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GOLD, BLOOD, AND POWER: FINANCE AND WAR THROUGH THE AGES

James Lacey

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FOREWORD

Cicero once pointed out that the crucial sinew of war is, and always has been, "endless streams of money." Wars throughout history have been waged for only as long as the money has held out. If silver and gold continued to pour forth from a state's treasury, then a ruler or government could tap a never-ending supply of soldiers and war materiel. However, soon after the supply of coin was expended, armies began to vanish and sources of supply would dry up. Only when new methods of providing long-term finances started to evolve, first in the Netherlands and soon thereafter through the Bank of England, do we begin to witness progress toward a financial revolution that was still evolving at the start of the 20th century. By World War II, however, this process was complete. For the first time in recorded history, a major war was fought where the manpower and productive capacity of states was exhausted before any major state's finances gave out.

This monograph provides a survey of the crucial interplay between finance, national power, and the capacity to wage war, starting in the ancient era and progressing through to the present. As such, it demonstrates the crucial importance of economic power, particularly in the realm of finance, as the basic underpinning of all strategic considerations and plans.

Embedded within this survey, Dr. Lacey provides in-depth case studies that present new debate-sparking insights, such as: how a military Lilliputian such as Greece defeated the might of the Persian Empire; how Rome's decision to defeat the Huns proved to be an epic strategic blunder; how Britain's preparations for hugely increased social spending helped

win World War I; and, finally, how the Federal Reserve's inexhaustible money spigot turned the tide of World War II.

This monograph concludes with some thoughts about the potential problems the United States will face in financing military power in the first-half of the 21st century, as well as the prospects for funding a major increase in military spending in the event of a future military crisis. The Strategic Studies Institute hopes this historical survey will draw attention to an aspect of military power that is too often neglected.

DOUGLAS C. LOVELACE, JR.
Director
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JAMES LACEY is the Professor of Strategy at the Marine Corps War College. Prior to that, he was a widely published senior analyst at the Institute for Defense Analyses in Washington, DC. He also teaches graduate level courses in Military History and Global Issues at Johns Hopkins and Georgetown Universities. Mr. Lacey has written extensively for many other magazines, and his opinion columns have been published in *National Review*, *The Weekly Standard*, the *New York Post*, the *New York Sun*, *Foreign Affairs*, and many other publications. He is also regularly published in *Military History Magazine*, *Military History Quarterly*, and the *Journal of Military History*. He is the author of *Moment of Battle* (Bantam), *The First Clash* (Bantam), *Takedown: The 3rd Infantry Division's 21-Day Assault on Baghdad* (Naval Institute Press), *Pershing* (Palgrave-Macmillan), *The Making of Peace* (Cambridge University Press), *The Making of Grand Strategy* (Cambridge University Press), and *Keep from All Thoughtful Men* (USNI, 2010). Mr. Lacey also has a trilogy of works on global terrorism published in 2008 (Naval Institute Press). He is currently working on a book about the relationship between President Franklin Roosevelt, the Joint Chiefs of Staff, and the War Cabinet during World War II.

SUMMARY

This monograph presents a survey of the crucial link between state (national) power and finance from the ancient era through the present day. Cicero once said that the true sinew of war was "endless streams of money." His observation remains as accurate today as it was when Rome first began constructing its Empire.

Unfortunately, too many historical works leave this crucial underpinning link out of their narratives. Even those that do economic and financial concerns typically miss the fact that the size of a state's economy often has little to do with its capacity to wield influence on the global stage. Much more crucial in this regard is the possession of an administrative system capable of efficiently mobilizing a state's resources. It was such an administrative apparatus that allowed Britain to punch far above its weight in the international arena for centuries. As a survey, this work is far from comprehensive, but the author hopes it will provide a stepping stone for a much-needed in-depth examination of the topic.

GOLD, BLOOD, AND POWER: FINANCE AND WAR THROUGH THE AGES

> Victory has always gone to the side with the more flourishing production base.
>
> Paul Kennedy,
> *The Rise and Fall of Great Powers*[1]

Professor Kennedy is wrong. Victory has not always gone to the side with the greatest materiel resources, although that often remains the best wager. Rather, it has gone to the side best able to mobilize its resources for the decisive effort of war. Persian production, for example, far exceeded anything available to Alexander, yet Persia's mighty 200-year-old empire collapsed in an historical twinkle under the successive hammer blows of the formidable Macedonian army. Likewise, the barbarians who later brought Rome to its knees possessed almost no production base. Yet, these barbarians eventually massed sufficient force to collapse the greatest empire in history, which, for a variety of reasons, was no longer capable of mobilizing even a fraction of its latent power. In later periods, one need only look at tiny Britain, which for centuries punched far above its weight in the international arena as a result of its superior ability to mobilize its relatively meager national resources for war.

Since the start of organized warfare, the crucial sinew of war had been "endless streams of money."[2] For as long as the money held out, there was always a well-armed mercenary for hire. On the other hand, when the money was gone, the war ended as armies dissolved for lack of pay. By World War II, however, money was no longer a crucial concern of the major belligerents. In every World War II case, production

capacity and manpower were exhausted long before the wherewithal to pay for them. Money concerns only came to the fore when one nation exhausted its production base and had to purchase munitions from other nations. The best example of this was Britain's rapid depletion of its foreign reserves to purchase munitions from the United States in the early days of World War II, a looming financial disaster that was averted only by the institution of Lend Lease by President Franklin Roosevelt.

Throughout history, power has flowed not out of the barrel of a gun, as Mao famously claimed. Rather, it has derived from a nation's ability to amass sufficient funds to prosecute a war. In other words, the ability to buy Mao's guns and the ammunition that goes with them has been, and remains, the crucial element of any strategic policy.[3] As Presidential advisor James Carville famously said, "It's the economy, stupid," and in war, this particularly means the financial aspects of the economy. Despite 3,000 years of experience, historians often ignore the financial aspects of warfare. To some degree, this is understandable; after all, it was barely more than a generation ago that most battle and campaign narratives neglected the effects of logistics. Despite general awareness of the old adage, "amateurs talk tactics, while experts talk logistics," historians still largely ignored logistical concerns, except for the periodic mention of famine-induced disasters. One probable reason for this neglect is that logistical studies are boring, and recounting logistical matters invariably slows down the narrative pace of a campaign history. After all, who really wants to read about how many trains it took to move ammunition to the front in 1916 or the hay consumption rate of one of Marshal Joachim Murat's cavalry divisions?[4]

If military historians find logistics boring, they find economics and finance are positively "coma-inducing." Despite their begrudging allowance of logistical concerns into the mainstream of military history, many historians (there are exceptions) are still barring the door to the inclusion of economic matters. Two factors likely explain this neglect: economics lacks drama, and it is difficult to understand. Historians who write of armies sweeping across continents and who paint verbal pictures of brutal battlefield carnage have little desire to delve into the economics that drive the character and form of war. Furthermore, the "dismal science" of economics is not a subject military historians typically have invested much time in learning.[5] Unfortunately, this neglect will likely widen, as economics continues on its current path toward pure mathematics and model-based econometrics, while slipping further away from its original moorings within a larger topic of political economy.

ANCIENT WORLD

Herodotus, the father of history, or if you believe Plutarch, "the father of lies," lays out for us that history of the start of the great wars without ever really explaining how relatively insignificant Athens mustered sufficient military force to defeat the fully mobilized might of the Persian Empire. As such, a brief case study examining the relative wherewithal of the two contenders might illuminate why a thorough comprehension of the economic, and particularly financial, context of any conflict is crucial if one is to understand its outcome.

Persia vs. Athens.

*The Limits of Power***.**

In the 5th century BC, Persia was the sole superpower.[6] Its land mass covered 7.5 million square miles, reaching from the Aegean Sea to India, and its population was probably in excess of 40 million. Measured against that standard, Athens was feeble.[7] All of Attica amounted to less than 4,000 square miles, and in 490 BC possessed probably 150,000 citizens.[8] It is no wonder that many historians considered Athens' stand at Marathon a forlorn hope, and its victory akin to a miracle. What is therefore no less remarkable is that Athens, with a full understanding of Persian wealth and power, still decided to stand against the titan. Or did Athens know something that has mostly been overlooked by later historians?

The first thing to understand about ancient empires is that the latent power that appears available from just a cursory look at the numbers is illusionary. Not discounting the organizational achievements of Darius, it is fair to say that the Roman Empire possessed a superior organization. Despite this, Rome, even at the height of its power, normally maintained less than 2 percent of the empire's total population under arms, and found that it could only sustain 3 percent mobilization for a limited period of time.[9] It is safe to assume that Persia, despite a slightly inferior administrative organization, could maintain an approximately equal percentage of it population under arms.[10] It should also be remembered that throughout most of history, the bulk of the population survived at the barest subsistence level, and even the slightest change in conditions could bring on famine. In

these societies, every hand was needed in the fields, and only a small proportion would be available for a professional military.[11]

Two percent of the population of Persia equates to 800,000 men. But remember, this is a high estimate of Persian capabilities, and there is reason to believe that the Persians failed to approach these levels.[12] In this regard, another comparison with Rome may be beneficial. In the Roman Empire, approximately half of state revenues went to pay the army.[13] However, after Darius' early years of high expenditures, a large proportion of Persian revenues were simply hoarded. Moreover, Rome paid a high price in political stability, as such large forces concentrated at various points throughout the empire, which provided a constant temptation for their commanders to use them in a bid for ultimate power. Darius, who had come to power by way of a military coup, knew better than anyone the danger of maintaining large standing forces without an external enemy to hold their attention. Therefore, the Persian permanent military establishment was always small and counted on local levies in the event of war. In support of this claim, one only has to look at how long it took to mobilize sufficient forces to crush the relatively minor Ionian Revolt—5 years.

This is not the end of it, though. Persia's frontiers were not secure. Thrace remained restive, and beyond the Danube, the Scythians were still awaiting any opportunity to damage the empire, while their kin on Persia's northeastern borders were always ready to sweep down on the Empire's fertile plains. Keeping these enemies in check required well-garrisoned fortresses, and one suspects a mobile field force sufficiently large to immediately counter any major incursion. Moreover, all the other frontiers of the

empire also required permanently stationed troops. Further, the Ionian Revolt was a reminder, if any was needed, that there were a number of subject people within the polyglot empire who were looking for any sign of weakness to make their own bid for independence. To forestall this, Darius had to keep a large number of royal garrisons in large cities and at key geographical locations.

Finally, one must never lose sight of the cost and logistical difficulties of sending an expeditionary army far from the center of power. Again, the Roman example is instructive. When Caesar began the conquest of Gaul, he had only four legions, with probably an equal number of auxiliaries, for a total force of about 35,000 men. It is doubtful that he ever had over 50,000 legionaries during the entire war. As another example, when Crassus, set out to conquer the entire Parthian Empire, he led out only 45,000 legionnaires. Even the more resilient and aggressive early Republic had great difficulty sending substantial forces far from Italy. Although Republican Rome could maintain over 100,000 troops facing Hannibal in Italy for 16 years, it strained every resource to maintain a mere 30,000 in nearby Africa for the decisive Zama campaign. In summary, if the most efficient and warlike empire of the ancient world could sustain only 50,000 troops on distant campaigns, can we reasonably expect that the Persians could do much better? That they did manage to double this for Xerxes' 480 BC campaign reflects that the Persians spent almost half a decade preparing, and that they expected this to be a lightning campaign, which would allow for the demobilization of most of the army in a very short time.[14] More than any other factor, the inability of Persia to maintain a large expeditionary force for more than a single campaign-

ing season accounts for Xerxes' departure with probably half the army, before they had suffered any major setback on land.

When judging how much power Darius could throw against Greece, one must note the fact that the Persian Empire had just finished crushing the Ionians, at a cost that must be judged as catastrophic. Victory had taken over half a decade, and in the process Persia had lost two fleets, and probably had one extensively damaged at the Battle of Lade. Furthermore, the Carians had annihilated one field army, and thousands more Persians must have fallen in other operations. On top of all this, a substantial part of the empire—previously the richest portion—was left in ruins. As this was the region (Ionia) from which the Persians expected to draw the bulk of the support required for an invasion of Greece, its economic devastation was a severe drag on preparations.

On the other side of the equation, the Persians who were preparing for the Marathon expedition were probably able to forgo calling up new and untried levies. The veterans of the Ionian campaigns (probably with a number of defeated Ionians among them) and Mardonius' earlier campaign in Thrace were still available, and Athens offered them rich booty. As very few of these men would have been survivors of the Carian disaster, this army would have never tasted defeat—an inestimable confidence booster. Inured to hard conditions and familiar with combat, these men would make formidable foes. They did, however, suffer from one serious weakness. They had never faced an army of veteran hoplites in a set-piece battle. That would make all the difference.

Given all of the aforementioned, and extrapolating from the best available estimates of the size of

Persian armies during the campaigns in Thrace and Ionia, a supreme Persian effort could have fielded at best 40,000 troops, and possibly as many sailors for a campaign in 490 BC.[15] It is almost inconceivable that the Athenians—living in the period, having experienced personally the difficulties of campaigning, and having a number of citizens (not the least of whom was Miltiades) with substantial experience with the Persian army—were not aware of these factors and limitations. Still, 40,000 troops and a similar number of sailors was a substantial force. In fact, it was several times larger than the entire hoplite class of Attica. What advantages did Athens have that convinced its citizens that making a stand would be more than a forlorn-hope?

The most important factor on the credit line was that Athens was going to fight this war on its home court and would therefore be able to mobilize a far higher percentage of its population than Persia. If we accept a total population of Attica of 150,000, that would mean there were about 30,000-35,000 men of combat age.[16] Of these, the author estimates that Athens could afford to equip 14,000 of them as hoplites. As there were only 9,000 Athenian hoplites at Marathon, this total requires a defense. First, it is unlikely that the hoplites at Marathon represented all that was available to Athens, although it may have consisted of the best of them. For one thing, there were 4,000 colonists at Chalcis, whom Herodotus tells us were ordered to go to the aid of Eretria when the Persians attacked that city.[17] They did not arrive in time, and that is the last Herodotus mentions of them. This represents several thousand hoplites who would not have mustered with any of the 10 tribal regiments at Marathon. In all probability, they were left on the northern

frontier to keep watch on Thebes and to harass any Persian move or cavalry raid in that direction. Moreover, the road from Marathon, guarded by the bulk of the Athenian army, was indeed the easiest route to Athens, but not the only one. Other roads and even paths (the Persians proved at Thermopylae that access to a goat path was enough for them to inflict a nasty surprise on an enemy) would have to be strongly garrisoned. The same was true of key positions along the coast, in order to prevent the Persians from making an amphibious end-run around the encamped Athenian army.

However, could Athens afford 14,000 hoplites? The answer is probably yes. During this time, a hoplite was expected to supply his armor and weapons at his own expense. This cost was not insignificant, and was a strong limiting factor in the size of the armies of many Greek cities. However, there were a number of factors that would have made it easier for many of Athens' citizens to afford the entire hoplite panoply. Foremost among these were the land reforms of Pisistratus. By breaking up numerous large noble estates, he had given thousands of the poor and landless enough property for them to produce a surplus of food for sale in the city. This surplus was sufficient to enable thousands of yeoman farmers to purchase armor and join the privileged ranks of hoplites.[18] As Attica transitioned its primary cash crop from grain to olives, the surplus created by trading would have been even greater. Revenues from olive-based trade would also have paid for a number of city and costal dwellers to enter the hoplite class. Furthermore, although the richest veins in the Laurion silver mines were discovered a few years later, the mine was still producing enough silver to allow the government to subsidize some

hoplites, if necessary. I have discovered no evidence that the state was giving or loaning cash to purchase armor. There is substantial evidence of numerous loans for farming and other business activities, which amounts to the same thing. It would be odd indeed if a city that had been almost constantly at war for the 2 previous decades (against other Greek city-states) did not do all within its power to increase the size of its main fighting force.

These constant wars had led to at least three battles that Athens won decisively. Although it is hard to guess at total numbers of enemy losses, we know that 700 Thebans were captured in one battle, and it might be assumed that twice that number was killed. Also, the army of Chalcis was beaten severely enough for that city to withdraw immediately, and as it was no longer rated a threat by Athens, it must have demobilized most of its military establishment, i.e., turned over its armor and weapons to Athens. Megara, a city about the same size as Chalcis, was able to field 3,000 hoplites in 480 BC, so that is probably a fair estimate of the size of Chalcis' army. Finally, the Athenians killed 1,000 Argive hoplites and an unknown number of Aeginetans in battle the year before Marathon. A conservative guess is that, over the years, Athens easily collected enough armor from its enemies to outfit about 8,000 hoplites. From this, it would seem that the normally expensive hoplite panoply was probably available in Athens at drastically reduced prices.[19]

However, this is not the end of Athens' mobilization. As the Battle of Marathon was fought after the harvest, the rest of the male population of Attica was also available for military duty. These were mostly the *thetes* class of poorer citizens, who were used as light troops.[20] These light troops were not mentioned

by Herodotus as being present at Marathon, but it is unlikely they would have been left behind, particularly as we know an even lower class—slaves—did fight in the battle. Like the contemporary accounts of medieval battles, which habitually left out the contributions of the peasants and foot-soldiers in favor of the daring deeds of the heavy cavalry (knights), Herodotus probably did not believe the participation of these citizens of any account. Although slaves were normally forbidden from participation in combat, they were present at every major battle, and in emergencies, they could be freed and permitted to fight in the ranks.[21] Under any circumstances, slaves would have been present to prepare food, rescue wounded men, serve as attendants, and, most importantly, act as baggage carriers and caretakers for the hoplites' armor.[22] However, if Athens ever faced an emergency situation, Marathon was it. It is likely that in this crisis, Athens would have released at least a proportion of its slaves for combat duties, and evidence for this does exist. Pausanias states that, during his travels, he was shown the common grave of the Plataeans and "servants" killed at Marathon.[23] There is no way to know the number of slaves and recently freedmen who traveled with the army, but several thousand would seem a reasonable estimate.

So, in practical terms, Athens could field a fighting force at least numerically equal to what the Persians were capable of throwing at it in 491 BC. More importantly, the core of the Athenian army was made up of 9,000 heavily armored hoplites.

The Athenian victory was indeed stunning. However, any reasonable assessment makes it clear that as long as Athens stood on the strategic defensive, the deck was not as stacked against it as is typically assumed.

The Financial Comparison.

According to Herodotus, Darius received 14,560 talents from the empire on an annual basis, although this was not likely to be his only source of revenue (for instance, neither tribute from nearby nations, nor imperial customs duties are included). Translating ancient currency amounts into something understandable to a modern reader is always difficult, but some effort must be made to present an impression of the awesome wealth at the empire's disposal in the event of war. During Darius' reign a single talent could pay the wages for a trireme's 200-man crew for 2 months, or the wages of three laborers for 20 years. As trained soldiers tended to receive a higher rate of pay than day laborers, a talent would pay the salary for a single soldier for 20 years.[24] In other words, if the empire had no other expenses to pay, which was far from the case, it could pay a full-time professional force of over a quarter of a million men out of annual revenues. To put this in perspective, Athens began the Peloponnesian War with 6,500 silver talents in its treasury, and its annual revenue was about 1,000 talents (400 internal and 600 from tribute from other members of the empire).[25] So, even at the height of its power, Athens' annual revenues were approximately 1/15th of Persia's. It needs to be remembered that Athens did not have an empire at the time of the first Persian invasion, nor had it yet exploited the richest veins of the Laurion silver mines. An estimate of annual Athenian revenues in the years preceding Marathon should be placed under 250 talents, with only a percentage of that available for war. This was approximately a 50th of Persia's revenues. (See Figure 1.)

