

Social orders

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Abstract This review discusses the stability of social orders in light of the recent work *Violence and Social Orders* by Douglass North, John Wallis and Barry Weingast (hereafter NWW). The purpose of this book was to understand the two great transitions that have occurred in human society. The first, the agricultural revolution, resulted in a transition from *hunter-gather society* to what NWW call *limited access society*. This first transition occurred at various times and places, but generally about 10,000 years before the present. The second revolution, the social/industrial/technological revolution, from limited access to what NWW call *open access*, occurred initially in a few societies, particularly Britain and the United States, within a fairly brief period between 1600 and 1860. Currently, all the West European economies, as well the Western offshoots (the United States, Canada, Australia and New Zealand) and Japan have crossed the economic threshold of \$20,000/capita. However, inequality across the set of all political economies is extreme, and likely to increase. The paper attempts to complement the institutional analysis of NWW, deploying some theoretical ideas from social choice theory, game theory, and economics (particularly the role of factors of production, land, capital and labor). Emphasis is placed on the variation of risk preference between autocrats and other factor groups. The discussion also alludes to the notion of structural stability of dynamical social systems, and the possibility of chaos.

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It is argued that all the limited access societies face a Malthusian constraint, generated by the pressure of population on land. In such societies, particularly in Africa in the present day, this quandary over land is likely to lead to the exercise of power by risk preferring autocrats who will restrain any move to open access democracy.

1 Limited access society

Violence and Social Orders by Douglass North, John Wallis and Barry Weingast (hereafter NWW) continues the research program that has engaged these three authors for many years.¹ The key purpose of the book is to understand the two great transitions that have occurred in human society. The first, the agricultural revolution, resulted in a transition from *hunter-gather society* to what NWW call *limited access society*. This first transition occurred at various times and places, but generally about 10 KYBP (1 KYBP means 1,000 years before the present). The second revolution, the social/industrial/technological revolution, from limited access to what NWW call *open access*, occurred initially in a few societies, Britain and the United States, within a fairly brief period between 1600 and 1860.

North's early work with Thomas ([North and Thomas 1973, 1977](#), 1970) presented an economic explanation of this first agricultural transition. Since then, much work has been done in anthropology in terms of understanding the evolutionary consequences of this transition. First of all it led to a very rapid increase in population growth. The population is estimated to be between 250,000 and 500,000 in 62 KYBP, slowly increasing to about 6 million in 12 KYBP, at the end of the ice age. After the transition, population increased to about 60 million in 3 KYBP (the beginning of the bronze age) and then to about 240 million in 2 KYBP.

Farming appeared in the Fertile Crescent about 11.5 KYBP with wheat, barley, then peas and lentils. It spread to Egypt by 9.5 KYBP, and had independent origin in China and India about the same time, but much later in the New World ([Diamond 1997](#)). Pastoral agriculture appeared about the same time: goats were tamed in Iran by 12 KYBP, sheep in Iraq by 9 KYBP, and various breeds of cattle in the middle east and India by 8 KYBP. Recent research has emphasized the importance of the domestication of the ass or donkey ([Marshall and Hildebrand 2002](#)) and particularly the horse. [Anthony \(2007\)](#) suggests very plausibly that the domestication of a “gentle” horse, about 4.5 KYBP, together with the technological innovation of the wheeled chariot/cart, provided the impetus for a people, speaking a proto-Indo-European language, to spread out of an area in the southern Russian grasslands, near the Black Sea, to “colonize” Western Europe and India.²

It is possible that this expansion was coupled with an evolutionary advantage associated with lactose tolerance. These pastoral Indo-Europeans depended for much of

¹ The current review is the last in a sequence of articles ([Schofield 2000, 2001, 2003, 2005a](#)) which discusses the recent work on applying aspects of social choice theory to political economy.

² Other accounts based on statistical analysis of the daughter Indo-European languages favor an earlier origin in Anatolia about 8–9.5 KYBP.

the calorie intake on cow, sheep and goat milk (as did the later Mongol conquerors under Ghengis Khan) and this is a very efficient way of obtaining calories.

Early Indo-European society was clearly limited access, with an elite consisting of a priestly caste together with a warrior class (expert in the war technology associated with wheeled horse-driven chariots) while the remainder were the agricultural labor of herders/farmers. Today, approximately 3 billion people speak one of the various Indo-European languages.

Many of these anthropological accounts have a distinctly evolutionary flavor. For example, [Cochran and Harpending \(2009\)](#) note that while agriculture produces 10–100 times more calories than foraging, the nutritional quality declined, leading to populations whose average height was smaller in the early agricultural societies than in the hunter forager societies they replaced. I have not seen this point noted in the anthropological literature, but it is possible that the real average economic product/capita (in terms of calories) in *pastoral* societies tends to be higher than in *agricultural* societies, those based mostly on production of grain or rice, etc. For agricultural societies, increasing population density, urbanization and domestication of animals enhanced the effect of disease. In short, agriculture resulted in caries³ and disease, such as the black death, which could be lethal in some circumstances.

Since this agricultural world that came into being is “Malthusian”, there may have been proportionally fewer deaths by violence but more by starvation and disease.⁴ [Diamond \(1997\)](#) has emphasized the consequence of this evolutionary contest between agricultural societies and disease. When Europeans arrived in the New World they carried potentially lethal diseases, such as smallpox, measles, diphtheria, whooping cough, leprosy and bubonic plague. The invaders had developed defenses against these diseases, but the invaded hunter/gatherer or agricultural societies were completely defenseless. In return the Europeans picked up syphilis.

NWW focus on the societal and political consequences of the nature of limited access societies. Though they do not emphasize this point, the invention of writing and the development of mathematics and astronomy seem to occur in limited access, agricultural societies. The earliest Sumerian cuneiform writing on clay tablets dates to 5.4 KYB and Egyptian hieroglyphics to about 5.1 KYB. Indo-European Hittite cuneiform documents are dated at 3.5 KYB. A major innovation was the Phoenician script, with 22 symbols for consonants, about 3.3 KYB. This semitic language was closely related to Hebrew. By 3.5 KYB a Cypriot script, descended from Minoan/Mycenean/Phoenician was in place, and can be seen as ancestral to classical Greek (with symbols for vowels) as well as Latin, and thus English script. The Greeks of course brought mathematics to new heights. Ptolemy (*Klaudios Ptolemaios*), mathematician and geographer, who lived in the Greek city of Alexandria, Egypt, from

³ This is due to the change to a diet based on carbohydrates. The increase in western society of the incidence of diabetes II is due to a similar kind of diet.

⁴ [Clark \(2007a,b\)](#) refers to the tendency of population to rise to match food production as the “Malthusian Trap” after [Malthus \(\[1798\], \[1830\] 1970\)](#). Malthus wrote his essay to contradict the more optimistic views of Condorcet’s *Esquisse* (1795). On Condorcet’s *Esquisse* see [Baker \(2004\)](#). In this current paper, the Malthusian generic tendency for population to grow to match food production is seen as an important consideration that is neglected by NWW. Darwin read Malthus in 1838, and it was this Malthusian logic that provided the basis for Darwin’s theory of natural selection.

approximately 87–170 CE,⁵ codified the Greek geocentric view of the Universe, by extending Hipparchus's system of epicycles and eccentric circles to construct a geocentric model of the solar system. This system of astronomy was accepted as empirically and conceptually accurate for approximately 1,500 years.

The control of agricultural surplus requires the ability to keep records and to count, leading eventually to mathematics. Thus, agricultural societies need a scientific elite who have access to this astronomical and mathematical technology. It is also plausible that the elite will use this technology to predict the seasons, and thus to act as intermediaries to the gods.⁶ Moreover, agricultural societies depend on the factor of land, and there is likely to be a process, over time, of increasing concentration of land ownership, and thus the formation of an aristocracy, as well as hierarchy and tyranny, supported by a priesthood. So agricultural societies not only lead to disease, mathematics and astronomy, but also tend to bring about state sponsored religion, priests and autocracy.

Pastoral societies seem to be somewhat different. While land is obviously important for grazing, pastoralism tends to be associated with nomadism, so wealth resides in herds or flocks, not land per se. Early nomad societies tended to be of small population, and were thus often subjugated by more populous agricultural tyrannies, witness the Jewish people in Babylon and Egypt.⁷

Agricultural societies must balance the factors of land and labor in some fashion. Since population grows, under the Malthusian restraint of the supply of land, we expect the real price of land to rise, and the wage rate of unskilled labor to fall. In the extreme, we would expect slavery to be a component of a hierarchical agricultural society. Because of the importance of the particular kind of astronomical technology, we also expect the wage rate of scientifically skilled labor to rise. Thus, agricultural societies experience a bifurcation: there will be two elites, landed and priestly/technological, comprising what may be termed the oligarchy (Greek: *ολιγαρχία*), opposed to the masses, the *hoi polloi* (Greek: *οἱ πολλοί*) and the unfree (such as the helots of Sparta: *ειλωτες*).

Agricultural societies engage in war with each other, and we therefore expect the landed elite to become a military elite. It is possible for some societies, such as the Greek city states of the classical period or of Macedonia, to engage in highly profitable war. In this case there may develop a class of hoplites (Greek: *οπλίτης*), highly skilled military warriors, naturally allied with the landed elite. Hoplite military equipment cost approximately the equivalent of a year's income, so the existence of such a hoplite elite depends on high productivity, or real wage. The basis for this class system in the Greek world was the form of mixed pastoral agriculture.⁸

A point to be developed further is that a society based on pastoralism, and associated with a specialism of this kind, may prove superior in war to a society based

⁵ CE means Christian Era, or AD, while BCE means before the Christian Era.

⁶ For example, Schele and Miller (1986), Hammond (1982) describe how the Mayan autocrat was implicitly bound up with the astronomical technology of the priestly class.

⁷ An interesting point here is that many nomadic pastoral societies tend to have little use for writing. However, Hebrew had a very early phonetic script, which may have been ancestral to Phoenician.

⁸ I believe the high productivity of the Greek peninsula was due to a mix of pastoralism with intensive agriculture of grapes, figs, olives etc.

purely on agriculture. As suggested above, pastoral society may be less subject to the inequalities induced by the creation of an elite who control most of the land.⁹ I shall comment on this below, in a discussion of the Roman Empire in contest with pastoral invaders from Eurasia.

To illustrate the returns to this military specialism of what I am calling a pastoral society, consider the invasion of Persia by Alexander's Macedonian army of 47,000 in 333 BCE. At Gaugamela in 331 BCE, 40,000 Greek and Macedonian hoplites and 7,000 cavalry completely routed the army of Darius III, comprising approximately 200,000 infantry, 40,000 cavalry and 200 war chariots.¹⁰ The treasury of Persepolis that fell to Alexander was worth 6,000 talents. A talent is 60 kg of gold. The current price of gold is approximately \$27,000/kg so a talent can be valued at \$1.6 million in current terms. However, gold was much scarcer in the ancient world than in ours, and it is estimated that the true value ratio is approximately 14 to 1, indicating a talent was approximately \$22.4 million, and the Persian treasury worth \$134.4 billion. Since the population of Greece/Macedonia was about 3 million, the spoils of war were worth about \$45,000 per head of the Greek population.

