

Empires on Credit: A Second Military Revolution

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Michael Roberts coined the term “Military Revolution” when describing the sea change in European warfare which took place in the century between 1560 and 1660.¹ His seminal article has sparked a lively and enduring debate on the nature of military change in early modern Europe.² One dominant (and interdisciplinary) thread of commentary concerns the impact of Roberts’ military revolution on the development of the modern state.³ Indeed, there has been near universal agreement among

¹ Michael Roberts, “The Military Revolution, 1560-1660,” in *The Military Revolution Debate: Readings on the Military Transformation of Early Modern Europe*, ed. Clifford Rogers (Boulder: Westview Press, 1995), 13-35.

² Geoffrey Parker, for instance, essentially confirms Roberts’ main claims but believes the military revolution began some decades earlier in Renaissance Italy and that Roberts should have discussed sieges at greater length; Geoffrey Parker, “The ‘Military Revolution,’ 1560–1660 – a Myth?” *The Journal of Modern History* 48, no. 2 (June, 1976): 195-214. Clifford Rogers, while also amenable to Roberts’ thesis, argues that military developments during the Hundred Years War (1337-1453) were just as significant as those between 1560 and 1660 and attributes the rise of the West to a series of military revolutions occurring in response to one another; Clifford Rogers, “The Military Revolutions of the Hundred Years’ War,” *The Journal of Military History* 57, no. 2 (April, 1993): 241-278. For a compilation of the first forty years of debate, see Clifford Rogers ed., *The Military Revolution Debate: Readings on the Military Transformation of Early Modern Europe*, ed. Clifford Rogers (Boulder: Westview Press, 1995).

³ See, for example, Michael Duffy, ed., *The Military Revolution and the State, 1500-1800* (Exeter: University of Exeter Press, 1980); Nicola Gennaioli and Hans-Joachim Voth, “State Capacity and Military Conflict,” *The Review of Economic Studies* 82, no. 4 (October, 2015): 1409-1448; John Lynn, “Clio in Arms: The Role of the Military Variable in Shaping History,” *The Journal of Military History* 55, no. 1 (January, 1991): 83-95; I.A.A. Thompson, “‘Money, Money, and Yet More Money!’ Finance, the Fiscal State, and the Military Revolution: Spain 1500-1650,” in *The Military Revolution Debate: Readings on the Military Transformation of Early Modern Europe*, ed. Clifford Rogers (Boulder: Westview Press, 1995), 273-298.

historians that a primary result of the military revolution was the creation of increasingly efficient taxation systems and bureaucratic administrations to support armies of unprecedented size.⁴ A larger military and centralized administration, the argument goes, both require and are able to collect more taxes; these taxes are promptly invested in an even larger military and the bureaucracy; on and on the cycle goes until the creation of the modern state.⁵

As interesting as this may be to one interested in the relationship between governments and peoples, the focus on taxation is rather misleading to those interested in the development of warfare. While the problem of funding increasingly large and well-equipped armies is correctly identified, taxation was not a viable solution. The financial burden wrought by Roberts' military revolution required changes in finance far beyond even the most efficient taxation, and the creative financial solutions developed in the Netherlands and perfected in England (approximately 1600-1715) constitute another military revolution. These solutions included the assumption of debt by a national and permanent entity with an interest in credibility (as opposed to a monarch), the creation of central banking institutions, the inauguration of a massive and essentially permanent public debt on which the government is expected only to pay annual interest payments, and the creation of a secondary market for government debt. They should be considered a military revolution for at least five reasons. First, they allowed for further increases in army size and equipment. Second, they allowed for increases in the geographical scope of war, extending European conflicts into the Americas, Asia, Africa, and both the Atlantic and Pacific Oceans. Third, they dramatically increased naval capacity and gave rise to naval-commercial empires, facilitating European conquests around the world. Fourth, they allowed economies and investment to thrive

⁴ Thompson, "Money," 273; Thompson dissents from this view.

⁵ John Lynn, "The Growth of the French Army During the Seventeenth Century," *Armed Forces and Society* 6, no. 4 (Summer, 1980): 580-581, note 43.

during war time despite massive expenditures. Fifth, they shifted the political and power balance in Europe from monarchical, land-based powers (France and Spain) to more republican, sea-based powers (the Netherlands and England).