First Province 400 Talents Ionians, Magnesians, Aeolians, Carians, Lycians, Milyans, Pamphylians	**Second Province 500 Talents** Mysians, Lydians, Lasonians Kabalians, Hytennai
Third Province 360 Talents Phrygians, Thracians, Paphlagonians, Cappadocians, Mariandynians	**Fourth Province 500 Talents** Cilicians
Fifth Province 350 Talents Posideion, Phoencia, Syria, Cyprus	**Sixth Province 700 Talents** Egypt, Libya, Cyrene, Barke
Seventh Province 170 Talents Sattagydians, Gandarians, Dadikai	**Eighth Province 300 Talents** Susa, Kissians
Ninth Province 1,000 Talents Babylonia, Assyria	**Tenth Province 450 Talents** Ecbatana, Media, Parikanians, Orthokorybantians
Eleventh Province 200 Talents Caspians, Pausikai, Pantimathnoi, Dareitai	**Twelfth Province 360 Talents** Baktrians, Aigloi
Thirteenth Province 400 Talents Paktyike, Armenia	**Fourteenth Province 600 Talents** Sagartians, Sarangians, Thamanaians, Outians, Mykians
Fifteenth Province 250 Talents Sacae, Sogdiana	**Sixteenth Province 300 Talents** Parthians, Chorasmians, Areians
Seventeenth Province 400 Talents Parikanians, Ethiopians of Asia	**Eighteenth Province 200 Talents** Matienians, Saspeires, Alarodians

Figure 1. Tax Rates on Persian Provinces.

Within Persia, this massive transfer of wealth to the center did not represent the full tax burden on the peoples of the empire. As none of these tax receipts were typically transferred back to the provinces, the local satraps collected additional revenues to pay for their own upkeep, infrastructure projects, and defense. This likely amounted to a sizeable sum, as many of the satrapies had hostile neighbors on their borders and were expected to see to their own defense against all but the strongest attacks. However, the tax burden did not end there. In addition to the satraps, there were a large number of sub-satraps, regional governors, and other administrators who collected taxes to pay for their own maintenance, which was often extravagant. For instance, the sub-satrap for Judah during this time

fed 150 of his officers from his own table every day.[26] But even this was not the end. All levels of the Persian government also collected taxes in kind, and tens of thousands of sheep, mules, and horses and tons of foodstuffs, incense, ebony, and ivory were taken by the tax collectors every year.

All of this constituted an enormous burden on the empire's economy. It would not have been so bad if the government had spent the money or found some other way to keep these funds in circulation. However, it would be 2,000 years before Britain discovered that it was economically better to keep its specie in circulation to grow the economy, while still remaining available through taxes and loans in an emergency. Prior to this, every good ruler stored as much bullion as possible in his treasury as insurance in the event of war or bad times. The Persians proved to be second to none at the art of hoarding. This was plainly demonstrated after Alexander brought the empire crashing down. Reportedly, after the Macedonians captured the Persian royal treasuries, Alexander seized almost 200,000 talents in gold and silver. This must have seemed a fantastic sum for an adventurer, who had begun his march of conquest with only 60 talents in his own treasury and owing 500 talents to creditors. It should be noted that this massive sum of Persian treasure was what remained after Darius III had already drawn down vast sums to pay for the war against Alexander, and after he made off with 8,000 talents when he fled Alexander's approach.

Over time, the propensity to neglect the role of finance in warfare has not only hampered our understanding of history's many conflicts, it has also often led to considerable misrepresentations of history. For example, the greatest historian of the ancient world,

Thucydides, in his history of the Peloponnesian War, made only one mention of the Athenian silver mines that funded much of the Athenian war effort. That mention came when he quoted a speech by the Athenian turncoat, Alcibiades, urging the Spartans to fortify Decclea:

> Whatever property there is in the country will become yours, either by capture and surrender, and the Athenians will at once be deprived of the revenues of their silver mines at Laurium.[27]

Following Thucydides' lead, for two millennia, historians have identified Athens' failed Syracuse Expedition as the turning point in the Peloponnesian War. In truth, Athens made good most of the losses from that campaign in a remarkably short period and continued the war for another decade. What wrecked Athenian power was the assault on the economic basis of its military power: losing the silver revenues from Laurium, isolation from the revenues of the Delian League, and, finally, a blockade imposed by a Spartan fleet (financed by Persia) on the routes between Athens and its Black Sea food sources. One would have to read Thucydides very closely, indeed, to see that Athens was defeated through economic warfare and exhaustion, rather than on the field of battle.

Likewise, the discovery of two major silver mines in Macedonian-controlled territory is an often-overlooked factor in Phillip's rise to dominance over Greece. Just as neglected is the role this new Macedonian wealth played in Alexander's dismantling of the powerful Persian Empire. One must wonder how successful Alexander would have been if he could not purchase the loyalty of his soldiers by paying them

two or three times the going wage for the most skilled masons.[28] Once Alexander invaded Persia, the cost of paying and maintaining this force was approximately 20 talents (about 1,000 pounds of silver) a day, a sum, despite his silver mines, that was far beyond Alexander's means.[29] Fortunately for his prospects, each conquered Persian city yielded a vast horde of bullion, including over 50,000 talents in Susa alone.[30] If the Persian king, Darius, had spent this money on defense, rather than hoarding it, Alexander's invasion would likely have been crushed before it got far out of the starting gate.[31] After Alexander's death, this vast treasure financed decades of war by the Diadochi, paying for armies on a scale rarely seen in the ancient world.

In the Roman era, military historians marvel at the brilliant maneuvers and stratagems of Hannibal and his nemesis, Scipio. However, much more rarely mentioned are the silver mines Hannibal controlled in Spain, which allowed him to keep his army in the field for almost 2 decades without any additional financial support from Carthage. This factor also helps explain Scipio's strategy for defeating Carthage by first invading Spain, rather than trying to best Hannibal's army in Italy. By cutting Hannibal off from his inexhaustible source of finance and simultaneously securing the silver mines for Rome, Scipio ensured Hannibal's eventual defeat as surely as if he had vanquished him on the field of battle.[32]

In the end, the Punic Wars proved a financial bonanza for Rome. In the first two Punic Wars, however, victory almost eluded Rome due to financial collapse. To turn the tide of the First Punic War, Rome required a new fleet capable of wresting control of the seas around Sicily from Carthage. But after 20 years of war, the state was bankrupt. Salvation came in what

Polybius calls their "patriotic and generous spirit," Rome's wealthiest citizens came forward with enough donations to build 200 *quinqueremes*, which were crucial to winning the decisive victory at the Battle of Aegates.[33] Rarely mentioned, however, is the fact that these citizens were promised repayment with interest after Rome's ultimate victory, making this the first recorded instance of a debt-financed war.

In the Second Punic War, after losing three consular armies at the Battles of Lake Trasimene and Cannae, Rome was in such dire financial straits that it nearly sued for peace. Just to feed the fleet, Rome was forced to borrow the price of 6 months of corn from Hiero of Sicily—the first record of international borrowing to finance a war.[34] In fact, the loss of so many wealthy citizens in these battles so decimated the tax rolls that Rome could not, for a time, finance the rebuilding of its army or send a planned expedition to Spain. The Senate considered raising the tax rate, but voted the measure down lest it financially ruin Rome's remaining taxpayers.[35] In the end, a Roman praetor was sent to the markets to ask the tradesmen to supply the army on credit, "on condition that as soon as there was money in the treasury, they should be the first to be paid."[36] As the financial crisis continued into the following year, Rome was forced to seize a trust fund put aside for widows and orphans, further defer contractor payments, and withhold the pay of cavalrymen (typically wealthier citizens) and centurions. Only Scipio's victories in Spain, which filled Roman coffers with plunder and the rich ores of Spanish silver mines, alleviated Rome's financial straits and allowed it to prosecute the war to victory.

Victory in the Punic Wars brought Rome a financial windfall that financed its continued military conquests, which soon began paying for themselves. In just the 50 years after the defeat of Carthage, Roman currency in circulation increased by a factor of 10, as seizures and tribute from the newly conquered provinces poured into its coffers. In addition to the 14,000 talents demanded from Carthage in reparations, Sidon was forced to pay 15,000 talents, while 12,000 talents were extorted from Greece. Thousands of more talents were seized from former Carthaginian possessions in Spain, while the output of Spanish mines was doubled by the liberal application of slave labor.[37] By such methods, the pattern of Rome's expansionary wars paying for themselves was established, at least until Caesar's costly conquest of Gaul.

For much the same reason that Rome and Scipio decided to fight Carthage in Spain, Caesar, in his war against Pompey a century-and-a-half later, invaded Spain before moving east to confront Pompey's gathering army. After exhausting the 15,000 gold bars and 30,000 silver bars that he had seized from the Roman treasury at the outset of the war, Caesar found himself in dire financial straits. His army was a capable and veteran force, but one that would melt away in an instant if it was not paid. He dearly needed the silver from Spain's mines to carry on the war. Historians, focusing on the military dynamics of the situation, have often wondered what was behind Caesar's propaganda statement, "I go to meet an army without a leader, and I shall return to meet a leader without an army."[38] The reality is that Caesar chose his main theater of operations not because Pompey had stationed seven legions there, but because Spain was where the mines he needed to finance an extended conflict were located.

Lost in most analyses of the conflict is a fact Caesar knew well: the base of Pompey's power was Spain's wealth. Knowing it would take time to mobilize the wealth of the eastern portions of Rome's empire, Pompey had placed seven legions in Spain to protect his source of funds and recruits. Caesar knew that without access to Spain's mines, Pompey would inevitably find it difficult to finance his army.[39] As it turned out, through Herculean efforts, Pompey extorted sufficient money to raise an Eastern army, but it was a near-run thing, and his raids on temples throughout Asia Minor and confiscation of their gold and silver did much to undermine his local support.[40]

For the several hundred years that the Roman Empire existed, finance remained inextricably linked to Rome's military power. In fact, the word "soldier" is derived from the name of the gold coin issued by the Emperor Constantine—the *solidus*.[41] The argument has been made with considerable justification that the Western Empire foundered when its financial system broke down and Rome could no longer gather the specie to pay the legions.[42] A perfect example of this is the Roman crisis of the 3rd century. By almost any measure, the situation appeared as bad as it did 2 centuries later when the Empire finally collapsed. The key difference was that in the 3rd century crisis, Rome maintained its hold on the wealthiest tax-generating core of the Empire, and used this wealth to first stabilize the situation and then reverse it.

In the 5th century, however, Rome made a terrible strategic mistake. By concentrating its military force against the Huns, who were ravaging less crucial (from a financial point of view) areas of the Empire (Gaul), Rome allowed a rather insignificant number of Vandals to rampage across North Africa. When the

Vandals captured Carthage and entrenched themselves throughout the province, they effectively broke the tax spine that maintained the military might of the Empire. Unable to raise sufficient funds elsewhere to sustain its legions, Rome's final collapse was merely a matter of time.

The reasons for the collapse of the Western Roman Empire to barbarians that the Republic or early Empire would have easily vanquished has puzzled historians for over 1,500 years. As such, it is worth examining in more detail the underlying financial constraints that I believe provides much of the explanation.

The Fall of Rome.

*Breaking the Tax Spine***.**

At the center, there was Rome, which maintained itself through taxes drawn from the wealth and productive capacity of the rest of the empire.[43] As Keith Hopkins has points out, the Roman Empire had three distinct segments:[44]

1. The outer ring of the frontier provinces in which the defensive armies were stationed;
2. An inner ring of rich, tax exporting provinces (Gaul, Spain, Egypt, North Africa, Asia Minor, and Syria); and,
3. The center, Rome, later joined by Constantinople.

The crucial element of Rome's long-term survival, therefore, rested on keeping the tax-exporting provinces secure and stable. Only by doing so, could the Roman elite maintain themselves in luxury, while still feeding approximately one-quarter million Roman

citizens free of charge. Moreover, by the time of the empire, neither Rome nor the Italian peninsula produced sufficient excess wealth to sustain itself, and neither could pay even a small fraction of the cost of a large professional army. Therefore, it fell to the provinces to fund the frontier armies, on which their safety and prosperity depended. Even at the time, Rome recognized that the frontier provinces or zones would never produce enough wealth to sustain the troops stationed there. The great Cicero, a republican who never confronted the expense of empire, was known to complain that many provinces were barely able to pay anything in their own defense.[45] Strabo, who wrote prior to Rome's invasion of Britain, did not believe it could support the cost of even one legion.[46] And yet, throughout much of the empire's existence, it continuously stationed at least four legions on the island.

As Keith Hopkins notes the process of building the empire paid for itself:

> Conquest by the Romans disrupted established patterns even in economically advanced regions: Romans plundered the stored reserves of generations, from towns, temples and from rich individuals treasure chests. They siphoned off skilled and unskilled labor as slaves; they gave loans to oppressed landowners and then distrained upon their estates, when they were unable to pay extortionate rates of interest.[46a]

As the Empire ceased its previously rapid expansion, this source of funding dried up, and it had to rely on its own internal resources to support its strategic policies.[47] Anyone trying to grasp the full range of strategic options available to Rome must first comprehend the extent of this resource base. Using recent estimates,

Raymond W. Goldsmith places Roman government expenditures during the Augustan era at between 600 and 825 million sesterces.[48] This amounts to between 3 and 4 percent of the total national product of the empire. While Rome may have been able to raise a few percent more during times of crisis or civil war, such spending could not be long sustained.[49] Given the practical economic limits placed on Roman expenditures how much of a military force could the empire bear? Through the first 3 centuries of the empire, Rome, on average, spent approximately 450 million (perhaps as high as 500 million) sesterces annually on the maintenance of its military. This represents about half of total imperial expenditures during the early empire.[50] For this, they got a military establishment of 150,000 legionaries, 150,000 auxiliaries, a Praetorian Guard, transport, and a navy.[51] Interestingly, the amount Rome spent on its military is only a fraction of the personal revenues and expenditures of the Roman elite, which was several times that of the empire's treasury. This disparity likely increased in the later empire, as private fortunes grew even as the Empire began having trouble maintaining its tax base. Rome's inability, or unwillingness, to access the accumulated wealth of its elites was a crucial handicap when the funds necessary to secure the Empire ran short. Nero may not have fiddled as Rome burned, but many of its richest citizens continued leading the high-life even as the Goths, Vandals, and Franks poured across the frontiers.

Gross Domestic Product (GDP)	Goldsmith	Hopkins	Scheidel	Lo Cascio	Maddison
Per Capita in	(AD 14)	(AD 14)	(AD 150)	(AD 150)	(AD 14)
Sesterces Wheat 1990 International Dollars	HS380 843 kilograms (kg)	HS 225 491-kg	HS 260 680-kg $620	HS 380 855-kg $940	HS 380 843-kg $570

Figure 2. Roman Per Capita GDP as Given by the Main References for this Section.[52]

Evidence clearly indicates that Roman policymakers were aware of these limits. As Elio Lo Cascio states:

> What we know of the *ratonarium*, which was published regularly by Augustus and his successors, and the *breviarium totius imperii* left by Augustus at his death, shows that state authorities kept track of the various elements of income and expenditure.[53]

The pains Augustus took to reorganize the taxation system of the Principate further attests to this knowledge. During the Empire's early years, a:

> uniform, if not universal, criteria for counting subjects and assessing their wealth were extended first of all to the *provvciae Caesaris,* the provinces under the direct control of the emperor, and later to the *provinciae populi* as well.[54]

Rome may have been what most historians call a "low tax state," and most of the evidence does seem to indicate that the Roman yoke was not particularly harsh. Still, these historians are examining Roman tax rates from a modern standpoint where collecting under 5 percent of GDP in annual taxes does indeed appear miniscule. In relation to other pre-industrial mostly

subsistence economies, however, the Romans were as good as any, and better than most, when it came to revenue collection. Only Egypt and the Persian Empire of Darius, where wealth was far more concentrated on a per capita basis, did better. In later centuries, Western European rulers did not approach Roman levels of revenue collection until the early modern era. By creating a taxation infrastructure capable of drawing substantial revenue toward the center Rome was able to compensate for a GDP per capita that was probably only half that of Western Europe in the late-medieval era.

Population Revenues		Revenues Per Head	
	(Millions)	(Tons of Silver)	(Grams of Silver)
Persia (350 BC)	17	697	41
Egypt (250 BC)	7	384	55
Rome (AD1)	50	825	17
Rome (AD 150)	50	1,050	21
Byzantium (850 BC)	10	150	15
Abbasids (AD 800)	26	1,260	48
Tang (AD 850)	50	2,145	43
France (AD 1221)	8.5	20.3	2.4
England (AD 1203)	2.5	11.5	4.6

Figure 3. Population and Tax Revenues 350 BC to AD 1200.[55]

However, as noted in the body of this report, when it comes to military power, the total amount of national wealth is secondary to a nation's ability to mobilize whatever wealth is available. For this reason, a strategist cannot examine Roman revenues in isolation. Wealth and the ability to draw on such wealth for military purposes must always be weighed against

enemy capabilities. In this regard, Rome had a distinct advantage through the first few centuries of the Empire, particularly in Western Europe. According to Angus Maddison, the barbarian region (in the early Empire) was only half as populous as the Roman Empire and had a per capita GDP of $400.[56] Such a level is just barely enough for survival and leaves little excess for a centralized authority to build the structures of a functioning state. This alone, accounts for the fragmentation of the barbarian tribes through the first two centuries of the Empire, a situation that changed as the tribes grew richer in succeeding centuries.

On Rome's eastern front, the Parthian Empire was much richer and possessed an infrastructure capable of collecting substantial funds and deploying them for military purposes. In fact, Parthia proved quite capable of defending itself against Roman incursions (Crassus' defeat at Carrhae in 53 BC and Mark Anthony's disastrous invasion in 37 BC) despite periodic setbacks, such as those inflicted by the emperors Trajan and Severus. When facing Rome, however, Parthia was almost always on the defensive. Pressed by barbarians on its own northern and eastern borders, along with continuous upheavals within the ruling dynasty, Parthia was never able to mount a formidable challenge to Roman power. This dramatically changed, however, when the Sassanid Persians overthrew the Parthian Empire in AD 224. The new Persian dynasty was highly centralized and determined to reconquer all of the lands that formally made up the great Persian Achaemenid Empire, which included the bulk of the Eastern Roman Empire. For the next several centuries, until the coming of the Arab invasions in the early-7th century, the Sassanids remained a mortal threat to the Empire.

In summary, the Roman Empire possessed vast, but not unlimited riches. Given the character of the economy, its low growth rate in the early centuries, followed by a declining economic situation from at least the Antonine Plague (AD 165-180) forward, the size of the Roman military establishment likely represented the greatest possible sustained effort the empire was capable of maintaining. As long as its enemies were fragmented and/or weak, this was sufficient to guard the frontiers and maintain internal stability. However, as Rome's economic fortunes declined and its enemies grew in wealth and strength, the Empire was hard pressed to maintain the integrity of the frontiers. Compounding this was a corrupted political order, particularly after the period of the "good emperors" that increasingly damaged the empire's internal stability and often denuded the frontier of legionary protection just when it was most needed. **Still, as long as Rome was able to protect and make use of its core central tax base, it had the wherewithal to survive, counterattack, and restore its fortunes**. Nowhere is this better displayed then by Rome's recovery from the "3rd Century Crisis." However, when the "tax spine" was broken, as it was in the 5th century, Rome and its empire were doomed.

In the 3rd century, under the relentless pressure of barbarian invasions, civil war, and natural disasters, the empire began to disintegrate. At one point, it even split into three major parts: Britain, Gaul, and Hispania broke off in AD 258 to form the Gallic Empire; 2 years later, the eastern governor created his own Palmyrene Empire out of the provinces of Syria, Palestine, and Aegyptus. However, he died soon thereafter, leaving his son, Vaballathus, a weakling who was thoroughly controlled by his mother, Zenobia, to lead the

eastern legions in a war of conquest into Syria, Egypt, and Lebanon.

