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Ferguson's Law:
Debt Service, Military Spending, and the Fiscal Limits of Power

Niall Ferguson
Milbank Family Senior Fellow
Chairman, Hoover Applied History Working Group
Hoover Institution, Stanford University

History Working Paper 202502

HOOVER INSTITUTION
434 GALVEZ MALL
STANFORD UNIVERSITY
STANFORD, CA 94305-6010

February 21, 2025

ABSTRACT: Are there financial determinants of great-power decline and fall? This paper proposes "Ferguson's Law," which states that any great power that spends more on debt servicing than on defense risks ceasing to be a great power. The paper identifies the "Ferguson limit," or the point at which interest payments exceed defense spending, as the tipping point after which the centripetal forces of the aggregate debt burden tend to pull apart the geopolitical grip of a great power. This is because the debt burden draws scarce resources towards itself, reducing the amount available for national security, and leaving the power increasingly vulnerable to military challenge. Using historical case studies that are analogous to the situation of the modern United States as the dominant global power, the paper shows that it is very rare but not unprecedented for a great power to return to the right side of the Ferguson limit. The paper is timely, as the United States began violating Ferguson's Law for the first time in nearly a century in 2024.

INTRODUCTION

> States have endeavoured, in some instances, by pawning their credit, instead of employing their capital, to disguise the hazards they ran. They have found, in the loans they raised, a casual resource, which encouraged their enterprises. They have seemed, by their manner of erecting transferable funds, to leave the capital for purposes of trade, in the hands of the subject, while it is actually expended by the government. They have, by these means, proceeded to the execution of great national projects, without suspending private industry, and have left future ages to answer, in part, for debts contracted with a view to future emolument. So far the expedient is plausible, and appears to be just. The growing burden too, is thus gradually laid; and if a nation be to sink in some future age, every minister hopes it may still keep afloat in his own. But the measure, for this very reason, is, with all its advantages, extremely dangerous, in the hands of a precipitant and ambitious administration, regarding only the present occasion, and imagining a state to be inexhaustible, while a capital can be borrowed, and the interest be paid.
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> … an expense, whether sustained at home or abroad, whether a waste of the present, or an anticipation of future, revenue, if it bring no proper return, is to be reckoned among the causes of national ruin.
>
> —Adam Ferguson, *An Essay on the History of Civil Society* (1767), Part V, Section V.

For most of recorded history, the nexus between military and financial capacity has determined the power of states.[1] Sun Tzu considered warfare to be of "vital importance to the State, a matter of life and death, a road (*Dao*) to safety or to ruin."[2] Heraclitus famously called war "the father of all things."[3] Cicero's Fifth Philippic declared "the sinews of war" to be "unlimited money." If "the life of man upon the earth is a warfare," as Job ruefully observed of the human condition,[4] then the money needed to wage it is indispensable. As Cardinal Richelieu observed, "Gold and money are among the chief and most necessary sources of the state's power," because "a poor prince would not be able to undertake glorious action."[5] "War made the state, and the state made war," was Charles Tilly's memorable aphorism.[6] Only in the past century did that change, with the rise of welfare states.

It is sometimes assumed that the cost of war has followed a linear or exponential upward curve throughout history as military technology and fiscal capability have progressed. This is not the case. If one controls for the size of armies relative to their populations, firepower, and economic output, one discerns a complex pattern of fluctuations in military expenditure.[7] A critical factor in the capacity of states to wage war has been their ability, beginning in the city-states of northern Italy in the Middle Ages, to exploit the "tax-smoothing" instrument of public debt, which allows the high costs of war to be spread out over time and shared between generations. Closely related has been

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[1] The author thanks Kyle Kinnie and Christopher Millay for research assistance. I am also grateful to Michael Boskin, John Cochrane, John Cogan, Mauricio Drelichman, Matt McLennan, Manny Rincon-Cruz, Andrew Roberts, Kenneth Rogoff, Paul Schmelzing, Hans-Joachim Voth, and Philip Zelikow for comments. All errors are my own.

[2] *Sun Tzu on The Art of War: The Oldest Military Treatise in the World*, trans. Lionel Giles (London: Luzac & Co., 1910), p. 1.

[3] Heraclitus, *The Cosmic Fragments: A Critical Study*, trans. G. S. Kirk (Cambridge: Cambridge University Press, 1975 [1954]), p. 245.

[4] Job 7:1 (RHE).

[5] Quoted in Evan Luard, *War in International Society: A Study in International Sociology* (London: I. B. Tauris & Co., 1986), p. 248.

[6] Charles Tilly, "Reflections on the History of European State-Making," in *idem* (ed.), *The Formation of National States in Western Europe* (Princeton: Princeton University Press, 1975), p. 42. See also Charles Tilly, *Coercion, Capital, and European States, AD 990-1990* (Oxford and Cambridge, MA: Basil Blackwell, 1990).

[7] Niall Ferguson, *The Cash Nexus: Money and Power in the Modern World, 1700–2000* (New York: Basic Books, 2001), pp. 2f.

the ability of states to raise taxes efficiently to enable prudent debt management—for example, the consistent payment of interest or the running of primary budget surpluses in postwar periods.

This paper identifies an historical pattern in which, in the absence of fiscal prudence, the rising cost of debt servicing consumes a growing share of state revenues and generates political and economic incentives to freeze or cut military spending. I identify the "Ferguson limit" as the point at which interest payments and principal repayments on the public debt (together, debt service) exceed defense outlays and argue that it is a particularly dangerous threshold for a great power to cross for an extended period. This is a somewhat more exact formulation than the one Adam Ferguson proposed in the fifth part his *Essay on the History of Civil Society*, which is quoted in the epigraph above.[8] If the debt-service burden rises beyond a certain level, the state may be forced not only to reduce its defense spending but also to default on all or part of its liabilities; or, if it controls the monetary unit in which the debt is denominated, to inflate away their real value.

The paper is of considerable relevance to the United States today. In 2024, according to the Congressional Budget Office (CBO), net interest outlays on the U.S. national debt reached 3.1% of GDP, surpassing defense spending (3.0%) for the first time in nearly a century.[9] By way of comparison, between the Cuban Missile Crisis and the fall of the Berlin Wall, U.S. interest payments averaged 1.8% of GDP, compared to 6.4% of GDP for defense. Assuming that U.S. defense spending remains around the 2014–23 average of 48% of total discretionary spending, the CBO projects that net interest payments will be nearly double the defense budget (4.9% of GDP versus 2.5%) by 2049.[10] This unpleasant fiscal arithmetic poses a clear and present danger not merely to the U.S. economy but also to the position of the United States as the world's dominant military power. It must be a matter of urgent concern for American policymakers to restore an appropriate relationship between spending on debt service and spending on national security.

FERGUSON'S LAW AND THE FERGUSON LIMIT

The Debt Nexus

The extent to which debt servicing exceeds defense spending is historically an advance indicator of great power decline. Financial capacity determines a great power's ability to project military strength and sustain a commensurate military infrastructure. Regardless of regime type, every state faces competing foreign and domestic claims on its resources. When such commitments in total exceed annual revenues, the state runs deficits, debt accumulates, and interest payments rise (unless the rate of interest simultaneously declines). A confluence of political and economic factors tends to create a strong preference to cap or shrink defense spending relative to GDP. As military spending serves as an approximate index of a state's ability to project and sustain hard power, freezing or cutting it signals a reduced commitment to maintaining a state's geopolitical position. In an essentially anarchic international system, states operate on the assumption of imperfect information about the

[8] Adam Ferguson, *An Essay on the History of Civil Society*, ed. Fania Oz-Salzberger (Cambridge: Cambridge University Press, 1996 [1767]).

[9] Only once since World War II has this happened before—briefly in the first quarter of 1998, when National Defense Consumption Expenditures and Gross Investment were $356.6 billion, and interest payments were $368.3 billion. Data can be found at https://fred.stlouisfed.org/series/A091RC1Q027SBEA and / A824RE1Q156NBEA. Prior to 1945, the other two periods when debt interest exceeded defense spending were 1790-1809 and the 1920s.

[10] Calculations based on data that supplemented CBO's March 2024 report, "The Long-Term Budget Outlook: 2024 to 2054" (March 2024), updated at https://www.cbo.gov/system/files/2025-01/51119-2025-01-LTBO-budget.xlsx.

strategy, operations, and tactics of others. A reduction in a great power's defense spending is thus a form of interstate signaling. It reduces the potential cost and increases the potential payoffs of aggression by its rivals.

The obvious route to an unsustainable debt burden is a recurrent fiscal deficit. The underlying causes of fiscal imbalance are numerous, and high military expenditure is only one of many. Recent economic literature distinguishes between crisis and non-crisis deficits.[11] In the absence of a crisis, rational policymakers should prioritize fiscal equilibrium by avoiding deficits and evening running surpluses. In a crisis—such as a war or some other emergency—borrowing makes sense. Yet governments often deviate from this rule, allowing deficits in normal years. A state's revenues can be eroded relative to its expenditures by a decline in the working-age population, a shrinking tax base, declining productivity, or the loss of income-generating assets. Expenditures can be inflated ahead of revenues by other forms of government consumption—for example, on public services and employment. Unless interest rates decline or are artificially depressed, a rising debt absorbs a growing share of state revenues and eats away at the resources available for discretionary spending. More commonly, a deteriorating fiscal position creates a vicious circle in which investors drive down bond prices, raising interest rates, and driving up debt servicing costs. The outcome can be explosive if the real interest rate on the debt exceeds the real growth rate of the economy and hence the real growth of revenue. This was often the case prior to the 20th century, and there is reason to think it may once again be a problem for many indebted nations.[12] Military spending in most democratic systems is discretionary and reflects a political bargain between the various interests represented in the legislative and executive branches. There is a more or less predictable pattern whereby fiscal dynamics inexorably reduce the resources available to the armed services.

1. **Less Butter, Fewer Guns**

   States face significant budgetary constraints as the cost of debt servicing rises. Internal political pressures and external market forces begin to demand greater fiscal discipline, often signaled in the modern era through downgrades by credit-rating agencies. In liberal democracies, the political costs of cutting non-military forms of discretionary spending generally exceed those of cutting military spending. In autocracies, too, the rising cost of debt servicing can undermine the domestic legitimacy of the sovereign by reducing the resources available for internal security or "bread and circuses."

   In the medieval and early-modern periods, when capital markets were in their infancy, kings frequently reneged on their creditors' claims, a recurrent theme in David Hume's sardonic *History of England*.[13] By the time of Hume and Ferguson, the world had changed. Amsterdam, London, Paris and Edinburgh were home to all kinds of novel financial institutions: monopoly trading companies with marketable equities; joint-stock banks including some that could issue banknotes as well as discount bills of exchange; stock markets; and standardized, increasingly liquid government bearer bonds such as consols. The birth of a financial press also contributed by improving the frequency (if not always the accuracy) of flows of financially relevant information. An international order in which capital can flow easily

[11] Carmen M. Reinhart and Kenneth S. Rogoff, *This Time Is Different: Eight Centuries of Financial Folly* (Princeton: Princeton University Press, 2009), pp. xxxiii, 290f.
[12] Kenneth Rogoff and Paul Schmelzing, "R-G Before and After the Great Wars 1507-2023," NBER Working Paper 33202 (Nov. 2024); Julio Escolano, "A Practical Guide to Public Debt Dynamics, Fiscal Sustainability, and Cyclical Adjustment of Budgetary Aggregates," International Monetary Fund Technical Note (Jan. 2010).
[13] David Hume, *The History of England*, 8 vols. (Oxford: William Pickering, 1826 [1754-1762]).

across national boundaries generates strong incentives to prioritize debt servicing in national budgets. A government can ill afford to alarm investors, bond markets, asset managers, allocators of capital, central banks, and international financial institutions, lest all or some of these lose confidence and dump the government's bonds or currency, driving up the cost of new borrowing. As early as 1767, Adam Ferguson understood well the power that financial markets could wield over a profligate government. It was already obvious in the late 18th century that a sovereign owing money to domestic creditors faced somewhat different pressures and choices from one who owed money to foreign creditors; and that a sovereign with control over the currency in which his debt was denominated was more advantageously placed than one who had contracted debts in gold or a foreign currency.

2. The Wages of Debt Crises

The budgetary axe that cuts spending for the sake of debt service is often the harbinger of broader fiscal strains and political instability. "Austerity measures" are seldom without direct political consequences. They can exacerbate political polarization, stoke popular dissatisfaction with a state's ruling elite, or sow dissension within the elite itself. All else being equal, a fractured polity will face greater difficulties in forming a durable political consensus that prioritizes external military commitments over internal civilian ones. Those running heavily indebted states must make hard distributional choices between "disappointing the rentier," i.e., the bondholder, disappointing the generals and soldiers, disappointing the taxpayers, or disappointing the recipients of public salaries and transfer payments. The downstream economic consequences of a debt crisis can be damaging, as there are macroeconomic costs to austerity, default and inflation. The political consequences of a debt crisis can be dramatic. Ferguson was writing less than a decade before a revolution that had its origins in the tax demands on American colonists of a heavily indebted British state; and just 22 years before another revolution that had its origins in the French monarchy's inability to manage its debts—liabilities it had greatly enlarged by helping those colonists win their independence from London.

3. The Short and Long Tails of Military Debilitation

The deleterious effects of cutting or capping military budgets relative to GDP tend to group into a bimodal distribution. Over the short term, reductions in military spending can reduce troop numbers, shrink expected inventories of arms and munitions, render extant equipment unserviceable or obsolete, frustrate procurement schedules, generate market uncertainty for military-industrial contractors, and delay or cancel modernization programs. These factors directly harm military readiness and degrade operational capacity, both of which attenuate power projection abroad. Over the long term, the effects of the lost fiscal years of military modernization and force readiness can undermine national readiness for a major war before it is even fought. States may hedge against such a possibility by offloading strategic responsibilities onto allies or negotiating arms-control agreements that aim to restrain adversaries. Absent the means to enforce compliance with the implicit threat of force, however, such agreements tend to be advantageous to an adversary that is willing to cheat.

