Lecture on "Economic History, Trade and Growth"

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Introduction

- This lecture is about the most important subject in economics: why some countries are rich and other countries are poor.
- Adam Smith is widely regarded as the father of economics and in his book *The Wealth of Nations* from 1776, the main focus was on explaining why some countries are rich and other countries are poor.
- Economists today are struggling to offer a satisfactory explanation. In this lecture, I give as an example the influential book from 2012 *Why Nations Fail* by Daron Acemoglu and James Robinson. I present their explanation and discuss the problems with their analysis.

- In my opinion, economic historians have been more successful than economists at explaining the wealth and poverty of nations.
- In this lecture, I present the ideas of some leading economic historians and what they have to say matches up very nicely with the implications of the dynamic general equilibrium models covered in this course.
- I will present selected passages from many sources, including the following books about economic history:

Niall Ferguson (2011), *Civilization: The West and the Rest.*
Rodney Stark (2014), *How The West Won.*
Wayne Grudem and Barry Asmus (2013), *The Poverty of Nations.*

Acemoglu and Robinson (2012), *Why Nations Fail.*

- "Inclusive political institutions" contribute to "economic prosperity".
- Religious beliefs do not influence economic outcomes.

Ferguson (2011), *Civilization: The West and the Rest.*

- "More competition", "more science" and "more private property" contribute to "economic prosperity".
- Religious beliefs do influence economic outcomes.

- "More science" contributes to "economic prosperity":

  [In the model of growth and trade, symmetric trade liberalization lead to more R&D, more innovation and higher long-run consumer welfare $(\tau \downarrow \Rightarrow \theta_0 \downarrow, x \uparrow, u_0 \uparrow)$.]

- "More private property" contributes to "economic prosperity":

  [In the model of intellectual property rights, stronger protection of private property leads to more technology transfer, more R&D employment, more innovation and higher long-run consumer welfare $(\iota \downarrow \Rightarrow \phi \uparrow, L_{Ft} \uparrow, \delta_N \uparrow, u_{S0} \uparrow)$.]

- "More competition" contributes to "economic prosperity":

  [In the Melitz model, symmetric trade liberalization lead to more competition, higher industrial productivity and higher consumer welfare: $\tau \downarrow \Rightarrow \varphi_{iis}^* \uparrow, \Phi_{is}^k \uparrow$ and $U_i \uparrow$.]

- Acemoglu and Robinson (2012), *Why Nations Fail* write:

  "Is the cultural hypothesis useful for understanding world inequality? Yes and no. Yes, in the sense that social norms, which are related to culture, matter and can be hard to change, and they also sometimes support institutional differences, this book's explanation for world inequality. But mostly no, because those aspects of culture often emphasized – **religion**, national ethics, African or Latin values – are **just not important for understanding how we got here** and why the inequalities of the world persist."

- Ferguson (2011), *Civilization: The West and the Rest* quotes with approval a scholar from the Chinese Academy of the Social Sciences (p.287), who says:

"We were asked to look into what accounted for the... pre-eminence of the West all over the world ... At first, we thought it was because you had more powerful guns than we had. Then we thought it was because you had the best political system. Next we focused on your economic system. But in the past twenty years, we have realized that the heart of your culture is your **religion**: Christianity. That is why the West has been so powerful. The Christian moral foundation of social and cultural life was **what made possible** the emergence of capitalism and then the successful transition to democratic politics. We don't have any doubt about this."

- So, who is right?

- Is "religion just not important for understanding how we got here" (Acemoglu and Robinson), or is "religion what made possible" the prosperity of the West (Ferguson)?

Table: Estimates of Real GNP per Capita for Selected Countries (in 1960 $ U.S.). From David Landes (1999, p.232) *The Wealth and Poverty of Nations*.

	1830	1913	1929	1950	1970
Canada	280	1110	1220	1785	3005
Denmark	225	885	955	1320	2555
France	275	670	890	1055	2535
West Germany	240	775	900	995	2705
Italy	240	455	525	600	1670
Japan	180	310	425	405	2130
Netherlands	270	740	980	1115	2385
Portugal	250	335	380	440	985
Russia	180	345	350	600	1640
Spain	—	400	520	430	1400
Sweden	235	705	875	1640	2965
United Kingdom	370	1070	1160	1400	2225
United States	240	1350	1775	2415	3605

Table: Levels of real GDP/person (in thousands of 1990 US dollars). From Nicholas Crafts (2002, *Britain's Relative Economic Performance, 1870-1999*).

1870		1913		1950		1973	
Australia	3.6	Australia	5.7	USA	9.6	Switzerland	18.2
UK	3.2	USA	5.3	Switzerland	9.1	USA	16.7
Netherlands	2.8	N. Zealand	5.1	N. Zealand	8.5	Canada	13.9
N. Zealand	2.7	**UK**	4.9	Australia	7.5	Denmark	13.9
Belgium	2.7	Canada	4.4	Canada	7.4	Sweden	13.5
USA	2.4	Switzerland	4.3	Denmark	6.9	Germany	13.1
Switzerland	2.2	Belgium	4.2	**UK**	6.9	France	13.1
Denmark	2.0	Netherlands	4.0	Sweden	6.7	Netherlands	13.1
Germany	1.9	Denmark	3.9	Netherlands	6.0	Australia	12.8
France	1.9	Germany	3.8	Norway	5.5	N. Zealand	12.5
Austria	1.9	France	3.5	Belgium	5.5	Belgium	12.1
Ireland	1.8	Austria	3.5	France	5.3	**UK**	12.0
Canada	1.7	Sweden	3.1	Germany	4.3	Japan	11.4

Table 4.1 in Harrison (2006, *The Central Liberal Truth*)

Hist. Dom. Religion	Countries	Population (in millions)	Per Capita GDP (2002)
Protestant	US, Germany Sweden, UK	530	$29,784
Jewish	Israel	6	$19,320
Catholic	France, Italy Spain, Brazil	904	$9,358
Orthodox	Greece, Russia Romania, Ukraine	262	$7,045
Confucian	South Korea, China Japan, Singapore	1491	$6,691
Buddhist	Thailand, Cambodia Laos, Mongolia	146	$4,813
Islam	Saudi Arabia, Egypt Morocco, Pakistan	1122	$3,142
Hindu	India, Nepal	1041	$2,390

A Barack Obama Quote (or how to lie effectively)

- "What passages of Scripture should guide our public policy? Should we go with Leviticus, which suggests slavery is OK and eating shellfish is abomination? How about Deuteronomy, which suggests stoning your child if he strays from the faith? Or should we just stick to the Sermon on the Mount - a passage that is so radical that it's doubtful that our own Defense Department would survive its application? So before we get carried away, let's read our Bibles. Folks haven't been reading their Bibles."

Civilization: The West and the Rest

Harvard history professor Niall Ferguson (2011) writes:

- If in the year 1411 you had been able to circumnavigate the globe, you would have been most impressed by the dazzling civilizations of the Orient.
- The Forbidden City was under construction in Ming Beijing; in the Near East, the Ottomans were closing in on Constantinople (which they would finally capture in 1453).

- By contrast, England would have struck you as a miserable backwater ravaged by plague (the Black Death 1347-1351 killed half the population), bad sanitation and incessant war.
- The other quarrelsome kingdoms of Western Europe – Aragon, Castile, France, Portugal and Scotland – would have seemed little better.
- The idea that the West would come to dominate the Rest for most of the next half millennium would have struck you as wildly fanciful.
- And yet it happened.

- In 1500 the future imperial powers of Europe accounted for about 10 percent of the world's land surface and at most 16 percent of its population.
- By 1913, eleven Western empires (Austria, Belgium, France, Germany, Italy, Netherlands, Portugal, Spain, Russia, the United Kingdom and the United States) controlled nearly three-fifths of all territory and population and more than three-quarters (a staggering 79 percent) of global economic output.
- Average life expectancy in England was nearly twice what it was in India.
- By the 1960s the UK/China per capita GDP ratio had reached 14: the average Brit was 14 times richer than the average Chinese.

- What was it about the civilization of Western Europe that allowed it to trump the outwardly superior empires of the Orient?
- The answer, Niall Ferguson argues, was that the West developed six 'killer applications' (or good institutions) that the Rest lacked: 1. competition, 2. science, 3. property rights, 4. medicine, 5. consumerism, and 6. the work ethic.
- These 'killer apps' allowed a minority of mankind originating on the western edge of Eurasia to dominate the world for the better part of 500 years.

- 1. Competition – a decentralization of both political and economic life, which created the launch-pad for both nation-states and capitalism.
- 2. Science – a way of studying, understanding and ultimately changing the natural world, which gave the West (among other things) a major military advantage over the Rest.
- 3. Property rights – the rule of law as a means of protecting private owners and peacefully resolving disputes between them, which formed the basis for the most stable form of representative government.

- 4. Medicine – a branch of science that allowed a major improvement in health and life expectancy, beginning in Western societies, but also in their colonies.
- 5. Consumerism – a mode of material living in which the production and purchase of clothing and other consumer goods play a central economic role, and without which the Industrial Revolution would have been unsustainable.
- 6. The work ethic – a moral framework and mode of activity derivable from (among other sources) Protestant Christianity, which provides the glue for the dynamic and potentially unstable society created by apps 1 to 5.

1. Competition

Ferguson (2011) writes:

- In Nanjing today you can see a full-size replica of the treasure ship of Admiral Zheng He, the most famous sailor in Chinese history.
- It is 400 feet long –nearly five times the size of the Santa Maria, in which Christopher Columbus crossed the Atlantic in 1492.
- And this was only part of a fleet of more than 300 huge ocean-going junks.
- These ships were far larger than anything being built in 1400's Europe.
- With a combined crew of 28,000, Zheng He's navy was bigger than anything seen in the West until the First World War.

- In a series of seven epic voyages between 1405 and 1433, Zheng He's fleet ranged astoundingly far and wide.
- The Admiral sailed to Thailand, to Calicut (in today's India), up the Red Sea to Jeddah (in today's Saudi Arabia) and even to the East coast of Africa (today's Kenya).
- What the Ming Emperor Yongle was looking for from these voyages was for foreign rulers to pay tribute to him the way China's immediate Asian neighbours did, and thereby to acknowledge his supremacy.
- After reaching the East coast of Africa, envoys from some thirty African rulers were invited on board to acknowledge the 'cosmic ascendancy' of the Ming Emperor.

Emperor Yongle in Ming China.

- But then Emperor Yongle died – and China's overseas ambitions were buried with him.
- Zheng He's voyages were immediately suspended. A decree came down from the new emperor forbidding the construction of any oceangoing ships. The records of Zheng He's journeys were destroyed.
- From 1500 anyone in China found building a ship with more than two masts was liable to the death penalty.
- What lay behind this momentous decision?
- According to Stark (2014), the court Mandarins believed that there was nothing in the outer world of value to China and that any contacts were potentially unsettling to the Confusian social order.

- Like the Apollo moon missions, Zheng He's voyages had been a formidable demonstration of wealth and technological sophistication.
- Landing a Chinese eunuch on the East African coast in 1416 was in many ways an achievement comparable with landing an American astronaut on the moon in 1969.
- But by abruptly cancelling oceanic exploration, Emperor Yongle's successors ensured that the economic benefits of this achievement were negligible.

A European Story

- In 1497, Portuguese King Manuel put Vasco da Gama in command of four small ships with combined crews of just 170 men.
- Their mission was to go in search of spices – cinnamon, cloves, mace and nutmeg – which Europeans could not grow for themselves but which they craved to enhance the taste of their food.
- The traditional spice route – overland through Arabia and Anatolia – was tightly controlled by the Turks and the Venetians.
- The Portuguese realised that if they could find an alternative route, down the west coast of Africa and round the Cape of Good Hope to the Indian Ocean, then this business could be theirs.

- The West had more than one advantage over the Rest. But the one that really started the ball rolling was surely the fierce competition that drove the Age of Exploration.
- For Europeans, sailing round Africa was not mainly about exacting tribute from foreign leaders, it was about getting ahead of their rivals, both economically and politically.
- If da Gama succeeded, then Lisbon trumped Venice.
- Maritime exploration was the 1400s European space race, or rather, its spice race.

