

**2024-01-23 Tu: Spring 2024: Econ 115 ::**

## **II. Pre-Modern Societies: Breaking Through:**

**Imperial-Commercial, Gunpowder-  
Empire, and Towards Steampower  
Society: 1500 to 1920**

# 2024-01-23 Tu: Spring 2024: Econ 115 :: II. Pre-Modern Societies: Breaking Through: Imperial-Commercial, Gunpowder-Empire, and Towards Steampower Society: 1500 to 1920

## Last Lecture Lessons:

1. agrarian age of low economic growth
2. Also agrarian-age society very unequal—a society of domination...
3. They look really smart—and really ingenious...



# 2024-01-23 Tu: Spring 2024: Econ 115 :: II. Pre-Modern Societies: Breaking Through: Imperial-Commercial, Gunpowder-Empire, and Towards Steampower Society: 1500 to 1920

## Last Lecture Lessons:

1. Looking at the globe from the discovery of agriculture to 1500 (and, in much of the world, much later)
2. Hinge of history in 1870
3. Transition from 1500 to 1870
4. Slow growth of technology before 1500: Figure 6% per century
5. Malthusian demographic pressures induce dire poverty for the masses
6. Only way to get *enough* for yourself and your family is to join the élite domination-and-exploitation by force-and-fraud gang
7. Yet civilizational accomplishments were mighty—and intra-élite politics, sociology, and economics very interesting
8. Not static: efflorescences and dark ages
9. But they do not lead to any form of escape

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1. Worldwide, the world goes from 6% per century of technology growth before 1500 to  $\frac{1}{3}\%$  per year over 1770-1870
2. This is not nearly enough to break the ensorcellment of humanity by the Devil of Malthus
3. But it is, definitely, a start
4. There is also *some* improvement in typical-human standards of living, as the population explosion lags productivity a bit
5. There are also powerful and important changes in organization and the forms of élite domination: commercial-gunpowder is not feudal or classical agrarian; and steampower is even more different
6. Why the two triplings *ca.* 1500 and 1770?
7. Why not China?



# READING: This Week: Wymman, Engels, Lee

- **Wyman, Patrick.** 2021. *The Verge: Reformation, Renaissance, and Forty Years that Shook the World*. New York: Twelve <<https://www.amazon.com/Verge-Reformation-Renaissance-Forty-Years-ebook/dp/B08P1MF813>>, Intro., ch. 3, & Conc.;
- **Engels, Friedrich.** 1880. *Socialism: Utopian and Scientific*. Paris <<https://archive.org/details/socialism-utopian-and-scientific-friedrich-engels>>, pp. 37-8,
- **Lee, Ronald.** 2003. “The Demographic Transition: Three Centuries of Fundamental Change.” *Journal of Economic Perspectives* 17 (4): 167–190 <<https://www.aeaweb.org/articles?id=10.1257/089533003772034943>>

1. **Wyman:** The Dover Circle and the regions immediately surrounding it were still a backwater in 1500—but a backwater capable of much more than typical in the way of mobilizing resources for purposes...
2. But it was not that the “West” had a “market economy”—China had long had a market economy starting with the Sung, and Southeast Asia, India, the Middle East, and indeed the Classical Mediterranean had had large market segments...
3. Consider Isabella of Castile. How did her reign exemplify the changing nature of political power and governance in Europe at the time?
4. Consider the role of Jakob Fugger and the rise of banking in shaping early modern European economics. How did banking and finance contribute to the economic, political, and military events of the era?
5. What was the Great Divergence? How did the convergence of exploration, state expansion, warfare, printing, and finance contribute?

1. **Engels:** Agrarian-age society taught people they had duties and obligations given by God and history to stay in their place; commercial-gunpowder society taught people that they were individuals who had to find their own place by taking action as individuals with resources by building networks of contract and exchange; steampower society would teach people... what?
2. How does Engels define 'Utopian Socialism'? What are the limitations that Engels sees in Utopian Socialism?
3. What in the Holy Name of the One Who Is does Engels mean by “dialectics”?
4. How does Engels describe the evolution and impact of “capitalism”?
5. What “contradictions” within capitalism does Engels highlight? Why does he believe that they will soon be fatal for the system?
6. How did the introduction of steam power and new tool-making machinery transform the manufacturing process, according to Engels?
7. What were the broader social implications of this transformation?
8. How does Engels contrast the 'social anarchy' of production under capitalism with the 'social regulation' he envisions in a socialist society, particularly in the context of steam-powered production?

# Pre-1500 Things Change with Glacial Slowness...

Date	Technological Ideas-Stock Growth Rate $h$	Technological Ideas Stock Level $H$ (1870 = 1)	Average Annual Real Income per Capita $y$	Total Human Population $P$ (millions)	Total Real World Income $Y$ (billions)
-48000	0.002%	0.011	\$1,200	0.2	\$0.24
-8000	0.003%	0.036	\$1,200	2	\$2.4
-6000	0.009%	0.043	\$900	5	\$4.5
-3000	0.018%	0.074	\$900	15	\$14
-1000	0.030%	0.136	\$900	50	\$45
150	0.060%	0.272	\$900	200	\$180
800	0.014%	0.297	\$900	240	\$216
1500	0.052%	0.429	\$900	500	\$450



# The Ice Breaking...

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1500	0.052%	0.429	\$900	500	\$450
1770	0.149%	0.643	\$1,100	750	\$825
1870	0.442%	1.000	\$1,300	1300	\$1,690
2010	2.159%	20.557	\$11,600	6900	\$80,040

- Worldwide, a tripling of technology growth as we cross 1500 ( $\frac{1}{3}$  the emergence of a special tinkering-entrepreneurial culture in the Dover Circle,  $\frac{1}{3}$  the Columbian Exchange, &  $\frac{1}{3}$  globalization proper?)
- Worldwide, another tripling of technology growth as we cross 1770 ( $\frac{1}{3}$  the emergence of a special industrial-engineering culture in the Dover Circle,  $\frac{1}{3}$  the ingathering of global manufacturing, &  $\frac{1}{3}$  glacial bulldozers to extract coal easily?)
- Not enough to break the ensorcellment of the Devil of Malthus

# Background & Review: Malthusian Agrarian-Age Near Stagnation

## Levels

- Neolithic Revolution impoverishment, -8000 to -6000
- An largely-empty world:
  - Where we have 1000 people today,
  - we had 63 in 1500;
  - we had 6 in -1000,
  - we had 1 in -6000
- A desperately-poor world: \$2.50/day; 60% of consumption is your 2000 calories/day plus essential nutrients
  - Short, unhealthy, unintelligent?