4. Security Dilemmas Old and New

What distinguishes great powers from merely regional ones is their ability to exert a degree of military, economic, political, diplomatic, or cultural influence beyond the immediate confines of their borders or region. The ability to project military strength is what Joseph

Nye has called "hard power," as opposed to the "soft power" of influence.[14] Military power secures the tangible and intangible assets that make a great power great in the first place—for example, its access to critical natural resources and land or sea trade routes, or its ability to communicate and collaborate with its allies. A decline in hard-power projection as a result of reduced defense outlays undermines the credibility of a great power's claims to regional or global leadership.

With a shrinking share of state resources allocated to research on, and development of, advanced military technologies and intelligence-gathering capabilities, a great power's ability to deter its rivals or successfully wage wars against them inevitably recedes. A local change in relative military strength can shift the regional or global balance of power, embolden revisionist states to challenge the declining great power, and induce a period of instability in which all other players in the game, including smaller states, seek a new equilibrium. A contraction of the overseas geopolitical commitments of a great power is usually framed in terms of redressing grievances—for instance, decolonizing to emancipate once-subjugated peoples and to reduce burdens on voters in the metropole—but in reality it signals the inability of a great power to remain a provider of regional or global security. A sudden withdrawal can leave a power vacuum in contested regions, which is usually filled by rival powers or hostile nonstate actors.

The Ferguson Limit

To convey how rising debt burdens are essentially hypotrophic to great-power status, an analogy from celestial mechanics may be helpful. The French astronomer Édouard Roche (1820–1883) defined the Roche limit as the minimum distance at which a satellite can orbit its primary body intact. Transgressing the limit risks the corporeal distortion of the satellite by the greater tidal forces of the primary body, which can overcome the self-gravitation of the satellite and violently pull it apart.[15] In a similar manner, debt servicing tends to pull scarce state resources towards itself and limit outlays on the line items that defray the costs of the armed services. Historically, rising debt service costs limit or reduce spending on arms in peacetime, as military spending is largely discretionary, but debt servicing is not, at least in theory. The diversion of resources away from its armed forces renders a great power vulnerable to diplomatic and economic coercion and risks outright military defeat. This is the essence of the Ferguson limit.

The Ferguson limit is the point at which the cost of debt servicing surpasses a great power's military spending. In itself, it cannot say what forces are responsible, but it is a useful predictor of the decline of a great power. Crossing the Ferguson limit is not necessarily deterministic of terminal great power decline, however. Unlike celestial bodies, nations have a degree of agency and can reverse course before the inertial pull of debt servicing distorts all other forms of spending. In that sense, the Ferguson limit is best regarded as a useful indicator. Crossing for an extended period it usually

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[14] Joseph S. Nye, Jr., *Soft Power: The Means to Success in World Politics* (New York: Public Affairs, 2004).

[15] Described in Édouard Roche, "Mémoire sur la figure d'une masse fluide, soumise à l'attraction d'un point éloigné (Première partie)," *Académie des Sciences et Lettres de Montpellier: Mémoires de la Section des Sciences*, vol. 1 (Montpellier: Typ. Boehm et fils, 1849), pp. 243–62; "Mémoire sur la figure d'une masse fluide, soumise à l'attraction d'un point éloigné (Seconde partie)," *Académie des Sciences et Lettres de Montpellier: Mémoires de la Section des Sciences*, vol. 1 (Montpellier: Typ. Boehm et fils, 1850), pp. 333–48; and "Mémoire sur la figure d'une masse fluide, soumise à l'attraction d'un point éloigné (Troisième partie)," *Académie des Sciences et Lettres de Montpellier: Mémoires de la Section des Sciences*, vol. 2 (Montpellier: Typ. Boehm et fils, 1851), pp. 21–32.

signals the deteriorating fiscal-military health of a great power. It necessitates action, because remaining above the Ferguson limit for a period of years is generally predictive of a great power's geopolitical decline. In that sense, Ferguson's Law is covering law in Carl Hempel's sense.[16] Of course, it is possible to find examples of great powers winning victories so comprehensive that they were able to cut military spending to the bone, crossing the Ferguson limit without necessarily having an excessively high debt burden. It is also possible to imagine a great power adhering to Ferguson's Law by defaulting entirely or partly on its debts, but the bill would fall due—in the form of a higher risk premium—the next time it had to borrow.

CASE STUDIES

To illustrate the usefulness of the Ferguson limit as an indicator of great power "overstretch," this section examines the relationship between debt servicing and military spending in a sample of great powers spanning the early-modern and modern eras. Individual cases are selected on the basis of several criteria, such as their having a degree of geopolitical similarity to the modern United States; bearing a significant public debt burden over a protracted period; and being exposed to the global financial markets of their era. These cases distinguish the dynamics of peacetime public finance from the *Zugzwang* of wartime crash spending, when military expenditures nearly always surge ahead of interest payments. They also show the illusory nature of the "dividends" that are supposed to be paid when peace allows military spending to fall. All cases fall within the first (1492–1800) and second (1800–1929) periods of globalization, when navigational and shipbuilding techniques, the firepower provide by gunpowder and increasingly accurate gunnery, and advances in manufacturing, communication, and propulsion technology made possible both unprecedented overseas imperial expansion and the first globally integrated markets.

Habsburg Spain and the Dutch Republic

It was fiscal mismanagement, not defeat in war or revolution, that laid low the first "empire upon which the Sun never set." At its height during the *Siglo de Oro*, the Spanish Empire was a colossus. The territories ruled by the House of Habsburg extended from the Kingdom of Castile across four continents. Spanish *tercios* (infantry formations) mastered the use of pikes and firearms (arquebuses). Spanish galleons shifted the fulcrum of global trade from Eurasia to Western Europe.[17] The empire's sixteenth-century rulers, notably Charles V (r. 1516-56) and Philip II (r. 1556-98), could credibly aspire to establish a universal monarchy.[18] However, over-reliance on a complex and costly system of debt financing ultimately undermined the position of their successors.

Revenues from American silver mines—accounting for nearly 20% of crown income during the 16th century—were crucial to financing Spain's expansive military endeavors.[19] Yet, as is well known, this system had defects understood by few contemporaries. As bullion flowed in, the price level rose, undermining the purchasing power of state revenues and distorting the broader European economy in what economic historians used to call the "Price Revolution." The Castilian crown had significant

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[16] Carl Hempel, "Reasons and Covering Laws in Historical Explanation," in William Dray (ed.), *Philosophical Analysis and History* (New York: Harper & Row, 1966), pp. 143–63.
[17] Peter Frankopan, *The Silk Roads: A New History of the World* (New York: Vintage Books, 2017), pp. 231f.
[18] José Martínez Millán and Manuel Rivero Rodríguez, "From Charles V to Philip IV of Spain: The Concepts of *Monarchia Universalis* and Catholic Monarchy," *History of European Ideas*, 50 (Oct. 2024), pp. 4–7.
[19] Mauricio Drelichman and Hans-Joachim Voth, "Lending to the Borrower from Hell: Debt and Default in the Age of Philip II," CEPR Discussion Paper No. DP7276 (May 2009), p. 18.

sources of internal revenue: the *alcabala* (a sales tax), *servicio ordinario* and *extraordinario*, customs and monopolies. But the crown was reluctant to increase its reliance on the Cortes, which consented to such taxes. Moreover, the tax system was highly regressive, relying disproportionately on indirect taxes paid by the lower classes, while the nobility and clergy—protected by legal exemptions—contributed little. The system of *fueros*, which codified exemptions for regions and estates, fragmented the tax base. This left the empire increasingly reliant on borrowing to sustain its military machine.

The state's principal borrowing instruments, the *juros*, were revolutionary for their time. These long-term bonds, secured against specific revenues and held mostly by members of the Castilian elite, provided a steady stream of funds. However, they also created a substantial claim on the empire's finances.[20] By the late 16th century, the obligation to service the interest accrued on the *juros* consumed over 40% of annual revenues.[21] In addition, the Spanish crown contracted short-term and contingent *asientos*, loans from bankers in Genoa and elsewhere, which represented between 10 and 25% of total obligations.[22] As figure 1 shows, Spain arguably became the first great power to cross the Ferguson limit between 1575 and 1583, when debt servicing costs overtook military spending. But the violation was brief. The Castilian government ran primary surpluses between 1566 and 1596.[23] The real fiscal crisis came later.

[20] Mauricio Drelichman and Hans-Joachim Voth, *Lending to the Borrower from Hell: Debt, Taxes, and Default in the Age of Philip II* (Princeton, 2014), p. 98.
[21] Mauricio Drelichman and Hans-Joachim Voth, "Debt Sustainability in Historical Perspective: The Fiscal Cost of Imperial Ambitions," in *Sustainable Fiscal Policies and Public Debt Management*, ed. P. Kenny (Oxford: Oxford University Press, 2011), pp. 135–157. See also Mauricio Drelichman and Hans-Joachim Voth, "The Sustainable Debts of Philip II: A Reconstruction of Castile's Fiscal Position, 1566–1596," in *Journal of Economic History*, 70, 4 (Dec. 2010), p. 823.
[22] Drelichman and Voth, *Lending to the Borrower from Hell*, p. 99.
[23] James Conklin, "The Theory of Sovereign Debt and Spain Under Philip II," *Journal of Political Economy* 106, 3 (Jun. 1998), p. 488.

Figure 1

Source: Drelichman and Voth, *Lending to the Borrower from Hell*, p. 117. Raw data kindly provided by Mauricio Drelichman.

Spanish imperial finance in the 17th century illustrated Adam Ferguson's point that over-reliance on borrowing gradually erodes the strength of a great power. Spain's reliance on debt led to the pattern of serial default that is the hallmark of unstable fiscal regimes. Between 1557 and 1662, the Spanish crown defaulted on part of its debt eight times—1557-60, 1575, 1596, 1607, 1627, 1647, 1652 and 1662—renegotiating its debts with creditors to alleviate fiscal pressures.[24] (Spain defaulted a further eight times in the 19th century.)[25] A fifth of all *asientos* concluded in Philip II's reign were not repaid by the original deadline, while in nearly a third of cases there was some failure to fulfil the terms of the contract. These defaults ultimately eroded the crown's creditworthiness, forcing it to borrow at increasingly punitive interest rates. The system was very lucrative for the bankers who did much of the lending. The median gross rate of return on the *asientos* was 13.8%, and many contracts earned an effective interest rate of 20%.[26]

In some ways, the term "default" is misleading. In practice, the crown was restructuring its debt by converting short-term liabilities into the longer-term *juros*. The negotiations were known as the *Medio General*. The problem was that this caused the stock of long-term debt to grow inexorably, and with it the burden of interest payments. The total stock of *juros* grew by a factor of 3.4 between 1594 and

[24] José Ignacio Andrés Ucendo and Ramón Lanza García, "The Castilian Fiscal and Financial System in the 16th and 17th Centuries (1561-1700)" (forthcoming).
[25] Drelichman and Voth, *Lending to the Borrower from Hell*, p. 104.
[26] *Ibid.*, p. 109.

1687, at a time when the revenues of the crown stagnated.[27] Payments on the *juros* (known as the *situado*) went from absorbing 52% of Castilian revenues in 1667 to 87% twenty years later.[28] As Philip IV told the Council of the Indies in 1639, "I recognize that the introduction of the juros has caused the enormous ruin we experience."[29] Nevertheless, in 1608 and again between 1639 and 1665, the government in Castile also authorized the sale of long-term debt secured on the revenues of the Real Hacienda in Lima and Mexico City, though New World *juros* never became as large as source of revenue as those secured on Castilian revenues.[30]

Spain's fiscal system was more sustainable than used to be thought, but it was insufficient to fulfil the monarchy's strategic ambitions. The crown's commitments were immense: maintaining the forward deployment of the *tercios* deep within hostile territory; securing vital trade routes in the Americas and Asia; and engaging in prolonged wars against Protestant rebels in the Netherlands, the Ottoman Empire in the Mediterranean, and Bourbon France across the Pyrenees. Between 1556 and 1659, military expenditures averaged 75% of total government outlays.[31] However, as debt servicing obligations mounted, the financial resources available to sustain these military commitments dwindled. In 1608 the Duke of Lerma, Philip III's chief minister, implemented a conversion operation, buying back the *juros* that carried the highest interest rates and converting them into annuities paying 5%, an operation financed by selling *juros* in Peru and Mexico.[32] The reign of Philip IV (r. 1621-1665) was notable for increasingly reckless financial expedients, such as the 1634 seizure of the interest due on the *juros* (euphemistically called *media annata de juros*), a measure highly damaging to investor confidence.[33] In addition, the government found that it could make money by debasing the petty copper currency known as *vellón*—though foreign creditors would accept payment in such coins only if they received additional supplements known as *reducciones*.[34] This was more obviously inflationary than the more gradual rise in the price level caused by the influx of New World silver. Not coincidentally, the growth in per capital GDP that had characterized the 16th century "Golden Age" was followed by contraction in the 17th.[35] This in turn reduced the crown's tax revenues: despite the creation of new taxes and state monopolies, total revenues fell by 46% between 1679 and 1687.[36]

Payment delays and supply shortages became endemic, undermining troop morale and operational readiness. The destruction of the Armada in 1588 might be dismissed as bad luck, but the protracted failure to suppress the 80-year Dutch Revolt exposed the limits of Spanish hard power. By the mid-17th century, Spain's once dominant *tercios* had fallen behind the innovative mixed order of Maurice

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[27] Data from José Ignacio Andrés Ucendo and Ramón Lanza García, available at the European State Finance database: https://www.esfdb.org/.

[28] Andrés Ucendo and Lanza García, "Castilian Fiscal and Financial System." See also Sergio Tonatiuh Serrano Hernández, "Debt Policy in Spanish America During the Seventeenth Century," *Explorations in Economic History*, 90 (Oct. 2023), p. 11 (table 3).

[29] Ibid., pp. 12f.

[30] Hernández, "Debt Policy in Spanish America," pp. 1f.

[31] Geoffrey Parker, *The Military Revolution: Military Innovation and the Rise of the West, 1500*–1800, 2nd ed. (Cambridge: Cambridge University Press, 1996).

[32] Hernández, "Debt Policy in Spanish America," pp. 11f.