Before discussing how Amsterdam and London were able to solve the issue of financing early modern warfare, it is worth mentioning just how intractable the problem was. The 180 years between 1530 and 1710 featured a ten-fold increase in European army size.⁶ This was a continent-wide phenomenon. The Spanish army doubled in size from 1550 to 1640, the French army increased at least seven-fold (and possibly as much as fourteen-fold) during the 1600s and would more than triple again in the early 1700s, the Dutch army quintupled in the same period, the Swedes increased their forces from 15,000 men in the 1590s to 100,000 by 1700, and England's armed forces tripled in size from 1550 to 1700, and the Russian army nearly quintupled in size from 1630-1710.⁷ These increases, remarkably, tend to underestimate the added financial burden. Not only did armies balloon in size, but the cost to field an individual soldier increased and forces became more permanent and therefore in need of constant maintenance.⁸ Understandably, skyrocketing army size coupled with the construction of more (and more expensive) fortresses and

⁶ Parker, "Military Revolution," 206.

⁷ Colin Jones, "The Military Revolution and the Professionalisation of the French Army under the Ancien Régime," in *The Military Revolution and the State, 1500-1800*, ed. Michael Duffy (Exeter: University of Exeter Press, 1980), 30; Simon Adams, "Tactics or Politics? 'The Military Revolution' and the Hapsburg Hegemony, 1525-1648," in *The Military Revolution Debate: Readings on the Military Transformation of Early Modern Europe*, ed. Clifford Rogers (Boulder: Westview Press, 1995), 254; Martin Van Creveld, *Supplying War: Logistics from Wallenstein to Patton* (Cambridge: Cambridge University Press, 1977), 5-6; Lynn, "Growth of the French Army," 578; Gennaioli and Voth, "State Capacity," 1413; Parker, "Military Revolution," 206.

⁸ Duffy, *Military Revolution 1500-1800*, 1; Thompson, "Money," 273. These increases were noted at the time as well; see Parker, "Military Revolution," 211, note 37.

burgeoning navies led to tremendous increases in the cost of war.⁹ European wars cost millions of pounds in the 1500s, tens of millions in the late 1600s, and hundreds of millions after the rise of Napoleon.¹⁰ Accounting for inflation, Spain's total expenditures increased four-fold with military funding accounting for more than ninety percent of the total.¹¹ Spain's situation was typical on the continent. State budgets multiplied throughout Europe with military budgets dwarfing all other expenditures.¹²

The cost of war became unbearable to near universally disastrous effect. No state in Europe was equipped to afford these newly expensive conflicts.¹³ Spain, despite enormous success exploiting the New World, went bankrupt no fewer than ten times from 1557 to 1662 and would not recover from the debt which caused their first default for more than two hundred years.¹⁴ This disrupted troop payments and led the Spanish army to mutiny forty-six times from 1572 to 1607, often with catastrophic consequences for nearby civilians. While Spain's condition was particularly dire (they would fade from great power competition due to financial collapse near the end of the 1600s), the rest of the continent faced similar issues.¹⁵ No country proved consistently able to supply their troops, and "[u]nable to feed their troops,

⁹ Petri Talvitie and Juha-Matti Granqvist, "Introduction: Military Maintenance in Early Modern Europe The Northern Exposure," in *Civilians and Military Supply in Early Modern Finland*, ed. Petri Talvitie and Juha-Matti Granqvist (Helsinki: Helsinki University Press, 2021), 1.

¹⁰ Paul Kennedy, *The Rise and Fall of the Great Powers* (London: Unwin Hyman, 1998), 77.

¹¹ Rogers ed., *The Military Revolution*, 6; Thompson, "Money," 274.

¹² Talvitie and Granqvist, "Military Maintenance," 4; Thompson, "Money," 273.

¹³ Duffy, *Military Revolution 1500-1800*, 2.

¹⁴ These bankruptcies occurred in 1557, 1560, 1575, 1596, 1607, 1627, 1647, 1652, 1660, and 1662. All this occurred despite the fact that Spain was the richest country of the era. Thompson, "Money," 286; Creveld, *Logistics*, 8.

