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The Wealth of Nations:

A Further Inquiry into Its Nature and Causes

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Abstract:

A new framework for understanding the wealth of nations is introduced. It uses the involved parties' relative capacity for violence as a unifying variable to explain how the wealth of nations is determined through non-market mechanisms (*e.g.*, the Hobbesian war or Coasian bargain), how the Smithian market emerges, and how a market-preserving government is created and preserved. The study reveals a common logic underlying various institutions, broadens our understanding of the nature and causes of the wealth of nations, and offers a new criterion for sound public policies.

Key words: Relative capacity for violence, wealth, institutions, government types.
JEL codes: A1, B3, D0, H1, N0, P5. SSRN site:

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1. Introduction.

In his book *An Inquiry into the Nature and Causes of the Wealth of Nations*，published in 1776, Adam Smith (1937) used concepts such as the division of labor and the invisible hand to explain how a free and competitive market promotes economic efficiency. Since then, the kind of market described by Smith (henceforth referred to as "the market") has become the dominant economic institution in some countries, and these countries have become the wealthiest in the world.

Smith's monumental book invites two follow-up questions. First, what determines the wealth of nations when the market is absent or marginal? Second, how can the market emerge from a violent world? These questions arise from the fact that humans have had a history for scores of millennia, during which they successfully spread all over the world, and multiplied their population.[1] In more recent millennia, humans created ancient civilizations with large amounts of accumulated wealth.[2] Today, the Egyptian pyramids, the Parthenon temple of Athens, the city of Rome, and many other monumental ancient projects are visited by millions of people each year.[3] They signify tremendous amounts of wealth, arts, and technology of ancient civilizations.[4]

Apparently, the market cannot quite explain these and other pre-historic and pre-

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[1] Homo sapiens probably began to conquer the world some 70,000 years ago (Harari, 2011).

[2] Smith (1937, p. 361), for example, noted "a considerable degree of opulence" in some Roman provinces. North *et al* (2009, pp. 3–4) observe that the low per capita income growth rate before 1800 "does not mean that societies never experienced higher standards of material well-being in the past." Rather, it is due to the fact that periods of increasing income are followed by periods of declining income or accompanied by periods of increasing population.

[3] The list can be much extended: the Great Wall of China, the Blue Mosque and St. Sofia's Cathedral of Istanbul, the Taj Mahal of India, and so on.

[4] The Parthenon Temple, for example, is not only grand and artistic, but also advanced in anti-earthquake technology. (Shiono, 2017, II, p. 65.)

modern human successes in wealth, arts, and technology. In those times, a so-called "market economy" was yet to exist.[5] In those times, it was common for nations to acquire their fortunes primarily through conquest, not the market.[6] A puzzle is how the market could have emerged from a violent world.[7] A related puzzle is why, even with proven evidence of its high social values, is it still so hard for the market to prevail in most countries in the world.

A framework is introduced in this paper to address these questions and thereby broaden our understanding of the wealth of nations. The framework centers around the involved parties' relative capacity for violence (F^R), using it as a unifying variable to explain various economic institutions, government types, and the wealth of nations. In particular, it explains how F^R determines wealth through the Hobbesian war or the Coasian bargain, and under what conditions of F^R the market can prevail.

The framework starts with the recognition that, when the Hobbesian war is the

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[5] Although trading is common in human history, market economies with the market as the dominant economic institution emerged only in recent centuries. To be a "market economy", a country must fully recognize and protect property rights. According to North *et al* (2009), 25 or so countries (out of about 200) in today's world have the political and legal foundation of a market economy: open political access and the rule of law.

[6] Alexander built an empire stretching from the Adriatic Sea to the Indus River, making Persia and many other lands his tax sources. When he started his conquest, he had 70 talents of gold in his treasury and a debt of 1300 talents while he needed 300 talents a year to support his army and navy (Shiono, 2017, III, p. 210). His teacher Aristotle and others advised him to wait. He did not, and seized the Persian royal money of 3000 talents in Issus (p. 272), 18,000 talents in Susa (p. 342), and more in Damascus and other cities. He shared the seized wealth generously with his soldiers (p. 281). Genghis Khan started in a barren corner of Northeastern Asia to conquer most of Eurasia and founded the largest contiguous empire ever in history.

[7] Two observations are helpful for answering the question. One of them is that, for the market to prevail, violence must be suppressed. The other is about the indispensible role of government. The real questions, however, are *how* to suppress violence, and *how* to ensure that a government is market-preserving rather than market-disrupting.

main mechanism for resource allocation, wealth and institutions are at the winners' discretion. F^R is important in such a situation because it is a key determinant of who is likely to win a war.

In the Coasian world, the parties bargain for solutions to avoid war and its costs. Bargained solutions, however, remain dependent on F^R. The claim is consistent with many real-world experiences and also with the logic of Nash bargaining. With war and bargained solutions as alternatives to each other, the expected outcomes of a would-be war determine the reservation values for the parties at the bargaining table. With war outcomes dependent on F^R, bargained solutions must also align with it.

For the market to emerge, it is inadequate for war to be avoided, bargains to be voluntary, and signed deals to be Pareto-improving. When one party has a dominant capacity for violence, a bargained deal would likely contain terms for the dominated to surrender. For the market to emerge, the parties must be able to bargain as equals, and sign deals without the threat of violence. When the parties are left to themselves, this equality condition can only be accidentally satisfied.

As Smith (1937) observed, for the market to prevail, it is essential to have a fair and effective government to enforce law and maintain order. Only then can it become a norm for people to trade as equals and enjoy the full benefits of the market. The question is then how such a government is created and sustained. Our framework addresses this question by studying how F^R determines government types.