- After nearly a year at sea, da Gama landed near Calicut India. da Gama gained valuable cargo by plundering Muslim ships along the way: when he sailed for home, his cargo was worth sixty times the cost of the expedition, including the construction of his ships.
- Other Portuguese explorers sailed on, establishing an amazing network of trading posts that stretched like a global necklace from Lisbon, round the coast of Africa, Arabia and India, to the spice islands themselves and even to Macau (in China).
- This network of trading posts produced immense wealth for the Portuguese.
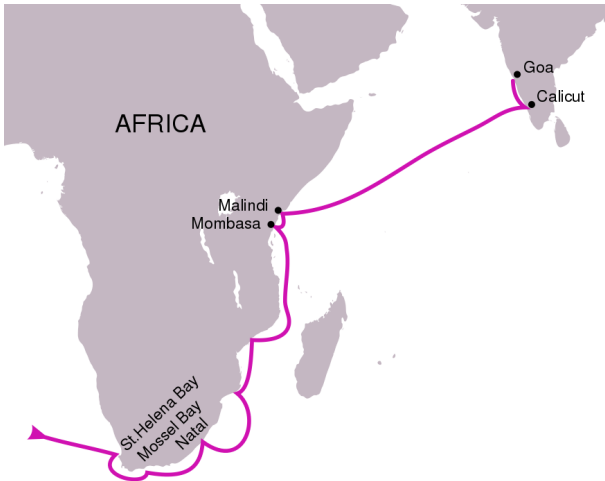
The route followed in Vasco da Gama's first voyage (1497-1499).

- The benefits of overseas expansion were not lost on Portugal's European rivals.
- Spain established colonies in the New World, from which they were able to ship huge quantities of silver.
- By the mid-1600s, the Dutch had overtaken the Portuguese in terms of both number of ships and tonnage sailing around the Cape, and England's trade was flourishing from Belfast to Boston.

- Nanjing was probably the largest city in the world in 1420, with a population of between a half million and a million.
- Asian agriculture was considerably more productive than European.
- In East Asia an acre of land was enough to support a family, such was the efficiency of rice cultivation, whereas in England the average figure was closer to 20 acres.
- This helps to explain why East Asia was already more populous than Western Europe.

- For several centuries, Ming China was the world's most sophisticated civilization by almost any measure.
- But then, harsh weather, famine and epidemic disease opened the door to rebellion within and incursions from without.
- The results of the Ming collapse were devastating. Between 1580 and 1650, conflict and epidemics reduced the Chinese population by between 35 and 40 percent.
- The Ming system had created a high-level equilibrium – impressive outwardly, but fragile inwardly.
- The countryside could sustain a remarkably large number of people, but only on the basis of an essentially static social order that literally ceased to innovate.
- It was a kind of trap. And when the least little thing when wrong, the trap snapped shut.

- The greatest economic reformer of the post-Mao era, Deng Xiaoping, has written:

  "No country that wishes to become developed today can pursue closed-door policies. We have tasted this bitter experience and our ancestors have tasted it. In the early Ming Dynasty in the reign of Yongle when Zheng He sailed the Western Ocean, our country was open. After Yongle died the dynasty went into decline. China was invaded. Counting from the middle of the Ming Dynasty to the Opium Wars, through 300 years of isolation China was made poor, and became backward and mired in darkness and ignorance. No open door is not an option."

- This is a plausible reading of history.

- It is also remarkably close to what economist Adam Smith wrote back in 1776 in his book *Wealth of Nations*:

  "China seems to have been long stationary, and has probably long ago acquired that full complement of riches which is consistent with the nature of its laws and institutions. But this complement may be much inferior to what, with other laws and institutions, the nature of its soil, climate and situation might admit of. A country which neglects or despises foreign commerce ...cannot transact the same quantity of business which it might do with different laws and institutions ...A more extensive foreign trade ...could scarce fail to increase very much the manufactures of China, and to improve very much the productive powers of its manufacturing industry."

- In contrast with China, Europe during this era was blessed with lasting disunity. Stark (2014) has a chapter called "The Blessings of Disunity."
- Disunity enabled extensive, small-scale social experimentation and unleashed creative competition among many independent political units, which, in turn, resulted in rapid and profound progress.
- As economics Nobel Prize winner F.A. Hayek explained, "European civilization ...owes its origins and *raison d'etre* to political anarchy."
- [In the Melitz model, symmetric trade liberalization lead to more competition, higher industrial productivity and higher consumer welfare: $\tau \downarrow \Rightarrow \varphi_{iis}^* \uparrow$, $\Phi_{is}^k \uparrow$ and $U_i \uparrow$.]

2. Science

Ferguson (2011) writes:

- The year was 1683 and once again – an Ottoman army – this time consisting of a 60,000-strong cavalry, supported by 80,000 Balkan auxiliaries and a force of fearsome Tatars – reached the gates of Vienna.
- At its head was Kara "the black" Mustafa, Grand Vizier to Sultan Mehmed IV.
- In Vienna, King Leopold dithered. The city's defences and the City Guard had been decimated by a recent outbreak of plague.

- Kara Mustafa presented the defenders with a choice:

  "Accept Islam, and live in peace under the Sultan! Or deliver up the fortress, and live in peace under the Sultan as Christians; and if any man prefer, let him depart peaceably, taking his goods with him! But if you insist [on resisting], then death or spoliation or slavery shall be the fate of you all!"

- The Ottoman encampment was itself a statement of self-confidence. Kara Mustafa had a garden planted in front of his own palatial tent.

- The message was clear: the Turks had time to starve the Viennese into surrender if necessary.

- But autumn was in the air. Kara Mustafa's lines of communication back to Ottoman territory were over-extended. His men were now running short of supplies.
- And King Leopold had a secret advantage: before the Ottoman invasion he had signed a treaty of mutual defense with the Kingdom of Poland, so it was the Polish King Jan III Sobieski who led the 60,000-strong Polish-German army towards Vienna.
- On September 12, 1683, the Polish army arrived. Kara Mustafa had done too little to defend the approach routes. The battle was ferocious but swiftly decided.
- When Sobieski entered Kara Mustafa's tent, he found it empty. The siege of Vienna was over.

- The retreating Kara Mustafa paid the ultimate price for his failure.
- The Sultan ordered his immediate execution. He was strangled in the time-honoured Ottoman fashion, with a silken cord.
- For the Ottoman Empire, the failure to take Vienna marked the beginning of the end – a moment of imperial overstretch with disastrous long-term consequences.
- In battle after battle, the Ottomans were driven from nearly all the European lands conquered by Suleiman the Magnificent (1520-66).

Vienna Battle of 1683.

- The raising of the siege of Vienna was not only a turning point in the centuries-old struggle between Christianity and Islam.
- It was also a pivotal moment in the rise of the West.
- The years after 1683 saw profound changes in the way the Western mind conceived of both nature and government.
- In 1687 Isaac Newton published his *Principia*. Three years later, his friend John Locke published his *Second Treatise of Government*.
- If one thing came to differentiate the West from the East it was the widely differing degrees to which such new and profound knowledge was systematically pursued and applied.

- Europe's path to the Scientific Revolution and the Enlightenment was very far from straight and narrow; it was long and tortuous.
- It had its origins in the fundamental Christian tenet that Church and state should be separate.
- 'Render therefore to Caesar the things that are Caesar's; and unto God the things that are God's'' (Matthew 22:21) is an injunction radically different from that in the Koran, which insists on the indivisibility of God's law as revealed to the Prophet and the unity of any power structure based on Islam.

The Scientific Revolution that happened in Europe is perhaps best illustrated by a list of important breakthroughs:

- 1543 – Nicolaus Copernicus states the heliocentric theory of the solar system.
- 1572 – Tyco Brahe records the first European observation of a supernova.
- 1589 – Galileo's tests of falling bodies revolutionise the experimental method.
- 1600 – William Gilbert describes the magnetic properties of the earth and electricity.
- 1608 – Hans Lippershey and Zacharias Jansen independently invent the telescope.

- 1610 – Galileo discovers four of Jupiter's moons and infers that the earth is not at the centre of the universe.
- 1614 – John Napier introduces logarithms.
- 1628 – William Harvey accurately describes the circulation of blood.
- 1637 – Rene Descartes founds analytic geometry.
- 1654 – Fermat and Pascal found probability theory.
- 1661 – Robert Boyle defines elements and chemical analysis.
- 1669 – Isaac Newton presents the first systematic account of the calculus, independently developed by Gottfried Leibniz.
- 1687 – Isaac Newton states the law of universal gravitation and the laws of motion.
- 1738 – Daniel Bernoulli founds the mathematical study of fluid flow and the kinetic theory of gases.

- Those who decry 'Eurocentrism' as if it were some distasteful prejudice have a problem: the Scientific Revolution was, by any scientific measure, wholly Eurocentric.
- An astonishingly high proportion of the key figures – around 80 percent – originated in a hexagon bounded by Glasgow, Copenhagen, Krakow, Naples, Marseille and Plymouth, and nearly all the rest were born within a hundred miles of that area.
- In marked contrast, Ottoman scientific progress was non-existent in this same time period.
- The best explanation for this divergence was the unlimited sovereignty of religion in the Muslim world.

- Toward the end of the eleventh century, influential Islamic clerics began to argue that the study of Greek philosophy was incompatible with the teachings of the Koran.
- Islam holds that the universe is inherently irrational – that there is no cause and effect – because everything happens as the direct result of Allah's will at that particular time. Anything is possible.
- Attempts at science, then, are not only foolish but also blasphemous, in that they imply limits to Allah's power and authority.

- The prominent Sufi scholar Abu Hamid al-Ghazali (1055-1111) said, "It is rare that someone becomes absorbed in this [foreign] science without renouncing religion and letting go the reins of piety within him." He added that killing infidels was obligatory for all good Muslims.
- Under clerical influence, the study of ancient philosophy was curtailed, books burned and so-called freethinkers persecuted.
- In 1485 Bayezid II, sultan of the Ottoman Empire and caliph of Islam, outlawed the printing press. In 1515 a decree of Sultan Selim I threatened with death anyone found using a printing press.
- This failure to reconcile Islam with scientific progress was to prove disastrous. If the Scientific Revolution was generated by a network, then the Ottoman Empire was effectively offline.
- The only Western book translated into a Middle Eastern language until the late 1700s was a medical book on the treatment of syphilis.

- Some Ottomans came to realise that they needed to learn from the West.
- For example, in 1732 Ibrahim Muteferrika, an Ottoman official wrote in a book presented to Sultan Mahmud I:

  "Why do Christian nations which were so weak in the past compared with Muslim nations begin to dominate so many lands in modern times and even defeat the once victorious Ottoman armies?"

- The message of his book was clear: the Ottoman Empire had to embrace both the Scientific Revolution and the Enlightenment if it was to be credible as a great power.
- To describe the superiority of European governments was one thing. To implement reforms of the Ottoman system was quite another. Time and again, attempts at change fell foul of political opposition.

The Enlightenment and Science

- Stark (2014) identified all the significant scientific stars of the era beginning with the publication of Copernicus's *De revolutionibus* in 1543 and including all born prior to 1680.

- This yields a data set consisting of 52 star scientists.

- 3. Boyle, Robert (1627-1691), 4. Brahe, Tycho (1546-1601), 7. Copernicus, Nicolaus (1473-1543), 8. Descartes, Rene (1596-1650), 11. Fermat, Pierre (1601-1665), 13. Galilei, Galileo (1564-1642), 22. Halley, Edmond (1656-1742), 29. Kepler, Johannes (1571-1630), 32. Leibniz, Gottfried (1646-1716), 37. Newton, Isaac (1642-1727)

- By studying biographical information, Stark (2014) then coded each star scientist as to their personal piety.
- To code someone as **devout**, Stark required clear evidence of especially deep religious involvement. For example, Robert Boyle spent a great deal of money on translations of the Bible into non-Western languages.
- Stark used the code **conventionally religious** to identify those whose biography offers no evidence of skepticism but whose piety does not stand out as other than satisfactory to their associates.
- Finally, Stark reserved the label **skeptic** for anyone about whom he could infer disbelief, or at least profound doubt, in the existence of a conscious God. Only one of the 52 qualified: Edmond Halley – he was rejected for a professorship at Oxford on grounds of his "atheism."

