

Robert U. Ayres

THE HISTORY AND FUTURE OF ECONOMICS



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Contents

1	From Pre-history to the Crusades	1
2	From the Crusades to the Renaissance	9
3	The Protestant Work Ethic and the Rise of Capitalism as Gods Work	19
4	The Enlightenment: From Leonardo to Galileo	31
5	The Rise of the East India Trading Companies	43
6	The “Glorious Revolution” and the BoE	57
7	Laissez-Faire and John Law’s Premature Invention of “Futures”	73
8	Classical Economics as Moral Philosophy	87
8.1	On Trade, Mercantilism and ‘Laissez Faire’	87
8.2	Adam Smith and the Invisible Hand	94
8.3	Thomas Malthus and the Principle of Population	98
8.4	David Ricardo and Value-Added	102
8.5	Marx’s Labor Theory of Value	108
8.6	The Communist Manifesto	110
9	Bentham and Utilitarianism	113
9.1	Precursors	113
9.2	Utilitarianism	114

9.3	Benthamites	118
9.4	Say's Law of Markets: A View from an Entrepreneur	119
9.5	Sismondi: Booms and Busts	121
9.6	Dialectical Materialism and Academic Marxism	123
10	The Rise of Physics: From Newton to Einstein	127
10.1	Background	127
10.2	Variables	128
10.3	Mathematics	133
10.4	Crossing Disciplinary Boundaries	137
10.5	The Steam Engine	139
10.6	Falsification of Phlogiston	142
11	Energetics	147
11.1	Heat as Energy	147
11.2	The First and Second Laws of Thermodynamics	151
11.3	Entropy and Statistical Mechanics	154
11.4	Order and Disorder; Self Organization	158
12	Evolutionary Theory and Genetics	161
12.1	The Age of the Earth	161
12.2	The Idea of Species: Fossils and Extinction	163
12.3	Darwin's Theory of Natural Selection	166
12.4	Mendel's Theory of Inheritance	168
12.5	The Tree of Life	170
12.6	From Vitalism to Monism (Again)	172
13	Entropy, Exergy, Information and Complexity	179
13.1	Background	179
13.2	Complexity	180
13.3	Sources of Exergy in the Cosmos	184
13.4	The Standard Model of Physics	186
13.5	Entropy and Information	189
14	The "Marginal Revolution" in Economics	195
14.1	Mathematics in Economics	195
14.2	The Theory of Utility	197
14.3	Alfred Marshall and the Supply–Demand Diagram	200
14.4	On the Causes of the Great Depression	203
14.5	The Problem of Growth	209
14.6	The Production Function and the Solow-Swan Model	214

14.7	The Next Step: Adding a Third Variable to the C-D Function	217
14.8	Evolutionary Game Theory	222
15	Socialism and the Welfare State	231
15.1	Antecedents	231
15.2	Political Marxism	236
15.3	Utopian Socialism and Consumer Cooperatives	239
15.4	Henry George	241
15.5	Leo Tolstoy and Mahatma Gandhi	244
15.6	Social Democracy as an Antidote to Marxism	251
15.7	The Creation of the US Federal Reserve Bank	255
16	Keynes v. Hayek and the Monetarists	259
16.1	The Great Divide from the Old World to the New	259
16.2	From Woodrow Wilson to Adolph Hitler	261
16.3	Unemployment and Financial Crises	272
16.4	Unemployment and Wages, Short Run Versus Long Run	281
16.5	Money Creation and Monetary Policy	283
16.6	What Causes Recessions and Busts?	296
16.7	The Other Side of Capitalism	301
16.8	The End of the Gold Standard, Hayek and the Washington Consensus	306
16.9	SVM, Buybacks and Inequality	314
16.10	Positive Returns: Short Term Versus Long Term	320
17	The Future of Economics and the Economics of the Future	325
17.1	The Population Problem	325
17.2	The Problem of Resource Exhaustion	328
17.3	Pollution as an Inevitable By-Product of Extraction and Industrial Production	334
17.4	Energy Economics: The Price of Energy	338
17.5	The Avalanche Model	339
17.6	The Sources of Value	345
17.7	The Circular Economy?	348

Appendix A: Bio-Geochemical Cycles	355
Appendix B: Climate Change: The Externality that Makes Everything Else Irrelevant	375
Appendix C: The Rise and Fall of the Nuclear Dream	391
Appendix D: Capsule History	401



1

From Pre-history to the Crusades

Humans appear to be among the most sociable and territorial of all animals. The primary resource of primitive tribes, was territory in which to search for food. Land is the source of all biological and mineral resources. Since prehistory it has been “improved” by forest clearing, wild animal capture and breeding, agriculture, and irrigation. If the territory available to a tribe is inadequate (or is perceived to be inadequate) to support the population, leaders try to increase the territory under control by conquest. Throughout human history, the most effective leaders are remembered by their conquests. We make statues of “great” conquerors (usually on horseback) from Cyrus the Great to Alexander the Great, to Julius Cesar, to Attila the Hun, to Genghis Khan, to Tamerlane, Charlemagne, to Peter the Great, Napoleon Bonaparte, Frederick the Great, Catherine the Great... the names are familiar.