## Growth rates

- In spite of massive incentives to have children, your typical couple has only 2.04 children survive to reproduce
- Ideas growth averaging 3%/century

# Slowness of Technological Advance

**Pre-1800: significant over time, but agonizingly slow:**

- No stirrups until 250 in China, 800 in Europe;
  - horse collar only in 750
  - “The Greeks and Romans also lacked windmills...Yorkshire, England, in 1185...
  - Buttons... Germany, 1230s...
  - Spinning wheels (France, by 1268),
  - Mechanical clocks (England, 1283),
  - Spectacles (Italy, 1285), f
  - Firearms (Spain, 1331),
  - Movable-type printing (Germany, 1453)...”
- “Preindustrial societies differed from each other in every conceivable way socially and institutionally...”
- “Yet... all... had one thing in common: the production technology improved very slowly... [with] periods of regression...”
- Many societies had good-enough institutions to provide incentives



# Western Europe Technologically? Nothing Special in 1500...

## A very few sectors with an edge:

- Precision metalwork (printing, mechanisms, clocks)
- Caravels
- Gunpowder weapons
- Many more, both technological and organizational, in which it was equal or even behind
- Vastly behind in human organization:
  - vs. India on the verge of the Mogul—Gurkhani—Empire...
  - vs. Ming China...
  - vs. Islam—both on the eastern and the western edge of the *ekumene*...





# Western European View of Elsewhere:

## Consensus View:

- People orderly & prosperous
- Merchants and princes fabulously rich
- From the 1300s Catalan Map (from right)
  - Mansa Musa of Mali
  - Sultan of Egypt
  - King of Delhi
  - Kublai Khan (of Mongol Empire)
  - Alexander the Great recruiting Satan to imprison Gog and Magog

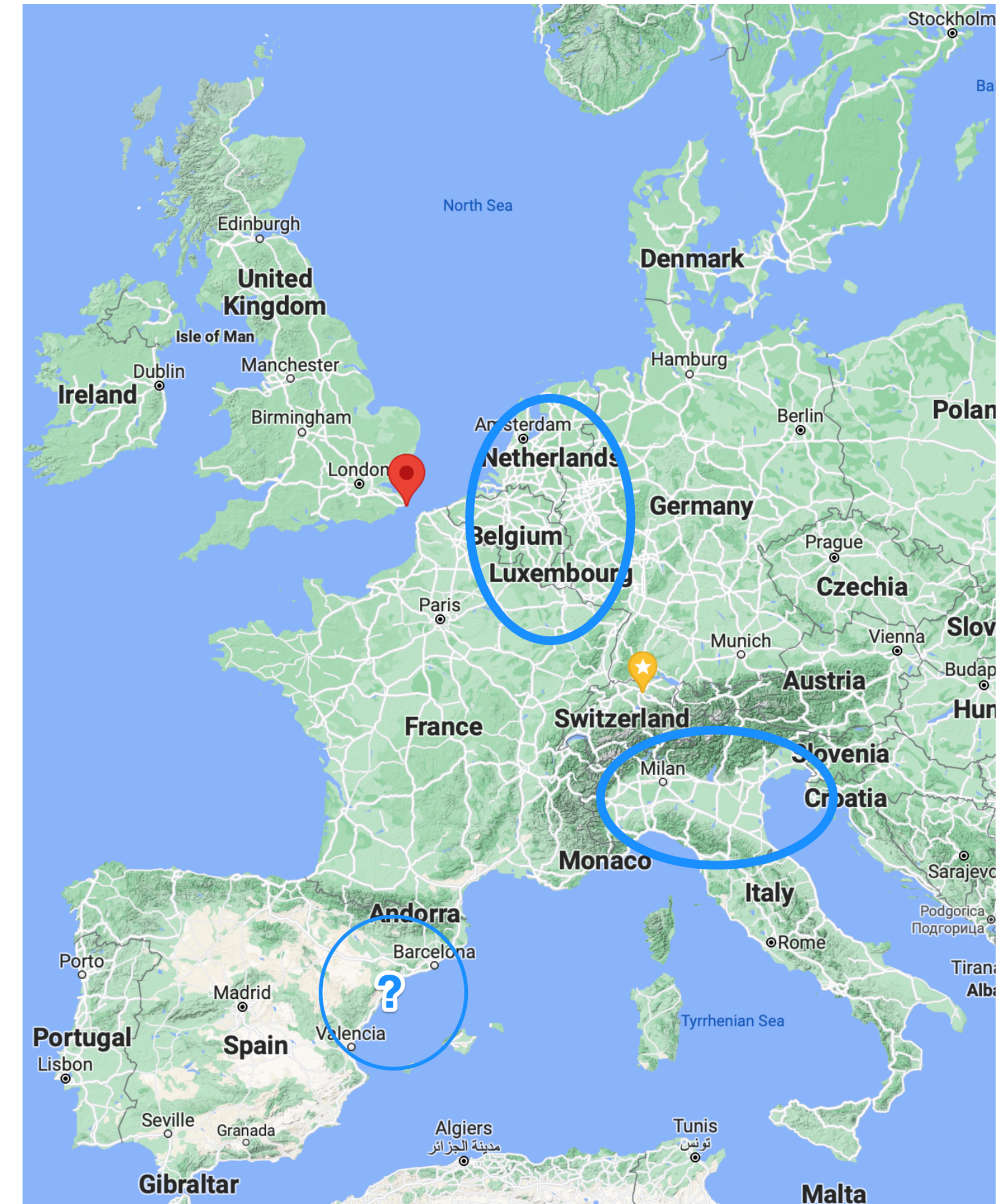
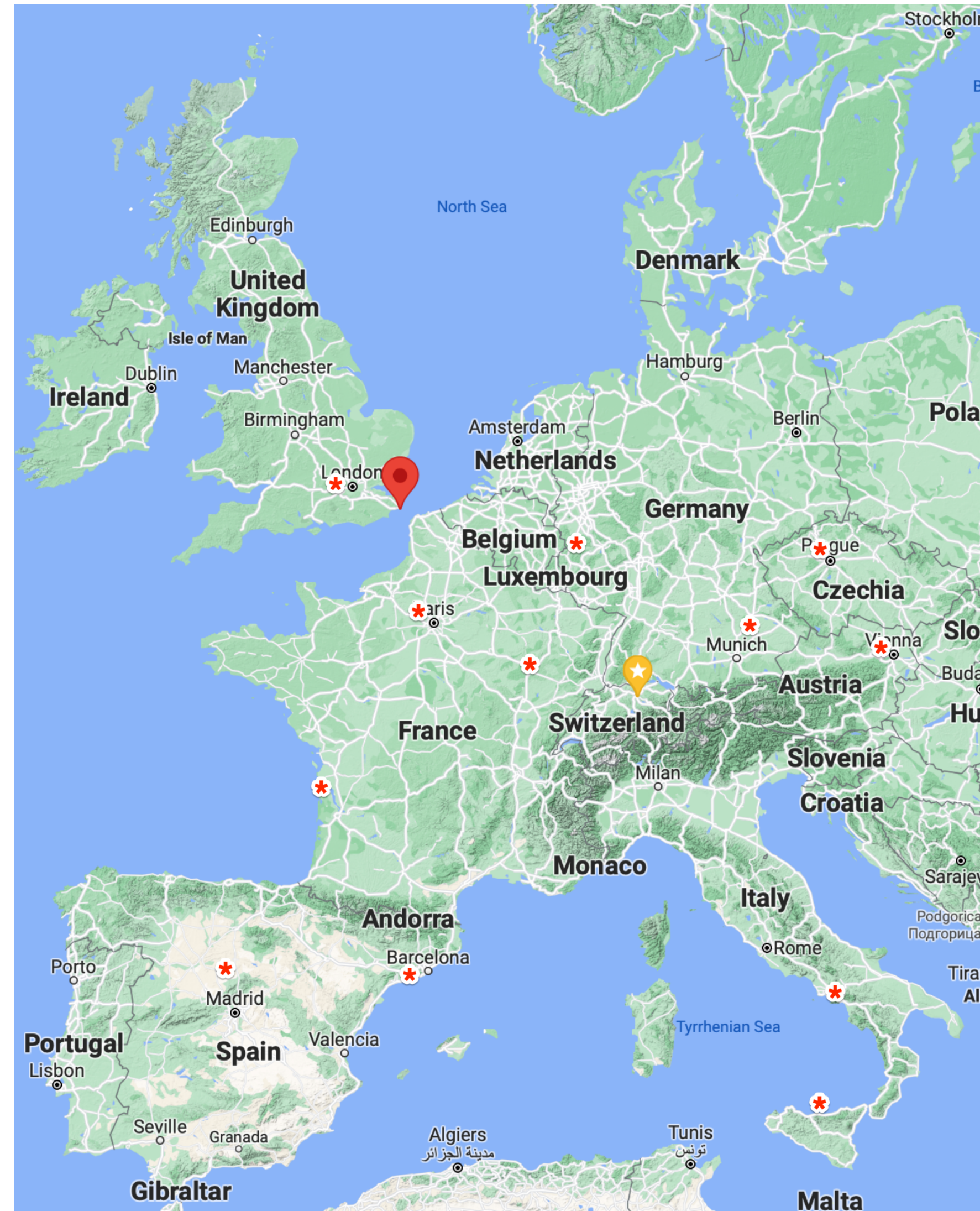