Table 14-2 in Stark (2014):
Personal Piety of 52 Star Scientists (1543-1680)

Piety	Number	Percent
Devout	31	60%
Conventional	20	38%
Skeptic	1	2%
Total	52	100%

- It is only because Europeans believed in God as the intelligent designer of a rational universe that they pursued the secrets of creation.
- Johannes Kepler stated, "The chief aim of all investigations of the external world should be to discover the rational order and harmony imposed on it by God and which he revealed to us in the language of mathematics."
- In his last will and testament, the great chemist Robert Boyle wished the members of the Royal Society of London continued success in "their laudable attempts to discover the true Nature of the Works of God."
- One of the 52 star scientists [Leibniz, Gottfried (1646-1716)] even developed a new argument for the existence of God.

Leibniz asked, "Why is there something rather than nothing?" This led him to what philosophers call the **Leibniz Cosmological Argument**:

- Everything that exists has an explanation of its existence.
- If the universe has an explanation of its existence, that explanation is God.
- The universe exists.
- Therefore (from 1 and 3), the universe has an explanation of its existence.
- Therefore (from 2 and 4), the explanation of the existence of the universe is God.

GODEFROI GUILLAUME
LEIBNITZ,
Né le 3 Juillet 1646 mort le 14 Novembre 1716.

Although Isaac Newton was the first to discover a correct way of calculating integrals and derivatives in 1666, he did not publish his method until 1693. Gottfried Leibniz independently discovered a better way of calculating integrals and derivatives in 1674 and published the first paper about calculus in 1684. Leibniz's method is better because it involves fewer steps and it is Leibniz's notation $\int f(x)\, dx$ that is used today.

- Looking at history, we find a biblically inspired confidence in the mathematical structure of the universe came *first*, before any actual scientific discoveries.
- Mathematician Morris Kline writes: "The early mathematicians were sure of the existence of mathematical laws underlying natural phenomena and persisted in the search for them because they were convinced *a priori* that God had incorporated them in the construction of the universe."
- People must first be convinced there *is* a mathematical order in nature. Otherwise they will not go searching for it – and science will not get off the ground.

- Melvin Calvin, Chemistry Nobel Prize-winner:
  As I try to discern the origins of that conviction [underlying all science that the universe is orderly], I seem to find it in a basic notion discovered 2,000 or 3,000 years ago, and enunciated first in the Western world by the ancient Hebrews: namely that the universe is governed by a single God, and is not the product of the whims of many gods, each governing his own province according to his own laws. This monotheistic view seems to be the historical foundation for modern science.

- C.S. Lewis put things this way:
  Men became scientific because they expected law in nature and they expected law in nature because they believed in a lawgiver.

Relevance for Today

Ferguson (2011) writes:

- Jerusalem today sometimes seems like the modern equivalent of Vienna in 1683 – a fortified city on the frontier of Western civilization.
- Israel, which claims Jerusalem as its capital, is menaced on all sides by Muslim forces that threaten its very existence.
- As a result, many people in Israel feel as threatened as the Viennese did in 1683.
- The key question is how far science can continue to be the 'killer application' that gives a Western society like Israel an advantage over its enemies.

- To an extent that is truly remarkable for such a small country, Israel is at the cutting edge of scientific and technological innovation. Between 1980 and 2000 the number of patents registered in Israel was 7,652 compared with 367 for all the Arab countries combined.
- In 2008 alone Israel inventors applied to register 9591 new patents. The equivalent figure for Iran was 50 and for all majority Muslim countries in the world 5657.
- Israel has more scientists and engineers per capita than any other country and produces more scientific papers per capita. As a share of gross domestic product its civilian research and development expenditure is the highest in the world.
- [In the model of growth and trade, symmetric trade liberalization lead to more R&D, more innovation and higher long-run consumer welfare $(\tau \downarrow \Rightarrow \theta_0 \downarrow, x \uparrow, u_0 \uparrow)$.]

3. Property Rights

Ferguson (2011) writes:

- Our story begins with two ships.

- On one, landing in northern Ecuador in 1532, were fewer than 200 Spaniards. Their ambition was to conquer the Inca Empire for the King of Spain and to secure a large share of its reputed wealth of precious metal for themselves.

- The other ship, the *Carolina*, reached the New World 138 years later, in 1670, at an island off the coast of what today is South Carolina. Among those on board were servants whose modest ambition was to find a better life than the grinding poverty they had left behind in England.

- The two ships symbolised this tale of two Americas.
- On one, conquistadors; on the other indentured servants.
- One group dreamt of instant plunder – of mountains of Mayan gold, there for the taking.
- The others knew that they had years of toil ahead of them, but also that they would be rewarded with one of the world's most attractive assets – prime North American land – plus a share in the process of law-making.
- Real estate plus representation: that was the North American dream.

- Between 65 and 80 percent of all the Britons who came to the Chesapeake in the course of the 1600s did so by signing themselves into service with a standard deed of indenture.
- This was by no means exceptional. Fully three-quarters of all European migrants to British America over the entire colonial period came as indentured servants.
- This was a very different migration from the one experienced by the Spaniards, who literally found mountains of silver in Mexico and Peru. All there seemed to be on the shores of Carolina was a bone-yard of bleached tree-trunks.
- For many years Britain's American colonies remained a patchwork of farms and villages, with a few towns and virtually no true cities. And here the natives, though less numerous, were not so easily subjugated.

- The British colonists who left England for America took little with them. Even the price of their passage was paid by, in effect, a mortgage on their future labour.
- But they carried in their minds a number of ideas that had profound implications for the American future.
- The first was the idea of property rights as they had evolved in the common law courts since the 1100s.
- The second idea was that of militant Protestantism.
- The third idea was that taxation depended for its legitimacy on parliamentary approval.

- In his second *Treatise of Government*, John Locke (1690) writes:

  "Freedom is...a Liberty to dispose, and order, as he lists, his Person, Actions, Possessions, and his whole Property, within the Allowance of those Laws under which he is; and therein not be subject to the arbitrary Will of another...The great and chief end therefore, of Men's uniting into Commonwealths...is the preservation of their Property."

- And the Legislative may not 'take from any Man any part of his Property without his own consent', meaning a consent of the majority of representatives to taxation.
- This had truly revolutionary implications, as Locke well knew.

- The Constitution of Carolina was drawn up in 1669 by none other than John Locke. The document is remarkable.
- Article 4 specified that three-fifths of the land was to be divided 'amongst the people'.
- Another article states that "No man shall be chosen a member of parliament who has less than five hundred acres of freehold within the precinct for which he is chosen; nor shall any have a vote in choosing the said member that hath less than fifty acres of freehold within the said precinct."

- In England property rights were secure, but property was held in a few hands.
- In 1436 between 6,000 and 10,000 families of nobles and gentry had owned around 45 percent of the land; the Church 20 percent; the Crown 5 percent.
- But in British America even the lowest of the low had the chance to get a first foot on the property ladder.
- One of the indentured servants Abraham Smith that arrived on the ship *Carolina* in 1670, after serving for five years, was duly given 270 acres of land, to keep or sell as he saw fit.
- Abraham Smith had indeed arrived – not only economically but also politically. He could arrive in a wilderness with literally nothing and yet within just a few years become both a property-owner and a voter.

- In the Spanish colonies to the south, land was allocated in a diametrically different way.
- At first it was not land that was given to the Spanish conquistadors; technically, it was just the labour of the 6,000 or so Indians who lived there.
- Unlike in British colonies like Carolina, where acres were widely distributed, in Spanish America it was the right to exploit the indigenous people that was granted to a tiny elite.
- Previously, they had worked for the Inca Emperor under the *mita* system.
- Now their lot was to work for the Spaniards.

- It was essentially a tribute system – and tribute took the form of toil.
- The Indians were to do as their Spanish masters pleased, whether to plough the land or to dig gold and silver out of the mountains.
- The ultimate result was that the conquistador class became the idle rich of America.
- The majority of the people were left with only tiny plots of land. Even among Spanish immigrants, the *encomenderos* were a minority, perhaps as few as 5 percent of the Hispanic population in Peru.

- In 1775, despite all the profound economic and social differences that had developed between them, both North and South America were still composed of colonies ruled by distant kings.
- That, however, was about to change.
- On July 2, 1776 a large crowd gathered on the steps of the old trading exchange in Charleston to hear South Carolina's government declare the colony's independence from Britain.
- Some fourty years later Spanish rule was ended in Latin America.

- Yet while one revolution cemented the democratic rights of property-owners, and brought into being a federal republic that within a hundred years was the world's wealthiest country, the South American revolutions consigned all of America south of the Rio Grande to two centuries of division, instability and underdevelopment.
- Both the Spanish and the British empires experienced crises in the late 1700s. The increased regulation of transatlantic trade by the imperial authorities and the high cost of the Seven Years War (1756-63) paved the way for colonial revolts.
- But when independence was claimed by 13 of Britain's North America colonies, it was the reaction of a self-consciously libertarian society of merchants and farmers against what they saw as an over-extension of imperial authority.

- The economic problems of the war and post-war period were severe: inflation close to 400 percent at its peak in 1779, then a slump that halved per-capita income between 1774 and 1790, a mountain of debt equivalent to 62 percent of gross national product in 1790 and states imposing tariffs on each other.
- Had the revolution not progressed beyond the Articles of Confederation, then perhaps the fate of North America would have been more like that of South America – a story of fragmentation rather than unification.
- It took the constitution of 1787, the most impressive piece of political institution-building in all of history, to create a viable federal structure for the new republic.

- The constitution of 1787 created not only a Lockean quartet of powers – executive, bicameral legislature and supreme court – but also a single market, a single trade policy, a single currency, a single army and (significantly) a single law of bankruptcy for people whose debts exceeded their property – not forgetting an amendment, the Fourth, protecting the individual against 'unreasonable searches and seizures'.

- At root, it was all about property.

- Independence set the United States on the road to as yet unsurpassed prosperity and power. Yet independence from Spain left South America with an enduring legacy of conflict, poverty and inequality.

- Why did free-market capitalism and democracy fail to thrive in Latin America?

- The South American Washington should have been Simon Bolivar (1783-1830). He too overthrew an empire – Spain's. But why did he fail to create a United States of South America?
- The superficial answer lies in Bolivar's determination to centralize power and the resistance of the regional warlords who had stepped into the vacuum left by the Spanish collapse. But this is to miss three deeper difficulties.
- The first is that the South Americans had virtually no experience of democratic decision-making, of the sort that had been normal in North American colonial assemblies from the outset.
- Indeed, because power had been so concentrated in the hands of the Spanish-born *peninsulares*, the creoles has little experience of any kind of administrative responsibility.

- In Bolivar's view, the United States constitution would require 'a republic of saints' to work. Such a system could not possibly work in South America.
- So Bolivar's dream turned out to be not democracy but dictatorship, not federalism but the centralization of authority, 'because', as he had put it in the Cartagena Manifesto, 'our fellow-citizens are not yet able to exercise their rights themselves in the fullest measure, because they lack the political virtues that characterize true republicans'.
- Under the constitution he devised, Bolivar was to be dictator for life.
- He declared, "I am convinced to the very marrow of my bones that America can only be ruled by an able despotism...[We cannot] afford to place laws above leaders and principles above men."

- The second problem had to do with the unequal distribution of property itself. After all, Bolivar's own family had five large estates, covering more than 120,000 acres.
- In post-independence Venezuela, nearly all the land was owned by a creole elite of just 10,000 people – 1.1 percent of the population.
- In 1910 – on the eve of the Mexican Revolution – only 2.4 percent of household heads in rural areas owned any land at all.
- The rural property-ownership rate in the United States in 1900 was just under 75 percent.
- The third – and closely related – difficulty was that the degree of racial heterogeneity and division was much higher in South America.

