

Cities and Sieges in Medieval Europe *

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This is a preliminary treatment. My long-run goal is to apply the analysis to the European conquest of the New World; as well I want to use it as a launching pad for a systematic comparison of Tokugawa Japan with Medieval and Mercantilist Europe. Comments would be much appreciated: please direct them to my e-mail address. Please do not cite without the permission of the author.

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Abstract

During the Medieval period Europe was highly fragmented and heavily militarized. Conflict was on-going. Still commerce thrived, particularly after 1000 CE. Why? The main reason is the relative peace accorded to cities. Remarkably few cities were besieged. Why? The main reason is three powerful actors – feudal lords and heads of manorial estates; the church, both in its secular arm and in its monasteries; and dynasties attempting to aggrandize their territorial reach – all benefited from the rents that they could extract from the commerce carried on by urban denizens. In competing for the rents they were also competing for power, particularly but not exclusively military power bought and sold on the market. Employing a data base consisting of 415 battles and sieges taking place during the Medieval Period, this paper explores a remarkable paradox: both commerce and conflict, de facto opposites, thrived because of each other, not despite each other.

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I Conflict and Commerce

Cooperation is paradoxical.

Cooperation is a requisite for competition. Absent cooperation, you cannot set up a farmers market in which vendors vie for customers, heirloom tomato sellers going head to head against luscious beefsteak beauties. Absent cooperation motivating all the echelons of a military unit you cannot carry out a successful raids on an opposing army's fortifications, you cannot ferret out the furtive movement of enemy spies.

Without stability, trusting everyone plays by the rules of self-interested price indexed exchange or peaceful barter – so many gallons of goat milk negotiated for so many sticks of margarine, so many haircuts given for covering the cost of having a legal brief drawn up – commerce would atrophy. Without the stability of trust binding together armed battalions, the belief your fellow combatants have your back, are following the same plan of attack, are motivated by loyalty towards each other and their commanders, respect and obey the orders coming down the chain of hierarchy, warfare would wither.

To be sure trust given may be trust betrayed. Cooperation has its limits. Still the fact cooperation is essential for engaging in two human endeavors considered diametric opposites is suggestive. It suggests a continuum exists: at one end win-win perfectly transparent buying and selling in markets negotiated by honest participants; at the other end win-lose blood soaked brutality leading to rape, pillage and destruction of property.

In point of fact many markets would not exist if warfare had not proceeded their inception, laying the groundwork for the very existence. Think the Opium Wars in China that led to the creation of treaty ports on the Chinese coast and the Yangtze River delta; think the Mongolian conquests of the 13th century paving the way for the *pax Mongolica*; think the Atlantic slave trade of the 16th century; think the *conquistador* conquests over the Incas, Aztecs and Mayans that ultimately opened up trans-Atlantic Ocean commerce in sugar and precious metals for Spanish merchants, soon afterward joined by competing groups of Dutch, French and British trading companies.

By the same token competition for the control of raw material markets has ushered in battles on land and sea. Think naval competition between Venice and Genoa in the Eastern Mediterranean during the late Medieval Era; think the Anglo-Dutch wars of the seventeenth century; think the rivalry of France and England in India and the Americas that laid the groundwork for the mid-eighteenth century global warfare known as the Seven Years War; think the defeat of a Chinese army at Talas River by Muslim armies leading to the consolidation of the great bulk of the Silk Road by Islamic powers; think the civil wars fomented in contemporary Africa by tribal conflict over the rights to control diamond mining rights or oil fields.

To be sure military conflicts have often as not disrupted commerce. Blockades are a classic example. In attempting to bring Britain to its knees, Napoleon's government elaborated the Continental System aimed at choking off his arch rival's markets in Europe; the Union government relied on the Anaconda Plan strangling Confederate commerce through the closing

of southern ports on the Atlantic Seaboard and control of the Mississippi River. Again civil wars erupting in a repetitive cycles have sent countries into economic tailspins: Syria, Libya, and Afghanistan today. Moreover highly militarized societies – North Korea is an excellent example – organize society around hierarchical values, promoting fawning personality cults, exploiting cruel intimidation (executing disgraced officials with antiaircraft guns that tear bodies into bloody smithereens, domestic terror campaigns, and heavy doses of propaganda drummed daily in the citizenry. Setting up command and control models for industrial and agricultural production units inimical to the give and take required to equilibrate supply and demand for inputs and outputs, trumpeting politics over economics, laying the foundations for deep rooted corruption by powerful officials and military commanders.

In small groups it is easy to imagine trust inducing cooperation to flourish. Members of the group monitor each other; sharing common enemies, protecting the group naturally goes hand in hand with protecting the individual. Enjoying a common ideology – say devotion to a patron saint, reverence for an archbishop – certainly helps. In miniscule groups or in homogeneous groups reputation matters a great deal. Shunning untoward behavior works. Informal sanctions short of organized violent campaigns directed at malcontents and shirkers is sufficient for cooperation.

But how do you foster trust amongst anonymous individuals or foreign institutions? How do you keep them resorting to warfare, banditry, pillage, blackmail? In short how to foster trust between anonymous commercial units, between anonymous individuals, separated from one another by vast distances or distinct cultural norms. To use a Medieval European example:

how do you get Flemish speaking merchants in Bruges to trust English speaking wool suppliers in London sufficiently to forge a stable trading route tying together the Champagne Fairs, the English landed interests raising sheep, and the Italian speaking trading houses of Lombardy and Tuscany? Given the excess supply of desperate lower class knights and footloose infantry ravaging the countryside of Europe during the 13th, 14th, and 15th centuries giving in to the urge to attack and rob merchants and artisans in rival cities must have been extremely tempting to city dwellers or local lords aggrieved about a debt unpaid, an insult unintended, the delivery of contaminated meat to a feudal overlord.

It is this question that animates the present paper. Tokugawa Japan between 1600 and 1868 was divided into approximately three hundred fiefs controlled by warlords the *daimyo*. Each fief was headquartered in a castle town into which were assembled their military underlings, the *samurai* allowed to carry two swords. Assuming the *samurai* constituted on a country wide basis five percent of the total population, it is evident Japan was heavily militarized. While we have no reliable estimates of the proportion of the Western European population that was in active military service – the horse riding armored knights digging in their spurs on their great chargers occupied elite positions at the apex of a military retinue that included peasants and townspeople dragooned into combat from time to time, serving as support troops, digging trenches, constructing massive siege machines designed to hurl boulders at castle walls – we are certain Medieval Europe was also highly militarized, local warlords spread throughout the countryside. Functioning like armored personnel carriers – slits for eyes grooved out of metallic helmets, chainmail underneath shiny armor covering horse and rider alike, shields, lances – outfitting a retinue of knights was an expensive proposition. The

unit cost p_{mf} involved in fielding armies of knights was hardly a trivial financial proposition. Unit costs for infantry and support personnel: far lower. This was the hard cold economic reality of chivalry.

Despite being heavily militarized, despite being fragmented into numerous feudal estates, despite embracing incredible violence – breaking malcontents on the wheel, burying thieves alive, sawing criminals into pieces, drawing and quartering enemies, burning heretics at the stake was regularly countenanced in Medieval Europe; if ordered to kill oneself committing *hara-kiri* ritual suicide by disemboweling oneself with a sharp knife was central to the *bushido* ideology pervading the ranks of the *samurai* – both Tokugawa Japan and Medieval Europe managed to become highly commercialized, spawning a sprawling host of urban conurbations where merchants plied their trade, even forming powerful guilds to enhance their political muscle.

How did this come about?

To understand why the two regions overcame their military orientation it is useful to begin by making two key points. There are important differences between the two cases. Japanese feudalism was closed; Medieval European feudalism was open. Why this matters will be clear as our argument unfolds. Yet despite this difference a similar logic holds for both cases: on-going competition between decentralized highly fragmented military and religious interests created umbrellas of safety under which merchant dominated conurbations could and did prosper. Avoiding killing the goose laying the golden eggs was common to both cases.

Why the eggs were golden and why military rivalry spawned protection is an interesting question. Before we get into the specifics of the historical details it is useful to lay out analytical concepts that will guide us through the thicket of the historical details, unveiled in this paper mainly for Medieval Europe.

II The Military Power Equation and the Decomposition of Productivity Growth¹

Military potential **M** depends upon the size of the economy from which military leaders extract resources, the degree to which they are able to secure a piece of the economic pie (the ratio of military expenditure to total economic output **m**), and the relative prices of exerting military force. Relative prices (compared to the average price level for all goods and services generated within an economy) for exerting military force depend upon a number of variables: the costs of acquiring and outfitting soldiers; the unit cost of lethality for the weapons their soldiers brandish; the efficiency of transport methods they harness (like chariots, horses, tanks; the burden of upkeep for the roads their armies march over; the challenges for mobility of forces imposed by geographic impediments; and the like.

It is important to keep in mind that the concept of “relative price” invoked here refers to real resource costs implicitly or explicitly priced up in the market. To argue that feudal obligations were often satisfied in terms of loyal service or payment in kind was not obviate the point I am making. Even in a barter economy real prices exist. They are not necessarily stated in currency terms but they undergird cooperative exchange. How expensive securing swords, armor, the use of horses always prevails in terms of their implicit opportunity cost (for instance the cost reckoned in terms of forgone uses of metals – for ploughshares – and animal power for

that could otherwise be devoted to pulling ploughs). In what follows I assume the logic of opportunity cost prevails.

Putting up all this together in a simple equation Mosk (2013) captures the logic of military potential:

$$(1) \quad (M = (m * Y)/p_{mf})$$

p_{mf} being the relative price of exerting military force and Y is total output or income. Note that Y is equal to per capita income y multiplied by population size P so:

$$(2) \quad M = (m * P) / p_{mf}$$

In short population size is a determinant of potential military capacity. It should be emphasized that this refers to potential capacity. It is not equal to success in warfare. History is replete with examples of cases in which understaffed armies defeated larger threatening forces.

Technological progress in the military sector tends to reduce the relative price of exerting military force. This is one reason states subsidize professionals involved in developing new weapons or devising new methods for organizing armies and navies. Basic to warfare of all types is combining methods for shooting projectiles (including fire) or engaging in killing or maiming enemy through person to person contact.

From a long-run historical perspective warfare has advanced through three major phases. The first was an early era when hand to hand conflict prevailed. Using rocks, swords, the phalanx, horse drawn siege machinery, chariots, the bow and arrow was characteristic of

this method of engaging in battle. Technological advances occurring as Stone Age civilization evolved - through the Bronze Age - into the Iron Age precipitated slow declines in the relative price of exerting military force. In this phase population size matters a great deal.

Stones, swords, spears, crossbows, daggers, missile launching engines for smashing down walls or throwing plague ridden infected bodies into cities to spread terror among city dwellers, incendiary or poison tipped arrows, axes: the list goes on and on stretching from rocks dug out of the soil to biological warfare. For most of human history these have served as the weaponry of conflict. Whenever an advance was made and implemented it was adapted by the victims. From the field of battle victors and the defeated not only pulled away the corpses of their fallen companions. As well they removed blood stained weapons. By reverse engineering the methods of manufacture producing these weapons they adapted their own methods of fighting, rendering the agents of their defeat into the instruments of their future victories.

As late as the era of the Mongolian Conquests in the thirteenth century, slow improvements in the manufacture of weaponry improving lethal capacity had not advanced the science of warfare far past this point. To be sure the Chinese had developed gunpowder and used it in primitive cannons and tube like "guns" to harass enemies; learning how to refine gunpowder so it could be effectively used in armed skirmishes was key to Arabic conquests over Crusaders in the 13th century. Still a case in point: lacking guns the Mongols were still remarkably successful in riding roughshod over most of the Eurasian land mass, Success was theirs because they possessed a large percentage of the Eurasian horse population, were

unusually adept in organizing their troops, and promoted common soldiers to high rank if they proved ruthless and ambitious enough in combat.

The use of gunpowder ushered in a second phase. Technological progress increasingly focused on creating more accurate guns, more potent shells, and more prodigious cannons. Front loaded flintlock guns gave way to muzzle loaded rifles in the nineteenth century, finally to Gatling guns and automatic weapons. During this phase industrialization became increasingly important for mobilizing military force. The importance of population size begins to fall off during this phase. An industrial power advanced country like England was able to defeat the Chinese in the first Opium War fought between 1839 and 1841.

A third phase was gained ascendancy during the 19th century. This is the era of technological warfare. Declining prices of steel during the nineteenth century paved the way for increasingly formidable battleships. The Dreadnaught race of the late 19th century pitched England against Germany. Tanks and aerial warfare came into their own during World War I. Poisonous gases were employed. Eventually atomic weapons were developed. During this phase science has become increasingly important for devising state of the art methods of carrying on combat. Today warfare is being carried on with drones in the aerial sphere; nuclear powered submarines ply the oceans; and a completely technology driven style of fighting - cyber warfare using computer hacking – has taken off.

It is now possible for a relatively small country – North Korea – to develop weapons of mass destruction, allowing it to punch way above its population size in the military arena. In the North Korean case this arises from a high value of m , the military conversion rate. Another way

to say this is to say the percentage of output available for personal consumption by the civilian populace is low. The average consumer is short-changed, enjoying very little in diet, housing or clothing. The same conclusion holds for Israel that is overshadowed in terms of human numbers by Egypt. In this case tiny Israel holds its own against much larger Egypt because the average standard of living of the Israeli populace towers over that of the Egyptian policy. This is ultimately the reason why the relative price of exerting military force matters.

The point about Israel makes clear there the close relationship between the average standard of living of a populace and its military capacity matters a great. As noted earlier total income of a populace is per capita income times the size of the polity, $Y = P * y$ where y is per capita income and P is population size. Raising the economic productivity of a society enhances its military capacity other things equal. Political leaders securing power over high productivity populations automatically enjoy a power advantage that they can turn to military purposes, By the same token encouraging growth in productivity is tantamount to achieving growth in military potential.

Turning to productivity growth as the engine of improvements in the standard of living and or the carrying capacity of the environment that is population size (both enhancing military capacity in accordance with the logic of the military power equation) I introduce a growth equation for productivity. The idea here is to express output generating by a population residing in a politically defined jurisdiction into the product of a function of three factors of production – labor, land and physical capital - each augmented by knowledge multiplied by a second variable, total factor productivity (A) that is a function of general purpose knowledge

(ideas), economic structure (the composition of the labor force divided into three sectors, agriculture, manufacturing, and service sector, each sector being further divided into subsectors) and scale economies.

