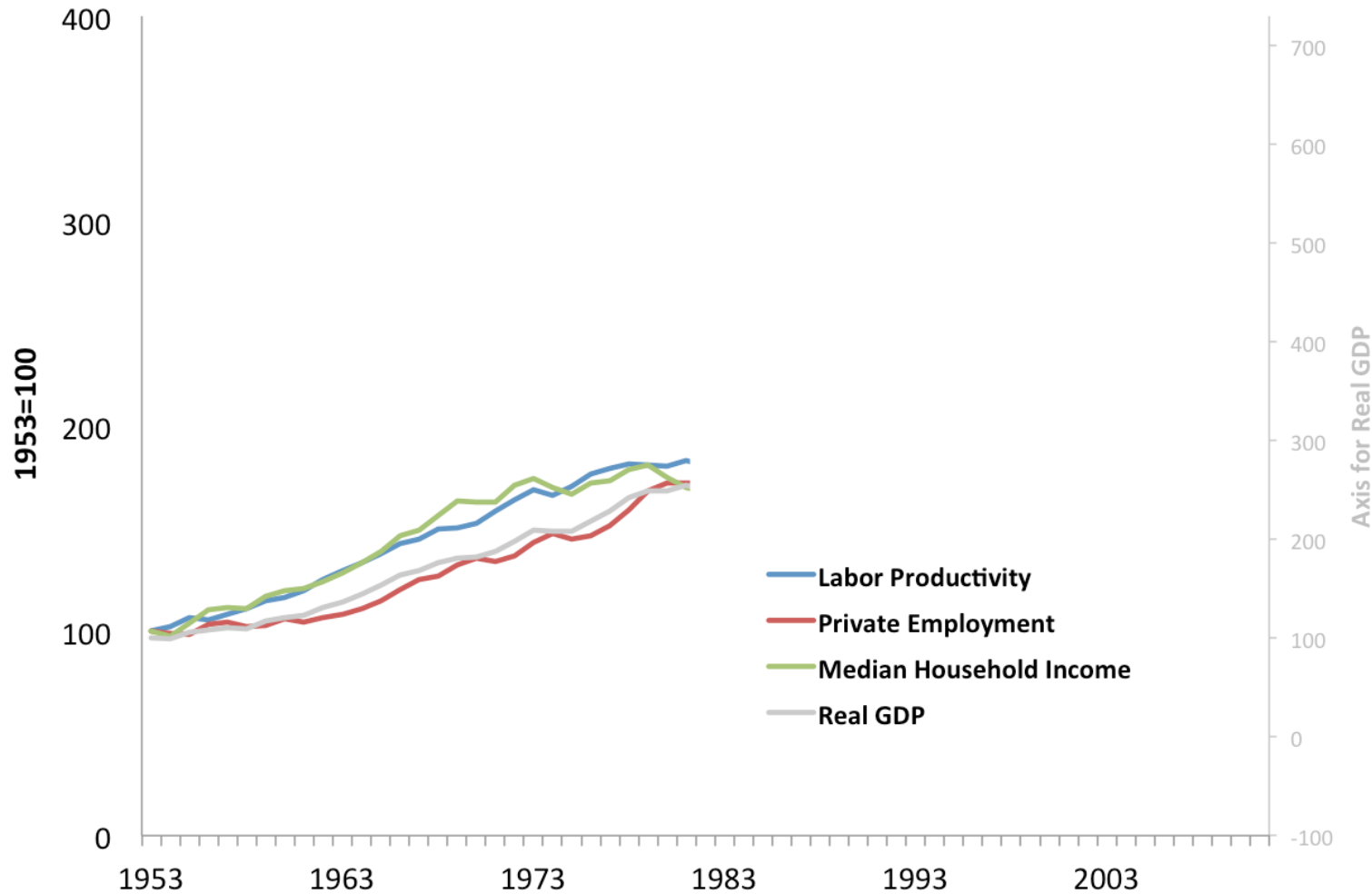
An event, development, or confluence of events and developments over time, that result(s) in a significant change in the progress of a company, industry, sector, economy or geopolitical situation. An inflection point can be considered a turning point after which a dramatic change, with either positive or negative results, is expected to result. **Most strategic inflection points appear slowly, and are often not clear until events are viewed in retrospect. Denial is often present in the early stages.**