This paper is relevant to today's world. It suggests an institutionally diverse and dynamic world due to different and changing values of F^R. As Kornai and Eggleston

(2001), Maskin (2015), Rodrik (2017) and Einchengreen (2018) observe, economic reforms, globalization, new technologies, and other events create losers. As the number of losers and their anger grow, F^R is changed. This change can threaten existing political and economic systems, as found in the rise of radical politics and populism in recent years. Sound public policies and the design of future institutions must take into account the power of F^R and its changed values.

The framework presented in this paper benefits from many previous papers in political economics. It follows Aumann and Kutz (1977) in viewing social decision as a function of power, Kornai (1980, 1992) in emphasizing the relationship between power and the market, Olson (2000, p. 3) in recognizing power as involving "the capacity to coerce," Acemoglu and Robinson (2006, p. 21) in recognizing force as "the first source of political power," and North *et al* (2009) and Wang (2017) in recognizing the central role of violence in shaping social order.[8] It follows North (1990) and Maskin (1999) in viewing an institution as a set of rules. It is in the same spirit of Greif (1989), Greif *et al* (1994), Milgrom *et al* (1990) and Weingast (1995) on predatory governments, Acemoglu and Robinson (2006) on the economic origins of dictatorship and democracy, and Besley and Persson (2011) on governmental capacities. Our model benefits directly from Hoffman's (2015) model explaining the European conquest of the world, and other models of contest theory (details below).

It is worth emphasizing several unique features of how this paper treats violence. First, it recognizes that violence affects not only the distribution but also the creation

[8] This work complements North *et al* (2009) by explaining what determines the ruling elites' internal relationship in limited-access societies, and how to establish an open-access society.

of wealth. Second, it views violence not as a force separate from and opposed to other institutions, but as a parent of them. Indeed, a key purpose of this paper is to study how violence gives birth to other institutions. Third, it uses F^R as a unifying variable to operationalize the study of violence and institutions. Finally, it does not assume that a particular party has absolute superiority in violence (*e.g.*, the government as is often presumed, or the poor as in Acemoglu and Robinson, 2006), but rather treats F^R as an endogenous variable capable of having different equilibrium values. Indeed, a point to be made in this paper is that the world is institutionally diverse because of different values of F^R. The way violence is treated here is consistent with the inspiring histories of Morris (2010, 2014), McNeill (1991), Harari (2011), Pavlac (2011), Diamond (2005, 2012), Shiono (2008, 2017), and Montefiore (2011), among others. It enables us to systematically and coherently study the wealth of nations in different social environments.

The rest of the paper is organized as follows. Section 2 discusses the role of F^R in the Hobbesian war. Section 3 discusses how F^R determines the outcomes of the Coasian bargain and how the market emerges. Section 4 discusses how F^R determines government types. Sections 5 and 6 discuss the determination of the equilibrium F^R and government type, respectively. Section 7 concludes.

2. The wealth effects of war.

As widely recognized, violence (in the form of random street violence, gang violence, war, conquest or else) is one of the most common means for human beings to acquire

wealth. What also needs to be recognized is that war (as a specific form of violence) affects not only the distribution, but also the production of wealth.[9]

For sure, war is bloody and destructive. However, it also promotes the well-being of nations through at least three mechanisms: redistributing existing wealth with productive implications; stimulating institutional changes; and promoting innovations and technological progress.

First, war has redistributive and productive wealth effects. It either makes some nations better-off at the cost of others, or makes everyone better-off.

History is unambiguously clear about nations enriching themselves through conquest. It is in pursuit of wealth that the world has been conquered again and again. One of the most obvious patterns of history is that nations rise and fall depending on how they do in wars. The pattern tells us that war is a key determinant of the wealth of nations.[10]

Gains from conquest often benefit not just a few but the general population. In the Athenian, Macedonian and Roman empires, for example, money and land (often from conquered territories) were generously given to citizens especially those who served in the military, and many social policies were adopted to benefit the poor.[11] In fact,

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[9] See Olson (1982, 2000), Acemoglu and Robinson, (2006, 2012), Acemoglu *et al* (2010), Skarbek (2014), Morris (2010, 2014), Diamond (2005, 2012), McNell (1963 [1991]), Pavlac (2011), and Hoffman (2015) for discussions of wealth and violence.

[10] As one may have noted, many of the monuments of ancient civilizations mentioned in the Introduction are the legacies of successful conquerors.

[11] McNell (1963 [1991], p. 287) observed that: "In the fifth century B.C., corporate citizen bodies – Athens above all – had collectively exploited weaker peoples, while maintaining an exhilarating sense of social cohesion and equality at home." In its Golden Age, people all over Greece went to Athens for economic opportunities there. Athenian citizens benefited from

Roman citizenship was so valuable that people from conquered territories often campaigned hard to acquire it.[12]

The conquered are at the mercy of the conquerors. They may be impoverished, enslaved, or even extinguished (as in the experiences of the Neanderthals, Australian aborigines, American Indian tribes, and others).[13] It is, however, not accurate to say that the conquered are always doomed. In fact, war may also have a positive wealth effect on the conquered, especially in the long-term. The peace and prosperity under Pax Romana, and along the Silk Roads across the vast Mongolian Empire surely benefited not only the conquerors.[14] With many institutions imposed on them by the U.S., Japan after World War II recovered from the ruins and achieved unprecedented levels of political liberty and economic prosperity in a few decades. Hong Kong as a British colony in 1840 through 1997 developed from an economically insignificant

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rising rental cost as the law permitted only them to own properties in Athens (Shiono, 2017, III, p. 12). In those days, Athens paid the poor money equivalent to two-thirds of a worker's normal income. Pericles, a prominent Athenian leader of the time, insisted on paying the poor when they were providing public and military services to maintain soldiers' morale (II, p. 72). Populist politician Cleon extended the payment to the poor when they were not providing any services. Shiono (2017, III, p. 140-141) believes that this generous payment undermined citizens' willingness to serve and fight for the polis. During this period, the poor also received money when they went to theaters (Pavlac, 2011).