Conquest of land for agricultural colonization is now out of style. Adolf Hitler’s stated goal of acquiring (by conquest) “Lebensraum” for German-Aryan colonists in Russia was a “pipe dream” from the start. Mr. Putin’s dream of re-establishing the USSR seems is almost certainly another pipe dream. Conquest of territory, today, is accomplished by multi-national companies, by means of brands, not armies. Coca Cola and McDonalds are exemplars. (The continuing violence in the Middle East has its origins partly in competition for oil but mainly in Religious history.)

The concept of markets is so fundamental to economics that we are tempted to assume that no explanation is needed. We know a market when we see one. It is a congregation of buyers and sellers of goods and services. An

important attribute of markets is that they provide an impersonal mechanism for nonviolent exchanges. Exchanges between individuals, in the absence of a market, are inherently unequal. One of the two will be stronger than the other, or needier than the other. Conflict is more likely than exchange. Thus the creation of markets was a crucial element in the decline of violence as policy.

In a hypothetical Hobbesian “state of nature, red in tooth and claw”, where everyone is a competitor and a potential enemy, money and markets play no role. The existence of money and markets implies social structure. After defense, one of the primary roles of the central government and the ruler by “divine right” (that Hobbes advocated), must be to provide a marketplace his or her subjects to meet and exchange goods. A precondition of the existence of the market is *prevention* of violence, which also means—as a practical matter—protection of property and prevention of wealth acquisition by illegitimate means (theft, fraud, piracy, violence or threat of violence.)

Exchange, in turn, presupposes heterogeneity of economic output. If we are all self-sufficient creatures finding and consuming what we need to survive—as wild animals do—there would be no need to trade or exchange. But some of us till the soil and plant seeds, some hunt for deer in the forests, some collect birds eggs, some collect edible mushrooms, some catch fish, some weave fibers into threads, some weave cloth, some make clay pots, some smelt metal...Well, you get the idea.

Anthropologists think that money was originally invented as a unit of value for financing agricultural labor in Sumer: Labor was needed for plowing, planting, harvesting and probably for grinding. Loans and corresponding labor debts were recorded on clay tablets, back then in Sumer. But trade with distant markets required recognizable but portable forms of value, hence coins. The value of coins and paper money depends on trust in the stability of the issuer, usually a government, or an agency of the government (e.g. a bank).

Coins (money) were definitely a device for facilitating exchange transactions, and markets. The first copper coins we know of were first used in China in the eleventh century BCE). (Paper money came 2000 years later, also from China.) Money as portable exchangeable value—coinage—in the Middle East had a well recorded beginning: It was born in the city of Sardis, in the small Anatolian Kingdom of Lydia, during the 14 year reign of **King Croesus** (560–546 BCE).¹ The first proto-coins were minted from an alloy

¹ The legend of **king Midas** was about his pathological desire for gold, and its awful consequences; it was not about gold as money. Gold was not used for money, as coins, in China, India, Mesopotamia or Egypt, or in meso-America.

of gold and silver, called electrum, that was taken from the river that flowed through the town. The extraction technique was “panning” the silt in the river, to let the heavier metal particles accumulate at the bottom of the pan. The gold particles were the heaviest, so they could be gradually separated by successive pannings. (This technique is still employed in some remote areas of the world.)

The first proto-coins in Sardis were lumps of the alloy stamped with an image of a lion’s head. Croesus’ first innovation was to make the stamped lumps of electrum exactly the same weight and to assign them an equal value. This trick eliminated the need for merchants to weigh the proto-coins before agreeing to a transaction. All they needed to do was to count. The proto-coins became gold coins in the modern sense, between 640 and 630 BCE. Sardis’s second innovation was the creation of a central market where all the merchants could gather and exchange their wares for coins. That market in Sardis became famous and famously attractive for visiting merchants with luxury items to sell. It was the model for all the Greek markets, called *agora*.

The combination of the two innovations was spectacularly successful for a few years. It made King Croesus—“as rich as Croesus”—and the merchant elite of Sardis very wealthy. It engendered conspicuous consumption in various forms (such as competitively fancier tombs). It enabled Lydia to conquer most of the nearby Greek cities of Anatolia, including Ephesus (which he rebuilt). His wealth engendered dreams of glory. He consulted the Greek oracle of Apollo and famously asked the oracle what would happen in case of war with Persia. The oracle cleverly replied that “*a mighty empire would fall*”. So Croesus decided to go for it, in 547 BCE. Not surprisingly the Lydian proto-empire fell and disappeared from history. But Croesus’ two innovations did not disappear.

What followed the invention of coinage in Lydia was the creation of a web of commerce among both the Greek-speaking cities and the Persians. It has been argued that the advent of coin-based markets—the *agora*—was the key to Athenian Democracy and commercial Greek civilization, followed by Rome. King Philip of Macedonia imitated Croesus’ imperial ambitions, but prepared better. His son Alexander the Great (356–323 BCE (trained by Aristotle) conquered the known world in a decade, including Egypt, Babylon, Persia (and some of Mughal India) before reaching the limits of his administrative capability (and health). Greek was the language of markets. Yet the market trading links left by Alexander’s successors created the information pathways for the spread of Christianity five centuries later.