¹⁵ Christon Archer et al., *World History of Warfare* (Lincoln: University of Nebraska Press, 2002), 250-251; Kennedy, *Great Powers*, 71.

commanders were also incapable of keeping them under control and of preventing desertion.”¹⁶ Seventeenth century armies were notorious for neglecting honor, orders, military objectives, and national interest in order to plunder even friendly civilians.¹⁷ This obviously limited military effectiveness, but the costs could be even more dire.

Government responses to funding issues not only failed to pay the exorbitant costs of war, but they also inaugurated a host of new issues. Massive tax increases, most state’s favored method of paying for war, risked widespread societal unrest. France’s most significant tax “increased 400% between 1632 and 1648 despite a period of currency deflation,” and tax burdens sparked “endemic” popular revolts across the country.¹⁸ While the French were able to crush these rebellions, British monarchs were not so lucky. Charles I’s efforts to unilaterally squeeze funding for the royal navy from a hostile populace helped spark a civil war which, ironically, found the navy opposing the crown due to chronic shortages of pay and food.¹⁹ Charles would emerge from the conflict headless. Other desperate attempts to solve the problems of military finance included, defaulting on debts, debasing currency, and launching new conquests in hope of capturing natural resources more valuable than the costs of acquiring them.²⁰ Finally, there was no

¹⁶ For a more complete discussion of logistics during the military revolution, see Creveld, *Logistics*, 5-39.

¹⁷ Jones, “French Army,” 33-34.

¹⁸ Lynn, “Growth of the French Army,” 582.

¹⁹ Michael Duffy, “The Foundations of British Naval Power,” in *The Military Revolution and the State, 1500-1800*, ed. Michael Duffy (Exeter: University of Exeter Press, 1980), 50.

²⁰ The Portuguese (similar to the Spanish) unsuccessfully attempted to maintain an empire through conquest. This created an inescapable cycle necessitating constant expansion which continued until the empire was stretched too thin to survive and was supplanted by the Dutch and British. For a detailed account of Portugal’s imperial problems of finance, see Malyn Newitt, “Plunder and the Rewards of Office in the Portuguese Empire,” in *The Military Revolution and*

safe opting out of state-threatening levels of spending; countries which failed to keep up militarily “were likely to be plundered and have their economy destroyed by more powerful states.”²¹ It would require another military revolution to resolve Europe’s financial problems.

The revolution would begin in an unlikely place: the Spanish-controlled Netherlands. Spain’s catastrophic financial situation made them a poor investment, and the monarchy found itself shut out of familiar credit markets. Charles V turned to provincial estates in the Netherlands to compel wealthy citizens to purchase government debt guaranteed by the revenues of specific tax increases. As Spain’s need for funds continued to grow, however, local assemblies in the Netherlands were able to extract significant concessions from the Spanish. They gained control of both taxation and local expenditures. Beginning in 1553, the Estates of Holland ended the practice of compelled debt. Instead, they marketed entirely voluntary loans to lenders in and outside of the province.²² With increased financial independence, the Estates of Holland were able to establish themselves as reliable debtors, allowing them to borrow with unprecedentedly low interest rates.²³ Where monarchs forced loans onto unwilling lenders and frequently defaulted on their debts (sometimes imprisoning or assassinating those lobbying for repayment), the Netherlands proved that a democratic assembly could not only be a safe but also a profitable investment.²⁴ Indeed, the first key aspect of this

the State, 1500-1800, ed. Michael Duffy (Exeter: University of Exeter Press, 1980), 10-28. Kennedy, *Great Powers*, 72.

²¹ Duffy, *Military Revolution 1500-1800*, 6.

²² David Stasavage, *Public Debt and the Birth of the Democratic State: France and Great Britain, 1688-1789* (Cambridge: Cambridge University Press, 2003), 55-56.

²³ Stasavage, *Public Debt*, 57.