[12] In the Greek *poleis*, citizenship was obtained only by birth. After the death of Alexander, his successors Ptolemy and Seleucid settled large numbers of land-hungry Macedonian and Greek soldiers in special military colonies in Asia, and gave them land in exchange for their services (McNell, 1963 [1991], p. 281). In Rome, citizenship could be earned (McNeill, 1963; and Pavlac, 2011). Provincial people, for example, would be granted citizenship to qualify for retirement benefit after 25 years of supportive military services (Shiono, 2017, III, p. 429).

[13] There are two competing theories explaining the extinction of the Neanderthals: inter-breeding and replacement. DNA tests of modern humans, however, suggest that the Neanderthals were largely replaced by the sapiens (Harari, 2011, pp. 15-17).

[14] Smith (1937, p. 361) observed "a considerable degree of opulence" in Rome's western provinces, and the fall of these provinces to "the lowest state of poverty" when commerce was interrupted by the barbarians.

place of to a major financial center of the world.[15]

Morris (2014, p. 9) summarizes the long-term wealth effect of war well: "…with the passage of time…the creation of a bigger society tends to make *everyone*, the descendants of victors and vanquished alike, better-off. The long-term pattern is again unmistakable. By creating larger societies, stronger governments, and greater security, war has enriched the world."

Olson (2000) explains why a positive wealth effect for the vanquished is possible: the ruler may have an encompassing interest. S/he would, for example, benefit from a prosperous economy generating more tax revenues.

Second, war is a powerful stimulus to institutional changes, for the conquerors and the conquered alike.

For the conquered, they have no choice but to accept the institutions imposed on them. Losing the Peloponnesian War in 404 B.C., and barely escaping complete destruction as some Peloponnesian League *poleis* (*e.g.*, Corinth and Thebes) wanted, Athens was forced to disband its navy and the Delian League, and allow anti-democratic politicians to return. These measures reduced Athens from a super power to a *polis* of military insignificance, political chaos, and economic decline (Pavlac, 2011; and Shiono, 2017, II). Similarly, the ancient Roman and modern European conquerors developed their plantations all over the seized lands, and the Mongolian conquerors seized fertile crop farms in China to turn them into grazing fields. In the American Civil War, slaves were freed and higher tariffs on imports were

[15] During its colonial time, Hong Kong enjoyed so much more peace and prosperity than the rest of China that it became a favorable destination of millions of Chinese migrants.

imposed against the wishes of the South. These imposed changes affected not only the distribution of existing wealth, but also the long-term economic course of the country.

War also brings profound institutional changes to the conquerors. A main reason that many Greek *poleis*, prominently Athens, evolved into democracies around 500 B.C. was the poor's demand for political rights and a share of wealth consistent with their military contributions (Pavlac, 2011).[16] To make Macedon a super power, King Philip and his son Alexander overhauled the country's political, military, irrigation, land, monetary, fiscal, and cultural systems (Shiono, 2017, III).[17] To help win World War II, the U.K. promised independence for India, which was honored in 1947 (Stavrianos, 1971). Also during World War II, many American women joined the labor force, and many African Americans joined the military or migrated from the South to work in the North. These changes significantly influenced the country's post-War economic and political course, such as the development of suburban communities (Gordon, 2016) and the increased participation of women and ethnic minorities in national and local politics.

An important point to remember is that war is an ultimate means to settle

[16] Pavlac (2011) writes: The "two innovations, hoplite and trireme, broke the dominance of the aristocracy in combat and lost them their political monopoly. Repeatedly in history, innovations in military methods have forced changes in political structures. In ancient Greece, a simple peasant could afford the few weapons of a hoplite… Anyone with a strong back and limbs could be a thete. Once the peasants and merchants realized that they were putting their lives on the line for their "country," they demanded a share of power and wealth controlled by the aristocrats." (pp. 53 - 54) The result of their struggle was that "…most Greeks settled on some form of democracy by 500 B.C." (p. 54)

[17] These reforms included establishing a mechanism for the generals to elect a new king (Shiono, 2017, III, p. 114), founding the phalanx (pp. 116-122), giving seized land to the farmers (p. 126), minting high quality money (p. 127), increasing fiscal revenues from mining (p. 127, p. 130), and inviting the best Greek scholars and artists to Macedon.

fundamental institutional questions such as who has or does not have certain rights, and what the rules are in the political and economic games to be played. Another important point is that nations design, and change social institutions with war in mind (to improve the odds of winning in war). For these reasons, war can be viewed as a parent of institutions. It is a right place to start with in the study of institutions.

Third, war promotes innovation and technological progress. As well known, many innovations in human history were first made and used for military purposes (Morris, 2010, 2014; Hoffman, 2015). Gordon (2016) observes the much faster increases in total factor productivity in the U.S. in 1920–1970 than in the preceding and the following decades. He lists four reasons for the phenomenon, of which two are war-related. First, knowledge and skills which were accumulated quickly during World War II (through, for example, learning by doing) continued to be valuable after the war. Second, investment in equipment with new technologies boomed during the war, reaching 50 percent of the stock of pre-war equipment in 1941.

Note that the above discussion on the three mechanisms does not differentiate wars *between* nations and wars *within* nations. The fact is that either type of war can profoundly impact a nation's wealth and economic institutions.