It is said that Alexander transferred more than 100 years of the Greek GDP from Persia to Greece. The spoils were in fact distributed to his hoplites and military elite, on average about \$2 million per head. However, the limited access, military Macedonian society was unstable, since it depended on a godlike autocrat, Alexander himself.

Alexander's death brought about a period of chaos, as the various Greek leaders created Hellenistic kingdoms such as the Ptolemaic Kingdom of Egypt, Pergamum and Pontus in Asia Minor, and the Seleucid Kingdom, on the Euphrates and Tigris. Ptolemy's Alexandria and Seleucia on the Tigris were rich cosmopolitan cities. Euclid wrote his *Elements* in Alexandria *circa* 300 BCE, laying the foundation for the later work in astronomy. The vast Alexandrian transfer of wealth from Persia to the Mediterranean litoral stimulated economic growth, but also caused inflation, and economic distress.

Rome, with a population base in Italy of about 4 million grew increasing powerful, and the more sophisticated Roman military technology proved superior to the Greek phalanx. Eventually all the successor Hellenistic Kingdoms, except Ptolemaic Egypt were absorbed as Roman dominions. The population of Greece itself fell to 2 million in the next 150 years, after the military defeats inflicted by Roman legions in various Macedonian wars.

2 Rome and Byzantium

After the defeat of its enemy, Carthage, in the first (264–241 BCE) and second (218–201 BCE) Punic Wars, Rome continued its expansion across the Mediterranean litoral, reaching a total population of about 8 million in 1 CE. By 200 CE the Roman empire

⁹ I acknowledge that Greek society depended to some degree on an agricultural slave class such as the helots. Nonetheless, Greeks felt they were free, while they regarded Asian or Persian society as unfree. I suggest that the difference between these societies was due to the logic of their agricultures.

¹⁰ The war chariot had been the standard military technology of Indo-Europeans for centuries, but it proved to be no match for the hoplite phalanx, coupled with Alexander's light cavalry.

encompassed 46 million people (roughly 20% of the world population), including 28 million of the 36 million living in Europe.

NWW argue that limited access societies must face and solve the problem of violence if they are to survive. From about 100 BCE, Rome faced what I shall call *quandaries over land and power*. Rome's growing population required new dominions, such as North Africa,¹¹ Greece,¹² Pontus, on the Black Sea and Greater Armenia,¹³ Sicily and the Iberian Peninsula,¹⁴ to send tribute in the form of food to Rome. These dominions provided bases of support for competing military elites, triggering a sequence of civil wars.¹⁵ In 60 BCE, the contending elite factions, led by Gaius Julius Caesar, Gnaeus Pompey Magnus and Marcus Licinius Crassus, had attempted to resolve their conflicts by creating the "The First Triumvirate". This compact only lasted until Crassus's death in 53 BCE. In 59 BCE, Caesar left Rome to gain the resources of a great new dominion, Gaul. The task took 9 years.

Vercingetorix, his opponent, was able to unite the Gallic tribes and build a military force of between 80,000 and 250,000 Gauls. He was eventually surrounded and defeated at the city of Alesia in Northern Gaul, as a result of very sophisticated military technology and tactics by Caesar. This battle can be seen as one of the crucial contests in the expansion of Rome. It makes clear that Caesar was both risk loving and extremely skilled in the military arts. His success opened Gaul up so it could be absorbed into the Roman dominions, eventually becoming a peaceful, agricultural supplier of food for Rome.

Crossing the Rubicon and returning to Rome in 49 BCE, Caesar then defeated his Roman opponent, Pompey, at Pharsalus in 48 BCE. In the same year Caesar landed at Alexandria, Egypt, where he was presented with Pompey's head. To secure Egypt as a further dominion, he allied with Cleopatra Ptolemy, who bore him a son. By 46 BCE he was back in Rome, in 44 BCE he was declared *dictator perpetuus*, and on March 15 of the same year, he was murdered by an opposed faction, led by Brutus.

The final civil war between Octavian, Caesar's adopted son, and Mark Anthony, newly allied with Cleopatra, was resolved at the Battle of Actium in September, 31 BCE, when Octavian's army of 198,000 legionnaires, and navy of 250 ships defeated Anthony's similarly sized army and navy of 300 Roman and Egyptian ships.¹⁶ One result of the battle was that Greece and Egypt became fully absorbed in the Roman Empire as Roman dominions.

¹¹ Carthage was finally destroyed in 149 BCE by Scipio Africanus the Younger.

¹² Philip V of Macedonia stood against Rome and allied with the Carthaginian, Hannibal, during the Second Punic War. However, the second Macedonian War (200–197 BCE) led to a Roman victory. All of Greece and Macedonia finally fell to Rome after the defeat of Philip's son, Perseus, at Pydna in 168 BCE (Grant 1982).

¹³ These fell after the wars against Mithridates by Sulla and Pompey circa 88 BCE.

¹⁴ These fell to campaigns by Pompey circa 82 BCE and 71 BCE.

¹⁵ One "civil war" was the slave revolt led by Spartacus circa 70 BCE, which resulted in the crucifixion of 6,000 by Crassus, and the final destruction of the revolutionary forces by Pompey.

¹⁶ This was the largest naval engagement of the ancient world, and remained the largest until the Battle of Lepanto, off Greece in 1571, between the Catholic Holy League (Spain, Venice, Genoa, Savoy, Malta and the Papal States) and the Ottoman Empire. In that battle, the 206 galleys and 6 huge galleasses of the League destroyed the 230 galleys and 56 galliots of the Empire.

After the defeat of Anthony, Octavian restored the outward facade of the Roman Republic, with governmental power vested in the Roman Senate, but in practice he retained autocratic power. In 27 BCE, Octavian effectively became the Emperor, Augustus, with the approval of the Senate, the loyalty of his legions, and the respect of the people. The resulting *Pax Romana* lasted at least 200 years.

Although the creation of an autocracy essentially resolved the power quandary, the quandary over land remained. During the Empire, further expansion into dominions was accomplished by Augustus himself, who completed the conquest of Hispania, and by Trajan (52–117 CE) who conquered Dacia, and invaded Parthia in 117 CE. Britannia was invaded in 43 CE by Claudius, but in 60 CE, Boudica led a revolt against Roman rule, and it was not until Hadrian (76–138 CE) that Britannia was pacified and the northern boundary demarcated by the wall separating Britannia from Pictland (119–121 CE). These various expansions, while making more land available, also made it more difficult for a single emperor to govern alone from Rome.

Marcus Aurelius (121–180 CE) partially solved this problem by creating the institution of *joint augusti* with Lucius Verus, under which Aurelius dealt with the Lombards and German tribes at the Danube, and Verus faced the eastern enemy, Parthia. The creation of the Eastern Empire in Constantinople (earlier and later called Byzantium), founded in 330 CE by Constantine the Great, took this solution one step further.

Although the Western Roman Empire survived until September 4, 476 CE, when the Scirian chieftain, Odoacer took Ravenna, then capital of the empire, and deposed the young emperor, Romulus Augustus, it had been under external pressure for many years. In 408 CE, Alaric the Goth spared the city for a ransom of 5,000 pounds of gold, and 30,000 pounds of silver. Then, in 451 CE, the Roman general, Aëtius, in coalition with the first Christian Visigoth king, Theodoric, was able to defeat Attila the Hun at Châlons in Gaul. In 429 CE, the Vandal, Geiseric, had landed in North Africa, taking Carthage in 439 CE, eventually sacking Rome itself in 455 CE.

Salvian (born 400 CE) had noted that even as the empire died, “the poor (were) dying of the increase in taxes that they already found too great for endurance” (quoted in Grant 1998, p. 26). As the Western Roman Empire died, the Eastern Empire flourished. In 488 CE, with the connivance of the eastern emperor, Zeno, a later Visigoth ruler, also called Theodoric, invaded Italy and on March 5, 493 CE, forced Odoacer to capitulate. Until his death in 526 CE, Theodoric ruled Italy as Viceroy, essentially a vassal of the eastern emperor. In 527 CE, Justinian and Theodora, his wife, were crowned co-rulers of the Byzantium Empire. The Nika riots of 532 CE in Constantinople were vigorously put down by Justinian’s general, Belisarius. Justinian, to reassert the majesty of the empire, ordered the rebuilding of the great church Hagia Sophia, in Constantinople (consecrated in 537 CE), and determined to reconquer the western empire. By 534 CE, Belisarius had destroyed the Vandal kingdom centered on Carthage, and in short order, took Sicily and southern Italy. After 3 years of war, Ravenna fell to the Byzantine army. The church of San Vitale, in Ravenna, although started under Theodoric, was completed by the Byzantines in 547 CE as a monument to Justinian and Theodora (Norwich 1988, pp. 181–226).

Many writers (and most importantly Gibbon [1781], 1994) have attempted to assess why the Western Empire fell in 476 CE, but the Eastern Empire, centered in Constantinople, persisted until May 29, 1453 CE, when it was taken by the Ottomans

under Mehmed II. It is true that Constantinople/Byzantium slowly lost territory to the Arabs and Seljuk Turks. Even so in the mid twelfth century CE, the Eastern Empire controlled half of Asia Minor and most of what is now Greece and the Balkans.

Schofield (2009) suggests that the *Codex Justinianus*, prepared by order of Justinian the Great in Constantinople in 533 CE, while setting out a system of Roman Law that was the basis for the later Civil Law of Europe, gave legitimacy to the imperial or kingly autocrat, and it was this legitimization of the concentration of power that allowed the Eastern Empire to solve the quandary of power. (Below, the quandary of power will be discussed more formally.)

A possibility concerning the eventual fall of the Eastern Empire that has been suggested by Rosen (2007) is that the Empire was continuously weakened by population crashes as a result of the bubonic plague. For example, in the year 542 CE the plague afflicted Constantinople during Justinian's reign, killing about 10,000 people every day. The plague appears to have started in the Egyptian harbor town of Pelusium, and it is possible that climate change had opened up a pathway from Africa that gave the flea/rat invasion access to the Mediterranean littoral.¹⁷

North's (1981) reason for the fall of the Western Empire is a version of Salvian's observation, attributing the fall to institutional inefficiency, as a result of increasing demands on the tax structure combined with a decline in the tax base. While this argument is plausible, it does not seem to account for the longevity of the Eastern Empire.

