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Not an ordinary bank but a great engine of state: The Bank of England and the British economy, 1694-1844

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Abstract

From its foundation as a private corporation in 1694 the Bank of England extended large amounts of credit to support the British private economy and to support an increasingly centralized British state. The Bank helped the British state reach a position of geopolitical and economic hegemony in the international economic order. In this paper we deploy recalibrated financial data to analyse an evolving trajectory of connections between the British economy, the state, and the Bank of England. We show how these connections contributed to form an effective and efficient fiscal-naval state and promoted the development of a system of financial intermediation for the economy. This symbiotic relationship became stronger after 1793. The evidence that we consider here shows that although the Bank was nominally a private institution and profits were paid to its shareholders, it was playing a public role well before Bagehot's doctrine.

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'The stability of the Bank of England is equal to that of the British government … [The Bank of England] acts, not only as an ordinary bank, but as a great engine of state'

(Adam Smith 2003/1776)

I

During the long eighteenth century (1688-1815), Great Britain's engagements in successive bouts of warfare led to the formation of a powerful state, supporting (and supported by) a framework of "private" institutions that eventually promoted its precocious transition through the first industrial revolution. Among the most important of these institutions was the Bank of England, founded in 1694 during King William's War, 1689-97.[2] The Bank supplied successive governments with flows of liquidity required to wage war. It supported the formation of the state and the building of fiscal capacity by providing the short-term liquidity necessary to deal with military crises. Without the Bank these crises would have compromised Britain's capacity to wage warfare, which in turn would have diminished long-term economic progress. By fostering the development of a more monetized economy, the Bank also made it easier for the state to collect taxes. Indirectly, it also encouraged overall financial intermediation for the private economy and contributed to the progressive emergence of an investment-friendly environment. But it never became a systematic source of funds for the government in a way which would have vitiated the government's commitment to price stability over the long run. The symbiotic relationship between the Bank of England and the British state was an advantage to the emergence of the Industrial Revolution.

In this paper we consider the role of the Bank of England's support for the state and the economy.[3] We elaborate upon the evolution of the institutional framework without which the

[2] The semi-public character of the Bank's "private" lending is emphasized by Kynaston (2017, p. 44).
[3] The converse was also the case but the fact that the state supported the Bank is better understood in the literature. In fact, their reputations were jointly determined, as suggested by the above quotation from Adam Smith. Other

money market could not have supported the British government's systematic military successes over the eighteenth century.[4] The culmination of these efforts was victory in the most protracted and costly conflict of all, namely the Revolutionary and Napoleonic Wars, which witnessed a new and more radical form of monetary policy.[5]

We argue that there were three key ways in which the Bank provided support to the state and the private economy. First, it played an important role as debt manager, helping the government to raise large amounts of credit from private investors (O'Brien 1967, pp. 99-168). Second, it provided short-term finance to the government by directly buying unfunded debt, particularly in the form of Exchequer and Navy bills. It also lent to private investors, many of whom then invested in government securities. Thus, actions of the Bank leveraged the financial system. Third, it increased the money supply, which not only benefited the private economy – by extending the tax base – but also made a more monetized economy easier to tax (Palma 2018b, Bonfatti et al. 2020).

Our analysis differs from the existing literature along several dimensions. In their comparative analysis of the finances of Britain and France during the late eighteenth century, Bordo and White (1991) focus on the credibility of British government debt. Their thesis is that Britain was able to borrow heavily and at lower interest rates than France because of the higher credibility of its policies: 'Britain's continuous parliamentary form of government, in which debt holders exercised considerable influence, was able to issue a massive quantity of debt and leave the gold standard with the promise of eventual redemption' (Bordo and White 1991). Recently, several scholars have, however, argued that institutional commitment designed from above was not sufficient for credible commitment from the government. The Bank worked as a guarantor of re-

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contemporaries such as Baring (1797) and Colquhoun (1815) also stressed the importance of the Bank of England for the success of the British economy, state, and even empire.

[4] The American war was Britain's only important defeat over a century of warfare.

[5] We study the Restriction period of 1797-1821 in detail in a complementary paper (O'Brien and Palma 2020).

sponsible governmental action, contributing to the formation of "credible commitment" by the state (Broz 1998; Cox 2016, pp. 62-7; Kynaston 2017, p. 21). This mattered because for government commitment to work, the right institutions needed to be in place at the micro level, growing along pre-existing, social, and political lines towards collective efficacy (Coffman et al. 2013, Murphy 2013).[6] This view finds support in the comparative experience of, for example, Imperial Brazil, which despite having borrowed repeatedly without default, failed to develop the institutional foundations required for financial development (Summerhill 2015).

Hence our conclusions differ in fundamental respects from the recent consensus with respect to the role of the state in crowding out economic growth during the eighteenth century.[7] The main difference results from the realisation that crowding out is a short-term, static effect. It is true that by borrowing liberally to wage warfare, the state did dry up some amount of liquidity. But it does not follow that in net terms this slowed long-term aggregate economic growth. First, state borrowing itself encouraged, over a long period of time, the gradual development of an efficient system of financial intermediation, which eventually generated more liquidity. Second, in the context of a mercantilist international economic order, without the external warfare waged by the British state the process of economic growth would have been slower. This is because military expenditure was not "pure waste". Instead, it was a means to secure external security, internal order, and imperial expansion.

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[6] For a greater emphasis on 1688-9 as a discrete regime change, see Bogart (2011), Pincus and Robinson (2014), and Dimitruk (2017). Pincus and Robinson (2014) do recognize the difficulty of discerning 'the exact nature of the changes [brought about by the Glorious Revolution] that made the new set of institutions self-enforcing'.

[7] Temin and Voth (2005, 2013) argue that the industrial revolution happened despite the policy actions of the British state whose military spending crowded out private borrowing and slowed down economic growth. These authors contend that the frequent and costly wars engaged in during the eighteenth century were responsible for the slow accumulation of capital (broadly in line with Williamson 1984). Note, however, that Temin and Voth (2005, pp. 345-6) and Temin and Voth (2013, p.175), recognize in passing that they capture mainly short-term effects. Additionally, Ventura and Voth (2015) argue that high levels of debt in the eighteenth century favoured growth through the formation of a market for sovereign debt – one of several mechanisms that we emphasize in the present paper.

II

To understand how and why the Bank's support to the state mattered for economic growth, we must first discuss the mechanisms which suggest that the state's actions themselves mattered. Recent research programmes in economics and economic history have become more concerned with understanding the state's role in the construction and development of the institutions behind modern economic growth (Besley and Persson 2011). The reappearance and widening of this discussion in political economy has moreover been accompanied by a comparative (and quantitative) element which is to be welcomed (Dincecco 2009, 2011; Dincecco and Onorato 2017). The study of the case of Britain remains central, however. While England's institutions were weak by European standards until the mid-seventeenth century (Henriques and Palma 2019), from that period and until well into the nineteenth century their development was gradually sustained. British institutions were eventually considered to be a superior ideal, but difficult to replicate well (Cardoso and Lains 2010).