The war effects on wealth distribution and production discussed above can be mathematically presented as follows. Later on in the paper, these effects will be incorporated into a full model for studying violence as an industry.

Suppose that, in a society of population size 1, …i, j, …N, $N \geq 2$, parties i and j have wealth, respectively, w_i and w_j, w_i, $w_i \geq 0$. Through war, they can redistribute the

wealth, and determine who has the right to tax the population. If i wins the war, it seizes a fraction $s_i \in [0, 1]$ of w_j, and taxes the rest of the population for income $t_i \sum_{-i,-j} w_{-i,-j}$, where $t_i \in [0, 1]$ is the tax rate, and the subscript "-i, -j" stands for "everybody other than i and j". The total wealth of i after winning the war with j would then be

$$P_i = \delta_i(w_i + s_i w_j + t_i \sum_{-i,-j} w_{-i,-j})$$

In this expression, $\delta_i \geq 0$ is a parameter that captures the productive effect of war. $\delta_i \geq 1$ or $\delta_i < 1$ depending on whether the positive wealth effect of war is greater or smaller than its negative effect. In Hoffman (2015) the prize of war is an important variable.[18] P_i is an expression explaining what the prize may consist of.

Likewise, if j wins the war, it can seize w_i and tax the population to have $\delta_j(w_j + s_j w_i + t_j \sum_{-i,-j} w_{-i,-j})$, where δ_j, s_j, and t_j are qualitatively the same as their counterparts with the subscript i.

The discussion of this section gives us

Principle 1: F^R plays a deterministic role in the distribution and creation of wealth in the world of the Hobbesian war.

3. From the Coasian bargain to the Smithian market.

In this section, we discuss the relationship of F^R with two important economic mechanisms of resource allocation: the Coasian bargain, and the Smithian market.

In the world of the Hobbesian war, a party sufficiently strong could, and often

[18] See also Morris (2010, 2014), Dube and Vargas (2013), Esterban *et al* (2014), Michaels and Lei (2014) and Caselli *et al* (2015) on the prize of war.

does, undertake conquering in order to enrich itself. Coase (1960), however, suggests that conflicts can be settled through bargains to make both parties better-off.[19]

Any deal made through the Coasian bargain is voluntary in the sense that war is always an alternative. It is reasonable to view the expected war outcomes (with all expected costs and gains considered as to be made explicit later) as the "reservation values" for the parties as in the Nash bargain, and view any result better than the reservation value as an improvement.

The terms in a signed deal are likely to vary with the F^R in favor of the stronger party.[20] The reason for this is that, with war and bargain as alternative mechanisms for redistributing the wealth, a party would accept nothing less from the bargain table than from war, while what the parties can expect from war is dependent on F^R.

More formally, suppose that parties i and j in the society specified in the previous section have respective war capacities $F_i \in [0, \infty)$ and $F_j \in [0, \infty)$. Let $F^R_{i,j} = F_i/(F_i + F_j)$, $F^R_{i,j} \in [0, 1]$, be the index measuring the capacities relative to each other. (Hereafter F^R is used in the place of $F^R_{i,j}$ for notational economy when it is not causing confusion.) $F^R \to 0$ means that F_i is negligible relative to F_j, and i would be overwhelmed by j in war. In such a case, the negotiated terms would be dictated by j and mainly about how

[19] Coase (1960) argues that any costly social conflict should and can be avoided through bargain. Olson (2000, p. 58), however, asks why the Coasian bargain "does not lend itself to explaining bad outcomes" such as war and poverty.

[20] In Greek history, an asymmetric bargain happened in 338 B.C. In the summer of that year, the Macedonian army defeated the joint army of the Greek *poleis* (except Sparta) in the battle of Chaeronea, making clear of its military superiority. King Philip called for a meeting of all *poleis* (again, except Sparta) in Corinth in the fall of the year, at which he dictated the terms for the political, legal, military, and economic systems of a new *de facto* Greek confederation. Not surprisingly, all the terms were accepted by all *poleis* attending the meeting (Shiono, 2017, III, pp. 156-169). History is full of similar experiences.

i may surrender. The opposite would be true when $F^R \to 1$. $F^R = \frac{1}{2}$ means that i and j have equal military capacities. The closer F^R is to $\frac{1}{2}$, the more the parties can bargain, and sign deals, as equals.[21]

In the world of the Coasian bargain, people bargain voluntarily and make deals in the full spectrum of $F^R \in [0, 1]$. The market, however, is not a place for deals that are voluntary but based on $F^R \to 0$ or $F^R \to 1$. Instead, it has to be based on $F^R = \frac{1}{2}$ meaning that the market features voluntary exchanges between true equals. In this sense, the Smithian market can be viewed as a special part of the Coasian world: it emerges from the Coasian world when the parties are equally strong so that they can bargain as equals as neither party can hope for gains from war.[22]

It is easy to imagine that, when i and j are left to themselves (*i.e.*, without government), $F^R = \frac{1}{2}$ can only be accidental. So while voluntary bargain, and contracting are common because they can happen in the full range of $F^R \in [0, 1]$ (like war), the market is not. This is why the Smithian market does not naturally become the dominant economic institution, and market economies are rare.

Voluntary exchanges between equals, however, become standard when there is a government to fairly and effectively enforce law and maintain social order. With such a government using its coercive power (its capacity for violence) F_G to punish anyone

[21] War is a complex operation involving factors such as human and financial resources, moral and spirit, operational skills derived from knowledge, talents/instincts, experience, and training. There seem to be two ways to evaluate F^R. One of them is to compare the factors contributing to it. The other is to test them in battles. Once F^R is tested, future bargains can proceed with more accurate information.