Source: A. Grove, *Only the Paranoid Survive*

# Growth & Productivity- Good Old-Fashioned Job Creation

US Productivity, GDP, Employment, and Income: 1953-1981

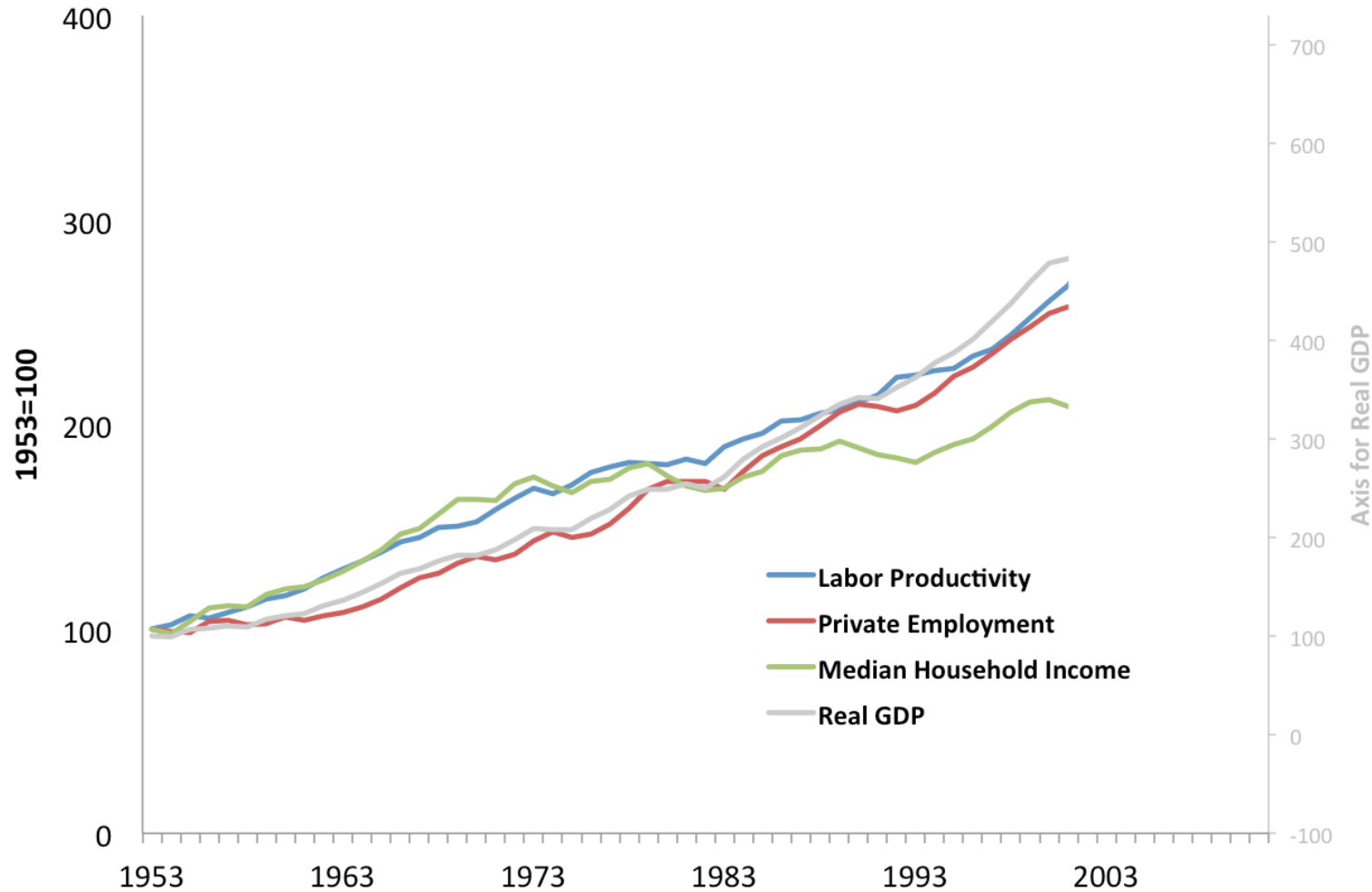


© 2012 Andrew McAfee (@amcafee)

Sources: Census Bureau, Bureau of Labor Statistics

# Growth & Productivity- Good Old-Fashioned Job Creation

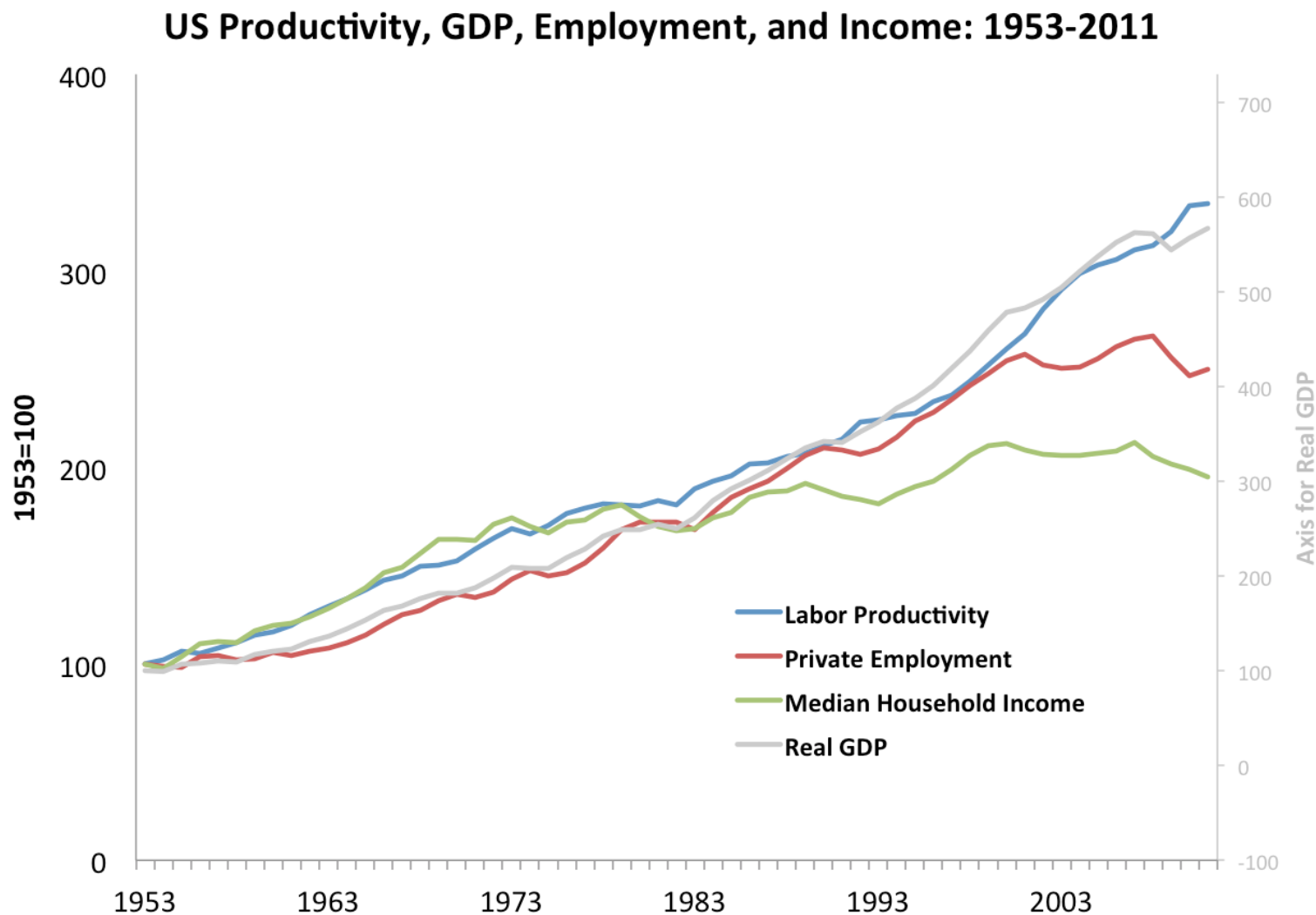
US Productivity, GDP, Employment, and Income: 1953-2001