[33] *Ibid.*, p. 6. See also Carlos Álvarez Nogal, *Oferta y Demanda de Deuda Pública en Castilla: Juros de Alcabalas (1540-1740)*, *Estudios de Historia Económica*, 55 (Madrid: Unidad de Publicaciones, Banco de España, 2009).

[34] Andrés Ucendo and Lanza García, "The Castilian Fiscal and Financial System."

[35] Carlos Álvarez-Nogal, Leandro Prados De La Escosura, "The Decline of Spain (1500–1850): Conjectural Estimates," *European Review of Economic History*, 11, 3 (Dec. 2007), pp. 319–366.

[36] Andrés Ucendo and Lanza García, "The Castilian Fiscal and Financial System."

of Nassau on land, and its naval competitive advantage was being eclipsed by nimbler English and Dutch hulls at sea.[37] The geopolitical repercussions were unavoidable. In 1640 Portugal regained its independence after 60 years of dynastic union. The Peace of Westphalia in 1648 marked the formal recognition of Dutch independence and the effective end of Spain's predominance in Europe. The Treaty of the Pyrenees in 1659 further underscored its diminished status, as Spain ceded territory to France. The Spanish presence in the Indian Ocean was also greatly reduced. Not coincidentally, the costs of defending Spain's New World empire surged from around 1650, so that a rising share of colonial revenues was consumed by military operations as well as administration in the Caribbean, Chile, and the Philippines.[38]

The experience of Habsburg Spain is a warning against crossing the Ferguson limit for a sustained period. What had worked for Philip II in the 16th century broke down under his successors. As debt servicing costs consumed an ever-larger share of revenues, the state's ability to fund its military commitments was eroded. Defaults and currency depreciation eroded investor confidence and surely contributed to the 17th-century slowdown in the Castilian economy. The growing imbalance between fiscal obligations and strategic needs inexorably forced geopolitical retreat.

Significantly, one of the principal adversaries Spain faced in this period, the Dutch Republic, consistently adhered to Ferguson's Law. In the initial emergency of revolting against Spanish rule, interest payments on the various annuities issued by Dutch cities were suspended. The period of hardest fighting was a time of financial improvisation, including the use of forced loans, but military success and economic growth led to rising revenues and consolidation of the fiscal system. Between 1575 and 1713, military spending consistently exceeded interest payments on provincial and "generality" debts combined. Only between 1714 and 1729— the period of peace in Europe between the War of the Spanish Succession and the War of the Austrian Succession—did interest payments exceed defense spending (see figure 2). The key to the Dutch victory over Spain was institutional. With their republican institutions, the United Provinces combined the advantages of the city-state with the scale of a nation-state.[39] They were able to finance their wars by developing Amsterdam as the market for a whole range of new securities—not only life and perpetual annuities, but also lottery loans and an ever-growing quantity of short-term bills. By 1650 there more than 65,000 Dutch *rentiers*—men who had invested their capital in one or other of these debt instruments and thereby helped finance the long Dutch struggle to preserve their independence. As the United Provinces progressed from self-defense to imperial expansion, their debt mountain grew from 50 million guilders in 1632 to 250 million in 1752. Yet the market interest rate on Dutch bonds declined steadily, to a low of just 2.5% in 1747—a sign not only that capital was abundant in the United Provinces, but also that investors had little fear of a Dutch default.[40] The Dutch problem was that the holders of annuities and bills grew risk-averse, preferring to collect the interest on public debt than on riskier economic and geopolitical ventures. In the words of a recent study, "the political question of whether or not to wage war … played out in the Estates of Holland among the 18 cities represented there. Over time, the cities moved from supporting offensive warfare to

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[37] William H. McNeill, *The Pursuit of Power: Technology, Armed Force, and Society Since AD 1000* (Chicago: University of Chicago Press, 1982), pp. 99–102, 131, 134–135,

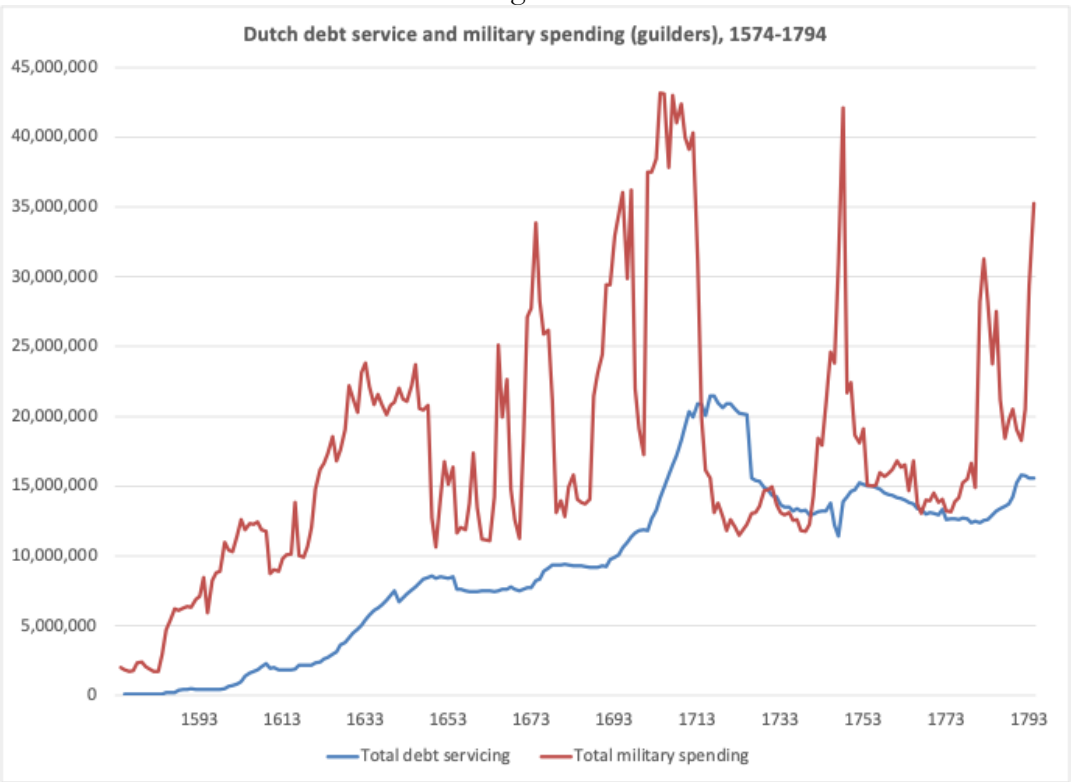
[38] Hernández, "Debt Policy in Spanish America," pp. 3, 6f.

[39] David Stasavage, *States of Credit: Size, Power, and the Development of European Polities* (Princeton: Princeton University Press, 2011).

[40] Marjolein 't Hart, "The United Provinces 1579-1806," in Richard Bonney (ed.), *The Rise of the Fiscal State in Europe, c. 1200-1815* (Oxford: Oxford University Press, 1999), pp. 311ff.

retreat from interstate competition."[41] The beneficiaries of this Dutch retreat were England and France.

Figure 2



Source: Wantje Fritschy, *Public Finance of the Dutch Republic in Comparative Perspective: The Viability of an Early Modern Federal State (1570s-1795)*, Library of Economic History, vol. IX (Leiden: Brill, 2017).

Ancien Régime France and Hanoverian Britain

Perhaps the most familiar case of a great power succumbing to fiscal constraints is that of Bourbon France in its contest with Hanoverian Britain in the late 18th century. By the death of Louis XIV in 1715, France was without question the most powerful state in Europe. Eighty years later, the monarchy had been overthrown and the country, now a revolutionary republic, found itself at war with Austria, the Netherlands, and Spain.

Of all the great powers, France had the greatest difficulty in evolving a stable system of public debt management—a distinct disadvantage for a power which ran a deficit in every year between 1610 and 1800 apart from the nine years between 1662 and 1671.[42] This was not for want of trying. Under Louis XIV, Jean-Baptiste Colbert had labored to raise tax revenues and to establish in the form of the *caisse des emprunts* an institution of modern debt management. It was abolished after his death.[43] In 1718 the Scotsman John Law set out to modernize French borrowing—which under Louis XIV

[41] Oscar Gelderblom and Joost Jonker, "Public Finance and Economic Growth: The Case of Holland in the Seventeenth Century," *Journal of Economic History*, 71, 1 (Mar. 2011), p. 2.

[42] Geoffrey Parker, ""The Emergence of Modern Finance in Europe, 1500–1730," in C. M. Cipolla (ed.), *The Fontana History of Europe*, vol. II: *The Sixteenth and Seventeenth Centuries* (London: Fontana, 1974), p. 575.

[43] *Ibid.*, p. 576.

had relied increasingly on innumerable short-term loans from tax farmers, accountants and contractors[44]—by combining the functions which were carried out separately in Britain by the Bank of England and monopoly trading companies. His Banque Générale was re-chartered as the Banque Royale and, in return for exchanging its own stock for the existing government debt, gained the right to issue banknotes. However, from the outset, the Banque Royale's fortunes were inseparable from those of Law's Compagnie d'Occident, which had been granted monopolies on French trade with the Caribbean and the Mississippi river basin. In May 1719 Law merged the Compagnie d'Occident with two other trading companies to form the Compagnie des Indes, then used issues of new Banque Royale banknotes to chase up the prices of the new company's shares. He then proceeded to take over the royal tobacco monopoly and the United General Farms, the corporation of the principal tax farmers. At the zenith of his "system," Law accepted the office of Comptroller General and merged the Banque Royale and the Compagnie des Indes. As inflation surged, the bubble burst. By September 1720, the share price of the Compagnie des Indes had fallen by 80%; in October the notes of the Banque Royale ceased to be legal tender; and in December Law fled France.

The collapse of Law's schemes, it is generally agreed, "demolished the existing credit structure in France,"[45] far more than the roughly contemporaneous South Sea Bubble damaged the English financial system.[46] Because of Law's failure and the drastic way it was dealt with, France remained locked in a system whereby private credit was restricted to the "information network" provided by an elite of public notaries,[47] while public credit increasingly depended on the old forms of short-term loan ("assignations," "anticipations," and "rescriptions")[48] and the sale of offices. (The money invested in offices was not so different from the money invested in bonds, except that the interest was paid in the form of salaries.) In 1660 Colbert estimated the value of the capital invested in offices by some 46,000 officeholders at 419 million livres; when the Revolution finally liquidated the system, the compensation paid to officeholders was almost twice that sum.[49]

The English fiscal system was already significantly different from that of the continental monarchies. The lands owned by the Crown had been sold off earlier than elsewhere, increasing the power of parliaments to control royal expenditure at a time when the powers of comparable bodies were waning in Spain, France and the German lands. There was already an earlier English move in the direction of a professional civil service, reliant on salaries rather than peculation. The Glorious Revolution of 1688—which ousted the Roman Catholic James II from the English throne in favor of the Protestant Prince of Orange—introduced to London a number of crucial financial institutions that the Dutch had pioneered. In 1694 the Bank of England was founded to manage the government's borrowings as well as the national currency, similar (though not identical) to the successful Amsterdam Wisselbank founded eighty-five years before. A more centralized system of borrowing than the Dutch one evolved: a national public debt with a Stock Exchange, where long-term bonds could easily be bought and sold in primary and secondary markets. From now on there

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[44] See J. F. Bosher, *French Finances, 1770-1795* (Cambridge: Cambridge University Press, 1970), pp. 12–16.

[45] Larry Neal, "How It All Began: The Monetary and Financial Architecture of Europe during the First Global Capital Markets, 1648–1815," paper presented at the Conference on the History of Global Finance, Yale School of Management (Oct. 15, 1999), pp. 26–33.

[46] Philip Mirowski, "The Rise (and Retreat) of a Market: English Joint Stock Shares in the Eighteenth Century," *Journal of Economic History*, 41, 3 (Sep. 1981), p. 569.

[47] Neal, "How It All Began," pp. 33f.

[48] William Doyle, *Origins of the French Revolution* (Oxford: Oxford University Press, 1980), p. 50.

[49] Richard Bonney, "France, 1494–1815," in *idem* (ed.), *The Rise of the Fiscal State in Europe, c. 1200–1815* (Oxford: Oxford University Press, 1999), pp. 131ff., 152f.

was no more regular defaulting (such as the "Stop of Exchequer" of 1672). There was no more debasement of the coinage, particularly after the adoption of the gold standard in 1717. Crucially, there was henceforth to be parliamentary scrutiny of royal finances—though it is important to note that the credibility of the political parties' commitment to fiscal stability took some decades to establish.[50] And there was a sustained effort to consolidate the various debts that the Stuart dynasty had incurred over the years, a process that culminated in 1749 with the creation by Sir Henry Pelham of the "Consolidated Fund."[51]

In London by the mid eighteenth century there was therefore a thriving bond market, in which government "consols" were the dominant securities traded, bonds that were highly liquid—in other words easy to sell—and attractive to foreign (especially Dutch) investors.[52] The fact that this allowed the government to borrow at significantly reduced interest rates made wars far easier to afford. Daniel Defoe was quick to see what that meant:

> Credit makes war, and makes peace; raises armies, fits out navies, fights battles, besieges towns; and, in a word, it is more justly called the sinews of war than the money itself, because it can do all these things without money—nay, it will bring in money to be subservient, though it be independent.
>
> Credit makes the soldier fight without pay, the armies march without provisions, and it makes tradesmen keep open shop without stock. The force of credit is not to be described by words; it is an impregnable fortification, either for a nation, or for a single man in business; and he that has credit is invulnerable, whether he has money or no; nay, it will make money, and, which is yet more, it will make money without an intrinsic, without the *materia medica* (as the doctors have it); it adds a value, and supports whatever value it adds, to the meanest substance; it makes paper pass for money, and fills the Exchequer and the banks with as many millions as it pleases, upon demand.[53]

Defoe added in footnote: "How strikingly was this proved in the last war [War of the Spanish Succession 1702-13], when the British government obtained credit for no less than six hundred millions to conduct warlike operations, and by these means was ultimately victorious." Over a third of the cost of that war (37.6%) had been financed by loans, over a quarter of the cost of the Seven Years' War (28.5%) was later financed that way, and nearly half of the American War of Independence (47.3%).[54]

The French fiscal system lagged woefully behind. After Law, there was no central note-issuing bank. There was no liquid bond market where government debt could be bought and sold. The tax system had in large measure been privatized. Instead of selling bonds, the French crown sold offices, creating a bloated public payroll. A succession of able ministers—Charles de Calonne, Loménie de

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

[51] Douglass C. North and Barry R. Weingast, "Constitutions and Commitment: The Evolution of Institutions Governing Public Choice in Seventeenth-Century England", *Journal of Economic History*, 49, 4 (1989), pp. 803−32. The classic account of Britain's financial revolution is P.G.M. Dickson, *The Financial Revolution in England: A Study in the Development of Public Credit, 1688-1756* (London: Routledge, 1967).