[22] Axelrod (1984), Libecap (1989), Ellickson (1991), and Gibbons (2001) explain how the market may be supported by reputation. Perhaps a large δ_k provides a motivation to rob while a small δ_k allows room for reputation to work. See Wang (2017).

who threatens others with violence, and the parties being deterred from using violence against each other, it becomes the norm for bargains to be not only voluntary, but also conducted between true equals.

Principle 2:

1) The Hobbesian war and the Coasian bargain can take place at any value of F^R.

2) The outcomes of the Coasian bargain depend on the value of F^R similarly as those of the Hobbesian war.

3) The Smithian market requires $F^R = \frac{1}{2}$. It prevails only when there is a fair and effective government to enforce laws and maintain order.

4. Government types.

Government, however, is often not fair and effective in law enforcement and order-keeping. This presents an additional difficulty for the market to prevail (beyond the fact that $F^R = \frac{1}{2}$ is an exception rather than a common natural phenomenon).

If the government cannot effectively enforce laws and maintain order, the society falls into the Hobbesian war or the Coasian bargain. Wealth and institutions in the society are then aligned with $F^R \in [0, 1]$ as stated in Principle 2.

If the government is effective but not fair, it makes and enforces rules that benefit some parties at the cost of others. With F_G large (for the government to be effective) and used in biased ways, F^R is necessarily tilted in favor of whoever backed by F_G.

The two criteria of government being fair and effective give rise to four types of governments as summarized in Table 1: fair and effective government (G_1), biased

(not fair) but effective government (G_2), fair but not effective government (G_3), and biased and ineffective government (G_4).

Table 1: Government types G_T, T = 1, 2, 3 or 4. .

	Effective	Ineffective
Fair	G_1	G_3
Biased	G_2	G_4

Weingast (1995) observes that the fundamental dilemma of political economics is that a government must be strong enough to maintain order, but not so strong as to prey on its citizens. Of the four types of governments, G_2 is predatory while G_3 and G_4 are too weak to maintain order. Only G_1 meets the Weingast Criterion to be market-preserving.

In the real world, G_1 is found in modern democracies with the rule of law (North *et al*, 2009). The market prevailed in these countries known as market economies.

G_2 is found in typical autocracies, which, as North *et al* (2009) observe, is the dominant and natural type of government in the world. Nations with G_2 may enjoy the benefit of the market when super-encompassing interest prevails. It is however more often in the Coasian or the Hobbesian world depending on if conflicting interests is controlled (Wang, 2012). These possibilities explain autocracies' diverse performance records: it could be as good as any economy, or disastrous.

The new Indian government in 1947 is probably an example of G_3: it had good intentions for the newly independent nation but did not have the experience and administrative capacities to control violence.

G_4 is found in nations where some special (*e.g.,* tribal or military) interest forms a short-lived government to rob the nation but fails to maintain social order.

Incorporating G_T into it, F^R becomes $F^R[F_i/(F_i + F_j) \mid G_T]$ in the form of:

$$F^R = \begin{cases} \frac{1}{2} & \text{if } T = 1 \\ 0,\ \frac{1}{2}, \text{ or } 1 & \text{if } T = 2 \\ x & \text{if } T = 3 \text{ or } 4 \end{cases}$$

The reason for $F^R = \frac{1}{2}$ when T = 1 is that, as explained, G_1 bans the parties from threatening each other with violence. When T = 2, F^R = 0 or 1 depending on with whom the government sides. $F^R = \frac{1}{2}$ is also possible for the reason of encompassing interest.[23] When T = 3 or 4, the government is ineffective, and $F^R = x \in [0, 1]$ meaning that F^R can be of any value. In the worst situations, T = 3 or 4 is equivalent to not having a government.[24]

Hobbes (1651) argued that having a government is always better than anarchy, which suggests $G_1, G_2 > G_3, G_4$. The belief that the market can best enhance social welfare suggests $G_1 \geq G_2$. If an ineffective government's intention to be fair does not make things worse for a society, $G_3 \geq G_4$ holds. When all these arguments and beliefs hold, we can rank-order the well-being of nations under the four types of government with $G_1 \geq G_2 > G_3 \geq G_4$.[25]

The questions are: What makes a government effective? And what makes it fair?

Besley and Persson (2011) offer insights into the question of how to make a

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[23] One way for G to affect F^R is to side with a party to make $F^R(F_i, F_j \mid G_T) \rightarrow 0$ or 1. Another way is for it to become an independent interest with $F^R[F_i/(F_i + F_G)]$ and $F^R[F_j/(F_j + F_G)] \rightarrow 0$.

[24] Kornai's (1992) is skeptical of market socialism. The discussion here supports his view.

[25] By this criterion, the average Iraqi and Libyan are probably worse off as the Color Revolution changed their government from G_2 to G_4.

government effective. Using a well-structured framework, they demonstrate how violence negatively affects long-term investment in the legal and taxation capacities of government. The insight points to a vicious circle running from violence to low investment in governmental capacities, to ineffective government, and back to more violence.[26]

Would an effective government play a fair or biased policing role, *i.e.*, is it of type 1 or type 2? As noted earlier, in the real world, type-1 government exists only in a small number of countries.

Political scientists and political economists agree that checks and balances are essential to prevent a government from becoming predatory. They have further studied various ways to achieve checks and balances. In modern democracies, checks and balances are built between the voters and government, among governments at different levels, and among different governmental branches.