© 2012 Andrew McAfee (@amcafee)

Sources: Census Bureau, Bureau of Labor Statistics

# Growth & Productivity- Good Old-Fashioned Job Creation

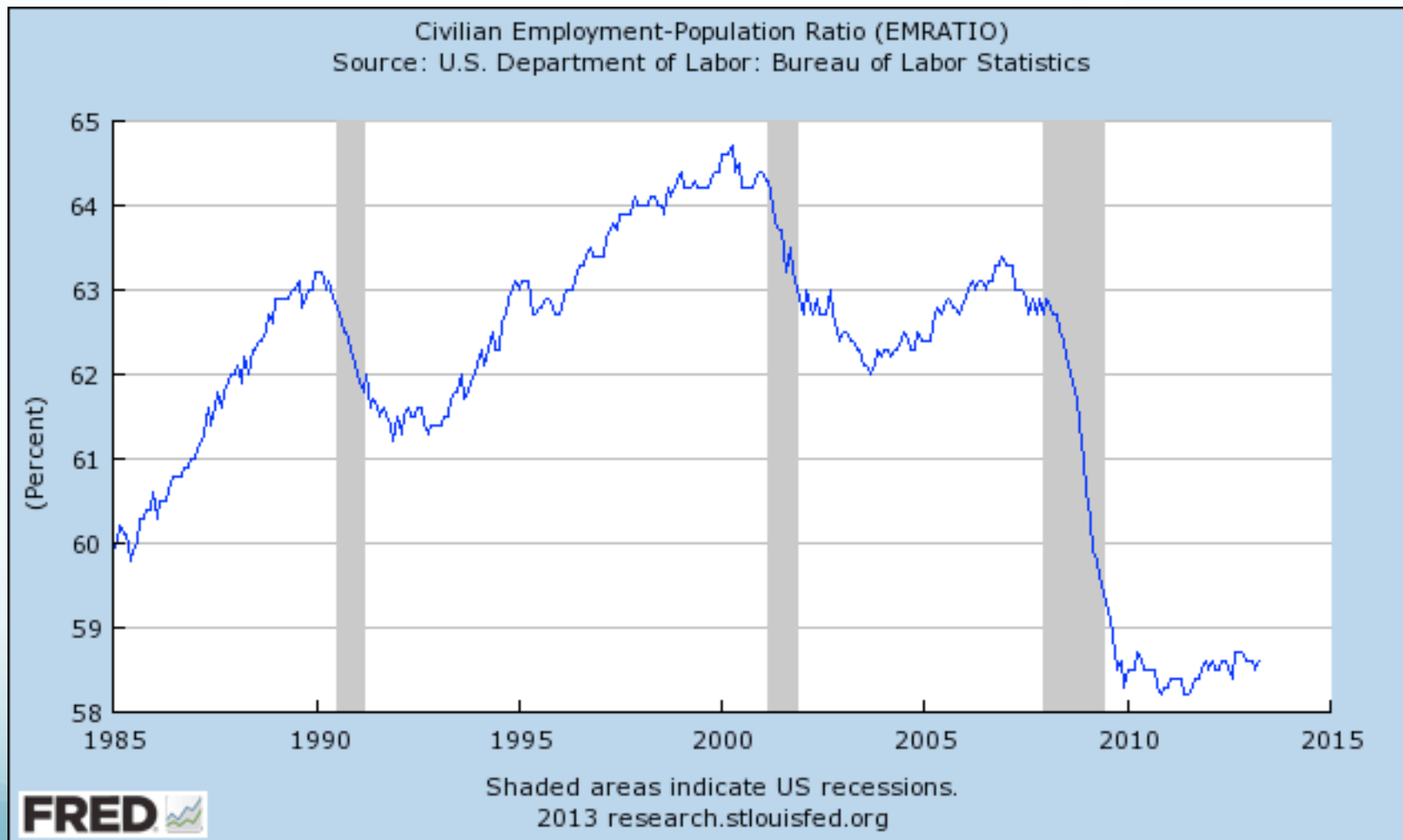


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Sources: Census Bureau, Bureau of Labor Statistics