In England, before the creation of the Bank, Downing's efforts to transform the Exchequer into a state bank 'broke down on certain hard facts of English life … the graver handicap, confided to Pepys by Sir Richard Ford in August 1666 [was] "the unsafe condition of a bank under a monarch" … [this] was an objection which hampered the development of public borrowing for another generation' (Roseveare 1991, pp. 18-19). Once the Bank appeared, however, arguably 'no other institution contributed more to the stability of the Revolution settlement' (Roseveare 1991, p. 40).

High levels of fiscal capacity mattered for economic growth because military provision is the ultimate public good. The Royal Navy provided external security for the British Isles and the expansion of their commercial and imperial interests abroad through continued victories over rival colonial ventures and native powers. External security combined with internal order are necessary conditions for the protection of property rights; "credible commitment" to service pub-

lic debt is impossible if a coup d'état or an invasion might lead to defaults.[8]

During the mid-seventeenth-century civil wars, and with further upswings during the eighteenth century, England developed comparatively high levels of fiscal capacity (Karaman and Pamuk 2017; Brandt et al. 2014, p. 69; Costa et al. 2020).[9] The state benefited from a fortunate geopolitical position and was financed through a mix of effective taxation and borrowing (Figure 1). The advance in fiscal capacity supported a rapid increase in military expenditure in times of warfare (Figure 2), which – through a "ratchet effect" – supported a persistent expansion of the size of the state. After each war, the size of government was reduced again, but to a level only somewhat higher than before (O'Brien 1988; O'Brien and Hunt 1999). The exception to this pattern was the French Wars of 1793-1815, after which high and increasing levels of expenditure became permanently much higher (Figure 3). England's rising fiscal capacity could be seen through its growing naval power, measured, for instance, by the increasing number of warships available relative to other countries, especially the powerful ships of the line (Rodger 2006).

State capacity promoted not only a stable domestic economy plus returns from the Empire, but also frequent success in military interventions in Continental Europe which served British interests. These could be either direct military interventions or, more often, subsidies to British allies by taking advantage of reputable bills of exchange. This was, for instance, how Britain subsidized Prussia during the Seven Years War. In the Napoleonic Wars, subsidies were sometimes paid in bullion made available by the substitution of domestic currency with Bank of England notes.

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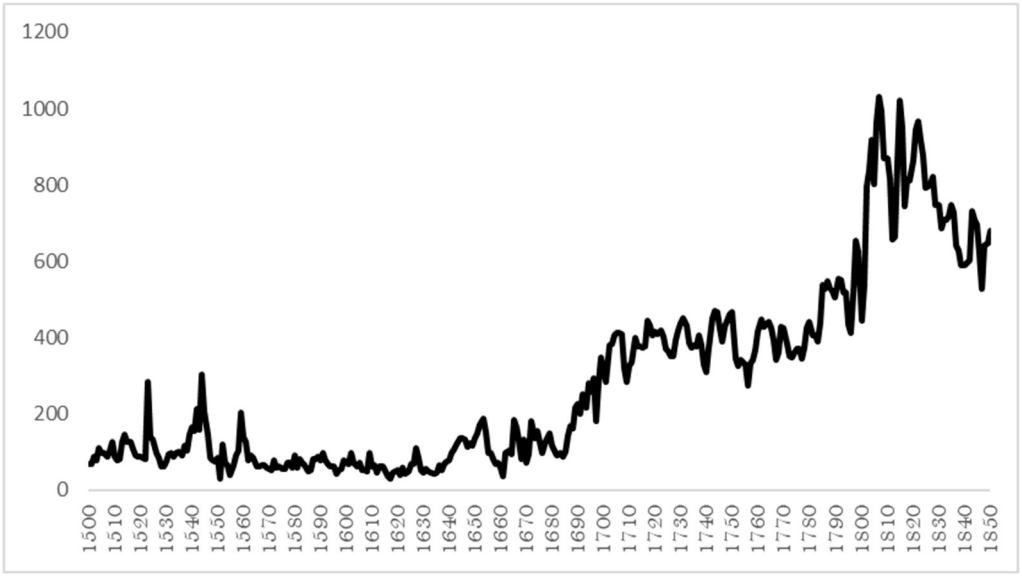
[8] This is one reason why, for instance, the Netherlands when at risk of Spanish invasion, paid comparatively high interest rates, even though they had a less "absolutist" form of government (Epstein 2000).

[9] Pincus and Robinson (2014), in their defence of the Glorious Revolution, emphasize parliamentary sovereignty and the Whig programme of modernization, but even they recognize that 'the English fiscal-military state has been growing by leaps and bounds since the 1640s'.

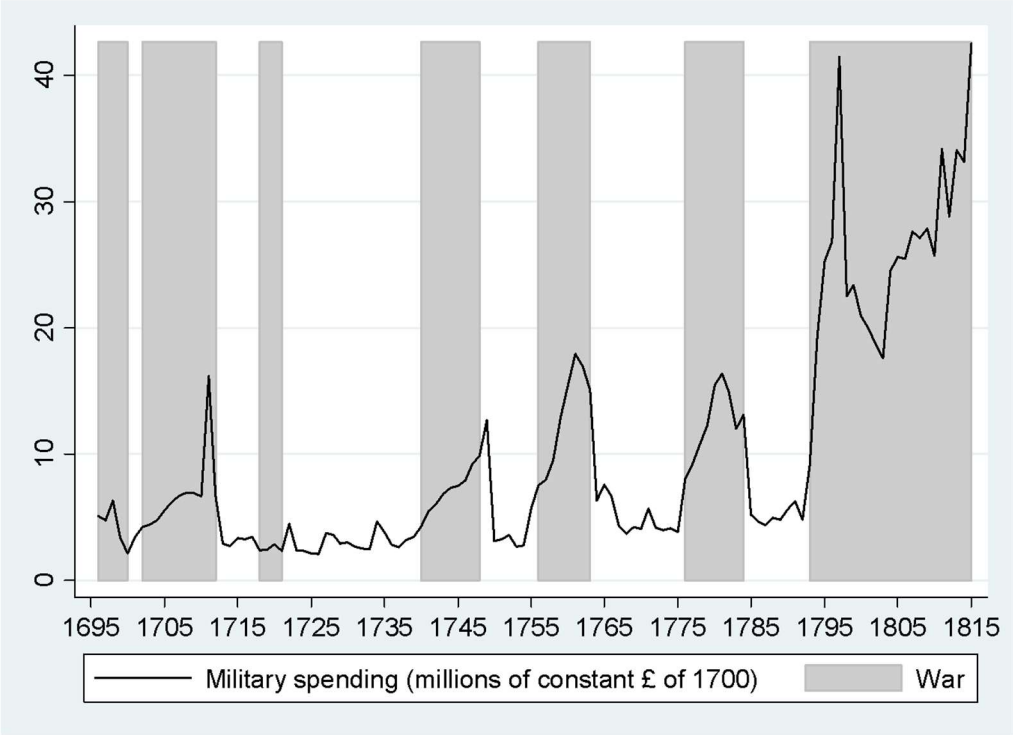
Figure 1. England's fiscal capacity in real terms (index, with 1500-1504 revenues average = 100)