The checks and balances depend on F^R in at least two ways. First, they do not come from nowhere, but situations in which F^R is not too tilted. Modern democracy in the U.K., for example, has its root in England's power-sharing tradition (Acemoglu and Robinson, 2006). The tradition was based on the subtle balance that the barons' military capacities were individually weaker but jointly stronger than that of the crown (Barzel, 1997). Periodically, this balance would be tested in the battlefields and reconfirmed. Such a structure of F^R created the conditions for the signing of *Magna*

[26] Besley and Persson (2011) focus on governmental bureaucratic capacities. Wang (2012) on the other hand focuses on taxpayer's capacity for violence to explain the limit to taxation and why some nations alternate between effective and ineffective government.

Carta in 1215, its persistence, and more constraints later imposed on the crown (Pavlac, 2011, McNeil, 1963 [1991]). Other democracies also had a power- sharing history based on the checks and balances in F^R.[27]

Second, the viability of all checks and balances depend on F^R. The reason for this is that checks and balances of any form can be challenged by a superior capacity for violence. Autocracies can have constitutions specifying civil rights, elections, and checks and balances among governmental branches, but only on paper. Coups d'état can topple an elected government. In American history, the South challenged the 1860 federal election causing the Civil War that killed more Americans than any other war did. In German history, Hitler in the 1930s used propaganda and violence to assure Nazis' electoral victory. It is worth noting that he used the Nazis' private militia organizations (Sturmabteilung – SA, and Schutzstaffel – SS) to help win elections while the state's military forces remained faithfully neutral in German politics.

These observations tell us that the ultimate checks and balances exist in nowhere but F^R. Democracy and the rule of law cannot exist unless F_R is sufficiently balanced. For this reason, we have the following principle.[28]

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[27] The U.S. started with thirteen colonies with a tradition of self-governance and limited military capacities. Germany was not a unified nation until the Prussia-Franco War of 1841. Japan was the first nation outside of the European cultural sphere to adopt modern democracy. The country had a long history of effective government. But, in the seven centuries preceding the Meiji Restoration in 1865, subtle checks and balances existed among the crown, the Shogun, and the local lords. The Tokugawa Shogun had direct tax power over less than one sixth of the country's arable land (Chen, 2016, p. 18).

[28] Recall the discussion in Section 3 on the Coasian bargain suggesting that F^R matters even when violence is not actualized. Violence is still used to influence democratic politics even in established democracies although there it is of limited scale and impact except in incidents such as the American Civil War or the assassination of an elected leader.

Principle 3: A fair and effective government cannot be established and maintained when F^R is too large or too small.

5. Equilibrium F^R for violence.

As we have tried to explain, F^R is a key determinant of economic institutions and government type. This section addresses the question of how F^R itself is determined.

The question is addressed by treating violence as an industry and treating the parties as profit-maximizers engaged in Cournot competition, as in Hoffman (2015) and Wang (2017). Following Wang (2017), in the game, i and j first non-cooperatively decide how much to invest in their capacities for violence F_k, k = i, j. After that, they decide, again non-cooperatively, whether to actually fight a war or not.[29]

Let the odds of winning the war be $p_i(F_R) \in [0, 1]$ for i, and $p_j(F_R) \in [0, 1]$ for j, with $(p_i + p_j) = 1$. Recall that $F^R = F_i/(F_i + F_j)$, and assume that $dp_i(F^R)/dF^R > 0$ and $dp_j(F^R)/dF^R < 0$, meaning that the odds of winning increases with a party's capacity for violence relative to that of the other party.[30]

Assume that F_k (k = i, j) increases with $I_k \geq 0$. The decision involves a butter-cannon tradeoff as in the economics textbook, which suggests a resource constraint. Let the constraint be $I_k \leq w_k + b_k \leq W_k < \infty$, where b_k is k's borrowing

[29] The timing of the moves is quite clear so we omit it in the notations. The models can further trace their origins to the contest literature. See the surveys of this literature by Coyne and Mathers, 2011; Levy, 2011; Jackson and Morelli, 2011; Garfinkel and Skaperdas, 2012; and Corchón and Serena, forthcoming. See Fudenberg and Tirole (1991, p. 14); and Gibbons (1992, pp. 14-21) on Cournot competition.

[30] A simple form of $p_i(F^R)$ is $p_i = F^R = F_i/(F_i + F_j)$, which is known as the lotus probability with the property of being homogeneous of degree zero. See Corchón and Serena (forthcoming), and Corchón and Yildizparlak (2013).

capacity, and $W_k < \infty$ suggests limited resources.[31]

Let $\tau_k \geq 0$ be k's technology to transform I_k into a battle-ready fighting capacity. Assume that the larger τ_k is, the more effectively k can transform I_k into F_k. $F_k(I_k, \tau_k)$ thus has the properties of $F_k(0, \tau_k) = 0$, $\partial F_k(I_k, \tau_k)/\partial I_k \geq 0$, $\partial F_k(I_k, \tau_k)/\partial \tau_k \geq 0$, and $\partial[\partial F_k(I_k, \tau_k)/\partial I_k]/\partial \tau_k \geq 0$.[32]

Because what matters is F^R, the parties' optimal investments are interdependent of each other, *i.e.*, $I_i^*(I_j^*)$ and $I_j^*(I_i^*)$, which suggests an arms race bearing a logic similar to that of the Cournot quantitative competition.

Let the direct cost of war be $c_i(F^R)$ and $c_j(F^R)$ for i and j, respectively. Assume that $c_i(0) = \infty$, $dc_i(F^R)/dF^R < 0$, and $c_i(1) = 0$ while $c_j(0) = 0$, $dc_j(F^R)/dF^R > 0$, and $c_j(1) = \infty$.

Assume that the parties are risk-neutral.