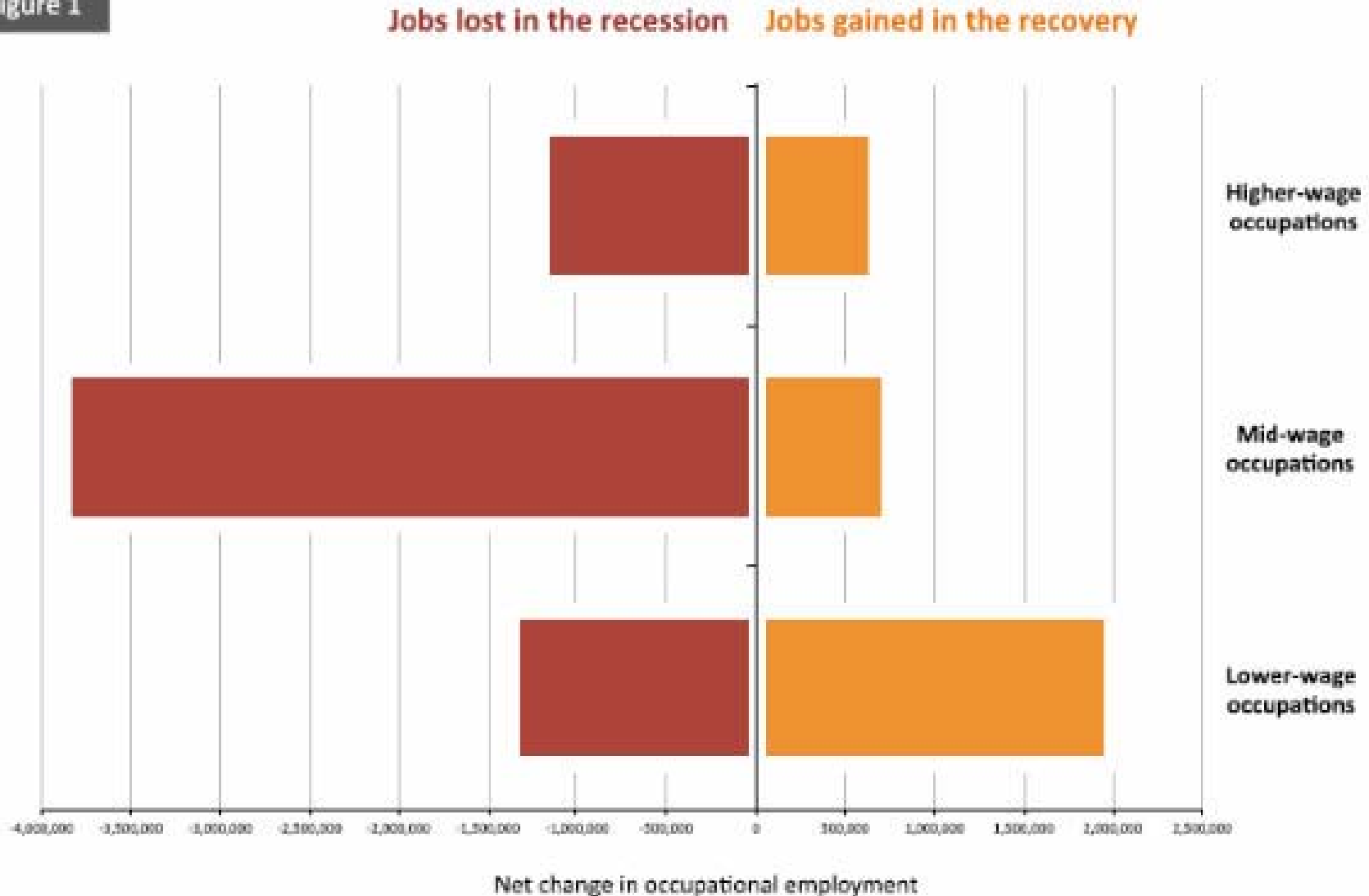
# Fewer Americans Working

## Prime Working Age Adults Are Giving Up on Work



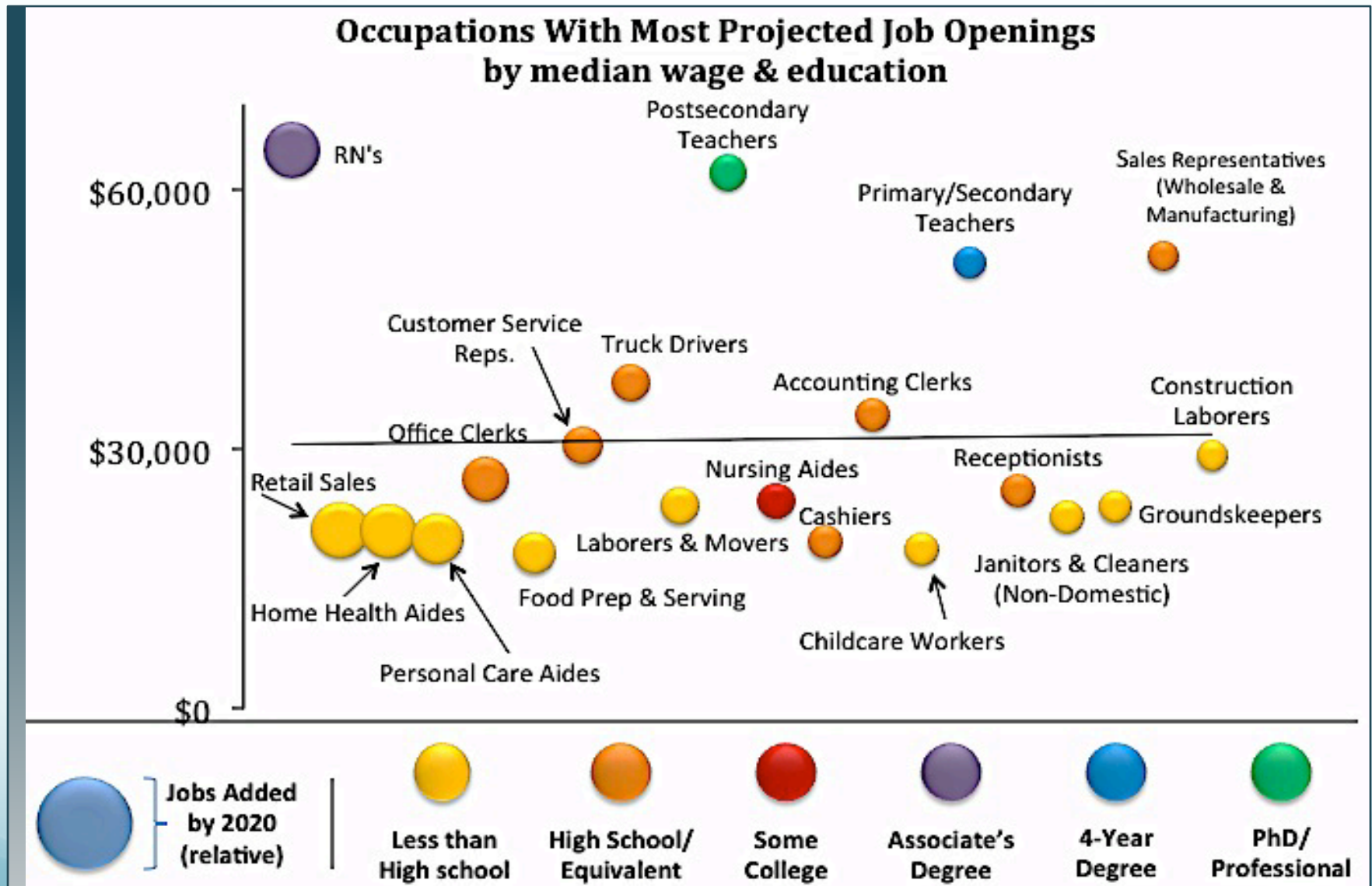
# The Low-Wage Recession and Recovery – Today