2.1 Competition between factors

The stability of the two Roman Empires may result from the nature of the underlying quandaries of land and power mentioned above. First, consider the nature of the landed elite, \mathbb{C} . As we have suggested, with population pressing against the Malthusian resource food boundary, land becomes relatively more expensive in terms of the average wage rate of total labor, \mathbb{L} . Some fraction of the landed elite, as exemplified by the Roman emperors Hadrian and Trajan, become military specialists, labelled $\mathbb{C}_m \subset \mathbb{C}$. This landed military elite would also include members of the landed equestrian or centurian order. Whereas members of $\mathbb{C} - \mathbb{C}_m$ will tend to be risk averse, members of \mathbb{C}_m will be risk-loving. Some fraction of \mathbb{L} , labeled \mathbb{L}_t , will specialize in the technological, engineering and legal skills required to run the empire.

As the empire expands, these skills will become more valuable. Since expansion requires military competence, a legionnaire class, $\mathbb{L}_m \subset \mathbb{L}$, will specialize in these skills. We might expect \mathbb{L}_m to be also risk-loving. In the initial phase of expansion, agricultural labor, $\mathbb{L}_a \subset \mathbb{L}$, in new dominions such as Gaul and Hispania, will also benefit from higher returns to land. Risk preferring military coalitions of $\mathbb{C}_m \cup \mathbb{L}_m$ will also demand more of the total product of the empire, and this can be accommodated by distribution of some of the new land to members of the legionnaire/military

¹⁷ This suggestion does not provide a reason why Byzantine's opponents were less affected by the plague. It may be again a question of exposure and eventual resistance to the disease, or the higher level of urbanization in Byzantium.

caste, \mathbb{L}_m , when they retire from service. Since land becomes more valuable over time, $\mathbb{C} - \mathbb{C}_m$ will also expect a greater share of the total product. Consequently the share of unskilled labor,

$$\mathbb{L}_u = \mathbb{L} - \mathbb{L}_m - \mathbb{L}_a - \mathbb{L}_t$$

in total product will fall.

Equilibrium can be maintained as long as the expansion of new land and its higher productivity matches the equilibrium or Malthusian population growth rate. However, when new land runs out, the share of \mathbb{L}_u may fall rapidly. If the productivity of land also eventually starts to fall, then the real return of $\mathbb{L}_a \cup \mathbb{L}_m$ must also fall, possibly resulting in a population crash.

The problem facing Rome as a result of this quandary may have been exacerbated by the characteristics of the various invaders, whether Hun, Visigoth or Vandal. Unlike Rome, these people were pastoralists, not agricultural farmers. While the invaders also sought land to feed their growing populations, they were not subject to the problem of high concentration of the ownership of land. Moreover, if this pastoralism was more efficient in terms of calorie creation per unit of labor than Roman agriculture, then the pastoralists real wage would be higher than the Roman.

Finally, almost all labor in the invading societies would involve a combination of military (risk-taking) and agricultural expertise, so the drain on resources attributable to \mathbb{L}_u did not exist. It may be that the Eastern Empire depended more on pastoralism, in the Balkans and Asia Minor, and so avoided some of the consequences of the quandary over land that the West faced. It may also be that there developed a priestly class, say $\mathbb{L}_p \subset \mathbb{L}_t$, specializing in control of the masses, \mathbb{L}_u . Finally, because of Byzantium's position on the trade route between east and west, there developed a capitalist merchant class, \mathbb{K} , controlling not land, but capital, and this class would trigger economic growth through trade with the early city Italian states of Venice, Genoa and Palermo.

3 Structural stability and chaos

The above suggestions are in terms of an equilibrium concept of the economic and power transformations that faced the polities in question. NWW make no mention of equilibrium, possibly because their view of economic equilibrium theory ([Arrow and Debreu 1954; Arrow and Hahn 1971](#)) is that it is a static theory, unsuited to the study of dynamic change. I suggest that this view is incorrect, and that we can make use of equilibrium concepts, as well as the notion of factor groups, as presented above. The theory presented here is based on social choice theory, which is here regarded as a fundamental theory of social conflict ([Schofield 2006](#)).

Definition 1 Dynamic equilibrium.

At time τ , there is a population \mathbb{N}_τ of size n_τ . This population is divided into various categories (or factor groups, to use the economic terminology):

$$\{\mathbb{C}_m, \mathbb{L}_m, \mathbb{L}_p, \mathbb{L}_u, \mathbb{L}_t, \mathbb{K}\}$$

as just described.

At this time, societal choices lie in a “state” space, \mathbf{X}_τ , a bounded (or compact) space. This space describes the total factors available, including land, capital and labor/population, as well as the distribution of total product to all the factor groups.

At τ , each individual, i , is described by a utility function $\mathbf{u}_i : \mathbf{X}_\tau \rightarrow \mathbb{R}$, so the population profile is given by $\mathbf{u} : \mathbf{X}_\tau \rightarrow \mathbb{R}^{n_\tau}$. Beliefs about the future $\tau + 1$ are given by a stochastic rule, \mathbb{Q}_τ , that generates a new profile for $\mathbb{N}_{\tau+1}$ at $\tau + 1$ given by $\mathbb{Q}_\tau(\mathbf{u}) = \mathbf{v} : \mathbf{X}_{\tau+1} \rightarrow \mathbb{R}^{n_{\tau+1}}$. The utility and beliefs of i depend on which subfactor i belongs to. In particular, risk preference is a key property of the factor groups.

Thus we obtain a transformation on the function space $[\mathbf{X}_\tau \rightarrow \mathbb{R}^{n_\tau}]$ given by

$$[\mathbf{X}_\tau \rightarrow \mathbb{R}^{n_\tau}] \xrightarrow{\mathbb{Q}_\tau} [\mathbf{X}_{\tau+1} \rightarrow \mathbb{R}^{n_{\tau+1}}] \xrightarrow{\quad} [\mathbf{X}_\tau \rightarrow \mathbb{R}^{n_\tau}].$$

The second transformation here is projection onto the subspace $[\mathbf{X}_\tau \rightarrow \mathbb{R}^{n_\tau}]$ obtained by restricting to changes to the original population \mathbb{N}_τ and space.

A *dynamic belief equilibrium* at τ for \mathbb{N}_τ is a fixed point of this transformation. Penn (2009) shows that particular conditions on this transformation allow the application of Brouwer’s fixed point theorem (Pugh 2002) to show existence of such a dynamic equilibrium. This concept was first suggested by Hahn (1973) who argued that equilibrium is located in the mind, not in behavior.

NWW also emphasize the importance of what they call *causal beliefs*. Here, a dynamic belief equilibrium refers to the stability of the utility functions for \mathbb{N}_τ as these individuals guess as future consequences of choices, on the basis of the causal beliefs about how society operates.

Definition 2 Chreed or structurally stable dynamical path.

The term chreed was used by Thom ([1966], 1994) to describe a dynamical system that returns to a steady trajectory, as in evolutionary or biological processes. *Structural stability* refers to the property that the qualitative features of the path are not changed by small perturbations. The word is derived from the Greek word for “necessary” and the word for “pathway”. The term is in contrast to the notion of homeostasis which refers to a stable equilibrium.

A *social chreed* is therefore a structurally stable path through all time, τ , where the state space $\mathbf{Z} = \cup_\tau \mathbf{Z}_\tau$ now involves not only characteristics, such as factor endowments, but also the beliefs of individuals, particularly as regards the risk postures that are embedded in their utilities. Over the long run, there may be selection for character traits and propensities.

A structurally stable path need not always exist. Indeed, the opposite notion to that of chreed is of *chaos*, when the dynamic path displays extreme sensitivity to perturbations. Even when a structurally stable path does exist, the path may exhibit points of inflection, where the dynamic process exhibits a small qualitative change. (See the notion of punctuated equilibrium path below.) Major points of inflection occur at transitions in the fundamental structure of production and consumption of the society, and these will generally be associated with a qualitative change in the developmental path.

The suggestion here is that these transitions are chaotic, and that different transitions exhibit very different forms of chaos.

Definition 3 Major transitions: from hunter gatherer society to agricultural society and from agricultural society to industrial society.

These transitions occur in different societies at different times and locations, as briefly discussed in Sect. 1 and below. How they are triggered is subject to considerable controversy, but if the transitions are indeed chaotic, then the attempt to determine causality will be extremely difficult.

The historic examples discussed here suggest failure of existence of structural stability due to different kinds of chaos: Arrovian, Malthusian and Keynesian. These causes of failure of structural stability are characterized in social choice theory by power relations, which are defined in terms of decisive coalitions.

Definition 4 Decisive coalition at τ .

A decisive coalition, M_τ , is a subset of \mathbb{N}_τ , able to defeat its complement, $\mathbb{N}_\tau - M_\tau$. The set of decisive coalitions at τ is denoted \mathbb{D}_τ . For convenience, we now delete reference to τ .

Definition 5 Autocrat.

An autocrat is an agent, A , who with allies in $\mathbb{C}_m \cup \mathbb{L}_m$, belongs to every decisive coalition, and is also decisive.

Definition 6 Collegium.

A collegium is a subset of $\mathbb{C}_m \cup \mathbb{L}_m$, allied to an autocrat, which belongs to every decisive coalition, but is not itself decisive.

Definition 7 Risk loving autocrat.

An autocrat who is sufficiently risk loving that he may bring disaster to the society.

Definition 8 Benevolent autocrat.

An autocrat whose risk preference is low enough that disaster is unlikely.

Although Augustus, Trajan, Hadrian and Constantine may be viewed as benevolent autocrats, since they succeeded in expanding the empire, this was partially because they controlled a military technology that brought about their success. Two of the Julian emperors, Nero and Caligula, who followed Augustus, cannot be so considered. Alexander is an example of an extreme risk-loving autocrat whose military adventure was coupled with a very superior military technology. We may say he was munificent, at least in the short run.

Definition 9 Arrovian chaos.

Social choice theory Arrow (1951), Schofield (1985), Saari (1997) strongly indicates that if the state space is of sufficient complexity, and there exists no concentration of power in terms of existence of an autocrat or collegium, then the outcome of the exercise of power is unpredictable.¹⁸

In situations of such Arrovian chaos, the people may choose an autocrat over other power distributions, as suggested by the Roman example of the peoples' preference for Octavian's exercise of power. A second example is the creation of the Empire by Napoleon, after the Terror following the French Revolution.¹⁹ When distributional conflicts over land, for example, are paramount, and the elites are fragmented, so that power cannot be concentrated, then Arrovian chaos may lead to violence, sufficient to destroy the conditions for existence of economic equilibrium and thus of dynamic equilibrium.

Definition 10 Malthusian chaos.

If the pressure of population against the productivity of land means that the distributional quandary over land cannot be solved, then society may fall into Arrovian chaos and eventually collapse (Diamond 2005).

Definition 11 Keynesian chaos.

For non-agricultural societies, the uncertainty associated with distributional conflict between economic factors could make life so intolerable that the people would choose an autocrat, giving up their freedom for a believed security. Keynes (1936), in particular, argued that such uncertainty could arise from irrational speculation, which we might ascribe to high risk preference by capitalists.

Definition 12 Chaos due to external autocrats.