Counting standardized coins, rather than weighing gold (or silver) in the marketplace of Sardis, in Lydia, led step-by-step to calculating, bookkeeping,



Fig. 1.1 The Croeseid, one of the earliest known coins. Classical Numismatic Group, Inc.—Wikimedia commons

arithmetic, geometry, mathematics, astronomy and even to science. But it also led to occasional bubbles, like the Dutch Tulip mania of 1636, and the rise and fall of the Mississippi Company followed by the South Sea Company of 1720.

Coinage was the beginning of monetization, and monetization was the beginning of Mediterranean civilization, which is the basis of our own western civilization. All exchangeable goods (and some services) were increasingly valued in terms of a common denominator: money as coins, and later just money as coin equivalents. Debt also was equated to money. In fact “debt bondage” was becoming an issue in market-oriented Greek—and later, Roman—society.

From being thought of as a ‘sub stance’ to being regarded as a mathematical artifact of a field to being just another way to express a symmetry” (Fig. 1.1).

Primitive markets must have existed as long as trade and as long as cities. Sumer, 3500 BCE, was the first urban civilization, as far as we know. Modern historians say that about 90% of its population already lived in walled cities. It is clear that money-equivalent loans, of some sort, were first used in Sumer for agricultural purposes. The residents of the city consumed agricultural products that had to be produced, and that the producers had to feed themselves, meaning that agricultural production at the time was already very efficient, and capable of yielding outputs significantly greater than aggregate inputs.

The situation of Sumer explains the broader need for trade and money. In David Graeber’s words: “trade was crucial because while the river valley of ancient Mesopotamia was extraordinarily fertile and produced huge surpluses of grain and other foodstuffs, and supported enormous numbers of livestock, ...it was almost completely lacking in anything else. Stone, wood, metal, even the silver used as money, all had to be imported” (Graeber, *op cit.* p. 64). Graeber’s point being that the caravan trade had to be financed by loans

(credit). Moreover, he argues that interest—call it rent—was invented, at that time, as a way for temple (government) functionaries to take their share of the of the trading profits. Much the same situation must have applied in ancient Egypt. The Phoenecian civilization was based entirely on inter-city trade around the Mediterranean Sea.

Trade was risky and loans for trade purposes had to reflect that reality. The Code of Hammurabi was written in Babylon, 1800 BCE. It formalized the laws dealing with credit. Loans were risky, and interest—the cost of risk taking by the lender—was part of every loan agreement. Hammurabi established the legal maximum interest rates that could be charged by lenders: 33.3% per year on loans of grain, and 20% per year on loans of silver. To be valid, loans had to be witnessed by a public official and recorded as a contract.

Solon of Athens (630–560 BCE) is reputed to have outlawed debt bondage and cancelled all outstanding debts. (This strategy to “start fresh” has been imitated many times, but the debtor’s problems almost always recur.) Solon’s most radical reform was to stop reserving public office for men of noble birth. This was arguable the first step toward Athenian democracy, and today’s (almost) universal right to vote.

In the Roman Republic, 50 BCE, Marcus Cicero noted that his neighbor (Crassus) paid 11.5 million sesterces for bought 625 acres (250 hectares) of land. The weight of that much money in coins would have been about 11.5 tons (10 tonnes). It was done through credit and paper. Cicero wrote “*nomina facit, negotium conficit*” meaning “he uses credit to complete the purchase.”

The “Dark Ages” in Europe 600 to 1000 CE followed the collapse of the Western Roman Empire, and economic activity slowed to a near-halt. The Church even banned the practice of charging interest on loans, calling it “usury”, a sin. Usurers were called nasty names, ranging from “blood suckers” to “loan sharks”. Needless to say it was very hard for Christian merchants to find lenders to borrow from. The exceptions (as lenders) were Jews, who were excluded by law and custom—perhaps deliberately—from every other profession. The Jewish lenders had to be quite tough about collateral. Shakespeare’s Shylock in “The Merchant of Venice” demanded security for a non-payment in the form of “pounds of flesh”. Rich people, especially unscrupulous aristocrats, were known to use Jews as surrogates for their own moneylending practices.

Usury is the practice of making unethical or immoral monetary loans that unfairly enrich the lender. In many historical societies charging of interest of any kind and was considered wrong, or was made illegal. The Catholic Church in medieval Europe, as well as the Reformed Churches, regarded the charging of interest (as well as charging a fee for the use of money) as sinful,

though rents were allowed. Religious prohibitions on usury are predicated upon the belief that charging interest on a loan is a sin.

The invention of money, markets (and credit) was a human device for facilitating exchanges and, the “division of labor” thus made possible. More generally markets are a device for utilizing diversity and maximizing constructive competition, both among producers and consumers. The earliest markets back in pre-history may have happened by accident, but markets are so fundamental that they deserve serious attention as societal entities. Indeed, we need to introduce the topic of “market failures”, meaning non-optimal outcomes of trading (and the other economic activities associated with trade).