[52] Larry Neal, *The Rise of Financial Capitalism: International Capital Markets in the Age of Reason* (Cambridge: Cambridge University Press, 1990).

[53] Daniel Defoe, *The Complete English Tradesman* (London, 1726), ch. 24.

[54] D.E. Schremmer, "Public Finance in Britain, France and Germany," in Peter Mathias and Sidney Pollard (eds.), *The Cambridge Economic History of Europe*, vol. VIII: *The Industrial Economies: The Development of Economic and Social Policies* (Cambridge: Cambridge University Press, 1989), p. 320.

Brienne and Jacques Necker—tried and failed to reform the system. In their search for new sources of revenue after 1750, ministers turned to life annuities (*rentes viagères*), which increasingly took the place of sales of office as the crown's readiest source of funds. However, a rising proportion of these were sold at a flat rate without regard to the ages of the purchasers.[55] Between 1777 and 1781, Necker borrowed some 520 million livres by this and other means, but for terms seldom exceeding twenty years.[56] His successors Calonne and Brienne could not equal this and, despite the forcible registration of new loans in the parlement of Paris in November 1787, royal finances became increasingly dependent on renewing the short-term *anticipations* of future tax revenue, which now amounted to some 240 million livres. When the government attempted to override the parlement's demand that the Estates General be convened, "the government's usual creditors refused to lend." In August 1788 Brienne was forced to suspend payments, even on long-term rentes. The easy way out of the mess would have been for Louis XVI to default on all the monarchy's debts, which took a bewildering variety of different forms and cost almost twice what the British government was paying on its standardized bonds. Instead, the King sought consensus. An Assembly of Notables went nowhere. The lawyers of the *parlements* only made trouble. Finally, in August 1788, Louis was persuaded to summon the Estates General, a body that had not met since 1614.[57]

The domestic crisis was prefigured by geopolitical overstretch. French intervention in support of the American colonists, culminating at Yorktown in 1781, may have appeared a strategically smart retaliation for defeat in the Seven Years' War. But the fiscal consequences took Louis XVI's government far beyond the Ferguson limit. By 1780, debt service was absorbing 43% of total expenditure, the War Department just 24.7%. By 1788, debt service rose above half of total expenditure.[58] According to Patrick O'Brien's estimates for military spending and the Bank of England's data for debt service, only in 1790 did UK debt service costs exceed the cost of warfighting.[59] Yet the historian must be wary of "just so" stories. According to Schremmer, Britain's public finances violated the Ferguson limit for most of the eighteenth century. Already in 1739, British debt service was 42% of total expenditure, compared with 39% spent on the Army and Navy. By 1792, the figures were, respectively, 55% and 37% (see figure 3).[60] The difference between Britain and France was twofold: first, the lower borrowing costs enabled Britain to pay for a much larger navy than France; second, the British tax system, though highly regressive, was not sufficiently unpopular to contribute to a legitimacy crisis of the regime at home—only abroad, in those American colonies where even modest additional taxation elicited fiery demands for political representation. In that sense, the Hanoverian crossing of the Ferguson limit did have geopolitical consequences.

The best available French sovereign borrowing rate that can be compared with that for Britain is probably the yield on the *emprunt d'october* (October Loan) created by the new Compagnie des Indes in 1745.[61] Averaging out the figures for 1754 to 1789, we can see that the cost of borrowing was

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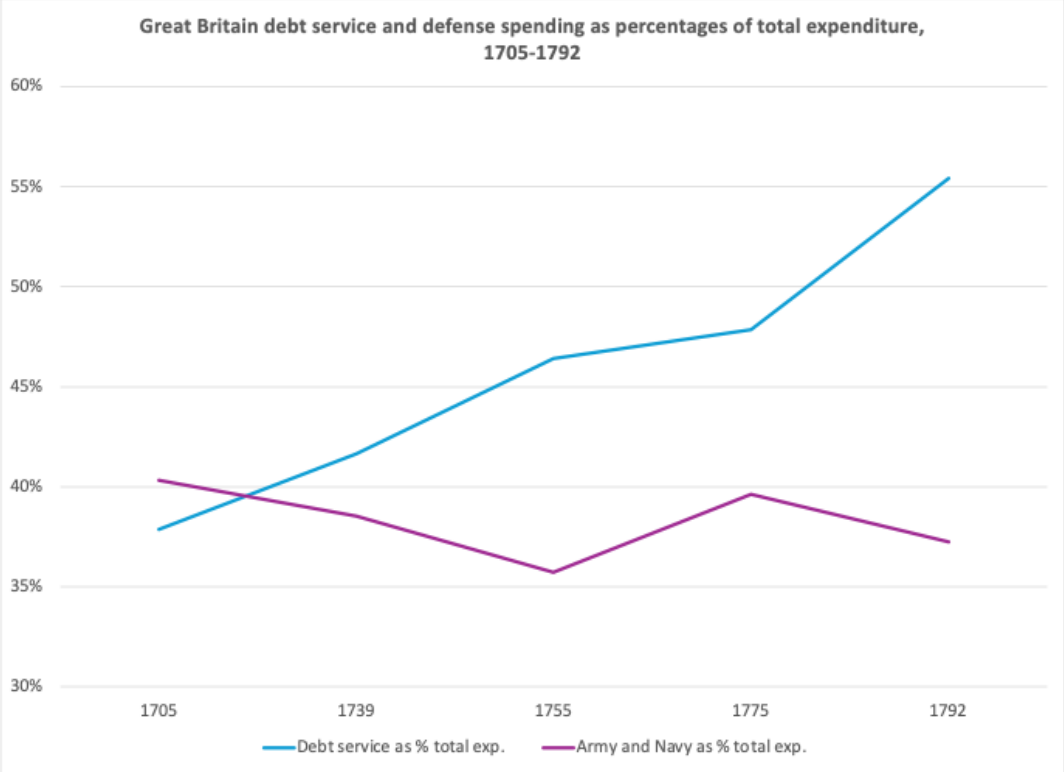
[55] François R. Velde and David R. Weir, "The Financial Market and Government Debt Policy in France, 1746–1793," *Journal of Economic History*, 52, 1 (Mar. 1992), pp. 3, 28–36.
[56] Doyle, *Origins*, p. 48.
[57] Ibid., p. 114.
[58] Schremmer, "Public Finance in Britain, France and Germany," p. 370.
[59] Compare the estimates of interest payments provided by the Bank of England with those on defense in Patrick K. O'Brien, "Power with Profit: The State and the Economy, 1688-1815," University of London inaugural lecture (London, 1991), pp. 34f.
[60] Schremmer, "Public Finance in Britain, France and Germany," p. 326.
[61] Velde and Weir, "Financial Market," p. 23.

significantly higher for France than for her rival across the Channel by around 244 basis points, or nearly two and a half per cent.[62] These differentials were based on past experience of which bonds were most likely to be defaulted upon: there was an element of "prepaid repudiation."[63] But there was also clearly a jump in French yields in the aftermath of defaults in 1759 and 1770, suggesting that the market was not wholly clairvoyant.[64] Moreover, the rates the French government had to pay on new loans issued in the period was almost always significantly higher than the yield on the October Loan.[65] These were far higher rates than the British government had to pay for old or new loans. This was what Bishop Berkeley meant when he said that credit was "the principal advantage which England hath over France."[66] As Isaac de Pinto put it in 1771, when French yields were soaring: "It is not credit that has ruined the finances of France … On the contrary, it was the failure of credit in time of need that did the mischief."[67] Only after another great financial collapse—that caused by the Revolution—were steps taken to remodel French finance in something like the British image. Henceforth government borrowing took the form of issues of *rentes perpetuelles* bearing interest of 3 or 5%.[68]

Figure 3



Source: Schremmer, "Public Finance in Britain, France and Germany," p. 326.

[62] Neal, *Financial Capitalism*, pp. 241–57, for consol prices; French data kindly supplied by François Velde.
[63] The phrase is James Riley's, quoted in Velde and Weir, "Financial Market," p. 37.
[64] Eugene N. White, 'France and the Failure to Modernize Macroeconomic Institutions', Paper presented at the 12th International Economic History Congress, Madrid (Aug. 1998), pp. 31f. See also Stasavage, *Public Debt*, p. 96.
[65] Velde and Weir, "Financial Market," pp. 20-3.
[66] Paul M. Kennedy, *The Rise and Fall of the Great Powers: Economic Change and Military Conflict from 1500 to 2000* (London, 1988), pp. 103ff.
[67] Bonney, "France, 1494–1815," p. 136.
[68] Eugene N. White, "Making the French Pay: The Costs and Consequences of the Napoleonic Reparations," *European Review of Economic History*, 5, 3 (Dec. 2001), pp 337–65.

The Ottoman Empire

At its height, the Ottoman Empire spanned three continents; its capital stood astride vital East-West trade routes; and its galleys secured its maritime commerce across three oceans. By the 19th century, however, a chronic reliance on foreign debt, the inability to modernize its fiscal system, and prolonged military engagements against expansionist neighbors placed the empire on a trajectory of decline. Like Habsburg Spain, the "sick man of Europe" was not felled by a singular catastrophic event, but rather by the corrosive force of Ferguson's Law, which ultimately made it financially dependent on its foreign creditors.

The economic fortunes of the Ottoman Empire were tightly tied to its strategic ambitions. During its zenith in the 16th century, the House of Osman controlled critical trade routes linking Europe to Asia and the Middle East, generating immense revenue from customs duties and tariffs. Its galleys projected naval power into all the empire's littoral seas. Its statesmen thwarted Portuguese commercial and military intrusions into the Indian Ocean and waged "history's first world war" from 1536 to 1546.[69] Its agrarian economy, structured around the *timar* system, ensured both military recruitment and tax collection. However, as ascendant European naval powers redirected global trade patterns away from their former Eurasian core and towards the Atlantic periphery, the economic base of the empire began to erode. This loss of revenue coincided with increasing military pressures as the Ottomans sought to defend and expand their territories against European rivals, from Portugal in the Persian Gulf to Russia across the Black Sea.

The 19th century marked the empire's descent into fiscal dependency as legacy methods of revenue generation proved incapable of matching the fiscal burdens of modern statehood. Seeking to modernize its military and infrastructure to compete with European powers, the Sublime Porte became increasingly dependent on foreign loans. These loans, predominantly from British and French creditors, carried high interest rates and restrictive terms that presaged the conditionality of International Monetary Fund loans to modern distressed markets.[70]

The Crimean War was reflective of a deteriorating pattern. Ottoman public expenditures were tens of times greater at the conclusion of peace in 1856 than they had been at the outset of the Greek revolt.[71] Fighting alongside Britain and France against Russia, the Ottoman Empire financed its war effort almost entirely through borrowing. Despite the destruction of the Ottoman fleet at Sinope in 1854, foreign military intervention secured temporary breathing room for the Porte. However, the financial aftermath of the war proved ruinous. By the 1870s, interest payments on foreign debt consumed more than half of government revenues,[72] far outpacing military expenditures, at a time when European militaries were rearming with cartridge small arms and breechloading cannon (see figure 4).

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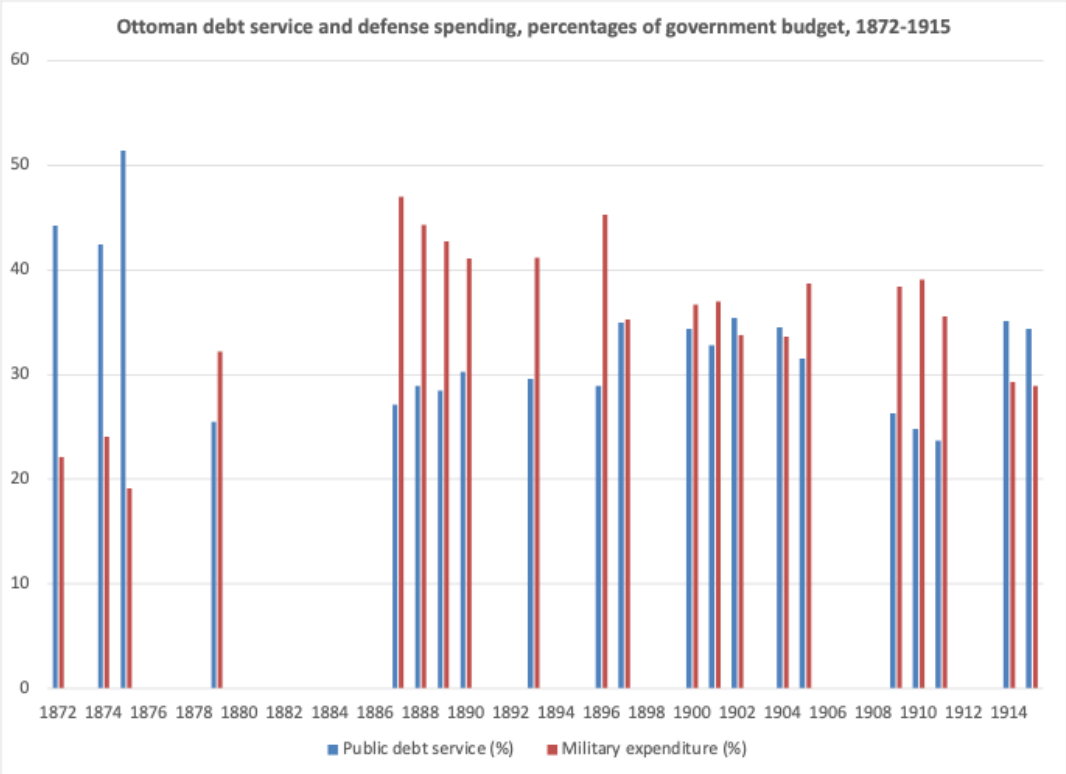
[69] Giancarlo Casale, *The Ottoman Age of Exploration* (Oxford: Oxford University Press, 2010), pp. 80–3.
[70] Emine Kıray, "Turkish Debt and Conditionality in Historical Perspective: A Comparison of the 1980s with the 1860s," in Tosun Arıcanlı and Dani Rodrik (eds.), *The Political Economy of Turkey: Debt, Adjustment and Sustainability* (London: Palgrave Macmillan, 1990), pp. 254–7.
[71] Natalia Chernichenkina, "The Ottoman Public Debt in the Economic History of Russian Turkology," *Atatürk Araştırma Merkezi Dergisi* [*Atatürk Research Center Journal*] 28, 82 (Mar. 2012), pp. 131f.
[72] Engin D. Akarli, "Economic Policy and Budgets in Ottoman Turkey, 1876–1909," *Middle Eastern Studies* 28, 3 (Jul. 1992), pp. 443–476.