Invasion by enemies, whether Hun, Vandal, Visigoth, or later Mongol or Ottoman, will destroy belief equilibria. Moreover, the leaders of such peoples generally will be autocratic and extremely risk preferring. Schofield (2006) suggests that such leaders (for example Napoleon or Hitler) will be willing to take military risks that appear insane, or certainly unpredictable to their opponents.

Definition 13 Decline or collapse due to an internal autocrat.

A risk-loving autocrat like Napoleon or Hitler can lead his people in acts of war that eventually destroy the society.

We discuss below the possibility that an autocrat, like Philip II of Spain, can engage his people in a long-term war, resulting in massive debt and then decline. In the twentieth century, autocrats like Mao Zedong, the chairman of the Communist Party of China, or Stalin, in the Soviet Union, may launch internal programs that result in great

¹⁸ In the illustrations above, the state space is sufficiently complex, since it involves all feasible distributions of total societal product to the various factor groups.

¹⁹ It is possible that the universal system of law put in place by Napolean, and modeled on Justinian's code, provided him with the autocratic authority to build a citizen army, with the motivation to gather tribute from the conquered countries of Europe. Although Napoleon intended to be munificent, he was in fact tragic.

loss of life. In the current period, poverty or disorder in poor societies allow autocrats, such as Mugabe in Zimbabwe, to come to power. Their risk preference helps them to retain power against all opponents, even when the polity has embryonic democratic institutions.

Definition 14 Quandary or bifurcation.

With chaos, it is impossible to rationally choose future actions with any certainty. Another way of characterizing belief disequilibrium is that the population faces a quandary, representable as a bifurcation in the set of possible courses of action to take.

As in the previous discussion, leaders like Octavian or Justinian may decide that there is a way to resolve the quandary, and by force of personality, persuade the society that this is the correct course. Other times, the quandary generates social conflict, with multiple leaders pressing for different solutions, leading to further Arrovian chaos.

Definition 15 Madisonian constitutional quandary.

A democracy may on occasion face aggression from a hostile power led by a military, risk-preferring autocrat. Only a democratically elected leader, able to deal with such a threat, can respond in an appropriate fashion.

A solution to this quandary is to partially restrain the risk preference of the leader by the risk aversion of a political collegium. Below we discuss this solution in terms of the restraint exercised by Parliament on the military autocrat, William III, in Britain. The genius of the American constitution, as proposed by Alexander Hamilton and James Madison, in the *Federalist* (1787) is that it allows for concentration of power by granting the President almost autocratic power, so as to deal with foreign aggression, yet constrains his power by the collegial veto capacity of a (risk averse) Congress.

Definition 16 Quandary over the transition to democracy.

Before a collegium will relinquish power, by extending the franchise, it may be necessary to formulate a theory why this will not induce Arrovian chaos. [Schofield \(2005a,b, 2006\)](#) argues that the work by [Condorcet \(\[1785\], 1994\)](#) provided such a theory and that this was utilized by [Madison \(\[1787\], 1999\)](#) in his notion of a “fit choice” by the people.

Below we also discuss the resolution of this democratic quandary by Disraeli in Britain in 1867.

Definition 17 Belief cascade.

Facing a social quandary of some form, a democracy may respond to the argument of a leader that there is only one way to deal with the quandary. An example might be that of William Wilberforce and the eventual *Slavery Abolition Act* of 1833, which abolished slavery in most of the British Empire. On the same question of slavery in the United States in 1860, the society bifurcated into two utterly opposed groups, with war between them the only method of choosing the future.

Definition 18 Social point of inflection.

Resolution of a quandary may create a minor point of inflection, or change in the political and economic path of development of the society. The illustrations from the Roman Empire, above, and from the discussion below of political history in Britain and the United States suggest that points of inflection are often associated with fundamental changes in the nature of political and social rights. The most important of these are to do with the extent and logic of the franchise.²⁰

Definition 19 Punctuated equilibrium.

There may be long periods of stable equilibrium, punctuated by sudden change in the qualitative nature of the evolutionary path, at a point of inflection ([Eldredge and Gould 1972; Denzau and North 1994](#)).

This notion has proved useful in evolutionary biology. It suggests that the social evolutionary path of a society can exhibit major break points where the developmental path is transformed because of some form of bifurcation. The major transitions of the agricultural and technological revolutions seem to have incorporated multiple points of inflection.

Definition 20 Climatic chaos.

Recent work in evolutionary biology ([Calvin 1991, 2006](#)) suggests that climate can best be described as a dynamic process exhibiting punctuated equilibrium, where the bifurcations are associated with periods of climatic chaos.

According to Calvin, the climatic equilibrium following the last ice age, about 15 KYBP, was the reason for the development of agriculture. According to current evolutionary anthropology, anatomically modern humans evolved solely in Africa, between 200 and 100 KYBP, with members of one branch leaving Africa by 60 KYBP. The last glacial period lasted from 110 KYBP to between 10 and 15 KYBP, and so overlapped with the various migrations out of Africa. More importantly, inter-equilibrium climatic chaos during this glacial period had a profound effect on human evolution, driving rapid cultural adaptation in the long pre-agricultural period from 60 to 15 KYBP.

It would seem that a full account of the cultural and biological changes that occurred in this interval will depend on developments in evolutionary anthropology based on the Malthusian principle.

The next section examines population and GDP/capita estimates, as computed by [Maddison \(2007\)](#), using a standardized \$1990 as a measure of product/capita, to seek for points of inflection in the recent past, from 1 KYBP to the present.

²⁰ The discussion below includes the origins of the Civil War and the Civil Rights Acts in the 1960s in the United States, as well as the extension of the franchise in Britain in 1867. From the discussion above, it should be obvious that the rights and obligations of citizenship in the Roman Empire were also crucial for its stability.

4 The Malthusian constraint and points of inflection

In 1000 CE (1 KYBP), world population is estimated to be 225 million, with 60 million in China, 75 million in India, 33 million in the rest of Asia, and only 31 million (or 13%) in Western and Eastern Europe.²¹ GDP/capita had increased slightly in China from \$450 in 1 CE (in \$1990) to \$466 in 1000 CE, while in Europe it had fallen from perhaps \$600 in 1 CE to \$425 by 1000 CE, with France the richest and most populous.

By 1600 CE world population had increased to 600 million with 400 million in Asia (160 million in China and 135 million in India). Western and Eastern Europe had about 62 and 17 million, respectively (again 13%) with 2.3 million in the English colonies and 8 million in Latin America. In Asia, GDP/capita had increased to \$600 in China, to \$570 in Japan and \$550 in India. In Europe, the highly developed Netherlands reached \$1,380, with Italy at \$1,100, England at \$980 and France at about the European average of \$840. Mexico, with its mineral wealth reached \$760. Asia was clearly growing in population but faced the Malthusian boundary, while most of Western Europe had crossed an inflection point.

By 1820 CE, world population was 1,040 million with 710 million in Asia (China 380 million, India 210 million, Japan 31 million, the rest of Asia 89 million). Latin America reached 22 million and Africa 74 million. Western and Eastern Europe were at 133 and 36 million, respectively (or 16% together), with France still the most populous (31 million) and Germany at 25 million. Russia had grown to 55 million, while the English off-shoots (the United States, Canada, New Zealand and Australia) had grown to 11 million.

In Asia, GDP/capita was generally fairly constant (at \$580), slightly lower in India (at \$533) and somewhat higher in Japan (\$670), and \$600 in Africa. In Europe it had increased to \$1,800 in the Netherlands, \$1,700 in the United Kingdom, \$1,135 in France, close to the European average of \$1,200, and the United States at \$1,250. Eastern Europe was far behind at \$680, close to the world average GDP/capita of \$667.

Although the population share of the West (Western Europe and the English off-shoots) was about 17%, it generated about 27% of world product. The West had obviously overcome the Malthusian constraint that still bound the rest of the world. We could say that Condorcet in his optimistic *Equisse* of 1795²² had proved correct, but only for the West, while the much more pessimistic argument of Malthus (1798) appeared to be correct for most of the world.

By 2008, it was clear that there existed multiple population and GDP/capita inflection points for different countries. World population was at 6.7 billion, with 4.0 billion in Asia (1.3 billion in China, 1.1 billion in India, 127 million in Japan), 950 million in Africa, 575 million in Latin America, 287 million in Russia, 400 million in Western against 120 million in Eastern Europe (or 7.6% of the total), while the English off-shoots had grown to 362 million (5.4%).

²¹ These are no more than informed guesses, but they suggest that Europe's population had fallen considerably between 200 and 1000 CE. Note that Italy's population had fallen from about 8 million in 1 CE to 5 million in 1000 CE.

²² In all following dates we drop the notation CE.

World average GDP/capita according to Maddison is currently \$6,500, with low averages of \$1,500 in Africa, \$2,100 in India, \$4,800 in China, \$5,300 in Russia, \$5,700 in Latin America, \$6,500 in Eastern Europe, and highs of \$20,000 in Western Europe (with Germany, France and the United Kingdom all very similar), \$21,200 in Japan and \$28,000 in the English off-shoots. With a population share of 13%, the West and Japan generated over 48% of world product. In contrast, Russia with 4.2% of world population generated only 3.4% of world product.

Thus, all the West European economies, as well the English off-shoots and Japan have crossed (or are just about to cross) the economic threshold of \$20,000/capita. Singapore and Hong Kong have crossed this economic threshold, but are limited access societies, while Taiwan and South Korea are close to the economic threshold, and we may infer that they will soon become open access societies.

Inequality across the set of all political economies, particularly in Africa, is extreme. GDP/capita in Africa ranges from a low of \$212 in Zaire, to highs in countries like Botswana of \$5,000. Some African countries, such as Botswana, may be able to cross the Malthusian barrier, because of their control of scarce resources, but others will find it impossible ([Collier 2007](#)). The argument presented in this paper is that such societies face a harsh form of the distributional quandary over land, as their populations grow rapidly. Their political leaders will tend to be extreme risk preferring, and violence will be endemic, as in regions like Darfur or the Republic of Congo.²³ [Bates \(2003\)](#) present a fairly dismal outline of the propensity to violence in poor countries.

Differing estimates by [Friedman \(2009\)](#) puts current global product at \$54 trillion, with the US share at \$14 trillion, Japan's at \$4.4 trillion and Western Europe about 11.2 trillion (so 55% in all). While China, India, Brazil and possibly Russia will grow in the future, it is unlikely that their population and GDP/capita will change this unequal pattern of economic power. It is also probable that the share of Africa will decline further ([Collier 2009](#)).