- A month before his death in 1830, Simon Bolivar wrote a last despairing letter:

  "I have ruled for 20 years, and for these I have derived only a few certainties: (1) [South] America is ungovernable, for us; (2) Those who serve a revolution plough the sea, (3) The only thing one can do in America is to emigrate; (4) This country will fall inevitably into the hands of petty tyrants, of all colours and races; (5) Once we have been devoured by every crime and extinguished by utter ferocity, the Europeans will not even regard us as worth conquering; (6) If it were possible for any part of the world to revert to primitive chaos, it would be America in her final hour."

- It was a painfully accurate forecast of the next century and a half of Latin American history.

- The recent President of Venezuela Hugo Chavez styles himself the modern Bolivar. An ex-soldier with a fondness for political theatre, Chavez loves to hold forth about his 'Bolivarian revolution'.
- The reality of Chavez's regime, however, it that it is a sham democracy, in which the police and media are used as weapons against political opponents and the revenues from the country's plentiful oil fields are used to buy support from the populace in the form of subsidized import prices, handouts and bribes.
- Private property rights, so central to the legal and political order of the United States, are routinely violated. Chavez nationalizes businesses more or less at will.
- And like so many dictators, he makes a mockery of the rule of law by changing the constitution to suit himself, like in 2009 when he abolished term limits to ensure his own indefinite re-election.

How do Institutions Change?

- It can be pretty depressing to read about the history of Latin America.
- The question naturally arises, is it possible for countries to move from having bad institutions to having good institutions?
- How does it happen that countries move from having, for example, sham democracy to having real democracy?

- A remarkable paper was published in the *American Political Science Review* in 2012, called "The Missionary Roots of Liberal Democracy" by author Robert D. Woodberry. (It won the American Political Science Association's 2013 Luebbert Best Article Award.)
- In this paper, Woodberry demonstrates historically and statistically that conversionary Protestants (CPs) heavily influenced the rise and spread of stable democracy around the world.

Woodberry (2012) writes:

- "CPs were a crucial catalyst initiating the development and spread of religious liberty, mass education, mass printing, newspapers, voluntary organizations, and colonial reforms, thereby creating the conditions that made stable democracy more likely."
- "Statistically, the historical prevalence of Protestant missionaries explains about half the variation in democracy in Africa, Asia, Latin America and Oceania and removes the impact of most variables that dominate current statistical research about democracy."
- "The association between Protestant missions and democracy is consistent in different continents and subsamples, and it is robust to more than 50 controls and to instrumental variable analysis."

- Woodberry focuses on conversionary Protestants because they actively attempt to persuade others of their beliefs, they emphasize the importance of everyone reading the Bible and they believe that grace/faith/choice saves people, not group membership or sacraments.
- For conversionary Protestants, everyone needs access to the Bible, not just elites. Therefore, everyone needs to read, including women and the poor.
- Furthermore, CPs expected ordinary people to make their own religious choices.
- They believed that people are saved through "true faith in God"; thus, each individual has to decide which faith to follow.

- Woodberry also studied the effects of Catholic missions but found that Protestant missions predict democracy, whereas Catholic missions do not.

- With Catholic missions, there has not been the same emphasis on everyone reading the Bible.

- I will now present the most important regression results in Woodberry (2012).

- In the regressions, the dependent variable is *Democracy* measured as each country's mean democracy scores from 1950-94 using data from Bollen and Paxton (hereafter, BP).

- Woodberry writes, "BP's variable has many advantages: it (1) includes more countries than most variables; (2) has a range of 0-100, which allows the use of ordinary least squares (OLS); and (3) minimizes rater bias (many other democracy scales systematically favor particular types of countries)."

- For independent variables, Woodberry uses three variables that measure the impact of Protestant missions: *Years Exposure to Protestant Missions*, *Protestant Missionaries per 10,000 Population in 1923* and *Percent Evangelized by 1900*. These three variables respectively measure the length, breadth and impact of missionary activity.

- The model 1 regression equation is

$$y_i = \beta_0 + \beta_1 x_{1i} + \beta_2 x_{2i} + \beta_3 x_{3i} + \beta_4 x_{4i} + e_i, \qquad i = 1, 2, ..., n.$$

- The regression results are presented in the next slide.
- Coefficients and standard errors from robust regression (rreg in Stata).
- The constant coefficient is not shown in the table to save space.
- Notation used about statistical significance: $+ \leq .1$, $* \leq .05$, $** \leq .01$, $*** \leq .001$, two-tailed tests.
- Since several of the independent variables are skewed, Woodberry uses robust regression, which minimizes the impact of influential cases/outliers.
- However, the results are comparable using OLS or OLS with robust standard errors.

Robust Regression Predicting Democracy in "Non-West": Mean Level of Democracy from 1950-1994

Model	1	2
	Full Sample	No Dutch Colonies
Dutch Colony	-44.73**	
	(16.37)	
Years Exposure to Protestant Missions	.15***	.16***
	(.04)	(.04)
Protestant Missionaries per 10,000 pop. in 1923	4.39***	4.42***
	(1.27)	(1.32)
Percent Evangelized by 1900	.28***	.28***
	(.05)	(.05)
N	142	140
R^2 from Robust Regression	.500	.498

- The main regression result in the table is shown as the column labeled Model 1.
- One can see that all three variables related to Protestant missions strongly predict democracy (have coefficients that are positive and highly statistically significant).
- This regression is on the full sample of 142 countries in Africa, Asia, Latin America and Oceania. The sample excludes Europe, the United States, Canada, Australia and New Zealand, and thus the regression is a conservative test of CP influence.
- The R-squared of .500 indicates that the historical prevalence of Protestant missionaries explains about half the variation in democracy in Africa, Asia, Latin America and Oceania!

- In a very influential paper, economists Acemoglu, Johnson and Robinson (2001, AER) argued that "European mortality accentuated how exploitive European colonizers were and thus undermined the rule of law in high-mortality countries."
- They presented evidence that European-settler mortality influenced the development of democracy.
- However, their settler mortality data are sparse and the sample size plummets to 57.
- In the table, model 2 shows AJR's sample without controlling for settler mortality. Adding settler mortality (model 3) has no effect on the mission coefficients and the coefficient on the settler mortality rate variable is statistically insignificant.

Robust Regression Predicting Democracy in "Non-West": Mean Level of Democracy from 1950-1994

Model	1	2	3
	Full Sample	Reduced to AJR "Settler" Mortality Sample	"Settler" Mortality Sample
Years Exposure to Protestant Missions	.16*** (.04)	.26*** (.05)	.26*** (.05)
Protestant Missionaries per 10,000 pop. in 1923	4.42*** (1.32)	4.20+ (2.13)	4.16+ (2.17)
Percent Evangelized by 1900	.28*** (.05)	.18+ (.10)	.19+ (.10)
"Settler" Mortality Rate (from AJR 2001)			.001 (.005)
N	140	57	57
R^2 from Robust Regression	.498	.631	.624

- As Woodberry explains, "These regressions challenge previous research about mortality's effect on political institutions; settler mortality does not influence democracy after controls for Protestant missions."

- Woodberry ran other regressions where many other variables that are mentioned in previous studies are included in addition to the three Protestant mission variables.

- He finds that none of these other variables continue to be statistically significant once the Protestant mission variables are included.

- "Variables related to missionary access and mortality (latitude, island, landlocked), alternative means of transmission (percent European, colonizers), and resistance to mission influence (percent Muslim, written language prior to mission contact) no longer have an effect."

Robust Regression Predicting Democracy in "Non-West": Mean Level of Democracy from 1950-1994

Model	1	2
British Colony	14.61**	3.29
Other Religious Liberty Colony	24.88*	16.00
Dutch Colony	9.99	-33.59
Never Colonized Significantly	2.12	.15
Latitude	.58*	.09
Island Nation	14.17*	4.71
Landlocked Nation	-13.99*	-.88
Percent European in 1980	.19+	.13
Percent Muslim in 1970	-.21**	-.02
Major Oil Producer	-5.99	-3.97
Literate Culture before Missionary Contact	-9.77+	-3.47
Years Exposure to Protestant Missions		.13*
Protestant Missionaries per 10,000 pop. in 1923		3.63*
Percent Evangelized by 1900		.22**
N	142	142
R^2 from Robust Regression	.412	.504

- Notice that the coefficient 14.61** on the British colony variable is positive and highly statistically significant. This means that countries that are former British colonies are more likely to have stable democratic institutions.
- But when the Protestant mission variables are added to the regression, the coefficient becomes statistically insignificant (3.29). This means that former British colonies are more likely to have stable democratic institutions because they had more Protestant missionaries earlier in time.

- Notice that the coefficient .58* on the latitude variable is positive and statistically significant. This means that countries that are close to the equator (small latitude) are less likely to have stable democratic institutions.
- But when the Protestant mission variables are added to the regression, the coefficient becomes statistically insignificant (.09). This means that countries close to the equator are less likely to have stable democratic institutions because they had less Protestant missionaries earlier in time. Many missionaries died of tropical diseases like malaria and yellow fever.

- Woodberry also studied the effects of Catholic missions but found that Protestant missions predict democracy, whereas Catholic missions do not.

Robust Regression Predicting Democracy in "Non-West": Mean Level of Democracy from 1950-1994

Model	2	3
British Colony	3.29	4.98
Other Religious Liberty Colony	16.00	17.79
Dutch Colony	-33.59	-31.76
Never Colonized Significantly	.15	2.57
Latitude	.09	.11
Island Nation	4.71	5.04
Landlocked Nation	-.88	1.25
Percent European in 1980	.13	.12
Percent Muslim in 1970	-.02	-.01
Major Oil Producer	-3.97	-3.01
Literate Culture before Missionary Contact	-3.47	-3.52
Years Exposure to Protestant Missions	.13*	.13*
Protestant Missionaries per 10,000 pop. in 1923	3.63*	3.75*
Percent Evangelized by 1900	.22**	.17*
Years Exposure to Catholic Missions		.02
Foreign Catholic Priests per 10,000 pop. in 1923		.86

Robust Regression Predicting Democracy in "Non-West": Mean Level of Democracy from 1950-1994

Model	2	4
British Colony	3.29	
Other Religious Liberty Colony	16.00	
Dutch Colony	-33.59	-44.73**
Never Colonized Significantly	.15	
Latitude	.09	
Island Nation	4.71	
Landlocked Nation	-.88	
Percent European in 1980	.13	
Percent Muslim in 1970	-.02	
Major Oil Producer	-3.97	
Literate Culture before Missionary Contact	-3.47	
Years Exposure to Protestant Missions	.13*	.15***
Protestant Missionaries per 10,000 pop. in 1923	3.63*	4.39***
Percent Evangelized by 1900	.22**	.28***
N	142	142
R^2 from Robust Regression	.504	.500

- Acemoglu, Johnson and Robinson (2002, QJE) argue that Europeans instituted forced labor and extractive institutions in societies with high urbanization and population density before 1500. Thus, they claim that countries that were better off before colonization are worse off now. Pre-colonial urbanization and population density might also channel Protestant missionaries, thereby biasing mission coefficients.

- However, the following tables removes this concern as well. Reducing the sample to the 86 countries with AJR population density data makes the variable Protestant missionaries in 1923 insignificant, but the other mission variables remain highly significant. Controlling for Population Density in 1500 does not influence the missionary coefficients and reduces adjusted R-squared.

- Similarly, controlling for Urbanization in 1500 reduces the sample to 35, causing problems with collinearity (thus, one of the three missionary variables was dropped), but has no influence on the missionary variables, and adjusted R-squared decreases.