The empire's fiscal woes came to a head in 1875, when the Ottoman government defaulted on its debt. The establishment of the Ottoman Public Debt Administration (OPDA) in 1881 put European creditors in charge of key revenue streams, such as customs duties and tobacco taxes.[73] While the OPDA helped stabilize fiscal inflows, it also represented a profound diminution of sovereignty and relegation of the Ottoman Empire to the "poor periphery."[74]

Figure 4



Source: Engin D. Akarli, "Economic Policy and Budgets in Ottoman Turkey, 1876–1909," *Middle Eastern Studies* 28, 3 (Jul. 1992), pp. 443–476

The Ottoman Empire crossed the Ferguson limit several times from Abdulaziz (r. 1861–1876) to Mehmed V (r. 1909–1918). In 1872, 1874, and 1875, public debt service exceeded military spending by a factor of, respectively, 2.0, 1.76 and 2.7. However, the importance that Abdul Hamid II (r. 1876–1909) attached to military modernization required a larger allocation of state financial resources to the military. Debt servicing and military spending ran neck and neck in the decade between the Cretan crisis and Vienna's annexation of Bosnia-Herzegovina; the latter briefly exceeded the former again in 1904. The Porte once again crossed the Ferguson limit in 1914–1915, after which the war drove military spending back in front.

The consequences of fiscal overextension were starkly visible in the Ottoman military. Chronic underfunding left the empire unable to modernize its forces sufficiently in an era of rapid technological change. A budget crisis in 1906 both halted the construction of the Baghdad Railway

[73] Olive Anderson, "Great Britain and the Beginnings of the Ottoman Public Debt, 1854–55," *Historical Journal*, 7, 1 (1964), p. 62.
[74] Joseph L. Love, "Raul Prebisch and the Origins of the Doctrine of Unequal Exchange," *Latin American Economic Review* 15, 3 (1980), pp. 45–72.

and left pay for officers and men in arrears for months, prompting some 17 army mutinies through 1908.[75] Despite the presence of a German military mission in the army and a British military mission in the navy, it was obvious by the time of the Cretan crisis of 1898 that the Ottoman armed forces lagged behind their European counterparts in artillery, logistics, naval power, and training.[76] This disparity became glaringly apparent during the First and Second Balkan Wars (1912–1913), in which a coalition of smaller Balkan states inflicted humiliating defeats on the Ottomans. These conflicts cemented the loss of the Porte's formerly productive Rumelian lands and left a small exclave around Adrianople to defend the land approaches to the capital. The empire's inability to sustain its military ambitions also undermined its diplomatic credibility. Allies grew skeptical of the Ottomans' capacity to fulfill their commitments, while adversaries exploited the empire's weaknesses.

The Ottoman Empire's decline shows once again how financial mismanagement can erode geopolitical power. First, excessive reliance on foreign debt reduced the empire's ability to achieve its strategic objectives. This dependency placed its economic sovereignty in the hands of foreign creditors. Secondly, the fiscal rigidity of OPDA-imposed conditionality created a vicious circle of underinvestment in critical sectors, particularly the armed forces, heavy industry, and transportation infrastructure.[77] Passing the Ferguson limit marked a tipping point, as the costs of debt servicing undermined the Porte's ability to fund its military commitments and maintain its territorial integrity.

Austria-Hungary and Tsarist Russia

At its zenith, the Austro-Hungarian Empire spanned nearly 700,000 square kilometers and ruled over 51 million people in the heartland of Europe. Vienna was a major cultural capital, while its diplomats proved crucial to securing the long European peace of 1815–1914. For the economic historian, Austria-Hungary's position as a "self-financing but not capital importing" country put it somewhere between the 19th-century core of "net creditors" (Britain, France) and peripheral countries who needed to "borrow large amounts from abroad" (Russia, Italy).[78] While Austria-Hungary has long been studied as a victim of the centripetal forces of nationalism, its fiscal dysfunction—arguably the more proximate cause of its decline—deserves equal scrutiny.

In the late 19th century, Austria-Hungary's macroeconomic position was by no means bad. True, industrialization was uneven and biased towards the Cisleithanian half of the Dual Monarchy, with the empire's heavy-industrial base concentrated in Lower Austria and Bohemia, in contrast to the relatively underdeveloped agrarian economy of the Transleithanian Lands of St. Stephen.[79] But the Empire was narrowing the per-capita industrial output gap relative to Germany, Britain, and

[75] Sean McMeekin, *The Ottoman Endgame: War, Revolution, and the Making of the Modern Middle East, 1908–1923* (New York: Penguin Press, 2015), p. 44.
[76] For discussion on the lingering problems and inadequacies of Ottoman military modernization, cf. Colmar von der Goltz, "Stärke und Schwäche des türkischen Reiches," *Deutsche Rundschau*, 93 (Oct. 1897), pp. 95–119.
[77] Şevket Pamuk and Jeffrey G. Williamson, "Ottoman De-Industrialization 1800–1913: Assessing the Shock, Its Impact and the Response," *NBER Working Paper* 14763 (Mar. 2009), 1–43, at p. 15, http://www.nber.org/papers/w14763.
[78] Niall Ferguson, *The World's Banker: The History of the House of Rothschild* (London: Weidenfeld & Nicolson, 1998), p. 938.
[79] N. T. Gross, "Industrialization in Austria in the Nineteenth Century," unpublished PhD dissertation, University of California–Berkeley (1966), p. 96.

France.[80] The "very successfully" implemented shadow gold standard of the 1890s *Valuta Regulierung* also brought currency stability.[81]

The Empire's weakness was the fiscal effect of the constitutional *Ausgleich* of 1867, which gave the Hungarian half of the empire its own parliament, tax base, and state bureaucracy. The *Ausgleich* established a two-tier fiscal system operating at a "country level" and a "confederate level," not dissimilar to the modern European Union. At the country level, the parliaments in Vienna and Budapest determined their own expenditures, taxation, and investments. Their budgets were not obliged to balance and indeed oscillated a good deal.[82] At the confederal level, the rising burden of military spending began to outstrip the ability of customs revenues and annual appropriations from the two parliaments to fund all imperial institutions. This led to chronic budget deficits and rising public debt.

A striking feature of the Dual Monarchy's fiscal policy was its prioritization of debt servicing over military modernization. With the exception of the years 1869–1873, 1878, 1909, and 1913, the Dual Monarchy was born, matured, and grew old in excess of the Ferguson limit (see figure 5). At the outbreak of World War I, debt servicing consumed nearly 20% of the imperial budget, while defense spending lagged at just over 15%.

The Dual Monarchy's persistent violation of Ferguson's Law had profound geopolitical consequences. While the German Reich built an enviable military machine in the decades following unification, Austria-Hungary struggled to equip its forces with sufficient modern artillery and rifles before and after the outbreak of war.[83] As Robert Musil lamented in *The Man Without Qualities*, the Dual Monarchy "spent enormous sums on the army; but only just enough to assure one of remaining the second weakest among the great powers."[84] These weaknesses meant that Vienna could not deter Belgrade from pursuing an increasingly reckless policy with respect to Bosnia-Herzegovina. Nor could the Imperial and Royal Navy keep pace with regional rivals in the prewar dreadnought arms race.[85]

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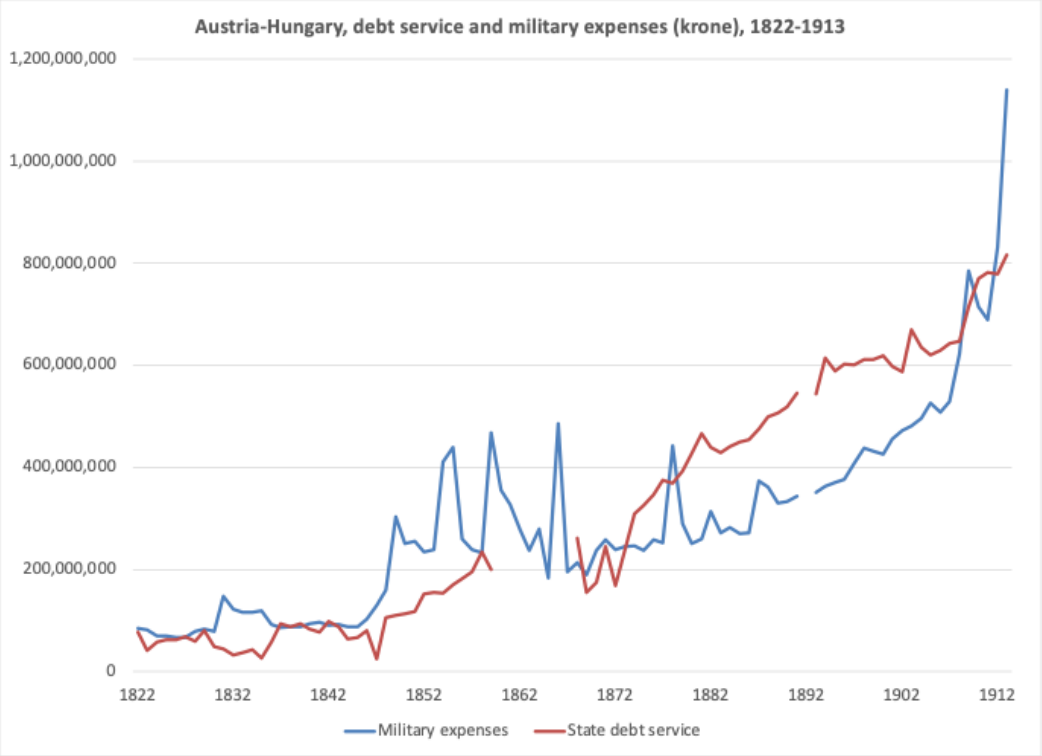
[80] Max-Stephan Schulze, "The Machine-Building Industry and Austria's Great Depression After 1873," *Economic History Review*, New Series 50, 2 (May 1997), p. 296.
[81] Marc Flandreau and John Komlos, "Core or Periphery? The Credibility of the Habsburg Currency, 1867–1914," *HAL Open Science* (Sep. 17, 2014), https://sciencespo.hal.science/hal-01064885v1, pp. 1f.
[82] Richard Roberts, "A Stable Currency in Search of a Stable Empire? The Austro-Hungarian Experience of Monetary Union," *History and Policy*, Paper 127 (October 1, 2011), https://www.historyandpolicy.org/policy-papers/papers/a-stable-currency-in-search-of-a-stable-empire-the-austro-hungarian-experie. See also Michael Pammer, "The Hungarian Risk: The Premium on Hungarian State Bonds, 1881–1914," *Financial History Review*, 24, 1 (2017), pp. 33f.
[83] Graydon A. Tunstall, *The Austro-Hungarian Army and the First World War* (Cambridge: Cambridge University Press, 2021), pp. 1f.
[84] Quoted in Niall Ferguson, *The Pity of War* (London: Penguin, 1998), p. 118.
[85] Stanley D. M. Carpenter, "The Rise and Fall of the Austro-Hungarian Navy, 1900–1918," *International Journal of Naval History*, 15, 2 (2020), https://www.ijnhonline.org/the-rise-and-fall-of-the-austro-hungarian-navy-1900-1918/.

Figure 5



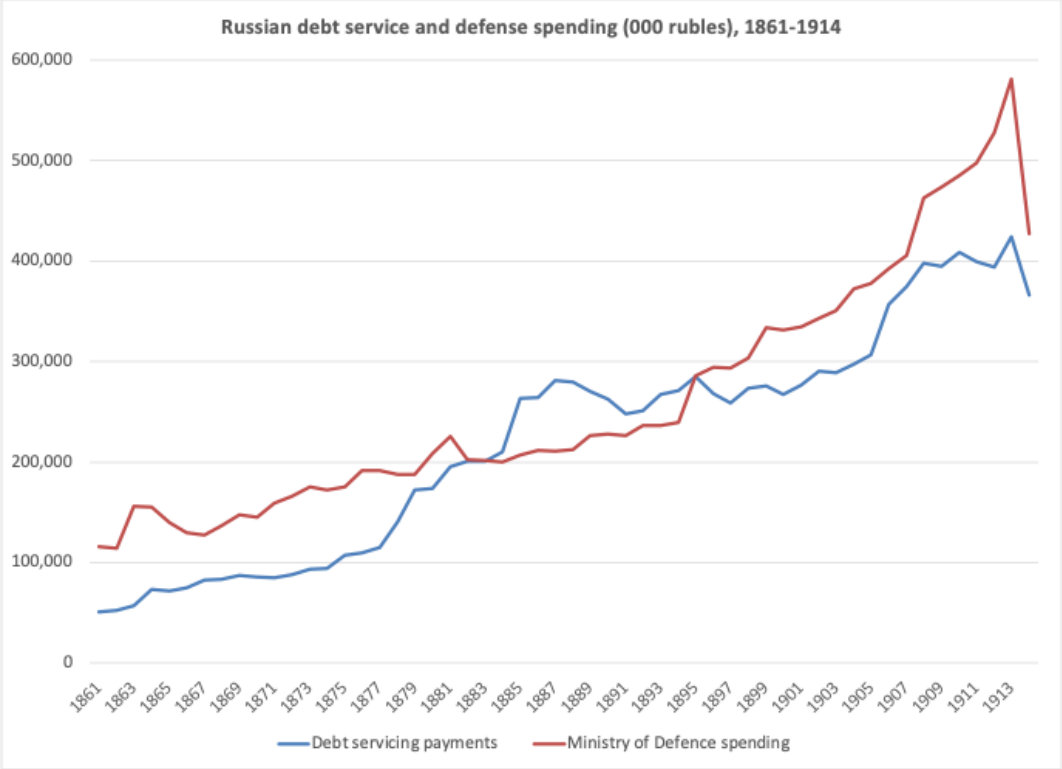
Source: Michael Pammer, "Constitutionalism and State Finances in the Austrian Empire and Austro–Hungarian Monarchy, 1815–1914," in *Polity and State Finances in the Peripheries of the Global Economy: XVIII World Economic History Congress* (Boston: Aug. 2, 2018), pp. 1–19.