Source: based on fiscal data from Karaman et al. (2017), which in turn is based on total revenues of the English Crown / Commonwealth for 1500-1749 from O'Brien and Hunt (undated, 1993, 1999), on central government revenue of Great Britain for 1750-1801, and that of the United Kingdom for 1802-1850 from Mitchell (2011). The latter were similar to those of Great Britain because Ireland sent almost no net revenue to the Exchequer. Population data (for England until 1749 and Britain thereafter) from Broadberry et al. (2015).

Note: The underlying unit is days of standard consumption baskets. We divided tax revenue in grams of silver by the cost of Allen's (2001) respectability basket and by population.

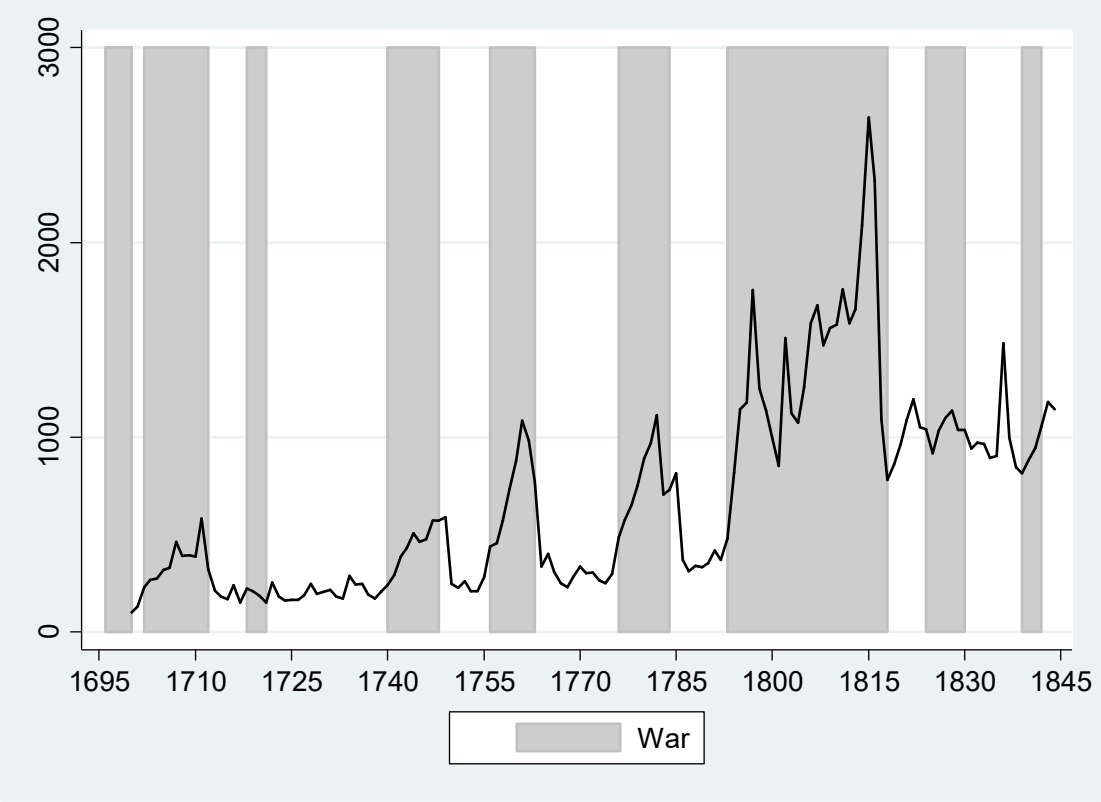
Figure 2. Military spending (army plus navy) during 1696-1815, at constant 1700 prices



Notes: Naval spending equals parliamentary grants plus borrowing by the navy, plus debt and transport provided by the navy, added from the records of the army. Army spending equals total grants (grants for army and ordinance services including militia) plus transport (added to the navy), plus votes of credit, subsidies and pay of foreign troops, and Irish military expenditure (army, ordinance and votes of credit). Shaded areas correspond to years of war.

Sources: For naval and military spending, O'Brien and Duran (2010), for the deflator, Broadberry et al. (2015).

Figure 3. Government expenditures (public administration and defence) and war, 1700-1844 (unit: real index, 1700=100).



Source: Broadberry et al. (2015).

III

While Britain's exceptional fiscal state allowed for an unusual capacity to service sovereign debt, the monetary and fiscal sides of state finance were not separable.[10] The monetary side of state building remains poorly understood. Previous work has emphasized the roles of taxes and public borrowing in supporting state building, but less attention has been paid to explaining the timing, motivation, and feasibility behind the supply of credit advanced from the Bank to the state, its wider role, and consequences for the fiscal capacity of the state, and its influence on the outcome of wars, especially the Revolutionary and Napoleonic Wars.

In this section and the next, we document the interactions of Britain's financial institutions, in particular the Bank, with internal trade and external commerce. We bring into perspective the support that the Bank accorded to the operations of an exceptionally powerful fiscal state and its strategies for servicing British economic interests at home and overseas.[11] We highlight three separate roles that the Bank played as an engine of the state and the economy. First, it managed the sovereign debt. This made it a trusted monitor of principal-agent transactions that made effective the implicit commitment mechanism of the state. Second, it leveraged the financial system. The Bank's lending to private customers (mainly in London), had consequences for state finance as well because it enabled borrowers with discount facilities at the Bank to take advantage of arbitrage opportunities to re-invest in government debt.[12] Third, it monetized the economy, with implications for the tax regime that emerged. Hence, overall the Bank not only reinforced but also amplified the effectiveness of appropriating taxes, and in particular the excise which was at the heart of Britain's rising fiscal capacity. Its monitoring of tax collection across the country, was hence complementary to its provision of deposits to government accounts and domestic outpayments (Quinn 2008).