Figure 1





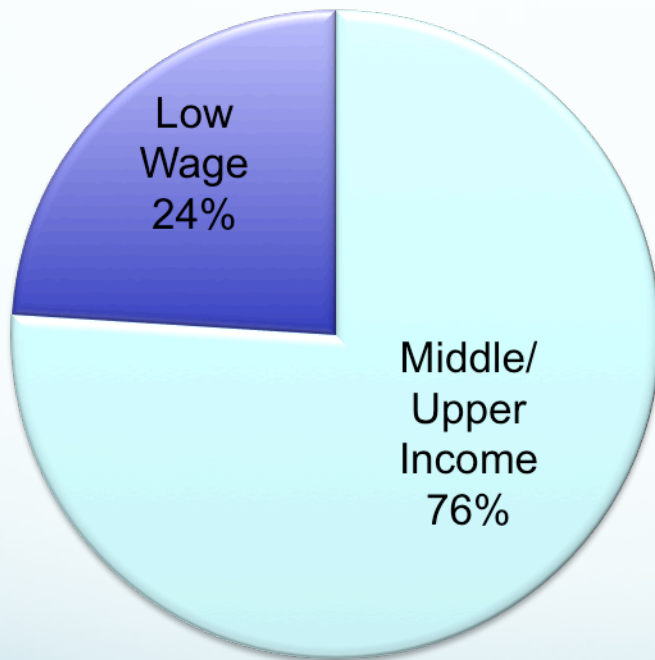
# The Low-Wage Future By Growth Occupations



Source: BLS

# The Low Wage Future - Tomorrow

**Workers Employed in  
Low Wage Jobs  
2009**



**Workers Employed in  
Low Wage Jobs 2020  
(projected)**



# Factors?

- Labor Globalization
- Technological Change
- Decline of Unions
- Depreciating Value of Minimum Wage
- Privatization Trends
- Lowering Individual Tax Rates
- Deregulation of Industry
- Increasing Business Concentration

# Is This The Turning Point?

- **There Are Not Enough Jobs for Everyone**
- Development of technologies is happening at a more rapid pace and at a larger scale than any previous advances. (Moore's Law)
- Virtually every sector of the economy impacted which inherently limits scale of job creation from new businesses.
- There is no economic law that says technology must create as many or more jobs than it destroys.
- Not just a manufacturing story. Service sector jobs are the next target of automation.
- Real impact will be felt 20 to 40 years in the future

# Is This The Turning Point?

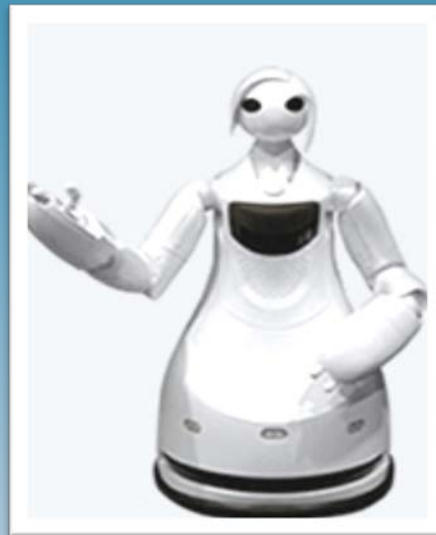
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Andrew McAfee – Associate Director and Principal Research Scientist at MIT Center for Digital Business  
Bo Cutter – Senior Fellow and Director of the Next American Economy Project at the Roosevelt Institute

# The Robots Are Coming

*“Smart machines now collect our highway tolls, check us out at stores, take our blood pressure, massage our backs, give us directions, answer our phones, print our documents, transmit our messages, rock our babies, read our books, turn on our lights, shine our shoes, guard our homes, fly our planes, write our wills, teach our children, kill our enemies, and the list goes on.”*

**-Jeffrey Sachs and Laurence Kotlikoff**





# 3D Printing – The Future of Workerless Manufacturing

The  
Economist

Schumpeter  
Business and management

## Additive manufacturing Print me a jet engine

Nov 22nd 2012, 12:54 by P.M.