The Ferguson limit is predictive not only of a state's external vulnerability but also of its internal fragility. Austria-Hungary's fiscal imbalances exacerbated the nationalist tensions within its borders. With limited resources to spare after servicing its debts, the empire was forced to prioritize certain regions over others, breeding resentment among its diverse ethnic groups. The Lands of St. Stephen, for instance, tended to resist fiscal centralization and sought to direct more revenue toward their agrarian interests, often at the expense of broader imperial needs.

The contrast between Austria-Hungary and its neighbors is noteworthy. On the eve of the 1885 Penjdeh crisis—a clash between the Russian Empire and the Emirate of Afghanistan that led to a diplomatic spat between London and St. Petersburg—*The Economist* noted that Russian finances were in a state of "chronic deficit." The empire's cost of borrowing had doubled in the previous 10 years. True, the magazine noted, "want of money never stopped a nation that was bent on war from entering on it, and in an emergency, Russia can fall back on the printing press … By doing so, however, she will only pave the way to future bankruptcy, and they must be very sanguine indeed who believe that if Russia became involved in a war with this country she would be able to keep up with the interest payments of her foreign debt."[86] The stabilization of Russian finances under Count Sergei Yulyevich Witte, the imperial finance minister between 1892 and 1903, essentially consisted of bringing the Tsarist system back into compliance with Ferguson's Law (see figure 6).

[86] Niall Ferguson, "Political Risk and the International Bond Market between the 1848 Revolution and the Outbreak of the First World War," *Economic History Review*, New Ser., 59, 1 (Feb. 2006), p. 88.

Figure 6



Source: P.A. Khromov, *Ekonomicheskoe razvitie Rosii v XIX-XX Vekakh 1800-1917* (Moscow: Institute of Economics, Academy of Sciences, 1950).

The German Empire was on an even sounder fiscal footing. The central government's debt service costs were consistently around a tenth of the military budget from 1893 until 1913.[87]

It is worth adding that, by the year immediately before World War I, all the great powers were in compliance with Ferguson's Law, illustrating that fiscal responsibility by itself is no guarantee of strategic rationality.[88] A compelling argument about the origins of the war remains that at least three of the great powers—Germany, Austria-Hungary and Russia—were tempted to risk a war precisely because the fiscal strains of the peacetime arms race were becoming domestically intolerable.[89]

The United Kingdom since 1919

Of the historical cases discussed here, that of Britain between the world wars has the most in common with the predicament of the United States today. Both have politically liberal and democratic forms of government, strong historical commitments to the rule of (common) law, and at different times very extensive overseas commitments. Both were pioneers of the Industrial Revolution, thanks to an abundance of critical natural resources, considerable technological

[87] Suphan Andic and Jindřich Veverka. "The Growth of Government Expenditure in Germany since the Unification." *FinanzArchiv*, 23, 2 (1963), pp. 169–278.
[88] Niall Ferguson, "Public Finance and National Security: The Domestic Origins of the First World War Revisited, *Past and Present,* 142 (Feb. 1994), table 2. In this article I calculated defense *plus* debt service as % GDP as a measure of fiscal-military commitment, as most great-power public debt was the result of past wars.
[89] Ferguson, *Pity of War*.

ingenuity, an educated labor force, and an elite whose interests largely favored financial, commercial as well as industrial expansion. In time, the national strategies of both converged upon an offshore-balancer role with thalassocratic power-projection based on a global network of naval bases at key maritime chokepoints.[90] British policy responses from the aftermath of World War I to the post-Cold War era suggest that ministers and civil servants tended to view resource allocation between debt servicing and overseas strategic commitments as a near-zero-sum proposition. The rate of decline of the British Empire cannot be understood separately from successive governments' attempts to get the national finances to adhere to Ferguson's Law.

This case study focuses on the second century of the second British Empire (*ca.* 1783–1997), to borrow Brendan Simms's periodization.[91] The second great wave of British imperial expansion into Canada, South Asia, and Australasia took place despite the heavy costs of fighting the French Revolutionary and Napoleonic Wars, which drove the debt burden from below 100% of GDP in the early 1790s to a peak of 173% in 1822. "For almost the entire period between 1818 and 1854," to quote an earlier work, "more than half of gross central government expenditure was going on debt service, close to the debt burden carried by the French *ancien régime* on the eve of the Revolution."[92] Paying the interest due to the bondholders—the wealthy elite—from taxes that in peacetime fell mostly on consumption created severe social strains and periodic outbreaks of popular discontent. However, despite the scares of Peterloo and the Chartist movement, the debt burden declined steadily throughout the first half of the 19th century. This was due in part to the productivity gains of industrialization, the growth of the financial sector, relative European geopolitical stability under the Metternichian system, and rising global trade under the protection of the Royal Navy. But it also reflected the ascendancy of classic liberal theories of public finance, which encouraged successive chancellors of the Exchequer to run budget surpluses and pay down the debt, as well as the benefits of a monetary anchor (the gold standard), and abundant domestic savings, which steadily drove down interest rates until the 1890s. Debt servicing costs peaked at an all-time high of 7.9% of GDP in 1822 before embarking on a steady decline that would persist until 1914, the slight peaks in 1842–1843 and 1851 notwithstanding.

Whereas interest expenditure data exist as far back as 1688, reliable annual figures for British military spending begin only with the brief phase of the 19th-century Anglo–Russian "cold war" that turned hot in the Crimean War.[93] Combining both datasets for the period after 1815 shows that British government expenditures breached the Ferguson limit at times during three distinct periods. During the first period (1815-1914), although debt servicing slightly exceeded military spending in 1857–61 and 1869–84, both series show a gradual downward trend until the annihilation of the Hicks Expedition in 1883 drove British military spending back up. The two indices then diverge symmetrically through 1913, with a local maximum of 5.6–6.5% of GDP allocated to military spending during the counterinsurgency phase of the Second Boer War in 1900–1902. The years from the Treaty of Vereeniging to the July Crisis of 1914 brought a stabilization of British military

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[90] For discussions of British geopolitical and military strategy in the 20th century, see Halford J. Mackinder, *Britain and the British Seas* (London: William Heinemann, 1902); and Andrew Lambert, *The British Way of War: Julian Corbett and the Battle for a National Strategy* (New Haven: Yale University Press, 2021).

[91] Brendan Simms, *Three Victories and a Defeat: The Rise and Fall of the First British Empire, 1714-1783* (London: Allen Lane, 2007).

[92] Ferguson, *Cash Nexus*, p. 135.

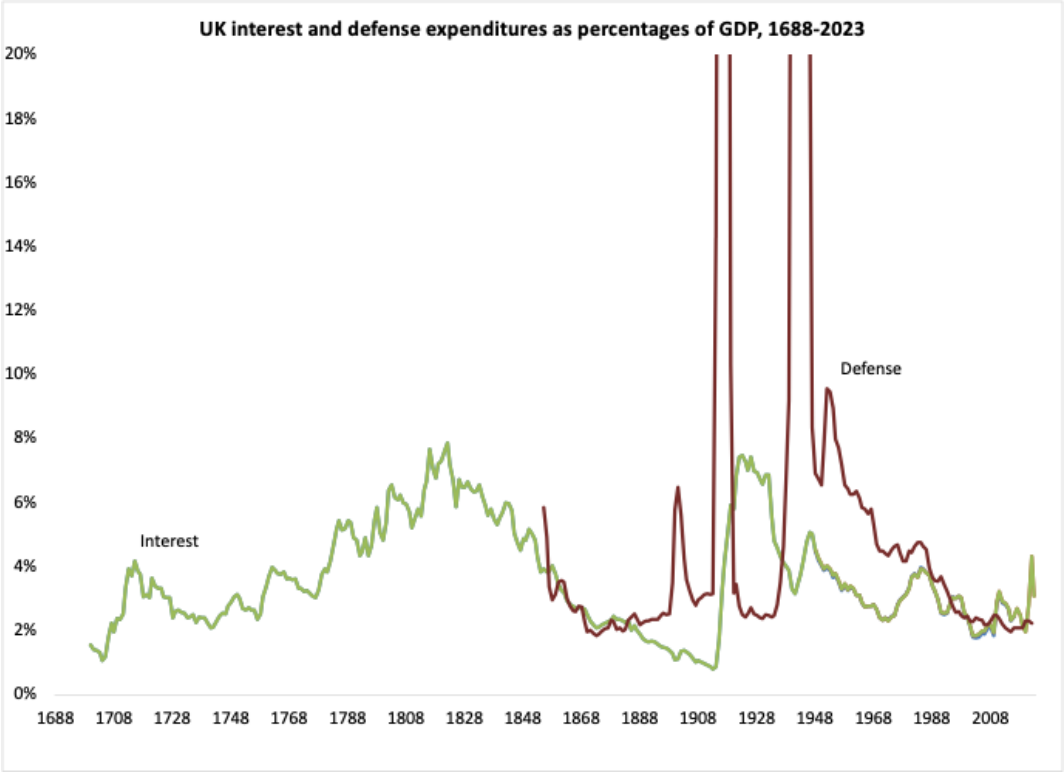
[93] For an interpretation of Anglo–Russian geopolitical tensions between the 1820s and 1907 as the first recognizably modern "cold war," cf. Barbara Emerson, *The First Cold War: Anglo–Russian Relations in the 19th Century* (London: C. Hurst & Co., 2024).

spending at around 2.8–3.2% of GDP and a historically low interest burden of 0.8% in 1913, despite the costs of the dreadnought-building arms race with Germany.

The experience of the 19th century dictated the conduct of British fiscal policy in the second period—the one between the world wars—when debt servicing consistently exceeded military spending every year from 1920 to 1937. The reason is clear. The Great War saw military spending soar from a 1913 baseline of 3.2% of GDP to 14.3% in 1914, 39.7% in 1915, 54.1% in 1916, 54.9% in 1917, and 45.3% in 1918. The coming of peace brought the figure down to 10.3% in 1919, and 1920–1921 saw another reduction to 3.2% and 3.5%, after which military spending never again exceeded 3.0% until the Abyssinian Crisis and the outbreak of the Spanish Civil War in 1936. The cost of fighting World War I increased the national debt by a factor of twelve. By 1927 it was equivalent to a crushing 172% of GDP. Debt interest payments had stood at an all-time low of 0.8% of GDP in 1913. They rose steadily to 0.9% in 1914, 1.7% in 1915, 3.3% in 1916, 4.2% in 1917, and 5.0% in 1918. But the return of peace to Europe brought no financial reprieve for London. With the economy contracting in response to fiscal and monetary tightening, interest payments climbed to 5.9% of GDP in 1919, 5.8% in 1920, 6.8% in 1921, 7.4% in 1922, and peaked at 7.5% in 1923. Annual interest expenditures did not fall below 7.0% of GDP until 1928 and hovered around 6.7% until reaching 5.5% in 1933, after which the share steadily declined to 3.9% of GDP on the eve of war in 1939 (see figure 7). The interest on the debt accounted for more than two-fifths of public expenditure in the late 1920s. In 1933, interest consumed over twice as much annual GDP (5.5%) as military spending (2.4%).

Policies for coming back within the Ferguson limit included imperial retrenchment, arms control, and the granting of political concessions within the British sphere of influence. However, probably the single most important variable was the decline of interest rates in the depressed conditions of the 1930s.

Figure 7



Source: R. Thomas and N. Dimsdale, "A Millennium of UK Data," Bank of England OBRA dataset (2017), http://www.bankofengland.co.uk/research/Pages/onebank/threecenturies.aspx.

In the name of "retrenchment," defense expenditure was reined in. Prime Minister Stanley Baldwin told the International Peace Society: "I give you my word that there will be no great armaments." He meant it. The Ten-Year Rule amounted to a spending freeze for the armed services. Even when it was dropped in 1932, the Treasury insisted that "financial and economic risks" militated against significant increases in the defense budget.[94]

The 1920s witnessed severe contractions in British hard power as debt servicing costs squeezed military outlays. The Royal Air Force, which had been the world's first independent air force and its most powerful, with 20,000 aircraft and over 300,000 personnel at the war's end, found itself perilously close to extinction by mid-decade.[95] Under Ramsay MacDonald's National Government, a pay cut of 10% for officers and senior ratings and 25% for junior ratings caused 1,000 Royal Navy sailors to mutiny at Invergordon in September 1931. The evaporation of basic military discipline aboard the capital warships that were the leading edge of British hard power prompted panic on the London Stock Exchange, a run on the pound, and the permanent freeing of British finances from the fetters of the gold standard.[96]

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[94] Niall Ferguson, *War of the World: History's Age of Hatred* (Penguin, 2006), p. 325.
[95] Geoffrey Lloyd, *Sir Christopher Bullock K.C.B. C.B.E. Memorial Service Address* (Cambridge: Cambridge University Press, 1972), pp. 3–5.
[96] For discussion on the immediate financial repercussions of the mutiny, see Alan Ereira, *The Invergordon Mutiny: A Narrative History of the Last Great Mutiny in the Royal Navy and How It Forced Britain Off the Gold Standard in 1931* (Milton Park: Routledge, 1981).