Following standard Cobb-Douglas expressions of output used by economists, I write per capita output (q) as:

$$(3) \quad q = A * f(l^a, k^a, la^a) = A * \{(l^a)^\alpha * (k^a)^\beta * (la^a)^{1-(\alpha+\beta)}\}$$

A being the index of total factor productivity; l^a being labor input per capita adjusted for hours worked h and the efficiency of an hours worked (that depends on the diffusion of knowledge concerning production); k^a being per capita capital adjusted for the quality of capital (that depends on the knowledge embodied in the physical machines and structures); and la^a being land adjusted for the quality of land (e.g.: irrigated fertilized land enjoying a warm climate being superior to parched dry fields left to grow weeds).

Using a little symbolism to tidy up this presentation I write:

(4) $l^a = h * e(h) * w$, w being the proportion of the population in the labor force (the proportion of the populace who are workers), h being hours worked per worker, and $e(h)$ being the efficiency with which people toil at their tasks;

(5) $k^a = q_k * k$, q_k being the quality of capital (a function of the embodying of knowledge in machinery, structures and transport vehicles and the extent to which physical capital is devoted to production); and

(6) $la^a = q_{la} * la$, q_{la} being the quality of land (e.g.: expressing its inherent capacity to produce crops consumed both by animals domesticated by farmers and crops consumed by human consumers.

One of the pleasant features of this presentation is the fact it can be easily turned into a statement about growth rates $G(x) = \frac{\Delta x}{x}$, $\Delta x = x_2 - x_1$, being the change of a variable x on its base.

$$(A.7) \quad G(q) = G(A) + \alpha * [G(h) + G\{e(h)\} + G(w)] + \beta * [G(q_k) + G(k)] + [1 - (\alpha + \beta)] * [G(q_{la}) + G(la)]$$

Another benefit offered up by this formulation is the fact that α is simply the share of income enjoyed by owners of labor; β is the share of income secured by owners of capital; and the term $[1 - (\alpha + \beta)]$ is the share of income secured by land-owners.

There are several points that can be drawn from this equation. The first is that ideas are mobile. Absent barriers to their diffusion, their capacity to invigorate production everywhere is limitless. As noted earlier warfare is one endeavor in which diffusion is remarkably potent. Sadly for the global spread of income enhancing techniques barriers to the diffusion of non-military concepts are much more daunting. To be sure plenty of barriers exist: patents; classified national secrets; censorship by governments; religious prohibitions on certain types of knowledge (for instance on medical procedures like abortion); quotas and tariffs imposed on foreign products entering the domestic market where reverse engineering of state of the art technologies embodied in the products can occur.

Second, it is clear productive hours worked varied by social class in feudal society. The military elite and the religious elite – knights, overlords, *samurai*, monks Christian in Europe and Buddhist in Japan – did not work hard at economically useful activities. Peacekeepers? Emissaries to the transcendental world of the gods? Parasitic plunders? How to slice and dice this ideologically is a matter of opinion: not surprisingly a fervent believer in divinity will interpret this reality differently from an ardent secularist. The bottom line is that peasants were the principal mainstays of the laboring populace. Naturally they resented the discrepancy between their long hours of toil and the relative leisure of their hierarchical superiors. Naturally peasant rebellions occurred. Naturally warriors suppressed these acts of revolt. To be sure artisans joined peasants in working hard. Farriers pounded out horseshoes; peasant-artisans built caskets for making beer; stomping on grapes to make wine was a harsh debilitating task. In point of fact in rural communities – as opposed to cities - artisans were simply seconded peasants living on manorial estates, owing labor services of all kinds to the lord of the domain.

Third, supporting a merchant urban class entails an improvement in food output per peasant worker. With the proliferation of commercial specialists food generated must support not only warriors and monks and abbots and bishops but merchants and artisans as well. Food output – rice harvested, sake wine brewed, daikon and radishes plucked, fish caught and dried; dairy and cheese processed, rye and barley planted, wine and beer fermented, pigs slaughtered, and so forth – had to sufficiently abundant to support both agricultural workers and a substantial group on non-food producers alike. Given the toll that rural tasks exacted on the bodies and spirit of the lowly agrarian classes – hence the diminution in hours that a peasant could work due to disease and outright fatigue - there is little doubt the standard of living was

low in general. Japanese peasants resided in thatched wooden hovels, often lacking flooring; in Medieval Europe rock mortared hovels were hardly more inviting.

What is clear is that productivity per hour worked in farming had to rise in order that urban concentrations consisting of artisans and merchants flourish. You cannot escape the mathematical realities. Dividing up foodstuffs between the agrarian classes and the remainder of the population must take place. If agrarian workers have to consume everything their labor in the fields generates there is no surplus left over to transfer to anyone else. Rents have to be secured from the surplus.

One way to capture the economic realities of the feudal system is to state it in terms of rent. The usurpers – knights and *samurai*, monks – lived off of rents extracted from peasants. Rents were shared between warriors and religious adepts and authorities. Other things equal the proliferation of merchants living in conurbations puts pressure on the rents extracted from the economically productive labor force.

However other things do not remain the same when merchant communities prosper in feudal situations. Merchants promoted trade. Specialization and division of labor occurs; $e(h)$ rises. Having access to wider markets farmers turn land into more specialized and productive uses. Rye and barley gives way to vineyards; sheep are put out onto rock strewn fields in response to a rising demand for wool; land is reclaimed from rivers, lakes and cliffs fronting onto the ocean. All of this enhances land quality, q_{1a} . Capital stock is transformed: more windmills, more waterwheels, more giant barns for storage, less capital put into castle building and cathedral construction. From an economic point of view the quality of capital is enhanced.

In short, productivity is bolstered overall. To be sure population growth may swallow up the gains in carrying capacity engendered by merchant activity. Per capita standards of living may not grow vigorously as human numbers press up against prevailing resources. But the total volume of the social surplus does grow, albeit not necessarily on a per capita basis. What about its division? Prior to merchants entering the picture in force, the surplus was captured by warriors and religious personnel. But now merchants enter the ranks of seekers focused on extracting a share of the surplus. Were they not so valuable in raising the productivity of land, capital and labor one can easily envision a situation where the other rent seekers cut them out of the rents root and branch. But they were valuable. To the military classes the value is clear. Taxing the trade merchant trade creates, licensing urban communities with charters, blackmailing merchant groups into providing forced loans to feudal overlords enhances the rents they can devote to buttressing their military capacity **M**.

It is important to remember that the military class is fragmented by feudal division into squabbling estates rivalling one another. If one estate is able to raise its prowess by granting an urban charter and inviting merchants to congregate in its jurisdiction, its rivals have no choice but follow suit or see their power fade away. Cities proliferate because highly decentralized military authorities are caught in escalating commercial warfare.

Religious authorities, jealous of their rents, enter the fray as well. Great abbeys compete with great feudal military overlords. From the ideological point of view of religious actors they – and they alone – represent a bulwark against society descending into invidious conflict; they alone seek peaceful resolution of divisive blood feuds. From a practical point of view the more

conflict, the greater the disruption to commerce and farming, the less the rents that can be extracted from land. Monasteries and abbeys alike compete for rents, evoking the Prince of Peace in putting a lid on bloody carnage.

Still competition is competition. Plunder is one way to compete. Feudal lords can weaken rivals by attacking not only their castles but also their sheltered merchant communities. To survive in such an environment cities have three choices: promote the aggrandizement of overarching state authority, namely monarchical or imperial authority, by offering rents to ambitious territorial unifiers; develop their own militias to ward off attack, thereby devoting some of their surplus to aggrandizing the means of guaranteeing their self-protection; play off local overlord or religious authorities against one another by forming a potent league of cities that can negotiate deals with rivalling feudal authorities, exploiting their advantage as a single bargaining agent.

The key is a merchant community only thrives when other merchant communities also thrive. As a system they form trade networks. London exports wool to Flanders; cities in Flanders export cloth to cities in Tuscany. Each link in the chain depends on the other links functioning in an environment free of military conflict.

What I am describing here with description of defensive action taken by cities is a European story not a Japanese story. The reason is simple. Under closed Japanese feudalism *daimyo* did not invade each other's territory. The two largest commercial centers – Osaka and Edo – were used by groups of *daimyo* administrations establishing residences and/or warehouses for the rice and other products they bought and sold. Castle towns were left alone.

The urban network was the product of the division of the countryside into fiefs and the establishment of two great urban conurbations by the military overlord – the *shogun*, the *bakufu* – that laid out the political contours of feudal Japan, closing off the entire system itself to all but the slightest contact with the outside world. Using Japan as a comparison highlights the importance of the openness in the European case. Indeed during the heyday of European feudalism – the period 1000 CE to 1300 CE – Western Europe was highly expansionary, pushing outwards on all geographic fronts. The reasons for Europe’s expansion lie not only in Europe itself but in the dynamics of Eurasia itself, in the military relationship between Central Asia nomadic groups and the great civilizations into which these nomadic groups pushed themselves through military forays.

III Military Diversion Shapes Core and Periphery on the Eurasian Land Mass, 300 CE – 1300 CE

Specialists analyzing trade patterns differentiate between trade creation – all regions expanding their trade – and trade diversion, some regions expanding their trade at the expense of other regions that see their trade opportunities wither. The same holds for military invasions. Sometimes one region is spared invasion while other regions suffer them.

Invaders are opportunists. As predators they are constantly on the lookout for the best prizes, the softest opposition, and the easiest points of entry for their armed forces. Geography matters. Mountain ranges or parched valleys - the Hindu Kush, the Takla Makan desert, and the Himalayas, the Alps, the Caucasian range naturally impact predatory opportunities: by dint of the barriers to mobility of people and arms they create their sheer existence raises the unit price of exerting military force p_{mf} . On the other hand if the glitter shining off the prize is

sufficiently blinding predators will ramp up their efforts, exerting greater effort to carry out conquest even crossing perilous mountain passes. It is the logic of cost/benefit applied to warfare. Great conurbations offer attractive targets, for terrorists today looking to disrupt tourism, for Central Asian armies swirling out of the steppes.

When wealthy Rome was in its heyday as capital of a vast empire it was a dazzling prize. Once dismembered by Goths, Huns, Avars, Lombards, and Vandals it was no longer a magnet. In the heyday of the Abbasid caliphate Baghdad became a likely target, nicely situated in the crosshairs of the Seljuk Turks and after them the Mongols. What is the attraction of miniscule Rome, Paris or Florence when you think you can sack Baghdad, Damascus or Cairo?

To be sure the Central Asian groups were not only predators. They were traders as well. Conquest or commerce were options, not fixed points of destiny. Moreover the core regions of Eurasia – whether Roman Empire, Persian Empire, Chinese Empire – were all trying to push out into the periphery. Competing with the Central Asians often as not meant bringing them to heel militarily. It was a two-way street.

In point of fact a Eurasian pattern ancient in its origin, really only terminating with the Mongolian invasions of the 13th century, involved periphery groups of all stripes – mainly nomadic - crashing into the great core regions, into China, into India, into the Roman Empire and the Mediterranean, into the Iranian plateau. As noted, in the most prominent cases the periphery groups originated in Central Asia. But they also came from the far north – from contemporary Scandinavia for instance or from the south, from Northern Africa, the Berbers being a prominent example. In all cases the invaders conquered and colonized – that is seized

territory and plundered; in all cases they eventually settled in the great core regions, adapting themselves to the cultural and political norms of their adversaries to a degree, in particular converting to their religions.

What is peculiar about the period 1000 CE to 1300 CE is the absence of invasion into the Western European core zone. Consistent with the military diversion argument it should not surprise us to discover that Western Europe became remarkably expansionary as a result. Indeed it pushed eastward and northward on the continent, pushing southward into the Mediterranean, pushing into the Levant where Islam prevailed, pushing into areas ruled by Slavic groups, and driving the Muslims out of most of Iberia and Sicily at the foot of the Italian boot. While other regions of Eurasia suffered invasion – notably on-going Turkish inroads into the great Islamic zone stretching from Iberia in the west through North Africa through the great silk road centers in peppering the Middle East including what is today Iran, Afghanistan and Pakistan and Mongolian invasion in the 13th century ushering in the conquest of China itself – Western Europe was not only left alone but actually expanded at the expense of at least one of these other zones. Western Europe, pulverized by invasions from the fourth century onward was spared largely because other regions suffered. This brutal fact is crucial in understanding the dynamics of open feudalism in Medieval Europe.

A detailed account takes us too far afield. What I provide with Table 1 is a cursory summary.