Under these assumptions, the problem for i is to choose an investment level $I_i = I_i^*$ to maximize expected profit $E(\pi_i)$.

$$\text{Maximize } E(\pi_i) = [p_i P_i + (1 - p_i)(1 - s_j)w_i] - c_i$$

$$\text{Subject to: } p_i = p_i(F^R),$$

$$P_i = \delta_i(w_i + s_i w_j + t_i \textstyle\sum_{-i,-j} w_{-i,-j}),$$

$$c_i = c_i(F_R),$$

$$F^R = F_i(I_i, \tau_i)/[F_i(I_i, \tau_i) + F_j(I_j, \tau_j)], \text{ and}$$

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[31] The textbook would then go into detail about the butter and forget about the canon. See Jackson and Morelli (2009, 2011) about how gun-butter tradeoff affects war decisions. The specification of the constraint is similar to that of Hoffman (2015). A more general form of it is $L_i(w_i) = L_i(w_i, b_i(w_i))$, meaning that the borrowing capacity b_i depends on w_i.

[32] As discussed in Section 2, there is a correlation between military technology τ_k and civilian technology contributing to δ_k. The expected gain of war goes up faster when τ_k and δ_k increase, making war more desirable. This seems to be what happened to Europe after 1492 (Hoffman, 2015; and Morris, 2010).

$$I_i \leq w_i + b_i \leq W_i < \infty.$$

Player j's optimization problem is similar, and can be written by swapping the subscripts i and j in the above optimization problem.

The equilibrium of the game is a pair (I_i^*, I_j^*) at which $E(\pi_i)$ and $E(\pi_j)$ are both maximized.

How I_i^* and I_j^* interact with each other and the values of I_i^* and I_j^* depend on the functional forms of F_k, c_k, p_k, and the parameters s_k, τ_k, w_k, δ_k, and W_k (k = i, j).[33]

Whether I_i^* and I_j^* have an interior solution or not depends on the budget constraints W_i and W_j, and the values of $d(I_i^*)/d(I_j^*) > 0$, $d(I_j^*)/d(I_i^*) > 0$. When the slopes of $d(I_i^*)/d(I_j^*) > 0$ and $d(I_j^*)/d(I_i^*) > 0$ are small, and W_i, and W_j are large, an interior solution with $[I_i^*(I_j^*) < W_i, I_j^*(I_i^*) < W_j]$ is obtained (Figure 1a). Otherwise a corner solution with $I_i^* = W_i$ and $I_j^* = W_j$ is obtained (Figure 1b).

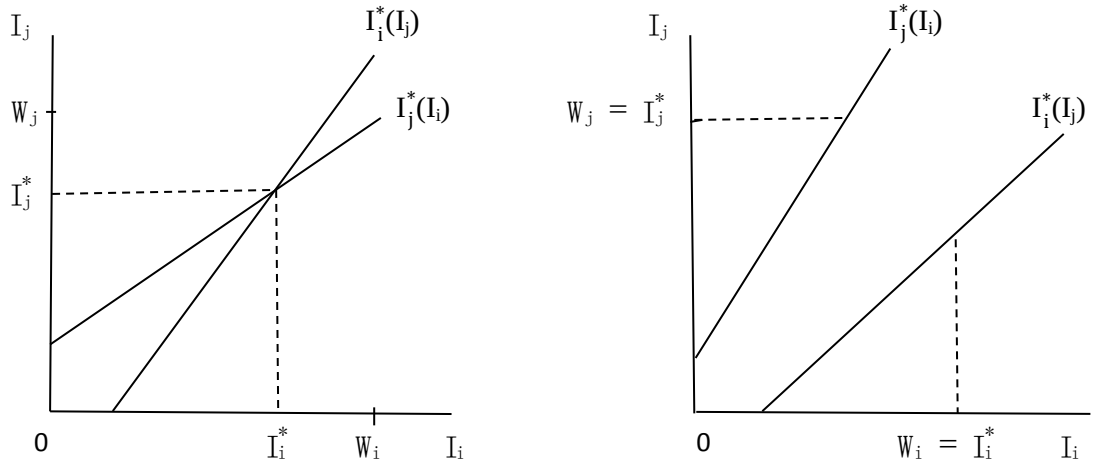

Figure 1: War-preparing investment, I_i and I_j.

With investment (I_i^*, I_j^*) made, i and j next independently decide whether to go to war or not. If $E(\pi_i(I_i^*, I_j^*)) < 0$ and $E(\pi_j(I_i^*, I_j^*)) < 0$, there is no war. If $E[\pi_i(I_i^*, I_j^*)] > 0$, i

[33] See Wang (2017) for a more detailed and more rigorous presentation.

can gain by having a war. If $E[\pi_j(I_i^*, I_j^*)] > 0$, j can gain by having a war. In either case, there is a war unless the parties can bargain for a satisfactory solution.[34]

Principle 4: There exists a pair (I_i^*, I_j^*) that simultaneously maximize $E(\pi_i)$ and $E(\pi_j)$. With the values of τ_i and τ_j given, (I_i^*, I_j^*) determine the equilibrium F_i^*, F_j^*, and $F^{R*} = F_i^*/(F_i^* + F_j^*)$.

6. Equilibrium government type.

Hobbes (1651) observed that government could be created by war or by agreement.[35] Wang (2017) studies how.

When war is the equilibrium of the game, the winner creates the government with the capacity to make and enforce economic and other social rules. This way, "war makes the state" as Tilly (see Morris, 2014, p. 8) claims. A government created this way is likely to be of type 2 with concentrated power and wealth (Aumann and Kurz, 1977), or of type 4 if war does not produce a clear winner.