²⁴ The Netherlands was particularly well-suited to illustrate this point. Wealthy merchants and investors often constituted a majority of Dutch assemblies. Indeed, a main argument of Stasavage’s work is that the ability of creditors to

military revolution was the assumption of public debt by representative institutions. This advantage quickly materialized militarily when the Dutch revolted against Spanish rule in 1572. Spain waged, and eventually lost, an eighty-year war attempting to subdue the tiny Netherlands. The cause of this victory, rather than military might, was the Netherlands' consistent ability to out-borrow Spain and the ease with which they paid relatively tiny interest rates.²⁵ Despite their size, they were able to outlast the mightiest power of the era.

In addition to surviving particular invasion attempts, the unparalleled ability of the Dutch to finance their military provided more general benefits. The most important of these was the ability to pay for the first modern navy. While the offensive effectiveness of the Dutch navy can be overstated, it provided the Dutch with a key advantage in resisting invasion and facilitated the development of an immensely profitable maritime trade network.²⁶ When the

influence assemblies is a key aspect of democratic credibility. While this surely works to the advantage particular legislatures, and assemblies can repudiate creditors (late eighteenth-century Rhode Island being a prime example), Stasavage understands the innate advantages of legislatures over (especially absolute) monarchs. While state wealth is often treated by the monarch as personal, it is far more difficult to single elected members of a larger body to do so. Additionally, the transition of power from one monarch to another poses an extreme threat to government obligations; there is no similar period for assemblies. For the seminal article on credibility differences in democracies and monarchies, see Douglass North and Barry Weingast, "Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth-Century England," *The Journal of Economic History* 49, no. 4 (December, 1989): 803-832. James Lacey, *Gold, Blood, and Power: Finance and War Through the Ages* (Carlisle Barracks: United States Army War College Press, 2015), 43-44; Stasavage, *Public Debt*.

²⁵ Lacey, *Gold, Blood, and Power*, 43-44; Stasavage, *Public Debt*, 57.

²⁶ These elements of the Dutch navy informed one another rather than being paradoxical. A main reason for the limitations of Dutch offensive naval capabilities was that their focus was primarily on protecting merchant fleets and promoting commerce rather than establishing military supremacy. W.J.R. Gardner, "The State of Naval History," *The Historical Journal* 38, no. 3

Dutch East India Company conquered Portuguese Malacca in 1641, the Dutch established themselves as easily the most powerful force in the Pacific; they simultaneously enjoyed a significant trading empire in the Atlantic world and possessed commercial and naval supremacy in Europe.²⁷ Inaugurating a system the British would later perfect, Dutch financial credibility, naval primacy, and commercial success formed a positive feedback loop: the stronger the Dutch navy became, the more profitable Dutch commerce became, the more of a reliable investment the Dutch government became, the more money was available for naval expansion... The significance of joint-stock companies, a peculiar innovation of commerce-focused republics, should not be understated. Much of the Dutch maritime empire was secured and defended by the semi-state and semi-corporate Dutch East India and Dutch West India companies. These companies proved far superior to either state funded military expeditions or the plundering exploits of ambitious captains seeking personal wealth and glory more than the maintenance of a sustainable empire.²⁸

Dutch financial reforms led to other indirect advantages. First, they facilitated the rise of the financial sector in the Netherlands; Amsterdam became a key center of global finance, and the credit markets and investment opportunities available to the Dutch extended globally to increase all of the advantages

(September, 1995): 696-697. For the tremendous success of Dutch military maritime trade expansion, see Engel Sluiter, "Dutch Maritime Power and the Colonial Status Quo," *Pacific Historical Review* 11, no. 1 (March, 1942): 29-41. For the limits of Dutch naval prowess, especially in offensive state to state conflict, see J.R. Jones, "The Dutch Navy and National Survival in the Seventeenth Century," *The International History Review* 10, no. 1 (February, 1988): 18-32.

²⁷ Sluiter, "Dutch Maritime Power," 41.