As bad as this fragmentation was, the true damage to the Empire's future prospects was the economic changes that were occurring almost unnoticed against the backdrop of military crisis. As widespread unrest made safe travel for merchants impossible, the vast Roman trading network broke down. This breakdown hugely exacerbated a financial crisis that began when Rome needed to find new funds to defend the Empire, and that grew worse as various provinces were devastated or broke away. As a result, cities and large landowners began establishing autarkic economic zones. This was a profound economic change, as wide swathes of the Empire stopped exporting or importing goods. From this point on, these regions would look only to themselves for subsistence crops, as well as many manufactures. At the same time, many cities, no longer confident that legions could hold the frontier lines, began looking to their own defenses and erecting walls. These changes to the basic fabric of the empire would make themselves felt in the following century. By then, local leaders, economically independent and despairing of support from Rome, rather than fight and see their property ravaged, began finding it advisable to come to terms with invading barbarians.[57]

Ancient Roman historian Michael Grant states, "That the survival of the Empire, in the face of intolerable odds, is something of a miracle, and one of the most remarkable phenomena in human history."[58] While saving the empire was remarkable, it was not a miracle, for the Empire, even in this dark hour, still possessed formidable strength. As a result of invasions and revolts, the Empire was forced back upon

it core provinces, and here it found salvation. Despite everything that had gone wrong, the core of the Empire (Byzantium and Anatolia, Italy, Spain, and, most importantly, North Africa) remained wealthy enough for one great effort. All that was required was leadership, which, when it was most needed, was found in the emperors Gallienus, Aurelian (the self-declared restorer of the Empire), and Diocletian. In a series of lightning campaigns, these emperors reunited the Empire, restored the borders (except for Dacia, which was abandoned), and damaged the Sassanids sufficiently to negotiate a 30-year-long peace. It was only after Julian was defeated by the Sassanids almost 100 years later (AD 363), coupled with the loss of the Eastern field army to a Gothic force at Adrianople, in AD 378 that the Roman world began its final decent.

5th Century Collapse.

After the Roman defeat at Adrianople, the barbarian Goths devastated the Balkans before being induced to move west, where they sacked Rome itself in AD 410. Rome survived that shock, and the Goths eventually moved on to southwestern Gaul where they were settled. Unfortunately, Rome was given no time to restore its frontier defenses so as to properly confront the large populations of barbarians, who, pressured by the Huns to the east, began their migration into the empire. Unchecked by any Roman army, Vandals, Alans, Suevi, Franks, and many others moved across the Rhine river. Great cities—Trier, Tournai, Arras, and Rheims—were sacked as the invaders cut away large regions of the empire as permanent settlements for themselves. They met with little resistance, as those in the path of these invaders, having developed autarkic

economic systems and no longer protected by Roman arms, found accommodation preferable to resistance.

Still Rome was not beaten. For all appearances, the current crisis does not appear to have been as bad as what the Empire survived in the 3rd century. Despite some incursions, the Eastern Empire remained powerful and remarkably unscathed during this period. Moreover, the imperial army, now mostly consisting of barbarian troops, was still capable of fighting force. In fact, as late as AD 451 at the Battle of Chalons or Catalaunian Fields, a Roman field army along with Gothic allies defeated Attila's Hunnic force, precipitating the collapse of the short-live Hunnic Empire. So, although, Rome's entire strategic enterprise, at least in the West, had collapsed, the empire was not yet without resources. Even if the Eastern emperor, dealing with problems of his own, could not be prevailed on to send assistance, for a time, much of Italy remained free of barbarians. More importantly, North Africa, the jewel and breadbasket of the Empire, remained untouched. These regions, in conjunction with resources drawn from other provinces not yet ravaged (Sicily), were likely sufficient for Rome to undertake the re-conquest of what had been lost. After the defeat of the Huns, the remaining barbarian tribes averaged between 10,000 and 30,000 warriors. Moreover, they were fragmented and incapable of combined action. In short, none of these tribes was a match for a well-trained and well-led Roman field army, which, as proven at Chalons, Rome was still capable of fielding.

So why was Rome not able to repeat the feat of the 3rd century and restore, if not all, at least the bulk of the Western Empire? Among a host of reasons historians have presented, one great strategic blunder stands out. Totally fixated on the deluge of barbarians cross-

ing the Rhine and then later on the Hunnic threat, the Romans allowed an earlier invader, the Vandals, to enter Africa in AD 429. Once the Vandals had captured Carthage, in AD 439, they controlled the African grain supply that propped up the Western Empire. As Chris Wickham relates:

> The Vandals broke the Mediterranean infrastructure of the West, the source of most of the city of Rome's food. The food had largely been supplied free, in tax; the Vandals were autonomous, however, and kept the African produce for themselves—although they were prepared to sell it. The Carthage-Rome tax spine ended. The population of the city of Rome began to lessen precipitously after the mid-fifth century, in the next it dropped more than 80 percent. And a gaping hole appeared in the carefully balanced fiscal system of the western empire; the Romans faced a fiscal crisis, just when they needed to spend as much on troops as they possibly could.[59]

Wickham continues:

> Not foreseeing that Geiseric would take Carthage . . . is arguably the main strategic error of the imperial government in the 5th century: the moment when the political break-up of the imperial government became a serious possibility.[60]

The breaking of Rome's "tax spine" tore out the economic machinery of the Western Empire.[61] Without economic resources, not even the most brilliant strategic conception could be enacted. After 500 years of adhering to a simple strategic formulation, Rome, in the mid-5th century, had forgotten its cardinal tenet—defend, at all cost, the rich economic core. Once this was lost, so was the Western Roman Empire.

DARK AGES

The end of the Western Roman Empire accelerated an economic decline that had become evident more than a century before.[62] By the middle of the 5th century, coins were no longer used as a medium of exchange in Britain; by the middle of the 6th century, the issue of new silver and gold coins ceased throughout what had been the Western Roman Empire. It would be 200 years before coins were again minted within the region.[63] As a result, trade was nearly extinguished, and central authority in most areas collapsed. This period marks the final break between the ancient classical era and the emergence of what has become known as the Dark Ages.[64]

As the financial system broke down, coins became scarce. In the decades immediately after the fall of Rome, barbarian kings often tried to maintain the Roman tax system for their own purposes. It was a losing game, as the political fragmentation of the Empire, coupled with the disruption of trading networks, soon worked their effects on the tax system. As coins gradually disappeared, kings took ever greater amounts of their tax haul "in-kind," but this only slowed the decay, it did not stop it. For instance, by the 6th century, the Frankish Merovingian kings were taxing only their ever-dwindling numbers of Roman subjects, exempting all Franks from such payments. By the next century, taxation was so unpopular among all classes that it was viewed as an abuse of power and halted.[65] From this point, kingly (that is to say central government) revenues were based on the funds a king could raise from his own royal lands rather than through taxes drawn on the entire population or wealth of a country. For most of the period coinciding with the

Merovingian Dynasty, there were sufficient royal lands to parcel out to followers to purchase the loyalty of the army. In fact, land available for presenting to followers in return for military service lasted much longer than many would have thought possible, as the Merovingian kings were able to reclaim many lands upon a recipient's death or through assorted legal maneuvers. Sooner or later, however, the land had to give out, and during Frankia's 7th century civil wars, it finally did.

The rising "mayors of the palace"—Charles Martel and his sons, Pepin and Carloman—were quick to take advantage of the resulting Merovingian decline to push forward their claims of leadership. They too had to pay their soldiers with land, but they added a couple of new twists. First, they compelled churches and monasteries to turn over much of the land they had been accumulating for centuries.[66] Then they ceased distributing land in small plots to individual soldiers in favor of giving large estates to loyal vassals. In return, these vassals would use the revenues from their estates to equip and train a force of soldiers that had to answer the mayors' call to arms. Here, we see the primary origins of the feudal system, rooted in the Frankish king's lack of silver and gold.[67]

As Western Europe began its emergence from the Dark Ages, a new barbarian plague descended on the continent—the Vikings.[68] At first, the Vikings limited themselves to relatively minor raids, such as that at Lindisfarne in AD 793. However, starting with the AD 865 arrival of the "great host" in England, the Vikings adopted a course of conquest and settlement. Over the next few generations, successive invasions left most of England under Viking control—an area known as the *Danelaw*. By the middle of the 9th century, only Wes-

sex, under its king, Alfred the Great, still resisted the Viking onslaught. Historians rightly credit Alfred the Great with saving his kingdom of Wessex by building England's first standing army, a fortified system of *burhs* (fortified town), and even a small fleet. It remains little noted that the backbone of Wessex's resistance lay in Alfred's remaking of the kingdom's financial administration.[69] To pay for his troops, navy, and military construction, Alfred instituted a new taxation system and redoubled the Anglo-Saxon effort to mint sufficient coinage to keep Wessex on a permanent war footing.[70]

Alfred's reorganization and military operations were successful mostly due to the early attention he paid to finance, particularly restoring the integrity of the kingdom's coinage and the expansion of the mint network. Upon taking the throne, there were only two mints operating in his realm (Canterbury and London). Alfred expanded this to eight mints, each of which was placed in one of his strongest *burhs*, all purposely sited near a port so as to ease the transport of continental silver to the mints. From the outpouring of these mints, Alfred collected a fee of between 5 and 25 percent. Moreover, the creation of a moneyed economy made it easier for Alfred to collect taxes, tolls, and fines in silver, rather than "in-kind" payments (corn or wheat).[71] Without this strong financial base, Wessex could never have withstood the Viking onslaught. In fact, Alfred's most enduring legacy was the basic administrative and financial system he bequeathed his successors.

Although Alfred's successor, Edward, grimly held onto his gains, in the end, the Viking assaults proved too much for the fractured states left in the wake of Rome's collapse. Within a generation of Al-

fred's death, England was paying off the invaders in a yearly tribute known as the *Danegeld*. The sums England paid out in *Danegeld* were huge when compared to any previous post-Roman standard.[72] While often viewed as a drain on England's limited resources, the *Danegeld* was actually a strong driving force in lifting the country out of the Dark Ages.[73] As the system of taxation handed down by Alfred proved insufficient for collecting the huge sums required for the *Danegeld*, the Anglo-Saxons were forced to create a centralized administration system that drew England together as a unified state and became the basis of its military institutions. Although William the Conqueror later imposed a feudal system on top of this English administrative system, he and his Norman successors were careful not to disturb the Anglo-Saxon organizations that proved second-to-none in the systematic mobilization of funds throughout the Middle Ages. These funds, in turn, allowed England to influence international events far beyond what its resources implied as its limits for over 100 years.

THE MIDDLE AGES

Still, in the years after William's death in 1087, the demands of almost constant war nearly overwhelmed England's finances, and the silver content of its coins became so debased that the Kingdom often verged on financial collapse.[74] In one instance, after his mercenaries complained that their pay was in debased coins (silver content below the standard 92.5 percent) Henry I, rather than adopt a program of fiscal restraint, blamed his problems on dishonest minters, who were supposedly diluting the silver content of the realm's coins so they could profit from the excess. To help "encourage" them to produce coins with more intrin-

sic value, on Christmas Day 1124, he called the country's 150 mint-masters to Winchester Castle to defend themselves against charges of debasing the currency. In the end, 94 of them were found guilty and each had his right hand and one testicle removed. Given the state of medicine at the time, most of these unfortunates likely died.[75] For a short period, the quality of money improved, and Henry I's mercenaries in Normandy got back to their brutal work. However, by the end of his reign in 1135, the quality of silver coins was again at a low-point, and the mint-masters had learned not to put their names or other identifying marks on their coins.

The quality of English currency completely collapsed in the next decade's period of anarchy, as Henry's daughter, Matilda, and his nephew, Stephen, fought a civil war over the crown. Only when Henry II ascended the throne in 1154 was there a decisive move to improve the quality of English currency and to put the monarchy on a firm financial footing. Henry's reforms (reducing the number of mints from over 100 to six and placing the issue of currency under firm royal control) made the English silver penny the preferred medium of exchange throughout Europe, and inaugurated a period of 200 years of currency stability in England.[76] This stable currency was employed to fund England's extensive military adventures on the European Continent and the formation of the Angevin Empire. However, holding on to these French territories required almost constant fighting and vast expense for the crown. Under such conditions the feudal system, which required a vassal to give his lord 40 days of fighting, proved useless. In order to maintain full-time garrisons and a permanent standing army in the field, Henry II demanded cash from his lords in lieu of military service (*scuttage*). The proceeds from

this *scuttage* allowed Henry to maintain a professional standing army and marked the beginning of the end for feudalism.[77]

Although England's financial system, which others mimicked as best they could, was the most efficient seen for several hundred years, its success must be judged against the chaos of the Dark Ages. During the medieval era, no king ever approached the efficiency with which the ancients collected funds to support their empires. In the early-13th century, for example, French revenues averaged about 2.4 grams of silver per head, while English efficiency almost doubled that, at 4.6 grams per head. This explains how English kings were able to hold their own in a series of wars against a much larger and wealthier France. Still, both countries revenues fell far short of the 21 grams per head that Rome was collecting at the height of its power, and was not even in the same league as the still dangerous Arab *Caliphs,* who were soaking their richer population for 48 grams per head.

	Population Revenues	Revenues Per Head	
	(Millions)	(Tons of Silver)	(Grams of Silver)
Persia (350 BC)	17	697	41
Egypt (250 BC)	7	384	55
Rome (AD 1)	50	825	17
Rome (AD 150)	50	1,050	21
Byzantium (850 BC)	10	150	15
Abbasids (AD 800)	26	1,260	48
Tang (AD 850)	50	2,145	43
France (AD 1221)	8.5	20.3	2.4
England (AD 1203)	2.5	11.5	4.6

Figure 4. Population and Tax Revenues 350 BC to AD 1200.[78]

The inability of European rulers to grow their economies and develop crucial administrative systems explains almost all of the European way of war in the Middle Ages. Lacking large financial resources, rulers never possessed the capacity to wage war on the scale of the ancients. Moreover, without the money to maintain large standing armies, kings had little hope of unifying their feudal underlings into a cohesive state.

The greatest Western military adventure of the Middle Ages, the Crusades, clearly demonstrates how a paucity of funds can directly affect military operations. There is little doubt that just mounting the First Crusade in 1069 drained a significant portion of the West's wealth. Almost every noble who went on crusade was forced to sell his estate or pawn whatever other property he owned to cover the expense of raising a force he could take with him to the Holy Land. In fact, so much money left for the East that many mints (which were typically kept busy reminting older coins) closed. All through Western Europe, money went into retreat.[79] This was not without some benefit to Western rulers. Since the Crusades drew off significant numbers of troublesome knights and mercenaries, it is often credited with giving Europe a breathing spell from the previous era of incessant feudal wars. In truth, the general peace that descended on Europe was a natural result of much of its financial liquidity being drained off to the East. Without ready cash, Europe's remaining nobles did not have the wherewithal to wage war. Within a very short time, only kings could scrape up enough cash to pursue the continuous rounds of warfare that had previously been endemic to Western Europe. As a direct result, Europe's kings began centralizing political power, a process repeated

by some of the greater barons, who also took the opportunity to increase their domains at the expense of poorer rivals. Europe was still a long way from the creation of true nation-states, but it is here that one sees their embryonic form.

Despite this crushing expenditure, the First Crusade was only brought to a successful conclusion through the generosity of the Byzantine Empire and the seizure of Arab and Christian wealth along the Crusaders' path of conquest. Once created, however, the Crusader kingdom operated on a shoestring budget, and constantly sought donations from the impoverished West. In fact, lack of money was the key factor in the Crusaders' devastating defeat at the decisive Battle of the Horns of Hattin in 1187.[80] England's Henry II, under pressure from the Pope to assist the Crusaders, forwarded 20,000 pounds of silver to the Mid-East, which was kept in various Knights Templar and Hospitaller strongholds. Unfortunately for the Crusaders, Henry considered this silver part of his own reserves. Unwilling to part with a silver hoard he thought he may one day require for his own needs (possibly a Crusade of his own), Henry forbade anyone to spend any of his stored funds. So, at its moment of crisis, the Crusader Kingdom found itself strapped for the cash needed to buy allies and mercenaries, and unable to use the vast sums Henry had on deposit only a few miles from the King of Jerusalem's household. Although Henry relented after the battle was lost and Jerusalem had fallen, it was too late to turn the tide.

One great benefit of the Crusades was the early development of a system for financial transfers. The crusading orders of knights, particularly the Templars, not only watched over Henry's silver and pilgrims, but also offered a number of other financial services to

people traveling to the Holy Land. Foremost among these was the transfer of funds. Rather than risk losing a lifetime of savings (and borrowings) on the perilous journey to the Holy Land, a lord, knight, or pilgrim would deposit his silver at a Templar stronghold in Europe and receive a demand note in exchange. This note would be presented at a Templar castle in the Holy Land and the appropriate funds would be given to the bearer, minus a percentage the Templars charged for this service. As a result of this and other services, many economic historians credit the warlike Templars as the driving force behind the emergence of modern banking in Europe. Whatever the merits of this argument, a new breed of merchant-banker soon adopted many of the Templar financial devices, first in Italy and later throughout Western Europe. These new financial methods provided the cash that propelled a huge upswing in economic activity and at the same time made it possible to fight wars on a previously unimagined scale.[81]

It was at this point that the expense of wars between proto-states increased enormously.[82] By the start of Edward III's reign in 1312, the feudal military organization was only a memory. In its place were "contract armies" that were maintained at the king's expense.[83] As a result of accelerating financial requirements and the corresponding need to raise as much revenue as possible without disturbing internal stability more than necessary, rulers began calling on parliaments (the English name—other states used different titles for similar organizations) to approve and assist in raising funds. So began a long process that eventually led to governments formed by and through the governed.[84] Through their parliaments, rulers were able to increase taxation greatly, while limiting the chance

of revolts. But when even this failed to produce the required revenues, kings were forced to borrow.