CONFIRMATION as to how seriously some companies are taking additive manufacturing, popularly known as 3D printing, came on November 20th when GE Aviation, part of the world's biggest manufacturing group, bought a privately owned company called Morris Technologies. This is a small precision-engineering firm employing 130 people in suburban Cincinnati, Ohio. Morris Technologies has invested heavily in 3D printing equipment and will be printing bits for a new range of jet engines. Morris Technologies has a number of 3D printing machines, all of which work by using a digital description to build it in physical form, layer by layer. Among the 3D printing technologies Morris Technologies is laser sintering. This involves spreading a thin layer of powder onto a build platform and then fusing the material with a laser beam. The process is repeated until an object emerges. Laser sintering is capable of producing all kinds of parts, including components made from aerospace-grade titanium.



## Bloomberg

### Your Future Will Be Manufactured on a 3-D Printer

By the Editors - May 12, 2013

Would you like to build your own gun? There are plenty of ways to do so, legal and [otherwise](#). Last week, a group called Defense Distributed offered you a new one: It published instructions for creating a plastic firearm using a 3-D printer. One guy even fired a real bullet with it.

## Bloomberg

### 3-D Printing: the Ultimate Intellectual-Property Threat?

By the Editors - May 15, 2013

## Bloomberg

### How 3-D Printing Could Disrupt the Economy of the Future

By the Editors - May 14, 2013

# Watson – Diagnosing Disease

## Meet Your Robot Oncologist

By Matthew Yglesias

Posted Friday, May 17, 2013, at 4:50 PM

A blog about business and economics.



IBM's Watson is displayed at a press conference before the "Man V. Machine" Jeopardy! competition at the IBM T.J. Watson Research Center on Jan. 13, 2011, in Yorktown Heights, N.Y. Photo by Ben Hider/Getty Images

carpenter to work in the Ikea warehouse. The whole point of this is to combine the oncological knowledge of a medical doctor and then people who





# The Future: Not a Matter of Chance But Choice

“We are being afflicted by a new disease which some readers may not have heard the name, but of which they will hear a great deal in the years to come-namely, ***technological unemployment***... In our own lifetimes we may be able to perform all the operations of agricultural, mining, and manufacture with a quarter of the human effort to which we have come accustomed.”