²⁸ This provided the Dutch, and later the British, empire with distinct and insurmountable organizational advantages over both the Spanish and the Portuguese. Throughout the seventeenth century, the Dutch East India Company exceeded the combined power of France and Portugal in and around India. Sluiter, "Dutch Maritime Power," 32; Duffy, *Military Revolution 1500-1800*, 2.

detailed above.²⁹ Second, beginning at the dawn of the seventeenth century, shares of the Dutch East India company created a thriving secondary capital market by providing high-reward, low risk, and easily transferable opportunities for speculation.³⁰ While this advantage was not fully exploited, it echoed the (to be discussed) development of a secondary bond market in Britain a century later. Third, Dutch reliability normalized the existence of permanent public debt, decreasing pressure from investors for repayment during difficult times and enabling the Dutch to borrow significantly more than they could immediately pay back.³¹ The Dutch, however, represent only the first step of the military revolution. For various reasons (a small population, an inconvenient and eminently invadable geographical location, competition with allied British merchants, etc.), the Dutch faded from maritime and financial dominance.³² The British, by replicating Dutch reforms and adding important innovations of their own, would complete the military revolution.

In 1688, the British Crown was assumed by William Prince of Orange and Mary II after James II fled Dutch advances in the Glorious Revolution.³³ Almost immediately, the British replicated Dutch financial practices.³⁴ This began with Parliament's assertion

²⁹ Kennedy, *Great Powers*, 78.

³⁰ While exact details of Dutch capital markets fall outside of the purview of this investigation, they are discussed at great length in Oscar Gelderblom and Joost Jonker, "Completing a Financial Revolution: The Finance of the Dutch East India Trade and the Rise of the Amsterdam Capital Market, 1595-1612," *The Journal of Economic History* 64, no. 3 (September, 2004): 641-672.

³¹ Kennedy, *Great Powers*, 78.

³² Kennedy, *Great Powers*, 87-88.

³³ Despite the enduring moniker, Dutch forces were prepared for the revolution to be far less glorious, arriving with 20,000 men, 5,000 horses, and a fleet four times the size of the Spanish Armada. Julian Hoppit, *A Land of Liberty? England 1689-1727* (Oxford: Oxford University Press, 2000), 15.

³⁴ Commentators are universal in deeming this an intentional imitation; this was also recognized at the time. There has recently been interesting research suggesting that the British had laid significant groundwork in emulating Dutch

of its ability to prevent the Crown from borrowing money.³⁵ Doing so both prevented monarchs from taking on risky loans they were unlikely to repay and made Parliament a guarantor of public debt similar to the Estates of Holland. Parliament approved loans quickly came to dominate British public finance, constituting nearly three quarters of the Crown's annual income during the first three years following the Glorious Revolution despite hovering around five percent under the late Stuarts.³⁶ Benefitting from this new credibility, the British government gained access to far more credit, and, despite adding a constitutional check to borrowing money, increased borrowing more than ten-fold by 1697.³⁷ Contributing to Britain's newly booming financial situation was the creation of the Bank of England. Initially created as a war-time measure in 1693, the bank exceeded all possible expectations.³⁸ Prior to the creation of the bank, Britain had borrowed exclusively using short-term loans (early modern loans of this type were subject to nearly fifty percent annual interest); from zero in 1693, its long-term debt "increased to £1,200,000 in 1695, £4,100,000 in

finance during its brief time as a republic in the 1650s. See, for example, Jonathan Scott, *How the Old World Ended: The Anglo-Dutch-American Revolution 1500-1800* (New Haven: Yale University Press, 2019), 121-138. For two examples of attributing British financial reforms to Dutch inspiration, see Jerome Roos, *Why Not Default? The Political Economy of Sovereign Debt* (Princeton: Princeton University Press, 2019), 95; Stasavage, *Public Debt*, 5.

³⁵ Gary W. Cox, "Was the Glorious Revolution a Constitutional Watershed?" *The Journal of Economic History* 72, no. 3 (September, 2012): 568.

³⁶ Cox, "Constitutional Watershed," 578.

³⁷ This borrowing would increase the public debt from less than a million pounds to more than nineteen (a third of national income). These trends would extend well into the eighteenth century. Stephen Quinn, "The Glorious Revolution's Effect on English Private Finance: A Microhistory, 1680-1705," *The Journal of Economic History* 61, no. 3 (September, 2001): 593; North and Weingast, "Constitutions and Commitment," 805.

³⁸ The direct connection between the Bank and Britain's wars is obvious. Not only was the purpose of the Bank specified, but a director of the bank was killed by stray fire while joining the army during a siege. Lacey, *Gold, Blood, and Power*, 45; Kennedy, *Great Powers*, 80.