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[10] Sargent and Wallace (1981), Sims (1994). See also Bonfatti et al. (2020).
[11] Elsewhere in Europe and China insufficient fiscal capacity led to underinvestment in public goods and lower rates of growth and structural transformation; see Epstein (2000), O'Brien (2007), O'Brien (2011), or Brandt et al. (2014).
[12] We further consider lending from the Bank to the private sector in Section 4.

We also provide in this section an account of the Bank's institutional evolution in relation to the resolution of successive crises. We discuss, for example, how the Bank's contribution to the French Wars had long-lasting effects for the money supply and the economy.[13]

The Bank's role as manager of the sovereign debt began in 1694 when its capital was a major part of the existing sovereign debt. That role grew over time as the pressing needs of war finance repeatedly arose and required innovative responses by the Bank. Over time, and especially around each re-chartering, the Bank increased its investment. There was an also increased managerial role of the Bank in overseeing the payment of interest on most issues of sovereign debt that occurred after the South Sea Bubble (Carlos and Neal 2006). The dominance of the Bank of England increased after the mid-eighteenth century, when it became the dominant institution managing nearly all the long-term sovereign debt (Quinn 2008).

The Bank met the state's needs for ready cash while loans and taxes were coming into the Exchequer. Without this liquidity, day-to-day expenditures by all departments of state, particularly the Army and the Navy would have had to wait for receipts from taxes and loans. This was another key for the success of state formation and the rise of a fiscal naval-state and supports our viewpoint that the Bank contributed towards military victories at critical stages of Britain's engagement in mercantilist warfare (Roseveare 1991, p. 37).

State building depends on the government's ability to collect taxes, and it is considerably more efficient to collect them in money than in kind (Bonfatti et al. 2020). By promoting a more monetized and liquid economy, the Bank – as well as other London and provincial banks that were subject to policies pursued by the Bank – contributed to facilitating tax collection. Since the Bank's credibility, and hence capacity to have its notes accepted, in turn depended on the gov-

[13] By comparison, the earlier Bank of Amsterdam (Wisselbank) was not a Bank of issue, did not buy government securities, or operate a discount window (Quinn and Roberds 2007, p. 265). It was insolvent by 1790.

ernment's fiscal base, these links can be represented as another channel of endogeneity between the Bank's actions, its credibility, and the formation of fiscal capacity (Capie 2004).

Nevertheless, it is naïve to suppose that monetary expansion was driven by fiscal dominance, because the Bank's actions were not ultimately controlled by the government, unlike suggested by Antipa (2016).[14] Furthermore, it was the policy of the Treasury to discourage the Bank from restricting credit to the private sector to accommodate the state. It is true that it might have been politically difficult for the Bank to deny credit to the government during military emergencies, but it was also often in the interest of the Bank to comply with suggestions from the Treasury, regardless of when or whether there was a Charter renewal approaching (Broz and Grossman 2004). A close look at the historical record in fact shows numerous instances when the Bank of England denied credit to the government, even in times of warfare (Kynaston 2017, pp. 16, 23, 34, 56-7 and 79; Desan 2014; p. 327; O'Brien and Palma 2020, p. 403). The Bank's consistent support for the state's strategic policies is moreover implicit in the efforts made by Tories – who were in favour of a blue-water policy only and minimal interference in continental affairs – to undermine it by creating a rival Land Bank (O'Brien 1967; Pincus and Robinson 2014).

As mentioned, the Bank of England supported the state by providing it with the credit required for national defence. Foremost, it provided liquidity to the government needed for the day-to-day expenditures which invariably rose during wartime. It did so on bills contractually repayable over short periods of time. While the Bank's funding was not typically a large part of

[14] See O'Brien (1967, chapters 4 and 6) and O'Brien and Palma (2020). Antipa's criticism is not new. David Ricardo and others castigated the Bank for being responsible for overexpanding credit which in turn would have led to inflation and instability in the value of sterling. This criticism is unwarranted. As O'Brien (2001, p. 277) argued, the French Wars, a 'protracted and costly conflict (which left Britain as the hegemonic naval, commercial and imperial power for more than a century after Waterloo) could have hardly been financed on the gold standard'. Wartime monetary policy on several occasions provided loans to the private sector facing liquidity crises, and 'enabled merchants and manufacturers working for the export trades to invest heavily in stocks during the crisis years of 1793, 1797, 1799, 1807-8 and 1802-12'. (O'Brien 2000, p. 276). The existence of accumulated inventories benefited merchants and manufacturers in periods when blockades were lifted, avoiding supply chain disruptions and later increased profits (O'Brien 2000, p. 265, 268).

the government's revenue, it was a source of funding that did not dry up at critical times, unlike private sector funding.[15] Furthermore, by promoting financial deepening for the economy overall, the Bank helped generate higher income levels, which in turn led to higher fiscal capacity for the government. As high fiscal capacity was essential for continued growth, there was a positive feedback loop between the Bank's actions and growth itself.[16]

The Bank's lending activities were primarily extended to the private sector. Nevertheless, during the eighteenth century the share of total governmental debt directly held by the Bank of England could become large, although by an amount that is difficult to measure precisely.[17] In its relationship with both the state and the private economy, the Bank's macroeconomic weight cannot be gainsaid; during the eighteenth century, the percentage of national debt (directly) held by the Bank fluctuated between 5 and 20 per cent, typically staying above 10 per cent (Quinn 2008). In turn, the national debt-to-GDP ratio experienced significant growth over the eighteenth century. It grew from a small amount in the early decades to the 1.5-threshold which it crossed in the early nineteenth century. It then steadily decreased and only reached the same heights during the First World War (Hills et al. 2010, p. 280).

The Bank also had a role in leveraging the financial system. The discounting functions of the Bank went beyond allowing moneyed men to exploit arbitrage possibilities in the market for all forms of sovereign debt. Businessmen could also invest in country banks which were the

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[15] Borrowing from the Bank and mercantile companies did at times reach 80% of state loans, though between 10 and 20% is a more common figure for the eighteenth century taken as a whole (Quinn 2008). However, these figures relate to direct borrowing from the Bank; certainly, the Bank also lent to individuals who in turn lent to the state as for the first two years of the Restriction (and then from mid-1803 to late-1805) the Bank's discount rate was fixed at 5%, while government bonds were paying more (Clapham 2008). O'Brien and Palma (2020) find that borrowing from the Bank of England to the state did not increase relative to coin supply in times of warfare until the 1790s. However, borrowing from the private sector did tend to decrease during war.

[16] Furthermore, notice that the state's high fiscal capacity itself meant that the Bank's actions were more credible, especially during times when the Bank's notes were largely backed by government debt (O'Brien and Palma 2020).

[17] While the value of debt which appears on the Bank of England balance sheet corresponds to (secondary or spot) market value, it is hard to know the equivalent amount of total outstanding governmental debt owed (i.e. the nominal or issuing value).

equivalent of venture capital firms (Brunt 2006). The "discounter" bank model, compared to the older "goldsmith" model, rose in importance over time, and especially during the suspension period (Gent 2016). There was also a shift towards acceptance banking (Sissoko 2022).