Robust Regression Predicting Democracy in "Non-West"

Model	1	6	7
	Full Sample	Reduced to 1500 Population Density Sample	1500 Population Density Sample
Dutch Colony	-44.73**	-56.98***	-57.11***
	(16.37)	(16.35)	(16.63)
Years Exposure to Protestant Missions	.15***	.21***	.21***
	(.04)	(.04)	(.05)
Protestant Missionaries per 10,000 pop. in 1923	4.39***	2.76	2.76
	(1.27)	(1.78)	(1.80)
Percent Evangelized by 1900	.28***	.31***	.31***
	(.05)	(.07)	(.07)
Population Density in 1500			-.01
			(.18)
N	142	86	86
Adjusted R^2 from OLS	.452	.539	.533

Robust Regression Predicting Democracy in "Non-West"

Model	1	8
	Full Sample	Reduced to 1500 Population Density Sample
Dutch Colony	-44.73**	
	(16.37)	
Years Exposure to Protestant Missions	.15***	.20*
	(.04)	(.08)
Protestant Missionaries per 10,000 pop. in 1923	4.39***	18.49***
	(1.27)	(5.23)
Percent Evangelized by 1900	.28***	
	(.05)	
Urbanization in 1500		.47
		(.71)
N	142	35
Adjusted R^2 from OLS	.452	.418

- As Woodberry explains, "Controlling for Protestant missions removes the effects of most variables that dominate current statistical research about democracy".
- "Much of what we think we know about the roots of democracy needs reevaluation."

History of Ideas:
Did anyone see Woodberry's findings earlier in time?

Jedidiah Morse, *A Sermon, Exhibiting the Present Dangers and Consequent Duties of the Citizens of the United States of America, Delivered at Charlestown, April 25, 1799, The Day of the National Fast.*

- "To the kindly influence of Christianity we owe that degree of civil freedom, and political and social happiness which mankind now enjoys. In proportion as the genuine effects of Christianity are diminished in any nation . . . in the same proportion will the people of that nation recede from the blessings of genuine freedom, and approximate the miseries of complete despotism. I hold this to be a truth by experience. Whenever the pillars of Christianity shall be overthown, our present republican forms of government, and all the blessings which flow from them, must fall with them."

Liberty and Property Rights

Stark (2014) writes:

- When property rights are not secure, it may be pointless to be more productive.
- If, for example, the lord leaves the peasant the same bare minimum no matter how good the crop is, it is better for the peasant to conceal some of the crop than to improve the yield.
- That has been the state of affairs in most societies throughout history – not just for the peasantry but for nearly everyone else as well.
- The Ottoman sultan, like the emperor of China, claimed ownership of everything; whenever either of them needed funds, "confiscation of the property of wealthy subjects was entirely in order," as the economist William J. Baumol (1990) observed.
- And that is precisely why the rulers of the great empires were rich but their societies were poor and unproductive.

- The Magna Carta (signed in 1215) guaranteed the property rights not only of British citizens but even of foreign merchants.
- Hence, unlike their counterparts in China, iron industrialists in England were secure against government seizure.
- Writing in 1776, the same year that James Watt perfected his steam engine, Adam Smith explained why liberty and secure property rights produce progress:

"That security which the laws of Great Britain give to every man that he shall enjoy the fruits of his own labour, is alone sufficient to make any country flourish ... The natural effort of every individual is to better his own condition, when suffered to exert itself with freedom and security, is so powerful a principle, that it is alone, and without any assistance, ... capable of carrying on the society to wealth and prosperity."

- Adam Smith (1776) continues, "In Great Britain industry is perfectly secure; and though it is far from being perfectly free, it is as free or freer than in any other part of Europe."
- In contrast, taxes were so confiscatory in France that, as Smith pointed out, the French farmer "was afraid to have a good team of horses or oxen, but endeavors to cultivate with the meanest and most wretched instruments of husbandry that he can," so that he will appear poor to the tax collector.
- Writing to a friend back in France during a visit to England, Voltaire expressed his surprise that the British farmer "is not afraid to increase the number of his cattle, or to cover his roof with tile, lest his taxes be raised next year."

Embracing Commerce

Stark (2014) writes:

- In addition to having secure property, high wages, and cheap energy, British culture was favorable to commerce.
- That made Britain different from most other societies throughout history, which generally regarded commercial activities as degrading.
- In his *Politics*, Aristotle noted that although it might be useful to explore "the various forms of acquisition" of wealth, it "would be in poor taste" to do so. He condemned commerce as unnatural, unnecessary, and inconsistent with "human virtue." Cicero wrote with contempt that "there is nothing noble about a workshop."

- As for the Romans, they considered participation in industry or commerce to be degrading. The Emperor Constantius declared, "Let no one aspire to enjoy any standing or rank who is of the lowest merchants, money-changers, lowly officers or foul agents of . . . assorted disgraceful professions."
- Freedmen were largely responsible for commercial and industrial activities in Rome. Having been slaves, they were already stigmatized and had no status at risk in such enterprises. Freedmen were, of course, at the mercy of the state, and their property was insecure.
- In China, the Mandarins held commerce in such contempt that they outlawed significant commercial enterprises.

- Similar attitudes prevailed in many parts of Europe. In 1756 the Abbe Coyer wrote: "The Merchant perceives no cluster in his career, & if he wants to succeed in what is called in France *being something*, he must give it up. This . . . does a lot of damage. In order to be *something*, a large part of the Nobility remains nothing."

- Acemoglu, Johnson and Robinson (2005, AER) find that the rise of the bourgeoisie occurred first in those European nations most involved in Atlantic trade *and* having relatively free (nonabsolutist) political institutions.

- That is why Britain and the Netherlands emerged as the first bourgeois societies, while absolutist monarchies prevailed in the other Atlantic trading nations: Spain, Portugal and France.

MIT economist Daron Acemoglu and his colleagues empirically confirmed an immense historical literature proposing that from 1500 through 1800:

- All Atlantic port cities grew much faster than did inland cities or ports on the Mediterranean. These cities were dominated by merchants engaged in import-export trading with the New World.

- Rapid urbanisation took place in Britain and the Netherlands but much less so in France and Spain, and there was a strong correlation between urbanisation and per capita income, for in cities commerce was king.

- Legal changes that greatly improved property rights (including patent laws) took place in Britain and the Netherlands but much less so or not at all elsewhere.

- Merchants came to dominate the Parliament in Britain and the Dutch States-General.

- Why absolutist states limited the rise of the bourgeois is not difficult to explain.
- By imposing a command economy, the state also sustained the nobility's status and power – and their contempt for commerce. Moreover, these states actually impeded commerce.
- In France, for example, nearly every commercial enterprise operated under a monopoly license purchased from the state; there was no competition.

- But why should Atlantic trade have spurred the rise of the bourgeoisie in non absolutist nations? Three factors were involved.
- First, vigorous Atlantic trade expanded and strengthened those merchant groups involved directly or indirectly in this trade.
- Second, as these groups grew and became rich, they gathered sufficient power to demand changes, including even more secure property rights, that expanded their ranks.
- The third factor might have been the most important one: by virtue of their success and influence, the bourgeois earned respect and dignity.

How Important are Institutions for Economic Development?

- Acemoglu, Johnson and Robinson (2001, AER) exploit differences in European mortality rates to estimate the effects of institutions on economic performance.

- Europeans adopted very different colonization policies in different colonies, with different associated institutions. In places where Europeans faced high mortality rates, they could not settle and were more likely to set up extractive institutions.

- These institutions persisted to the present. Exploiting differences in European mortality rates as an instrument for current institutions, AJR estimate large effects of institutions on income per capita. Once the effect of institutions is controlled for, countries in Africa or those close to the equator do not have lower incomes.

- AJR write, "What are the fundamental causes of the large differences in income per capita across countries? Although there is still little consensus on the answer to this question, differences in institutions and property rights have received considerable attention in recent years. Countries with better institutions, more secure property rights and less distortionary policies will invest more in physical and human capital, and will use these factors more efficiently to achieve a greater level of income.

- At some level it is obvious that institutions matter. Witness, for example, the divergent paths of North and South Korea, or East and West Germany, where one part of the country stagnated under central planning and collective ownership, while the other prospered with private property and a market economy. Nevertheless, we lack reliable estimates of the effect of institutions on economic performance. It is quite likely that rich countries choose or can afford better institutions."

- "To estimate the impact of institutions on economic performance, we need a source of exogenous variation in institutions. Our theory rests on three premises:

- 1. There were different types of colonization policies which created different sets of institutions. At one extreme, European powers set up extractive states, exemplified by the Belgian colonization of the Congo. These institutions did not introduce much protection for private property, nor did they provide checks and balances against government expropriation. In fact, the main purpose of the extractive state was to transfer as much of the resources of the colony to the colonizer.

- At the other extreme, many Europeans migrated and settled in a number of colonies, creating Neo-Europes. The settlers tried to replicate European institutions, with strong emphasis on private property and checks against government power. Primary examples of this include Australia, New Zealand, Canada and the United States."

- "2. The colonization strategy was influenced by the feasibility of settlements. In places where the disease environment was not favorable to European settlement, the cards were stacked against the creation of Neo-Europes, and the formation of the extractive state was more likely.
- 3. The colonial state and institutions persisted even after independence.
- Based on these three premises, we use the mortality rates expected by the first European settlers in the colonies as an instrument for current institutions in these countries."

- "We use data on the mortality rates of soldiers, bishops and sailors stationed in the colonies between the seventeenth and nineteenth centuries. These give a good indication of the mortality rates faced by settlers. Europeans were well informed about these mortality rates at the time, even though they did not know how to control the diseases that caused these high mortality rates.

- Colonies where Europeans faced higher mortality rates are today substantially poorer than colonies that were healthy for Europeans. Our theory is that this relationship reflects the effect of settler mortality working through the institutions brought by Europeans.

- To substantiate this, we regress current performance on current institutions, and instrument the latter by settler mortality rates. Since our focus is on property rights and checks against government power, we use the protection against risk of expropriation index from Political Risk Services as a proxy for institutions."

- "Our sample is limited to the 64 countries that were ex-colonies and for which we have settler mortality, protection against expropriation risk and GDP data."
- The next table of OLS regressions shows that there is a strong correlation between the measure of institutions and income per capita. The R^2 of the regressions indicate that over 50 percent of the variation in income per capita is associated with variation in this index of institutions.

The Importance of Institutions: OLS regressions

Model	2	6
	Log GDP per capita in 1995	Log GDP per capita in 1995
Average protection against expropriation risk, 1985-1995	0.52 (0.06)	0.41 (0.06)
Latitude		0.92 (0.63)
Asia dummy		-0.60 (0.23)
Africa dummy		-0.90 (0.17)
"Other" continent dummy (America omitted)		-0.04 (0.32)
N	64	64
R^2	0.54	0.69

- "To get a sense of the magnitude of the effect of institutions on performance, let us compare two countries, Nigeria, which has approximately the 25th percentile of the institutional measure in this sample, 5.6 and Chile, which has approximately the 75th percentile of the institutions index, 7.8.

- The estimate 0.52 indicates that there should be on average a 1.14 log-point difference between the log GDPs of the corresponding countries (or approximately a 2-fold difference).

$$\log y_c - \log y_n = \log(y_c/y_n) = .52(R_c - R_n) = .52(7.8 - 5.6) = 1.14$$

$$\Rightarrow y_c/y_n = e^{1.14} = 3.13$$

- In practice, this GDP gap is 2.53 log points (approximately 11-fold)."

$$\log y_c - \log y_n = \log(y_c/y_n) = 2.53 \Rightarrow y_c/y_n = e^{2.53} = 12.5$$

- Therefore, if the effect estimated were causal, it would imply a fairly large effect of institutions on performance, but still much less than the actual income gap between Nigeria and Chile."

- "There are a number of important reasons for not interpreting this relationship as causal.
- First, rich economies may be able to afford, or perhaps prefer, better institutions.
- Arguably more important than this reverse causality problem, there are many omitted determinants of income differences that will naturally be correlated with institutions.
- Finally, the measure of institutions are constructed ex post, and the analysts may have had a natural bias in seeing better institutions in richer places.
- As well as these problems introducing positive bias in the OLS estimates, the fact that the institutions variable is measured with considerable error and corresponds poorly to the cluster of institutions that matter in practice creates attenuation and may bias the OLS estimates downwards."