Table 1

Three Waves of Peripheral Population Penetrations Remake the Great Core Regions of Eurasia, 300 – 1300 CE

Panel A: 300 – 600 CE

Western Roman Empire	Eastern Roman Empire/Persia	Eastern Core (China/India/Japan)
Population (1,000s) – Circa 500 CE		
25,057	n.e.	139,550
Peripheral Population Invasions and Their Impact		
Huns, Goths, Ostrogoths, Visigoths, Alans, Vandals, Sueves, Burgundians, Jutes, Angles, Saxons carve up Western Segment of Roman Empire	Byzantine and Persian Empires relatively untouched by invasions	Invasions from Central Asia destabilize China leading to collapse of Han Dynasty
Major Political Events in Region		
Rome sacked by Vandals in 410 and again in 455 Arian Christianity competes with Nicene Christianity Christianity established as official religion of Roman Empire <i>Comitatus</i> inspired Central Asian organized interacts with disintegrating Roman organization Merovingian Empire Established	Code of Justinian promulgated establishing a groundwork later utilized in developing Canon and secular law in Europe Persian Empire (Sassanian Empire) and Byzantine Empire deplete each other's military capacity by fighting with one another particularly contesting the Middle East and Levant (contemporary Saudi Arabia, Syria, Iraq)	Dynastic Instability in China from 220 CE to 589 CE Three Kingdoms (220 – 2650) Jin Dynasty 9265-420) Northern and Southern Dynasties (386-589) Central Dynastic Rule returns to China with establishment of Sui Dynasty Buddhism spreads from India to China along the Silk Road

Table 1 (Continued)

Panel B: 600-1000 CE

Western Roman Empire	Eastern Roman Empire/Persia	Eastern Core (China/India)
Population (1,000s) – Circa 500 CE		
25,413	n.e.	157,500
Peripheral Population Invasions and Their Impact		
<p>Invasions by Viking raiders (Danish, Norwegian, and Swedish) from North, extending down into France and England; invasion from east by Magyars; Invasion from south and along shores of Mediterranean by Muslim raiders</p> <p>Fall of Iberia to Muslims</p> <p>Sicily falls to Muslims</p>	<p>Turks begin penetration into Muslim held areas especially in eastern reaches of Islamic Empire</p>	<p>Tang China expands into Central Asia making bid to consolidate control over eastern Silk Road; defeated by Muslim Central Asian/Persian army in Talas Valley</p>
Major Political Events in Region		
<p>Carolingian Empire established, unified under Charlemagne, disintegrates thereafter</p> <p>Normans invade Italy</p> <p>Vikings explore Northern Pacific waters, establishing colonies in Iceland, Greenland and Vinland on the North American continent</p> <p>Viking inroads into Britain repulsed</p>	<p>Muhammad establishes Islam in Medina and Mecca</p> <p>Rule of Islamic community by four righteous Caliphs; fourth Caliph Ali assassinated leading to Sunni/Shi'a split, Arabs drive Byzantine and Persian Empires out of Middle East</p> <p>Northern Africa and Syria lost by Byzantine Empire to Muslim rule; Persia conquered by Muslim armies</p> <p>Umayyads establish caliphate making Damascus their capital</p> <p>Central Asian/Persian army bolstered Abbasids overthrow Umayyads, establishing Baghdad as capital</p> <p>Umayyads establish rival caliphate in Iberia (al Andalus) making Cordoba their capital</p> <p>Pro-Shi'a Fatimids establish control over Northern Africa</p>	<p>An-Lushan Rebellion roils China</p>

Table 1 (Continued)

Panel C: 1000-1300

Western Roman Empire	Eastern Roman Empire/Persia	Eastern Core (China/India)
Population (1,000s) – Circa 500 CE		
57,268	n.e.	228,400
Peripheral Population Invasions and Their Impact		
<p style="text-align: center;">No further invasions</p> <p>Mongol conquests spare Western Europe</p> <p>Europe becomes expansionary Christianizing much of periphery, driving Muslims out of most of Iberia, establishing foothold in Levant eventually lost to Islamic armies</p>	<p>Turkish and Mongol invasions</p>	<p style="text-align: center;">Mongol Invasions</p> <p>Conquering Jin Empire in North, later Southern Song Empire</p> <p>Protracted sieges of Jin capital Kaifeng and Southern Song capital of Hangzhou</p>
Major Political Events in Region		
<p>Crusades directed at Islam first, later directed at “heresies” in Europe (Albigensian, Waldesian, Hussite) and at “pagan” peoples in Eastern Europe</p> <p>Holy Roman Empire consolidated by Otto</p> <p>Conflict between Holy Roman Empire and Papacy roils the German/Italian territories</p> <p>Norman conquest of England</p> <p>Teutonic Knights establish rule over territories in Northern Europe, fighting Russian and Polish/Lithuanian peoples</p>	<p>Abbasids become figureheads, losing power to Turks</p> <p>Fatimids take Cairo</p> <p>Crusaders set up Crusader states in Levant: Kingdom of Jerusalem, County of Tripoli, Principality of Antioch, and County of Odessa</p> <p>Saladin defeats Crusaders at Hattin in 1187, retaking Jerusalem eventually establishes Ayyubid dynasty in Cairo, followed by Mamluks who defeated Mongols in 1260</p> <p>Mongols capture Baghdad in 1258, but fail to defeat Arab armies in Syria in 1260</p> <p>Black Sea Constantinople becomes major terminus on Silk Road</p>	<p>Mongols establish Yuan Dynasty in China</p> <p>Mongol Empire broken up: Empire of the Great Khan in China, Chagatai Khanate, Khanate of the Golden Horde in Eastern Russia, Il-Khanate in Persia and Georgia</p> <p>Pax Mongolica creates huge trade zone in central Asia, expanding the geographic reach of the Silk Road</p>

Thinking in terms of military diversion and in terms of the trade-off conquest and commerce provides a useful hook into the dynamics of Eurasian core/periphery interaction. Military conquest leading to the consolidation of empires leads to trade; it fosters diffusion of technology across vast land areas. The positive feedback of conquest on commerce persists for a while; but it does not persist indefinitely. Eventually empires atrophy. Empires atrophy because holding together diverse populations is politically fraught. They atrophy because periphery populations girded for war scratch and claw at the borders of empires, eventually overturning the institutions that once cemented them into unified regions.

Imperial capitals, great prizes for conquerors, are especially vulnerable to sacking by invaders; concentrating religious and political power in a handful of regional capitals creates economic and military vulnerability. Whether we are thinking of Rome and Cairo during the heyday of the Roman Empire - or Baghdad, Damascus, Cairo and Cordoba during the period when three major power centers (Abbasid/Fatimid/Umayyad) controlled Islamic areas – or the two capitals of China ravaged by the Mongols during the thirteenth century we are witness to a common theme. Other things equal a decentralized urban system like the one evolving in Western Europe between 1000 CE and 1300 CE is less vulnerable than one with a steep rank hierarchy, top heavy, centered upon one or several massive conurbations.

Trade displacement following on the heels of military displacement is a concomitant of the disruption of major empires. The collapse of the Roman Empire in the West severely weakened the ability of the Byzantine rump to exercise military power in the Levant and Northern Africa. Intent on holding onto as much as possible of the eroding Roman imperial authority in the West – for instance in Italy – sapped the military capacity of Byzantium in its Eastern reaches. The door was opened for a peripheral population – Arabs inspired by Islam – to seize much of the territory once operating under

the administrative and economic dominance of Rome and Constantinople. That the armies of the Persian Sassanian Empire also found themselves exhausted opened another swinging door: Arab expansion across the Iranian Plateau under the aegis of Islam. As a result a new empire emerged one organized commercially around control of the Silk Road, or rather Silk Roads, one laid out on the landmass, another consolidated through merchant shipping expeditions into the Indian Ocean and the Strait of Malacca. In turn the Mongol conquests disrupted these commercial highways, moving trade routes further north, connecting Western China through the Takla Makan desert to Constantinople in the West.

IV Eurasian Technological Diffusion is a Cup Half-Full/Half-Empty

To this point we have analyzed the impacts of commerce and conflict in static terms. Conflict shapes the political landscape; commerce gives rise to specialization and division of land, labor and capital enhancing their economic productivity. This is hardly the whole story. As well both commerce and conflict generate improvements in the total factor productivity parameter **A**, namely **G(A)**.

There are three reasons why. Technology transfer is one. Contact – Chinese merchants discussing the quality of their wares with Italian merchants; craftspeople adept in reverse engineering taking apart manufactures devised by foreigners; prisoners taken in conflict hoping to improve their chances for survival by divulging methods for making paper, magnetic compasses, and gunpowder; taking control of territory bristling with novel inventions and ingenious building styles; hiring architects and doctors who have mastered their skills in distant lands – is a potent conduit, ideally suited for spreading technological knowledge. Bolstering total factor productivity through securing fresh knowledge either disembodied as blueprints,

disseminated by masters training apprentices, described in manuals and treatises goes hand in hand with growth in total factor productivity.

Scale economies are another. Bringing together peoples of diverse backgrounds and skills in conurbations – or in networks of conurbations connected through the churning of merchant activity – stimulates competition in the creative arts, stimulates competition in the world of idea, throwing up the much admired capacity to “think outside the box.”

Finally total factor productivity grows because of shifts in the composition of the labor force, specifically due to a fall in the percentage of the labor force engaged in farming matched by a gain in the percentage of the labor force working in services and manufactures. Fewer farmers toiling in the fields, pasturing sheep and pigs; more artisans fashioning cloth, wax and tables. Key to accomplishing this shift is raising output per agrarian worker. What underlies agricultural output per worker? Climate, soil quality, seed varieties, rotation cycles and fallowing, plows and threshing floors, barns where grains can be safely stored, hours worked, and efficiency per hour worked stemming from a person’s experience in farming and the community’s grasp of the state of the art. Clearly some of these are variables that agrarian workers operating in communities steeped in practice can control; some are not.

Covering the topic of technology transfer in detail is not our goal here. Rather I wish to limit my observations to a few cursory comments concerning the role conquest followed by empire building enhanced productivity growth in the Islamic Empire and the Central Western European Medieval period, namely the era of Western European expansion 1000 CE to 1300 CE.

Beginning with the Islamic conquests that remade the Eurasian land mass it is useful to divide the pre-1000 era into two phases: the period of the four righteous caliphs and the unified Sunni Umayyad caliphate (623-750); and the period when the Sunni Abbasid caliphate controlled most of the territory ruled by Islamic leaders, sharing it with two other powerful rival groups, the Shi'a inspired Fatimid dynasty (occupying the Maghreb and eventually taking Cairo and Jerusalem) and the rump of the Umayyad dynasty that established a rival caliphate in Cordoba (750-1000).² After approximately 1000 CE periphery invasions – Seljuk Turkish, Western European and Mongolian – reshape the Muslim political landscape sufficiently to consider it a third era.

During the first wave of Arabic conquests the focus was on seizing territories held in the west by Byzantium and in the east by the Sassanian Empire. For all intents and purposes the Arabs inspired by Islam fervor commenced their campaign of conquest defensively. Their goal was driving the Byzantines and the Persians out of the Arabian region.

In the west their conquests – Carthage falling in 697; Berber troops crossing the Strait of Gibraltar, defeating the Visigoths, and occupying Toledo in 712 – consolidated control over an area heavily Christianized, Jews being a distinct minority. As the Qur'an draws heavily on Jewish and Christian Biblical accounts Jews and Christians often welcomed Islamic rule, preferring it to Byzantine dominance. Indeed Jews and Christians were considered "people of the book" and – provided they paid special taxes – operated as *dhimmi* using their own religious courts and worshipping their own deities.

In the east the problem of integrating non-Arabic peoples was more complicated. As Arab armies pushed eastward – overcoming the Sassanians in the 640s – they established control over lands steeped in Zoroastrianism, Manichaeism, Buddhism, and polytheistic Greeks. These peoples were not “peoples of the book.” Without doubt the difficulties of subjecting these Central Asian regions – contemporary Afghanistan, Pakistan, Turkmenistan, Uzbekistan, Kyrgyzstan, Kazakhstan, and Iran – to Arabic rule inspired the successful revolt of the Abbasid faction against Umayyad dominance during the mid-eighth century. After all much of the military muscle behind the Abbasid campaign originated in Turkic-Persian troops recruited out of Central Asia. In the upshot the Abbasid caliphate abandoned the Umayyad capital of Damascus, moving it eastward to Baghdad, then Samara, to the east. Defeat of a Chinese army at the Talas River in 751 cemented Abbasid dominance over a Central Asian Silk Road empire stretching into India.

The point is that through military conquest the Islamic knowledge base took soared, expanding to encompass Greek and Roman learning (manuscripts assembled in Alexandria), Persian learning, and Indian learning under its umbrella of learning. In terms of disembodied technological knowledge – a crucial component of **A** – the libraries seized, the manuscripts pored over, offering treasure troves to ambitious Islamic scholars, doctors, architects, engineers, astronomers, and mathematicians. Just focusing on the Greek and Roman trove indicates the range of speculation and empirical background Islamic thinkers could contend with: Hippocrates and Galen in medicine; Pythagoras and Euclid in mathematics; Aristotle in biology; and Ptolemy in astronomy.

The result was the Golden Age of Islam. Exemplified by the House of Wisdom established by Caliph Harun al-Rashid in 786 and patronized by successor caliphs notably Abu Jafar Abdullah al-Mamun, the House of Wisdom especially on Central Asian initiative as Starr (2013) reminds us. To be sure pure theoretical learning sometimes has practical applications, for instance geometry is utilized in architecture, surveying and ballistics. In that sense knowledge is power. Additionally it is prestige. Rulers the world – Holy Roman Emperors, Chinese Emperors, English and French monarchs, caliphs – have tried to attract the cleverest scholars of their day lest they be seen behind the times, ignorant and uselessly indulgent in their use of largess. Not surprisingly – taking advantage of the Abbasid’s faltering power at the end of the tenth century - the Fatimid dynasty chartered Al-Azhar University, following up this bold stroke by fostering a second rival House of Wisdom in Cairo. In point of fact the Islamic world was alive with several centers spearheading advances in science, medicine and mathematics arising including Toledo in Iberia. Even after Toledo was conquered by Christian forces in 1085 it remained a vibrant magnet for Islamic thinkers who worked constructively with Jewish and Christian colleagues in translating works penned in Arabic into Latin.

Acting as a transmitter of ancient Greek, Islamic mastering of Chinese and Indian knowledge was only the tip of the iceberg for the Muslim intellectual pioneers of the Golden Age. Consider mathematics and astronomy. First and foremost is the admittedly mundane but ultimately powerful Indian-Arabic numerical symbols, each symbol apparently based on the number of corners used in their construction. Imagine doing accounting; carrying on complex financial calculations; or dreaming up solutions to algebraic equations using Chinese or Roman numerals. The concept of “zero” made its appearance. More generally consider algebra. In the

ninth century a Central Asian genius Al-Khwarizmi developed modern algebra publishing his classic *Algebr wal Muqabala* and training a host of followers at the House of Wisdom in Baghdad (it was only in the early thirteenth century that Leonardo of Pisa known as Fibonacci introduced a Western European audience to Indian-Arabic numerals and algebra with his book *Liber Abaci*).³ Islamic scholars also pushed the envelope in geometry including applying it systematically to astronomy and astrology.

In the classical Greek and Roman world mathematics, particularly geometry, and astronomy went hand in hand. Indeed the Ptolemaic system of epicycles was based on a belief in the perfection of circular motion, an idea not dispelled until Kepler put forth his three laws of planetary motion. At the House of Wisdom in ninth century Baghdad the *Elements* of Euclid and Archimede's *The Measurement of the Circle* were translated into Arabic, joining translations of Sanskrit texts on planetary motion; Al-Shammasiyah observatory was opened in the environs of Baghdad yielding myriads of new observations that either confirmed or contradicted classical thought. Islamic astronomy flourished: Al-Battani, Al-Buruni (who measured the circumference of the earth with a high degree of exactitude), and Ibn Yunus who made thousands of records, including forty planetary conjunctions and thirty lunar eclipses.

Pure science? Not really. More like a marriage of theory with technology. One of the most important practical applications of the marriage of geometry to astronomy was the astrolabe, an ingenious device constructed from interconnected plates representing the heavens at different latitudes. Without this travel along the two Silk Roads would have been

immensely more difficult and perilous; without this Islamic merchants would have been far less successful than they were.