While the Bank's overall influence for the development of the state and the economy was in net terms positive, it is undeniable that there were missteps. For example, the resumption of the gold standard – at pre-war parity – led to errors which partly explain the crisis of 1825 (Neal 1988), as well as the creation of branches of the Bank in various ports and manufacturing centres, with mixed results (Moss 1981).[18] And while Bank policy during the 1830s and early 1840s was more flexible than is commonly recognized (Matthews 2011, pp. 166-176), the re-charter of 1844 led to mismanagement in dealing with the Irish famine and the riots associated with Chartism (Baring 1847).

Another important role of the Bank – which was a bank of issue from the beginning – concerned monetizing the economy. The silver and gold mines of the Americas played an important role in the monetization of the Western European economies from the sixteenth century, but these worked in complementarity, not substitution, to banknotes (Palma 2018b, 2022). Monetization stimulated not only commercial activity but also raised fiscal capacities (Bonfatti et al. 2020). Monetization was symbiotic with rising taxation, and this was facilitated by the continuation of wartime cooperation between the Bank – which enabled, for instance, effective collection of the excise nationally – and the state. This gave the British state a permanent fiscal advantage over its European competitors, and the regressive nature of the excise explains why the public response was harder work and higher wages instead of repeated tax revolts.[19] In fact, prominent Americans involved in creating the first Bank of the United States took seriously the leading

[18] 14 new branches were opened until Peel's Act of 1844, 'mostly in commercial towns but also often at the insistence of the government and the Navy to facilitate payments to and from Naval Yards' (Ugolini 2017, p. 66).
[19] Of course, not all excise taxes were regressive, as for instance those on the sale of brandy or silks (O'Brien 2016).

example of the Bank of England; William Bingham convincingly explained to Hamilton the role of a national bank in raising a nation's fiscal capacity, surely based on his extended visit to England at the end of the Revolutionary war, before the 1790 report on public credit by Hamilton (Wettereau 1937).[20] During the Restriction period, in particular, the Bank's role in monetizing the economy and supporting the state would became essential (O'Brien and Palma 2020).

The Bank's role evolved over time. Prior to 1844 the Bank went through several distinct periods. First, there was its original war-finance, chartered-company phase (Kleer 2017). Second, the fallout from the South Sea Bubble led to a dominance not just over the rest of the private financial system but also of the other chartered companies. There was a period of building up on these trends, highlighted by a developing oversight of the whole financial system, and the Bank had a crucial role in the resolution of the struggle for control of the East India Company in the 1760s and 1770s.[21] The learning process underwent by the Bank over time influenced how it handled the extreme pressures of 1793-1815. The Restriction period (1797-1821) witnessed key transformations in the way the Bank operated, many of which continued into the reinstated Gold Standard. Finally, where were important milestones during and following the country banks crisis of 1825-6, prior to the move to the Bank Charter Act of 1844.[22]

It is beyond the scope of an article of this size to go over all these events in detail, but we now discuss the period 1793-1821 that was in many ways critical.[23] The time between the founding of the Bank in 1694 and the suspension of specie payments in February 1797 provide us with several in-

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[20] We thank Larry Neal for bringing this point to our attention.
[21] The loan given by the Bank to the EIC in the context of the Regulating Act happened after the Bank had suspended its hitherto seasonal funding of the EIC.
[22] The 1825-6 crisis was one of two major (i.e. systemic) banking crisis of the last 200 years (Turner 2014, p. 7). Nonetheless, the Bank lent generously during that crisis in accordance with the principle that internal drains owing to the failure of confidence 'called for free lending by the Bank to banks and other houses which might be illiquid but were not insolvent' (Matthews 2011, p. 172). In the decades following 1825, the Bank of England's opposition to limited liability in banking may have been due to strategic self-interest, but also 'underpinned the stability of the UK banking system' (Turner 2014, p. 214).
[23] Our discussion here complements that in O'Brien and Palma (2020).

stances for analysing the interplay between monetary and fiscal authorities, but none as consequential as the Restriction period. Departure from convertibility, accompanied by innovations to a highly effective fiscal constitution, ensured a plentiful supply of revenue to fund the kingdom's foreign, imperial, and strategic policies both in wartime and thereafter. It is difficult to see the long-run development of the financial service industry and its importance to the economy as a whole without reference to the fiscal and financial operations of the state, which gradually intensified as they did during the six episodes of war of the preceding century. Without the advances to the state made possible by paper money and the ability to suspend cash payments, Britain might well have lost the war against Revolutionary and Napoleonic France, with unpredictable consequences for the first industrial revolution.

Those who lived through the 1793-1815 French Wars were aware of the critical contributions made by the Bank of England to Britain's military success. An 1803 print by James Gillray shows Napoleon feasting with his officers at a table where models of buildings representing various British institutions are depicted. The state is represented by the Tower of London and St. James's Palace. On the head of a bishop, a label reads "Roast Beef of Old England". Conspicuously and at the centre of the image, stands an oversized Bank of England.[24]

The Bank's contribution to the war effort against France was multi-dimensional: it consisted of large-scale issuance of paper notes; the managing of both the national debt and the government's rising day-to-day demands for liquidity; the continued provision of short-term loans (discounts) to the government; the disinterested management of the government's loan process; and finally, the inventory management and storage facilities provided for merchants (Kynaston 2017, p. 88). By the end of the war, 'the structure of the (still privately owned) Bank of England

[24] See Figure A3 in our Appendix. According to several accounts, 'Napoleon boasted in June [1803] that he needed only three days of fog to be master of London, of Parliament, of the Bank of England' (British Museum, undated; see also Watkin 2006).

contained many of the essential components of modern central banks' (Roberds and Velde 2016, p. 488).