Figure 1 gives a broad idea of the nature of these inflection points for the period from 1900, while Fig. 2 illustrates the linear, indeed logistic growth of some western economies from 1950 to 1992.²⁴ Figure 3 gives another logistic curve, indicating the quandary generated by agriculture: very few countries with more than 10% of its population in agriculture can attain a GDP/capita of \$10,000. More to the point, there is a real possibility that climate change due to CO₂ and methane emissions will induce severe dislocations, particularly in poor countries ([Stern 2009](#)). As [Stern \(2007\)](#) argues,

Climate change poses a real threat to the developing world. Unchecked it will become a major obstacle to continued poverty reduction. Developing countries are especially vulnerable to climate change because of their geographic exposure, low incomes, and greater reliance on climate sensitive sectors such as agriculture.

²³ [Prunier \(2009\)](#).

²⁴ Figure 2 is taken from [Schofield \(2003\)](#), where it is argued that the growth curve is logistic in the sense of showing a decline over time. The current crisis has, of course, induced a profound drop in economic growth.

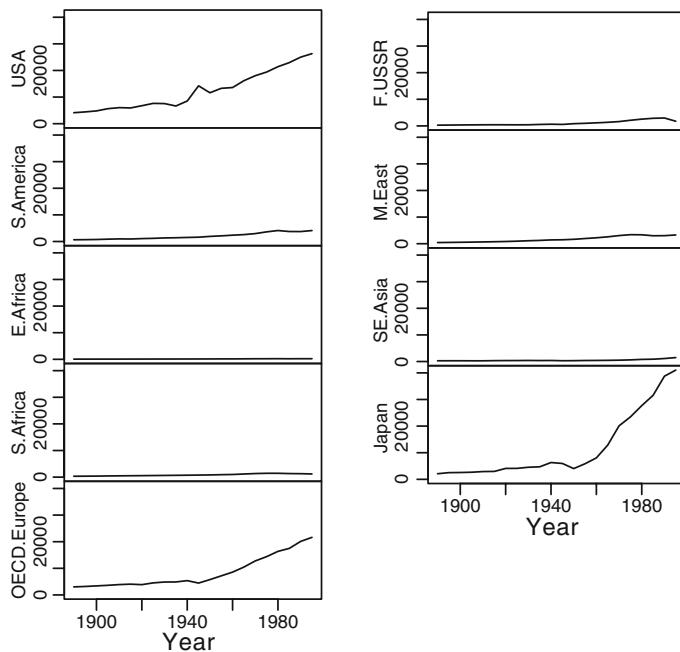


Fig. 1 Malthus or Condorcet

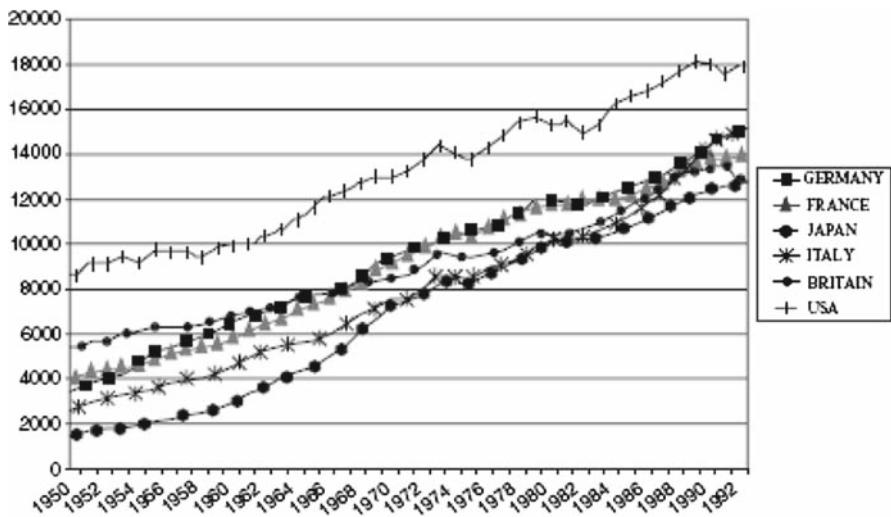


Fig. 2 GDP per capita in six OECD countries (in \$1985)

North (1993) made a number of propositions governing this process of political and economic change:

- interaction between institutions in a context of scarcity induces institutional change,

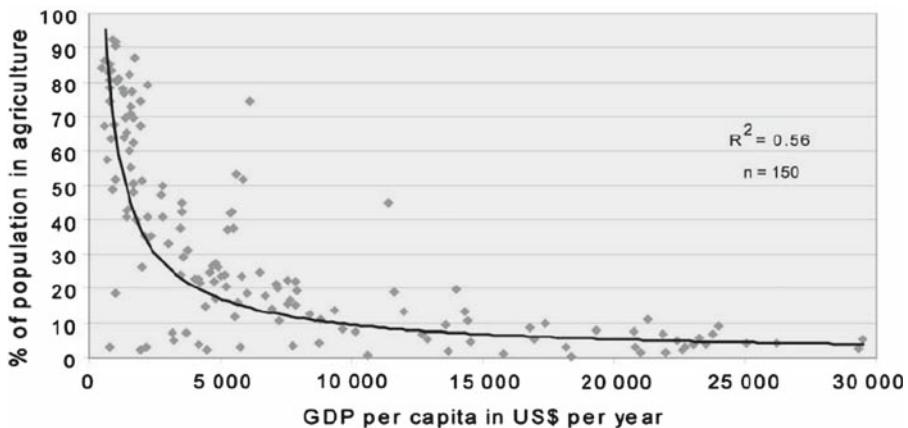


Fig. 3 Agriculture and GDP/capita (International Assessment of Agricultural Science and Technology for Development, 2008)

- competition forces institutions to invest in knowledge which shapes perceptions,
- institutions generate incentives which dictate the nature of sought-after knowledge,
- perceptions derive from mental constructs (beliefs),
- institutional change is overwhelmingly path dependent.

The idea of chreod, and of the ancillary notion of point of inflection, presented above, is an attempt to provide a possible way to formalize these earlier suggestions of North. The emphasis of NWW is very much on the nature and development of institutions, and in particular on extending North's earlier "neo-classical theory of the state", wherein "Leviathan" contracts to set up a system of property rights and taxes (North 1981). An emphasis in NWW is the ability of "Leviathan" to limit, or at least set bounds on, violence.

Although NWW discuss violence extensively, it can be useful to consider the roots of violence in terms of risk preference. First, a categorization of society into different factor groups, such as $\{\mathbb{C}_m, \mathbb{L}_m, \mathbb{L}_p, \mathbb{L}_u, \mathbb{L}_t, \mathbb{K}\}$, as in the discussion of Rome, would seem very useful. It is plausible that these classes or categories display very different risk postures. While this is simply a hypothesis, the work of Cochran and Harpending (2009) suggests that these postures are the result of rapid evolutionary selection. Recent work by Clark (2007a,b), discussed below, makes a similar argument. In what follows, I shall emphasize the consequences of differing risk postures of these factor groups.

As mentioned above, military leaders, like Philip II of Spain, Napoleon or Hitler must be considered extremely risk preferring. Moreover, members of the military classes in Europe seem in general to be highly risk preferring, and this would suggest that war between states was a fundamental aspect of the family of closed access societies. Rather than attempting to control violence, the elite in such societies would specialize in the exercise of violence. North (1981) paid attention to large-scale conflict, for example between the Ottoman Empire and Christian Europe (Pirenne 1939). Schofield (2000) discussed some aspects of this, and I shall make a few more remarks below.

Much of NWW is concerned with the ways institutions work differently in closed access and open access societies. Some of the conceptual apparatus used in this discussion was present in North's earlier work with Weingast (North and Weingast 1989) on the Glorious Revolution in 1688 in Britain. This social and economic revolution transformed Britain's ability to manage debt, fight wars (particularly with France), and develop an empire. But the Industrial Revolution that followed later in Britain was driven by a scientific revolution that first made its appearance about 1600. Although North (1993) discusses knowledge, there is little in NWW about knowledge-seeking institutions.²⁵ Writers like Mokyr (2002) emphasize the extension in scientific knowledge in this period.

Before discussing the institutional change that occurred in Britain after 1688, the next section will make some observations about the cultural transformations that took place in Europe from about 1100, and the later scientific developments after 1600.

5 Cultural and scientific change

5.1 Italy, Spain and England

One of the most interesting questions about social change concerns the role of “cultural transmission” in triggering the beginnings of economic growth.

By 1000, Al-Andalus, the Arab world which is now Spain, was an immensely sophisticated and wealthy culture, Cordova had a population of about half a million, exceeding that of Byzantium.²⁶

It can be argued that the knowledge of Greek writings and philosophy, which had been kept alive in Al-Andalus and Byzantium, was transmitted to Europe through the court of Frederick II (1194–1250), Holy Roman Emperor and King of Sicily with his capital in Palermo.²⁷ Frederick was elected king of Germany in 1215, and crowned in Aachen by Pope Innocent III. In 1227, Frederick was excommunicated by Pope Gregory IX for failing to lead a crusade to the Holy Land, although he did lead the crusade the next year. Possibly because of his ability to speak Arabic, he was able to make peace in the Holy Land, being crowned King of Jerusalem in 1229. In Palermo, he created a court based on the combination of Jewish, Muslim and Frankish culture, which had some similarities to that of Granada and Cordova in Al-Andalus. He also built on the reform of the laws begun by his grandfather, Roger II, leading to a remarkable collection of laws, *Liber Augustalis*. It made the Kingdom of Sicily an absolutist monarchy, but also set a precedent for the primacy of written law.

The twelfth and thirteenth centuries were times of conflict between the Italian city states and the Holy Roman Emperors, Frederick I, or “Barbarossa” (1122–1190), his son, Henry VI, and grandson, Frederick II. Frederick I attempted to assert his rights

²⁵ I could find nothing in NWW about natural science or mathematics, although there is much discussion of social and political science.

²⁶ Earlier, Arab armies had only been prevented from conquering a large part of Europe by the victory of the Frank, Charles Martel, over a Muslim army in 732 at Poitiers in France.

²⁷ He was known as *Stupor mundi* (“wonder of the world”).

at the second Imperial diet at Roncaglia, November 1158, by appointing imperial podestàs, “as if having imperial power in that place” and this was one of the causes of the formation of the “Lombard League” and the uprising against Frederick I in 1167.

The idea of a podestà, a man of foreign birth to act as a disinterested magistrate, had first been tried in 1151. Although the imperial podestà was rejected, local podestàs became common about 1200. These magistrates were appointed by the citizens (or by the citizens’ representatives) for a period of a year, and exercised power in foreign and domestic matters alike. [Greif \(2006\)](#) has argued that the podestà played an important role in the facilitation of trade by the city states in Italy.

Like his father and grandfather, Frederick II spent many years at war with the Pope, and a number of the city states, in an effort to consolidate Italy. As the example of the podestà illustrates, the indirect consequence of the actions of these three Emperors was the creation of a political and economic context in which trade in the Mediterranean could flourish. Moreover, it does seem to be the case that a number of agricultural and institutional innovations were put in place in Sicily by Frederick, and for a few hundred years the island was a source of great wealth. These innovations in the technology of commerce, banking and agriculture then spread to the rest of Italy. Even 350 years later, in 1600, Italy had a high GDP/capita of \$1,100,²⁸ although by then the richer countries were in Northern Europe.