1705, and £29,600,000 in 1715.” After Parliament proved a reliable debtor, Britain was able to borrow at consistently falling interest rates.³⁹ By 1715, they were charged less interest than even the Dutch.⁴⁰ The bank was able to further increase Britain’s credibility as it was authorized to (and did) use government revenues to repay public debt without prior approval from the government.⁴¹

Even more importantly, the bank facilitated the creation of a permanently funded debt.⁴² In so doing, it allowed Britain the ability to borrow far more than they could possibly hope to pay back at a particular time; indeed, Britain needed only to be able to cover annual interest payments. Because investors could profit from their investment and were sure of the bank’s theoretical ability to pay them back, Britain, in practice at least, never had to repay the principal.⁴³ In this way, debt did not threaten Britain in 1713 despite being six times larger than national revenue.⁴⁴ The final aspect of the military revolution, also allowed by the bank, was the creation of a secondary bond market. Because government debt was permanent and (eventually) uniform, it could be sold at market rates. This made holders of national debt, generally the wealthiest Britons, much more liquid. This both facilitated further investment by ensuring that debt could be sold to cover the losses of risky speculations and prevented money invested in the state from leaving circulation in the economy. Put succinctly, “Britain no longer was forced to rely on storing vast treasuries so as to

³⁹ Cox, “Constitutional Watershed,” 581-584; Stasavage, *Public Debt*, 53.

⁴⁰ Stasavage, *Public Debt*, 5.

⁴¹ Stasavage, *Public Debt*, 75.

⁴² David R. Weir, “Tontines, Public Finance, and Revolution in France and England, 1688-1789,” *The Journal of Economic History* 49, no. 1 (March, 1989): 95.

⁴³ Lacey, *Gold, Blood, and Power*, 48.

⁴⁴ Stasavage, *Public Debt*, 77.

wage war. Rather, its entire financial wealth could remain working within the economy.”⁴⁵

These financial reforms (the assumption of debt by a reliable representative body, the creation of central banks, the funding of a permanent public debt, and the creation of a secondary bond market) transformed warfare. First, they solved the crisis of funding created by Roberts’ military revolution. By the end of the Thirty Years War (1618-1648), no European country could afford to pay its troops — no European army, that is, except for the Dutch.⁴⁶ Britain became able to fund war on an “unimaginable scale,” spending far more in the beginning of the eighteenth century than the burdens which had proved unbearable to all just decades before. They could already spend France into exhaustion with 49 million pounds during the Nine Years War (1688-1697), but by the Napoleonic Wars, Britain could spend nearly twice that amount *per year*.⁴⁷ Despite facing occasionally significant strain, Britain was never again forced to default or impose economically destructive taxes on its people.⁴⁸ In 1693, probably to the shock of soldiers used to having their pay treated as optional, Parliament doubled the salary of its serving naval officers and increased the pay of demobilized officers during peacetime.⁴⁹ More remarkable given the horrific state of European finances during the seventeenth century, by 1800 Britain was able to afford not only its own army but was also capable of funding its allies.⁵⁰ More shocking still, Britain was better able to fund early eighteenth century wars more effectively than other European nations even though army size stopped increasing across the

⁴⁵ Lacey, *Gold, Blood, and Power*, 49-50.

⁴⁶ It is perhaps not coincidental that one of the key outcomes of the struggle was the Dutch achievement of independence. Creveld, *Logistics*, 8.

⁴⁷ Kennedy, *Great Powers*, 81.

⁴⁸ Lacey, *Gold, Blood, and Power*, 45-46.

⁴⁹ Duffy, “British Naval Power,” 62.

⁵⁰ Lacey, *Gold, Blood, and Power*, 50.

continent and Britain was forced to maintain a navy ballooning in cost and size.⁵¹

In addition to funding previously unfundable (and larger) militaries, Dutch-Anglo financial innovations allowed for an incredible increase in the geographical scale of European warfare. As previously discussed, the Dutch were able to assault Spanish and Portuguese colonial possessions simultaneously in the Caribbean, Africa, India, and the East Indies while maintaining a war with Spain in Europe.⁵² Eighteenth century wars took on a distinctly global character. The War of Spanish Succession (1701-1714) which, as may be self-evident, was fought to determine the next ruler of Spain spanned five continents and was waged across the world's oceans. This was repeated during the Seven Years War (1756-1763), which also left only Australia and Antarctica untouched and contained significant maritime elements. Recalling that no European country was able to supply troops stationed on the continent as recently as 1650, this is all the more significant.