# Western Europe vis-à-vis “the Rest” in 1500

## Nothing at all special:

- 2 ½ economic core areas
- Evanescent, at best, kingdoms
  - Henry II Plantagenet → his son John I “Lackland”
  - Philippe IV “The Fair” Capet → Charles VI “The Fool” Valois
- Core areas sources of feudal and townly resistance to centralization and bureaucratization
- London, Paris, Bordeaux, Dijon, Barcelona, the high plains of Castile, Naples, Palermo, perhaps Vienna, Prague, Regensburg, and the Rhineland Palatinate as bases for rulers making a bid
- Military chaos holds back commerce and industry, save for gunpowder and metalworking.





# Prerequisites for Modern Economic Growth

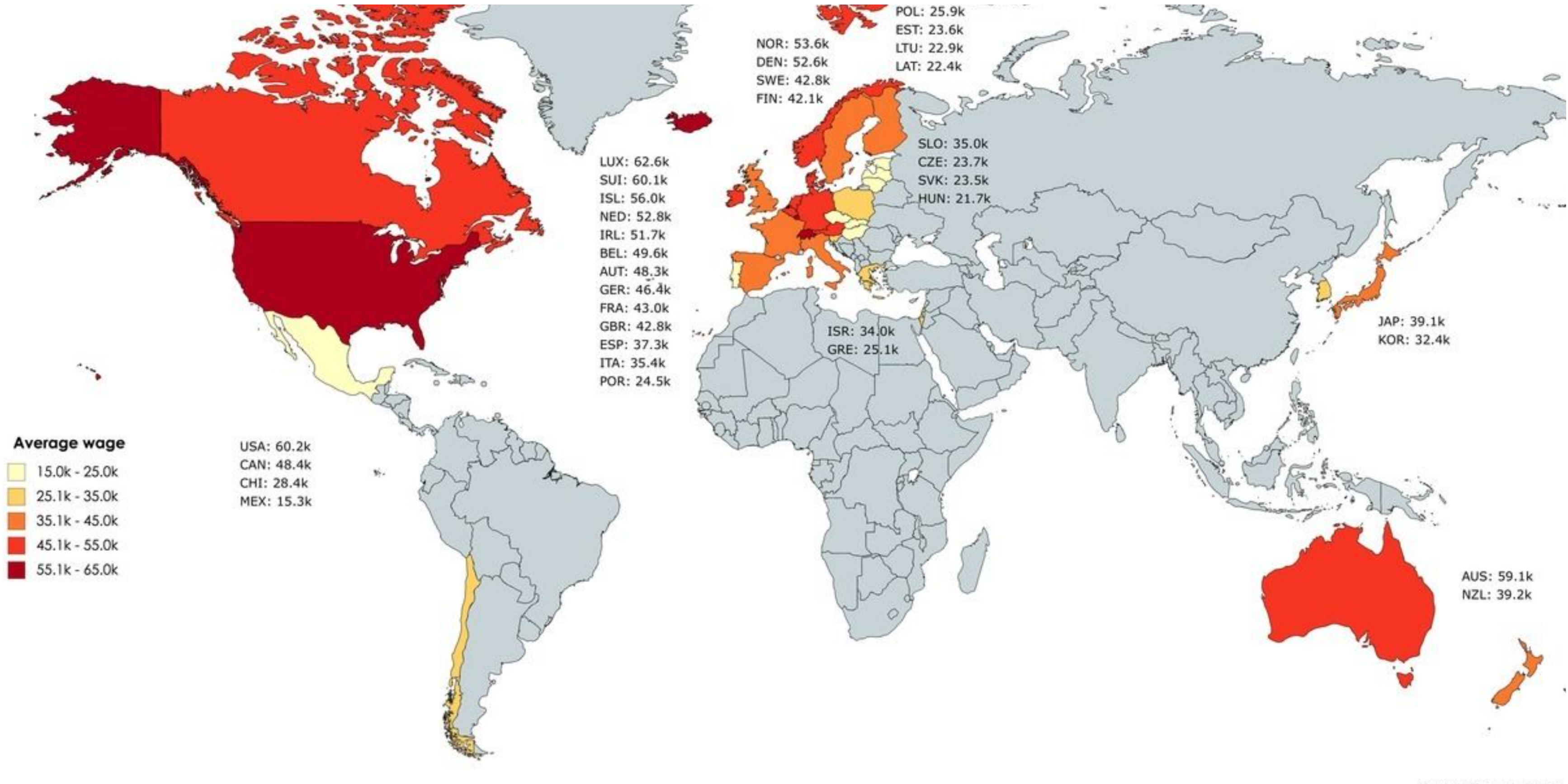
- **700%/century**
- 1870: The industrial research lab
- 1870: The modern corporation
- 1870: The global market economy
- 1870: Start of the demographic transition
- **56%/century .**
- 1830: The engineering profession
- 1830: The machine tool industry
- 1800-1850: Bob Allen's four policies:
  - Banks
  - Schools
  - Railroads, and other infrastructure
  - Appropriate tariffs
- 1750: Laws to be changed for general utility
- 1750: Laws not to be changed for the powerbrokers' benefit
- 1730: Steampower
- -30000: Coal
- 1700: Cotton
- 1689: Curbing of the British monarchy
- 1650: Sugar
- 1600: Capitalist mode of production
- **15%/century**
- 1600: Nothing by claim—by experiment only
- 1550: Freedom of occupation
- 1500: Global trade
- 1500: Columbian exchange
- **5%/century**
- 1215: Rule of law
- 1100: Tinkering metalworking culture (lots)
- Merchants and makers have a political voice (lots)
- 900: Printing
- 700: Individualism
- 530: Codified law [Rome]
- -150: Science [Hellenistic Greece]
- -300: Commercial society
- -400: Philosophy
- -600: Coinage
- -3000: Trade & Credit...
- -3000: Division of labor
- -3000: Writing
- -12000: Settlement