[Acemoglu et al. \(2005\)](#) argue that the countries that grew after 1550 or so were on the Atlantic rather than the Mediterranean littoral. However, the point made by [Pirenne \(1939\)](#) is relevant: the fall of Constantinople/Byzantium in 1453 meant that the Mediterranean became an Ottoman lake, dangerous for Christian vessels even after the defeat of the Ottoman navy, at the Battle of Lepanto in 1571. The final collapse of the Byzantine Empire stopped trade between West and East, and this provided the stimulus for the Spanish, Portuguese and English attempts to find new passages to the East.

The “discovery” of the New World by Columbus in 1492 had two indirect causes. First was the reconquest of the Iberian Peninsula, and particularly of Granada, by Ferdinand and Isabella of Christian Spain, and their desire to expand their empire. The second was the fact that Columbus was wrong about the circumference of the globe, but had “scientific” knowledge of the North Atlantic’s great circular wind pattern. In particular, a brisk wind from the east, commonly called an “easterly”, propelled Santa María, La Niña, and La Pinta for 5 weeks from the Canaries. To return to Spain eastward against this prevailing wind would have required several months of arduous sailing needing huge stores of food and drinkable water. Columbus returned to Spain by following prevailing winds northeastward from the southern zone of the North Atlantic to the middle latitudes of the North Atlantic, where the winds curve southward towards the Iberian Peninsula. This clockwise circuit was used thereafter by Spanish and Portuguese explorers.

²⁸ [Maddison \(2007\)](#), again in \$1990.

Within 30 years of Columbus's voyages, all Europe had begun to be split asunder by the beginning of the flow of tribute from the Americas, and the resulting contest between Catholic Spain and its Protestant opponents.²⁹

Martin Luther (1483–1546) obtained his Doctorate in Theology from Wittenberg, Germany, in 1512. His *95 Theses on Indulgences* of 1517 essentially denounced the Pope, and Luther in turn was denounced by *The Edict of Worms* issued on May 25, 1521 by the Holy Roman Emperor, Charles V.

For personal reasons to do with the annulment of his marriage, Henry VIII of England forced through Parliament an *Act of Supremacy* in 1534, declaring that the King was "the only Supreme Head in Earth of the Church of England".³⁰ The *Treasons Act* of the same year made it high treason, punishable by death, to refuse to acknowledge the King as such. In response to his excommunication by the Pope, the *Peter's Pence Act* was passed and it reiterated that England had "no superior under God, but only your Grace, Henry".

After Henry's death and the short reign of his son, Edward, his daughter, Mary, became Queen in 1553. Almost 300 religious dissenters were burned at the stake in the Marian Persecutions. In Europe, the Catholic autocrat, Charles V, had become King of Spain in 1516, and then Holy Roman Emperor in 1519. On his abdication in 1556, he left his son, Philip II, with a debt of 36 million ducats and an annual deficit of 1 million ducats.

In 1554, Philip became King of Naples, as well as King Consort of England on his marriage to Mary. Elizabeth, Mary's half sister, became Queen of England after Mary's death in 1558. Elizabeth well understood that England could not resist the naval might of Spain, and she managed to keep some sort of peace with Philip for 30 years, politely refusing his various offers of marriage.

Philip meanwhile occupied himself with rebellion in The Netherlands, and with the creation of the Catholic League against the Ottoman empire, leading to the Battle of Lepanto in 1571. In 1585 Philip made peace with the Ottomans, and turned his attention to England, angered by the execution of the Catholic Mary Queen of Scots, by Elizabeth, for treason. The Spanish Armada of 1588 comprised 108 armed merchant vessels and 22 galleons, against a defending force of 34 English warships and 163 armed vessels, with 30 Dutch flyboats. The storm that destroyed the Armada left perhaps 20,000 Spanish soldiers and sailors dead. For the religious people of England, this was an act of God.

Kennedy (1987) used the example of Spain under Philip II as an illustration of the propensity of states to overstretch, to engage in expensive wars in order to extend their domains. Schofield (2006) argues that it is not so much military aggression by the state as autocrat risk preference that leads to war. Certainly, Elizabeth was no war preferring monarch, but rather an extremely subtle and risk averse ruler. There is

²⁹ It is obvious that the conquest of the Aztec and Inca cultures by the Spanish conquistadores was due to a combination not only of their military technology and the diseases they carried, but most importantly of their military risk preference (Wood 2000).

³⁰ Although Henry had defended the Pope against Lutheran heresy in 1521, for which he earned the title "Defender of the Faith", between 1536 and 1541 he continued his conflict against the established Catholic Church with the dissolution of the monasteries.

no doubt that Philip's war proclivity led to inflation (a fivefold increase in prices in Spain) and this was transmitted throughout Europe (Parker 1998). This inflation may have been caused partially by the flow of tribute from the Americas, but government spending and the importation of manufactured goods by a privileged elite contributed to the fiscal imbalance. Spain's income, from taxes in Castile and The Netherlands, was insufficient to cover Philip's wars.

Philip became increasingly dependent on loans from foreign bankers, particularly in Genoa and Augsburg. By the end of his reign, interest payments on these loans alone accounted for 40% of state revenue. Even though Spain was able to maintain its empire in the Americas and in Asia until the nineteenth century,³¹ it no longer played as important a role as Britain or The Netherlands.

The argument by Acemoglu et al. (2005) about growth on the Atlantic littoral depended on the creation of a merchant class able to take advantage of transatlantic trade. While there was certainly trade between Spain and its American colonies, this seems not to have engendered a growth-enhancing merchant class.

A lesson to be drawn from Philip II must have been obvious to any Englishman: a risk-loving autocrat, particularly one who believes that God is on his side, is likely to engage in war, and this has the potential to bring about enormous disaster. The religious ferment of the next hundred years, at least until the Peace of Westphalia (1648), provided ample opportunities for risk-loving military autocrats to cause chaos. Disorder in Continental Europe continued until 1815, with the final defeat of Napoleon. England (or Britain) was to some extent shielded from this chaos by the English Channel, and by the growing power of its navy.

5.2 Scientific revolution

Before continuing with the discussion, in the next section, of how risk-loving autocrats may be constrained, it is worth mentioning scientific revolution. There have been speculations that it is no accident that the most important cosmologist after Ptolemy was Nicolaus Copernicus (1473–1543), born only a decade before Martin Luther. Both attacked orthodoxy in different ways.³² Copernicus formulated a scientifically based heliocentric cosmology that displaced the Earth from the center of the universe. His book, *De revolutionibus orbium coelestium* (*On the Revolutions of the Celestial Spheres*, 1543), is often regarded as the starting point of the Scientific Revolution. Moreover, in 1526 Copernicus also wrote a study on the value of money, *Monetae cudendae ratio*. In it Copernicus formulated an early version of the theory, now called “Gresham's Law”, that “bad” (debased) coinage drives “good” (non-debased) coinage out of circulation,

Margolis (2002) noted that something very significant occurred in the years after Copernicus. His ideas influenced many scholars: the natural philosopher, William

³¹ Spain conquered the Philippines in 1521 and lost it to the United States in August 1898.

³² Weber (1904) speculated that there was a connection between the values of Protestantism and Capitalism. It may be that there are connections between the preference for scientific explanation and protestant belief about the relationship between God and humankind.

Gilbert, who wrote on magnetism in *De Magnete* (1601); the physicist, mathematician, astronomer, and philosopher, Galileo Galilei (1564–1642); the mathematician and astronomer, Johannes Kepler (1571–1630); the philosopher Thomas Hobbes (1588–1679); the physicist, mathematician, astronomer and natural philosopher, Sir Isaac Newton (1642–1726).

Newton's *Philosophiae Naturalis Principia Mathematica* (1687), is considered to be the most influential book in the history of science.³³ Margolis (2002) argues that, from about 1600, scholars learnt to look at scientific problems from different angles, and that within the next 200 years this habit of mind became quite common, and was, in fact, the reason why the technological/industrial revolution gathered apace in the eighteenth and nineteenth centuries.

My own view is that, after Newton, a few scholars realized that the Universe exhibits laws that can be precisely written down in mathematical form. Moreover, we have, for some mysterious reason, the capacity to conceive of exactly those mathematical forms that do indeed govern reality. I believe that this mysterious connection between mind and reality was the basis for Newton's philosophy. While celestial mechanics had been understood by Ptolemy to be the domain most readily governed by these forms, Newton's work suggested that *all* reality was governed by mathematical forms.

Newton was later followed by the many scholars of the Enlightenment. In my opinion, chief among these is the philosopher, mathematician, and political scientist, Marie Jean Antoine Nicolas de Caritat, marquis de Condorcet (1743–1794), known as Nicolas de Condorcet, whose early work in social choice theory ([Condorcet \[1785\], 1994](#)) forms the basis for some of the theoretical arguments about democracy presented by Madison and many later writers.³⁴

I shall call the hypothesis entertained by these scholars *the universality of mathematics*. Major universal mathematicians include the Scot, James Maxwell (1831–1879), the Frenchman, Henri Poincaré (1854–1912), the German, Albert Einstein (1879–1955), and the Englishman, Stephen Hawking (born 1942). Without the application of this universal mathematics, our society would be quite different and much poorer. A discussion of the nature of scientific revolution, resulting from this hypothesis of the universality of mathematics, should be part of any study of social change.

6 Economic and political change in Britain

The experience of the people after the execution of King Charles I in 1649, followed by the rule of Oliver Cromwell, as Lord Protector of the Commonwealth from 1653 until his death in 1658, must have caused them to fear any risk-loving autocrat. While Cromwell had conquered Ireland and Scotland, and invaded Catholic France, he had also massively increased the debt of the country. After the Restoration and reign of Charles II, his brother James II came to the throne. Once it was realized in 1688 that James had plans to rule as autocrat, and more importantly, to restore the Catholic

³³ See Feingold (2004).

³⁴ The following sections of this review are also based on a Condorcetian perspective, as presented previously in Schofield (2006).

religion in Britain, Parliament invited his daughter, Mary, and her husband, William of Orange, to be co-rulers.

Following NWW, we may assert that the political economic equilibrium in a society is the result of a bargain between the elite holders of factors of production, and those who govern the institutions. A political leader, whether democratically elected, or holding onto power by force, must have enough support from the elite or the people, or both, to stay in power. For [North and Weingast \(1989\)](#), the quandary facing Parliament after 1688 was first whether to engage in a long war with France, as William III wished, and if so, how to fund the war.

War would require a standing army, which could give too much power to the monarch, endangering liberty. To depend on a militia could well induce France to attack. The solution was to divide control of the standing army between Parliament and the monarch ([Humphrey 2009](#)). Although William had the potential to be autocrat, this Parliamentary strategy restrained his power. We may use the term, *collegium*, introduced above, to describe this power of Parliament to veto or restrain the weakened autocrat.