This military revolution massively increased naval power and enabled the capture and maintenance of naval-commercial colonial empires. It is, obviously, no coincidence that the two financial innovators created Europe's two most powerful navies. The most obvious cause was the availability of funds. While armies were near impossible to fund, navies were even more difficult. They require significant initial investment to build ships and frequent repair work.⁵³ Plunder on its own was a poor way to fund land armies, but it eased the burden on governments; navies, however, could not possibly live off the land.⁵⁴ In spite of these extensive costs, the British were able to not only maintain, but

⁵¹ The British navy consisted of 50 ships in 1633, 173 in 1688, 320 in 1756, and over 1000 in 1810. Duffy, "British Naval Power," 55, 82.

⁵² Sluiter, "Dutch Maritime Power."

⁵³ In fact, "even the smaller ships in the English navy of the 18th century cost more than the largest industrial companies had in capital." Gennaioli and Voth, "State Capacity," 1414.

⁵⁴ Adams, "Tactics or Politics?" 284.

significantly expand their navy following the Glorious Revolution. This stood in stark contrast to other European powers, whose navies stagnated in part because of the financial problems they created.⁵⁵

The creation of larger and better funded navies facilitated the creation of immensely profitable empires based on trade. We have already seen the effectiveness of the Dutch fleet in promoting and protecting commerce and colonies overseas. The British navy, while more militaristic in character, was similarly effective. During war, the British navy proved both capable of allowing British trade to continue relatively unmolested and of strangling enemy commerce.⁵⁶ Nearly as important as the sheer amount of funds available was the secondary bond market. Even during peace, trans-oceanic voyages were risky endeavors, and mercantile fleets were in need of insurance. With the increased danger of enemy attack during war, insurance became absolutely essential for the continuance of maritime trade.⁵⁷ Insuring large merchant voyages, however, required large amounts of liquid funds. Without the ability to quickly offload bonds, the wealthiest Britons would have had to choose between lending money to the government or ensuring the merchant fleet. Due to the military revolution, however, private British wealth could be employed twice to promote the war effort while remaining in circulation. This “double use of capital” was integral to Britain’s commercial and naval supremacy and played a decisive role in their victory over Napoleon.⁵⁸ On the broadest scale, Britain’s Empire (made possible by these reforms) would exert tremendous impact on

⁵⁵ Duffy, “British Naval Power,” 55.

⁵⁶ Kennedy, *Great Powers*, 80-83.

⁵⁷ Adrian Leonard, “Marine Insurers, the City of London, and Financing the Napoleonic Wars,” in *Money and Markets: Essays in Honour of Martin Daunton*, ed. Julian Hoppit, Duncan Needham, and Adrian Leonard (Rochester: Boydell & Brewer, 2019), 69.

⁵⁸ Leonard, “Marine Insurers,” 55-56.

nearly every inhabited region on earth over the next two hundred and fifty years.

The secondary bond market and increased state credibility assisted more than just naval insurance. The liquidity of government bonds meant that the British economy, in stark contrast to contemporaries, did not decline in war time (it also, incredibly, was not subject to serious inflation).⁵⁹ While investment in the French government discouraged economic growth, investment in the British government encouraged it.⁶⁰ This facilitated a revolution in transportation. Private investment in public infrastructure projects increased with government credibility, using money already available for military spending due to the purchase of government bonds; this led to, among other things, a boom in road and canal construction.⁶¹ More importantly, the secondary bond market lubricated private capital markets, thus promoting the accumulation of capital which spurred Britain's incredible economic growth during the eighteenth and nineteenth centuries and helped make it fertile ground for the sparking of the industrial revolution.⁶²

Finally, this military revolution shifted the balance of power in Europe from monarchical land powers to maritime republican ones. While some military advantages of finance reform

⁵⁹ North and Weingast, "Constitutions and Commitment," 823.