Athenian democracy, followed by the Roman Republic, were arguably the first successful (for a while) societies where important decisions were based on debate among peers, not by decrees from an unelected warlord, king or emperor. But victory in a war with a neighboring country increased the wealth and resource-base of the victors (and the enslavement of the losers) but did not lead to the broadening of the citizenry and decision-making (voting) base. So the result of successive conquests by the Roman Republic was to narrow the power base (Roman citizens) and increase inequality. Imperial Rome was a large diverse territory ruled by a small fraction of the citizens of a single city.

The enforcers of Roman Law (and order) during the early years of the Republic, in Italy, were citizen-soldiers who served the Republic as needed and not for payment. But under the emperors, the enforcers were paid mercenaries. They had to be paid in money or land. Where did the money or land come from? The traditional means of paying con-career soldiers was to live off the countryside during campaigns, and after a victory, to let the soldiers loose in the conquered towns and cities to pay themselves by looting. Loot was portable wealth. Portable wealth was coins or garments or decorative objects that could be sold in a marketplace and exchanged for coins. One of the other ways in which conquering armies paid themselves was by capturing soldiers of the defeated army, or their families, and selling them in slave-markets. Rome was built and largely populated by slaves or ex-slaves. Roman Citizens—those descended from the early settlers—were a minority by Julius Caesars time.

But, as most of the good agricultural land in Italy was already occupied, soldiers in the permanent encampments in distant frontier countries had to be paid in coins of the realm. Gold and silver coins were recognizable as being valuable. Bits of paper or clay or anything else not inherently valuable, were too easily counterfeited, but gold and silver were not. Thus money and precious metals were increasingly the same thing: money was wealth and wealth was money, for much of human history.

Money (today) is a lot like phlogiston, a weightless substance that flows, except that it is not imaginary. But thanks in part to John Locke, most people in the 16th to eighteenth centuries associated money with coins issued by the Royal Mint, that were supposedly valued by their weight of silver or gold. John Locke famously argued in a parliamentary debate about the currency devaluation c. 1694: “A Pound Sterling means a pound of silver”. Money gained recognition as a factor of production in the seventeenth century, when central banks were being created to serve the markets in the major cities of northern Europe, national currencies started being exchanged, and paper money (letters of credit or LOCs) were replacing coinage for long distance trade where it made no sense to carry money as bags of coins.

Despite this history, many economics textbooks—notably since {von Mises, 1951}—have tried to explain money by postulating a prior “barter economy” where money didn’t exist. Ludwig Vin Mises, a theorist, postulated that money was “invented” to convert the imaginary barter-economy into a real economy. There is no evidence of an actual barter economy in human history. Well, there is one, the salt for gold trade in Africa (below).

The reality is that barter requires a “double coincidence” of a non-violent meeting between two persons, or possibly two tribes, each with a surplus of one commodity and a deficit in another, and that their surpluses and deficits exactly match {Graeber, 2011} Chap. 2. What did exist, in some places, was the use of portable, countable objects—such as cowrie shells, elephant tusks, coconuts or cattle—as measures of value (money equivalents) for accounting purposes, but that were rarely, if ever, physically exchanged. Having said that, there is some evidence that cowrie shells, in particular, were sometimes used as portable money in Africa and south Asia. There is also good evidence of a “market” on the headwaters of the Niger River in Mali, near Timbuktu (c. 1400 CE) where gold was exchanged for salt, but where the traders never actually met. Apparently, the gold/salt traders “bid” by leaving a fixed quantity of one commodity in a designated place and if the “price” was acceptable, it would be replaced overnight by an appropriate amount of the other commodity. See Fig. 1.2.

The salt for gold trade was discovered by Portuguese trader-explorers around 1500 CE, and was disrupted by them. But it was probably much older. A pure guess is that it began about the time when Timbuktu became a city. Timbuktu is located in the present day Republic of Mali at the edge of the Sahara desert. Timbuktu was founded by the Tuareg Imashagan or Kel Tamasheq in the eleventh century. The Kel Tamasheq roamed the desert during the rainy season in search of grazing lands for their herds and camels and settled in one location near the river, during the dry season (Fig. 1.3).



Fig. 1.2 Of Usury, from Brant's *Stultifera Navis* (ship of fools), 1494; woodcut attributed to Albrecht Dürer—Wikipedia

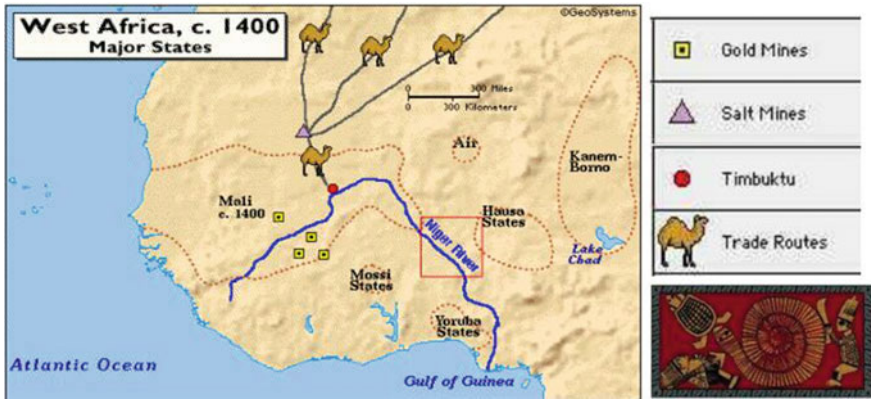


Fig. 1.3 Map of the gold-salt trade in Africa, c. 1500 CE <https://www.thinglink.com/scene/503653900734169090>



2

From the Crusades to the Renaissance

The crusades—basically a long-running war between Christianity and Islam—is not remembered with pride, by the descendants on either side.