# The Dover Circle—and Its Spread

## Conquest, Settlement, Emulation...

- Plus resource engrossment: imperialism & neoimperialism
- 2.5% of the world's population in 800, 5% in 1500, 15% in 1870, 11% of the world's population today
- Leading edge vs. world as a whole: 1-1 in 1500, 1.1-1 in 1770, 2.1-1 in 1870, 4.5-1 today





# Some Numbers: The World & The Dover-Circle Economies

## The World

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## The Dover Circle

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-3000	0.015%	0.060	\$900	0.5	\$0.45
-1000	0.035%	0.120	\$900	2	\$1.80
150	0.048%	0.207	\$900	6	\$5.40
800	0.022%	0.240	\$900	8	\$7.20
1500	0.096%	0.471	\$1,000	25	\$25.00
1770	0.200%	0.807	\$1,400	75	\$105.00
1870	0.914%	2.013	\$2,800	175	\$490.00
2010	2.514%	67.989	\$50,000	800	\$40,000.00

# Breaking Through: Dover Circle

## Breaking Through

- The 300-mile radius Dover Circle
  - One of 2.5 western European core areas (Iberia, Northern Italy)
  - No place special in -1000, 0, 800, or even 1500 (save for precision metalworking & gunpowder military)
  - Doubling of ideas growth around 1500, than x4.5 around 1770, then x2.5 around 1870
  - Plus resource engrossment: +0.25%/year growth of resources since 1500
- Pulls the rest of the world with it:
  - substantially 1500-1770,
  - partially 1770-1870, and
  - substantially (but, not yet, catchup!) 1870-2020

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# Resources! The “New World”

## The Columbian Exchange

- **Corn, the potato, chocolate, &c.:** substantial boost to calories
- Benefits everywhere!
- But one-sided: Europe gains empire and resources wherever its ships can sail and cannon can shoot
- Sugar islands and the slave trade
  - 400 calories per Briton per day by 1750?
  - The underdevelopment of Africa
    - 12.5 million Atlantic African slave trade
    - (2 million Mediterranean, 4 million Black Sea, 1 million Viking, 17 million Indian Ocean, 30 million Graeco-Roman)





# Resources! “Globalization” & Slavery

## The East Indies

- **Spices—later silks, porcelain, cottons:** 80% fall in real price
- Benefits everywhere
  - But benefits one-sided: disassembling a mountain of silver in Peru in order to import luxuries from China, India, Malaysia, and Indonesia...



## The West Indies

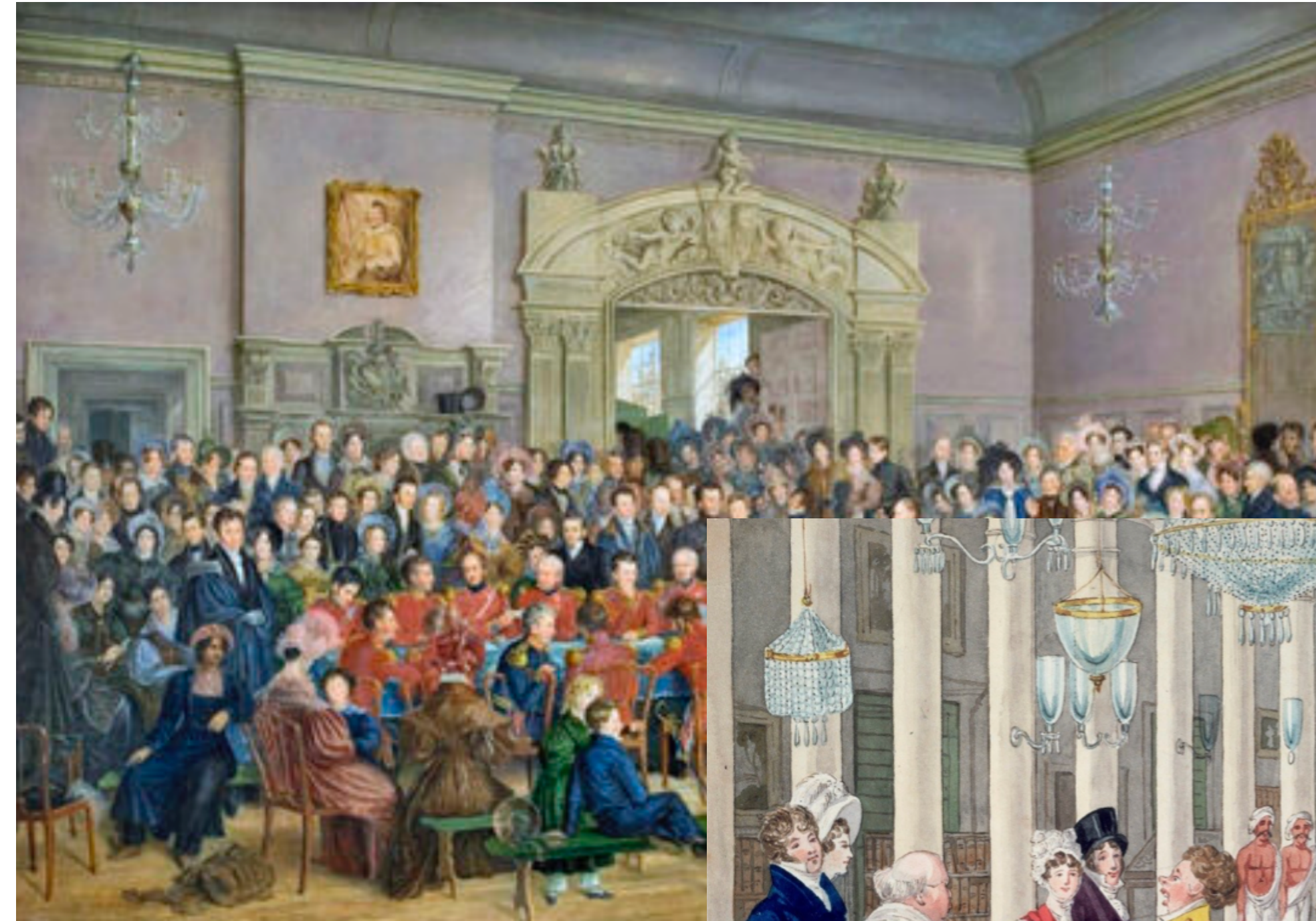
- Tobacco, sugar, *etc.*....