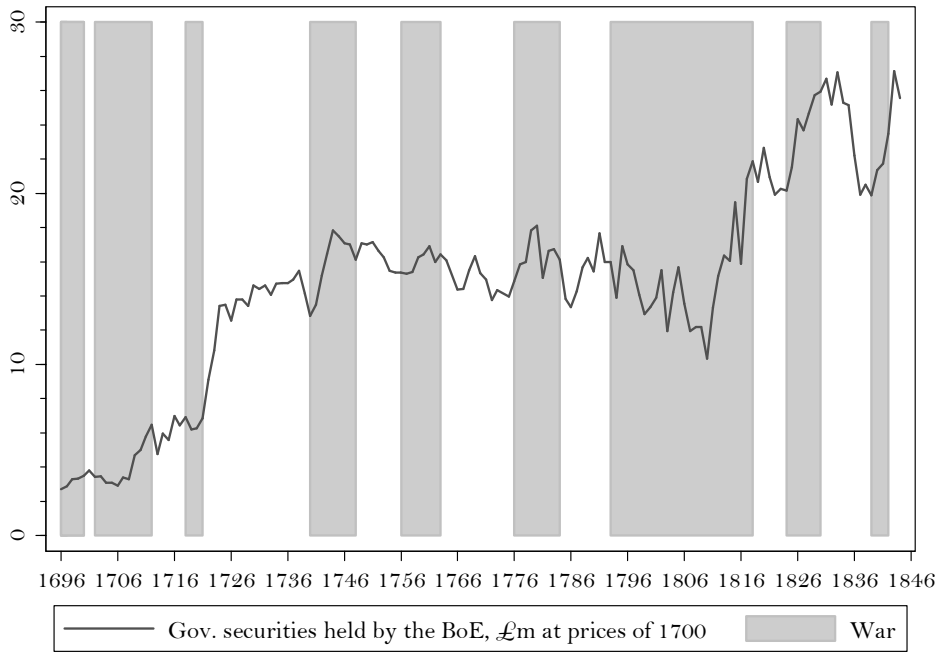
The 1793-1815 war – interrupted only briefly by the short-lived Peace of Amiens – led to a new monetary regime for the realm. Up to the last decade of the eighteenth century, there is no evidence of abnormal levels of banknote expansion from the Bank (O'Brien and Palma 2020).[25] Nonetheless, the asset side of the Bank's balance sheet indicates that periods of war were usually associated with increased lending to the government in real terms (Figure 4).[26] Following each upswing in lending, levels did not return to the previous status quo (i.e. ratchet effects occurred). The outstanding exception to this pattern was 1793-1810, when lending declined in real terms, briefly interrupted by stagnated lending around the time of the Treaty of Amiens. Once the war against Napoleon intensified, the Bank's purchases of government securities did so as well, with assets consequently jumping from less than £20 million in 1810 to over £32 million in 1813 in real terms (i.e. in constant 1700 prices).

The Bank's loans to the government expanded in times of war and behaved in a way that paralleled fiscal capacity (O'Brien 1988; Brewer 1989). However, these loans never turned into conventional debt monetization.[27] At the end of a long history of prudence, when the state's demands for both credits and loans intensified to levels never-before experienced, the economy was well prepared to make the transition to inconvertible paper which was indispensable for the conduct of more expensive warfare. Limited access to bullion, coupled with the continuation of flexible support for the demands from the private economy meant that the paper pound was well re-

[25] In fact, in some periods of war such as the American revolutionary war period, the ratio of Bank of England notes to coin supply decreased.
[26] The Bank of England's balance sheet is available in Bank of England (1967).
[27] A moderate amount of inflation did coincide with the last decade of the Restriction period, but it is not clear that this was due to the actions of the Bank of England, as argued by the bullionists, old and new (e.g. Antipa 2016); see O'Brien and Palma (2020, pp. 406-7). In any case, even if to some extent it was, the words of Clapham have stood the test of time: 'No one said frankly – accept a measure of inflation for victory's sake' (Clapham 2008).

ceived, and turned out to be politically powerful from a military standpoint (O'Brien and Palma 2020).[28]

Figure 4. Total government securities held by the Bank of England, millions of £ in constant 1700 prices



Source: Bank of England (1967), and for the deflator, Broadberry et al. (2015).

Notes: Total securities include government debt plus other government securities held by the bank.

The Bank's reputation, accumulated over the eighteenth century, was critical for the success of the Suspension period of 1797-1821. Already in 1745, the Bank had been saved from a potential run emanating from the threat of a Stuart restoration through 'a proclamation by the merchants of London, that they would accept and encourage payments in bank notes' (Vilar 1984, p. 281). This proclamation illustrates the importance that merchants attributed to the

[28] According to one authority, '[Bank of England] notes were considered by merchants to be a means of payment equivalent to coin; this confidence of merchants was the most important determinant of the Bank's strength' (Vilar 1984, p. 281).

Bank's activities for their own operations. A similar – and longer lasting – proclamation was issued in 1797 (O'Brien and Palma 2020). Indeed, '[T]he Bank was in fact an organ of the merchants, who placed their trust firmly in it' (Vilar 1984, p. 311).

The success of the suspension was due to the Bank's surprisingly high level of autonomy from the government. Although the Bank depended on the state to have its charter renewed, it could and did refuse credit to the state.[29] Thornton, in his justly famous 1802 essay, argued that the Bank of England's independence and power to resist the government provided important reasons for the success of the paper pound, and in particular, the resistance to any wild issues of currency. The two other reasons that he gives are cultural: English "common sense" and "spirit of stability", as well as the fact that England was wealthier than France, which justified a higher demand for fiat money (Thornton 2017). He did not consider the reverse causality which we emphasize here: the role of the Bank's actions as an engine for the growth of the British economy.

Despite the policy changes of the 1820s and the following decades — the return to gold, restrictions on the Bank, limitations on joint-stock banking — the financial policy innovations of the 1797-1821 Restriction period provided a permanent boost for the British economy. These policies were supported by the diffusion of trust in the Bank among investors and the public in general, leading to a permanent shift towards a paper (albeit not fiat) money system.[30] This in turn helped the second phase of industrialization (e.g. railways), which is helpful in understanding why this phase was more dynamic that earlier ones (Crafts and Harley 1992; Broadberry et al. 2015).

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[29] This happened, for instance, in 1783; see Vilar (1984, p. 286). See also O'Brien and Palma (2020, p. 403).
[30] O'Brien and Palma (2020). See also Roberds and Velde (2016, p.488) who write that there was a 'shift in the popular conception of money, from something that was tangibly bound to precious metal, to something more abstract in nature'.