In the century prior to this, the credit systems of European nations were barely developed and "based largely on dealings with the Jews."[85] "But in the second half of the 13th century," as W. M. Ormond states, "the Italian merchant bankers began to establish themselves in the principal economic centers of Western Europe."[86] Kings in the late-Middle Ages quickly discovered that these new Italian sources with their advanced financing methods could provide a source of previously unexploited funds, and thus they no longer had to rely on what they could raise or extort at home. Going into debt to fight a war was not unknown, but the ability to raise substantial funds from distant foreign creditors was novel. Moreover, by going into debt, they could draw on what, at least initially, must have appeared to be unlimited foreign wealth. In the year 1294 alone, one Italian banking family (the Franzesi Brothers) lent the French crown 200,000 *livres tournois,* a sum greater than the annual revenues of the realm. Bankers soon became so important that they became a military objective in their own right. For instance, France's Philip IV sent troops to imprison and seize the assets of the Riccardi of Lucca banking family so as to halt their financing of England's Edward I's military operations in France.[87] Once captured, the bankers were of no further use to Edward I, so he promptly seized all of their English assets to help pay for his wars in France and Scotland.[88]

Later in the century, the opening phases of the Hundred Year's War took financial requirements to new heights.[89] One can get an idea of the cost of the war by comparing the conflict's two great campaigns—Crecy and Agincourt. For Crecy, Edward III

mustered over 1,500 ships to transport an army that may have numbered near 25,000 men. Despite strenuous efforts to fund the largest force possible, Henry V, only 60 years after the Battle of Crecy, was able to field a navy and army only about half the size of Edward's. Much of the difference is accounted for by the huge economic dislocation caused by the Black Death. Still, a large portion of it is a result of the economic destruction caused by the war itself. These costs of war were measured not only by the devastation wrought throughout much of France (a substantial portion of which was English owned and therefore part of England's tax base), but also by the damaged credit ratings of the participants and the financial wreckage it left across Europe. At one point, Edward III was so strapped for cash that he hocked the crown jewels to the Archbishop of Trier. When it was finally redeemed from Flemish merchants several years later, Edward had paid more than 500 percent interest on the original loan.[90]

To finance the war's massive expenditures, Edward squeezed every possible source. At times he even allowed his most senior commanders to be held hostage or in prison due to bad debts.[91] As his own nation was squeezed dry, he often went hat-in-hand to his Italian bankers, who exchanged hard cash for the right to trade English wool and promises of excess returns once the loans were repaid. Although Edward put the money to good use and won a series of victories over the French, his debts eventually became too great to manage. When he eventually defaulted in 1339, he took down Italy's two largest banking concerns, the Bardi and Peruzzi families, and caused a depression that hung over Europe for more than a generation.[92] This and other lesser defaults so wrecked

English credit that pecuniary difficulties, rather than defeats in battle, became a primary cause of England's defeat in the Hundred Year's War. Within a decade of Henry V's death in 1422, England could no longer afford to pay for sufficient mercenaries to stand up to a resurgent and relatively financially sound France.[93] By the time the Hundred Years' War ended in 1453, England was near financial destitution, and a newly unified France was the European Continent's reigning military and financial power. As a final result of the war, Italian bankers substantially withdrew from international lending in general, and from loans to kings in particular.[94]

EARLY MODERN ERA

Toward the close of the medieval era, discoveries of large silver deposits in the Holy Roman Empire and the New World heralded a new epoch in warfare and ushered in the modern era. For the next couple of centuries, access to a tidal wave of bullion ensured wars would be, long, bloody, and extremely expensive. To pay for these wars, kings turned to a new breed of "merchant princes" whose financial acumen made them indispensible to ambitious rulers. One of the most dominant of these, but today almost forgotten, was the powerful Fugger family.[95] Through their control of the Holy Roman Empire's mines and other concessions, they first bought Charles V the Empire's crown and then financed his wars for over a generation. The Fuggers also played a major role in arranging finance for other rulers, including Philip II of Spain. In comparative terms, Bill Gates would have to increase his personal wealth by a thousand times to even begin approaching the relative wealth of the Fuggers at

their height. But even this vast wealth was no insurance against the vagaries of war and royal displeasure. The Fuggers were ruined when Spain could no longer afford its wars and became a serial defaulter on its loans, something it was to do with regularity for decades to come despite having the riches of the New World at its disposal. In fact, Spain's inability to match its ambitions to its admittedly vast, but not inexhaustible, riches sped its fall from the ranks of Europe's great powers.

Even at the heights of its power, Spain's precarious finances were seen as its Achilles' heel. While Sir Francis Drake's 1587 raid on the gathering Spanish fleet in Cadiz is often credited with delaying the Armada's sailing for a year, this is only half the story. While Drake's raid was undoubtedly destructive, the root cause of the delay was Philip II's inability to borrow the funds required to repair the damage. His bankers in Genoa, who had replaced the nearly bankrupted Fuggers in royal financial circles, buckled under considerable pressure from English merchants, mobilized by the devious Sir Francis Walsingham, who demanded they not lend to Philip II.[96] Because his Genoese bankers let him down, Philip's Grand Armada failed to sail as planned, and England was given a year's respite to prepare for the great trial ahead.

Throughout this period, the Spanish empire also waged an 80-year war with tiny Netherlands, a war that became as much about credit ratings as it was about intrinsic military power. The Netherlands was eventually victorious because on a per-capita basis, it could sustain a debt level multiples above what Spain could afford. The reason was clear. Lenders had learned to distrust monarchs, who would default on a whim and leave them with no recourse. In fact,

over the generations, many lenders learned that lending money to a king often led to prison or early death whenever a ruler decided such methods were more expedient than repaying loans. The Netherlands, on the other hand, was a Republic, possessed of institutions that would endure long after any of its members perished. Moreover, as many members of these governing institutions were merchants and bankers (the ones making the loans), they had a vested interest in making sure the government repaid its debts. Although lenders remained reluctant to lend to a single ruler; they showed fewer qualms about lending to a government with a ruling body such as a parliament or congress.

During the course of the 80 Years' War (1568-1648), the Dutch "came to view war as a battle not only of soldiers and guns, but also credit ratings."[97] As James Macdonald relates from one Dutch participant in the war:

> Even if the country has no money, it still has credit, and the enemy has neither funds nor credit, that I could not deny that we might wear out the enemy through this war, because this land has sufficient funds.[98]

While the Dutch made huge strides in harnessing capital for military purposes, it was left to the British to bring war finance into the modern age. Beginning with Holland's William of Orange's assumption of the crown in 1688 during the "Glorious Revolution," Britain first imported and then vastly improved on Dutch financial methods. Faced with the enormous costs of the wars against France's Louis XIV, which outstripped even the resources made available by the adoption of Dutch methods, the British were forced to

develop methods of finance never considered before, and at that period in history, likely impossible for any nation not possessing long-standing democratic institutions. This was the start of a true financial revolution which created a system of capital mobilization that not only financed Britain's wars on a previously unimaginable scale, but also ushered in the Industrial Revolution and the start of the modern era.[99]

The immediate impact of Britain's entry into a long series of wars with France was a rapid 300 percent increase in public expenditures. Government expenses that were under £2 million a year in 1688 grew to £6 million by 1702.[100] At first, Parliament attempted to finance this huge expense the old-fashioned way—increasing taxes and short-term loans. Soon, faced with financial collapse and an impending default that would have made Edward III's experience with the Bardi and Peruzzi banking families pale in comparison, Parliament began casting for ways to convert short-term into long-term debt. After some trial and error, they fixed on the establishment of the Bank of England.

Upon its creation, the Bank served a very different role than Britons today view as the Bank's *raison d'être*. For, as the Bank's original charter made plain, at inception and for many decades thereafter, its central role was to help Britain finance its wars through the creation of a "perpetual loan." In fact, one of the first directors of the Bank, Michael Godfrey, took this part of the job so seriously that he joined William of Orange at the siege of Namur in 1692. In the midst of discussions over the king's future financial needs, he was killed by a musket ball while visiting a front-line trench.[101] No other Bank Director has ever again seen it as part of his job to inspect the battlefront person-

ally to see how wisely the Bank's funds were spent.[102] In any event, from that point forward, no British government ever again defaulted or had to meet the crushing economic burden of war by raising taxes to economically destructive levels. Instead, funds were raised only in amounts required to pay the incremental cost of the loan's interest, producing a loan whose principal might never be paid off. At times, even this reduced burden appeared enough to doom Britain's financial stability, but Parliament always muddled through. This was not true of most of the other nations of Europe.

At the end of what may be properly called the first truly world war—The War of Spanish Succession (1702-13)—every major nation in Europe was fiscally exhausted.[103] For 3,000 years, wars had been limited by the inability of pre-modern states to raise the financial resources necessary to engage in conflicts on a grand scale. But, by the dawn of the 18th century, new financial methods were coming to the fore, hugely increasing both the scope and cost of warfare. For instance, William and Mary had been forced to issue £6,900,000 in debt to fight the War of the League of Augsburg with France (1688-97). To fight the War of Spanish Succession, however, Britain issued £28,796,006 in new debt.[104] The war was barely affordable to Britain, but proved ruinous to other nations' fiscal positions, particularly France's. Various nations attempted a wide variety of schemes to consolidate their debts, and then to follow the British lead in lengthening loan maturities (when they would have to pay them back). No nation was quite able to replicate the British achievement, as it was based on institutions (Parliament) other nations had yet to develop. The most notorious of these schemes was established in France by the Scotsman, John Law. It was Law's idea that crashed

most spectacularly, when the infamous "Mississippi Bubble" popped.

Law's notion involved replacing the use of gold with paper money, expanding government debt, and then transforming all of France's old and new debt into equity (stocks) of private firms, the most magnificent of which was the Mississippi Company. Law also established the *Banque Générale Privée* (General Private Bank) to handle paper money transactions, which were issued in large volumes with the bank's holdings of government debt (three-fourths of the bank's total reserves) being used as capital. In 1720, Law combined the bank and the Mississippi Company, along with other ventures, into a single entity. Before the year was out, an inevitable run on the bank, coupled with a spectacular drop in Mississippi Company share prices collapsed the entire system, forcing Law to escape France dressed as a woman. The French government chose to walk away from its debt obligations, plunging France into economic turmoil for a generation and ruining the monarchy's ability to secure international credit up through the Revolution that deposed it.[105] In fact, France's inability to regain its financial footing in succeeding decades is considered by many historians as the underlying cause of the French Revolution and, by extension, the rise of Napoleon.

Without going into details, Britain handled its War of Spanish Succession debt in manner quite similar to France, with one crucial difference—Britain did not walk away from the debt once the system came apart. In Britain's case, the operations of the Bank of England were supported by the creation of the South Sea Company, which, over the course of a decade, absorbed most of the government's war debt in exchange for equity in the company. When the company's shares,

which were propped up for a time by manipulations of the market, imploded in 1720, Britain faced an existential financial crisis similar to France's in the wake of the bursting Mississippi Company bubble. But rather than default on its obligations, Parliament compensated debtholders:

> by splitting their claim on the capital of the South Sea Company in half; one-half to be a claim on the equity of a much reduced South Sea Company and whatever dividends it might produce in the future (never to include payments in stock as that method is what brought about the collapse in the first place), and the other half as a claim on **perpetual annuities** that the government pledged to pay 5 percent for 5 years before reducing payments to 4 percent.[106]

These perpetual annuities were a remarkable innovation. In practice, the British government never had to repay the principal on its debt. Rather, it was only required to pay the interest on these annuities—named *Consols*—which by mid-century were being issued at a regular rate of 3 percent. So, if the British government was in debt for £30 million, it never had to worry about the day creditors would demand payment. As long as the government could fund the annual interest (£900,000), it could maintain the debt indefinitely, with plenty of maneuvering room for increases in times of emergency. In the event, debt accumulated rapidly as Britain engaged in a series of long and draining wars—the War of Austrian Succession, the American Revolution, and the Napoleonic Wars. By the turn of the 19th century, even the innovative "perpetual annuities" based system was under stress, forcing Parliament to find new revenue sources (the first income tax) just to keep up with the inter-

est charges. It remains a remarkable testament to the financial system Britain crafted, as well as to British fiscal probity, that the nation continues to pay interest on debt issued to finance the war against Napoleon.

Two other factors must be considered when discussing Britain's ability to sustain a huge national debt. The first was the creation of a secondary market for debt. The creation of *consols* (perpetual annuities) made it possible for secondary markets to develop, where original debt holders could shed the risk of holding government debt by selling their *consols* to investors prepared to bear it. Economic historians Ann Carlos and Larry Neal marked this issuance of "perpetual annuities" and their ability to be traded on secondary markets as the "defining financial innovation" of Britain's financial revolution.[107] This secondary debt market, in turn, greatly assisted the concentration of capital that propelled the start of the Industrial Revolution.

Moreover, it was this financial revolution that underpinned Britain's ability to finance debts far beyond what contemporaries could have predicted based on the nation's size and population. No matter how hard the tax collectors of other nations tried, they always had to deal with a basic economic fact: there was only so much wealth that could be taxed away from an agricultural-based economy before the economic base was destroyed. Typically, only a single-digit percentage of a nation's "trapped" agricultural wealth was available to support wars. Anything more and "geese laying the golden eggs" died of fiscal exhaustion. Increasing global trade from the Reformation onwards did increase revenues for all that participated, but they paled in comparison to the wealth generated as fruits of the Industrial Revolution. As Britain slowly moved

from an agrarian economy to one based on trade and industry, great concentrations of wealth were created within industrial and trading centers (cities). In a remarkably short time, Britain added a rich merchant class to her landed gentry, as well as a rapidly growing middle class—all of whom possessed incomes worth taxing. It was, in fact, William Pitt's imposition of an "income tax" on these people that made it possible for Britain to support the interest on *consols* issued to finance the great wars with France in the late-18th and early-19th centuries.[108]

For the rest of the 19th century, Britain made good use of its financial innovations to take a consistent leading role in global affairs, far beyond what her size and relatively small population should have made possible. Britain was proving that in the modern world, size did not matter near as much as its sound finances. By the early-1800s, Britain could count on its superior financial and taxation systems not only to finance its own military, but also to carry a great deal of its allies financial burdens during the wars against Napoleon.[109]

As the century progressed, the harnessing of the financial revolution with the Industrial Revolution made it possible to create a true nation-in-arms, far beyond the dreams of the French revolutionaries and their *levée en masse*. Industry could now produce armaments in quantities that were entire orders of magnitude beyond what the artisans of the past were capable of manufacturing, while the Bank of England's *consols* could pay for them. Britain no longer was forced to rely on storing vast treasuries so as to wage war. Rather, its entire financial wealth could remain working within the economy. By keeping as much specie in circulation as possible, rather than hoard-

ing cash and gold reserves for potential wars, Britain maintained within its economy the high levels of liquidity required for rapid growth. By creating reliable programs for emergency debt financing, peacetime Britain could invest its income back into growing the economy, while concurrently ensuring a ready source of cash in the event of war.

Although the Napoleonic Wars placed a tremendous strain on British finances, they never cracked under the stress. Still, to maintain its forces, as well as the forces of many of its allies, the Exchequer had to resort to many tricks, such as issuing 3 percent *consols* far below par, effectively increasing the interest on the total debt and offering *consol* holders huge capital gains if the *consols* were ever redeemed at par (something no minister thought possible, given the huge size of the debt). Also, for the first time, the propertied class, scared witless by the French Revolution, actually began to pay something approaching what a true assessment of their wealth would dictate. As one historian noted:

> Thus only the armies of France and the possible collapse of public credit persuaded Englishmen to accept the income tax. Only the sustained threat to national security from Napoleon, and to their high stake in national wealth, persuaded the propertied classes to assess their liabilities to pay, under the law, within tolerable margins of accuracy and of fairness.[110]

Of course, this war-induced surge in patriotic giving passed quickly. In the wake of the Battle of Waterloo and the end of the French threat, wealthy Britons immediately began dismantling the fiscal underpinnings of the state (including the income tax).[111]

Britain, however, had shown the way forward. For almost a century after 1815—the Pax Britannica—Europe's greatest nations pursued industrialization, state centralization, and the creation of fiscal and monetary institutions capable of funding renewed war.

WORLD WAR I

Nevertheless, old habits die hard, and before the onset of World War I, many looked with trepidation at the German war reserves stored inside the Spandau Fortress. Rather than spend or invest a large segment of the reparations France paid after the Franco-Prussian War, Germany stored away £70 million in gold to defray the costs of a future war. When, on the eve of war, someone reminded British Chancellor of the Exchequer (and future wartime prime minister) Lloyd George of this apparently massive gold reserve, he responded, "A mighty sum, but England will raise the last million."[112] It was a remarkable testament to his faith in Britain's capacity to finance a prolonged conflict, as well as proof that his government realized that the ability to raise massive sums of cash was the determining factor in war.[113]

In any event, no one in 1914 could have envisioned the colossal sums of cash 20th-century warfare would consume. The much-feared Spandau gold reserves proved insufficient to cover even a single month of war expenses. While methods of finance had improved considerably in the century and a half since Pitt the Elder, they still strained under the stress. Without the timely intervention of the United States and its mostly untapped financial resources, the Allied financial system would have collapsed.[114] Accessing this American financial stream was by no means an easy task, and

the scope of the effort involved was daunting. By 1916, Britain was spending five million pounds a day on the war, of which two million pounds was raised in the United States. Still, it was not until the British credit crisis of 1917 that the United States began providing government-to-government credits to Britain.[115]

While the Allied financial system adjusted to the demands of global war, industry also rapidly converted to meet new challenges. Though there were early shortages of materiel as the combatants either built or converted plants, once industry hit full stride, it easily met war demands, particularly after the United States added its massive production potential to the Allied pool.[116] British Cabinet minutes of the period reflect continuous concerns about raising more millions of pounds, but nary a word about running short of production capacity. While finance had closed the gap on production, it had not yet caught up. As long as the cash held out, there were always sufficient munitions available for purchase. In fact, as Professor Hew Strachan points out, "Before 1914 the competition in arms had created such abundance that there seemed little need to consider wartime procurement. How the war would be paid for promised to prove much more intractable."[117] In fact, the pre-war orthodoxy held that the cost of modern war would be so prohibitive, nations would soon bankrupt themselves and the war would end, according to one politician, no later than July 1915, "when the means to pay for it would have been exhausted."[118]

Such worries were exacerbated by the common belief among national leaders that they were starting the war with debt levels already approaching the maximum a nation could afford. When the war began, almost every major power was maintaining a debt level

close to half of its gross domestic product (GDP), and debt service was already the largest item on government budgets. Only Britain, which had made a concerted effort to reduce its debt after the expense of the Boer War, was in a respectable debt position, at about a quarter of GDP and requiring only 10 percent of the government's total budget for debt coverage.[119] Britain's wartime fundraising efforts also benefitted from the fact that Lloyd George, in his 1909 to 1911 budgets, had instituted progressive tax reforms that tapped large amounts of wealth the rich had not previously cared to contribute. These revenues were meant to pay for social welfare programs, but were turned for other purposes in 1914. As economic historian Glyn Davies states:

> [A] fiscal framework had therefore been fundamentally transformed on the eve of the First World War into a much more buoyant source of revenue, ripe for the insatiable demands of the military machine. What had been introduced . . . for welfare thus became a timely godsend for war.[120]

Even swelling tax revenues, with rates increasing by a factor of 4.5 by war's end, could not begin to meet the voracious funding demands of global war on an industrial scale.[121] Before the war ended, annual British government expenditures were 13 times greater than those of peacetime, similar to the burden all the other major warring states faced.[122] To meet these huge fiscal demands, Britain and other nations resorted to all three major methods for advanced economies to raise revenues: taxes, debt, and printing money.

Before the war ended, British national debt increased by a factor of 10, with the debt-to-GDP ratio increasing from 26 percent to 127.5 percent.[123] This is

remarkably close to the debt-to-GDP ratios set by the United States and Britain during World War II and might therefore be considered the limits of what a nation can afford, even in wartime.[124] To finance this debt, Britain was forced to abandon the idea of perpetual annuities in favor of issuing bonds with varying maturities.[125] The post-war requirement to rollover this debt placed tremendous strain on the British financial system throughout the 1920s. Moreover, Britain, accustomed in previous wars to subsidizing its allies (something it still did for France and others throughout the war), was forced to turn to others, particularly the United States, to fund a substantial portion of the war's cost.[126] When even all of this proved insufficient, the Exchequer turned to printing money, doubling the monetary base by war's end. Some of this was inescapable, but as printing money was always an easy escape from immediate financial difficulties, it was kept at too high a volume for too long, stoking a near ruinous inflation.[127]

In the end, Britain's fiscal system proved up to the task of funding a global war against other industrial powers; but in doing so, the nation's sterling based fiscal system was placed under nearly unendurable strain. As a result, the United States, already emerging as a competitor for global financial leadership before the war, was able to enhance its position as a global financial center. U.S. financial might continued growing over the next 2 decades—albeit more in relative than real terms during the Great Depression—positioning the United States as a global financial titan just in time for World War II.

Although, for much of its course, World War I appeared to prove that powerful nations could wage global war without money concerns, the reality turned

out different when the war ended just as most warring nations were reaching the end of their financial rope. There still remained room to expand production of war materiel, but there was no money to pay for such an expansion. In the end, although governments had raised record amounts of cash, by 1918 the pattern that held true since the beginning of recorded history held firm: When the money runs out, the war ends.

Although America, through the offices of J. P. Morgan & Company, provided substantial financial aid to Great Britain and other allies, it was not until America's entry into the war in 1917 that the Unites States placed its entire financial might behind the Allied effort. As such a deeper examination of how America financed its own mobilization as well as a substantial portion of Allied expenses for the final year-and-a-half of war will illuminate how modern financial made prolonged industrial warfare possible.

The American Experience.