# Political Economy!

## Political Economy

- **The merchants of Bristol,**
- **The nabobs,**
- **The King of Spain:** New wealth to add in to the scales...
- To serve God, to win glory, and to grow rich—ideologists, soldiers, and merchants
- Inflation





# J. Bradford DeLong and Andrei Shleifer (1993): Princes and Merchants: European City Growth Before the Industrial Revolution

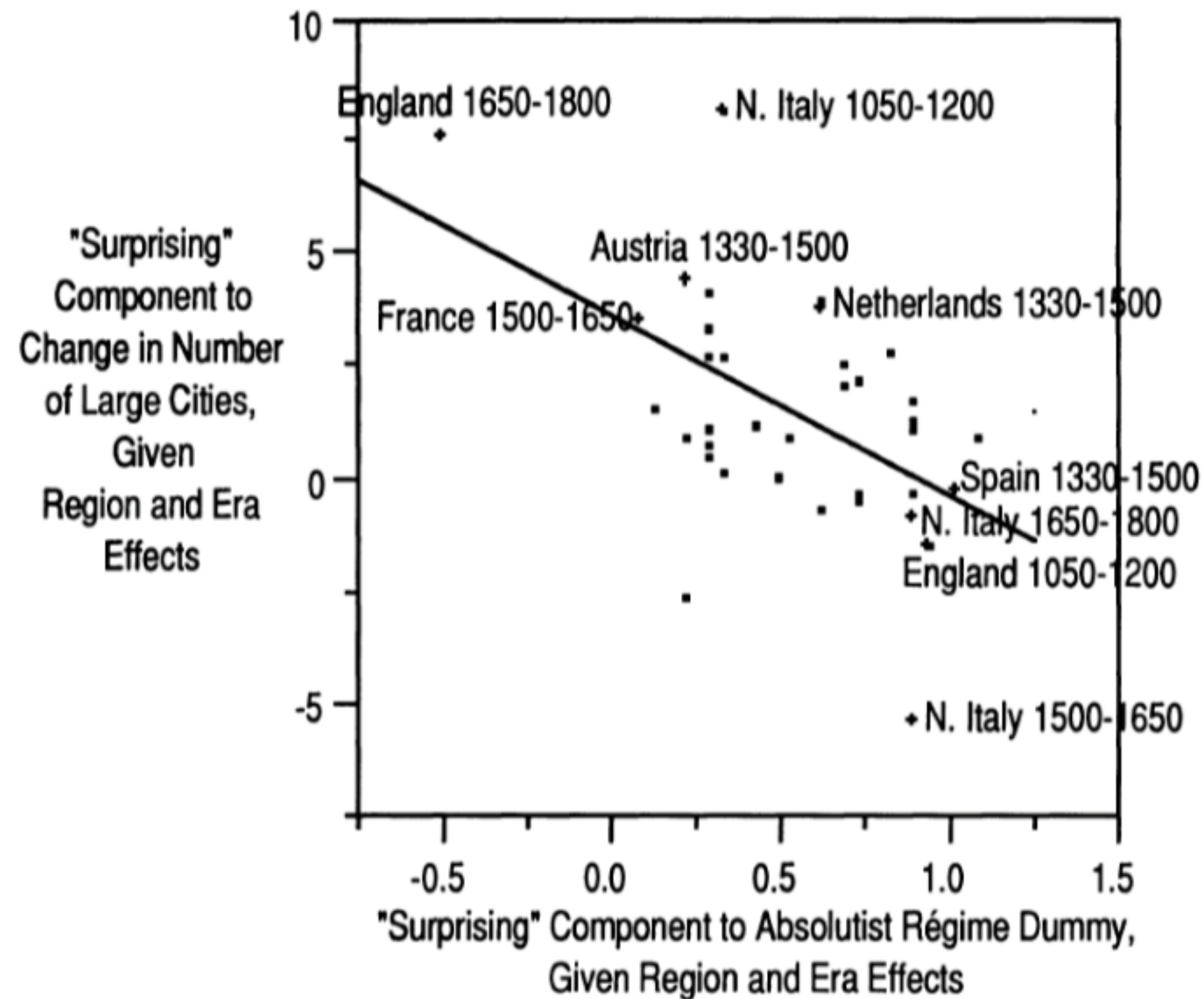


FIGURE 1.—Partial scatter of change in number of cities against absolutist regime

The total population living in western European cities of 30,000 or more in 1650 was 4.7 million. Had each of the nine regions experienced an additional century and a half of absolutist rule before 1650, this urban population would have been reduced by two million according to the regression in line 1 of Table 3. In such a scenario Europe in 1650 might well have played the same role in world history that it had played in 1000: a poor and barbarous backwater compared to the high civilizations of Islam, India, and China, rather than a continent on the verge of three centuries of world domination.