IV

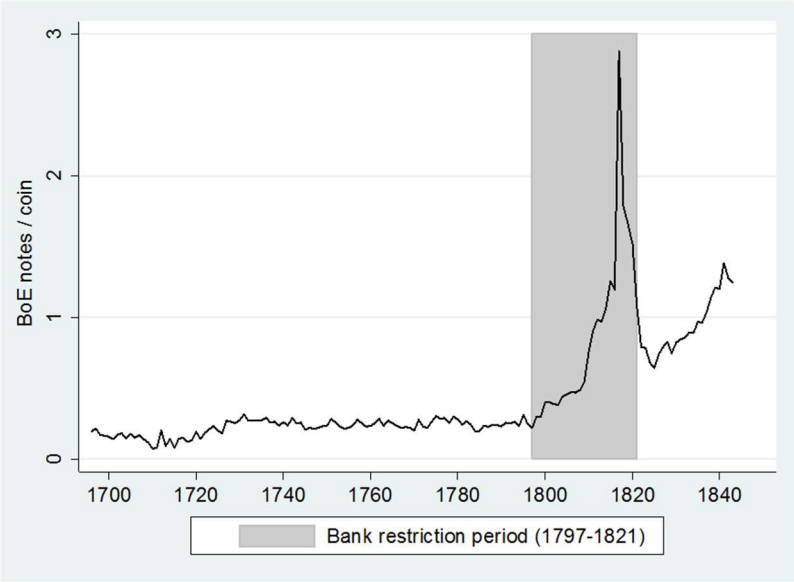
The Bank's actions promoted the financial development of the overall economy. On theoretical and empirical grounds, research suggests 'a positive first order relationship between financial development and economic growth: an efficient network of financial institutions reduces transaction and informational costs, mitigates risks, monitors firms, mobilises saving and facilitates trade' (Levine 1997). Although technical and organizational innovations undoubtedly facilitate development in the financial service industry, other factors including a country's legal and political system operated to promote its expansion, integration, and efficiency at critical stages in the growth process. Thus, it remains important to understand the evolution of the financial system over time and to comprehend how the financial activities of the state, operating in close cooperation with the Bank, generated benign outcomes for the long-term growth of the economy.

Within a decade of the Bank's foundation in 1694, most substantial traders in London were using (or considering using) Bank of England notes, drawing accounts and discount facilities.[31] Banknotes, in particular, 'provided an extremely convenient and relatively safe way for merchants, bankers and wholesalers to settle bills of exchange, notes, and other debts, including their debts to customs and excise' (Price 1992, p. 92). From 1700, the Bank's advances were offered to counterparties at pre-specified conditions upon deposit of gold ingots, eventually turning the Bank into the world's gold market-maker (Ugolini 2017, p. 232). But prior to the 1790s the Bank did not expand its money supply in tandem with warfare, in contrast to what happened with taxes or the size of government. But as a response to the extraordinary threat of the French revolution, and subsequent overseas events, from 1789 to 1821 per-capita M2 increased from £5 to £8 in real terms, while per capita coin supply fell from £4 to £3 over the same period (Palma 2018a). Before 1797, the Bank of

[31] As a result of goldsmith banking, an interbank clearing system was already present in London prior to the Glorious Revolution (Quinn 1997).

England had operated five printing presses, but as early as 16 of March 1797 it had 16 presses employed day and night, plus 14 more planned to be added (Kynaston 2017, p. 83). These actions were necessary to protect the private economy as well as the state. Contemporaries such as Thornton anticipated as early as 1802 the kind of arguments that Friedman and Schwartz (2008) would come to make, i.e. that a fall in money supply would be damaging for the economy: 'A great diminution of notes prevents much of that industry of the country … from being so productive as it would otherwise be' (Thornton 2017, p. 119).

Figure 5. Ratio of Bank of England notes to coin supply



Source: O'Brien and Palma (2020, p. 405), based on Bank of England (1967) and Palma (2018a).

Note: If we instead used only notes in circulation with the public in the numerator, and removed coin held by the Bank from the denominator, the picture would be qualitatively similar, but the magnitude of the rise would not be as large (there was a rise in Bank notes retained inside the Bank from the early 1810s up to 1844). At the same time, the Bank's expansion of its notes facilitated the expansion of private country banknotes which we do not include in the numerator.

Upon suspension of convertibility by the Bank in 1797, financing continued at a renewed pace. Businessmen as well as the public trusted the newly issued banknotes, which for the first time

became common as a means of payment. The events of the last decade of the eighteenth century led to a regime shift in the form of a decisive move towards an increased public role for the Bank. Once warfare was over, the increased liquidity stayed in the financial system, despite the full restoration of convertibility in 1821 (Figure 5; see also Gordon 1974).

Monetary transmission occurred as follows. Government borrowing affected the money supply and in turn the money supply affected the terms upon which the Treasury marketed public securities and the facility of doing so. If the Treasury borrowed directly from the Bank of England, through the issue of exchequer bills, the supply of reserve currency in circulation rose and created conditions for expansion of credit throughout the banking system. Whenever the banks expanded their liabilities, competition between the public and private sectors for loanable funds declined and the Treasury found it easier and cheaper to borrow the funds it required. A plentiful supply of credit satisfied demands for liquidity and encouraged those with idle balances to speculate in government bills.

The Treasury sold public securities to middlemen – loan contractors – who normally operated with borrowed funds, and hence it is obvious why easy credit conditions would raise the level of demand for bills and bonds. As Sir Richard Carr Glynn, a London banker, observed, 'a want of cash forces Merchants and traders to sell out of the funds and obtain cash from people with money in the funds'.[32] Thus whenever the Bank restricted the supply of its notes and deposits either by forcing the Treasury into the market or by rationing discounts to the London business community, its policy produced a decline in the money supply which heightened competition between the public and private sectors for funds and forced up rates of interest. If the Bank's action also affected confidence, the pressure for liquidity could prompt a withdrawal of balances from banks by the public, thereby reducing the supply of loanable funds still further. Since changes in the liquidity of the London money

[32] Parliamentary Papers 1826 (3), 43.

market exercised such a powerful influence on the prices obtained by the Treasury for its securities, it is worth taking some time to clarify the principles upon which the Bank normally regulated advances to the state and the private sector.

Advances took the form partly of deposits but mainly of notes issued to the government and the private sector. The Bank could and did refuse to accommodate the Treasury, but effective control over its liabilities was also exercised in relation to credit granted to the private sector. This credit included discounts on bills of exchange and drawing and deposit facilities granted occasionally to individuals but more generally to the large city corporations such as the East India, South Sea and Hudson Bay Companies.[33] Bills of exchange constituted the most important private asset held by the Bank, but its regulations on discounting in the eighteenth century do not indicate that the Bank set out to attract clients. Only firms located in the capital could discount their bills. The privilege also required a Directors' recommendation, usually accorded only to well-established and solid businessmen. Bankers could not enjoy the facility nor, for example, could persons whom the Directors disdainfully referred to as "speculators".