World War I began just as the United States began feeling its way toward becoming a global financial power. For most of its history, the United States had been a heavy importer of capital, with almost no investment outflows to other nations. Soon after the American Civil War, however, these huge capital inflows—instrumental in the building of the nation's railroads, canals, and financing industrial start-ups—began tapering off. By the second half of the 19th century, the United States was generating sufficient excess capital to more than replace external financial flows, making the nation's economic growth self-financing. In fact, by the end of the century, the United States was a large capital exporter, and loans to China,

Germany, Sweden, Canada, and South America were being floated in New York's capital markets. In making these loans, "The United States was gaining experience for handling the creditor position it would assume during World War I."[128]

Adjusting to the new fiscal realities brought on by accelerating industrialization, rapidly increased trade flows (the first great process of globalization), and increasing GDP growth was not easy, and there were many stumbles along the way. The financial panics of 1857, 1873, 1893, and 1907 had caused great hardship and greatly undermined faith in the U.S. financial system. It was the Panic of 1907, however, which finally and fully revealed to the general public the impotence of the U.S. Government to deal with a financial crisis. In the face of this crisis, government actions were always a combination of late, insufficient, or ineffectual ones. In the end, the financial system was rescued by J. P. Morgan, who locked 50 top financers in his library and forbade them food or drink until they agreed to provide enough liquidity to fund the banking system and to shore up the foundering U.S. financial infrastructure. As one contemporary noted:

> But for the influence of J.P. Morgan, it is probable that no united action would ever have been taken. It is certainly an element of weakness in our central money market that influential credit institutions should have to be dragooned into doing what is after all in their own interests as well as to the general advantage.[129]

Unwilling to further entrust the U.S. financial future to the good graces of any single individual, Congress embarked on a number of reform measures over the following years. The most notable of these, the imposition of an income tax (soon after the ratification of

the 16th Amendment) and the creation of the Federal Reserve System proved crucial to U.S. funding efforts during the war. The income tax was levied for the first time in the year before the war (1913). Approximately 368,000 persons from a total population of over 100 million paid just over $28 million into the treasury. By 1916, the income tax was yielding $68 million, which, when added to the corporate tax ($57 million), was enough to cover half of the nation's defense budget in that year. Unfortunately, it was only about 1/50th of the annual cost of the budget, once the United States entered into hostilities.[130]

The creation of the Federal Reserve (Fed) gave the United States a powerful tool for the management of the nation's finances. Although the Fed experienced substantial teething pains during its first months of operations, it immediately made itself felt during the war.[131] The Fed, which began operations in 1914, was established to overcome the problem with monetary inelasticity. That is, at the start of every financial difficulty, persons and corporations immediately withdrew their money from the banking system and started hoarding cash, gold, and silver. Such a rapid contraction of the money supply was usually enough to push a minor hiccup in the system into a full-fledged crisis. The Fed, through open market operations, and a host of lesser means that became even more sophisticated, became the lender of last resort. Rather than rely on J. P. Morgan to force bankers to add liquidity to the system, the Fed provided the U.S. Government the means for boosting the money supply at the first sign of a credit crunch.[132]

At the start of World War I, London, despite impressive gains by New York City, remained the financial capital of the world. "Sterling remained the

world's dominant currency," and as Lloyd George boasted, London was "transacting far more than the whole of our business: we were transacting half the business of the world as well, by means of paper transactions."[133] On the other hand, the United States was mired in a recession at the outbreak of war, a situation that rapidly reversed as European orders for food and munitions began pouring in. By 1914, however, this British dominance was already receding, as the United States, whose GDP had grown seven times since the Civil War, began replacing the "weary titan," first in its home markets and then abroad.[134] Within months of World War I's eruption, exports exploded, and gold flowed into the United States as payment. At the start of the war, the United States held 19 percent of the world's gold stock. At war's end, it had absorbed an additional 16 percent of the world's pre-war money gold and increased its own stock by 88 percent.[135] In addition, Europeans sold $2 billion in U.S. securities, while borrowing $2.4 billion during the first year of the war alone. For the first time in its history, the United States became a creditor nation.

At the start of World War I, U.S. Government spending averaged about $65 million a month, or on an annual basis 2.3 percent of GDP. By the start of 1917, spending had increased by $20 million a month, but as inflation was roaring, the total expense as compared to GDP fell (2.2 percent). After America's entry into the war, monthly expenses increased rapidly.[136] By the end of the war, the government was spending over $2 billion a month, about 32 percent of GDP on an annual basis.[137] Like all modern wars, the United States had three main options for financing the war—increasing taxes, raising debt, or printing new money.[138] As it turns out, the majority of the war effort was financed

by borrowing (58 percent).[139] The rest was paid for by taxes (22 percent) and by printing money.[140] As a result of these financing operations, what is now called "high-powered money," or the monetary base, more than doubled.[141] As the United States had yet to develop the measures to sterilize this excess cash, the resulting inflation had a severe negative impact on the economy.

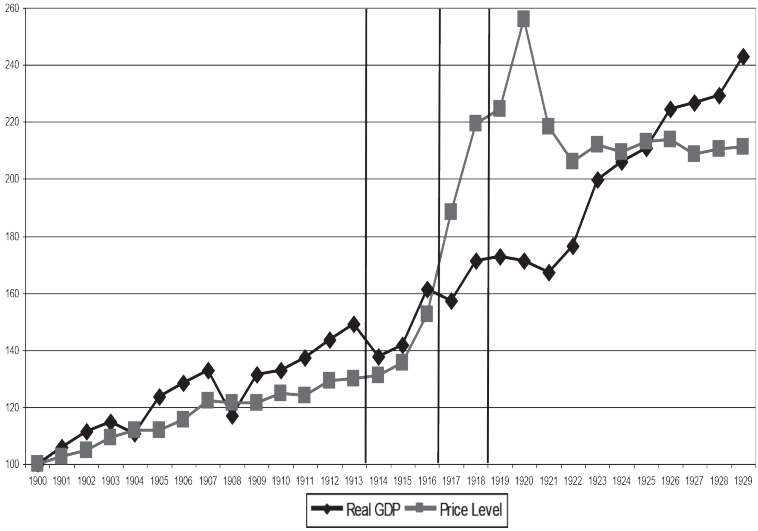

Figure 5. Real GDP and Price Levels.

The total cost of the war was immense ($33 billion), equaling over 40 times the amount the government brought in from all sources in the year before America's entry. At first, the government was at a loss as to how to meet such a vast expense, as no one had any clear understanding of the best methods for war financing on so vast a scale. There was, however, a widespread consensus that most or as much as possible of the cost should be paid for through taxes. Sec-

retary of the Treasury William Gibbs McAdoo strongly advocated that taxes pay for at least 50 percent of the war, dropping it to 33 percent later in the war. As Hugh Rockoff points out, "There was no precise theory behind these figures, but rather an intuition that too much borrowing or too high a level of taxes would be bad for the economy."[142] In the end, the U.S. Government, similar to every other war participant, combined a number of different approaches, including: increasing the income tax (the top rate went from 1.5 percent to over 18 percent), increased excise taxes (alcohol and tobacco), and an increase in luxury taxes. These tax increases on "sinners" and the rich were a result of President Woodrow Wilson's adamant support for the idea that the rich should pay for as much of the war as possible.[143] Surprisingly, the nation's wealthy industrialists, unwilling to risk being branded as war profiteers, were strong supporters of increasing their own tax burden.[144]

But tax changes are slow to take hold and rarely popular with electorates. As a result, this war, like every major war of the modern eras, was still largely financed through increasing debt. To sell this vast amount of debt, the Department of the Treasury drew on the lessons from the Civil War. In that war, Secretary of the Treasury Samuel Chase enlisted the services of the firm of Jay Cooke to help sell national bonds to as wide a spectrum of the American population as possible. There is no doubt that Cooke was effective in siphoning off funds from a large segment of the middle class, but this time around, Secretary McAdoo thought the Treasury could do better on its own, while also saving on the commissions that would be incurred if the debt was sold through third parties. In his unceasing efforts to sell debt to the masses, Sec-

retary McAdoo traveled the country while simultaneously enlisting the aid of Hollywood and any other influential groups that could help drum up support for Liberty Bonds and later, Victory Bonds. This campaign exerted enormous social pressure to purchase bonds, but its necessity remains an open question.[145] At an average interest rate of 4 percent, coupled with preferential tax treatment, these wartime issues of debt were highly competitive with any other investment vehicle. Patriotism may have been part of the selling technique, but purchasers were making a hardy profit on their patriotic feelings. If these bonds were purchased primarily to demonstrate support for the war effort one would expect to see purchases below the prevailing market rates (patriotic duty). This, however, did not occur at any point during the war. Americans in general were apparently only willing to financially support the war if forced to through increased taxes, or if rewarded through high investment returns.[146] Through such measures, some 20 million persons—almost a quarter of the population—purchased Liberty Bonds in one form or the other.[147]

Unfortunately, the methods used by the Treasury and the Fed proved to be highly inflationary.[148] There were many causes for this, but the primary one was that the Fed "encouraged" its member banks to make loans to individuals, which they could then use for the purchase of war bonds. Investors could take out cheap loans from banks and then buy bonds paying a higher interest rate than what the banks were charging them on the loans, thereby locking in a guaranteed (often tax-free) profit equal to the spread between the two. In practical terms, the Fed, by giving the banks the money to loan out for this purpose, was printing money, although it went to great efforts to disguise this fact.

The government tried a number of expedients to combat inflation during the war, but met with only limited success. By 1918, the cost of bread had doubled, as did the cost of clothing. Some items, such as sugar, quadrupled in price, while the overall cost of maintaining the pre-war living standard increased by two-thirds for the average household in just 2 years.[149] The best that can be said for government efforts to control inflation is that it probably curtailed it from hitting ruinous proportions. Still, it was the overall ineffectiveness of these anti-inflation programs that cued policymakers to pay careful attention to price levels for the much bigger financial effort required for World War II.

By the end of the war, America had financed $33 billion of its own war costs, as well as over $10 billion in war loans to other allies. By doing so, the nation greatly expanded the depth and sophistication of its capital markets, not to mention the size and scope of the federal government.[150] More importantly, the war put the final nail in the coffin of British global financial supremacy. From this point forward, that position would be occupied by the United States.[151]

WORLD WAR II

The American Experience.

For over 3 millennia, money had been the determining economic influence on war. As long as a ruler or state had the equivalent of cash on-hand or someone who was willing or could be forced to lend it to him, he could continue prosecuting any war of his choosing. There were always sufficient armories to produce war materiel and enough men whose service was for sale.

In every case examined to this point, a state's money gave out long before its productive capacity. This all changed in World War II. For the first time, every major warring power ran out of production capacity long before it ran out of money.[152] As U.S. Secretary of War Henry Stimson said after the war:

> The one thing upon which the whole country was agreed was that the services must have enough money. At no time in the whole period of the emergency, did I ever have to worry about funds; the appropriations from Congress were always prompt and generous. The pinch came in getting money turned into weapons.[153]

As further evidence that modern financial methods had closed the funding gap, the week after the United States entered the war, head of the Fed Marriner Eccles announced he would throw the entire power of the Fed behind the war effort, and that there were more than sufficient funds available to pay for the total mobilization of the country for war.[154]

In Britain, a new financial model—the Keynesian Miracle—made it possible to borrow huge amounts at record low rates. On the eve of war in 1939, Britain temporarily abandoned the cheap money policy (offering only low interest rates to lenders) that had been financing Depression Era deficits. The bank rate was doubled from 2 percent to 4 percent, but when war broke out and there was no sign of financial panic, it was reduced to 3 percent, and then a month later back to 2 percent.[155] There the rate remained throughout the war, only hitting 3 percent for short periods. In effect, Britain fought World War II at only 40 percent of what it would have cost if it had adopted the policies used in World War I and, in relative terms, for about a third cheaper than what it paid to fight Napoleon.

To accomplish this, Britain adopted some rather drastic methods, such as capital controls and rationing of essentials (food and clothing), and made it nearly impossible to purchase expensive nonessentials (cars and refrigerators). To calm public opinion that some industries (so-called war-profiteers) were making a killing while they suffered, Britain first imposed a 60 percent excess profits tax. When that failed to impress anyone, it was raised to 100 percent.[156] The other crucial element of the British plan was to control what Keynes called the 'inflation gap" by taking excess cash from consumers' pockets through increased taxes.[157] In 1939 alone, Britain raised income taxes by almost 20 percent for virtually the entire working population (not just the wealthy). All of Britain's indirect taxes (on such non-necessities as sugar, alcohol, and tobacco) also rose sharply.

Despite these increases, revenues in the first year of the war barely covered 50 percent of expenditures, leaving a deficit of nearly a billion pounds.[158] But as Britain was financing the war at a mere 2 percent interest rate, even this huge and growing debt load appeared manageable, particularly after America began its Lend Lease program. It also helped that, because of both voluntary and forced measures, Britons had few options for storing their money other than purchasing government debt. This was particularly true after the government got the banks to agree not to offer more than 1 percent interest on savings accounts, making purchasing government debt (bonds) twice as attractive to the average saver.[159] Moreover, to better tap the funds banks still had on hand (and deny the banks opportunities to lend their funds for higher rates elsewhere), the government forced the banks to accept Treasury Deposit Receipts in return for forced loans to

the government. By the end of the war these receipts (IOUs) made up over 40 percent of total bank assets.[160]

In the final analysis, Britain was able to finance a huge global war remarkably cheap compared to all other modern wars. It was the culmination of a financial revolution begun by the Dutch in the 17th century. For a time, in fact, it appeared that the iron laws of economics had been repealed. In all previous debt-financed wars, the more you borrowed, the more interest you had to pay. In World War II, however, Britain borrowed far more than ever before, at interest rates lower than ever before.[161] Its national debt rose from £7.25 billion in March 1939 to £23.75 billion by the time Germany surrendered. Yet, despite the growth of inflationary pressures throughout the war, Britain had entered a period of fiscal nirvana.[162] Fortunately, the war ended before inflation broke through the stringent controls and methods keeping it in check. One is therefore left to wonder how much longer this system of deficit spending could have gone on before inflation brought it crashing down. As an example of what might have happened if inflation had escaped its binds, one need look no further than Weimar Germany.

Similar to how it took over the financing of the Allied war effort in World War I, the United States acted in much the same role after the attack on Pearl Harbor, HI. As such, the fourth and final case study provides a more in-depth examination of how America financed 4 years of global war.

The Financial Revolution Fulfills Its Promise.

The Roman statesman, Cicero, once noted, "Endless money forms the sinews of war."[163] However, it was not until the 20th century that governments

finally mastered the procedures necessary for tapping their economic systems so as to provide these "endless" streams of money.[164] Although the three historical methods of financing government spending (raising taxes, borrowing, and printing money) remained, governments had become substantially more sophisticated in wielding these tools.[165] In spite of, or maybe because of, the nation's experience in World War I, orthodox economic thinking at the beginning of World War II still held that taxes should finance wars, on a pay-as-you-go basis.[166] This viewpoint had wide support across the political spectrum, as most politicians considered printing money inflationary and debt financing as a burden on future generations. Moreover, most believed that adding additional debt to the national balance sheet was particularly reprehensible because the initial burden of paying it off would fall on the same young men who had fought the war.[167] Economists also believed that turning on the printing presses would, at best, serve as an emergency stopgap measure, which would rapidly lose its effectiveness as hyperinflation outpaced the presses.[168]

An examination of World War II's financing, however, indicates that the printing press played a much greater role than commonly assumed, particularly in the early war years.[169] For at least the first 2 years of the war, the Fed's printing presses worked overtime, and the money supply expanded accordingly.[170] Such a rapid expansion, if kept up for too long a period, would, of course, have crippled the economy as inflation took hold. But in the exigency of the moment, it was the only method fast enough to fund the jump-start and rapid growth of production necessary to meet immediate war needs.[171] In the first place, the government-instigated monetary contrac-

tion, which had extended the length and depth of the Depression more than any other single factor, had not been rectified by the time the United States entered the war.[172] So, there was room to expand the stock of money without sparking inflation, particularly as the government had halted the production of high ticket durable consumer items. Leon Henderson, head of the Office of Price Administration, began instituting relatively effective price controls.[173] Moreover, if businesses were going to expand, they required immediate working capital, and there was plainly not enough of it available in the economic system in 1941.[174] In short, the in-circulation monetary base (cash or near-cash equivalents) in 1941 was too small to support the daily activities of the massive American economy as it mobilized for war.[175] Unless the government added cash to the system quickly, there was a real possibility the entire mechanism would seize up.[176]

The Federal Reserve Bulletin for December 1942 noted that the government had financed 75 percent of its expenditures in the first year of the war through borrowing, with the remaining 25 percent through taxation.[177] This was somewhat disingenuous because it failed to reflect how the Federal Reserve System creates money. Since the start of the Federal Reserve System in 1913, the primary method of adding liquidity to the monetary system was by altering the reserve requirement that members of the system had to keep on deposit with the Federal Reserve. In peacetime, this is a highly effective method, but several overlapping factors often led to lag times between reserve rate changes and expansion of the monetary base. In the emergency of global war when the funds necessary to finance rapid expansion are needed immediately, the government could not tolerate this lag.[178]

In the spring of 1942, the Federal Reserve changed its method of injecting liquidity (cash) into the system by hugely increasing its reliance on "Open market Operations"—buying government bonds directly from member banks. This was initially accomplished by setting a fixed buying rate on Treasury bills.[179] Under this policy, as the Federal Reserve Bulletin stated, "member bank reserves are almost automatically supplied, with the initiative being taken by the member banks rather than by the Federal Reserve System."[180] What this meant in reality was that member banks were allowed, and encouraged, to buy as much government debt as they wanted, or purchase other securities (commercial debt), or make loans as they desired, provided that, among the securities they acquired, were sufficient treasury bills to exchange at Federal Reserve banks for whatever additional reserves were needed to meet the accompanying expansion in reserves.[181] That is, the government turned the formulation and execution of monetary policy over to the commercial banks, with a blanket authorization to produce as much wartime monetary expansion as they found profitable.[182] **In short, the Fed gave banks a license to print money . . . all they wanted!**

How did this work in practice? As the public purchased government securities, the payments were credited to U.S. Government accounts in various commercial banks. This process automatically reduced the amount of cash reserves banks were required to keep on hand. Eventually, Treasury transferred these excess reserves to the various regional Federal Reserve banks, which then used them in payment for the purchase of war supplies and other government expenditures. The government's admonition to keep these reserves fully invested at all times, coupled

with the natural desire of profit-making institutions to increase their holdings of interest-bearing investments, encouraged banks to use their reserves to purchase large amounts of government bonds, both during bond drives and on the secondary market.[183] The banks made most such purchases directly from the Treasury when possible; otherwise, they were bought from private investors. The need to keep reserves employed until they were called for by the Central Bank also caused banks to make sizable loans to customers for the purchase of government securities, most of which these customers later sold to banks. Both the direct purchase of government debt and the funding of customers to do so tended to increase a bank's future reserve requirement. This increase showed up several months later, when the Treasury spent its new deposits and the funds reappeared in the accounts of banking customers. However, the announced policy of the Federal Reserve System to purchase Treasury bills at a fixed rate eliminated any fear that the bank might have trouble meeting future reserve requirements. As long as this policy continued, any bank could purchase any volume of U.S. Government securities for its own account, or could loan any volume of money to its customers for any purpose without fear of inability to meet future reserve requirements.

So why did this license to print money not lead to the ultimate financial devastation of the system? In time, of course, it would have, but two things stopped the banks from undertaking an immediate unbridled monetary expansion that would have led to hyperinflation and ruin. First, the U.S. banking system remained largely fragmented, with over 16,000 national and state-chartered banks across the country.[184] Most of these banks and bankers across the country simply

lacked the economic sophistication to spot the opportunity presented to them. More important, though, were memories of the Great Depression and the numerous banking panics of previous decades. Though on a practical basis the new Federal Reserve wartime policies had eliminated the need for reserves, most of the Depression-scarred banking community still thought it prudent to hold sufficient reserves on-hand for emergencies.[185]

The Government was issuing debt in quantities so huge that it would be impossible for the economy to digest those sums without massive interest rate increases to make bond purchases attractive. To clear the debt, the Federal Reserve became the buyer of last resort and purchased as much of the debt as necessary to keep the price and interest rate at a previously agreed pegged rate—called **monetizing the debt**.[186] These purchases created government-owned deposits on the books of the Fed, which equated to the banking system's receiving additional reserves, which its banks then used to expand their asset holdings (making loans) while creating additional deposit money.[187] Thus, one must consider the portion of the debt issued by the government that banks or private investors, using bank financing, bought back **as printed money**, although the Federal Reserve resisted such thinking at the time.

