

Institute for
New Economic Thinking

Capitalism in an Age of Robots

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Potential to automate by sector

% of time automatable with current technology



Source: US Bureau of Labor Statistics McKinsey Global Institute Analysis

The standard paradigm

Starting Point



Technical progress

New position

50 farmers produce 100 units of food

50 workers produce 100 units of cars, washing machines, televisions, etc.

Measured total economy productivity doubles

Endlessly repeatable progress?

50 farmers produce
100 units of food

50 factory workers
produce 100
manufactured goods



Further
technical
progress

- 25 farmers producing 100 food
- 50 factory workers producing 200 cars, washing machines, televisions
- 15 factory workers producing 60 units of computers, mobile phones and software applications
- 10 service workers producing 40 units of healthcare



400 units of value –
productivity doubled again

The Baumol Effect

100 farmers produce
100 units of food

Technical
progress

50 farmers produce 100 units of food

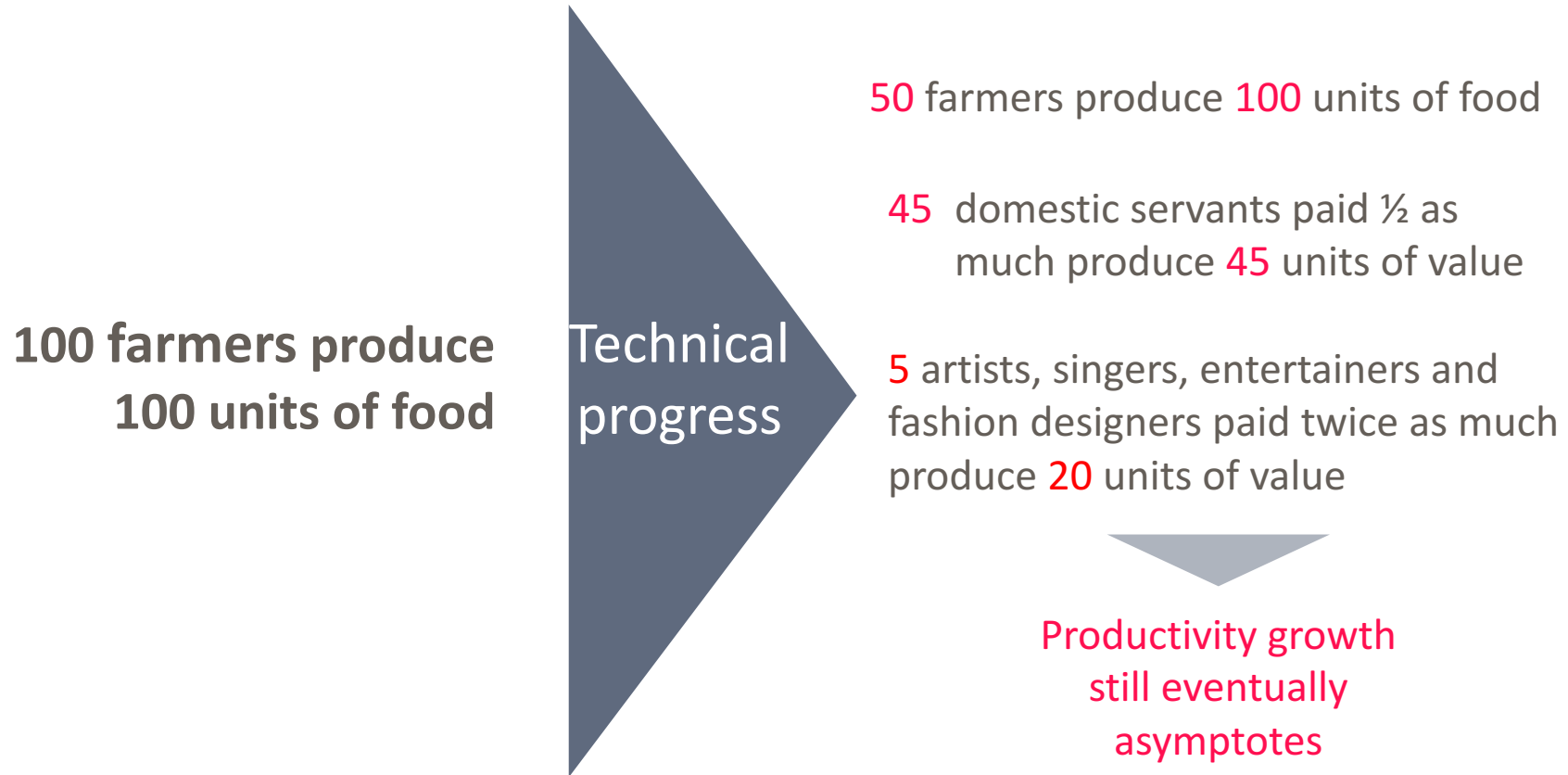
50 domestic servants paid $\frac{1}{2}$ as much
produce 50 units of value

- Agricultural productivity doubles
- Total economy productivity increased 50%
- The actual pattern in the first Agricultural Revolution?

