

# Industrial Revolution and Modern Economic Growth

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# The Industrial Revolution Era, 1750-1870

- “Two heads are better than one” theories
- “Eye of the needle” theories
  - People leading the progress were good...
  - People leading the progress were bad...
- Technological progress rapid enough that some people get rich enough to start to pass over the hump of the demographic transition
  - But the fertility decline follows the mortality decline: population momentum
- The great industrial-era technologies:

## In the Shadow of Malthus

Year	Population (Millions)	GDP per Capita (\$2015)	Total World GDP (\$2015 Billions)
-8000	5	\$750	\$4
-1000	50	\$750	\$38
0	170	\$750	\$128
1500	500	\$750	\$375
1800	750	\$1000	\$750
1900	1500	\$2000	\$3000
2000	6200	\$7700	\$47740
2015	7400	\$10000	\$74000

# Industrial Revolution

- Then at the end of the eighteenth century comes the Industrial Revolution
- First in the British Midlands...
- Then spreading: Belgium, New England, Northern France, Ruhr, Silesia...
- Just another series of inventions, but lucky enough that coal-steam-rails-cotton had a high elasticity of demand?
- Or a game-changer?



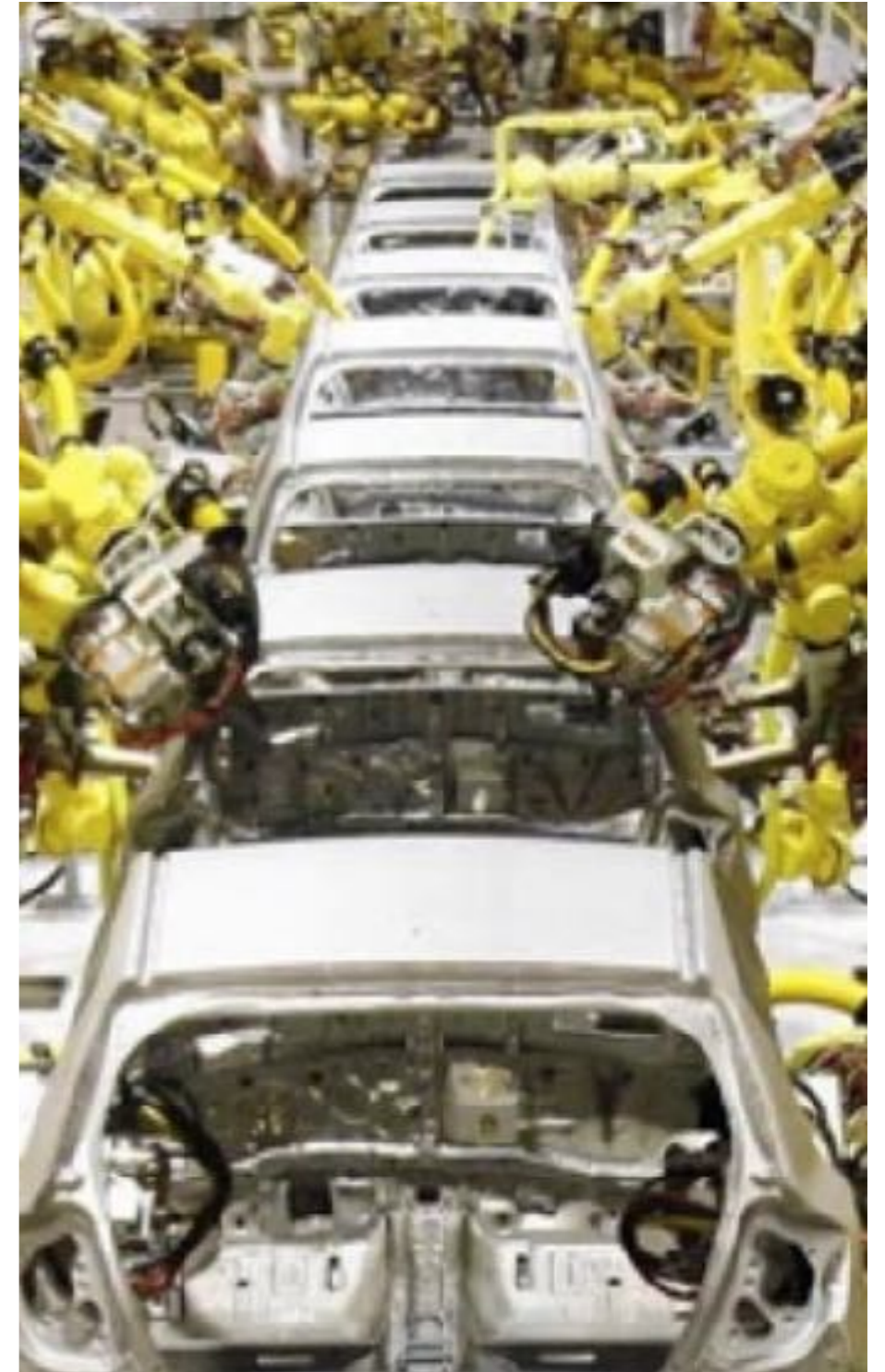
# Modern Economic Growth

- Then in the late nineteenth century: the Second Industrial Revolution
- The transition to Modern Economic Growth
- Population explosion followed by demographic transition
- 2%/year productivity growth in the industrial core...
- Catch-up or not catch-up elsewhere...
- The origins of large scale international economic inequality
- The role of migration and trade



# Sources of Growth

- Technological advance
  - New goods and new types of goods
  - Making old goods more cheaply and efficiently
  - Ideas as the ultimate non-rival (and barely excludible) commodities
  - How to manage intellectual property?
- Investment
  - In physical capital
  - In human capital
- Governance
- Resources
  - Resource discoveries
  - Resource exhaustion
- Externalities



# Why Escape? Why Modern Economic Growth?

## In the Shadow of Malthus

- Five important prerequisites:
  - Resources
  - Science
  - Technology
  - A market economy
  - Profits to be made from productive innovation
- Nurturing its continuation—and noting its fragility—perhaps the most important goal, and the most important lesson
- And here we get into astronomy and the Fermi paradox

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# Astronomy and the Fermi Paradox: The Great Filter

- What happens next?
- Finally, since 1970 some signs of global catch-up
- Robert Gordon's predictions of greatly slowed growth
- Where are our flying cars?
- Extrapolating growth
- The Fermi Paradox



# Catch Our Breath...

- Comments?
- Questions?