When going into war is not the equilibrium, the parties can create a government by agreement and thereby achieve a Pareto improvement. To see this, recall that peace prevails after the parties have invested (I_i^*, I_j^*), and then find $F^{R*}(I_i^*, I_j^*)$ to be such that $E(\pi_i(I_i^*, I_j^*))$, $E(\pi_j(I_i^*, I_j^*)) < 0$, meaning that neither party can gain from a war. This

[34] As already mentioned, Coase (1960) suggests that a bargained solution should always exist and dominate the choice for war. However, Olson (2000) questions the claim. Wang (2017) identifies conditions under which war cannot be avoided through bargain.

[35] Examples of government by agreement include the Austrian empire expanded through marriages, the U.K. when England and Scotland merged, the U.S. when the thirteen colonies agreed to become the United States of America, and Germany when the independent states joined the federalized nation after the Prussia-Franco War.

suggests a cost I_i^* for i, a cost I_j^* for j, and a net total social cost of $(I_i^* + I_j^*)$.[36]

The parties can reduce the cost by delegating the peace-keeping job to a third party called government. In an ideal world, government does not have any self-interest to pursue but to faithfully enforce laws and maintain social order, protecting people from violence (as prescribed by Smith, 1937). In this ideal world, the parties can spend I_G to create $F_G(I_G, \tau_G)$, $I_G = (I_{iG} + I_{jG})$, I_{iG} and I_{jG} being the parties' respective contributions to I_G. Meanwhile, they can continue to spend I_i for F_i and I_j for F_j. Party k's (k = i, j) total investment is then $I_{kt} = I_k + I_{kG}$. When government is ideal, $I_k = 0$ is the best choice. With $I_{it} = I_{iG} \leq I_i^*$ and $I_{jt} = I_{jG} \leq I_j^*$, the parties achieve a Pareto improvement. With (a small amount of) $I_G > 0$ and $I_k = 0$, the government can effectively protect i and j, and assure their equality in the market.

In a less than ideal but more realistic world, the government, once created, may acquire some self-interest and become predatory (using F_G to prey on i and j). Parties i and j then face a more challenging task to create a type-1 government (*i.e.*, G_1). The challenge is about how to build the ultimate checks and balances so that the government is strong enough to maintain order, but not too strong to prey on the citizens (recall the Weingast Dilemma).

A solution in pre-modern societies to the dilemma is to have a set of properly structured F^Rs.

Let $F_{-G}(I_i + I_j)$ be the capacity of the joint force of i and j (the subscript "-G"

[36] War and arms race are very costly games. Speaking of late Medieval European experiences, Morris (2014, pp. 189-190) observes that "keeping up with the arms race in standardized men and cannons was staggeringly expensive. Even in the richest states, there was never enough money, and matching means and ends soon became the greatest challenge for governments."

stands for non-government, and F_{-G} stands for the non-governmental force). The parties need to first make sure that $F^{R}_{-G,G} = F_{-G}/(F_{-G} + F_G)$ is sufficiently large so that G cannot gain by using force to prey on i and j ($F^{R}_{-G,G}$ reads "the non-government and government capacities relative to each other"). This condition is obviously easier to satisfy when the parties can take joint actions rather than have to face the government separately (face $F^{R}_{i,G} = F_i/(F_i + F_G)$ and $F^{R}_{j,G} = F_j/(F_j + F_G)$). It is also important that they can control governmental budget I_G, and control F_G through I_G.

Second, $F^{R}_{k,G} = F_k/(F_k + F_G)$ should not be so large that $E(\pi_k) > 0$. The condition ensures that the government is strong enough to deter any party's attempt to gain from violence. It requires F_k to be not too large relative to F_G.

These conditions seem well satisfied in medieval England, which later evolved into the first modern democracy and market economy (see Acemoglu and Robinson, 2006, for detail). For this historical reason, we refer to this solution as the England Solution. The conditions seem to be also satisfied in pre-modern Japan, which became the first modern democracy and market economy outside of the Euro-cultural sphere.

Principle 5: A solution to the Weingast Dilemma is to structure F^R in the society such that $F^{R}_{-G,G} = F_{-G}/(F_{-G} + F_G)$ is sufficiently large while $F^{R}_{k,G} = F_k/(F_k + F_G)$ is sufficiently small, so that neither the government nor a non-governmental party can gain by resorting to violence.

7. Conclusion.

The central role of violence in shaping social order is widely recognized. This study explains an important mechanism for violence to determine social order, focusing on

the role of the involved parties' relative capacity for violence (F^R) in determining economic institutions and government types. By explaining how various economic institutions and government types emerge at different values of F^R, and how the pressure for an institutional change builds up as the value of F^R changes, the study reveals a main reason for an institutionally diverse and dynamic world.

The study deepens our understanding of the market. The F^R requirement explains why, despite the high social benefit of the market, so few countries have created a fair and effective government and established a market economy. It also explains why the market prevailed so late and in so few countries in the world. It suggests that, to understand why a nation succeeds or fails to create a market-preserving government, the starting point is to examine F^R, and the way to go is to restructure F^R so that the government is created by agreement, not by force.

The findings of the work warn us about the danger of forcing a particular type of economic or political institution to all countries in the world. The world is inevitably institutionally diverse because of different values of F^R across societies. Enforcing institutions inconsistent with F^R in a society is likely to be very costly and ineffective.

The findings of the work also warn us about the danger of applying only market principles to making public policies as such policies can be irrelevant or even harmful to a potentially violent world. To make sound public policies, policy makers need to recognize factors such as public anger and populism as an essential part of the political and economic systems, and recognize that, as these factors accumulate, equilibrium F^R shifts. New political and economic arrangements are expected to

follow the shift. The trend may lead to radical politics, which can threaten not only the market system, but also democracy. It is thus of utmost importance to address public issues in light of the changing balance in F^R, and adopt effective policies to prevent F^R from moving to extreme values.

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