- "All of these problems could be solved if we had an instrument for institutions. Such an instrument must be an important factor in accounting for the institutional variation that we observe, but have no direct effect on performance."

Determinants of Institutions: OLS regressions

Model	7	9
	Average Protection Against Expropriation Risk in 1985-1995	Average Protection Against Expropriation Risk in 1985-1995
European settlements in 1900 (fraction of Europeans)	3.20 (0.61)	
Log European settler mortality		-0.61 (0.13)
N	66	64
R^2	0.3	0.27

- "There is a strong (first-stage) relationship between settler mortality rates and current institutions, which is interesting in its own right. The regression shows that mortality rates faced by the settlers more than 100 years ago explains over 25 percent of the variation in current institutions.
- We also document that this relationship works through the channels we hypothesize: (potential) settler mortality rates were a major determinant of settlements; settlements were a major determinant of early institutions; and there is a strong correlation between early institutions and institutions today."

IV Regression of Log GDP Per Capita

Model	1	2	3
	Log GDP per capita in 1995	Average Protection Against Expropriation Risk in 1985-1995	Log GDP per capita in 1995
Average Protection against expropriation risk 1985-1995	0.52 (0.06)		0.94 (0.16)
Log European settler mortality		-0.61 (0.13)	
N	64	64	64
R^2	0.54	0.27	
	OLS	First Stage	Two-Stage Least Squares

- "Our two-stage least-squares estimate 0.94 of the effect of institutions on performance is relatively precisely estimated and large.
- For example, it implies that improving Nigeria's institutions to the level of Chile could, in the long run, lead to as much as a 7-fold increase in Nigeria's income.

$$\log y_c - \log y_n = \log(y_c/y_n) = .94(R_c - R_n) = .94(7.8 - 5.6) = 2.068$$
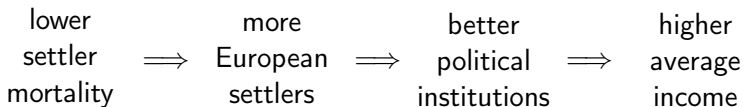
$$\Rightarrow y_c/y_n = e^{2.068} = 7.91$$

- (In practice Chile is over 11 times as rich as Nigeria).
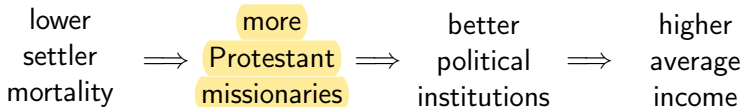
$$y_c/y_n = e^{2.53} = 12.5$$

- Overall, the results show a large effect of institutions on economic performance."

- "The exclusion restriction implied by our instrumental variable regression is that, conditional on the controls included in the regression, the mortality rates of European settlers more than 100 years ago have no effect on GDP per capita today, other than their effect through institutional development.

- The major concern with this exclusion restriction is that the mortality rates of settlers could be correlated with the current disease environment, which may have a direct effect on economic performance. In this case, our instrumental-variables estimates may be assigning the effects of diseases on income to institutions.

- We believe that this is unlikely to be the case and that our exclusion restriction is plausible. The great majority of European deaths in the colonies were caused by malaria and yellow fever. Although these diseases were fatal to Europeans who had no immunity, they had limited effect on indigenous adults who have developed various types of immunities. These diseases are therefore unlikely to be the reason why many countries in Africa and Asia are very poor today."

AJR (2001) interpret their regression results this way:

| lower settler mortality | $\implies$ | more European settlers | $\implies$ | better political institutions | $\implies$ | higher average income |

Here is a better interpretation of the same regression results:

| lower settler mortality | $\implies$ | more Protestant missionaries | $\implies$ | better political institutions | $\implies$ | higher average income |

Reversal of Fortune

- Among countries colonized by European powers during the past 500 years, those that were relatively rich in 1500 are now relatively poor.
- Acemoglu, Johnson and Robinson (2002, QJE) document this reversal using data on urbanization patterns and population density, which they argue, proxy for economic prosperity.
- This reversal weighs against a view that links economic development to geographic factors. Instead, they argue that the reversal reflects changes in the institutions resulting from European colonialism. The European intervention appears to have created an "institutional reversal" among these societies, meaning that Europeans were more likely to introduce institutions encouraging investment in regions that were previously poor.

- AJR write, "This paper documents a reversal in relative incomes among the former European colonies. For example, the Mughals in India and the Aztecs and Incas in the Americas were among the richest civilizations in 1500, while the civilizations in North American, New Zealand and Australia were less developed. Today the United States, Canada, New Zealand and Australia are an order of magnitude richer than the countries now occupying the territories of the Mughal, Aztec and Inca Empires.

- Our main measure of economic prosperity in 1500 is urbanization. Bairoch and de Vries argue that only areas with high agricultural productivity and a developed transportation network can support large urban populations. We present evidence that there is a close association between urbanization and income per capita.

- With this measure, there is a negative association between economic prosperity in 1500 and today." The next table shows a negative relationship between the percent of the population living in towns with more than 5000 inhabitants in 1500 and income per capita today.

Urbanization and GDP Per Capita

Model	1	2
	Log GDP per capita in 1913	Log GDP per capita in 1995
Urbanization in 1913	0.038 (0.006)	
Urbanization in 1500		-0.078 (0.026)
R^2	0.69	0.19
N	22	41

- AJR write, "It is important to note that this is not simply mean reversion – i.e., richer than average countries reverting back to the mean. It is a reversal. To illustrate this, let us compare Uruguay and Guatemala. The native population in Uruguay had no urbanization, while, Guatemala has an urbanization rate of 9.2 percent. The estimate 0.038 for the relationship between income and urbanization implies that Guatemala at the time was approximately 42 percent richer that Uruguay."

$$\log y_g - \log y_u = 0.038(U_g - U_u) = 0.038(9.2 - 0) = 0.3496$$

$$\Rightarrow \log(y_g/y_u) = 0.3496 \Rightarrow y_g/y_u = e^{0.3496} = 1.42 \text{ in } 1500$$

"According to our estimate -0.078, we expect Uruguay today to be 105 percent richer than Guatemala, which is approximately the current difference in income per capita between these two countries."

$$\log y_u - \log y_g = -0.078(U_u - U_g) = -0.078(0 - 9.2) = 0.7176$$

$$\Rightarrow \log(y_u/y_g) = 0.7176 \Rightarrow y_u/y_g = e^{0.7176} = 2.05 \text{ in } 1995$$

- AJR write, the view "which we believe provides the best explanation for the patterns we document is the institutions hypothesis, relating differences in economic performance to the organization of society.

- Societies that provide incentives and opportunities for investment will be richer than those that fail to do so. We hypothesize that a cluster of institutions ensuring secure property rights for a broad cross section of society, which we refer to as institutions of private property, are essential for investment incentives and successful economic performance.

- In contrast, extractive institutions, which concentrate power in the hands of a small elite and create a high risk of expropriation for the majority of the population, are likely to discourage investment and economic development. Extractive institutions, despite their adverse effects on aggregate performance, may emerge as equilibrium institutions because they increase the rents captured by the groups that hold political power."

- "European colonialism led to the development of institutions of private property in previously poor areas, while introducing extractive institutions or maintaining existing extractive institutions in previously prosperous places.
- The main reason for the institutional reversal is that relatively poor regions were sparsely populated, and this enabled or induced Europeans to settle in large numbers and develop institutions encouraging investment.
- In contrast, a large population and relative prosperity made extractive institutions more profitable for the colonizers; for example, the native population could be forced to work in mines and plantations, or taxed by taking over existing tax and tribute systems."

Urbanization and Institutions

Model	1	2
	Average Protection Against Expropriation Risk in 1985-1995	Constraint on executive in 1990
Urbanization in 1500	-0.107 (0.043)	-0.154 (0.066)
N	42	41
R^2	0.14	0.12

IV Regression of Log GDP Per Capita

Model	1	2
	Average Protection Against Expropriation Risk in 1985-1995	Log GDP per capita in 1995
Average Protection against expropriation risk 1985-1995		0.52 (0.10)
Urbanization in 1500	-0.042 (0.035)	0.024 (0.021)
Log European settler mortality	-1.21 (0.23)	
N	38	38
R^2	0.53	
	First Stage	Two-Stage Least Squares

- In the previous table, the mortality rate faced by settlers is used as an instrument for settlements of Europeans in the colonies and the subsequent institutional development of these countries. In areas with high mortality Europeans did not settle and were more likely to develop extractive institutions.

- The table provides evidence suggesting that institutional differences statistically account for the reversal in relative incomes. If the institutional reversal is the reason why there is a reversal in income levels among the former colonies, then once we account for the role of institutions appropriately, the reversal should disappear. This is what model 2 shows, since the 2SLS estimate 0.024 is statistically insignificant.

- "Why did European colonialism lead to an institutional reversal? In prosperous and densely settled areas, Europeans introduced or maintained already-existing extractive institutions to force the local population to work in mines and plantations, and took over existing tax and tribute systems. In contrast, in previously sparsely settled areas, Europeans settled in large numbers and created institutions of private property, providing secure property rights to a broad cross section of the society and encouraging commerce and industry."
- "While societies with extractive institutions or those with highly hierarchical structures could exploit available agricultural technologies relatively effectively, the spread of industrial technology required the participation of a broad cross section of the society – the smallholders, the middle class, and the entrepreneurs. The age of industry, therefore, created a considerable advantage for societies with institutions of private property."

AJR (2002) interpret their regression results this way:

$$\begin{array}{ccccccc} \text{lower} & & \text{more} & & \text{better} & & \text{higher} \\ \text{settler} & \Longrightarrow & \text{European} & \Longrightarrow & \text{political} & \Longrightarrow & \text{average} \\ \text{mortality} & & \text{settlers} & & \text{institutions} & & \text{income} \end{array}$$

Here is a better interpretation of the same regression results:

$$\begin{array}{ccccccc} \text{lower} & & \text{more} & & \text{better} & & \text{higher} \\ \text{settler} & \Longrightarrow & \text{Protestant} & \Longrightarrow & \text{political} & \Longrightarrow & \text{average} \\ \text{mortality} & & \text{missionaries} & & \text{institutions} & & \text{income} \end{array}$$

The American "Miracle"

Stark (2014) writes:

- When the Industrial Revolution began in Britain in about 1750, North America had hardly any manufacturing, aside from a large shipbuilding industry based on plentiful local supplies of timber and other materials (in 1773 American shipyards built 638 oceangoing vessels).

- Ships aside, manufacturing in America was limited to small workshops making items such as shoes, horse harnesses, nails and simple hand tools for the local market.

- Nearly everything else in the way of manufactured goods was imported from England.

- A century later the United States was catching up to Britain as a manufacturing power, and in fact the Americans soon surpassed the British and everyone else.

Table 17.1 in Stark (2014):
Percentage Shares of the World's Manufacturing Output

Nation	1870	1900	1929
Great Britain	31.8	14.7	9.4
United States	23.3	35.3	42.2
Germany	13.2	15.9	11.6
France	10.3	6.4	6.6
Russia	3.7	5.0	4.3
Belgium	2.9	2.2	1.9
Italy	2.4	3.1	3.3
Canada	1.0	2.0	2.4
Sweden	0.4	1.1	1.0
India	–	1.1	1.2
Japan	–	0.6	2.5
Finland	–	0.3	0.4

- In 1870 Great Britain produced about a third (31.8 percent) of all the world's manufactured goods and the United States produced about a quarter (23.3 percent).
- By 1900 the United States was producing more than a third (35.3 percent) of all the world's manufacturing output, compared with 14.7 percent produced by Great Britain and 15.9 percent by Germany.
- By 1929 the United States dwarfed the world as a manufacturing power, producing 42.2 percent of all goods, compared with Germany's 11.6 percent and Britain's 9.4.