⁶⁰ Charles Kindleberger, *A Financial History of Western Europe* (Crows Nest: Allen & Unwin, 1984), 163-164; Kennedy, *Great Powers*, 82-83.

⁶¹ Dan Bogart, "Did the Glorious Revolution Contribute to the Transport Revolution? Evidence from Investment in Roads and Rivers," *The Economic History Review* 64, no. 4 (November, 2011): 1073-1112; North and Weingast, "Constitutions and Commitment," note 55; Cox, "Constitutional Watershed," 590.

⁶² A discussion of the impacts of the industrial revolution, or of exactly how direct the connection between it and finance reforms was, warrants a piece of its own. It is clear, however, that Britain's terrific financial situation was a significant contributor. North and Weingast, "Constitutions and Commitment," 825-828; Kindleberger, *Financial History*, 158; Duffy, "British Naval Power," 81; Weir, "Tontines," 95-96; Jones.

have been touched on throughout the paper, more are worth making explicit. The most basic advantage was in the seemingly endless and unmatched amount of money Britain and the Netherlands could pour into a conflict. Lacey puts it well: “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.”⁶³ The British avoided this problem entirely, and while they could wage war with relentless endurance, the French (their primary rival) were repeatedly driven to financial catastrophe prior to surrender.⁶⁴ Britain and France fought no fewer than seven major wars following this military revolution, and the former, despite its smaller size, was able to generally emerge victorious because of a superior ability to bear the financial costs of conflict.⁶⁵ Indeed, despite more lucrative and efficient systems of taxation and Britain’s heavier reliance on debt, France was forced into bankruptcy (multiple times) by the Seven Years War and Britain was not. Without Dutch-Anglo financial reforms, France had to pay far higher interest rates.⁶⁶ The American Revolution is a particularly telling example. Despite helping accomplish the political goal of securing independence for thirteen of Britain’s North American colonies, France incurred a debt comparable to Britain but was forced to pay twice the interest rate.⁶⁷ These exorbitant rates combined with the already shaky state of French finance to spark the French Revolution.⁶⁸ The devastating impacts of France’s attempts to keep up with British spending would

⁶³ Lacey, *Gold, Blood, and Power*, 49.

⁶⁴ This dynamic mimics well the aforementioned conflicts between Spain and the Netherlands a century earlier. Kindleberger, *Financial History*, 159.

⁶⁵ Kennedy, *Great Powers*, 76-83.

⁶⁶ Stasavage, *Public Debt*, 88-95; Jones, “French Army,” 45.

⁶⁷ Kennedy, *Great Powers*, 84.

⁶⁸ Lacey, *Gold, Blood, and Power*, 47; “French Army,” 45-47; Lynn, “Growth of the French Army,” 581-582.

continue into the new regime and be a significant problem at least as late as 1815.⁶⁹

Financial reform also provided the British tactical advantages over both the French and Spanish on the seas. Due to ever-present money concerns, Britain's enemies were extremely reluctant to engage in naval battles – they simply could not afford to replace or repair ships. This allowed the British to easily overcome both administrative and technological inferiority. While French ships were faster individually, the British enjoyed advantages in both speed and maneuverability in formation due to huge disparities in training stemming from their willingness to fight. When forced into undesired battles, French and Spanish ships proved nearly helpless in the face of better trained and more aggressive British forces.⁷⁰

In summary, Dutch-Anglo financial reform fundamentally altered the scale and scope of warfare during the seventeenth and eighteenth centuries. Its impacts stretched far beyond the military realm, clearly altering the international balance of power (both between states and regime types) as Britain and the Netherlands were able to succeed at the expense of both absolutist European rivals and expand lasting empires across the world. These reforms also, at the very least, set the stage for industrialization and a century of British economic dominance over the rest of the world. These reforms clearly constitute a military revolution.

⁶⁹ White also recognizes the importance of debt in sparking the revolution. Eugene Nelson White, "The French Revolution and the Politics of Government Finance, 1770-1815," *The Journal of Economic History* 55, no. 2 (June, 1995): 227-255. France's post-revolutionary wars have been attributed to the burdens of past ones. Lynn, "Clio," 87.

⁷⁰ Duffy, "British Naval Power," 80.