In 1095, at the Council of Clermont, Pope Urban II proclaimed the First Crusade, to support the Byzantine emperor Alexios I against the Seljuk Turks. Having no army to command, he called for a pilgrimage to Jerusalem, relying on its participants to arm themselves. This call was met by an enthusiastic popular response. The first Crusaders were a melange of discontents with many motivations, including religious salvation, opportunities for fame and glory and hopes of loot.

Later crusades were generally more organized, some were led by a king (notably Richard “the Lion Heart”). All were motivated by papal indulgences. Initial successes established four Crusader States: the County of Edessa, The Principality of Antioch, the Kingdom of Jerusalem; and the County of Tripoli. The Crusader presence continued in some form until the fall of Acre in 1291. After this, there were no further crusades to recover the Holy Land, although violent skirmishes continued until much later, even after the conquest of Constantinople by the Ottoman Turks, in 1453.

During the thirteenth century the crusaders on a religious mission to capture or defend Jerusalem, fighting against the Saracens, included nobles with inherited estates (land) who felt a need to be sure of reclaiming their lands upon their return. Some of them—more over time entrusted the physical deeds to their properties in Europe, written on parchment or vellum,

to one of the commanderies (fortresses) of the Knights of the Temple of Solomon (or “Templars”).

The Templars undertook this security function. At first, it was simple Christian charity. But, in time, it became a service with costs, that had to be paid for. To avoid calling the fees “interest” (and risk a charge of usury, a sin), the Templars called it “rent”. The Templars simultaneously offered an associated service, namely “Letters of Credit” (LOCs) allowing the traveling knights with property to borrow (in effect) against the deeds to their properties. By the beginning of the fourteenth century, the Templars mission had shifted largely away from guarding pilgrim’s lives to protecting their property.

Moreover, the Templars found that they could make loans to others (such as sovereigns) secured by the value of the unclaimed properties they were guarding. In fact, they found that they could make more loans—in the form of paper letters of credit (LOCs)—than the value of the assets they actually had in hand as reserves. This “fractional reserve” lending practice (“leverage”, in modern terms) was very profitable, because it was a great boost to trade. It was also extremely dangerous, as they discovered.

One unintended consequence of the Templar’s lending activities was the sudden and catastrophic end of the Knights of the Temple of Solomon, themselves. This happened on Friday the 13th—still an unlucky day—in October the year 1307 CE when King Philip “le Bel” of France (who owed them money) decided not to pay. He mistakenly thought the Templars had a secret treasury full of gold. The King had the Templar leaders tortured for two years and finally burned at the stake. But no gold hoard was discovered.

After the Templar’s disappearance, there was a financial service for travelers, such as traders, that needed to be filled. The gap was filled, after the Templars, by wealthy families in the well-defended northern Italian city-states, notably (but not only) Pisa, Florence, Genoa, Verona, Milan and Venice. The service they provided (loans and transferable credit) was needed to support burgeoning trade between Mediterranean and northern Europe, later with Asia and Africa, especially after the return of the Venetian traveler, Marco Polo, and his stories c. 1275. The early banks were family affairs (Bardi, Frescobaldi, Peruzzi, Accaluoli, Medici). Those family “super companies” were originally producers of olive oil, wine, lemons and (in the case of the Bardi) woolen cloth. Their banking business depended—as with the Templars—on trusting, and being trusted by, the borrowers, but the dealt with people of all nationalities and religions, and all social classes. When trust failed, as when King Edward of England defaulted, the Italian banks collapsed. This happened several times.

Nevertheless, the letters of credit (LOCs), originally guaranteed by the Templars, began to be traded among traveling merchants, in the fourteenth century in Italy and around the Mediterranean Sea. By the middle of the fourteenth century some successful merchant families in Italy evolved into banks, i.e. institutions that made loans (to suitably affluent clients) and received either interest on the money (called “rents” to avoid the accusation of usury), or other forms of return. One such form of return was shares in a new enterprise, such as a sugar plantation, an olive grove or a mine. LOCs became a form of money. Thence, their guarantors (who also physically protected the valuables of depositors) became banks, albeit under another name. LOCs were the first “paper money”.