Indeed Islam was the first major religion in world history evolving key ideas out of the practical concerns of a merchant community, namely how to cement trust among warring tribes of traders. Submission to one god, Allah, was a key ingredient. Not surprisingly Islamic legal schools justified the issuing of bills of exchange, obviating the need to move specie from one local to another in order to settle accounts. Interestingly enough drawing up bills of exchange at a fee was also an ingenious device for charging *de facto* interest, without actually stipulating interest payments due. Credit creation thrived. All of this required a convenient form of mathematics for reckoning transactions. In short the advances in numerical counting, algebra, geometry and astronomy yielded practical results stimulating trade, ultimately laying the foundation for banking. Disembodied total factor productivity got a strong boost.

As well embodied technological change – in capital and land quality – thrived during the Islamic Golden Age. Consider energy production. The windswept deserts of Central Asia and the Middle East posed great challenges. Water management systems developed in Sassanian Persia – employing a series of L-shaped wells – passed into use throughout the Middle East and North Africa. Large waterwheels (*norias*) were constructed to draw water from rivers. As early as the caliphate of Umar windmills made their appearance in Arabia. Windmills powering a millstone were built in Persia during the seventh century. Their use spread throughout the Islamic world. Applying geometry to construction Islamic architects and engineers made notable advances in the construction of domes, arches, vaults, and spires. The Great Dome of Damascus erected

during the eighth century was a novel achievement. Followed by the pointed arch, the intersecting arch, the multi-foil arch, and the Ogee (two “s” shaped) arch, Islamic designers realized innovations captured centuries later by the builders of Europe’s great Gothic cathedrals. In short the quality of capital was gradually enhanced and refined in the Islamic world. The beautiful geometric patterns achieved in Muslim tile manufacture is testament to the merging of mathematics, artistic instinct, and practical engineering.

Likewise the quality of land. New crops made their way across the Middle East: cotton originally from India; sugarcane; cocoons and mulberry plants supporting silk reeling. Under the umbrella of Islamic commerce the spread of these crops was rapid and wide. In Cordoba during the heyday of Iberian al-Andalus, thousands of weavers were fashioning silk curtains, shawls and cushions. More crops, more land under cultivation, more soil nutrients depleted. Fertilization using pigeon dung replenished soil exhausted from cultivation came to the rescue.

Papermaking – originally learned by Islamic armies who interviewed Chinese prisoners after the Tang debacle at the Battle of Talas River in 751 – became a major industry in Baghdad during the eighth century. Syrians began growing hemp to meet the demand for paper mills. By 800 CE paper manufacture had spread to Cairo and Morocco.

All of these devices and agrarian practices were witnessed - and diligently studied - by Crusader armies and Christian merchants as they made their way into the Levant, capturing Arab held territories along the coast of Turkey, Lebanon and Gaza; in Iberia; and in Syria wrestled away from Fatimid rule by Norman Crusaders. With a lag the conquering Western Europeans translated and absorbed the knowledge advanced by Islamic scholars; took over use

of the inventions, learned how to build grander churches; ultimately pushing the envelope further in the realm of mathematics, accounting and banking. Still, a lag is a lag: the first paper mill in Christian Europe (in Bologna) was not set up until the end of the thirteenth century.

That said, the lag was exceeding short in one field: war-making. Consider gunpowder. Needham (1981) tells us early Chinese experiments in finding the correct formula for making gunpowder probably occurred in the early ninth century. By 919 it was being used in the slow match setting off a flame thrower and by 1000 CE it was being encased in bombs used by Chinese armies. Needham also waxes at considerable length on the interaction of Arabic technological knowledge with that of China, notably in the field of alchemy. By the 13th century a Syrian writer Hasan al-Rammah published a book *The Book of Horsemanship and Ingenious War Devices* describing the trebuchet used for flinging missiles; explaining how to construct and use the crossbow; and offering an account of how to purify potassium nitrate in fashioning gunpowder. Indeed at the Battle of al-Mansura in Egypt in the thirteenth century Crusaders were routed by Arab fighters using incendiary devices; even King Louis IX was taken prisoner in the clash. In the field of war-making the Europeans were quick to adapt. The crossbow and gunpowder remade European warfare in the later Medieval Era, ultimately downgrading the skills of knights by promoting the value of the infantry armed with powerful bows and incendiary devices whose projectiles could penetrate the strongest armor.

In short the Western European penetration of the Islamic world during the period 1000 to 1300 yielded immense rewards. Disembodied technology taking form of pure ideas espoused by Islamic scholars interacting with one another in universities and at the two Houses of

Wisdom – in mathematics, in medicine, in alchemy, in astronomy – all enriched scholarship in the West. Ultimately applications to manufacturing capital equipment sprung forth from these disembodied concepts on European soil. Moreover many concrete innovations made by Islamic engineers and designers were taken over lock, stock and barrel by the Europeans.

But what about land quality? What about productivity in agriculture that was the most crucial arena for technological change in Medieval Europe? Not much.

Agriculture is local. It depends heavily on natural endowments and climatic conditions peculiar to locales. This is why I refer to a cup half-empty in describing the transmission of knowledge from East to West – and its further refinement and application – opened up by the forging of a vast Islamic civilization stretching from Spain to Mali, from Mecca to Baghdad, from the Caucasus to the Hindu Kush.

In point of fact the advances in Western European agriculture made in the period 1000 to 1300 were mainly indigenous to the area.

Cutting down forests and filling in marshes in order to carve out more arable land is hardly novel. Shoring up rivers with embankments in order to better control their flow, to prevent flooding, and to irrigate fields is basic to farming everywhere. Use of the fields once reclaimed is part and parcel of the institutions unique to Medieval Europe. Marling of soil is ancient. The three-field rotation cycle – moving through a cycle in which the fields put to a Spring crop harvested in the fall are turned the next year into fields devoted to winter crop taken in during the spring months, and allowed to go fallow in the third year – is a logical

outgrowth of the manorial system and the emphasis on farming long strips of arable lying next to one another.

Plowing was revolutionized by replacing the ancient Roman swing plow with the Germanic plow. As ploughs with metal ploughshares employing mould-boards with two handles cut through the soil in deeper furrows in the planting season crops realized in the harvest season were much enhanced. Shoulder-collars for horses, frontal yokes applied to oxen, refining the art of making horseshoes, improving the protection of hooves for the livestock employed in farming work: all of these things contributed.

To be sure some innovations learned from the Islamic world may have played a role – perhaps windmills and watermills are a case in point although it is not clear how important was the Muslim example in this technological arena – but there is scant evidence that the growing employment of beaters for fulling and cleansing linen, and the construction of tanning mills on manorial estates was a by-product of contact with Islamic civilization during Western Europe's military expansion into the Levant, into Spain, and into Sicily.

This raises an important point. From what has been said it is evident that the impact of contact with Islam upon Western European productivity was mainly associated with improving quality of capital embodied in structures, improving merchant practice, and transforming the practice of warfare, not farming. Ultimately the repercussions were felt most strongly by the cities. The great Gothic cathedrals were largely urban; the commercial classes were concentrated in conurbations; the relative power of knights was diminished relative to urban centers who mainly relied on infantry, not cavalry, for protection.

V The Three Faces of European Medievalism: Militarism, Christianity, and Manorial Economy⁴

The three faces of Medieval Europe are well advertised: knights, castles, chivalry in the military sphere; decentralized self-sufficient manorial estates and isolated villages in the economic sphere; Nicene Christianity in the religious sphere, monasteries populating the countryside, monks praying for the souls of the departed, lessening their wretched time in purgatory. As well the prevailing consensus is that Medievalism reached its apex during the three centuries between 1000 CE and 1300 CE, the so-called era of the Central Middle Ages.

Mythology to a degree, truth to a degree: the characterization of Medievalism as reaching its truest historical expression in the era of expansionism, its truest form in the three faces of knighthood, manorial economy, and Christian piety is useful as a starting point in serious analysis, useless as a guide to grasping the detailed events of interest to the specialist. Think of historical movement as a floating iceberg. A lot happens to be taking place on the surface as cold winds whip icy fragments off it, flinging them willy-nilly into the atmosphere; despite this underneath the churned up frigid waters there is a solid mass that moves to be sure but moves extremely slowly, ponderous and resistant to change.

Characterizing the solid mass of Medievalism beneath the waters is easy. Consider the two sets of equations – the military power equation and the productivity equation – developed earlier. Labor productivity depends on hours worked h and the efficiency with which people labored per hour worked $[e(h)]$. During the Medieval Period it is a stretch to describe warrior knights (often described as “armed thugs”) as hard working laborers.⁵ The same can be said of monks although the degree to which monks actually worked in the fields as opposed to copying

manuscripts, praying and chanting, varied from monastic order to order. In effect the labor force consisted of free farmers, serfs, and slaves. Some worked independent farms; many were unfree to move, bound to great secular estates supporting knights or great abbeys supporting monks.

Market exchange largely took place in barter terms. Gold coinage disappeared. In so far as currency was concerned silver took precedence over the gold which fueled Muslim commercial activity. Rents paid on use of land largely took the form of grain, animal hides, slaughtered pigs, berries and – mostly important – labor services. The rents so extracted supported the knights, their noble overlords, the monks, the bishops, the priests.

In short medievalism was a system supported and organized around extracting output out of land, rents being seconded by elites. Knights and monks and bishops and archbishops were beneficiaries of land rents, extracting a surplus for the exertions of serfs, free villagers and slaves. It should be kept in mind that slavery did not melt away with the consolidation of Christianity in the West. Many of the slaves came from the east: the regions known as Eastern Europe (Ukraine, Bulgaria, Romania, and Hungary) and Russia. The word “slave” is based on the word “Slav.” Presumably slaves were taken by feudal lords in battle; presumably some were captured by Scandinavian Vikings that moved along the great rivers of western Russia, establishing a headquarters in Kiev, selling their captives along with furs and timber to western European rulers.

Serfs, free farmers, and slaves being largely illiterate, it is fair to describe their efficiency per hour worked as low. In addition their lifespans were short and their food intake sub-

standard according to contemporary definitions of adequate diet. It is reasonable to suppose they were often ill, often carrying out their tasks in great pain. To be sure there were lots of Christian holidays to relieve their agonies. However these days of rest cut into hours worked.

The problem with the “land rents and extracted labor services” characterization is not that it is false. Rather that it is woefully incomplete. The iceberg of history was melting. It had already melted away after the ninth century and the loss of frozen mass melted away particularly after 1000 CE. It melted away because commercialization and long-distant trade undercut barter; it melted away because walled cities appeared along the fringes of abbeys and castles; it melted away because changes in military technology undercut the skills of knights. In short it melted away because Western European became aggressively expansionary, absorbing vast amounts of knowledge and knowhow from the Muslim world.

If there was a period when the knight/manorial estate/monastery model applied it was during the time of Charlemagne, that is the late eight and early ninth centuries. If there was a place where it applied it was in West Francia, that is what is today France. It applied there and then because Western Europe was under attack on all fronts: Viking ships haunting the coastlines of France and England, dismembering rural monasteries, working their way down great rivers where they ravaged the few conurbations that existed.

To be sure Magyar armies crashed their way into northern Italy; Muslim armies took hold of Iberia and Sicily, attacking the coastline ports of southern France and Italy, intercepting Venetian fleets on their voyages to Constantinople. But it was West Francia that appeared to

fragment the most thoroughly into self-sufficient estates dependent of the military protection of knights and squires.

The knighthood model ultimately derived from the *comitatus*, the band of loyal warriors serving their leader as he rode roughshod over the steppes of Central Asia and the north. In the European environment it evolved into the hierarchical system of vassalage. Vassals owed military services – so many days a year as a rule – to overlords. In turn the overlords were served to vassals. It was a kind of gift exchange: a norm of extreme loyalty, in principle obedience unto death, was at stake. Over time vassalage became increasingly complex: vassals might owe allegiance to several overlords. Betrayal might occur if one of these overlords disputed with another. In an era when survival as a secular or religious institution was challenged to constant raiding by Vikings, Magyars, and Muslim pirates the norm of vassalage made a great deal of sense. No so later. Not surprisingly after 1000 many of these CE vassalage obligations were commercialized, taking the form of scutage payments paid in lieu of going into battle.

The manorial estates arose from the *vici* and *villa* of the decaying Roman Empire. Village life became increasingly local as marauders plied their way through the countryside. These were the increasingly isolated *vici*. *Villas* were large estates increasingly forced to defend themselves against invaders. Carolingian manorial estates were assembled from separate *villae* organized around a spacious *demense* carved out of wilderness by the retainers of great military overlords. Serfs who were often former slaves on *villae* owed limited service to the *demense* fields, threshing barns, and winepresses. So many days a year. They joined slaves who worked fulltime on the *demense* where they were also housed in rude huts. Like the slaves they

made clothing and shoes, turned out pottery, fashioned hemp, and produced wine. Only free peasants covered their rent by turning over goods – not labor services – to the estate.

Great estates were hardly restricted to military secular control, knights being supported on the produce generated off the *demense* and the rents paid by free holders. Great abbeys were organized along similar lines. After all the monks were supposed to be praying for the souls of the powerful nobles who allowed them to sprinkle their estates through the countryside. In many ways the abbeys provided crucial services for the nobility. In order to streamline inheritance, avoiding breaking up estates, some of the sons of powerful lords would find themselves pledged to monastic life; as well abbeys were supposed to house feudal lords and their retinue as they travelled around the countryside. That the monasteries were organized along the lines of orders following specific rules laid down by the administrators of the order (e.g.: at first Benedictine followed after 1000 CE by the new Cistercian, Cluniac, and Carthusian monastic orders) rendered the “tourism” aspect of monasticism particularly attractive.

The behavior of Charlemagne, first Holy Roman Emperor, illustrates well the way the vassalage/manorial/monastery complex operated as highly decentralized form of political economy. Charlemagne was a sincere Christian committed to spreading the Gospel with the sword. His favorite reading was Saint Augustine’s *The City of God and the World*. When the spring season arrived he organized the annual military campaign he was preparing to carry out, eliciting commitments from his vassals. He expanded Carolingian territory to the east, absorbing Bavaria, erecting a defensive “wall” against the Slaves, defeating the Avars in the east.

He demanded conversion to Christianity. He issued regulations (capitularies) that were supposed to hold throughout his lands, dispatching envoys who may or may not have successfully convinced his vassals to follow his dictates. He was relatively unsuccessful in stopping blood feuds erupting between his powerful vassals. He ruled by example, by law only in a faltering manner. Not surprisingly his empire was divided up by his quarrelling grandchildren. It was fragmented in the extreme.