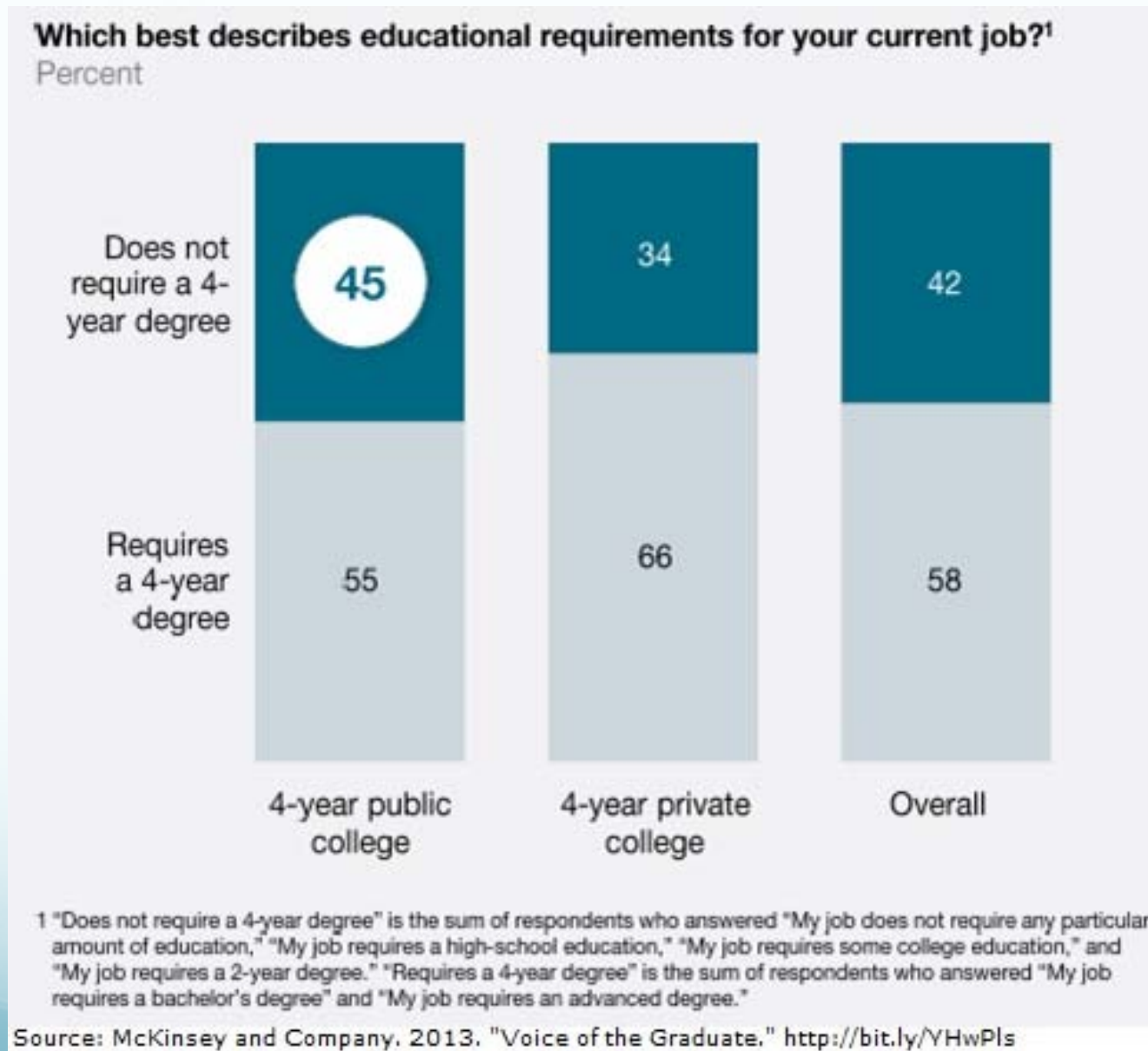
-JM Keynes 1930

# Same Old Solutions Won't Work

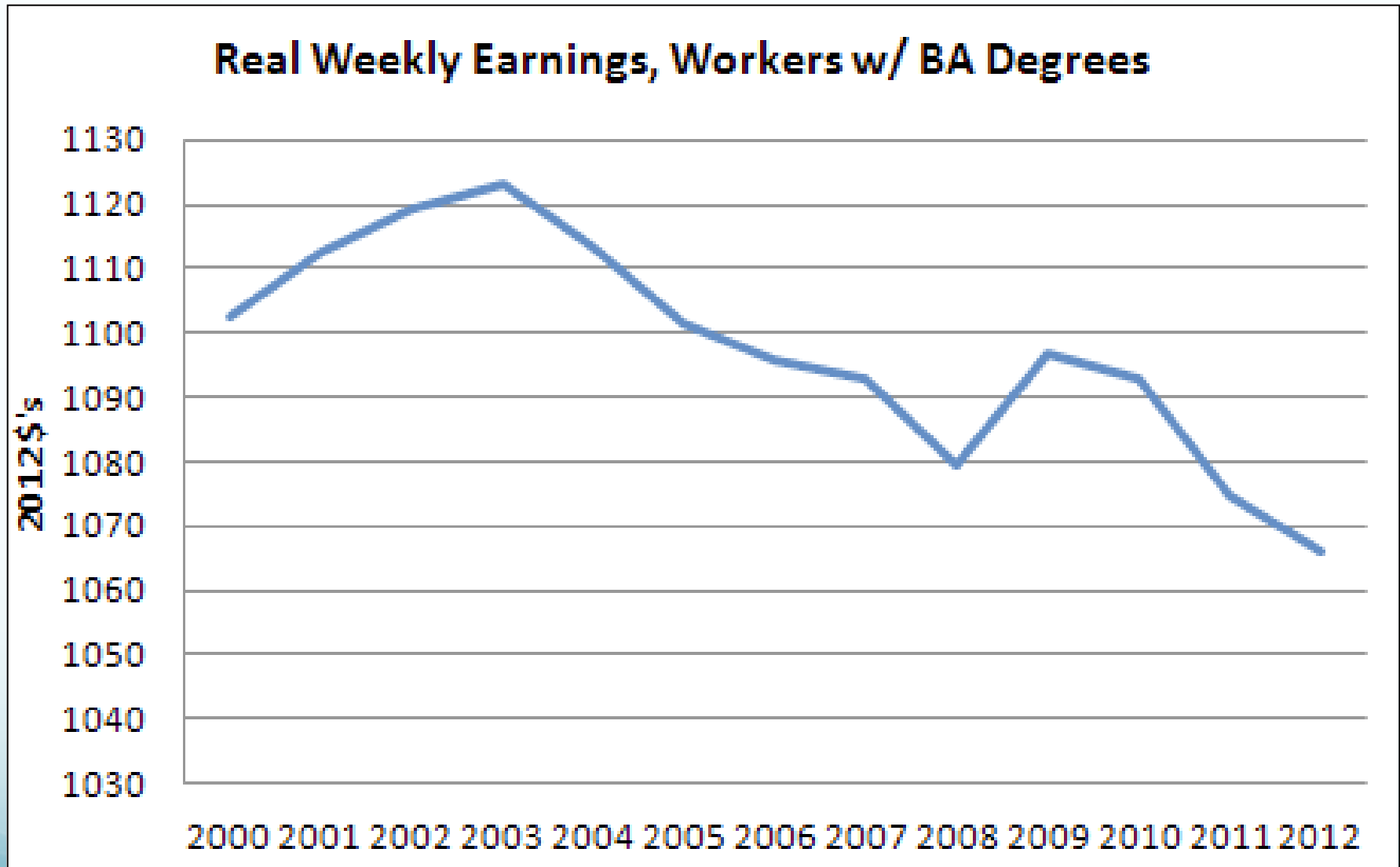
“The trite response to this reality is to call for more education and better training for workers, and more investments in research and development as well as infrastructure. It’s true that all such actions would help. **But they take time, and even then they would probably only take some of the edge off the decline, not fundamentally reverse it.**”

-Peter Orszag

# Education - 53% of Recent College Grads Are Un- or Underemployed



# Same Old Solutions Won't Work - Education



Source: Jared Bernstein and BLS Data

# Same Old Solutions Won't Work - Innovation



Apple + Facebook + Google + amazon.com = 200,000 U.S. Based Jobs

- IT and Technology Inherently limit the scale of job growth
- Technology allows for leaner operations and growth