The creation of the Bank of England in 1693 provided a method of imposing credible commitment on Parliament. The dilemma facing any government of that time was that war had become more expensive than government revenue could cover. Consequently, governments, or monarchs, became increasingly indebted. Risk-preferring, or war-loving, monarchs, like Philip II of Spain or Louis XIV of France, were obliged to borrow. As their debt increased, they were forced into repudiation, thus making it more difficult in the future to borrow. Since the Bank of England “managed” the debt in Britain after 1693, there was an incentive for Parliament to accept the necessary taxation, thus avoiding the temptation of repudiation. This had the effect of reducing the cost of public debt.³⁵

However, the cost of war kept increasing. The War of Spanish Succession (1701–1714) brought war weariness, and the governing party, the Tories, sought to avoid the costs (and taxes) induced by war ([Stasavage 2003](#)). Contrary to the argument of North and Weingast, the escalating war debt had made repudiation an increasingly attractive option by 1710. It was not obvious why Parliament would choose to commit to fiscal responsibility.

The fundamental problem was that the majority of members of both Commons and Lords were of the landed interest. The obvious method of funding government debt (which had risen to 36 million pounds sterling by 1710) was by a land tax. Indeed the land tax raised approximately 50% of revenue.

In a desperate attempt to deal with debt, the government “sold” the debt to the South Sea Company in 1711. After Queen Anne died in 1714, and the Hanoverian, George I, became sovereign, increasing speculation in South Sea Company stock and then the collapse of the “bubble” in September 1720, almost bankrupted the country. Walpole, Chancellor of the Exchequer and First Lord of the Treasury, stabilized confidence in the Company by a swap arrangement with the Bank of England. In April 1721, Walpole began his scheme to further control government debt by instituting a complex system of customs and excise.

³⁵ [Quinn \(2001\)](#) suggests that there was a crowding out, in the sense that while the cost of public debt fell, the cost of private debt rose, at least until 1705.

By restricting imports, mostly foodstuffs and land intensive commodities, this system had the effect of supporting the price of the scarce commodity, land. Thus the key compact (between the Tory landed elite, and the Whigs, the capital elite) to create a long-run political equilibrium involved the protection of land via increased customs and excise.

This enabled the government of Britain to dramatically increase its borrowing so as to prosecute the continuing wars with France. This compact not only raised food prices, but also was associated with the concentration of land ownership (leading to the beginning of the agricultural revolution). Moreover, the compact required restriction of the franchise. Thus the compact created benefits for land and capital, at the cost to labor, maintained by a relatively autocratic or collegial power arrangement. These excise taxes and customs raised an increasing share of government revenue.³⁶

(O'Brien, 1988, p. 16) comments that these data on tax revenue

provide some statistical support for suggestions that the burden of taxation on the aristocracy declined during the eighteenth century. Not until they confronted Napoleon did the upper classes once again undertake the kind of sacrifices for the defence of property that they had made under William III. [W]ith the repeal of the Pitt's income tax in 1816 the situation reverted to the status quo ante bellum.

As Brewer (1988) has described, the system required a sophisticated and skilled bureaucracy. The Walpole system of finance created a compact between the "commercial" Whig interests and both Whig and Tory "landed" interests, securing their Parliamentary support for continued war with France. This compact had a number of other effects. First, it ushered in a period of Whig dominance until 1783.³⁷ By supporting land prices, the bargain led to increased investment in agriculture.³⁸ Although agricultural output increased in Britain (by 76% between 1740 and 1860), the population grew even more rapidly (increasing from about 6 million in 1740 to 29 million in 1860, according to Maddison 2007).

Britain became increasingly dependant on food imports, particularly from the United States.³⁹ However, the combination of protection of land and population growth led to an increase of the cost of living of 43% between 1740 and 1800, and a decline of the real wage.⁴⁰ It is estimated that 80% of subsistence farmers were forced off the land between 1780 and 1810.

³⁶ Tax receipts as a percentage of national income rose from 10.8% in 1720 to 18.2% in 1810. The share of customs and excise in government income was about 73% in 1720 and 82% in 1800 (O'Brien 1988, p. 15).

³⁷ From 1721 to 1783, 11 out of 13 prime ministers were Whig. Tory prime ministers included the Earl of Bute (1762–1763) and Lord North (1770–1782). In contrast, from the time of the Tory, William Pitt the Younger (1783–1801, 1804–1806), until Benjamin Disraeli (1868, 1874–1880) there were 14 Tory or Conservative prime ministers out of 18.

³⁸ Allen (1988) estimates that the rental on land rose from about 0.5 pounds per acre in 1725 to 1.5 pounds per acre in 1825.

³⁹ Clark (2007a) estimates an increase of agricultural imports from 0% in 1730 to 22% of GDP in 1860.

⁴⁰ (Clark, 2005, p. 1325) estimates that the real wage in the decade 1800–1809 was about 10% below that of 1730. See also Floud and McCloskey (1994).

The continuing fall in the real wage must have contributed to the emigration of 80,000 from England and Wales, 115,000 from Ireland, and 75,000 from Scotland (including 15,000 highlanders) between 1700 and 1780.⁴¹ As a consequence, the population of the 13 colonies the United States had increased from about 200,000 in 1700 to 890,000 in 1750 to 2.8 million by 1790 and 5.3 million by 1800. The fall of real wages until the end of the Napoleonic Wars, coupled with a rise in GDP/capita suggests that income inequality increased in this period.

The model of political economy proposed by [Acemoglu and Robinson \(2005\)](#) suggests that the Walpole compact could only be maintained by a severe restriction of the franchise. It is true that it was not until 1867 that the franchise was extended to any great degree, and this extension was coupled with gains for labor. However, real wages started to rise after the end of the Napoleonic Wars, suggesting that economic inequality was slowly declining.⁴² More importantly, protection of land was only maintained until the repeal of the Corn Laws in 1846.⁴³ We can infer that after 1850, the compact between land and capital was no longer essential to British hegemony.⁴⁴

As discussed by [McLean \(2001\)](#), this first significant decrease in protection of land in 1846 was effected by the Tory, Robert Peel, together with Wellington in the Lords, against the interests of the majority of their party. Famine in Ireland made it obvious to Peel and Wellington that unless food prices were lowered then social unrest could lead to civil strife.⁴⁵ Two million people emigrated from Ireland in the period 1846–1856, while the US. population jumped in this decade from 23 to about 32 million, exceeding for the first time the population of Britain.

By the 1860s, Britain's economic lead allowed for further reduction in the protection of land, in the form of Gladstone's budget of 1861, which reduced the duty on wine and repealed the paper tax ([Aldous 2006](#)). [McLean \(2001\)](#) also discusses the political maneuver of Benjamin Disraeli, who, as Chancellor of the Exchequer in 1867, was able to push through the Reform Bill, doubling the enfranchised population.⁴⁶ Whether as cause or effect, the real wage and real GDP/capita started to rise rapidly

⁴¹ [Harper \(2003\)](#).

⁴² [Clark \(2005\)](#) estimates an increase of 66% between 1815 and 1860. He accounts for this with an evolutionary account model population growth leading to selection of attributes of thrift, thus causing the increase in productivity that became quite apparent in the mid 1850s.

⁴³ See [Nye \(2007\)](#) on protection of land in the nineteenth century. [Mokyr and Nye \(2007\)](#) provide an account of the ability of the landed interest to continue protecting land and their wealth until about 1850. They argue that the development of a centralized party system ([Cox 1987](#)) prevented the formation of rent seeking coalitions that could have slowed technological development.

⁴⁴ [Clark \(2007a\)](#) estimates that real farm rents/acre increased until about 1880 and then fell rapidly, indicating that the landed interest was still able to protect itself to some degree after the collapse of the compact.

⁴⁵ Notice that this observation differs from that of [Acemoglu and Robinson \(2005\)](#), who suggest the franchise would only be expanded because of the fear of civil strife. It was *protection of land* that was lifted because of the fear of strife.

⁴⁶ [Lizzeri and Persico \(2004\)](#) essentially present a different argument to [Acemoglu and Robinson \(2005\)](#), suggesting that the franchise was expanded because the dominant commercial elite formed a coalition with labor to demand a system of public goods, particularly in the urban centers. This led to a more productive labor force and increased the real return of both capital and labor.

from the mid-1850s, with a further decline in income inequality.⁴⁷ Marx's ([1867], 1930) extrapolation from the recent past proved to be as wrong as Malthus's earlier argument, as applied to Britain at least.

Schofield (2009) has proposed a political, rather than an economic, argument about the extension of the franchise. The Tory, Disraeli, understood that the hold on the Tories by the landed interest had to be broken, in order for the party to be able to oppose the Whigs, or Liberals, dominated by capital. It is plausible that the success of Disraeli's maneuver depended on beliefs in the population about Empire. For industrial labor, "Empire" meant the opportunities for emigration and a better life in the Imperial Dominions of Australia, New Zealand, Canada and South Africa. Using the rhetoric of "Empire", the Tories/Conservatives could hope to appeal to working class voters. These political changes laid the foundation for Britain's continuing hegemony in the late nineteenth century.⁴⁸

The principal axis of political contention in Britain for the next century concerned the nature of this British hegemony.⁴⁹ Throughout this period, a vigorous political debate turned on whether Britain should maintain a system of Imperial preference, so as to oppose the growing power of the United States. This imperial quandary was very much on Keynes's mind during the negotiations over the creation of the post World War II international institutions leading to the Bretton Woods Agreement in 1944 (Schofield 2006).

In summary, the Walpole compact

- helped to maintain the Whig elite in power,
- allowed the Whig government to borrow the capital required for Britain to finance the long war against France,
- transformed agriculture, forcing people off the land and into the cities,
- caused the impoverishment of a considerable proportion of the population until 1815, inducing a large immigrant flow, first to the colonies and then the United States,
- facilitated rapid population growth, because of the availability of agricultural imports from the United States,
- led to the creation of efficient capital markets, and the eventual expansion of manufacturing,
- which paid for food imports, thus creating the possibility for further population growth as the basis for the growth of the empire.

At least until 1867, the compact necessitated the maintenance of a restricted franchise, since it was believed, even by Gladstone, that extending the franchise could lead to Parliamentary disorder.

⁴⁷ Maddison estimates that GDP/capita grew 22% in Britain, from \$2,300 to \$2,800 (in \$1,990), in the decade 1850–1860. In the same decade GDP/capita in the United States grew from \$1,800 to \$2,100 (ie 16%).

⁴⁸ Disraeli's maneuver probably allowed the Tories/Conservatives to vie with the Liberals over the next fifty years.

⁴⁹ It is still an important theme in British politics, but transformed into an argument about the nature of the relationship between Britain and the European Union. See Schofield (2005b).