One military weapon Charlemagne lacked was a navy. This was one reason he was reluctant to push his campaigns southward toward Venice, toward Marseille and Arles. It was a Byzantine fleet - not a Carolingian fleet - that challenged Muslim pirates and raiders in the Mediterranean, the Adriatic and the Aegean. Indeed Venice and southern Italy operated under a Byzantine military umbrella to an important degree. In this sense Italian economic destiny was significantly different than Carolingian. To be sure the nascent Italian city states were part of feudal Europe geographically – knights, monasteries and *villa* were there to be sure and Rome was the nominal capital of Western European Christendom - but there is little doubt they escaped the full force of decentralized, barter infused, manorial organization prevailing in French and some German dominated regions of the West.

A final point suggesting the three faces of Medieval Europe were more firmly in place during the Carolingian era than during the three centuries 1000 CE to 1300 CE involves Christianity. To be sure Christian worship contended with so-called paganism at the local level. It is not clear how pious was a typical peasant, let alone slave. However the Carolingian era preceded the definitive split between the Greek Orthodox version of the faith and the Catholic

version. It preceded the issuing of Crusades directed at movements within the Christian fold that preached perfection was possible (for instance the Cathars, the Albigensians) and the mother Church was hopelessly corrupt and wallowing in sin (notable pre-Reformation movements including the Waldensians and Hussites for instance). These movements roiled Christianity during the era of Western Christian expansionism, not before.

Most important it is important to keep in mind that at no time during the Medieval Period was there universal acceptance of the primacy of Christian thought, dictating to the secular sphere laws and rules followed in political jurisdictions. That said, the bitter ideological and even militarized struggles between Holy Roman Emperor and pope, most notably involving investiture of bishops – and the split between the pope residing at Avignon and the pope residing in Rome – were not to come until later, until the era of expansion. In comparison to the experience of the Holy Roman Emperor Henry IV - excommunicated by the pope - the experience of Charlemagne (the first Holy Roman Emperor) in dealing with Rome in his role as the first Holy Roman Emperor was pleasant and diplomatic, albeit marred by some controversy particularly over ideological disputes between the pope and the Byzantine Patriarch.

VI European Battles and Sieges, 400 – 1500 CE

How militarized was Medieval Europe? We do not have a precise idea. We do know there were knights in abundance; we do know knights were the tip of an iceberg that included support personnel – seconded farmers and slaves for instance – who assisted the knights when major campaigns were initiated. Most important we know battles and sieges took place with

considerable frequency.⁶ How frequently? Regarding this point we possess substantial hard evidence, numbers we can sort through, figures with which we can work.

To be sure scholars rely upon written records in compiling lists of battles and sieges, in estimating the number of combatants, in attempting to describe how the events unfolded. The fact is during the early Medieval Era – from approximately 500 CE to 1000 CE - written documentation concerning many decisive events and important political decisions was sparse at best. Illiteracy was rampant, even among high Catholic Church officials who were certainly expected to work from written texts. There is a very good reason why the Dark Ages are known as the Dark Ages. Even Canon Law was not put into a usable form until after 1000 CE. Riven through with contradictions and inconsistencies trying to assemble a workable Canon Law document was a monumental achievement Johannes Gratian pioneered.

In short the evidence amounts to a mixed bag. After 1000 CE or so it is probably safe to assume all *major* battles and sieges were at least accounted for. It is probably safe to assume the locations and dates of the most important military exchanges were accurately recorded. That said, figures on the number of armed participants and figures on casualties and injuries are certainly rough guesses at best, fabrications at worst. In coming up with figures on the number of combatants as often as not I had to take averages, working from wildly varying guesses.

My results appear in Table 2.

Table 2

**Battles and Sieges in the Western European Medieval Period Organized by Region and by Period,
378 CE to 1499 ^(a)**

Panel A: Organized by Region

Period	Core Regions of Western Europe: Number of Major Military Events ^(b)			
	Britain	France	Germany	Italy
378-999 CE	2	11	3	3
1000 – 1299 CE	24	29	21	27
1300 – 1500 CE	13	54	22	31
Total	39	94	46	61
Period	Periphery Regions: Number of Major Military Events			
	Balkans/Hungary	Baltic	Iberia	Levant
378 – 999 CE	18	0	4	6
1000 – 1299 CE	19	15	26	19
1300 – 1500 CE	23	10	23	2
Total	60	25	53	27

Panel B: Organized by Type of Conflict (Crusades, Dynastic, City-State, Other) ^(c)

Crusade		Dynastic	City-State	Other
1000 – 1199 CE	19 (18 in Levant)	114	42	207
1200 – 1500 CE	33 (5 in Levant, 7 in Iberia, 8 in France, 6 in Balkans/Hungary, 4 in Baltics/Russia)			

Table 2 (Continued)

Panel C: Estimates on Number of Combatants Involved for 225 Battles and Sieges, 378 CE- 1500 CE

15,000 or More					
100,000+	50,000-99,999	40,000-49,999	30,000-39,999	20,000-29,999	15,000-19,999
7	17	16	17	26	20
14,999 or Less					
10,000-14,999	7,500-9,999	5,000-7,499	2,000-4,999	1,000-1,999	100-999
30	20	18	28	8	14

Panel C: Average Number of Years In-Between Conflicts 1000 – 1500: Sieges, Battles; Crusades, Dynastic, City-State ^(d)

Period (CE)	Battles or Sieges		By Type of Conflict		
	Battle	Siege	Crusades	Dynastic	City-State
1000-1049	0	5	0	10	0
1050-1099	3.1	2.6	8.3	8.3	50
1100-1149	3.3	2.5	6.3	5.0	0
1150-1199	6.2	5.0	12.5	16.7	0
1200-1249	1.8	1.8	2.8	5.0	4.2
1250-1299	10.0	2.6	25.0	6.3	10.0
1300-1349	3.1	1.6	16.7	2.4	12.5
1350-1399	5.0	1.4	16.7	3.3	5.0
1400-1449	2.3	1.6	10	2.6	3.9
1450-1499	3.6	2.7	50	3.3	10.0

Table 2 (Continued)

Panel D: Average Number of Years In-Between Conflicts 1000 – 1500: Organized by Region

Period (CE)	Core or Periphery		Two Sub-Regions of Core	
	Periphery	Core	Germany/Italy	Britain/France
1000-1049	7.1	12.5	25	25
1050-1099	2.8	3.3	4.6	12.5
1100-1149	2.9	2.8	8.3	4.2
1150-1199	5	6.3	10.0	16.7
1200-1249	1.9	1.7	5	2.9
1250-1299	10.0	2.6	3.6	10.0
1300-1349	4.2	1.4	5.6	1.9
1350-1399	3.3	1.6	2.8	3.9
1400-1449	2.9	1.4	2.8	2.8
1450-1499	3.1	1.8	5.6	2.6

Notes:

- a One battle included in the list occurred in 1520.
- b Switzerland and the Netherlands included in “Germany”; Flanders and Belgium included in “France.”
- c City-state conflicts included some battles between Scandinavian and North German cities as well as Italian city-state conflicts.
- d Average number of years in each period calculated by dividing the number of events in each period by the number of years included in the period.

I have organized the battles and sieges into categories: regional categories; categories defined in terms of the type of conflict involved. I divide the regions where battles and sieges occurred into eight regional spheres: four core sub-regions (England, France, Germany and Italy) and a periphery zone with four sub-

regions (Balkans/Hungary, Baltic, Iberia and the Levant). The core is basically Western Europe as of 1000 CE; the periphery is basically the areas either conquered or at least contested militarily by Western European forces. In conceptualizing the core zone I divide it into two sub-regions: a Germany/Italy geographic axis in which power was regularly contested between two ideologically opposed parties, the pope on the one hand, the Holy Roman Emperor on the other hand; and a England/France geographic axis defined in terms of intertwining dynastic rivalries between powerful English and powerful French feudal lords, later kings. As for military encounters defined in terms of underlying motives for fighting I define four groups: ideological conflicts in which religious norms and beliefs were contested; dynastic conflicts that were mainly about secular political power; and city-state conflicts that were primarily economic; and other.

From the table several points are clear. Ideological conflicts were mainly concentrated in the 1050 CE to 1250 CE era; city-state conflicts were especially concentrated in the 1250 CE to 1350 CE period; and dynastic conflicts in the post-1300 CE era. It is tempting – and I believe correct – to argue that there was a limited supply of persons and economic resources that could be devoted to fighting. When demand surged in one arena it slackened in the others.

In short I am making a basic point with this argument: military diversion was alive and well in a highly militarized Medieval Western European political setting.

Like trade diversion military diversion basically is a problem negotiating dynamic shifts in supply and demand. If you divert resources – ships, financial infrastructure, information gathering – to increasing your clout in one market you reduce the resources you have available to bolster your impact in another market. To be sure if the overall volume of trade for all suppliers and demanders of goods expands you may be able to expand your sales and purchases in all markets simultaneously. That is

trade creation. But in a static environment where the volume of trade is unchanged zero-sum logic applies.

Military diversion follows a similar logic. Start with a situation where the overall level of income available to be split up among military overlords is unchanging. Now consider the conundrum facing a particular overlord. Suppose the resources the overlord commands is to carry on military activity (the share of total income available multiplied by the percentage of that income share that can be extracted for military purposes)– or at least deter aggression from other lords eyeing the lord’s land and castle - is being used to a maximum. In the chivalry model of the Medieval Period these resources were abundantly clear to organizers of military campaigns: so many days of service imposed on vassals, so many horses, so much metal for armor and weapons, so many days of services that could be extracted out of serfs, so much in the way funds that could be used pay grunt labor and artisans designing siege machinery. Of course at the same time resources had to devoted to defending your castle while you were out campaigning if you chose to boldly sally out to war.

In a static economic environment with a large number of overlords contending for power the strategic possibilities are complex. For one thing outcomes of conflict are unknown but - other things equal - those commanding more resources in a head to head conflict are likely to prevail. This basic fact impacts calculations of whether to fight or not. As well all parties know that winners acquire more resources at the expense of the loser, notably land, perhaps vassals and income generating assets. So winners are likely to gather momentum allowing them to keep on winning in future military exchanges. This leads us to an important observation regarding the transition between the early Medieval Era (the Dark Ages) and the Central Medieval Era.

In the Dark Ages when Western Europe as a whole was under attack by Vikings, Muslims, and Magyars successful overlords were those that could hang onto territory and the loyalty of vassals. Not

losing resources was far more important than gaining resources. Established overlords were likely to leave each other alone. However once Western Europe became expansionary the reverse was the case. Gaining land and resources in territories conquered from outsiders became a viable strategy for increasing your future military prowess. However diverting resources to aggressively pursuing campaigns outside your own territory renders your home base vulnerable. There are risks to pursuing aggression abroad; by the same token there are risks to not pursuing aggression abroad. Your rivals may outstrip you in the race for resources.

To be sure forming alliances – coalitions – was another option available to feudal lords in guaranteeing security for your home base or in securing a share in the fruits of military victory, thereby acquiring more land. Cementing alliances by arranging marriages was a well-established mechanism used by Central Asian invaders crashing in the core regions of Eurasia. As well it became the template for forging alliances in Medieval (and even post-Medieval) Europe.⁷ This is the logic of dynastic aggrandizement of power that was effectively utilized by European monarchs in amassing kingdoms or fragile empires like the Holy Roman Empire.

Add to these considerations regarding strategic options available to overlords operating in an environment in which the territorial base of Western Europe the fact output per unit of land area was expanding. That is intensive growth was taking place in tandem with extensive (territorial growth). From Table 3 we know this was the case. This should not surprise us as we know commerce was expanding as Western European merchants, coming into contact with Islamic civilization, improved their ability to generate credit and manage their accounts using double entry accounting based on the Indian-Arabic numerical system. In short with the gradual spread of merchant communities – cities – overlords came to realize there was a new option available to them: charter a “burg” in your environs. Reap rents from the “burg” in terms of tax revenue – or re-chartering fees – and tariffs.

Table 3

Population and Per Capita Income in Sub-Regions of Western European Core and Periphery: Circa 14 CE, Circa 1000 CE, Circa 1500 CE, and Circa 1600 CE

Region	Circa 14 CE		Circa 1000 CE	
	Population (P)	Per capita income (y)	Population (P)	Per capita income (y)
Core	18,100	604.5	18,700	428.8
Britain	800	400	2000	400
France	5300	471.2	6900	425
Germany	3700	411.2	4500	425
Italy	800	809	4600	450
Periphery	11,700	465.3	12,850	416.7
Baltics	400	400	800	400
Iberia	4150	493.3	4600	446.7
Eastern Europe, Rest of Europe	4750	415.2	8050	400
Region	Population (P)	Per capita income (y)	Population (P)	Per capita income (y)
	Circa 1500 CE		Circa 1600 CE	
Core	46,442	775.5	60,370	894.3
Britain	3942	714	6170	974
France	16,400	739.6	20,100	851.8
Germany	14,950	695.2	20,000	785
Italy	10,500	1100	13,100	1100
Periphery	24,390	525.7	30,358	851.6
Baltics	1450	662.7	1810	779.1
Iberia	7800	654	9340	839.7
Eastern Europe, Rest of Europe	16,290	493.8	18,808	545.7

Table 3 (Continued)

Source: Maddison (2007): Tables A.1, A.4, and A.7 in Statistical Appendix, pp. 376, 379, and 382.

The lords were competing with one another for military resources; as a result they also found themselves competing for merchant communities. Of course powerful abbeys also joined the fray since they could aggrandize resources to support their orders, to subsidize their religious pilgrimages, to build their chapels, to purchase their holy relics, to fund their manuscript collecting.

Exploiting their political connections with the military nobility a patrician class of urban boosters negotiating charters with abbeys and military overlords emerged. In effect they shared in the rents extracted by feudal overlords and abbots. These rents derived from the activities of the merchants and artisans who gathered within city walls.

The patricians were not stupid. They knew they could play off one lord against another.⁸ They realized that being strategic, even duplicitous, in a decentralized and highly militarized environment might open convenient avenues to riches. They were fully prepared to cut an arrangement with a rival military overlord if they believed their economic interests might be better protected by operating under the umbrella of that lord should his or her regional power be sufficiently potent. Not surprisingly they cultivated strategy dealing with patricians controlling other cities. In doing so they appreciated a basic economic reality: it was in their interests to forge cooperative alliances with other cities. As a group cities had a common interest in expanding trade for the entire network. Trade creation was in the interests of all. Economists call this a scale economy. It was crucial to the emergence of the Hanseatic League, the Champagne Fairs, the alliances between cities in Lombardy and Tuscany.