In 1310 international finance played a role in English political history. King Edward I and his son Edward II had borrowed £22,000 (a very large sum for a family bank) to finance his wars. The lenders were the Frescobaldi, Bardi and Peruzzi banks in Florence. This relationship financed Edward I’s conquest of Wales, so Edward II wanted to conquer Scotland as well. He borrowed to finance his war against Robert The Bruce, of Scotland, which he lost in the battle of Bannockburn. There was no loot to reimburse the soldiers, and King Edward’s Parliament did not want to tax themselves to pay for it. The default had a very bad effect on Italian bankers, as may be imagined. An even bigger financial collapse was the simultaneous failure of the three “super companies” of Florence, in 1344–45 due to another royal default (by Edward III of England), followed by an outbreak of the black death in 1348.

Yet banking thrived. In 1422 there were 72 “international banks” operating out of Florence alone {Weatherford, 1997 #5513} p.82. Things turned sour after that. This was partly due to internal Florentine power struggles, and partly due to the repudiation of war loans by Edward II of England. According to one source, Edward owed 900,000 gold florins (£135,000) to the Bardi and 600,000 florins (£90,000) to the Peruzzi, which he could not pay. (Peruzzi records suggest that King Edward did repay some of his loans in cash and some in wool.) But the overall effect of the losses on Florence was devastating.

The Medici family moved its HQ to Florence in 1397 CE, and engaged primarily in trade, especially wool cloth. They expanded to Venice in 1402. At their peak, in the 1450 s the Medici’s had branch banks in Lyon, Geneva, Avignon, Bruges and London. The Medici’s financed the Roman Curia and later intermarried with French royalty. Catherine de Medici (1519–89), married to Henry II of the Valois dynasty, was the “mother of three kings”. Another Medici (Marie) was married to the next king, Henri the fourth (the first Bourbon), and later acted as regent to the young future King Louis XIII.

The Medici branch banks were financially independent of each other, in order to be protected from the failure of any one branch.

Other Florentine banking families included the Altoviti, Gondi, Pazzi, Salviati, Scali and Strozzi. As a matter of interest, there have been some great banking families, but virtually all of them were forced or induced—by elevation to the nobility—to lend money to kings or popes and all of them were ultimately destroyed by their royal debtors. The Medici bank was dominant in Florence in the fifteenth century, reaching its peak of power through its control (by Papal monopoly) of the alum mines of Tolfa.¹ It collapsed in 1494 when the Medici's were expelled from Florence.

The Fugger bank of Augsburg took over many of the Medici's assets c. 1500 CE and their political power and influence. The Fuggers were closely affiliated with the House of Habsburg whose rise to world power they financed. Unlike the citizenry of their hometown and most other trading patricians of German free imperial cities, such as the Tuchers, they never converted to Lutheranism, as presented in the Augsburg Confession, but rather major family bank remained with the Roman Catholic Church and thus close to the Habsburg emperors.

It is commonplace to date the rise of science to the capture of Constantinople by the Ottoman Turks, in 1453, which triggered the Age of Exploration. A case could also be made to date the change to a year earlier, the birthdate of **Leonardo da Vinci** (1452–1519). Leonardo was one of the greatest geniuses of all time, not only as an scientist but also as an engineer, inventor, and the artist who painted “Mona Lisa”, the most famous painting in the Louvre, if not world. Some credit must be given to the city of his birthplace, Florence, and its then-ruling family for creating the environment that allowed his genius (and others) to flower.

Leonardo da Vinci's interests ranged over many areas of science, including (alphabetically) acoustics, astronomy, botany, geology, hydrodynamics, optics and physiology, but human anatomy was his specialty. He was an empiricist to the core, long before Francis Bacon wrote *Novum Organum*, but he was not an experimentalist. He discovered by observation of dissected bodies (before William Harvey) that the circulation of the blood is controlled by the heart. His notebooks also noted that that the “humors”—blood, phlegm, yellow bile (choler), and black bile (melancholy)—that were thought to determine a person's physical and mental qualities by the relative proportions in which

¹ Alum (mineral aluminum sulfate) was used as a mordant (color fixing agent) in the textile dye business. Before the Ottomans came the only European source was in Anatolia. Another mine was discovered in Italy (Tolfa) about 1460 CE and its output was an asset of the Da Vinci bank.



Fig. 2.1 Study of the human embryo, 1510–1513, royal collection—Windsor—Wikimedia

they were present could not be located in any of the body cavities that he investigated.

In short, Leonardo da Vinci initiated the overthrow of traditional medical anatomical assumptions although most of his insights and inventions were lost along with his notebooks (some of which have been rediscovered recently). He was the first to understand the impossibility of perpetual motion, though others sought it for centuries after. He invented scores of workable devices, famously including the helicopter, but only on paper because the materials and tools to make them were not available in his time (Figs. 2.1 and 2.2).

The second high Renaissance giant from Florence was **Michelangelo di Ludovico Simoni** (1475–1564) who designed and decorated the Sistine Chapel and much else in the Vatican, as well as the most famous nude male statue in the world (“*David*”). (His painting of The “*Creation of Adam*” on the ceiling of the Sistine chapel (1508–1512) helped to cement the power the



Fig. 2.2 This portrait attributed to Francesco Melzi, c. 1515–1518, is the only certain contemporary depiction of Leonardo—Wikipedia

Church of Rome, and to perpetuate the Biblical myth of The Creation, not to mention the dominant role of men over women. “*The Last Judgment*” by Michelangelo spans the whole altar wall of the Sistine Chapel. It depicts over 300 (mostly male nude) figures surrounding the central figure of Christ who chooses some to be saved while most are destined for Hell.