# Same Old Solutions Won't Work - Stimulus

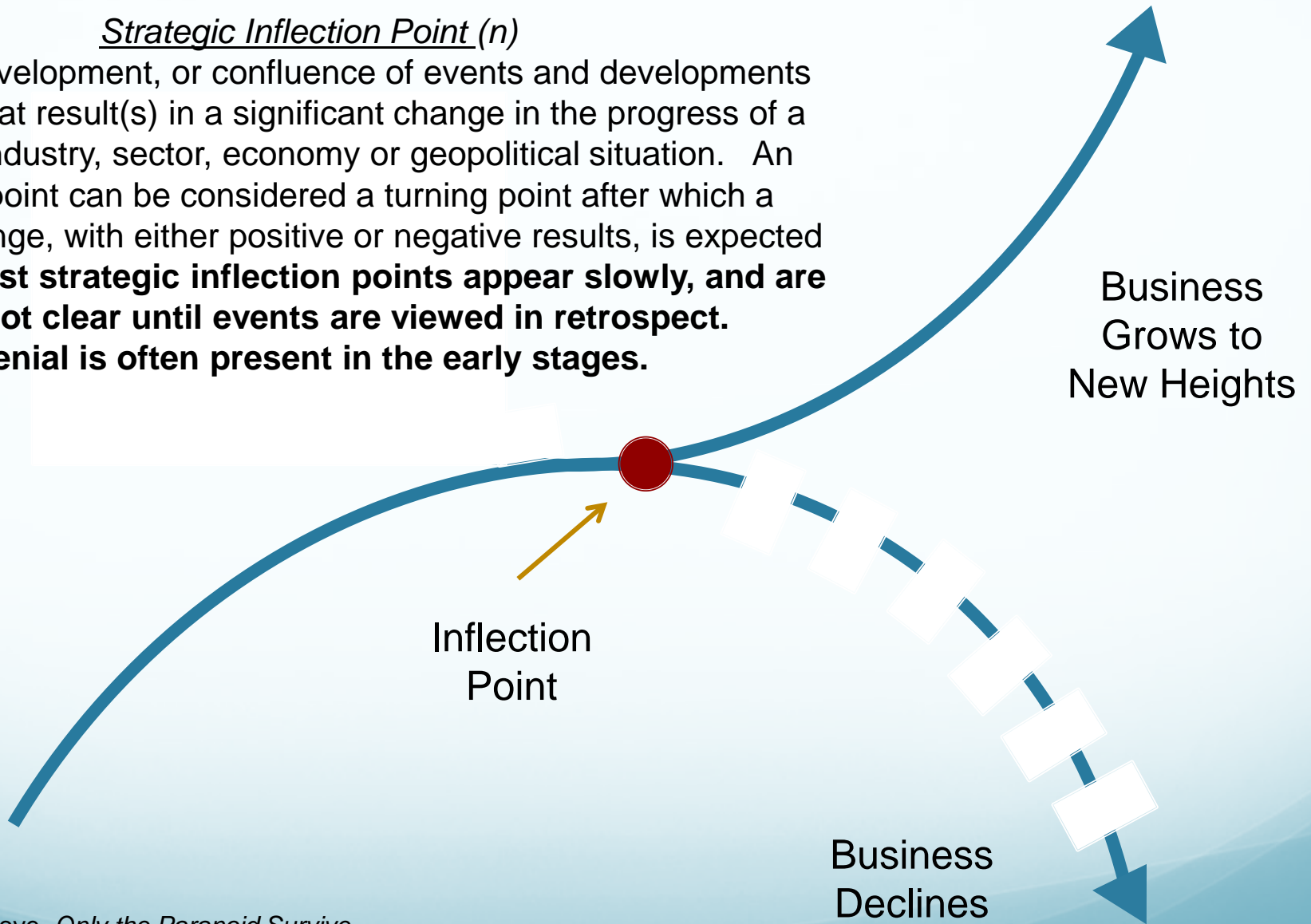
- Short-term stimulus makes sense
  - Raise demand and eliminate demand-related unemployment
  - Get valuable public works projects completed
- BUT WON'T SOLVE STRUCTURAL ISSUES
- Should we think about a new, more permanent role for stimulus?



# Strategic Inflection Point

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Source: A. Grove, *Only the Paranoid Survive*

# The Future: Not a Matter of Chance But Choice

“For the first time since his creation man will be faced with his real, his permanent problem—how to use his freedom from pressing economic cares, how to occupy the leisure, which science and compound interest will have won for him, to live wisely and agreeably and well.”

-JM Keynes 1930



# Potential Responses To Technological Unemployment

- Denial – The Luddite Fallacy Lives
  - Tech unemployment CAN'T happen
  - Creative Destruction will ultimately create jobs
- Same Old Solutions– Education, innovation and stimulus
  - Try and win the race against the machines by investing in education
  - Educate people to program machines
- Libertarian – Get the government out of the way
  - The market will signal to people what they must do to get by
- Overinvest in Technology To Speed Change
  - Tech will solve everything once we actually get to the singularity. Policy won't matter that much.
  - Problems will only happen in the time from now to when we have fully automated society with everything at our finger tips. Let's get there FAST!

# Potential Responses To Technological Unemployment

- Redistribution based on a new definition of work and/or citizenship
  - Direct government jobs creation
  - Based on people doing “work” that promotes themselves as a good citizen
- Universal Basic Income
  - Purposefully dis-incentivize a portion of work by offering a reasonable standard of living for those who don’t work
  - Eliminate all other safety net programs and create a deregulated, hyper-competitive job market
- Data ownership society
  - Build an infrastructure to track and monitor usage of data and provide micropayments from companies to individuals for usage of “their” data
- Decentralization
  - Technology allows everyone to be self-sufficient within a small area
  - Death of Consumerism

# A Question to Leave With

- What future economic activity or industry can we expect to offer large scale job creation? In other words, what are the future jobs that will require hundreds of thousands of people to accomplish?

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