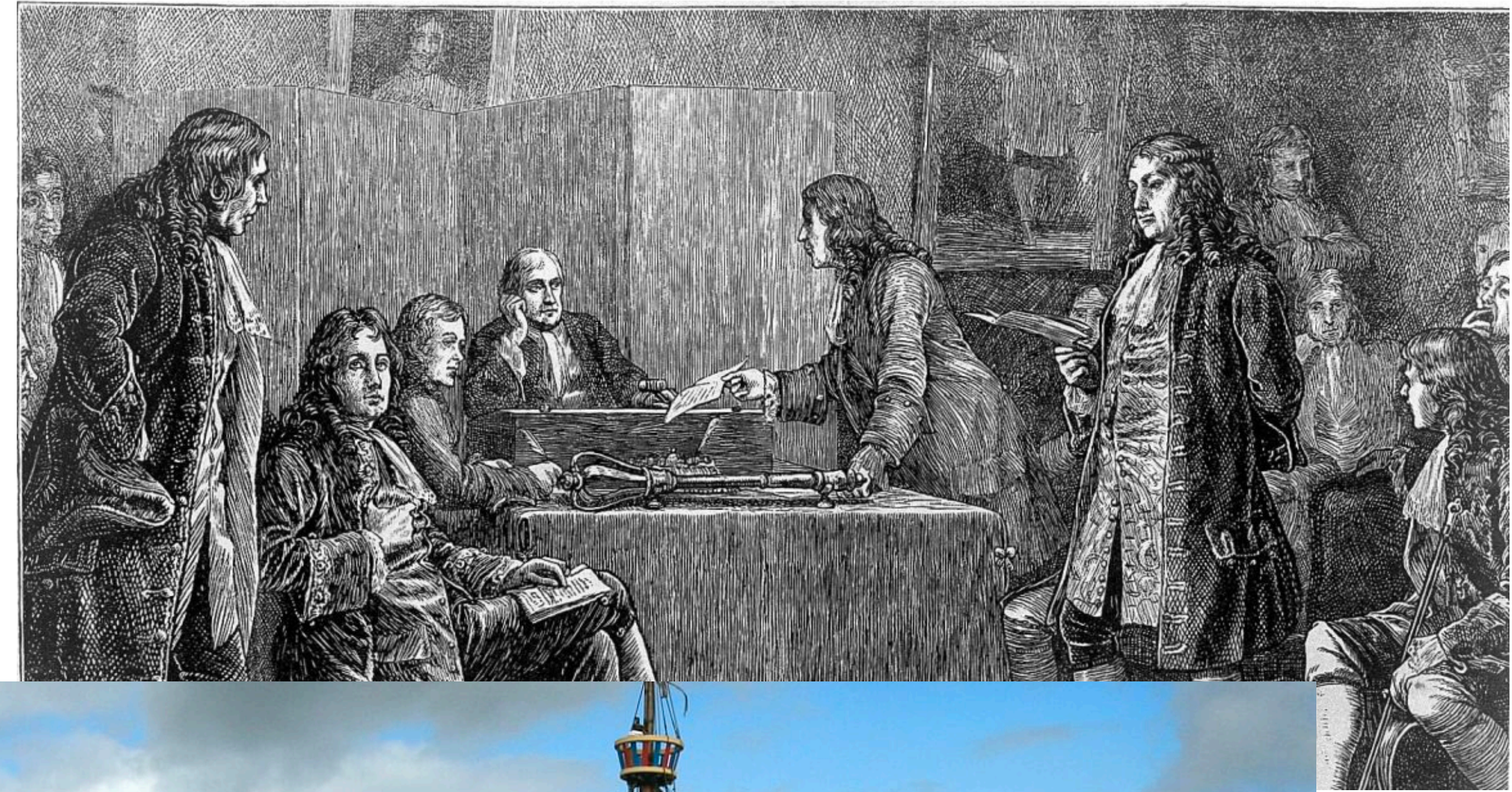
Conversely, had all of western Europe been free of absolutist rule over 1050–1650, then the regression in line 1 of Table 3 predicts that Europe in 1650 would have had a total urban population of nearly 8 million and would have had forty additional cities with more than 30,000 inhabitants. Such a heightened level of commerce and urban civilization might have triggered the Industrial Revolution considerably earlier.



# “Take Nobody’s Word for It”

## The Royal Society of London for Improving Natural Knowledge

- 1660
- “Nullius in verba!”—“Take nobody’s word for it!”
- Are two heads finally better than one?
- Empirical culture downstream from printing?
- Downstream from political-ideological fragmentation?
- What creates a society in which ideas are judged by whether they are true, rather than by whether they are convenient for the upper class?





# Rule of Law

A government that is powerful, but weak:

- Establishes an order for use and control: property
- Establishes an order for free transfer under mutual agreement: contract
- Protects that property order against:
  - Bandits
  - Local notables
  - The government's own functionaries
- Does not revise that order at the whim of the powerful
- Does revise that order for general utility





# But Good Institutions Are Much More than the Mere “Rule of Law”

Not just commerce, but distribution and invention:

- Incentivize people to work hard at productive occupations
- Incentivize people to save and invest
- Limit rent-seeking, and rent-sharing
- Provide people with tools to find counterparties
- Enable a fine and hence productive division of labor
- Provide people with tools to learn skills
- Provide people with the power to borrow and lend
- Provide people with the power to profit from new ideas
- Distribute wealth equitably
- Distribute social power equitably