Dante Alighieri (1265–1321) wrote the “*Divine Comedy*” (1308–1320), which made it all seem very realistic His depictions of Hell, Purgatory and Heaven provided inspiration for the larger body of Western art and literature. The painting reproduced below conveys a flavor. He is often described as the “father” of the Italian language.

Dante’s “*Divine Comedy*” and Michelangelo’s “*Last Judgment*” might be regarded as the dark side of the Italian High Renaissance. At the time most of the people—even educated people—who read Dante’s poem and saw Michelangelo’s art believed that they were an accurate pre-vision of reality, conveyed from the mind if God by the artist in much the same way a TV camera transmits images today. Christians of all sorts believed fervently in life after death, either in Heaven, with Christ and the angels, or with Satan and his demons, in Hell (Figs. 2.3 and 2.4).



Fig. 2.3 Dante and Virgil in Hell painting by William-Adolphe Bouguereau (1850)—
Wikimedia

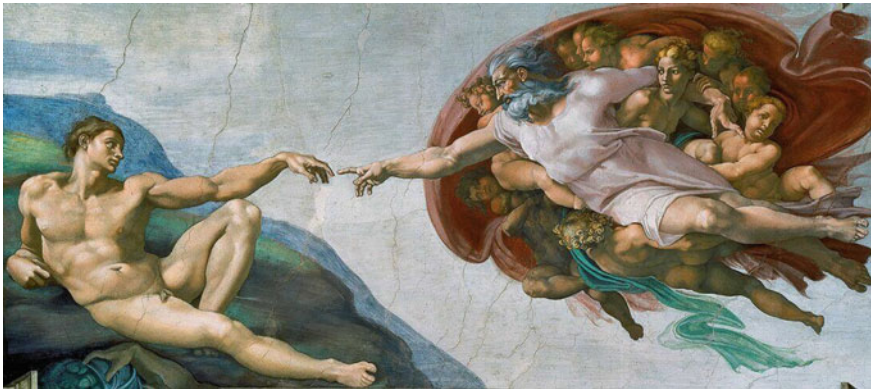


Fig. 2.4 The creation of Adam on the Sistine Chapel ceiling by Michelangelo—
Wikipedia



Fig. 2.5 Portrait of Luca Pacioli attributed to Jacobo de Barbari, c. 1495—Wikimedia

The Italian banks gained an edge in the sixteenth century thanks to the invention (in 1494 CE) of double-entry bookkeeping by **Fra Luca Bartolomeo de Pacioli** (c. 1447–1517). He was an Italian mathematician, Franciscan friar, collaborator with Leonardo da Vinci, and an early contributor to the field now known as accounting. He is referred to as “The Father of Accounting and Bookkeeping” in Europe and he was the first person to publish a work on the double-entry system of book-keeping on the continent. He was also called **Luca di Borgo** after his birthplace, Borgo Sansepolcro, Tuscany (Fig. 2.5).

The key to this accounting invention is to record every transaction in two separate accounts, usually a “cash” account and an “asset” (credit) account. In this system a loan is recorded as a subtraction from the cash account and a corresponding addition to the credit account. The two accounts have to balance at all times. In fact, what accountants do to this day is called “balancing” and corporate financial statements are called “balance sheets”. Keeping the two accounts physically separate (and maintained by different clerks) also constituted an effective protection against fraud.

How were the accounts themselves kept? We like to think that they were written on parchment and stored in a fireproof place. But we now know that virtually all the records of money payments to and from the government of England, from the 12th to the late eighteenth century, were kept on willow “tally sticks” that were kept in the Treasury. The tally stick for each transaction

was split along the wood grain. The creditor's half was the "stock" and the debtor's half was the "foil". The end of that tally system, and the unfortunate destruction (by fire) of 600 years of financial records, is a sad story told by Felix Martin {Martin, 2014} pp. 16–19. Only a few of the tally sticks remain, as evidence of how it worked, once upon a time.



3

The Protestant Work Ethic and the Rise of Capitalism as Gods Work

In the fourteenth century, thanks to the failures of the Crusades and the demonstrated subsidiarity of Popes to Kings, the upper echelon of the Church-of-Rome was widely seen to have morphed into a gang of money-grubbers. The laity needed another moral guide. They found it in money-making. Whereas in the past, religious devotion often involved vows of celibacy and rejection of worldly affairs, the new form of devotion was to acquire tangible wealth and advertise it.

Markets facilitate the exchange of material products (goods) by providing an impersonal mechanism for determining relative values (prices). Price determination is an essential service, but it also has limits. We all know that money can't buy everything, especially happiness or love. As Oscar Wilde said (in the voice of a character in a play): "*The cynic knows the price of everything and the value of nothing*" (from "Lady Windermere's fan"). Of course that was part of a dialog written for amusement. But it carries a "sting in its tail", so to speak. Not everything of importance is exchanged or available in markets, and some things—environmental services, for example—are priceless.