Why did the US become the richest country in the world?

- Ferguson (2011) attributes the amazing economic success of the United States in the 1800s to the US Constitution of 1787 ("the most impressive piece of political institution-building in all of history").
- But what was it about the US Constitution of 1787 that helped the US shoot up to become the richest country in the world?
- The whole constitution is worthy of careful study but we focus here on four features:

The signing of the US Constitution in Philadelphia on September 17, 1787. George Washington is standing in the middle, chairing the meeting. To the right of Washington stands James Madison holding a pen.

- 1. Thanks to the US Constitution of 1787, the US became the world's first large free trade zone, since the Constitution prohibited tariffs on trade between US states. For example, New York could no longer impose any tariff on imports from Pennsylvania. Prior to 1787, New York's main source of tax revenue was tariffs on imports (from other US states and from European countries).

- Article 1, Section 8, Clause 1 states, "The Congress shall have power to lay and collect taxes, duties, imposts and excises, to pay the debts and provide for the common defense and general welfare of the United States; but all duties, imposts and excises shall be uniform throughout the United States."

- Article 1, Section 9, Clause 5 states, "No tax or duty shall be laid on articles exported from any State."

- Article 1, Section 10, Clause 2 states, "No state shall, without the consent of the Congress, lay any imposts or duties on imports or exports,. . . and the net produce of all duties and imposts, laid by any State on imports or exports, shall be for the use of the Treasury of the United States; and all such laws shall be subject to the revision and control of Congress."

- Europe did not do something similar until 6 countries (Belgium, France, West Germany, Italy, Luxembourg, Netherlands) formed the Common Market in 1957. Thus, the US experienced the gains from free trade to a greater extent than Europe from 1787 to 1957.

- 2. Thanks to the US Constitution of 1787, the US became the world's most inventor-friendly country. Inventors would just have to apply once for a patent, and if granted, it would apply to all US states. To get comparable patent protection in Europe, inventors would have to apply for patents in many European countries, each with its own distinct rules (and high application fees).

- Article 1, Section 8, Clause 8 states: "The Congress shall have power to promote the progress of Science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."

- 3. Thanks to the US Constitution of 1787, the US government could not use its tax system to redistribute income from the rich to the poor (from high income states to low income states). "Soak the rich" income taxes were effectively prohibited, making the United States even more inventor-friendly.

- Article 1, Section 2, Clause 3 states: "Representatives and direct taxes shall be apportioned among the several States which may be included within this Union, according to their respective numbers."

- 4. Thanks to the US Constitution of 1787, the previously-mentioned laws cannot be easily changed. Amendments are possible but it takes a super-majority of voters to amend any law specified in the US Constitution.

- Article 5 states: "The Congress, whenever two-thirds of both Houses shall deem it necessary, shall propose Amendments to this Constitution,..., which shall be valid to all intents and purposes, as part of this Constitution, when ratified by the legislatures of three-fourths of the several States..."

- The US Constitution was not amended to allow for redistributive income taxation until 1913 (the 16th Amendment). The previously-mentioned 'free trade zone' and 'US patent office' features have never been amended and are still in effect.

- The moral values underlying the US Constitution of 1787 are best articulated by John Adams:

  "It is agreed that the end of all government is the good and ease of the people in a secure enjoyment of their rights without oppression. But it must be remembered that the rich are *people* as well as the poor, that they have rights as well as others, that they have as clear and as *sacred* a right to their large property as others have to theirs which is smaller; that oppression to them is possible and as wicked as to others; that stealing, robbing, cheating are the same crimes and sins, whether committed against them or others."

- "The rich, therefore, ought to have an effectual barrier in the constitution against being robbed, plundered, and murdered, as well as the poor . . . The poor should have a bulwark against the same dangers and oppressions . . . In every society where property exists, there will ever be a struggle between rich and poor . . . They will either be made by numbers to plunder the few who are rich, or by influence to fleece the many who are poor. Both rich and poor, then, must be made independent, that equal justice may be done and equal liberty enjoyed by all."

The Importance of Patents

Stark (2014) writes:

- The US founding fathers regarded patent rights as so important that they wrote them into the Constitution: Article 1, Section 8, states: "The Congress shall have power ... to promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries."

- In keeping with this mandate, in 1790 Congress passed the U.S. Patent Act, which gave inventors an exclusive right to their inventions for a period of 14 years. This was later amended to 21 years.

- By 1836 10,000 patents had been registered.

- Then came an inventive explosion, and by 1911 one million patents had been granted.

- A key representative of this inventive explosion was Thomas Alva Edison (1847-1931).
- It could be said that Edison invented modern life, as he was responsible for the electric lightbulb, recorded sound, movies, the fluoroscope, great improvements to the telephone and telegraph, and basic research on electric railroads – a total of 1,093 patents.
- But his most important contribution was to invent the research laboratory. Edison's laboratory in Menlo Park, New Jersey, was so successful at discovering needs and solutions that it became known as the "invention factory."

  [In the model of intellectual property rights, stronger protection of private property leads to more technology transfer, more R&D employment, more innovation and higher long-run consumer welfare $(\iota \downarrow \Rightarrow \phi \uparrow, L_{Ft} \uparrow, \delta_N \uparrow, u_{S0} \uparrow)$.]

Explaining the Differences

- In 1870, Great Britain lead to world producing 31.8% of manufacturing output. But by 1929, the United States had overtaken the British, producing an amazing 42.2% of the world's manufacturing output.

- What enabled the United States to catch up and pass the British? One important reason is that the United States had a better patent system than the British.

- In "An Economic History of Patent Institutions," B. Zorina Khan (2008) expains the differences. Starting with the British patent system, she writes:

- The grant of exclusive property rights vested in patents developed from medieval guild practices in Europe. Britain in particular is noted for the establishment of a patent system which has been in continuous operation for a longer period than any other in the world.

- English monarchs frequently used patents to reward favorites with privileges, such as monopolies over trade that increased the retail prices of commodities. It was not until the seventeenth century that patents were associated entirely with awards to inventors, when the Statute of Monopolies in 1624 repealed the practice of royal monopoly grants to all except patentees of inventions. The Statute of Monopolies allowed patent rights of fourteen years for "the sole making or working of any manner of new manufacture within this realm to the first and true inventor..."

- The British patent system established significant barriers in the form of prohibitively high costs that limited access to property rights in inventions to a privileged few. Patent fees for England alone amounted to £100-£120 ($585) or approximately four times per capita income in 1860. Patents could be extended only by a private Act of Parliament, which required political influence, and extensions could cost as much as £700.

- These constraints favored the elite class of those with wealth, political connections or exceptional technical qualifications, and consciously created disincentives for inventors from humble backgrounds. Patent fees provided an important source of revenues for the Crown and its employees, and created a class of administrators who had strong incentives to block proposed reforms.

- In addition to the monetary costs, complicated administrative procedures that inventors had to follow implied that transaction costs were also high. Patent applications for England alone had to pass through seven offices, from the Home Secretary to the Lord Chancellor, and twice required the signature of the Sovereign. If the patents were extended to Scotland and Ireland it was necessary to negotiate another five offices in each country. These features testify to the much higher monetary and transactions costs of obtaining property rights to inventions in England in comparison to the United States.

- Such costs essentially restricted the use of the patent system to inventions of high value and to applicants who already possessed or could raise sufficient capital to apply for the patent. The complicated system also inhibited the diffusion of information and made it difficult, if not impossible, for inventors outside of London to readily conduct patent searches. Patent specifications were open to public inspection on payment of a fee, but until 1852 they were not officially printed, published or indexed. Since the patent could be filed in any of three offices in Chancery, searches of the prior art involved much time and inconvenience.

- The United States stands out as having established one of the most successful patent systems in the world. Over six million patents have been issued since 1790, and American industrial supremacy has frequently been credited to its favorable treatment of inventors and the inducements held out for inventive activity.

- The first Article of the U.S. Constitution included a clause to "promote the Progress of Science and the useful Arts by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries." Congress complied by passing a patent statute in 1790. The United States created in 1836 the first modern patent institution in the world, a system whose features differed in significant respects from those of the other major countries.

- The historical record indicates that the legislature's creation of a uniquely American system was a deliberate and conscious process of promoting open access to the benefits of private property rights in inventions. The laws were enforced by a judiciary which was willing to grapple with difficult questions such as the extent to which a democratic and market-oriented political economy was consistent with exclusive rights. Courts explicitly attempted to implement decisions that promoted economic growth and social welfare.

- The primary feature of the "American system" is that all applications are subject to an examination for conformity with the laws and for novelty. An examination system was set in place in 1790, when a select committee consisting of the Secretary of State (Thomas Jefferson), the Attorney General and the Secretary of War scrutinized the applications. These duties proved to be too time-consuming for highly ranked officials who had other onerous duties, so three years later it was replaced by a registration system. The validity of patents was left up to the district courts, which had the power to set in motion a process that could end in the repeal of the patent.

- However by the 1830s this process was viewed as cumbersome and the statute that passed in 1836 set in place the essential structure of the current patent system. In particular, the 1836 Patent Law established the Patent Office, where trained and technically qualified employees were authorized to examine applications.

- Employees of the Patent Office were not permitted to obtain patent rights. In order to constrain the ability of examiners to engage in arbitrary actions, the applicant was given the right to file a bill in equity to contest the decisions of the Patent Office with the further right of appeal to the Supreme Court of the United States.

- American patent policy likewise stands out in its insistence on affordable fees. The legislature debated the question of appropriate fees, and the first patent law in 1790 set the rate at the minimal sum of $3.70 plus copy costs. In 1793 the fees were increased to $30, and were maintained at this level until 1861. In that year, they were raised to $35, and the term of the patent was changed from fourteen years (with the possibility of an extension) to seventeen years (with no extensions).

- The 1869 Report of the Commissioner of Patents compared the $35 fee for a US patent to the significantly higher charges in European countries such as Britain, France, Russia ($450), Belgium ($420) and Austria ($350). The Commissioner speculated that both the private and social costs of patenting were lower in a system of impartial specialized examiners, than under a system where similar services were performed on a fee-per-service basis by private solicitors. He pointed out that in the U.S. the fees were not intended to exact a price for the patent privilege or to raise revenues for the state – the disclosure of information was the sole price for the patent property right – rather, they were imposed merely to cover the administrative expenses of the Office.

- American laws employed the language of the English statute in granting patents to "the first and true inventor." Nevertheless, unlike in England, the phrase was used literally, to grant patents for inventions that were original in the world, not simply within U.S. borders.

- American patent laws provided strong protection for citizens of the United States, but varied over time in its treatment of foreign inventors. After 1861 patent rights were available to all applicants on the same basis without regard to nationality.

- The American patent system was based on the presumption that social welfare coincided with the individual welfare of inventors. Accordingly, legislators rejected restrictions on the rights of American inventors. Working requirements or compulsory licenses were regarded as unwarranted infringements of the rights of "meritorious inventors," and incompatible with the philosophy of U.S. patent grants. Patentees were not required to pay annuities to maintain their property, there were no opposition proceedings, and once granted a patent could not be revoked unless there was proven evidence of fraud.

- Numerous reported decisions before the early courts declared that, rather than unwarranted monopolies, patent rights were "sacred" and to be regarded as the just recompense to inventive ingenuity.

Evidence about Economic Freedom

Wayne Grudem and Barry Asmus (2013, *The Poverty of Nations*) write:

- A free-market system is one in which economic production and consumption are determined by the free choices of individuals rather than governments, and this process is grounded in private ownership of the means of production.
- In very simple, practical terms, a free-market system means that people, not the government, owns the firms, businesses and properties in a nation.
- In addition, the people "own" themselves in the sense that they have the freedom to choose where to work. The government does not decide where they work (as in slavery or in communism).