The resistance to rearmament was tenacious. In November 1935, the Defence Requirements Committee proposed an "Ideal Scheme" of rearmament financing through the issuance of a Defence Loan to break the ministerial gridlock. The Chancellor, Neville Chamberlain, objected that the proposed spending targets were unfeasible.[97] Winston Churchill's demands for much larger defense expenditures, which he first made in 1936, were also dismissed by Chamberlain. Only in 1937 was new borrowing undertaken to finance rearmament, to the tune of £400 million, and even then Chamberlain initially tried to cover the increased costs by raising taxes. His successor at the Treasury, Sir John Simon, insisted that total defense spending from April 1937 to April 1942 should be capped at £1,500 million.[98] Britain did not return below the Ferguson limit until 1937, as new borrowing to the tune of £400 million brought military spending up to 4.6% of GDP and a recovering economy brought the debt burden down to 4.1%.

This second period is of principal interest to this study, as the parallels to the situation of the modern United States seem closest. The first period, while useful for understanding the fiscal constraints upon a great power in its expansionary phase, has little to teach us about Washington's current situation.[99] The geopolitical environment that Great Britain faced after 1919, by contrast, was one of ruthless competition with economically and militarily formidable adversaries.

British policy responses to the various geopolitical crises of the interwar period illustrate the power of fiscal constraints. The British Empire reached its territorial zenith in 1923, spanning almost one quarter of the Earth's land area and encompassing more than one fifth of its population. The maintenance of military spending at nearly three times the 1913 level is at least partially explained by the outlays needed to sustain military interventions in Arkhangelsk, Murmansk, Siberia, the Caucasus, and the Dardanelles, as well as imperial policing operations in Ireland, India, and Iraq, not forgetting Palestine. Great Britain crossed the Ferguson limit in 1920, with immediate contractionary effects on British hard power. The Chanak Crisis of 1922—when the Canadian Prime Minister William Lyon Mackenzie King refused the automatic commitment of Canadian troops in the event of war with Mustafa Kemal Atatürk's Grand National Assembly—was a turning point. Chanak broke not only London's century-long aspiration to control the Black Sea Straits, David Lloyd George's political career, and Eleftherios Venizelos's "Megali Idea," but also the ties of military obligations between imperial metropole and Dominions.[100]

British statesmen saw participation in the post-1918 wave of international arms-control agreements as a means to preserve their country's postwar geopolitical position by avoiding an arms race that they could ill afford. Great Britain remained an active participant in the arms embargo on China (1919),[101] the Washington Naval Treaty (1922), the Kellogg-Briand Pact (1928), the First London Naval Treaty (1930), the Anglo-German Naval Agreement (1935), and the Second London Naval Treaty (1936). British acquiescence in the Washington Naval Treaty was especially telling. Burdened by a surplus of surface vessels, but without the fiscal wherewithal to match U.S. naval expansion proposals in 1919 and the Japanese Diet's appropriations for the construction of an "Eight-Eight Fleet" in 1920, the Royal Navy accepted strict tonnage limits on the displacement of its battleships,

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[97] Ferguson, *War of the World*, p. 327.
[98] Ibid., p. 326.
[99] *Nuclear Posture Review: February 2018* (Washington, D.C.: Government Publishing Office, 2018), p. 5.
[100] J. G. Darwin, "The Chanak Crisis and the British Cabinet," *History*, 65, 213 (1980), pp. 45–8.
[101] For discussion on the first comprehensive international arms embargo and how revisionist states successfully circumvented it, cf. Kyle Kinnie, "German Weapons Diplomacy in China, 1927–1938," MPhil dissertation, University of Cambridge (2022) 1 pp. 17, 24–30.

battlecruisers, aircraft carriers, and other surface combatants. The treaty halted the growth in British capital ship quantity, displacement, and armament that had begun with the Naval Defence Act 1889. The Admiralty effectively abandoned the old "two-power standard" of 1889, in which the Royal Navy had committed itself to match the naval assets of the next two largest navies combined, conceding the new reality of the "one-power standard," in which it could only guarantee parity with the U.S. Navy.[102]

In political terms, the Washington Naval Treaty decommissioned the Anglo–Japanese Alliance of 1902 and conceded tacit recognition of the Monroe Doctrine and thereby the effective transfer of military primacy in the Western Hemisphere to the United States. Other changes to the British geopolitical position were subtler, but no less revolutionary. If the Royal Navy and the overseas trade that it protected were the sinews of Empire, then Mackenzie King's assertion of Dominion independence in foreign policy at Chanak and the rollback of British foreign military commitments arguably generated the political opening for the Statute of Westminster of 1931, whereby Parliament relinquished its legal right to impose legislation upon Canada, Newfoundland, the Irish Free State, South Africa, Australia, and New Zealand.

Considering the fiscal constraints on British hard power, the now notorious policy of appeasement had a certain logic. Of paramount importance to the Treasury was the concern that higher spending on armaments would jeopardize Britain's precarious recovery from the Great Depression and might undermine the country's capacity to fight another world war. "The great fear" amongst British policymakers was that, in a protracted war, "Britain's credit abroad would prove far weaker than between 1914 and 1918, for the current account deficits of the later 1930s were eating away at Britain's net creditor position, her gold reserves and the strength of sterling."[103] Other structural issues, such as shortages of skilled industrial labor and of critical natural resources, exacerbated an already parlous situation for British military readiness. A powerful societal revulsion against the bloodletting of 1914–18—seemingly exemplified by the Oxford Union's infamous 1933 resolution that "This House will under no circumstances fight for its King and country"—further attenuated political willingness to spend on defense, despite the growing boldness of the revisionist powers.

Duff Cooper, as First Lord of the Admiralty, was one of the few members of the Cabinet to grasp that there was nevertheless a false economy at the heart of appeasement: "The first duty of Government," he argued, "is to ensure adequate defences of the country. What these adequate defences are is certainly more easily ascertainable than the country's financial resources. The danger of underrating the former seems to me greater than the danger of overrating the latter, since one may lead to defeat in war and complete destruction, whereas the other can only lead to severe embarrassment, heavy taxation, lowering of the standard of living and reduction of the social services."[104] As the leader writers of *The Economist* understood, the problem with buying time with diplomacy, as Chamberlain sought to do, was that Hitler also got the time—and he made more creative use of it between September 1938 and September 1939.[105]

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[102] Christopher M. Bell, "The Politics of Seapower: The 'One-Power Standard' and British Maritime Security," in *The Royal Navy, Seapower and Strategy Between the Wars* (London: Palgrave Macmillan, 2000), pp. 1–48.
[103] Ferguson, *War of the World*, p. 327.
[104] Ibid., p. 333.
[105] Niall Ferguson, "Earning from History? Financial Markets and the Approach of World Wars," Brookings Papers on Economic Activity (Spring 2008), p. 458.

In seeking to appease Hitler, Chamberlain failed to deter him and his confederates. Despite the fact that defense spending (4.6% of GDP) rose above debt service (4.1%) in 1937, and reached 9.2% of GDP in 1939, compared with 3.9% on debt service, the signal was not sufficiently strong to dissuade Hitler from invading Poland, even when accompanied by an explicit pledge of support for Poland in the event of threat to its independence. This second failure of deterrence cost Britain dearly. UK military spending peaked at 51% of GDP in 1944. The mountain of national debt exceeded 250% of GDP in 1947. However, infusions of American capital goods and liquidity via Lend-Lease and the relatively generous 2% interest terms of the $3.75 billion Anglo-American Loan of 1946—augmented by $1.9 billion from Canada—helped avoid a repeat of the surge of debt-servicing costs in 1915–1923.

The years 1946–48 saw interest payments climb to a postwar maximum of 5.1% of GDP, while military spending fell from 20.8% to 8.3%, as London began to jettison costly colonial commitments from Palestine to India. The striking point about Britain during the Cold War is that it did not cross the Ferguson limit, as the trendline for military spending remained consistently above that for debt servicing, only converging in the late 1990s and not crossing in a sustained way until after 2010. Defense spending remained high because—despite pervasive narratives about decolonization and national decline—Great Britain was still a great power, if not a superpower. The rolls of honor of countless regiments attest to the breadth of British military commitments in this period: Korea, the Mau-Mau Rebellion, the Malayan Emergency, Suez, Cyprus, Aden, the Borneo *Konfrontasi*, Dhofar, Ulster. True, the years between Harold Wilson's "east of Suez" declaration in 1968 and its implementation in 1971 saw military spending drop from 5.4% of GDP to 4.5%. By the time of the 1981 Defence White Paper, it had fallen to 4.4%. Yet this still exceeded debt service, which averaged 3.3% between 1948 and 1989. This explains why, in 1982, Britain still had the capability to fight and win the Falklands War, routing the Argentine occupiers of islands nearly 8,000 miles distant from London. UK defense spending even rose slightly to 4.8% of GDP in 1983–1984—the final peak of Cold War tensions—before contracting gradually to 3.6% by the fall of the Berlin Wall.

Britain not only remained a great power through the end of empire; it probably gained in military strength as it shed colonial policing responsibilities. In the aerospace sector, the V-bombers—the Vickers Valiant, the Avro Vulcan, and the Handley Page Victor—gave the RAF a high-payload, deep-strike capability, in-flight refueling, and an independent airborne nuclear deterrent. That a mere 14 years elapsed at Avro between the first flight of the lumbering piston-engine Lancaster and the tailless, delta-wing, jet-powered Vulcan showed just how advanced Britain's aerospace industry was after the war.[106] Duncan Sandys's 1957 Defence White Paper prompted a sharp reduction in troop strength along the Rhine, cancelled promising manned-aircraft projects, and urged the consolidation of the aerospace industry in light of Britain's acute economic difficulties.[107] With the cancellation of the Blue Streak nuclear-capable IRBM in 1960 and the gradual scrapping of the V-bombers, beginning in 1964, Britain fell decisively behind the superpowers. The victims of the Defence White Paper were national champions in aerospace such as Avro, Vickers, Handley Page, and Hawker Siddeley. Without the expectation of future contracts from the Ministry of Defence, they slowly capitulated to competitive pressure from their American and European rivals, leading to long-term

[106] The first production Lancaster flight was in October 1941; the first production Vulcan flight was in February 1955.
[107] Martin Stephen Navias, "The Sandys White Paper of 1957 and the Move to the British New Look: An Analysis of Nuclear Weapons, Conventional Forces and Strategic Planning 1955–57," (PhD dissertation, King's College, London, 1989), pp. 230–241.

British dependence on its allies for the most sophisticated military hardware.[108] Nevertheless, throughout this period, the UK retained a permanent seat on the UN Security Council; was a recognized nuclear-armed state under the Non-Proliferation Treaty; and sustained troop deployments in multiple geographies.

How was this achieved? The answer is that successive governments adopted a strategy of financial repression after 1945, so that the war debt was in large measure inflated away, which also rapidly reduced the real value of interest payments. The problem was that while financial repression prevented debt payments from outstripping military spending, as they had in the 1920s and early 1930s, it simultaneously caused chronic currency weakness. Sterling crises in 1949, 1967, and infamously 1976—when Chancellor of the Exchequer Denis Healey needed a $3.9 billion loan from the IMF—exposed the erosion of British financial strength.

The British case illustrates that crossing the Ferguson limit need not doom a great power to swift military and geopolitical decline. Great Britain crossed the limit in three periods after the Crimean War, but in each case it was able to cross back, stabilizing its debt service costs and maintaining a significant military capability, sufficient to win its wars, if not sufficient to deter its foes from starting them.

There are, in short, ways out even after a great power violates Ferguson's Law. However, to achieve this, the real growth rate needs to exceed the real long-term interest rate for a sustained period. In the British case, primary surpluses allowed debt reduction over the second half of the 19th century, while falling interest rates in the context of a global depression helped with debt management in the late 1930s. In the 1950s and 1960s, interest rates were artificially repressed by a variety of price, capital, and exchange controls. These policies had their costs, no doubt, and ultimately were unsustainable. But they were surely preferable to the fates suffered by other past empires, which succumbed after crossing the Ferguson limit to defaults, high inflation, or civil strife over who should bear the costs of deleveraging. The consequences were not merely failures of deterrence and strategic retreat, but eventually military defeat and / or revolution.

A great error of much historiography is thus to antedate British decline. Only very recently did Britain become militarily inconsequential. The point of failure was when Britain crossed the Ferguson limit for the third time in its modern history, in 2010. As in Baldwin's time, it was Conservative politicians who prioritized debt service over maintaining the country's military capability. Despite attempts under David Cameron and George Osborne to stabilize the debt—which had been substantially increased as a share of GDP by the global financial crisis—the three subsequent shocks of Brexit, Covid, and the Russo–Ukrainian War proved too much.

CONCLUSION

Ferguson's Law states that great-power decline is the very likely consequence of excessive indebtedness. The critical threshold is not, as has sometimes been hypothesized, a particular level of the stock of debt relative to gross national product. It is when the percentage of output devoted to interest payments exceeds the percentage spent on military capability. The cases considered here support the idea of an historical regularity. In the 17th century, Habsburg Spain could not sustain

[108] Tony Buttler, "The 1957 Defence White Paper: The Cancelled Projects," *Journal of Aeronautical History*, 2018/03 (2018), pp. 88–97.

Charles V's world empire, and certainly could not defeat the financially stronger Dutch Republic, because of the rising burden of the *juros* and *asientos*. Bourbon France was doomed to lose its 18th-century wars with Great Britain, as well as its domestic stability, because the French monarchy failed to modernize its system of borrowing between the 1720s and the 1780s. In the later nineteenth century, the Ottoman Empire suffered a significant diminution of sovereignty as a result of excessive indebtedness and default and after 1867 Austria-Hungary was almost as weak in fiscal and therefore in military terms. Germany and Russia were on a sounder footing on the eve of World War I. But not one of the four continental empires could survive a protracted global conflict without fiscal crises that culminated in revolutions, severe inflations, and debt defaults.