That said there are limits to scale economies just as there are limits to economic logic. One limiting factor is the dangle of quick enrichment through aggressive trade diversion. Grab the trade

routes held by rivals. For instance one group of cities might decide to blockade the trade of another city network bound together by dint of a carefully worked out alliance; for instance one group of cities might raise sufficient funds to hire away knights from declining manorial estates, raising a army, forging a militia, commissioning a naval fleet.

Another limiting factor was the control of city government. Patricians were extracting rents from merchants and artisans. Not surprisingly the merchants and artisans resented this. As well they resented the power the patricians exercised over the activities of – and legal disputes erupting among – their rank and file. Ultimately they formed alliances of their own to protect their own interests, to fight for their rights over city laws and taxes, in short to exercise leverage, power. One option was to form their own militias.

All of these factors – strategic playing off of rival lords and abbots; forging alliances with other cities; purchasing military services from knights; forming militias - played into the hands of Medieval European burg power elites determined not only to survive, but more important prosper, in a highly militarized setting.

VII Commercial Cities and Sieges, 1000 – 1500

The network of commercial trading centers – patrician dominated merchant cities of Medieval Europe – were remarkably successful in surviving during the period 1000 to 1300. Our best indicator of this is our figures on sieges. Very few major trading centers were subjected to withering sieges. In so far as European commercial hubs were subjected to siege, the major rationale for investing them was ideological, tied up with Crusades. Table 4 reveals this. Cities taken in Crusades dominate the list of important commercial centers subject to siege. Iberian centers loom large in the lists of overlapping cases; Toulouse in France was subject to siege by

Table 4

Commercial Cities and Towns Subject to Siege between 1000 CE and 1300 CE, and Estimates of Urbanization for Regions of Western Europe, Circa 1300 and 1500 CE

Panel A: Sieges Taking Place in Major Medieval Cities and Towns: Commercial Centers in the Case of Bennett/Holister, Oxford Atlas, and DK Atlas; Centers Establishing Universities between 1250 and 1450 in Hammond Atlas

Data Feature	Bennett/Holister	Oxford Atlas	Hammond Atlas	DK Atlas
Number of cities in data set	52	66	57	158
% experiencing siege	17.3%	15.2%	5.3%	9.5%
List of cities sieged	Toledo, Jerusalem, Bruges, Lisbon, Milan, Rouen, Toulouse, Cordoba, Seville	Cologne, Rouen, Tours, Toulouse, Lisbon, Seville, Cordoba, Milan, Parma, Palermo	Toulouse, Huesca, Seville	Bruges, Rouen, Aachen, Cologne, Toulouse, Valencia, Jaen, Cordoba, Lisbon, Milan, Parma, Mantua, Faenza, Palermo, Syracuse

Table 4 (Continued)

Panel B : Estimates of Urbanization (%) for Countries of Europe, Circa 1300 CE and 1500 CE

Country	Based on assumptions about the cities Given in the DK Atlas lacking direct estimates (for 1300 CE): In Column 1 all such cities are assumed to have 5000 inhabitants; in Column 2, 10000 inhabitants; in Column 3, 15000 inhabitants; in Column 4, 20000 inhabitants (direct estimates included in calculations when available)				Maddison Estimates (for 1500 CE)
Belgium	6.67%	6.67%	6.67%	6.67%	21.1%
France	2.27	3.06	3.85	4.65	4.2
Germany	0.02	0.03	0.04	0.06	3.2
Italy	9.87	12.17	14.47	16.77	14.9
Netherlands	n.e.	n.e.	n.e.	n.e.	15.8
Scandinavia	n.e.	n.e.	n.e.	n.e.	0.9
Switzerland	n.e.	n.e.	n.e.	n.e.	1.5
England/Wales	n.e.	n.e.	n.e.	n.e.	3.1
Scotland	n.e.	n.e.	n.e.	n.e.	1.6
England/Wales/Scotland	3.8	6.2	6.2	8.5	n.e.
Portugal	n.e.	n.e.	n.e.	n.e.	3.0
Spain	n.e.	n.e.	n.e.	n.e.	6.1
Iberia (Spain/Portugal)	7.6	8.8	10.1	11.3	n.e.
Western Europe	n.e.	n.e.	n.e.	n.e.	6.1
China	n.e.	n.e.	n.e.	n.e.	3.8
Japan	n.e.	n.e.	n.e.	n.e.	2.9

Sources: Barraclough (1999): pg. 100; Bennett and Holister (2006): pg. 170; Black (2000): pp. 190-191; (Maddison (2006): Table B-14, page 248; and O'Brien (1999): pg. 100.

forces assembled by Philip Augustus, monarch of France, who was acting at the behest of the pope who called a Crusade against the so-called heresy of the Albigensians but was also

conveniently taking advantage of the situation offered by the cloak of piety to consolidate control over rebellious feudal lords in the Toulouse region.

In considering the importance of the Crusades in the sieges of crucial commercial centers one must keep in mind that the Crusades were not nearly as disastrous an undertaking for Western Europe as is often claimed. True Saladin defeated Crusader armies at Hattin, wrenching away from Christian rule Jerusalem in 1187. True Jerusalem was only in Christian hands for less than two centuries, having been seized first in 1099 during the First Crusade. The fact is the Crusader conflicts taking place in the Levant were only part – not necessarily the most important part - of a much more complex project.

First and foremost the Crusades were integral to Western European expansionism. By directing military force outward they absorbed warriors that otherwise might have fought each other with greater ferocity within the core region of Europe than they actually did. The Crusades were part of a generally expansionary military and commercial drive outward into a periphery that included the Baltic, the Balkans, Sicily and Iberia. They were definitely warlike. But they fueled much commercial activity as well. Venice, Genoa, and Pisa all benefited from the Crusades. They ferried Crusaders; they established commercial outposts in the Levant. Interacting with Muslim merchants they took in valuable tips about how to create credit and how to carry on long-distant trade. The all but complete re-conquest of Iberia – only Granada holding out as an Islamic outpost – by the mid-thirteenth century brought into Christian hands extremely well developed commercial centers that were subsequently integrated into a growing network of European cities.

The Crusades also reshaped Christianity. It drove a decisive wedge between the Greek Orthodox Church expanding northward and eastward into Russia, Bulgaria, and the eastern reaches of the Baltic and the Catholic West. From their very inception the relationship between Rome and Constantinople played out during the Crusades had been fraught with deception and intrigue. The great schism between Rome and Constantinople had already occurred in mid-century. After the Byzantine Emperor was taken captive by a Seljuk Turk led army pushing its way into eastern Anatolia, a traditional holding of Byzantium, at the Battle of Manzikert in 1071 the Byzantine rulers looked to Rome for help, arguing along the standard strategic lines conveyed in the well-known dictum “the enemy of my enemy is my friend”.

Feigning cooperation with Byzantium but actually coveting growth of Rome’s influence in the global Christian world, Pope Urban agreed to call a Crusade. He did so in late 1095. His bid to aggrandize the influence of the Roman pope was two pronged. By guaranteeing immunity to Western feudal lords (guaranteeing that their home territories would not be invaded by rivals while they were away crusading) he hoped to promote a “Peace of God” in the West, thereby strengthening the authority of the papacy and bolstering particularly the weapon of excommunication that previous popes had wielded, notably against the Holy Roman Emperor Henry IV.⁹ In addition he wished to effectively diminish the power of the Byzantine Emperor and the appeal of the Eastern Patriarch. Indeed during the Fourth Crusade, in 1204, the Crusaders sacked Constantinople, establishing a Latin Kingdom in place of the Byzantine Empire.

Finally the Crusades commercialized chivalry, or rather intensified the drift toward commercializing chivalry. Consider the Knights Templar one of the three Military Orders created by the Church during the Crusades (the Knights Hospitalliers and Teutonic Knights being the other two). In theory devoted to stringent self-discipline and absolute obedience to the pope, the Poor Knights of Christ and the Temple of Solomon (the Knights Templar) was a new order assigned a prestigious headquarters in the al-Aqsa Mosque complex used by King Baldwin of Jerusalem as a royal palace. Gradually the order became remarkably rich, garnering loot seized from Muslim armies, donations from convents and monasteries throughout Europe. Maintaining warehouses that it guarded it gained a reputation as a safe place for holding wealth, a place to which one could make deposits. Not surprisingly it began to charge interest, fees, for its services. It became a powerful bank. What about Luke's assertion that the root of all evil was money? What about the prohibition against usury adopted at the Council of Nicaea? In point of fact it grew so corrupt that it was decisively suppressed by the pope during the 14th century, some of its high officials even executed.

Disbanding knights who had joined the Crusader campaigns in the Levant commercialized chivalry in other ways as well. A classic case is the phenomenon of *condottieri*, heads of free professionally trained military units contracting their services out to the highest bidder. Many knights returning empty handed from the Levant in the aftermath of the disastrous Second and Third Crusades - Saladin's forces decimating Crusader forces at Hattin, retaking Jerusalem for Islam – ended up foraging for a living in Italy, basically becoming bandits and ruffians, forming gangs that could extract revenue from wealthy Italian merchant centers made rich from trade with the Levant. Hire them on as protectors of the cities, killing two birds

with one stone as it were. You buy protection by employing mercenaries, drafting a *condotta*, contract that you sign with the *condottiero*. The increasingly powerful city-states of Italy saw this solution as a way to aggrandize power with pumped up military muscle, weakening the threat of invasion from the Holy Roman Empire on the one hand, warding off threats from the avowed enemy of the Holy Roman Empire, the pope.

Ironically by their very nature mercenary armies working at the behest of cities or feudal overlords or kings operated with a mixed set of motives. The commander of a regiment for hire was highly invested in the soldiers serving under the regimental banner. In effect they were capital, valuable capital. Losing them in battle meant losing assets. Better to protect these assets by feigning conflict, avoiding its most displeasing consequences, maiming and murdering. Provided your opponents play by the same rules everyone benefits. The *condottieri* and their minions have employment; the employers enjoy the fantasy of actually having a fearsome military force available at their fingertips; diplomacy can function largely freed from actual carnage.

In 15th century Renaissance Italy city-states basically operated in this kind of environment. Too powerful to yield to an aspiring leader for all of Italy – an outcome additionally hampered by on-going struggles between the German Holy Roman Empire and the papal authorities in Rome – city states in Italy operated in a world of constant squabbling that sometimes resulted in open warfare but as often as not was handled through diplomacy and negotiation. In his classic *The Prince* Machiavelli railed against the *condottieri*. He himself had been commissioned by Florence to raise a militia army for his employer, a militia that could

bring Pisa to its heels, consolidating Florence's hold over a major port on the coast. Hoping for a new Cesare Borgia to emerge in Italy, one committed to unifying the Italian peoples as a whole through an aggressive military campaign, Machiavelli viewed the phenomenon of mercenary warfare as an oxymoron. Why play at fighting? War carried on by militias, by the rank and file, by ideologically committed commoners, is real warfare.¹⁰

Mercenaries and militias: these were two ways cities could and did protect themselves in the Medieval Period. Militias were certainly becoming into their own in European warfare, a fact driven to some extent by changes in military technology. The growing importance of the crossbow and the gun – both of which sent flying towards heavily armored knights atop their steeds propellants that could and did successfully penetrate steel plated armor – was transforming warfare, raising the value of skilled infantry relative to knights operating on horseback. From a cost point of view outfitting a soldier trained to fight in the infantry was far less than the cost of putting onto the field of battle a mounted knight. Cities populated by merchants and artisans who could be trained in fighting with spears, bow and arrow, and powerful crossbows at relatively low cost posed an increasingly potent threat to knights as competition between armed forces transformed military units, knights giving way to the infantry.¹¹ In short the relative power of cities compared to feudal overlords rose as free floating mercenary armies and militias spread throughout Europe.

It should not be forgotten that cannons were as important, if not more important, than muskets or smaller handguns in moving European warfare towards gunpowder. How to transport cannons was a problem to be sure. That said it was perhaps a problem better solved

by putting cannons on galleys and armed ships. For ports along major waterways – wide rivers and especially seacoasts, the cannon offered considerable advantages. You could place them at strategic spots on hilltops and in front of city walls where they could ward off attacks. You could put them on ships. The gradual embrace of gunpowder did favor cities over overlords relying on the vassalage services of knights and squires.

Still the principal avenues pursued by medieval cities in avoiding debilitating siege lay not in the field of fighting but rather in the field of political strategy. The trick was how to cajole powerful overlords into protecting cities, appealing to the self-interest of overlords who often feuded with one another. How do you get powerful protectors who might contest with one another at the drop of a hat– and therefore were subject to the dictum that “the friend of my enemy is my enemy” – to leave you alone?

One approach successfully initiated by cities was securing “market safe conduct” (*conduit des foires*) guarantees from powerful lords. The merchants operating at the fairs of Champagne secured these guarantees from the Count of Champagne. Not only did the Count of Champagne grant the rights to merchants in his domain. He realized the fairs in his jurisdiction could not operate effectively if the merchants in Champagne could not go back and forth to southern France and Italy safely. With that in mind he arranged for the protection to be extended to the Duchy of Burgundy. Since it was in the economic interests of the Duke of Burgundy to increase the trade taking place in his jurisdiction he was agreeable. In short if trade raises the incomes of both rulers – more tariffs, more taxes, and more wealthy merchants from which one can borrow funds – it is in their mutual interest, even if they both apply the

additional income to building stronger military forces with which they can potentially attack one another.

Of course this does not prevent a powerful city from trying to divert trade away from rivals by appealing to a powerful military ruler to do their bidding. That there were no dominant cities in Europe, rather networks of commercial centers of roughly similar size, reduced the risk of this happening. The network nature of Medieval Europe must not be discounted in seeing how rival military lords could be induced to cooperate in protecting each other's merchants despite their potential rivalry on the field of battle.

Indeed institutions set up by networks of cities promoted the creation of commercial law. Consider contracts drawn up at fairs designed to prevent merchants from cheating one another. Officials at a fair were appointed to supervise fair ordinances; contracts were drawn up and witnessed by third party notaries guaranteeing enforcement; a court for the fair was set up to adjudicate disputes between rival merchants and rival merchant houses. Most important: you could excommunicate the merchants of a city from the fair altogether. In effect this meant each city in the network had to police the activities of the merchants within that city.