Asymptotic rather than endlessly repeatable progress



The Baumol Effect with high paid artists



Determinants of intensity of Baumol effect

- Automation potential in newly emerging economic activities
- Impact of productivity increase on income distribution
 - in part determined by asset ownership
- Consumption choices of winners from initial productivity increase

Twenty first century technology London



The Hi-Tech Hi-Touch Paradox

The more rapidly technological progress enables automation of existing activities...

...the more hi-touch jobs grow in activities which at least for now cannot be automated, or where wages are low enough to make automation uneconomic

Zero-sum activities in the simple model

100 farmers produce
100 units of food


Technical
progress



50 farmers produce 100 food

25 criminals

25 police paid same as farmers

- 
- Total measured productivity increases 25%
 - But no human welfare benefit of increased consumption

Zero-sum activities in the modern economy



- Cyber criminals and large number of high skilled cyber experts within companies



- Bad selling practices, financial regulators, compliance officers and compensation lawyers



- All legal services?



- Much financial trading and complex financial innovation



- Servicing the purchase and sale of existing real estate



- Some educational services – zero-sum job market signalling competition?



- Politics, elections, lobby groups, think-tanks... and even academic economists!

Automation and the zero-sum Paradox

Rapid technological progress could eventually automate away almost all the activities which are truly essential for human welfare

... while supporting increased intensity of zero-sum competition for relative income and status

... so that zero sum activities account for an increasing % of employment and measured output over time

Baumol type and zero-sum activities: **finding things to do**

➤ Keynes: “Economic Possibilities for our Grandchildren” (1929)

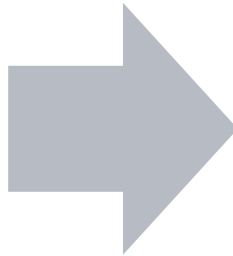
- 15 hour work week “a hundred years hence”

➤ Hypothesis for advanced economies

- If people had a higher leisure preference
- And if the distribution of income enabled everyone to enjoy a good standard of living with 15 hour work
- We would produce the vast majority of all goods and services essential for our “standard of living” with far fewer work hours... and a much higher productivity growth rate
- But we “find things to do” because of
 - i. Status consideration and positional goods
 - ii. Individual adequate minimum income requirements
 - iii. Work as social activity

Underestimated productivity and real income growth?

- New drugs
- Mobile phones and tablets
- Streamed films and music
- Computer games
- Social networks



Rapid productivity improvement

Falling prices and increasing quality

Inadequately captured in measures of real GDP and thus productivity growth

“The result is that the increase in real incomes is underestimated, and that the common concern about what appears to be the low growth of average household incomes is misplaced” [since] “these low growth estimates fail to reflect the innovations in everything from healthcare to internet services to video entertainment which have made life better during these years”

Martin Feldstein,
The US Underestimates Growth
(Wall Street Journal, 18 May 2015)

A caveat on the Feldstein analysis:

Two separate questions

1

Do low productivity growth estimates fail to reflect super rapid productivity growth, falling prices, increasing quality and innovation in specific products and entertainment?



Almost certainly yes – and perhaps by quite a large amount

2

Does this mean that human welfare improvement has been understated?



Certainly if health improvements undervalued

But not so clear that “always on” mobile devices and ever better computer games “made life better during these years”?

The end point: 2100 – Does *The Economy* even exist?

- Economics is about allocation of scarce resources in consumption and production



If robots do all the work, is there scarcity?

- Hypothesis: income measures of GDP will be dominated by
 - Real property ownership values and rents
 - Intellectual property rents
 - Substantive brand values and rents
 - The very high incomes of very small number of people skilled or lucky in IT, subjective value creation, or zero-sum competition

This income distribution will determine the distribution of consumption of scarce positional or status goods

New issues for economics

Neo-classical focus

Increasing productivity in
a two-factor (L+K)
competitive model

Required future focus

- Real property, rents and urban geography (back to a three-factor model)
- Environmental and congestion externalities
- Intellectual property rents, network externalities and returns to monopoly
- Debt, positional goods, financial instability and inequality
- Development challenges: job creation: new structural economics?
- Income distribution; UBI?; public good provision

The long-term challenge

“ Thus 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 him, to live wisely and agreeably and well ”

John Maynard Keynes
Economic Possibilities for our Grandchildren
(1930)