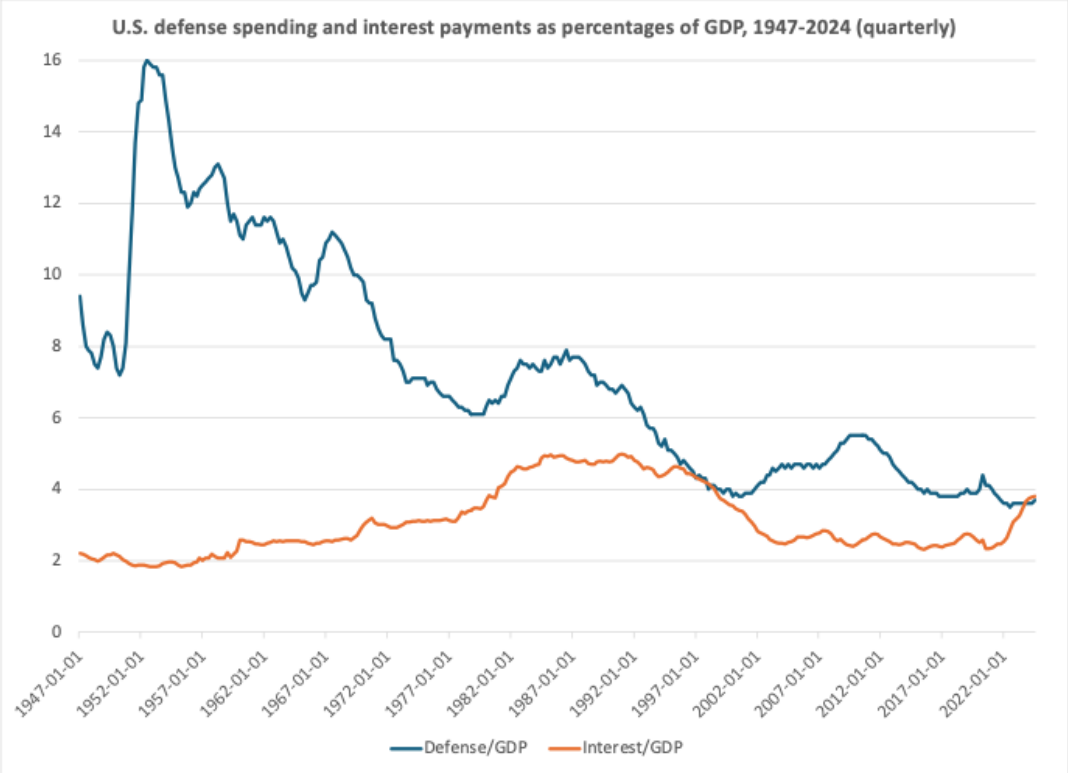
And yet the lesson of history is nuanced. All the great powers were compliant with Ferguson's Law by the eve of World War I, the result of fiscal retrenchment combined with increased defense spending. The tragedy was that this coordinated fiscal effort raised rather than lowered the probability of a general war. In Britain's case, even the seemingly Pyrrhic victory of 1918 was not so Pyrrhic after all. British military spending exceeded interest payments consistently for the entire period 1937-1996. This was, of course, achieved partly by means of decolonization and partly by inflation and currency depreciation. Britain ceased to be a world empire, it is true. Yet it did not cease to be a great power, as its wars in the 1980s and 1990s illustrated, and as its participation in the Global War on Terror still more or less confirmed.

Other cases can and should be explored. This paper might also have considered the Venetian Empire from the 14th to the 18th century, or Qing China in the late 19th and early 20th century. The case of 20th-century Portugal would also be worth further study. The Soviet Union may be the exception that proves the rule because its mounting liabilities after the 1960s were disguised by the idiosyncratic accounting system of the planned economy, which concealed them in the balance sheets of its value-subtracting state-owned enterprises. Note that, in these three cases, too, fiscal crisis culminated not just in military decline but in revolution and imperial dissolution.

There are important lessons in all this for the United States today. The United Kingdom's public debt after World War I rose from 109% of GDP in 1918 to just under 200% in 1934. And yet Britain was able to bring itself back below the Ferguson limit and rearm without triggering a debt crisis. America's federal debt is different in important ways, but it is comparable in magnitude. As we have seen, it will exceed 120% of GDP this year, even higher than its previous peak in the immediate aftermath of World War II. As we have also seen, the cost of servicing the debt last year exceeded the defense budget for the first time (see figure 8). This was not an outcome anyone planned. The Office of Management and Budget (OMB) assumed in 2020 that the 2024 defense budget would be 2.9%; net interest payments would be 1.7%. The OMB's Budget for the Fiscal Year 2024 projected that it would not be until 2028 that interest payments exceeded defense.[109]

[109] White House Office of Management and Budget, *Budget of the U.S. Government, Fiscal Year 2024* (Washington, DC: U.S. Government Publishing House, 2023), Table S–5. See also https://trumpwhitehouse.archives.gov/omb/historical-tables/.

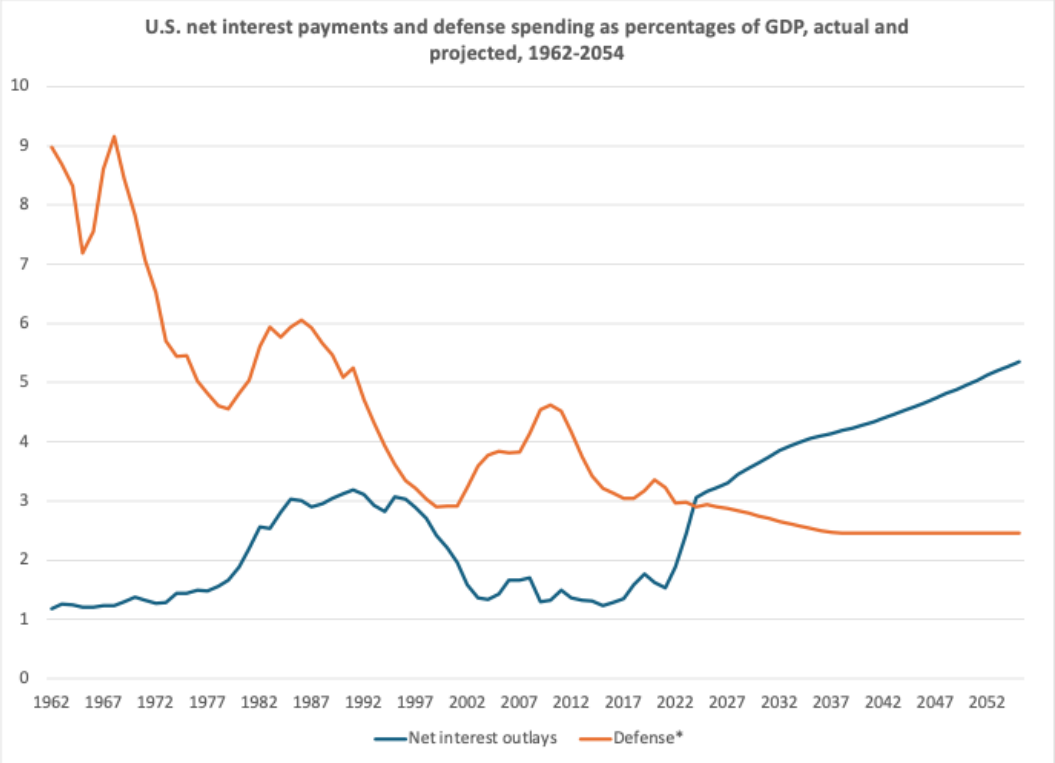
Figure 8



Source: U.S. Bureau of Economic Analysis, Federal Government Current Expenditures: Interest Payments [A091RC1Q027SBEA], retrieved from FRED, Federal Reserve Bank of St. Louis: https://fred.stlouisfed.org/series/A091RC1Q027SBEA (Jan. 30, 2025); and U.S. Bureau of Economic Analysis, Shares of Gross Domestic Product: Government Consumption Expenditures and Gross Investment: Federal: National Defense [A824RE1Q156NBEA], retrieved from FRED, Federal Reserve Bank of St. Louis: https://fred.stlouisfed.org/series/A824RE1Q156NBEA (Jan. 30, 2025).

There are, of course, multiple different measures of U.S. defense spending. As a share of GDP, the U.S. defense budget in 2023 is said to have been 3.36% by the World Bank and by the Stockholm International Peace Research Institute, 3.23% by North Atlantic Treaty Organization, 3% by the CBO and the OMB, and 2.8% by the Department of Defense. However, in no series is the trend other than downwards since 2020. And none of the available projections point to anything other than a continued and growing breach of the Ferguson limit. The OMB foresees the defense budget declining from 3.2% of GDP last year to 2.5% by 2033, and net interest payments rising from 2.9% to 3.3%. The CBO thinks net interest payments (3.1%) already exceeded defense spending (2.9%) in 2024. Data provided at the time of its March 2024 report, *The Long-Term Budget Outlook*, implied that by 2041 net interest payments would be double the defense budget, though the most recent projections move that to 2049 (see figure 9).

Figure 9



* Defense spending after 2023 extrapolated on the assumption that it remains consistently 48% of total discretionary (the average of 2014-23).
Source: Data Supplement, in Congressional Budget Office: *The Budget and Economic Outlook: 2025 to 2035* (Washington, DC: Government Publishing Office, Jan. 2025).

One inference that might be drawn from the historical cases featured in this paper—particularly the 20th-century British case—is that a great power can afford to cross the Ferguson limit for a few years, provided it is capable of reducing its debt-service burden and increasing its military spending in the face of a growing external threat.

However, an important difference between the United States today and the United Kingdom roughly a century ago is that the average maturity of American federal debt is quite short (the weighted average maturity is between 69 and 73 months, according to the Office of Debt Management), whereas more than 40% of the British public debt took the form of perpetual bonds or annuities.[110] This means that the American debt today is a great deal more sensitive to moves in interest rates than Britain's was—and therefore harder to "inflate away."[111]

Another key difference is the great shift there has been in fiscal and monetary theories, thanks in large measure to John Maynard Keynes's critique of Britain's interwar policies. Britain's decision in 1925 to return sterling to the gold standard at the overvalued pre-war price condemned Britain to

[110] Office of Debt Management, Fiscal Year 2024 Q4 Report, https://home.treasury.gov/system/files/221/TreasuryPresentationToTBACQ42024.pdf.
[111] Jens Hilscher, Alon Raviv, Ricardo Reis, "Inflating Away the Public Debt? An Empirical Assessment," *Review of Financial Studies*, 35, 3 (Mar. 2022), pp. 1553–95.

eight years of deflation. That only made debt management harder and exacerbated the pressure on imperial defense. Yet Britain's depression was mild, not least because abandoning the gold standard in 1931 allowed the easing of monetary policy. Falling real interest rates meant a decline in the burden of debt service, creating new fiscal room for maneuver. But such a reduction in debt-servicing costs seems unlikely for America in the coming years. Whereas British real interest rates generally declined in the 1930s, in America they are currently projected by the CBO to rise from 1.7% in 2024 to 1.9% in 2026, declining slightly to 1.8% in 2034. The real growth rate is projected to be almost identical. In this scenario, America's debt will cost more to service in the period 2025-2035 than it did in 2015-2025, when the average real rate was 0.3%, especially as the stock of debt will continue to grow.[112] This will squeeze other parts of the federal budget, especially discretionary expenditures such as defense. The respite provided by "secular stagnation"—perhaps in reality a brief interlude caused by the temporary global conjuncture of abundant savings, low-cost investment, and benign demographics—may be over. Only if there is "supra-secular stagnation," in Paul Schmelzing's phrase,[113] will the United States be able to service its current stock of debt at rates that do not require real reductions in defense spending. Calls for significant increases in defense spending—such as Senator Roger Wickers's plan for a $110 billion increase over two years—come at a difficult time, especially as Congress seems very likely to extend the 2017 tax cuts.[114]

A final point to note is that Britain was able to stay on the right side of Ferguson's Law for most of the 20th century partly because its demographics were favorable. This matters a great deal as the United States and other developed economies today are encumbered with expensive welfare systems designed for societies with much higher fertility rates and much lower life expectancy. Entitlement programs such as Social Security and Medicare are now the biggest items of federal expenditure. They will only become more expensive as the population ages. Multiple governments around the world have introduced incentives to encourage young couples to have more children. None of these measures has been successful. As an off-setting mechanism, mass immigration appears to have only modest net benefits, at best, from a fiscal point of view.

Geopolitically, the United States finds itself in a situation comparable with that of the United Kingdom in the 1930s. It confronts a new Axis of authoritarian powers. Where the biggest of these, the People's Republic of China, stands relative to the Ferguson limit is far from easy to say, given uncertainties about the total public sector debt burden—including local government liabilities—and the true extent of defense spending relative to a GDP that is itself subject to measurement uncertainty.[115] America's military commitments, unlike China's, are global in extent, as has been true since 1945. Yet the U.S. fiscal position is today far more constrained than at any time since then. The U.S. government is now in violation of Ferguson's Law and likely to move further beyond the Ferguson limit in the coming decades.

History suggests that any sustained period when a great power spends more on interest payments than on military capabilities is likely to see its strategic rivals challenge its position. The tension between "guns and coupons" may also undermine its domestic stability. In the absence of radical reforms of its principal entitlement programs—which successive administrations have ruled out—

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[112] Ibid.
[113] Paul Schmelzing, "Eight Centuries of Global Real Interest Rates, R-G, and the 'Suprasecular' Decline, 1311–2018," Bank of England Staff Working Paper, No. 485 (Jan. 2020).
[114] Roger F. Wicker, *21st-Century Peace Through Strength: A Generational Investment in the U.S. Military* (Washington, DC, 2024)
[115] M. Taylor Fravel, George J. Gilboy, and Eric Heginbotham, "Estimating China's Defense Spending: How to Get It Wrong (and Right)," *Texas National Security Review*, 7, 3 (Summer 2024), pp. 41f.

the only plausible way that the United States can come back within the Ferguson limit is therefore through a productivity miracle. The real contest of the second quarter of the 21st century may be between artificial intelligence—and history.