Safe conduct along routes carved out between cities posed another problem. How is a merchant or group of merchants moving English wool and French linen along rivers or over mountain passes? Here competition between rival districts was crucial. Since it was in the economic interests of an abbey or a manorial estate to direct trade through its vicinity it was in the interests of powerful economic actors within feudal domains to lobby their military protectors to forge travel routes beneficial to their commerce. Of course merchants were not

passive players in this arena. They formed syndicates, negotiating as a collective bargaining agent with groups of lords. As a classic example consider the road traversing the pass at Mont-Cenis. A merchant syndicate successfully negotiated to have a new road created that competed with an ancient road.

The fact that forests were systematically cut down as part of the drive to expand arable acreage helped in the carving out of roads. Bandits operate in dense forests, relying on the cover offered by thick vegetation. Fewer thickets, safer passage.

In short political urban networking was crucial to the expansion of commerce during the period 1000 to 1300 CE. To be sure it had its drawbacks. Networking allowed city groups to defy each other. The Hanseatic League pressured the cities of Flanders into surrendering markets. They used a boycott to accomplish this. As well the Hanseatic League blockaded Bergen, causing a famine to break out there.

One thing is clear. From the point of view of city networks the more powerful was the friend they depended on for protection— the more likely the friend was an actual or at least potential whale or shark operating in a sea populated by minnows - the greater was their chance of averting attack. This made important dynasties hoping to establish kingdoms highly attractive friends. To be sure it was also in the interests of dynasties vying to be monarchs to ally themselves with powerful cities from which they hoped to secure revenue thereby enriching the coffers they depended on for carrying on conflicts, including bringing restive subordinates to heel. This logic became increasingly important in the late Medieval Period, after Medieval Europe may have reached limits to growth.

VIII Limits to Growth? State Formation, Urbanization, and Social Levelling in the High and Late Medieval Period

As historians it is difficult for us to erase from our consciousness a story line we have learned over and over again: the period from 1300 CE to 1500 CE is a transitional period. After 1500 Europe moved along a path of global expansion, discovering and colonizing the New World, establishing an oceanic based trading system that connected the coastlines of China and Japan to the coastlines along the Atlantic, a global oceanic trading system that displaced the Silk Road systems pioneered in the Ancient World, expanded by Islamic traders and enriched geographically by the Mongolian conquests. Seen in the rear view mirror of historical development subsequent to the Renaissance we can easily tell a story of progress.

Beginning in the 1490s powerful Western European states emerged, centralized enough to garner a generous revenue base began naval expansion programs. Aggrandizing military power – notably galleys bristling with cannons - five states began to systematically explore and establish ports of call on the world's first global trade system, one spanning the world's oceans: Portugal and Spain in Iberia, France and the Netherlands along the Atlantic seaboard of the continent, and the island kingdom of England. Voyages around Africa opened up routes to the Indian Ocean and the South China Sea; voyages across the Pacific opened up the opportunity to establish vast colonial empires in the Americas. The Spanish ultimately turned the Pacific into a major trade route. Opening up a complex of silver mines in Potosi and in Mexico Spanish galleons shipped silver ingots to the Philippines, their colony in the Asia-Pacific, penetrating into the southern island of Japan, Kyushu. With the exception of Brazil which fell to the Portuguese

they grabbed territories through most of the Americas, from the southern tip of contemporary Argentina to California and Florida.

Thinking along these lines is fine as far as it goes. The basic story line is one in which Western Europe begins expansion around 1000 CE, accelerating the process after 1500 CE. It is a story in which progress builds on progress.

The problem with the story is it is incomplete. It does not take into account two centuries when Western Europe struggled as a region: struggled in terms of economic performance; struggled in terms of social stability; struggled in terms of warfare exemplified by the Hundred Years War that ravaged France and Britain, turning the border between England and Scotland into a contested military zone. Looking at the two centuries of late Medieval Europe from this vantage suggests limits to growth were reached, limits arising from the way Europe had expanded during the previous three centuries.

Beginning in 1315 famine hit the Western European countryside. It ravaged the core regions of Europe for almost eight years. Was it due a cooling of climate, perhaps stemming from volcanic eruptions? Was it due to soil exhaustion stemming from insufficient fertilization of the soil? Was it due to bringing into cultivation marginal lands of such poor quality – given the technology of soil management prevailing at the time – that crop failure had to eventually occur? Was it due to excessive specialization in the planting of crops and the pasturing of animals – too many fields turned over to raising sheep for wool, too many vineyards planted, too many citrus orchards – thereby suggesting trade during the previous three centuries had pressed too strongly against resources?

What we do know is that on average land quality (q_{la}) declined. We know this because much land was returned to waste. Forests grew. Farms along the high ridges of mountains – attributing to the previous three centuries when the mean altitude of arable cultivation was pushed willy-nilly every higher – were abandoned after the early fourteenth century.

From an economic point of view the consequences were devastating. Less food, starvation followed by spikes in mortality. Marriages were postponed. Couples were separated as people scavenged throughout the countryside. The birth rate plummeted. Population growth – vibrant up to 1300 – slowed. Prices for food rose; land rents on the land still arable soared. The rich grew richer; the poor poorer.

This was the first stage in the fourteenth century demographic crisis. It was followed by the horror of the Black Death. Perhaps brought on by the Mongolian invasions and the establishment of trade routes across the steppes of Central Asia – there is evidence the plague may have had its origins in the Himalayan region – the Black Death took three forms as it spread. In its bubonic form it was carried by rats who hitched rides on caravans. Fleas bit rats, devouring the bacillus from the bloodstreams of their victims. Biting humans, the fleas transmitted the disease to humans. Lodged in human populations the disease takes two other forms: pneumonic and septicemic. In the pneumonic form it is transmitted by person's sneezing. It spreads through the air. In the septicemic form it attacks the bloodstream of a victim. Then it is spread by fleas biting humans. Between 1347 and 1350 the plague spread across Europe, moving from Sicily and Sardinia in the Mediterranean northward to France (it reached Paris by

the summer of 1348), penetrating northern Europe by 1350, Danzig and Prague falling under its shadow at mid-century.

The fall in population that resulted – some estimates of percentage losses in human numbers exceed 30% - reconfigured the relationship between arable land and people. Lower population densities meant wages rose relative to land rents. Manorial estates now competed for labor. In the Western districts of Western Europe, where commercialization of farming had gained special force due to the opening up of cities and trade routes, slaves and serfs were able to cast off their bondage, their required labor services dwindled. Real wages rose because nominal wages increased and food prices plummeted. Social leveling of a sort occurred. We know social leveling occurred in the countryside of France: in 1358 a great Jacquerie Revolt spread across the northern districts. Peasants were exerting political voice, albeit by taking up arms, attacking wealthy monasteries, threatening the lives of feudal lords and their retainers.

In the eastern reaches of Western Europe – in the periphery zones in Poland and Lithuania, Pomerania, the Baltic coastline and Russia – the plague had not been as devastating. Moreover armed nobles exercised more power relative to central authority, in part because city networks were undeveloped in these lands. Isolation was more extreme. Mobility was far more limited. Bondage was easier to enforce. Peasants could not easily escape to cities where “city air made people free.”

Social leveling took a different form in the western districts of Europe where urban networks were far better developed, where fairs had prospered, where land and river routes

had been fructified by merchant comings and goings. Burgs as a whole gained power and within burgs merchant guilds and artisan guilds gained power relative to the patrician classes.

Burgs gained power because monarchs coveted their wealth, wishing to tax them so they could fill their coffers with revenue with which they could purchase mercenaries, commission cannons, secure muskets and crossbows, and build navies. We know this occurred because the early parliaments in England – for instance those called in session by Edward I during the late thirteenth and early fourteenth century included not only shire knights but also burgesses. Parliaments were called in England because monarchs needed funds to fight wars. In France Philip the Fair also established a parliament though it was largely restricted to judicial matters. It was clear Philip was after more revenue. He filled his coffers with taxes extracted out of the clergy, showing a willingness to take on the pope over this matter. Moreover the French Estates General established as an infrequently called but still somewhat effective shadow institution whose voice the French monarch was required to listen to and take into account in policy making included three estates: the clergy; the nobility; and townspeople.

Within burgs guilds gained power. They gained power because they were the real source of urban wealth. They did so because they could move elsewhere. They did so because they were the backbone of city militias. They did so because they had sufficient numbers to drive out unpopular patrician leaders. The Medici of Florence discovered this hard fact of political life to their chagrin in Renaissance Italy.

With these points in mind it is useful to consider the estimates of urbanization appearing in Panel B of Table 4. As crude as these estimates are it is clear the most urbanized

regions of Europe were Belgium, the Netherlands, England, France, Spain, Portugal and Italy. Setting aside Italy for a moment it is apparent that the states that emerged as the leaders in promoting Mercantilist expansion across the oceans were all relatively urbanized (albeit Portugal is a marginal case). In short cities and centralization of power appear to go hand in hand.

Italy is a special case for several reasons. First it was the home of the papacy, most of the time anyway as some popes established a base in Avignon and there was even a period when three popes contested the Holy See. Since the papacy and the highly fragmented Holy Roman Empire were intertwined through constant political and military interaction – since popes made it a practice to weaken the Holy Roman Emperor by encouraging nobles in Germany to reject imperial authority and Emperors regularly invaded Italy, attempting to control over both northern Italy (Lombardy and Tuscany) and southern Italy thereby hemming in the power of the pontiff – the lack of central authority secured by Italians is easier to understand. An alternative explanation revolves around cities gaining too much power in the 1100s as a result of the Crusades and the expansion of Mediterranean commerce they were able to command. Venice, Genoa, Pisa, and Florence became powerful political entities, each carving out city-state jurisdictions outside of their own walls. Again by 1300 Italy was prosperous. Perhaps too prosperous, making itself a target coveted by other powers, by German kings, by Spanish monarchs, by the French.

In any event it is apparent that three zones opened up in Europe as a result of reaching limits to growth as a feudal system. In one zone were the regions of Europe heavily urbanized

and/or well situated geographically to expand onto the Atlantic. This zone included Spain, Portugal, the Netherlands and the Low Lands, France and England. With the conquest of Granada by the Spanish Iberia was once more completely within the European core zone. These states were sufficiently centralized and sufficiently rich to commit their sailors to oceanic exploration. A second zone included the highly fragmented Holy Roman Empire/Italian axis. Italy was rich and highly urbanized; the Holy Roman Empire was highly decentralized politically and far less urbanized than Italy. As a zone it was urbanized but too fragmented for centralization. The third zone included periphery states. It included Scandinavia, the Baltic, Poland, Lithuania, Russia and the Balkans. In these areas urbanization rates were low. Centralization was contested by powerful nobles and rivalry between monarchs.

The fall of Constantinople to the Ottoman Turks in the mid-fifteenth century – an event that took place almost simultaneously with the fall of Granada to the Spanish – profoundly shaped the destinies of these three zones. It decisively closed the Black Sea window into Central Asia. Using land routes to access trade to Asian markets that were the dominant world markets in terms of sheer size was now almost totally abandoned by Western European merchants. If anything it was clear an expansionary Ottoman Empire was likely to contest the periphery zone of Europe – notably the Balkans – with the Western Europe powers.¹²

At the same time the almost simultaneous occurrence of the fall of Granada to the Spanish and the fall of Constantinople to the Ottomans strengthened the hand of the first – most highly centralized in monarchical states and most highly urbanized – zone of Europe. True for the feuding monarchies inhabiting this zone conquering the New World was unexpected;

however carving out safe havens along global oceanic shipping and commercial routes was not. Expansion meant going out to sea, finding ways to get to India and China without going through the great landmass of Eurasia.

This discussion naturally leads us to speculate on why it was Europe – not China, not the Islamic world – that discovered and conquered the New World. What I can offer here are observations based on the analysis of Eurasian power dynamics.

Why not Islam? True Islamic traders had pioneered much of the naval commerce in the Indian Ocean. But what incentive did they have for going out on the Atlantic or the Pacific for that matter? Their land trade zone was vast geographically. The oceanic portion of it was an add-on. They penetrated Indonesia and Southeast Asia where their commerce friendly religion made important inroads. The loss of Granada along with the Ottoman conquest of Constantinople kept the focus of their merchants on land based commerce. They had been weakened by the Mongol conquests but regaining control over the Black Sea helped. The fact the Mongol empire split apart into rival states helped as well. The military thrust of the Turkish Muslims was in the European periphery.

The Chinese had suffered grave defeat by the Mongols. After the collapse of the Mongol dominated Yuan dynasty and the emergence of a native Ming dynasty Chinese military calculations were naturally focused on keeping powerful Central Asian groups from attacking and conquering them. First and foremost they were a land power. To be sure the sheer size of their economy was vast. The resources the Ming administration was able to cobble together was sufficient for Chinese engineers to design the largest ships the world had seen. During the

period between 1405 and 1433 a naval commander, born in Mongolia into a Muslim family who took him on a pilgrimage to Mecca as a boy, Zheng He, made seven voyages with his fleet of “treasure ships” visiting thirty-seven countries. But where did he go? Into the Indian Ocean; onto the eastern seaboard of Africa. He went where the lure of markets was the strongest. He went where displaying Chinese power would have the greatest impact politically. Europe was not an attractive target and in any case reaching Europe for a Chinese explorer meant going around Africa. Sailing across the Pacific made no sense.

The fact that Zheng He, a Muslim, sailed for China and not an Islamic state is itself interesting. It suggests that the Islamic world was too fragmented – not nearly as fragmented as the European world but still divided into states defined in terms of ethnicity or variants of the faith – to commission a massive fleet of the sort Zheng He sailed on.

This brings us to the Western Europeans. Europe was fragmented but less so in the zone best equipped to commission fleets for exploration of the oceans. Fortunately for the European sailors venturing out onto the waters the Atlantic Ocean is much easier to navigate than the Pacific. It is smaller; it has more stepping stones to land on, more stepping stones from which one can jump on a further voyage. Indeed around 1000 Danish Vikings had accomplished the feat. They established bases in Iceland; moved onto Greenland; and eventually established a community on the coast of Labrador, Vinland.¹²

In short the states forming out of late Medieval Europe centralized and mostly urbanized had the incentive and the ability to discover the New World. This does not prove that European conquest was inevitable. Nothing in history is inevitable. However it does establish

that it was highly probable. The incentives were in place; the geographic advances allowing Europeans to get their first, beating out Chinese and Islamic contenders, were there. It is on this note that I conclude my account.