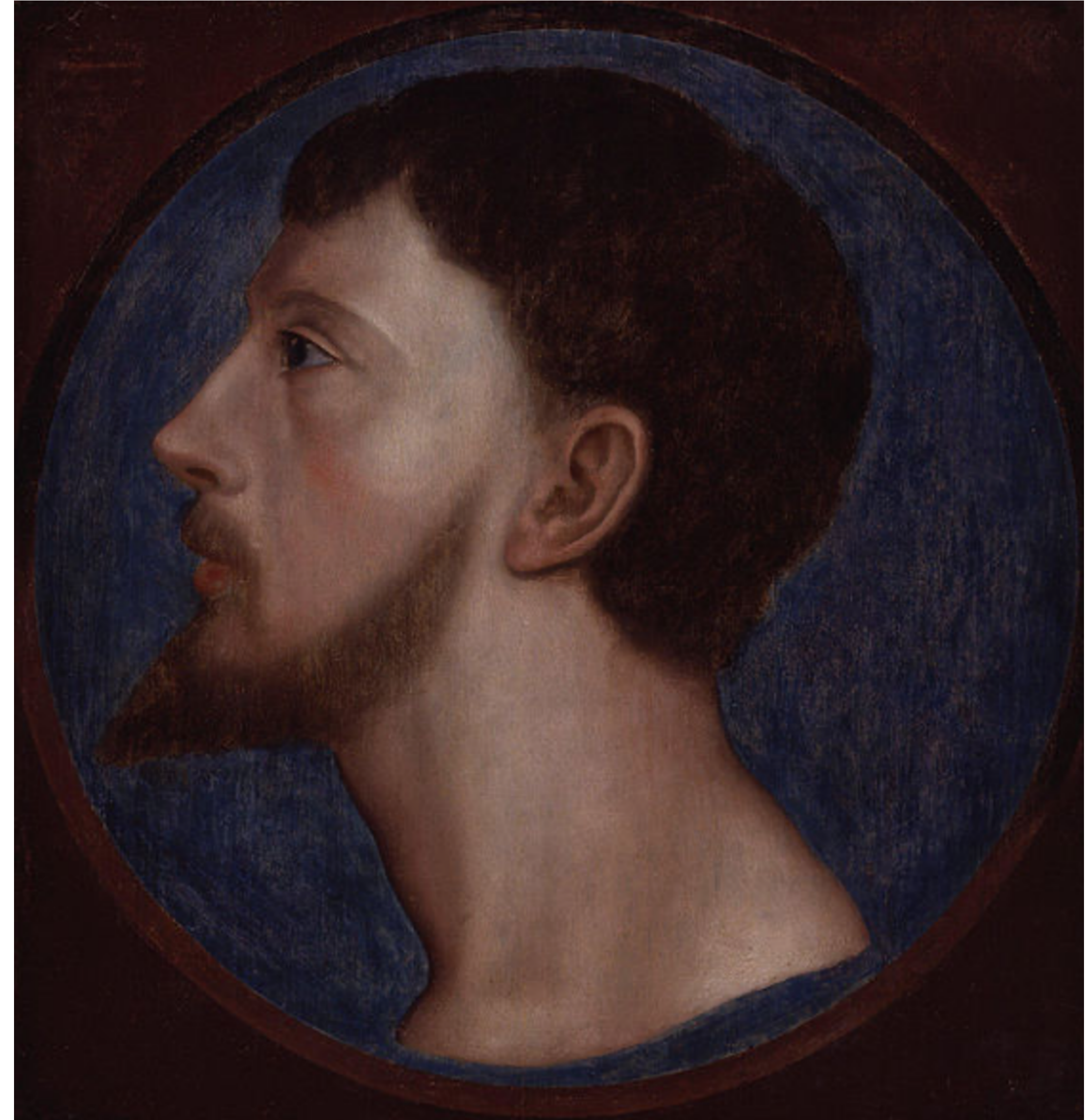




# Wyatt's Rebellion

## Queen Mary I Tudor's projected marriage to Felipe II Habsburg of Spain

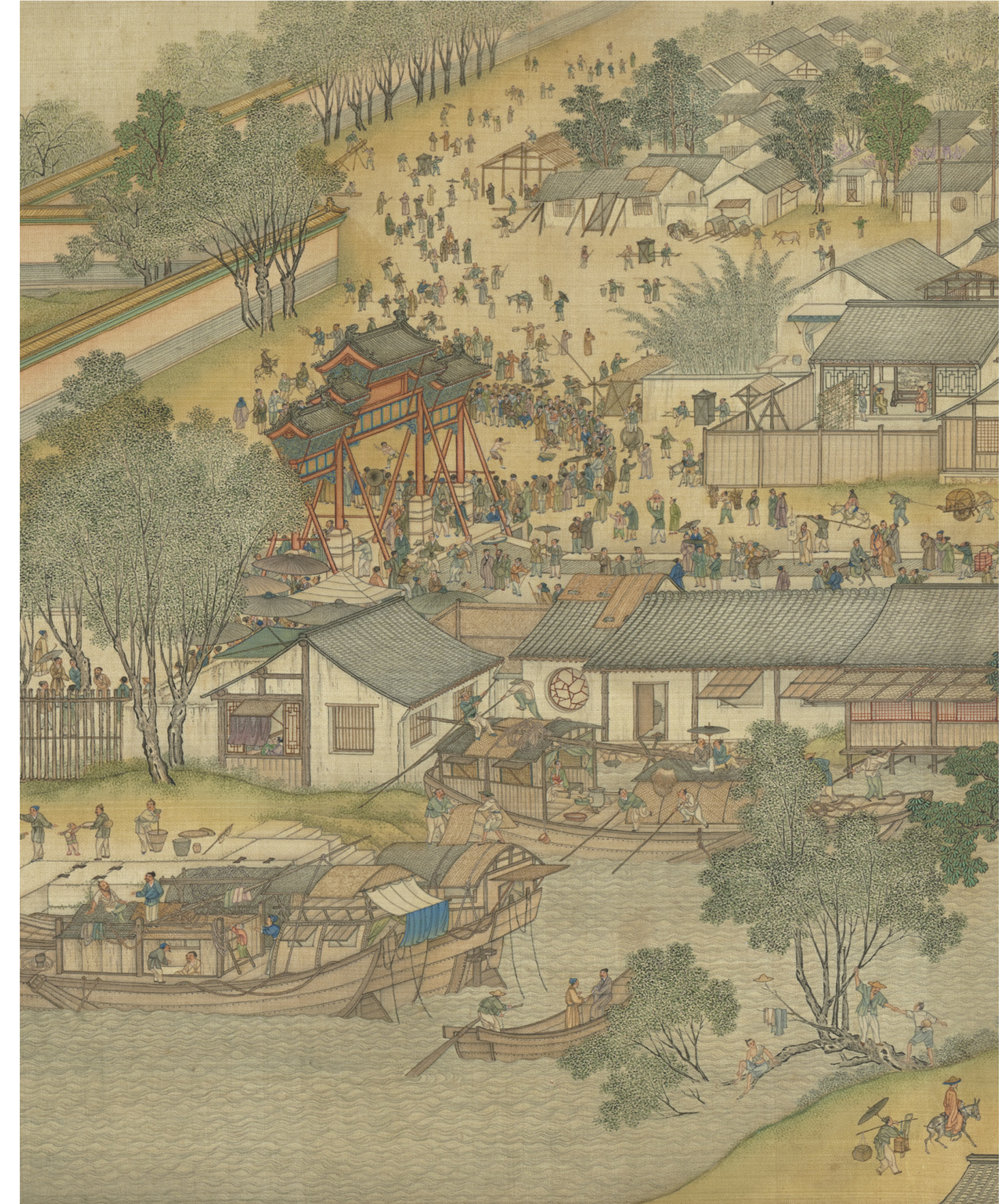
- My great<sup>12</sup>-grandfather Thomas Wyatt the Younger...
- Had been adicalized by diplomatic service in Spain...
- 1554: the Queen should not marry a foreigner...
- Agreed to take the lead in leading demonstrations and remonstrating with the queen—and assembling an army...
- Fails...
- Executed on Tower Hill on April 11, 1554...
- Head hung from a gallows—and then stolen after 7 days...
- Limbs “circulated to the towns”...