Adam Smith and David Ricardo argued that ideal markets for exchangeable goods must be "free" from unnecessary regulation, yet hyper-competitive and efficient. But such perfect markets cannot exist without clear rules governing transactions and effective mechanisms for enforcement of the rules. In fact, the very existence of such an ideal market is doubtful.

It is easy to be misled by images of village marketplaces, as illustrated in children's stories and Christmas cards, where all transactions are personal, in

cash, the goods (products of farms and artisan workshops) are portable and the community where everybody knows everybody else, is the only enforcer needed. The village pictured on the Christmas Card is peaceful because it is situated in a country not threatened by attack by barbarians (because the cavalry, or the navy, is keeping the barbarians away). The cavalry, and the navy work for a beneficent but invisible ruler who receives money from invisible sources—tariffs or a gold mine or a bit-coin mine—but not, please the Lord, by taxes collected by government agents physically knocking on their doors.

That picture was never realistic in Adam Smith's day, nor anywhere else, before or since. The village market in France or Italy or Morocco is attractive for tourists, but it cannot exist without a hinterland of farmers and factories and a system of laws and effective law enforcement. But in the vast majority of modern markets for portable goods, the village is a metaphor, not a model. In the metaphor, prices are arrived at by conversations—bargaining—between buyer and seller. The cost of regulation and enforcement remains largely invisible.

In reality, face-to-face bargaining is still applicable only for buying and selling of unique goods, such as works of art, and immobile goods (e.g. houses) where buyer and seller have roughly equal market power but the middle man—the broker—takes a share. (The government also takes a share from all transactions.) Rules are needed in these cases to define a valid and binding offer, an acceptance, a contract, a delivery, even a method of payment, as well as a penalty for breach of contract and an enforcement mechanism. Guarantees and warranties must be defined. Rules are also needed to deal with all the things that can (and do) go wrong in a transaction, ranging from departures from specifications and failures to perform as advertised, to 'acts of God' and deliberate fraud.

The reality of markets for non-unique portable goods is the chain-store (or, increasingly a web-site) where all goods have a "fixed price" determined by a mass-marketing enterprise that shares the value added gains with mass-producing enterprises on a more or less equal basis. But small-scale producers (such as farmers and artisans) lack the market power to share the gains from trade. The consequence of this inequity, over time, is that the big enterprises tend to get still bigger and claim a larger share of the gains from trade, and their owners get wealthier. Meanwhile, the non-unionized consumers, the non-unionized employees of the large enterprises, and the small local businesses receive a smaller and smaller share of the gains.

Demand and supply are two sides of the same coin: the buyer's willingness to pay constitutes "demand" while the seller's willingness to sell constitutes "supply". When a transaction occurs, they must be quantitatively equal,

by definition (Menger 1871, 1994). Markets for mass-produced portable goods sold in shops and markets for stocks and shares of companies, are similar enough to be treated the same, in principle. But important details are different. For instance, the sellers may be “price makers” (large scale producers) having much greater market powers than the customers (clients).

Regulation is therefore needed to ensure that competition in markets is reasonably fair. To start with, this means that the rules are supposedly enforced by incorruptible “guardians”, not by market participants. The primary requirement for regulation is to detect, eliminate and punish fraud, such as the sale of stolen goods, or fakes. After that, in most industrial countries, it also means limiting the role of debt, the use of leverage, and the so-called ‘market power’ of large players (lenders, borrowers, sellers or buyers). This is the main reason why anti-trust laws exist in most advanced economies, to minimize price-fixing and market sharing agreements by monopolies and cartels.

Evidently the markets in the real world never satisfy all of these conditions, resulting in so-called ‘market failures’. Curiously the idea of market failures did not appear in theoretical economics until the twentieth century, and the idea that such failures could be quantitatively important—even critical—has only emerged in recent decades. In particular, public goods and environmental services are inherently troublesome from a regulatory point of view, because the underlying goods themselves cannot be, or are not, owned by any individual economic agent.

It is worth emphasizing that markets cannot be self-regulating, whatever capitalist ideologues may think. Markets are institutions where goods and services are for sale to the highest bidder, whereas law enforcement and justice must be provided by agents who are immune to commercial incentives. (We use the terms “*H. Economicus*” and “*H. Custodius*” in reference to traders, on the one hand and policemen (or women), health workers, teachers, preachers, judges and others who create and enforce the “rule of law”, on the other hand.) Markets in the real world We assume, hereafter, that the markets discussed in this book (as in other economic texts) are imperfectly regulated by agents (belonging to *H. Sapiens*) who need to be trained and supervised to perform regulatory and enforcement functions honestly, without favor. In other words, the regulatory and enforcement system needs to be regulated itself. Free markets are an impossibility.

The greatest gap in economic theory is the role of energy (technically, exergy) and the laws of thermodynamics (physics), as applied to the direction of technological change. Without some understanding of thermodynamics, the crucial economic phenomena of today cannot be understood,