- The genius of a free-market system is that it does not try to compel people to work. It rather leaves people free to choose to work, and it rewards that work by letting people keep the fruits of their labor. In a free market, no government officials have to force people to work. The government simply has to get out of the way and let the free market work all by itself (with some appropriate restraints on crime).
- The rule of law is important to a free-market system. It prevents thieves and other criminals from taking away people's economic freedom by taking their property through fraud, deceit, or force.
- Some laws are necessary to protect the idea of a free market, because the idea of free, voluntary exchanges is violated when people steal from, cheat, or deceive others, or when people do not have the information they need to make informed decisions. Therefore, a proper understanding of a free market includes laws against theft, fraud, the violation of contracts, and the sale of defective and dangerous products.

- From time to time when we mention free markets in our seminars, someone in the audience objects: "There is no such thing as a free-market system today, because all economies have a mixture of private ownership and government ownership and control." The discussion then becomes confused because the relabeling implies that different economic systems are mostly the same.

- We think it does make sense [to talk about a "free-market system"] because there are real differences between economic systems from country to country. The national economies of the world can be numerically arranged along a scale from "free" to "unfree." One such ranking has been published annually for the last eighteen years by the Heritage Foundation and *The Wall Street Journal*.

- In order to determine how free an economy is, each year the researchers score 179 countries according to ten factors grouped into four categories:

  A. Rule of Law (1. Property Rights 2. Freedom from corruption)
  B. Limited Government (3. Fiscal freedom 4. Government Spending)
  C. Regulatory efficiency (5. Business freedom 6. Labor freedom 7. Monetary freedom)
  D. Open markets (8. Trade freedom 9. Investment freedom 10. Financial freedom)

- Each country is ranked on an economic freedom scale from 0 to 100. In the *2012 Index of Economic Freedom*, Hong Kong scored the highest (89.9), then Singapore (87.5), Australia (83.1), New Zealand (82.1) and Switzerland (81.1). These five are considered "free" by this publication.

- The researchers then listed twenty-three countries that are "mostly free," including Canada (79.9), Chile (78.3), Mauritius (77.0), Ireland (76.9), the United States (76.3), and eighteen others. For purposes of our study, these top twenty-eight countries may be considered to have free-market systems or mostly free-market systems.
- Sadly, eighty-eight countries still fall at the lower end of the scale: sixty countries rank as "mostly unfree," and below them another twenty-eight rank as "repressed." These countries score poorly in all ten categories of economic freedom. Such countries do not have free-market systems. The lowest ten are Equatorial Guinea (42.8), Iran (42.3), the Democratic Republic of the Congo (41.1), Myanmar (38.7), Venezuela (38.1), Eritrea (36.2), Libya (35.9), Cuba (28.3), Zimbabwe (26.3), and North Korea (1).

- In today's world, there is a strong correlation between economic freedom and prosperity. Those countries that have the highest levels of economic freedom (as measured by the *2012 Index of Economic Freedom*) also have the highest per capita incomes (GDP Per Capita, purchasing power parity).
- For Europe, the five most free countries have per capita income $46,593 and the five least free countries have per capita income $13,595.
- For Asia-Pacific, the five most free countries have per capita income $40,830 and the five least free countries have per capita income $3,400.

- For the Middle East and North Africa, the five most free countries have per capita income \$39,063 and the five least free countries have per capita income \$7,885.
- For the Americas, the five most free countries have per capita income \$25,198 and the five least free countries have per capita income \$8,243.
- For Sub-Suharan Africa, the five most free countries have per capita income \$8,989 and the five least free countries have per capita income \$1,514.

More Evidence

- Each year the Frazer Institute in Canada publishes a ranking of countries called *Economic Freedom of the World Index*. Milton Friedman (1976 economics Nobel prize) was heavily involved in the design of this index.
- For 2016, 162 countries were ranked based on the degree of economic freedom in five broad areas:
  1. Size of Government,
  2. Legal System and Property Rights,
  3. Sound Money,
  4. Freedom to Trade Internationally,
  5. Regulation.

- 1. Size of Government: As government spending, taxation, and the size of government-controlled enterprises increases, government decision-making is substituted for individual choice and economic freedom is reduced.
- 2. Legal System and Property Rights: Protection of persons and their rightfully acquired property is a central element of both economic freedom and civil society. Indeed, it is the most important function of government.

- 3. Sound Money: Inflation erodes the value of rightfully earned wages and earnings. Sound money is thus essential to protecting property rights. When inflation is not only high but also volatile, it becomes difficult for individuals to plan for the future.
- 4. Freedom to Trade Internationally: Freedom in exchange – in its broadest sense, buying, selling. making contracts, and so on – is essential to economic freedom, which is reduced when freedom to exchange does not include businesses and individuals in other nations.
- 5. Regulation: Governments not only use a number of tools to limit the right to exchange internationally, they may also develop onerous regulations that limit the right to exchange, gain credit, hire or work for whom you wish, or freely operate your business.
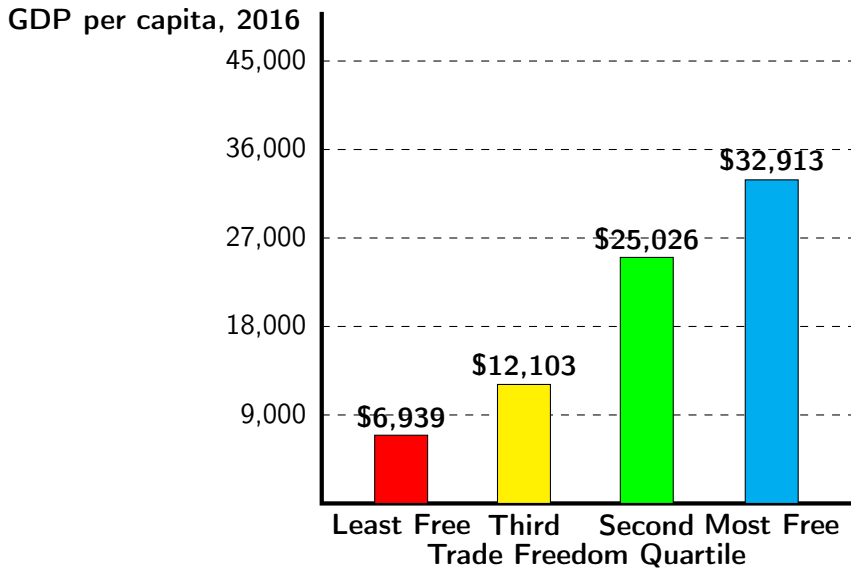
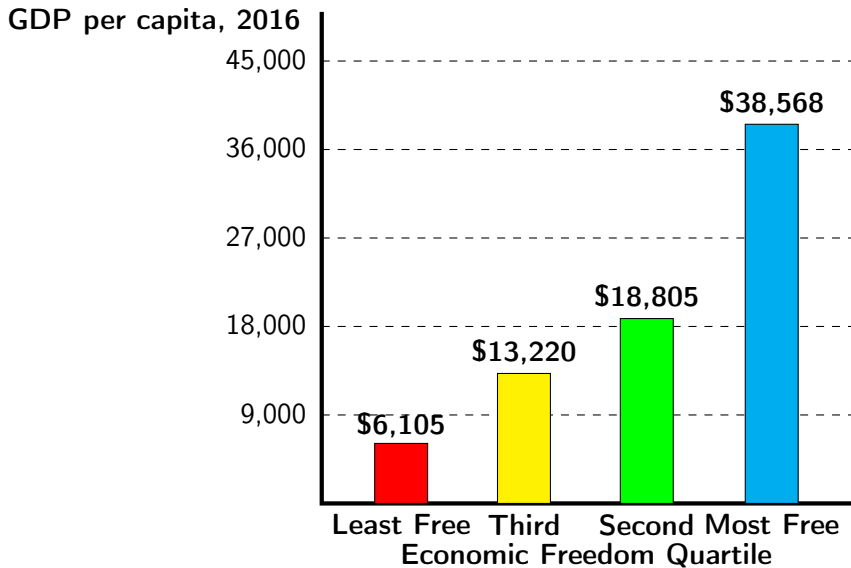Figure: Trade Freedom and Income per Capita.

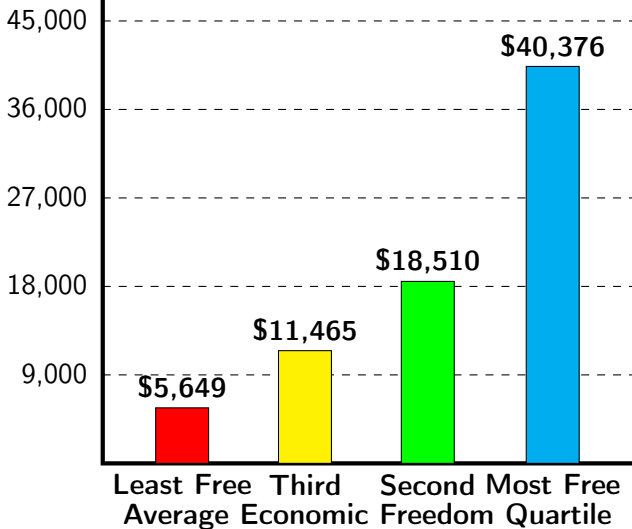Figure: Economic Freedom and Income per Capita.

Figure: Average Economic Freedom During 1995-2016 and Income per Capita.

- Because persistence is important and the impact of economic freedom will be felt over a lengthy time period, it is better to use the average rating over a fairly long time span rather than the current rating to observe the impact of economic freedom on performance.

- The share of income earned by the poorest 10% of the population is unrelated to economic freedom:

Average Economic Freedom Score, 1995-2016, Quartile	Income share (Bottom 10%) 2016
Most Free	2.74%
Second	2.38%
Third	2.52%
Least Free	2.47%

- The amount of income, as opposed to the share, earned by the poorest 10% of the population is much higher in countries with higher economic freedom:

Average Economic Freedom Score, 1995-2016, Quartile	Annual income per capita of poorest 10% 2016
Most Free	$10,660
Second	$3,721
Third	$2,774
Least Free	$1,345

- Life expectancy is about 15 years longer in countries with the most economic freedom than in countries with the least:

Average Economic Freedom Score, 1995-2016, Quartile	Life expectancy at birth, total years, 2016
Most Free	79.45
Second	73.47
Third	70.76
Least Free	64.40

- Greater economic freedom is associated with more political rights. Countries with democratic institutions are likely to score much higher on economic freedom than countries ruled by dictators:

Average Economic Freedom Score, 1995-2016, Quartile	Political Rights, 1=best, 7=worst 2016
Most Free	1.98
Second	3.38
Third	3.49
Least Free	4.74

Some questions economists almost never ask:

- Why do some countries have higher levels of economic freedom than others?
- Why do some countries have more democratic political institutions than others?
- Could it be that economic freedom and democracy have a common cause?

Table 4.1 in Harrison (2006, *The Central Liberal Truth*)

Hist. Dom. Religion	Countries	Population (in millions)	Per Capita GDP (2002)
Protestant	US, Germany Sweden, UK	530	$29,784
Jewish	Israel	6	$19,320
Catholic	France, Italy Spain, Brazil	904	$9,358
Orthodox	Greece, Russia Romania, Ukraine	262	$7,045
Confucian	South Korea, China Japan, Singapore	1491	$6,691
Buddhist	Thailand, Cambodia Laos, Mongolia	146	$4,813
Islam	Saudi Arabia, Egypt Morocco, Pakistan	1122	$3,142
Hindu	India, Nepal	1041	$2,390

Final Quote

- Albert Einstein (1921 Nobel Prize in Physics), wrote:

  Being a lover of freedom, when the [National Socialist] revolution came I looked to the universities to defend it, knowing that they had always boasted of their devotion to the cause of truth; but no, the universities were immediately silenced. Then I looked to the great editors of the newspapers, whose flaming editorials in days gone by had proclaimed their love of freedom; but they, like the universities, were silenced in a few short weeks.

  Only the Church stood squarely across the path of Hitler's campaign for suppressing the truth. I never had any special interest in the Church before, but now I feel a great affection and admiration for it because the Church alone has had the courage and persistence to stand for intellectual and moral freedom. I am forced to confess that what I once despised I now praise unreservedly.