This means that 75 percent of the government's expenditures in 1942 was not, in reality, financed through debt securities. Instead, the government funded a substantial portion of its purchases through money creation.[188] Estimates are that as much of 42 percent of wartime spending in 1942 was the result of turning on the printing presses, while actual nongovernment financed bond sales paid for approximately

34 percent, with taxes paying the remaining 24 percent. This situation reversed by 1944, when taxes and a much reduced amount of debt sales sufficed to cover expenses.[189]

If politicians and economists were in agreement that creating money was the worst possible way to finance the war, and raising taxes was the best, how did the reverse become policy, at least in the United States in the early war years? The overriding problem facing the U.S. Government during World War II was how to raise the staggering amounts of money required by war.[190] If it performed the job well, the government could stabilize the economy, which would make preserving the soundness of the currency immeasurably easier. If done badly, it might have destroyed the entire economy.

For example, most historians agree that Germany's failure to adequately address its war financing needs was a contributing factor to the general disruption of its economy in the aftermath of World War I. By failing adequately to tax its economy to meet wartime expenditures, the Germans left it up to their central bank to raise the necessary funds on a credit basis. This negligence, plus military defeat, contributed to the ruinous inflation that wiped out the value of most of German society's economic assets in the early postwar period—The Great Weimar Inflation.[191]

During World War II, the Treasury Department had the responsibility of raising sufficient funds to wage the war. In this regard, it focused on keeping interest rates low and thereby minimizing the cost of servicing the debt.[192] The Federal Reserve's principal concern was to ensure that the means used to raise funds were as noninflationary as possible. To the extent that these funds did not come from taxation or

borrowed savings, the United States had to raise its financial wherewithal through the banking system. In other words, the federal government used the banks to create sufficient credit.[193]

In the process, the Federal Reserve confronted a dilemma. On the one hand, the system had to supply the banks with the reserves required to support credit expansion (give the banks money so they could buy government bonds). On the other, it was the Fed's responsibility to neutralize the inflationary potential of newly created money (usually done by taking money away from banks). However, there was no satisfactory way to neutralize the money that would not, at the same time, either raise the cost of debt substantially or contract available credit (if you take the banks' money away to control inflation, you have to raise interest rates to attract the limited amount of money banks still have thereby increasing the cost of funding the war). The most the Federal Reserve could do was to go about its business with sufficient care to slow the impact.[194]

That inflation remained low, or at least within reasonable limits, was the result of three things. The first was creation of the Office of Price Administration in 1942. That organization possessed sweeping powers to control prices and establish rationing programs on products in short supply. The second was the fact that conversion to wartime production brought a halt to the manufacture of almost all big-ticket consumer durables, such as automobiles and refrigerators.[195] The wartime boom may have given consumers more cash than they had previously, but they did not have much on which to spend it. Third, and in many ways the most important, was the self-restraint consumers exhibited due to their post-war expectations. Virtually

all Americans had vivid memories of the Great Depression and believed that the current prosperity was a wartime boom. There was widespread trepidation that the Depression would return as soon as the war ended. Many, therefore, took the sensible precaution of saving, rather than spending, their windfall.

Was it necessary to go this route? During the 6 fiscal years from July 1, 1940, to June 30, 1946, the federal government spent $387 billion, of which $330 billion was for national defense (approximately three times the annual spending rate for World War I). The Treasury raised $397 billion, of which taxation garnered $176 billion, or 44 percent (most of this in the second half of the war).[196] Moreover, politicians were aware that taxation provided many benefits over the other two methods of finance. First of all, taxation distributed the cost of the war while it was being fought, rather than imposing the costs on future generations, and was therefore considered more ethical and fair. Taxation also fought inflation, as it had an almost dollar-for-dollar impact on inflation, because consumers cannot spend dollars the government has taken from them. Finally, taxation alleviated many negative post-war economic effects. This was because greater amounts of wartime borrowing meant greater post-war taxation in order to service the resulting debt. Furthermore, large amounts of government securities in private hands at the end of a war could easily provide sufficient liquid assets to stoke serious inflation, as was to happen in 1947-49.[197]

So why did the government not raise tax levels to cover the expense of war? First of all, there was the need to provide incentives to workers. During the war, the government wanted every worker to make a maximum effort to increase production levels. Taxes

not only discourage workers by making them feel poorer, they also have a negative impact on the human desire to earn extra dollars, which they believe will only end up in the hands of the government. Moreover, politicians are reluctant to place tax burdens on constituents to whom they will eventually find themselves accountable. When faced with a vote on a tax increase, politicians can easily forget about the burden to future generations, in favor of keeping today's voters happy.[198]

The major determining factor in financial decisions by far was the one that receives little coverage from the economic historians of the period, namely time. The emergency was now, and the need to pay for the war was immediate. This need was particularly pressing in the first year of major rearmament, when the American economy had to provide resources to build or expand factories and construct the infrastructure on which the expansion of the military establishment depended. Passing new tax laws through Congress and then establishing the apparatus on which to assess and collect those taxes would have been a time-consuming affair. Though Congress authorized a new tax structure in April 1942, it was almost a year before substantial new revenues began to find their way into the Treasury.[199] Bond drives that focused on sales to private individuals had the same problem: they took months to organize and publicize.

The maturity of the Federal Reserve System, born in the early days of World War I, provided an already in-place and efficient system to raise vast amounts of cash in a remarkably short period of time. It was not without risks, but, properly managed, the system provided a stopgap until taxation and bond drives could begin to provide the bulk of governmental funding re-

quirements. Even after taxation had reached its maximum wartime limit, the Federal Reserve continued to guarantee sufficient bank liquidity to ensure that bond drives always met their goals **without ever going over the 3 percent interest cost on offered bonds**. By any measure, the American banking system, controlled by the Federal Reserve System, provided the allies with a financial engine that relatively easily assumed the burdens of war finance. Although the strains on it were enormous, every indication is that the Federal Reserve could have created substantially greater funding, without collapsing the system, even if the war had continued for several more years.[200]

The Federal Reserve banks themselves absorbed approximately $22 billion of the public debt, while creating a favorable environment for absorption of roughly $95 billion more by commercial banks. Moreover, from June 1941 through December 1945, investors other than Federal Reserve commercial banks absorbed approximately $129 billion of government securities.[201] In sum, this was close to all of the government's spending on the war, and even in 1945, these sources were far from tapped out. In fact, the continuing high levels of savings that propelled the post-war boom could easily have provided additional war funds if required. **For the first time in history, a government exhausted production capabilities long before it exhausted the funding sources required to pay for new munitions.** Such a state of affairs could not have continued forever, but it lasted long enough to win the war.

The Federal Reserve held true to the promise it had made almost immediately after Pearl Harbor, when it issued the statement that the "system's powers would be thrown completely behind the war ef-

fort," and that there were "sufficient funds available to prosecute the war on a massive scale until victory." At the time, there were many politicians who doubted this was possible.[202] However, there is no record that any economist during the period doubted that the system could fulfill the Federal Reserve's boast.[203] Government had, for the first time in 3,000 years, devised methods to pay for total war over an indefinite period of time. When the test came, these methods proved effective at managing the fiscal machine.[204]

CONCLUDING THOUGHTS

Throughout history, the ability to mobilize huge amounts of capital has been the true sinew of power and the most important ingredient in waging successful war. For 2,500 years, since the Battle of Marathon, Western rulers have been on a continuous search for new sources of capital, and better methods of getting their hands on it. By the middle of the 20th century, major states appeared to have finally found and mastered the techniques of tapping the greater portion of their nation's financial resources. During World War II, national leaders might be forgiven for believing they had finally found the inexhaustible golden goose. But by 1945, it was clear that for most of these nations, the goose was on his last legs. Only the United States still possessed the financial resources to continue the conflict at the intensity of the prior several years, but even in America signs of strain were developing.

The post-war economic surge revived the geese for a time. But 7 decades later, it is apparent that many nations are arriving at what might be called a "Keynesian limit," and will find it progressively more difficult to place further debt on their balance sheets. Many

economists, addressed this l**ong-run** problem—debt growing beyond a nation's ability to service the interest—to Keynes when he first voiced his idea of using debt financing to jump-start economic growth. His famous reply was: "In the **long-run**, we're all dead."[205] Well, Keynes is long gone, as are all of those that began this Keynesian experiment with him. Unfortunately, for the rest of us, the long-run, if has not arrived, is on the visible horizon.

Everyday, the world is witnessing Europe's increasingly desperate attempts to shore up its Euro-based financial systems. Although a series of patches may hold the system together for a few years, such fixes are likely to only postpone the final, probably catastrophic, reckoning. Moreover the U.S. financial system, unless policy changes are enacted in the near future, may not be far behind. The nation's per-capita debt-to-GDP ratio is already worse than Greece's and set to nearly double over the next 15 years. Worse, over the next few decades, the nation faces approximately $100 trillion in unfunded liabilities—seven times the current GDP. There is a law of economics that states: "What cannot happen, will not happen." At some point, therefore, the United States will default. Whether such a default will be a catastrophic financial collapse (through outright default or hyperinflation) or a default of expectations (entitlements curtailed) is yet to be determined.

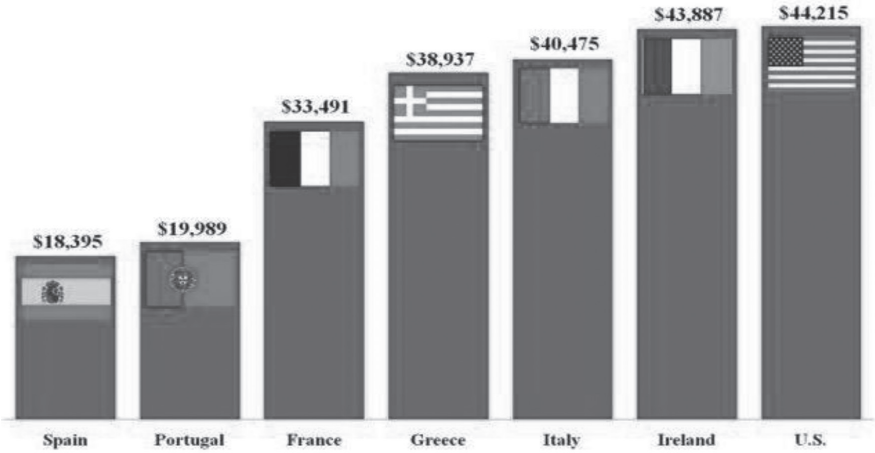

Figure 6. America's Per Capita Government Debt Worse than Greece.

As far as national security and America's ability to wage a large war is concerned, the nation's current debt burden places the country in uncharted territory. During World War II, we learned that the nation could support its military endeavors by growing the national debt from 40 percent of GDP to approximately 120 percent. In a future national emergency it remains an open question of how much higher the debt to GDP ratio can go. To wage World War II, we tripled the debt to GDP per capita ratio. Is such a feat possible if the nation starts any future tripling at debt already over 100 or 200 percent of GDP? We are entering uncharted territory. In the past, nations accrued debt to finance wars. Now that debt is being accrued to finance domestic programs. Because the United States has a massive economy and remains the world's reserve currency, it has the capacity to manage its current debt load. It remains an unanswered question if

it could handle a doubling of that debt to finance the reaction to a national emergency. Though no one is certain what the nation's financial breaking point is, there most certainly is a breaking point, and we are racing toward it.

When Paul Kennedy wrote *The Rise and Fall of Great Powers* 25 years ago, he predicted a U.S. financial collapse brought about by excess defense spending—"Imperial Overstretch." Kennedy, of course, diagnosed the right disease, but he selected the wrong patient. Imperial overstretch was an actual phenomena, but it was the Soviet Union it was killing. If Kennedy was to rework his manuscript today, he would surely note that it was not imperial overstretch that threatens U.S. fiscal health. Rather, it is "entitlement overstretch," a phenomenon he could not have been expected to note 25 years ago as there was no historical parallel to alert him to the danger. Now, however, that danger is all too visible. In some future national emergency, it is quite likely that the United States may find itself in a position where it cannot raise the funds required to defend the nation, a state of affairs that has been all too common over the long sweep of history.

Today's strategists and policymakers must take this financial limit into account, as in a future national emergency the U.S. debt position will start at approximately where the nation finished World War II. It is therefore uncertain whether the financial revolution that began in the late-17th century can be extended into the next. There is a very real possibility that we are approaching a "Keynesian Limit" that will negatively impact the nation's ability to finance a major mobilization, if one should prove necessary.

ENDNOTES

1. Paul Kennedy, *The Rise and Fall of Great Powers*, New York: Vintage Books, 1987.

2. M. Tullius Cicero. *The Orations of Marcus Tullius Cicero*, C. D. Yonge, trans., London, UK: George Bell & Sons, 1903, p. 95. This quote may be an adaptation of the original, "First of all the sinews of war is money in abundance." A copy is available from *www.perseus.tufts.edu/cgi-bin/ptext?doc=Perseus%3Atext%3A1999.02.0021*.

3. A strong case can be made that Mao's ultimate victory was a direct result of post-war hyperinflation, which destroyed the Chinese currency and financial system. This result might have been avoided were it not for the machinations of a Soviet spy in the U.S. Treasury, Harry Dexter White. In May 1945, White held up a promised shipment of gold bullion that could have stabilized the Chinese currency and given the government a stable footing on which to carry out the war against Mao's communist forces. This is one example of how wars are often decided by finance.

4. In recent years, there have even been a number of excellent works that focus primarily on the logistical aspects of war. See Martin van Creveld, *Supplying War: Logistics from Wallenstein to Patton*, Cambridge, UK: Cambridge University Press, 2004; Donald W. Engels, *Alexander the Great and the Logistics of the Macedonian Army*, Berkeley, CA: University of California Press, 1980; John A. Lynn, *Feeding Mars: Logistics in Western Warfare from the Middle Ages to the Present*, Boulder, CO: Westview Press, 1994; and Ian Malcolm Brown, *British Logistics on the Western Front: 1914-1919,* Westport, CT: Praeger, 1998.

5. The term "dismal science" itself originated in Thomas Carlyle's essay, "Occasional Discourse on the Negro Question," *Fraser's Magazine for Town and Country*, Vol. XL, February 1849, p. 531, available from *cepa.newschool.edu/het/texts/carlyle/carlodnq.htm*. It states, "It is not a gay science like some we have heard of; no, a dreary, desolate, and indeed quite distressing one; what we might call the dismal science."

6. This case study is an expanded version of the author's earlier work. See Jim Lacey, *The First Clash,* New York: Bantam, 2011.

7. For purposes of this analysis, the author focuses on Athens, as it faced the Persian assault at Marathon alone, I will add in Plataea's 1,000 hoplite contribution. If this analysis was made for Xerxes' invasion 10 years later, there would be justification for including a larger number of Greek cities in these estimates.

8. It is notoriously hard to find any convincing figures for Attica's population. I have discounted Arnold Gomme, *The Population of Athens in the Fifth and Fourth Centuries B.C.*, Oxford, UK: Clarendon Press, 1933, in favor of Peter Garnsey's analysis. See Peter Garnsey, *Cities, Peasants and Food in Classical Antiquity: Essays in Social and Economic History*, Cambridge, UK: Cambridge University Press, 2004. I have extrapolated the numbers Garnsey presents back to 490 BC, using an estimate population growth rate of 3 percent.

9. These calculations are the author's own, based on various estimates of the size of the Roman military establishment compared to estimated populations over time. These numbers do not hold up during the Republic, where Rome was able to mobilize a far larger percentage, as the Greek city-states also were, during times of stress. According to Goldsmith, even at the height of its power, Rome's total expenditures, of which approximately half went to the military) equaled between 3 and 4 percent of GDP. In times of crisis, such as at the end of the Antoine Period, Rome managed to raise a bit over 5 percent of GDP. This is about the average revenues any agricultural society was able to produce, equal to the United States in 1820. Still, the Persians typically did better, raising an average of 6 percent Empire-wide and as much as 8 percent in fertile areas, such as Mesopotamia. For Roman revenues, see Raymond W. Goldsmith, *Premodern Financial Systems*, Cambridge, UK: Cambridge University Press, 1987, pp 48-49. For Persian revenues, see Peter Bedford, "The Persian Near East," Walter Scheidel, Ian Morris, and Richard Saller, eds., *The Cambridge Economic History of the Greco-Roman World*, Cambridge, UK: Cambridge University Press, 2007, pp. 326-328.

10. As discussed in the previous note, the Persians were able to gather a greater percentage of their GDP as tax revenue, as a greater proportion of their inhabited territory was more fertile than that found within the Roman Empire, on average.

11. Again, Rome had an advantage in this regard over other ancient civilizations. As its Egyptian and North African fields were highly productive and produced a tremendous annual wheat surplus, Roman society could maintain a large military establishment and still feed itself. In an average year during the early Empire, Rome consumed 200,000 tons of grain a year, almost all of it transported from Northern Africa in 800 ships dedicated to the trade. See Elio Lo Cascio, "The Early Roman Empire: The State and the Economy," Scheidel *et al*., p. 639.

12. The Persian kings' policy of hoarding revenues would have limited annual military expenditures.

13. This is exclusive of taxes paid in kind, such as the wheat shipments from Egypt and North Africa, the *Annona.*

14. I reject out of hand that it was possible for the Persians to manage or logistically support any force much larger than this. For some reason, the historical community has come to a consensus that Xerxes marched with 250,000 troops. Consider that the Romans only put more than 200,000 men in the field once, and to do that they had to supply both armies, The Battle of Philippi, during The Civil Wars. According to Richard Gabriel, Alexander the Great's 65,000 men required 195,000 pounds of grain and 325,000 pounds of water to sustain it for a single day, plus 375,000 pounds of forage per day to sustain its animals. It strains credulity to believe that the Persians were able to supply four times this amount for a sustained period, particularly when they moved away from their established magazines within the empire. Moreover, expert calculations place the column length of a six-legion army at 22 miles. Extrapolating this for a Persian army of 250,000 gives a column length of over 160 miles. Given an average day's march, that means the first troops made contact at Thermopylae, while the rear of the army was still 2 weeks march from the battlefield, assuming they were all marching along the coast road. Even in multiple columns or in compressed formations, this size army would be a nightmare to manage and supply.

15. Sailors were relatively easy to mobilize, as the established merchant marine could always be conscripted. Of course, if it was away for any length of time, it would wreck the trading economies of the coastal cities.

16. Herodotus gives the number of male citizens as 30,000, Herodotus 5.97.

17. It will be remembered that these were the colonists that Athens sent after it defeated Thebes and Chalcis on the same day, at the time of the first Persian expedition. The author makes the assumption that the 4,000 number would have represented the heads of households, and that almost all of them would have been of military age.

18. It helps to think of the purchase of a person's own armor and weapons as a form of tax. It is doubtful that any able-bodied man who could afford it would have been able to avoid the obligation. Even if the state did not require it, the social pressure must have been irresistible.

19. Typically the entire hoplite panoply would cost 75-100 drachmas, or about 3 months' salary for a skilled worker. See Hans van Wees, *Greek Warfare: Myths and Realities*, London, UK: University College, 2004, p. 52.

20. A. H. M. Jones, "The Economic Basis of the Athenian Democracy," *Past and Present*, No. 1, February 1952, pp. 13-31. This article covers the period through the Peloponnesian War, but delivers a number of insights for the period covered in this work. The thetes class consisted of any Athenian citizen who held wealth of less than 2,000 drachmas.