# Almost every element usually regarded by historians as a major contributory cause to the Industrial Revolution in north-western Europe was also present in China:

- A revolution in the relations between social classes, at least in the countryside
- Only Galilean-Newtonian science was missing; but in the short run this was not important.
- Had the Chinese possessed, or developed, the seventeenth-century European mania for tinkering and improving, they could easily have made an efficient spinning machine out of the primitive model described by Wang Chen.
- A steam engine would have been more difficult; but it should not have posed insuperable difficulties to a people who had been building double-acting piston flame-throwers in the Sung dynasty.
- The crucial point is that nobody tried.
- In most fields, agriculture being the chief exception, Chinese technology stopped progressing well before the point at which a lack of scientific knowledge had become a serious obstacle.

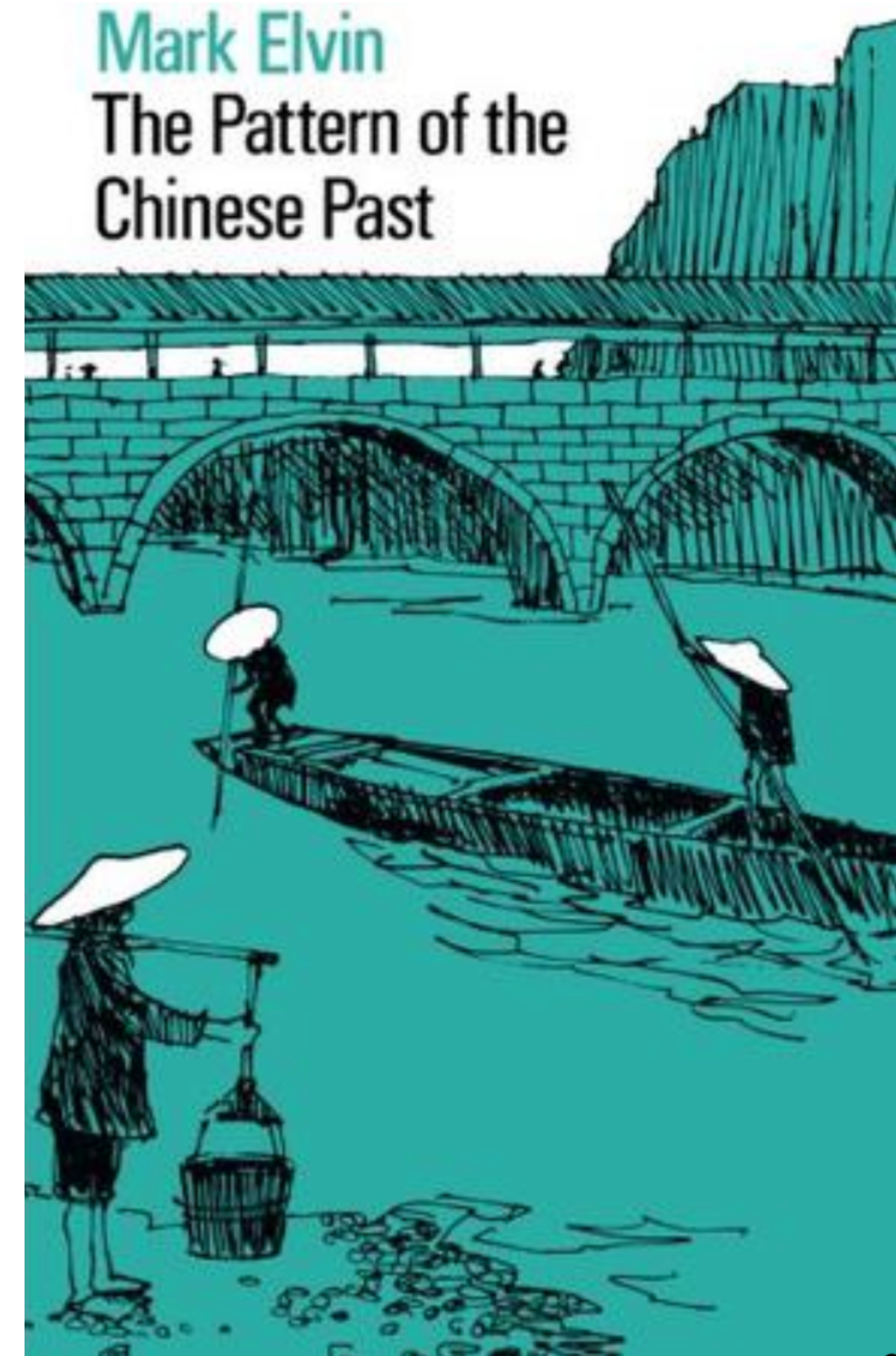




# But Property, Contract, & Commerce in Lots of Times & Places

## China & the “High-Level Equilibrium Trap”:

- Wang Shih-Mao’s description of the Kiangsi porcelain-making center of Ching-te-Chen:
  - “Tens of thousands of pestles shake the ground with their noise. The heavens are awake with the glare from the fires, so that one cannot sleep at night. The place has been called in jest ‘The Town of Year-Round Thunder and Lightning’...”
- Also in Kiangsi, water-driven hammers for husking rice:
  - “At important fords and in places where merchants gather... Over a hundred of the machines may be installed in the line of buildings to supply the grain boats which come and go selling rice...”
- In Fukien:
  - “Paddle wheels... are used to turn hammers for the manufacture of paper, so that ‘the sound of pounding was like the whirr of wings’...”





# Elvin's Conclusion

## Malthusian forces simply too strong:

- In late traditional China economic forces developed in such a way as to make profitable invention more and more difficult...
- With falling surplus and agriculture, and so falling per capita income and per capita demand, with the cheap ing labor but increasingly expensive resources in capital, with farming and transport technology so good that no simple improvements could be made, a rational strategy for peasant and merchant alike tended in the direction not so much of a labor saving machinery as of economizing resources...
- When temporary shortages arose, mercantile versatility, based on cheap transport, was a faster intra-remedy than the contrivance of machines...
- This situation may be described as a 'high-level equilibrium trap'...

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2. This is not nearly enough to break the ensorcellment of humanity by the Devil of Malthus
3. But it is, definitely, a start
4. There is also *some* improvement in typical-human standards of living, as the population explosion lags productivity a bit
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6. Why the two triplings *ca.* 1500 and 1770?
7. Why not China?



# Catch Our Breath

Let's reflect on what we have just heard & seen...

1. Comments
2. Questions
3. Readings