It was also crucial for this dynamic path of Britain's economic development that there be a plentiful and cheap supply of (land intensive) agricultural goods from the United States. This was made possible by the availability of land in the United States and by the growth of the American population, as just described. The next section discusses some aspects of this synergy between the United States and the British Empire.

7 Political transformations in the United States

The rapid expansion of this food-producing American agrarian empire can be partly attributed to the election of Thomas Jefferson in 1800. By the 1790s, Jefferson was well aware of the implications of the Walpole compact in terms of impoverishment of the people and the concentration of power. His reading of the works of Henry St. John, Viscount Bolingbroke, led him to believe that the land-capital compact led to corruption, as well as the filling of Parliament by placemen.

In fact, Bolingbroke's arguments against the British compact were, to some degree, invalid, since the compact did make it possible for Britain to manage its debt, fight its wars and create an empire. Bolingbroke's logic was, however, valid for the US. Hamilton's attempt in 1793 to recreate Walpole's system of commerce would have necessitated both a land tax and tariff protection. Since US imports were primarily manufactures, a tariff would protect the scarce factor, capital, associated with these imports. In Jefferson's view, this would have disadvantaged the landed interest.⁵⁰ By creating an agrarian coalition, essentially of the Southern slave-owning landed elite, and western free farmers, Jefferson created a long-lasting compact under which the US became the food supplier for Britain.⁵¹

The thrust of the argument in [Schofield \(2006\)](#) is that what appears to be a stable political economic equilibrium may eventually create a constitutional quandary. Such a quandary may cause *architects of political change* to respond by creating a new political economic compact, [Schofield \(2006, 2009\)](#) discussed the following political economic transformations, in the Colonies and in the United States, induced by such quandaries:

- the break between the Colonies and Britain in 1776–1783, caused by the conflict over the land of the Ohio Valley, induced by the offer of military support from France,
- the solution to the constitutional quandary of 1787, proposed by Madison, which balanced the potentially autocratic power of the President with the collegial veto power of Congress,

⁵⁰ [Schofield \(2006\)](#) argues that Jefferson's view about this agrarian empire, and the possibility for trade, was much influenced by the ideas expressed by Condorcet in the *Esquisse* (1795).

⁵¹ Of course, Britain also depended on food supplies from Europe. However, abundant land and productive labor in the United States led to a lower price of food, which obviously benefited Britain. It is possible that the general equilibrium model of [Dakhlia and Nye \(2004\)](#) could be used to explore the synergy between the economies of Britain and the United States.

- the Jeffersonian compact of 1800 leading to the American agrarian empire, which allowed for the rapid expansion of the US population, but required the maintenance of slavery,
- the dissolution of the Jeffersonian compact by Lincoln after 1860, again due to the conflict between the slave owning Southern landed elite and northern industrial capital, allied with labor, over control of the west,
- the continuing conflict between eastern capital, still allied with industrial labor, against western agrarian populism in 1896, expressed by the presidential contest between the Republican, McKinley, and the Democrat, Bryan.⁵²
- the dominance of capital leading to continuing economic growth, so US GDP/capita reached \$4,600 in 1905, exceeding for the first time that of Britain (\$4,500),⁵³
- the creation of the Democrat New Deal compact by Roosevelt, beginning in 1932, to protect labor from the effects of the economic chaos of the Depression,
- the creation of the Keynesian or Atlantic compact in 1945 under which the United States supported international institutions to promote growth and economic stability,
- the quandary over the extension of the franchise, leading to the Democrat compact associated with the Civil Rights Acts of 1964–1965 during the presidency of Johnson,
- the response by the Republican party during the presidencies of Nixon and Reagan, leading to the capture of the southern states and eventually the collapse of the Roosevelt and Johnson compacts,
- the disappearance of the bipolar world after the collapse of the Soviet Union in 1989, and the beginning of “globalization” and economic growth in China and India,
- the creation of a new Republican compact by George W. Bush, in response to the fear generated by 11 September 2001, taking on autocratic power with the support of the New South, consolidating the dominance of capital, increasing inequality and attempting to make the United States the global hegemon,
- the quandary associated with the increasing dependency of the United States on imported oil and debt, and thus on the oil autocracies of Saudi Arabia, and Russia, as well as the financial support of China,
- the international quandary of a fractured world, with numerous failed states in the Middle East and Africa as well as the possibility of a resurgent Russia, willing to use its oil and military power to expand its sphere of interest,
- the economic quandary caused by the eventual collapse of the financial bubble in September 2008, increasing the Federal debt to about \$13.3 trillion,
- the attempts to resolve these quandaries by Barack Obama, in the first stage of his administration, by recreating the American New Deal compact, and possibly

⁵² Even though there was an overall increase in GDP/capita from \$2,100 in 1860 to over \$4,000 in 1896, the population grew from 32 to 84 million (using Maddison's estimates for GDP/capita in terms of \$1,990). Economic disorder at the end of the nineteenth century seems to have increased inequality, with western agrarian interests pressing for cheap money against the hard money preference of capital.

⁵³ Again using Maddison's estimates.

the global Keynesian compact, in order to deal with the possibility of economic collapse, catastrophic climate change and a fractured world.

The economic collapse in 2008–2009 is reminiscent of the collapse of the South Sea bubble in 1720. The cause of the current collapse may be the kind of speculation that Keynes warned against. Indeed it has been suggested that one of the ancillary causes was the dominance of an economic/technical elite, as illustrated by Long-Term Capital Management, founded by Myron Scholes and Robert Merton. Their theoretic work was predicated on risk analysis, but seems to have led to choices that turned out to be extreme risk loving. It is also worth noting that since 1972 the median hourly wage for men in the United States has remained flat or declined, just as the real wage in Britain declined in the period 1720 to the late eighteenth century.

As regards debt, the current Federal debt is about 65% of GDP, and is expected to rise to 100% by 2010. It has been rising by \$500 billion a year since 2003. This debt ratio over GDP was 120% of GDP in 1950, but had declined to 40% by 1980.⁵⁴ It is estimated that China holds \$2 trillion of US Treasury bills, and it has been remarked that this can be regarded as a form of imperial tribute to the United States, similar to the tribute that flowed to Rome. The British Empire, in contrast, provided capital to the rest of the world in the nineteenth century. See Ferguson (2008).

8 Concluding remarks

The narrative presented in this paper suggests that the dynamic economic transformations that have caused the great bifurcation between the rich countries (Britain, the United States, etc.) and the poor were due to political changes with respect to civil rights as well as property rights. Britain's transition to an open access, more democratic society appears to have been the consequence of a series of somewhat contingent choices, based on a strategic decisions by political leaders, such as Walpole, Peel, Wellington and then Disraeli. We have described a similar sequence of contingent choices in the United States.

The Keynesian or Atlantic compact of 1945 was an important step in creating an international order that made it possible for the West European polities to become mature, open access societies after the disaster of World War II. The collapse of the Soviet Union in the 1990s has created a new round of democratization among polities in many parts of the world.

However, it is unclear whether this process will continue, with the transition of polities such as Russia to full democracy. A recent literature on democratization by many scholars, including Przeworski et al. (2000), Boix (2003), Epstein et al. (2006), Collier (2009), among others, has looked for relationships between economic transformation and democracy. While there are reasons to believe that electoral preferences secure sensible economic choices in mature democracies,⁵⁵ some of the conclusions

⁵⁴ It has also been argued that some of the deregulatory strategies adopted during Reagan's presidency are part of the fundamental cause of the current crisis.

⁵⁵ Besley (2006). Even so, this argument depends on a better understanding of democratic elections than is currently available.

from this literature about the relationship between the polity and the economy in less developed societies are quite pessimistic.

It is plausible that, in poorer countries, political leaders will tend to be extremely risk preferring.⁵⁶ Even if democratic elections occur, the risk attitude of autocratic leaders will lead to violence that cannot be contained, and chaos will be generic. Indeed, Collier (2009) finds empirically that democracy and violence are causally linked in poor countries.

The recent Keynesian disorder has brought considerable stress, even to developed polities, such as Iceland, and there is cause to fear the consequences in newer democracies like Poland. The government in the Czech Republic fell on 24 March 2009, as a direct consequence of the economic crisis. For poorer countries, the World Bank reports a rapid increase in hunger, and this will further exacerbate Malthusian chaos. As suggested above, it is very likely that climate change will have severe consequences for agricultural productivity in the longer run, particularly in Africa, thus further increasing the possibility of civil war, and inducing even more violence and autocracy.⁵⁷

In those countries that successfully crossed the Malthusian boundary in the past, the risk preference of leaders was constitutionally constrained by a more risk averse capital elite (who had gained some degree of power in the political institutions). Other countries, such as Germany in 1914, and Japan in the 1930s, were unable to politically control the military elite by a commercial collegium, and found themselves in pursuit of military empires. The quandary for the developed democracies in the twentieth century was that their populations could not be expected to have a taste for war. However, we may conjecture that, in the mature democracies of Britain and the United States, the economic returns of the extended franchise meant that their populations were in fact willing to fight for their freedom.⁵⁸

The fear generated in the United States after 2001 led to a short-lived autocracy that engaged in extreme risk-preferring strategies to create a military hegemony. It is plausible that there is a connection between this risk-preferring military strategy and the commercial risk preference that led to the recent collapse of the economic bubble. The collapse, in turn, created the conditions for a rejection of the Republican administration by the electorate of the United States in November 2008.⁵⁹ Nonetheless, the risk of international disorder is extreme, fed by economic uncertainty and global inequality.⁶⁰ While it is to be hoped that Obama is successful in creating new domestic and global compacts that will mitigate this disorder, the short-term prospects are daunting.

⁵⁶ One only has to consider Mugabe in Zimbabwe. The same may be true of middle income countries, as suggested by Putin in Russia.

⁵⁷ Miguel et al. (2004).

⁵⁸ This response seems to have been conditional on the ability of political leaders like Churchill and Roosevelt to articulate the danger presented by war-loving autocrats.

⁵⁹ See Miller and Schofield (2008) for a discussion.

⁶⁰ The recent IMF report predicts a drop of about 4% in the GDP of the advanced economies for 2009, and hopes for a slight rebound in 2010, but this drop will surely have serious consequences for poorer countries.

Indeed, the resolution of these complex quandaries appears to be at least as difficult as those that faced earlier societies, as discussed in this review. However, a start has been made, as indicated by the agreement, in April 2009, of the G-20 group of Industrial countries, under pressure from Obama, to make \$850 billion available through international financial institutions such as the IMF and World Bank.

One purpose of this review has been to attempt to understand how societies of the past, such as the Roman or British Empires, managed, at least temporarily, to construct constitutional or institutional rules that kept the logic of economic, or factor power, compatible with that of political power. Perhaps such an analysis will help in understanding our present quandary.

The analysis has deployed a number of abstract ideas from social choice theory and the theory of dynamical systems. It has also emphasized the role of the factors of land, capital and labor, so as to complement the institutional perspective on social order presented in NWW.

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