21. Rachel L. Sargent, "The Use of Slaves by the Athenians in Warfare," *Classical Philology,* Vol. 22, No. 2, April 1927, pp. 201-212. For a good discussion of specifically dealing with the use of slaves at the battle of Marathon, see James A. Notopoulos, "The Slaves at the Battle of Marathon," *The American Journal of Philology*, Vol. 62, No. 3, 1941, pp. 352-354.

22. Sargent, p. 203.

23. J. B. Bury, *The Cambridge Ancient History*, Cambridge, UK: Cambridge University Press, 1960, p. 248.

24. Readers of Donald Kagan's master work on the Peloponnesian War will see different weightings than given here, as his calculations needed to account for the tremendous inflation that war sparked.

25. Donald Kagan, *The Peloponnesian War*, New York: Free Press, 2003, p. 61.

26. Bury, p. 200.

27. Thucydides, *The Landmark Thucydides: A Comprehensive Guide to the Peloponnesian War*, New York: Free Press, 1996, p. 415.

28. Glyn Davies, *A History of Money From Ancient Times to the Present Day*, Cardiff, Wales, UK: University of Wales, 2002, p. 86. In 356 BC, Philip of Macedon established a new mint at Crenides to mint gold and silver pouring out of new discoveries at Mount Pangaeus. By the end of his reign, these mines alone were producing 1,000 talents a year. Assuming most of these talents were gold, as that is what Pangaeus is known for, and a 10:1 conversion rate with silver, typical of the early years of Alexander's rule, then these mines alone could support almost the full costs of Alexander's army. Unfortunately, these ores were mostly still in the ground, and Alexander's father, Philip II, had been a spendthrift, leaving his son an empty treasury. As Arrian reports Alexander told his generals (Arrian, 7.3):

> For though I inherited from my father only a few gold and silver goblets, and there were not even sixty talents in the treasury, and though I found myself charged with a debt of 500 talents owing by Philip, and I was obliged myself to borrow 800 talents in addition to these, I started from the country which could not decently support you.

29. Converting ancient money into modern terms is notoriously difficult. As a rough measure, however, one can assume that one talent could pay the expenses and salaries of a 200-man trireme for a month, or 20 of Alexander's infantry for a year.

30. The Persian silver and gold horde captured by Alexander could have financed all of his military expenses for 3 decades.

31. From his initial take at the Persian treasuries, Alexander coined 5,000 tons of silver and gold, about the same that is stored at Fort Knox.

32. T. A. Rickard, "The Mining of the Romans in Spain," *The Journal of Roman Studies*, Vol. 18, 1928, pp. 129-143. Also see Titus Livy, *The History of Rome*, Book XXXI, English Trans., Cambridge, MA: Harvard University Press, and London, UK: William Heinemann, Ltd., 1935; and Polybius, *The Histories of Polybius*, Book XXXIV, Kenneth Sacks, trans., Berkeley, CA: University of California Press, 1981.

33. Polybius 1.59.

34. Livy 23.21.

35. *Ibid*., 23.48.

36. *Ibid*.

37. See Keith Hopkins: "Taxes and Trade in the Roman Empire," *The Journal of Roman Studies*, Vol. 70, 1980, pp. 101-125.

38. Suetonius, *The Lives of the Twelve Caesars*, Book XXI, March 29, 2009, available from *www.fordham.edu/halsall/ancient/suetonius-julius.html*.

39. Tenny Frank, *An Economic Survey of Ancient Rome,* Vol. I, Paterson, NJ: Pagent, 1959, pp. 320-345. According to Frank, during the Civil War, Caesar raised approximately HS600 million from requisitions of silver and gold from Spain. For perspective, the HS600 million revenue in 50 BC was equal to about 600 million grams of silver or some 6.4 million troy ounces. This would be equivalent to about 23,000 Athenian talents, 829.5 ounces per talent. In other words, Caesar collected from Spain roughly 12 times the peak revenues of the Athenian Empire.

40. *Ibid*., p. 355.

41. From *Merriam-Webster Dictionary*, Origin of "soldier"—Middle English soudeour, from Anglo-French soudeer, soudeour mercenary, from soudee shilling's worth, wage, from sou, soud shilling, from Late Latin solidus solidus.

42. See Peter Heather, *Empires and Barbarians*, Oxford, UK: Oxford University Press, 2010; and Chris Wickham, *The Inheritance of Rome*, New York: Penguin, 2010, for two recent outstanding studies of the cause for Rome's fall.

43. This case study is adapted from an unpublished book chapter by the author on the "Grand Strategy of the Roman Empire."

44. Hopkins, pp. 101-125.

45. Richard Duncan-Jones, *Structure and Scale of the Roman Economy*, Cambridge, UK: Cambridge University Press, 2002, p. 30.

46. *Ibid*., p. 30.

46a. Hopkins, pp. 101-125.

47. The author recognizes that the offensive impulse toward conquest was not extinguished for at least several centuries. Still, it is clear that the great conquests were over by the time Tiberius assumed the purple. Any conquest from that point on typically failed to recoup the cost of the invasion. Exceptions, such as the influx of gold after Trajan's conquest of Dacia, or various conquests in the East eventually also proved such a drain on the Empire's resources that they were abandoned.

48. Goldsmith, p. 48. For an analysis of Goldsmith's conclusions that led to further adjustments to Roman GDP and expenditures, see Angus Maddison, *Contours of the World Economy 1-2030 AD: Essays in Macro-Economic History*, Oxford, UK: Oxford University Press, 2007, pp. 11-62. Maddison places the average per-capita GDP within the Empire at $540, 1990 G-K dollars, as compared to England during the Glorious Revolution (1688) of 1,411.

49. See Hopkins for a discussion of Rome's capability to raise taxes by installing a much larger administrative infrastructure, akin to that of China at the time, within the Empire. Whether such an infrastructure could have been installed or tolerated among such diverse populations as made up the Roman Empire is open to doubt. In any event, there is a good likelihood the administrative infrastructure would have captured most of the additional revenues for its own purposes, as eventually happened in China.

50. Willem M. Jongman, "The Early Roman Empire: Consumption," Walter Scheidel, Ian Morris, and Richard P. Saller, eds., London, UK: Cambridge University Press, 2006, p. 611.

51. In an appendix to "Taxes and Trade in the Roman Empire," Hopkins presents calculations for the size of the Roman military establishment that are accepted here. However, Hopkins only accounts for the cost of pay. He leaves out the costs of such things as supplies, armaments, military fortifications, ships, ports, and many other items necessary for a functioning military system. These costs are unquantifiable, at present, but they must have been substantial.

52. This table is built from a paper by Elio Lo Cascio and Paolo Malanima, which provides an excellent summary of the various estimates for Roman GDP and the methodologies used to achieve them. See Elio Lo Cascio and Paolo Malanima, "Ancient and Pre-Modern Economies: GDP in the Roman Empire and Early Modern Europe," Venice, Italy, 2011, available from *www.paolomalanima.it/default_file/Papers/ANCIENT-PRE-MODERN-ECONOMIES.pdf*, accessed March 5, 2012.

53. Elio Lo Casico, "The Early Roman Empire: The State and the Economy," Walter Schiedel *et al.*, *The Cambridge Economic History of the Greco-Roman World,* Cambridge, UK: Cambridge University Press, 2007, p. 623.

54. *Ibid*., p. 631.

55. This graph and the information in the preceding paragraph can be found in James MacDonald, *A Free Nation Deep in Debt*, New York: New York University, 2003, pp. 65, 109.

56. Angus Maddison, *The Contours of the World Economy*, Oxford, UK: Oxford University Press, 2007, p. 54.

57. Over the past 2 decades, a number of scholars have fundamentally redefined our knowledge of these events and the entire era. For the best summaries of this recent scholarship, see Peter Heather, *The Fall of the Roman Empire: A New History of Rome and the Barbarians,* Oxford, UK: Oxford University Press, 2006; Peter Heather, *Empires and Barbarians*, Oxford, UK: Oxford University Press, 2010; Chris Wickham, *The Inheritance of Rome: Illuminating the Dark Ages 400-1000*, New York: Viking, 2009; Adrian Goldsworthy, *How Rome Fell*, New Haven, CT: Yale University Press, 2009; and, Bryan War-Perkins, *The Fall of Rome: And the End of Civilization,* Oxford, UK: Oxford University Press, 2006.

58. Michael Grant, *The Collapse and Recovery of the Roman Empire*, New York: Routledge, 1999, p. 67.

59. Wickham, *The Inheritance of Rome*, p. 78.

60. *Ibid*., p. 78.

61. The Eastern Empire's survival was only possible because Constantinople stood as a bulwark against any barbarian incursions across the Dardanelles. As such, the rich provinces in Anatolia, Syria, Palestine, and Egypt were unmolested. Upon this wealth, Constantinople would survive for another 1,000 years, despite losing much of it during the great Arab invasions of the 7th and 8th centuries.

62. Over the past couple of generations, a great historical falsehood, claiming that the period between the fall of Rome and the start of what is commonly called the Middle Ages was not marked with widespread ruin and destruction of the social order, has become generally accepted in much of academia. In this interpretation, this was a period of transition marked by the smooth transfer of the social and economic systems of the Classical Period to a new rebirth and flowering of civilization several centuries later. For some recent antidotes to this prattle, see Peter Heather, *The Fall of the Roman Empire: A New History of Rome and the Barbarians,* Oxford, UK: Oxford University Press, 2006; Peter Heather *Empires and Barbarians*, Oxford, UK: Oxford University

Press, 2010; Wickham, *The Inheritance of Rome*; Goldsworthy; and Bryan War-Perkins, *The Fall of Rome: And the End of Civilization,* Oxford, UK: Oxford University Press, 2006.

63. Peter Spufford, *Money and its use in Medieval Europe*, Cambridge, UK: Cambridge University Press, 1988, p. 9. For the definitive volume on medieval coinage, see Philip Grierson and Mark Blackburn, *Medieval European Coinage*, Vol. 1, "The Early Middle Ages," Cambridge, UK: Cambridge University Press, 2007.

64. *Ibid*., pp. 10-11.

65. Chris Wickham, *Framing the Early Middle Ages*, Oxford, UK: Oxford University Press, 2005, p. 105.

66. The Carolingian Kingdom under Charlemagne is not covered in this piece, but will be part of any expanded work on this subject. While much is made of Charlemagne's military prowess, it must be noted that his military success (as is always the case) was built upon a firm financial footing. In 794, Charlemagne instituted a wide-ranging monetary reform that established a uniform currency for the entire kingdom. At the height of his power, Charlemagne had 40 mints scattered throughout his empire, producing a uniform silver coin that became the basis of a revitalized economy and financed Charlemagne's military adventures. This financial system was destroyed by the fragmentation of the empire by the four sons of Louis the Pious. Europe was not to have a unified currency again until the birth of the Euro, as a financial currency in January 1999 and, later, as banknotes and coins in 2002. See Mark Blackburn, "Alfred's Coinage Reforms in Context," *Alfred the Great: Papers from the Eleventh-Centenary Conferences*, Farnham, Surrey, UK: Ashgate Publishing, 2003.

67. Spufford, p. 16.

68. This section of the book focuses on the British experience, but the Viking demands for *Danegeld* also greatly weakened Royal power in France, ensuring that feudal lords would be strong enough to contest royal power for centuries to come. It cost Charles the Bald 7,000 pounds of silver to buy off a Danish army in Seine Valley in 845. A further payment of 5,000 pounds was made in 861 and another 6,000 in 862. Before the Vikings settled down, they may have taken as much 120,000 pounds of silver out

of France, for all intents and purposes bankrupting that state for generations. See Spufford, pp. 63-64. The authoritative source for the effects of the *Danegeld* on France remains Einar Joranson, *The Danegeld in France*, Rock Island, IL: Augusta Book Concern, 1923.

69. Prior to the *Domesday Book*, there is little documentary evidence on the basis of the English financial or taxation system. For more detailed analysis, see M. Blackburn and D. N. Dunville, *Kings, Currency and Alliances,* Woodbridge, Suffolk, UK: Boydell Press, 1998.

70. The outlines of this administrative system can still be found in the *Brughal Hidage*, which lists the 33 *burhs* that comprised Alfred's fortified network. The document was likely created after Alfred's death, but there is good reason to believe it reflects his plans for defense, as well as how the system would be paid for and maintained. See Frank Stenton, *Anglo-Saxon England*, Oxford, UK: Oxford University Press, 1971, pp. 64-267.

71. Mark Blackburn, "Alfred's Coinage Reforms in Context," Timothy Reuter, *Alfred the Great" Papers from the Eleventh-Centenary Conferences*, Farnham, Surrey, UK: Ashgate Publishing, 2003, pp. 199-218.

72. See Stephen Dowell, *A History of Taxation and Taxes in England from the Earliest Times,* London, UK: Longmans, Green Publication, 1888, p. 9. The English paid 10,000 pounds of silver in 991, 24,000 pounds in 1002, 36,000 pounds in 1007, and 48,000 pounds in 1011. This final payment was on the eve of Cnut's invasion and likely financed his expedition. That, however, did not stop Cnut from levying a geld of 72,000 pounds of silver once he sat on the English throne. At least, this final payment was spent in England and not on the Continent.

73. Still, there is little doubt that it was a huge drain on England's resources during the period, attested to in that more English silver currency has been found in hordes in Denmark than has been found in England. In fact, one may say with a large degree of confidence that England, through the *Danegeld*, financed its own conquest by Cnut.

74. The debasement of English coins during this period is a reflection of increased demands for silver coins by the monarchy, an unfavorable trade balance, which caused silver to leave England in payment for imported goods, and a general reduction in the amount of silver available in Europe as the German mines that had been producing at high levels since the 9th century began slowing down.

75. Nicholas Mayhew, *Sterling: The History of Currency*, New York: Wiley, 2000, p. 11. The original source is the Annales Monastici 1:11, only in Latin. At least one person—Brand of Chichester—escaped this penalty by paying a large fine. Also see Judith Green, *The Government of England Under Henry I*, Cambridge, UK: Cambridge University Press, 1989, p. 90.

76. Mayhew, p. 12.

77. When Henry's son, King John, tried to add increased feudal dues to what he collected in scuttage, it led to the Barons' Revolt and the signing of the *Magna Carta*.

78. This graph and the information in the preceding paragraph can be found in James MacDonald, *A Free Nation Deep in Debt*, New York, 2003, pp. 65, 109.

79. Spufford, p. 99.

80. For an account of the Battle of Hattin, see James Lacey, "Crushed on the Horns of Hattin," *Military History Magazine*, April 2008.

81. Several of the Italian city-states also took advantage of the Crusades to greatly increase their wealth, and establish themselves as powerful players on the European scene during this time. For instance, Venice charged more on an annual basis to transport Crusaders to the Holy Land than the kings of England earned in annual revenues. See Charles Tilly, *Capital and European States*: *AD 990-1992*, New York: Wiley-Blackwell, 1992, p. 145. This period also marks the widespread use of "bills of exchange" to finance trade. But as this development was an outgrowth of Templar activities and had little effect on military affairs, it is not discussed in this book.

82. For an idea of the rising cost of warfare as Europe began its transition to the modern period, see W. M. Ormond, "The West European Monarchies in the Later Middle Ages," Richard Bonney, ed., *Economic Systems and State Finance*, Oxford, UK: Oxford University Press, 1995, pp. 122-160.

83. For a short but excellent analysis of this transition, see Philippe Contamine, *War in the Middle Ages*, Oxford, UK: Blackwell Publishers, 1984, pp. 150-172.

84. For those interested in the process of state formation in Europe, see Tilly.

85. Ormond, p. 127.

86. *Ibid*.

87. Philip IV may have hurt his own later financing attempts both by garnering the mistrust of all Italian bankers and by neglecting the fact that the Riccardis were one of his own creditors.

88. For a superb study of this relationship, as well as Edward I's financing methods for a prolonged Continental war, see Richard W. Kaeuper, *Bankers to the Crown: The Riccardi of Lucca and Edward I,* Princeton, NJ: Princeton University Press, 1972. Other works that shed considerable light on the financing of states and war during this period include G. L Harriss, K*ing Parliament and Public Finance in Medieval England to 1369*, Oxford, UK: Oxford University Press, 1979; Bonney, ed., *Economic Systems and State Finance*, pp. 53-100.

89. For a good accounting of the economics of the war for the English, see M. M. Postan, "The Cost of the Hundred Years' War," *Past & Present*, No. 27, April 1964, pp. 34-53. For the French viewpoint, see John B. Henneman, Jr., "The Black Death and Royal Taxation in France, 1347-1351," *Speculum*, Vol. 43, No. 3, July 1968, pp. 405-428; and John B. Henneman, Jr., "Financing the Hundred Years' War: Royal Taxation in France in 1340," *Speculum*, Vol. 42, No. 2, April 1967, pp. 275-298.

90. E. B. Fryde, *Studies in Medieval Trade and Finance*, London, UK: Hambledon Press, 2003, p. VII 1165.

91. *Ibid*., p. VII 1164.

92. Edwin S. Hunt, *The Medieval Super-Companies: A Study of the Peruzzi Company of Florence*, Cambridge, UK: Cambridge University Press, 1994; and Edwin S. Hunt, "A New Look at the Dealings of Bardi and Peruzzi with Edward III," *The Journal of Economic History*, Vol. 50, No. 1, March 1990, pp. 149-162. Hunt demonstrates that there was more to the Bardi-Peruzzi crash then Edward III's default, but this remained a major factor.

93. Even as England's ability to raise cash was waning, a surging France was able to call on substantial new funds to prosecute the war. In fact, in the years immediately after the Battle of Crecy, French government revenues were triple what they had been before the war, as the French population awakened to the mortal threat England was presenting.

94. The Medici Family grew rich with a simple rule that they never lent to kings, as they had no leverage to force repayment. In the end though, political pressure forced them to lend to some rulers, who, when they inevitably defaulted, ruined the House of Medici. Italian financiers did not totally vacate this sometimes lucrative market. For instance, Genoese bankers were very active in financing the wars of Spain's Phillip II, probably assuming that New World gold and silver were a guarantee of repayment. They too were ruined by Spain's serial defaults during the 80 Years-War with the Netherlands.

95. For two excellent studies on the Fuggers and state financing during this period, see Richard Ehrenberg, *Capital & Finance in the Age of the Renaissance: A Study of the Fuggers and their Connections,* London, UK: J. Cape, 1928; and Jacob Strieder, *Jacob Fugger the Rich: Merchant and Banker of Augsburg*, *1459-1525*, Whitefish, MT: Kessinger Publishing, 2010.

96. Davies, p. 233.

97. MacDonald, p. 152.

98. *Ibid*, p. 152; sourced from an anonymous pamphlet dated 1632.

99. For a comprehensive look at this entire process, see P. G. M. Dickson, *The Financial Revolution in England: A Study of the Development of Public Credit 1688-1756*, New York: St Martin's Press, 1967. Other works include Peter Mathias and Patrick O'Brien, 'Taxation in Britain and France: 1715-1810*:* A Comparison of the Social and Economic Consequences of Taxes Collected for the Central Governments,' *Journal of European Economic History*, Vol. 5, pp. 601-650; Patrick O'Brien, 'The Political Economy of British Taxation 1660-1815,' *Economic History Review*, 2nd ser. xli, 1998, pp. 1-32; J. F. Wright, 'British Government Borrowing in Wartime, 1750-1815,' *Economic History Review*, Vol. 52, No. 2, 1999, pp. 355-361.