IX Addendum: Open Feudalism versus Closed Feudalism: Medieval Europe in the Japanese Mirror

A major theme in this paper is the way commerce and conflict shaped Medieval European political and economic development. My line of argument tends heavily on the importance of decentralized feudal competition for the successful emergence of capitalistically oriented urban networks.

A similar logic can be applied to Japan during the so-called early modern (Tokugawa) period, Tokugawa rule successfully established at the Battle of Sekigahara in 1600 and persisting until 1868 when a group of economically successful southern fiefs defeated the forces of the Tokugawa shogun, establishing imperial rule under the Meiji Emperor, ushering in government by a centralized nation-state.

It was during the Tokugawa period that market oriented merchant capitalism spread in Japan just as it did in Europe between 1000 CE and 1300 CE. It was during the Tokugawa period that infrastructure connecting together the disparate regions and islands in the Japanese archipelago was put into place: five major road networks were built; the banks of rivers were shored up; irrigation ditches were extended into the valleys and plains; new villages sprang up; population grew.

Key to all of this was the way Japanese feudalism during the Tokugawa Era operated. First and foremost guns were banned. Warriors, owing *comitatus*- inspired loyalty to their feudal overlords – were allowed to carry two swords. Not guns. The Japanese certainly knew about guns. Europeans – Spanish, Dutch – introduced guns into Japan during the sixteenth century when civil warfare roiled the land, powerful warlords contesting power with one another. Great warlords like Oda Nobunaga attempted to bring his rivals to heel; Hideyoshi Toyotomi followed his footsteps in stamping out powerful adversaries. Ultimately at the Battle of Sekigahara Tokugawa Ieyasu was able to cobble together a successful alliance system that proved able to defeat a rival alliance system, bringing open civil warfare to an end. Or almost to an end: investing Osaka, Hideyoshi's castle town, he defeated Hideyoshi's son and heir shortly after 1600.

The problem Tokugawa shogun rulers faced was how to prevent a reoccurrence of civil war. To that end banning guns and banning contact with foreign powers made sense. Hideyoshi had already realized that allowing *samurai* warriors to roam the countryside was destabilizing, Warriors continually fought one other, villages engaging in vendettas against rivals, farmer-warriors creating havoc in the rural countryside. Forcing the warriors to reside in the castle town of the *daimyo* overlord to whom they owed service removed them from open conflict in the rice fields and also kept the supporters of rival overlord clans apart. In taking these steps the Tokugawa shogunate (*bakufu*) government created a form of closed feudalism.

Crucial to the whole project of closed feudalism was demilitarizing the countryside. One of the great economic benefits arising from closed feudalism in Japan was the expansion of

arable land. Once the villages no longer engaged in regular fighting against one another they were able to form cooperative arrangements that were in the interests of them as a network. The network was basically a vehicle for extending irrigation lines, channeling the water sloshing down rivers along irrigation ditches. New rice fields were created because irrigation lines were extended. Fiefs had strong incentives to make sure peaceful conditions prevailed in the villages allocated to them. Taxing the villages at approximately a rate of 40% (of rice produced) allowed the fief administrators to transfer rice stipends to the loyal warrior retainers who populated the castle town.

With the expansion of irrigation lines the ratio of arable to total land area soared. Land quality jumped. So did population. More mouths to feed went with more rice that could be produced. Between 1600 and 1720 or so the population grew at a rate of approximately 1% per annum. By 1720 it was around 26 – perhaps 27 – million persons.

Each of the fiefs established by the Tokugawa authorities had a castle town. As a result hundreds of urban centers sprang up throughout the country. At the apex of this urban network were two conurbations: Osaka and Edo. Osaka became the so-called “kitchen of the *bakufu*”: the *daimyo* in southern and western Japan were required to maintain warehouses there. These warehouses held rice. The fiefs could buy and sell rice to one another in the Osaka market thereby staving off famine in their fiefs when rice output in their bailiwick fell short of demand. It was not an absolute bulwark against starvation. Famines did occur partly due to volcanic eruptions. However it helped.

Beginning by managing the rice trade merchants in Osaka began to venture out into other businesses: textiles, food processing, sake, fertilizer, dried fish, and so on. Osaka's population soared.

Edo grew rapidly for other reasons. It was the main castle town of the Tokugawa shogun, originally a small fishing village on the coastline of a sprawling fief carved out of the Kanto plain. To keep an eye on the *daimyo* – in short in order to spy on them – the Tokugawa *bakufu* required the lords to attend their court on an alternating basis. That meant they had to maintain luxurious residential compounds in Edo; this meant they had to travel on Tokugawa controlled roads where their baggage could be carefully checked for weapons. To be sure this system did create perfect peace and harmony, it did not absolutely hermetically suppress invidious blood feuds between rival lords, but it was effective in suppressing civil war. To be sure violence was not uncommon. During the early part of the Tokugawa era *samurai* retainers sometimes rebelled; in the second half of the Tokugawa era (1720 – 1868) peasant rebellions were not uncommon. Still it was a pax Tokugawa.

As the shogun's capital Edo joined Osaka in growing to immense size. As a result two major urban conurbations existed in Japan. In these two conurbations powerful merchant houses thrived. The great houses of Sumitomo and Mitsui emerged, each spinning off franchise branches.

By the mid-eighteenth century limits to growth had been reached. New arable lands proved increasingly costly to create; forests had been so cut down to meet the demand for wood in construction and heating, wood was becoming more and more expensive. Reflecting

these limits during the second half of the Tokugawa period – from approximately 1720 until 1850 – population hovered from around 26 to 27 million persons. Evidence increasingly suggests this was achieved mainly through control over reproduction within marriage, infanticide (*mabiki*) being resorted to by many families. In the northeast of Japan this practice seems to have produced negative population growth. In central - and highly urbanized - Japan something like zero population growth seems to have prevailed. It is likely this was achieved through a regime of deaths exceeding births in the two great conurbations of the region, Edo and Osaka, both becoming “mortality sinkholes.”¹⁴ In the southwest of the country, the region where the climate was most benevolent, it appears population grew somewhat. Overall from a total country point of view something like a steady state was achieved.

The most obvious sign of the “closedness” of the Tokugawa form of feudalism is the banning of guns. Ultimately it was applications of gunpowder that allowed European explorers and colonists to prevail against the populations they encountered at trading ports. To be sure disease was important as well, particularly in the New World. Most Europeans had developed natural immunity to infectious diseases like smallpox that jump from cattle to humans. In the New World where horses and cattle had not been domesticated – because there were no indigenous wild ancestors of these animal species – natural immunity did not exist. Nevertheless it was ultimately guns that paved the way for European dominance of trade along the coastlines of Asia.

Closed feudalism is possible as the Japanese case proves. However it is inherently opposed to expansion, hence less likely to generate sustained growth. The fact that Japan reached limits to growth in the eighteenth century is testimony to this fact.

I close out this discussion with Table A.1 that compares in a schematic way Japanese closed feudalism to open European feudalism.

Table A.1: Key Features of Closed and Open Feudalism. Japan 1600-1868 and Western Europe 1000 – 1300

Western Europe	Japan
Military Rule	
<p><i>Comitatus</i> loyalty crucial to vassalage concept in Europe</p> <p>Knights become the “tanks” of European warfare, heavily armored, serving as linchpin of Medieval war</p> <p>Turks defeat Byzantines at Manzikert; Knights move out into the periphery of Europe, establish Crusader States in Levant, establish temporary rule over Jerusalem (1099)</p> <p>Most of the “Re-conquest” of Iberia achieved by Christian forces</p> <p>In 1204 Venetian inspired Crusade leads to sacking of Constantinople by Western force; “Latin Kingdom” established in East</p> <p>Ara//b armies using gunpowder and guns defeat Christian army, introducing guns into Europe</p> <p>Papacy promotes crusades partly to divert knights away from fighting in the core regions of Europe</p>	<p><i>Comitatus</i> loyalty crucial to relationship between <i>daimyo</i> overlords and rank and file warrior <i>samurai</i></p> <p>After Battle of Sekigahara (1600) Japan divided into approximately 300 fiefs; <i>samurai</i> removed from countryside forced into the castle town of the <i>daimyo</i> to whom they are subordinate</p> <p>De facto closing of country</p> <p>Abandonment of military designs on Chinese mainland</p> <p>Banning of guns, <i>samurai</i> allowed to use swords</p> <p>Road network established so that <i>daimyo</i> and some of their retainers can travel to Edo, the shogun’s castle town, in order to attend to court rituals</p> <p>Emperor’s capital established in Kyoto; shogun constructs castle near emperor’s emperor to spy on imperial court</p>
Economic and Demographic Changes	
<p>Pushing knights out into the periphery reduces disruptions of peasant farming due to battles within core regions of Europe</p> <p>Manorial estates – secular and abbeys – introduce crop rotations</p> <p>Forests cut down, impinging on common rights of villagers over access to wood</p>	<p>Removal of <i>samurai</i> from countryside reduces rural conflicts between villages</p> <p>Land reclamation on-going, new rice fields (<i>shinden</i>) established throughout Japan; river embankments shored up, irrigation ditches expanded throughout valleys</p> <p>Forests cut down leading to silting of rivers, limits to growth on a infrastructure leaning heavily on wood for construction of homes and city structures</p>
<p>Population growth sustained throughout period both in core and periphery of Western Europe</p>	<p>Rapid population growth (1% per annum) from approximately 1600 to 1720; followed by population stagnation at the national level; negative growth in North East due to extensive reliance on infanticide; positive population growth in southeast</p>
<p>Urban centers flourish in Italy, urban networks grow throughout, many urban charters</p>	<p>Edo and Osaka flourish</p>

Footnotes

- 1 This section draws heavily on the Appendices in Mosk (2018).
- 2 The discussion of the Muslim conquests and the ensuing account of draws heavily on al-Hassani (2010), Findlay and O'Rourke (2007), Morgan (2007) and Starr (2013).
- 3 Lucca Pacioli, the inventor of double-entry accounting that revolutionized European merchant house practice, was trained in the tradition established by Fibonacci. See Gleeson-White (2011).
- 4 For my account of the three faces of the Medieval Era I draw upon Bautier (1971), Bennett and Hollister (2006), Fried (2013), Hay (1965), Latouche (1961), and Le Goff (2012).
- 5 For a graphic illustration of the "thug"-like behavior of knights the pictures displayed in Pinker (2011: 65-66). Pictures showing knights driving knives into the skulls of defenseless peasants should sober up even the most ardent fan of "gentle, refined, cultivated" chivalry.
- 6 My principal source for Medieval European battles and sieges is the encyclopedia edited by Rogers (2010). In addition I consulted Hindley (2003) on the Crusades, and the encyclopedia of warfare compiled by Dupuy and Dupuy (1993). The volume by O'Connell (1989)

- provides some useful observations on changes in military technology. The volume by Corvisier (1979) is an excellent source for the social aspects of military organization.
- 7 Teschke (2003) argues dynastic politics pursued through marriage alliances continued to dominate European politics and diplomacy through the seventeenth century, even after the Peace of Westphalia that ended the Thirty Years War between 1618 and 1648.
- 8 On patrician rule over European cities see the classic account given by Weber (1958).
- 9 The Third Crusade (1187-1192) illustrates how tenuous was the papal immunity guaranteeing to European monarchs and feudal lords protection for their European holdings while fighting in the Levant. After Jerusalem fell to the forces led by Saladin in early October 1187, the call for a new Crusade went out. Richard the Lionhearted of England and Frederick Barbarossa the Holy Roman Emperor led forces into the Holy Land. Frederick died en route. Richard's campaigns against Saladin proved relatively fruitless. On the way home from his campaign Richard was taken prisoner by Leopold of Austria who nursed a grudge against Richard. Eventually Richard was turned over to the new Holy Roman Emperor Henry VI who proceeded to put a price on Richard's head. Henry demanded a ransom of 150,000 silver marks. Swayed by Philip of France who coveted Richard's extensive holdings in France, Henry held up negotiations as long as he could. This illustrates in a nutshell the logic of military diversion: go abroad to fight, leave undefended your territory at home. Papal assertions to the contrary, there were obvious limits on the capacity of the pontiff to put a lid on infighting between rival feudal lords.
- 10 For a useful account of the wildly divergent views circulating among the elites of Renaissance Italy – specifically ultra-puritanical opponent of Church corruption Savonarola; cynical

proponent of republicanism Machiavelli; and advocate for humanist inspired diplomacy
Castiglione – see Roeder (1953).

- 11 The siege of Bruges – also known as the Battle of the Golden Spurs – illustrates how the ‘infantry revolution’ of the fourteenth century dovetailed with the growing importance of urban militias populated by well- trained commoners, frequently organized into guild regiments, in the field of Medieval warfare. The battle waged in 1302 took place in Flanders at Courtrai, It was the centerpiece of the Franco-Flemish war that raged between 1297 and 1305, pitting Flemish military resistance to French dominance over Flanders against the forces of Philip IV “the Fair”. After Flemish went on a rampage brutally attacking French persons residing in Bruges – basically carrying out a massacre that in modern day terms might be disparaged as ethnic cleansing – French troops led by Count Robert II of Artois approached the city with approximately 3,000 mounted knights plus squires and 5,500 infantry. According to the standard calculations of commanders of feudal army a mounted knight fitted out in full armor equaled approximately ten foot soldiers. The Battle of the Golden Spurs overturned this arithmetic altogether. The militia of Bruges consisted almost solely of infantry, dressed in chainmail hauberk, wielding spears, pikes, bows, crossbows, and the fearsome *goedendag* (a metal club tipped with a spear designed to penetrate between the plates of heavy armor. Channeling the battlefield into rivers and ditches the militia of Bruges (joined by militia from most of the other towns of Flanders with the exception of forces representing Ghent) rendered the cavalry charge of the French virtually useless. Knocking the struggling knights from their steeds, the Flemish killed the fallen nobles by thrusting their *goedendag* between the steel plates of armor. The French were completely routed. Many French nobles were slaughtered including Count Robert II of Artois. Once military planners came to realize the potency of a highly disciplined infantry – the unit costs of outfitting a foot soldier probably being a tenth of the unit costs of outfitting a knight in full battle array –

the heyday of the mounted knight came to an end. As guns and cannons became increasingly common on battlefields of Europe the death knell of chivalry was sounded.

- 12 Magocsi (2002) provides an invaluable account of the political and economic development of the periphery zone of Europe.
- 13 See Diamond (2005) for an account of the collapse of the Vinland settlement.
- 14 For a discussion of the dynamics of Tokugawa population growth see Drixler (2013), Hayami (2015), and Mosk (2001).

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