100. Dickson, p. 46.

101. Henry Dunning Macleod, *The Theory and Practice of Banking*, Vol. II, London, UK: Longman, 1856, p. 24.

102. For an excellent history of the Bank of England, see John Francis, *History of the Bank of England: Its Time and Traditions*—2 Vols., London, UK: Longman & Co., 1847. A digital version of this work is available from *books.google.com/books?id=eIlCAAAAIAAJ&printsec=frontcover&dq=bank+of+england+francis&hl=en#v=onepage&q=bank%20of%20england%20francis&f=false*. For a thorough history of the bank's modern activities, see R. S. Sayers, *The Bank of England*—3 Vols., Cambridge, UK: Cambridge University Press, 1976.

103. Many due to their participation in the War of Spanish Succession; others as a result of other great wars of the period, such as The Great Northern War, 1700-1720 between Sweden and Russia; after which, Sweden gave up its pretensions as a great state, as Russia emerged onto the European stage as a military and economic power.

104. See Economic Historian's Conference 2005, Ann Carlos, Larry Neal, and Kirsten Wandschneider, "The Origin of the National Debt: The Financing and Refinancing of the War of Spanish Succession," p. 7.

105. A complete account of the Mississippi Bubble and other major financial panics is beyond the scope of this book, but may be of interest to readers who want to examine the parallels to our recent financial crisis. For those interested, see Charles P. Kindleberger, *Manias, Panics, and Crashes: A Financial History of Crises*, New York: Wiley, 2005; and Edward Chancellor, *Devil Take the Hindmost: A History of Financial Speculation*, New York: Plume, 2000. For the best scholarly analysis of financial crises and their aftermath, see Carmen M. Reinhart and Kenneth Rogoff, *This Time Is Different: Eight Centuries of Financial Folly*, Princeton, NJ: Princeton University Press, 2011.

106. Carlos, Neal, and Wandschneider, p. 15.

107. *Ibid*.

108. For two excellent books on this period's financial innovations, see John Brewer, *The Sinews of Power: War Money and The English State 1688-1783*, New Haven, CT: Harvard University Press, 1988; and James C. Riley, *International Government Finance and the Amsterdam Capital Market, 1740-1815*, Cambridge, UK: Cambridge University Press, 1980. Brewer, who makes much of the institutions of the states as the key factor in successful long-term debt finance, also points out how the efficiency of collecting taxes through a state centralized administrative apparatus ensured that a far higher percentage of collected revenues actually made it to the government, as compared to states that used the inefficient tax-farming systems—France, Prussia, and, for a time, the United Provinces, p. 127.

109. For those interested in how Britain financed itself and its Allies during the Wars of the Revolution and the Napoleonic era, see John M. Sherwig, *Guineas and Gunpowder: British Foreign Aid in the Wars with France 1793-1815,* Cambridge, UK: Cambridge University Press, 1969.

110. Patrick K. O'Brien, and Philip A. Hunt, "England 1485-1815," Bonney, ed., p. 89.

111. *Ibid*., p. 90.

112. B. M. Anderson, 'Effects of the War on Money, Credit and Banking,' Washington, DC: Carnegie Endowment for International Peace, 1919, p. 6. The Germans began storing additional gold in the Reichsbank in 1912, but ceased collecting reserves at about $360 million when they apparently considered they had enough to finance a major war. In reality, it was enough to pay for, at best, a single month of heavy fighting in 1915. See also J. Laughlin, *Credit of Nations: A Study of the European War*, New York: C. Scribner's Sons, 1918, pp. 202-205. Laughlin places the total of Spandau gold at $51 million and goes into great detail on Germany's (and other European nations) financial preparation for war, noting: "The high regards for the efficacy of gold to be kept in a 'war chest,' although rather medieval and contrary to modern ideas of keeping money in productive use persisted in Germany."

113. According to Niall Ferguson, ". . . the British revenue side was exceptionally robust: as a consequence of the reforming budgets of 1907 and 1909/10—which had a far more decisive fiscal outcome than the comparable German finance bill of 1913." See Niall Ferguson, 'Public Finance and National Security: The Domestic Origins of the First World War Revisited,' *Past and Present*, Vol. 142, 1994, p. 142. For those interested in a deeper study of Allied finance during World War I, see Martin Horn, *Britain, France, and the Financing of the First World War*, Montreal, Canada: McGill-Queen's University Press, 1993.

114. Laughlin, pp. 133-189.

115. For an analysis of the scope and consequences of this effort, see Kathleen Burk, *Britain, America and the Sinews of War, 1914-1918*, London, UK: Allen & Unwin, 1985. Some of this is also summarized in her easier to obtain new book: Kathleen Burk, *Old World, New World*, New York: Atlantic Monthly Press, 2007, pp. 380-460.

116. N. F. Dreisziger, *Mobilization for Total War*, Waterloo, Ontario, Canada: Wilfrid Laurier University, Royal Military College of Canada, 1981, pp. 15-45. See also Kevin Stubs, *Race to the Front: The Material Foundations of Coalition Strategy in the Great War*, Westport CT: Praeger, 2002.

117. Hew Strachan, *The First World War*, Oxford, UK: Oxford University Press, 2001, p. 815.

118. *Ibid*., p. 816.

119. *Ibid*., p. 817.

120. Davies, p. 369.

121. Throughout the war, Britain adopted what became known as the McKenna Rule; collecting enough in tax revenues to pay for normal peacetime expenditures and to cover the interest on ever increasing war loans. This policy was criticized for leaving too much money in people's hands and therefore stroking wartime and postwar inflation. However, given the political realities of the period and the negative incentives of too progressive a tax policy, this was likely the best option available.

122. Stephen Broadberry and Peter Howlett, "The United Kingdom During World War," Stephen Broadberry and Mark Harrison, *The Economics of World War I*, Cambridge, UK: Cambridge University Press, 2005, p. 215.

123. Broadberry and Howlett, p. 219.

124. The modern Japanese economy is demonstrating that a nation can sustain a much higher debt-GDP ratio without collapsing. Japan, however, has enforced a national savings (confiscation) system that may make it a special case. Still, in the event of a future major conflict, nations who start the conflict with Debt-GDP ratios over 100 percent, might want to carefully examine Japanese methods for financing debt levels over 200 percent of GDP.

125. This was a result of attempts to bring down the interest rates at which the government was financing the war. The Exchequer aimed at financing the war as close to the 3 percent Napoleonic average as possible, but ended up financing the war at over 5 percent. This massive additional cost was likely unnecessary, as every war loan was oversubscribed and likely could have been sold at a much lower interest rate. This reflects a significant degree of mismanagement by British bureaucrats.

126. In fact, the total of funds Britain raised overseas almost equaled the amount of money they sent to their allies. In effect, Britain was a pass-through for mostly American money to her allies, using its good credit rating to allow allies to borrow funds overseas.

127. For an explanation of the importance of printing money and how it works to grease the system, particularly early in the war, see the appendix on U.S. financing of World War II.

128. Margaret G. Myers, *A Financial History of the United States*, New York: Columbia University Press, 1970, p. 246.

129. Jerry W. Markham, *A Financial History of the United States,* New York: M. E. Sharpe Publishing, 2002, p. 33. This work quotes Leon T. Kendall's *The Chicago Board of Trade and the Federal Government*, Chicago, IL: Callaghan & Co., 1920.

130. See Series Y 605-637, "Federal Government Expenditure, by Function: 1902 to 1970" in the Census Bureau's "Historical Statistics of the United States: From Colonial Times to 1970," Washington, DC: U.S. Bureau of the Census, 1975.

131. As the methods used by the Federal Reserve are detailed in Case Study IV of the paper. They are not delved into here.

132. The Federal Reserve Act gave the Fed other duties and responsibilities, but for the purposes of this work, its ability to increase the money supply through the purchase of government debt is the most crucial. At the start of the war, the 1908 Emergency Currency Act was employed for the printing of over $340 million in new currency, which was removed from circulation as the Federal Reserve began functioning. See Alexander Noyes, *The War Period of American Finance 1908-1925*, New York: G. P. Putnam's Sons, 1926.

133. Markham, p. 65.

134. There was a mild financial panic in the opening weeks of the war, but it was rapidly resolved.

135. Allan H. Metzler, *A History of the Federal Reserve*, Vol. 1, Chicago, IL: The University of Chicago Press, 2003, p. 83.

136 . Stephen Broadberry and Mark Harrison, *The Economics of World War I*, Cambridge, UK: Cambridge University Press, 2005, pp. 314-315.

137. During the Civil War, the North actually printed money—"Greenbacks"—to pay salaries and for the purchase of war materiel. Such blunt means were no longer necessary, as the Federal Reserve could "print" money through indirect means—placing excess reserves in its member banks.

138. This, however is a bit of illusion, as the government gave the government substantial amounts of funds that they loaned out for individuals to purchase government debt. In effect, the government was disguising the fact that it was printing money.

139. Broadberry and Harrison, pp. 314-315.

140. *Ibid*., p. 317.

141. *Ibid*., p. 320. Many of the arguments as the best way to finance World War I are presented in Case Study IV, World War II. In the interest in brevity, they are not included here.

142. *Ibid*., p. 321- 324.

143. If avoiding such accusations was their intent, then they failed miserably. See the World War II case study for a brief outline of how this affected our early attempts at industrial mobilization for World War II.

144. Markham, p. 77.

145. Some 2 million individuals volunteered to sell the bonds. Movie stars, including Charlie Chaplin and Douglas Fairbanks, were used to promote sales. Over a million newspaper articles supported the sale of the bonds. Some 2,700 editorials, and over 1,000 cartoons, approximately 16,000 columns of newspaper publicity, and over 1,500 pages of newspaper advertisements were devoted to Liberty Loan sales.

146. Secretary McAdoo often insisted on keeping the cost of the debt below the market rate, but this was typically done by no more than a few basis points (1/100 of a percent) and therefore negligible. Once enticements such as tax-free interest are included in the analysis, the cost differential disappears.

147. Markham, p. 77.

148. See Allan H. Metzler, pp. 83-90, for a brief but detailed description of the methods employed and the results. For a more in-depth and detailed examination of U.S. war financing, see Charles Gilbert, *American Financing of World War I*, Santa Barbara, CA: Greenwood Press, 1970.

149. Myers, p. 286.

150. In fact, by the end of the war, the Bureau of Internal Revenue had more than quadrupled in size and was collecting more than 30 times the revenue it collected prior to the war.

151. For an account of the transfer of financial power between the United States and Great Britain, see Kathleen Burk, *Britain, America and the Sinews of War 1914-1918*, London, UK: George Allen & Unwin, 1985.

152. This is obviously not true of the early years of the war when Britain ran down its reserves and liquidated most of its overseas investments to pay for war materiel produced in the United States. Still, it must be noted that England had exhausted its own production capacity long before it began to run low on cash. Its cash problems were a result of having to procure dollars or gold to pay for the use of American productive capacity. Once Lend Lease began, and more so after America entered the war, no Allied nation had to worry about funding, only about production resources.

153. Henry Stimson, *On Active Service in Peace and War*, New York: Harper & Bros., 1971, p. 352.

154. This claim was repeated in the Twenty-eighth Annual Report of the Board of Governors of the Federal Reserve System, 1941, St. Louis, MO: Federal Reserve Bank, pp. 7-8.

155. Davies, pp. 390-391.

156. W. K. Hancock and M. M. Gowning, *British War Economy*, London, UK: His Majesty's Stationery Office, 1949, p. 163.

157. John Maynard Keynes first mentioned the inflation gap in his pamphlet, *How to Pay for the War*, London, UK: Royal Economic Society, 1940. In general it is a result of real GDP growing faster than potential GDP, and this is being propelled by an expansionary monetary policy, printing money to pay for war munitions.

158. Hancock and Gowning, p. 170. See pp. 501-511 for an assessment of Britain's wartime fiscal policies.

159. Another measure to make the debt attractive was to have any government department with excess funds use them to purchase bonds, thereby propping up the price. Moreover, the government closely monitored the rate of debt issuance so as not to swamp the market and drive down prices.

160. Davies, p. 392.

161. How the United States performed a similar financial feat is detailed in Appendix IV.

162. Davies, p. 393.

163. Cicero, *Philippics*.

164. This case study is adapted from the author's earlier work. See Jim Lacey, *Keep From All Thoughtful Men*, Annapolis, MD: U.S. Naval Institute, 2010.

165. Focusing on these three methods, of course, generally ignores other possible funding sources in war such as commandeering assets, both at home and in conquered areas, liquidation of existing assets, as Britain did to purchase American industrial output, or voluntary contributions. However, for the most part, such additional methods played a miniscule role in the financing of the Allied war effort, particularly in the United States.

166. Hugh Rockoff, in Mark Harrison, *The Economics of World War II: Six Great Powers in International Comparison*, Cambridge, UK: Cambridge, 1998, p. 109. This position was articulated by Secretary of the Treasury John W. Snyder in a December 1951 speech at the Industrial War College. Snyder was a former director of the office of War Mobilization and Reconversion and previously was in charge of the Defense Plant Corporation, which financed the construction of new wartime production facilities. The Speech, "The Role of the Federal Reserve In Financing War," is available from *www.ndu.edu/library/ic1/L46-101.pdf*. It should be noted that Maynard Keynes' pamphlet, "Paying for the War," also advocated using taxes as the primary funding method, as did most other economists' writings at the time. A large number of these writings are archived on the website for the National Bureau of Economic Research and are available from *www.nber.org/nberhistory/*, accessed on October 1, 2007.

167. Secretary of the Treasury Snyder in a speech 1 year earlier than the one noted previously to the Industrial War College, with the same title, "The Role of the Federal Reserve In Financing War." It is also available from *www.ndu.edu/library/ic1/L46-101.pdf*.

168. It should be kept in mind that every economist in government had witnessed the hyperinflation in Germany, which contributed to Hitler's rise, and hence they were predisposed to view hyperinflation as one of the worst economic disasters possible.

169. Milton Friedman and Ann Schwartz, *A Monetary History of the United States: 1867-1960*, Princeton, NJ: Princeton University Press, 1971, pp. 546-550.

170. The author recognizes that "turning on the printing presses" is a bit of a colloquialism and has nothing to do with the actual procedure by which the U.S. money supply is expanded.

171. Milton Friedman and other economists blame the rapid wartime expansion of the monetary stock for the immediate postwar spike in inflation.

172. Despite the later popularity of Keynesian spending, during the Great Depression, most policymakers still held a strong attachment to balanced budgets and a low government debt load.

Even in the midst of the Depression, the government raised taxes in 1936, which immediately killed off renewed signs of economic growth and brought on the 1938 "Roosevelt Recession."

173. Removing durable items (cars and refrigerators) gave consumers fewer choices to spend their new found wealth on, while price controls had the same effect by limiting the amount of supply vendors were willing to part with at artificially low prices.

174. Gerald White, *Billions for Defense: Government Finance by the Defense Plant Corporation During World War II,* Tuscaloosa, AL: University of Alabama Press, 2005, p. 45.

175. For an excellent study conducted in 1942 of the funding methods being considered by the government and an analysis of their likely effect on the economy, see "Alternatives in War Finance," Washington, DC: Department of Commerce, October 1942, available from *library.bea.gov/cdm4/document.php?CISOROOT=/SCB&CISOPTR=3443&REC=9&CISOSHOW=3435*.

176. Interesting statistics and graphs showing the amount of money in circulation, the gold stock, and reserve bank credit throughout the war period can be found in Federal Reserve Bulletins from the war. All of these reports and the statistics have been gathered in several volumes, which are available from *fraser.stlouisfed.org/publications/*. A good synopsis of the financial situation of the United States can be found in Anna Youngman, "The Federal Reserve System in Wartime," *Our Economy at War*, Occasional Paper No, 21, New York: Financial Research Program, National Bureau of Economic Research, January 1945. Reprints of this wartime research study can be ordered from the National Bureau of Economic Research, New York.

177. Charles Whittlesey, "The Banking System and War Finance," *Our Economy at War*, Occasional Paper, New York: Financial Research Program, National Bureau of Economic Research, February 8, 1943, p. 29. Reprints of this wartime research study can be ordered from the National Bureau of Economic Research.

178. *Ibid*., p. 12.

179. Treasury bills typically have very short durations as opposed to bonds which do not come due for years or decades.

180. Federal Reserve Bulletin, July 1942, p. 592.

181. Clark Warburton, "Monetary Policy in the United States in World War II," *American Journal of Economics and Sociology,* Vol. 4, No. 3, April 1945, p. 378.

182. *Ibid*.

183. The secondary market consisted of all the people who bought war bonds just before reselling them, at a profit, to a local bank, which, in turn, sold them back to the Federal Reserve for case . . . also at a profit. This is the well-hidden equivalent of turning on the printing presses and handing out money, as was done with Civil War greenbacks.

184. According to Secretary of the Treasury Snyder, Speech to Industrial War College, of these 16,000 banks, only 6,300 were members of the Federal Reserve System, although these 6,300 banks did control over 75 percent of U.S. financial assets.

185. Warburton, p. 380.

186. For an excellent primer on debt monetization and its potential impact, see Daniel L. Thornton, "Monetizing the Debt," St. Louis, MO: Federal Reserve Bank of St. Louis, December, 1984, available from *research.stlouisfed.org/publications/review/84/12/Monetizing_Dec1984.pdf*. Most of this should be familiar to the modern readers, as the Federal Reserve has been doing the exact same thing (to the tune of about $4 trillion) since the start of the 2008 financial crisis. In fact, the Fed recently announced it would hold short-term rates where they are for at least 2 years; something it can only do by "printing money" to keep buying excess bonds in the market.

187. Hugh Rockoff, in Mark Harrison, *The Economics of World War II: Six Great Powers in International Comparison,* Cambridge, UK: Cambridge University Press, 2000, p. 107.

188. As we have seen, the debt was issued but immediately repurchased from the banks by the Federal Reserve, which is how the United States creates/prints money in its open market operations.

189. Rockoff, in Harrison, p. 108. Freidman also shows rather conclusively that the monetary stock continued to increase throughout the war. However, this is a reflection of the multiplier effect that earlier government security purchases had coupled with an increased monetary velocity, concepts we will not belabor in this work.

190. Speech given by Thomas B. McCabe, Chairman, Board of Governors of the Federal Reserve System, on the 'Role of the Federal Reserve in Wartime,' to the Industrial War College on January 10, 1951.

191. *Ibid*.

192. The Treasury and the Federal Reserve agreed to hold the interest rate on long-term bonds at 2.5 percent, with a sliding scale for shorter term notes, depending on their maturity. The pricing of bonds was a complex problem all through the war. For those interested in the complexities of the debt market during the war, the best place to start is Henry C. Murphy, The *National Debt in War and Transition*, New York: McGraw-Hill, 1950.

193. McCabe.

194. Whittlesey, p. 18.

195. Donald Marr Nelson, *Arsenal of Democracy*, San Diego, CA: Harcourt, Brace and Company, 1946, pp. 212-238.

196. Alan Gropman, *The Big L: American Logistics in World War II*, Washington, DC: National Defense University Press, 1997, p. 160.

197. See "Alternatives in War Finance."

198. For a more thorough discussion of taxation and debt in wartime, see Murphy.

199. Harold G. Vatter, *The U.S. Economy in World War II,* New York: McGraw-Hill, 1985, pp. 102-111.

200. Elmus Wicker, 'The World War II Policy of Fixing a Pattern of Interest Rates," *The Journal of Finance*, Vol. 24, No. 3, June 1969, p. 449.

201. Youngman, pp. 49-50.

202. "Twenty-eighth Annual Report of the Board of Governors of the Federal Reserve System," pp. 7-8.

203. A relatively thorough reading of the literature at the time shows that economists had no doubt that the United States could raise almost unlimited amounts of money. What concerned them was what methods the government would adopt to sterilize this massive growth in the monetary base in order to stifle inflation.

204. For an excellent study on the Federal Reserve during World War II, see Edward C. Simmons, "Federal Reserve Policy and National Debt During the War Years," *The Journal of Business of the University of Chicago*, Vol. 20, No. 2, April 1947, pp. 84-95.

205. A comment he might have considered more carefully had he had children of his own.

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Commandant

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