Rules on the kind of bills discounted appear to have been equally stringent, but by 1795 the practice had departed from the letter of the law. Bills discounted had to be for the purpose of industry or trade, of short maturity (one to three months) and for amounts above £50. Continuation loans could not be countenanced, and no firm could owe the Bank more than £3,000 at any one time on inland bills of exchange. These rules and the higher rates of interest charged by the Bank suggest that the Directors did not compete seriously with London bankers in the discount business. By the time of the French wars some 1,200 to 1,500 firms discounted with the Bank. Just under half of outstanding advances on bills of exchange in 1799 were to merchants engaged in foreign trade and the remainder covered almost every other mercantile and manufacturing activity represented in Lon-

[33] Clapham (2008, pp. 204 and 208).

don.[34] Even the Bullion Committee, so hostile to the Bank on other counts, noticed that 'the discount of mercantile paper is confined to paper of undoubted solidity arising out of real commercial transactions and payable at short fixed periods'.[35]

In turn, country bank notes circulated within fairly well-defined geographical areas and were employed for such payments as wages and purchases of local produce. Payments for goods and services traded between different parts of Britain generally took the form of bills of exchange drawn upon banks located in the capital.[36] Between the end of the Seven Years War and 1793 the liabilities of the banking system increased, though they never achieved a position of dominance in the country's money supply. Bankers issued notes and created deposits in exchange for assets offered by those who wished to obtain acceptable purchasing power. Their ability to acquire assets and create liabilities is today regulated by the central bank, but until well into the nineteenth century it is incorrect to use a term as strong as "control" to refer to the status of the Bank of England with respect to the economy's supply of money. The Bank's Directors never claimed to exercise control, and the conflict of views among both contemporary and modern writers on the nature and degree of central direction has created confusion about the extent of the Bank's power over the eighteenth-century monetary system.[37]

We turn now to the private sector. The Bank was created not only to provide support for the government's war effort but also, according to Wolfram and Pincus (2011), to support manufactures through the provision of low-interest-rate loans. It is certainly the case that during the second half of the eighteenth century, there was great expansion of Bank lending to the private

[34] Clapham (2008, pp. 124, 125, 129-30, 204, 205, 208 and 215-6); Parliamentary Papers 1810 (3), 89, 95-8, 157 and 220.
[35] Cannan (1919, p. 46.)
[36] Feavearyear (1931, p. 159), Joslin (1954).
[37] In the online Appendix to this paper (Sections A1 and A2), we provide further details on the Bank's relationship with the overall economy and the state, focusing on the money market, reserves management, and our position with respect to the crowding-out debate.

sector (Ugolini 2017, p. 233). Booms in trade led over time to sharp increases in demand for additional currency, often leading to waves of bankruptcies due to low liquidity (Feavearyear 1931, p. 163; Neal 1994). These would have been even more frequent had it not been for the Bank's support. The Bank took Bagehot-type actions in 1763 and 1772 (Kynaston 2017, pp. 38, 51, and 77-8; Kosmetatos 2018; Lovell 1957).[38] It was specifically identified as early as 1797 as a "lender of last resort" by Francis Baring, co-founder of the company which evolved into Barings Bank (Kynaston 2017, p. 91).[39] At times, the Bank did restrict credit, when this was seen to be in its own interest, but not usually due to government interference.[40]

During the Restriction period, banknotes of small denominations were issued and became widely used and accepted (Desan 2014, p. 401; O'Brien and Palma 2020).[41] Archival evidence collected from the Bank of England shows that even prior to the Restriction period, in 1792, most of the Banknotes issued were of the lower denominations issued at the time, in particular £10 (Bank of England archive, C66). In the subsequent years, as the Bank began to issue £5, £2, and £1 notes which could be used to pay salaries and became widespread in the economy (O'Brien and Palma 2020). In fact, this was true to such an extent that, as we document in the Appendix using new archival data (Bank of England archive, C66), forgeries were more common for smaller denominations, which were commonly accepted and less likely to raise suspicions.[42]

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[38] In an important article, Bignon et al. (2012) describe how the Bank of England was engaging in such policies well before the time of Bagehot's writing. However, they claim that there was a 'policy of universal credit rationing before 1850', which is debatable, despite the fact that intervention became more straightforward after the repeal of usury laws in 1833 (Pressnell 1956, p. 76, Anson et al. 2017, Kynaston 2017, Kosmetatos 2018, and O'Brien and Palma 2020). See also James (2012). More generally, the viewpoint that the Bank of England only began to accept its public responsibilities from the second half of the nineteenth century, together with an emphasis on the lender of last resort role in line with Bagehot, appears in Goodhart (1988, pp. 45-6). Ugolini (2017, pp. 5-7) provides criticism and an updated discussion.

[39] Sissoko (2022) argues that during the Restriction the Bank's operations were transformed as the Bullionist Controversy and the 1810 crisis led the Bank to acknowledge its duties to the public and restructure its discount policies to promote financial and monetary stability.

[40] During the eighteenth century, usury laws prevented the Bank from raising interest on discounts over 6% until 1714 and 5% thereafter. Hence when the Bank wanted to reduce its discounting it did so through credit rationing and reductions in the maximum duration of bills acceptable for discount (Price 1992, p. 96; Ugolini 2017, p. 234).

[41] Figure A4 in the Appendix illustrates how the Bank's policies were perceived to be expansionary at the time.

[42] For details, see sections A3 and A4 of the Appendix.

Between 1819 and 1821 the Bank was forced to resume payments to negate expectations set up by the controversy surrounding the bullion debate (Gordon 1974; Hilton 1980; Kynaston 2017, pp. 111-2). Arguably, resumption was not the best policy, as was at the time argued by the Birmingham school, led by Thomas Attwood. This seems reasonable since modern economies run well on fiat money. However, the modern macroeconomics literature explains how central banks can be forced to take second-best actions when expectation traps are set (Chari et al. 1998). Hence resumption was probably unavoidable, but it was not inevitable or even desirable, especially at par (O'Brien and Palma 2020, p. 402, fn. 31) – even if it had been repeatedly promised by ministers.

Following a run on country banks in late 1825, Prime Minister Lord Liverpool implemented currency and banking reforms which eliminated the smaller banknote denominations and allowed for the operation of joint-stock banks except within a 65-mile radius of London. The expanded responsibilities of the Bank of England were intended at encouraging its better management of the provincial credit markets, and while that had mixed results, provincial Bank branches took up local tax collection and other aspects of government business (Moss 1981, p. 543). Bank of England branches established in Liverpool and Swansea complemented, rather than competed with, the existing private bank network, even though this was less true for Birmingham (Moss 1981, p. 553). There was, in fact, fast growth in the number of joint-stock banks established in England and Wales following the 1833 Charter Act, and they were central for the provision of fixed and working capital for trade and industry, especially in Lancashire, during the 1830s (Matthews 2011, pp. 192-8). [43] With the 1844 Charter Act, the government sought to reduce the Bank's "discretionary" note-issuing powers by imposing a £14m fiduciary limit, which made future crises more likely (Kynaston 2017, p. 144). The rationale was the government's misleading interpretation of the events of the 1790s (Kynaston 2017, p. 142). By 1847, when mer-

[43] See also King (2016) and Ziegler (1990).

chants, traders and bankers were presenting a petition to the government against the Act, only a few defenders remained (Kynaston 2017, pp. 146-7; see also Figure A5 in the appendix).

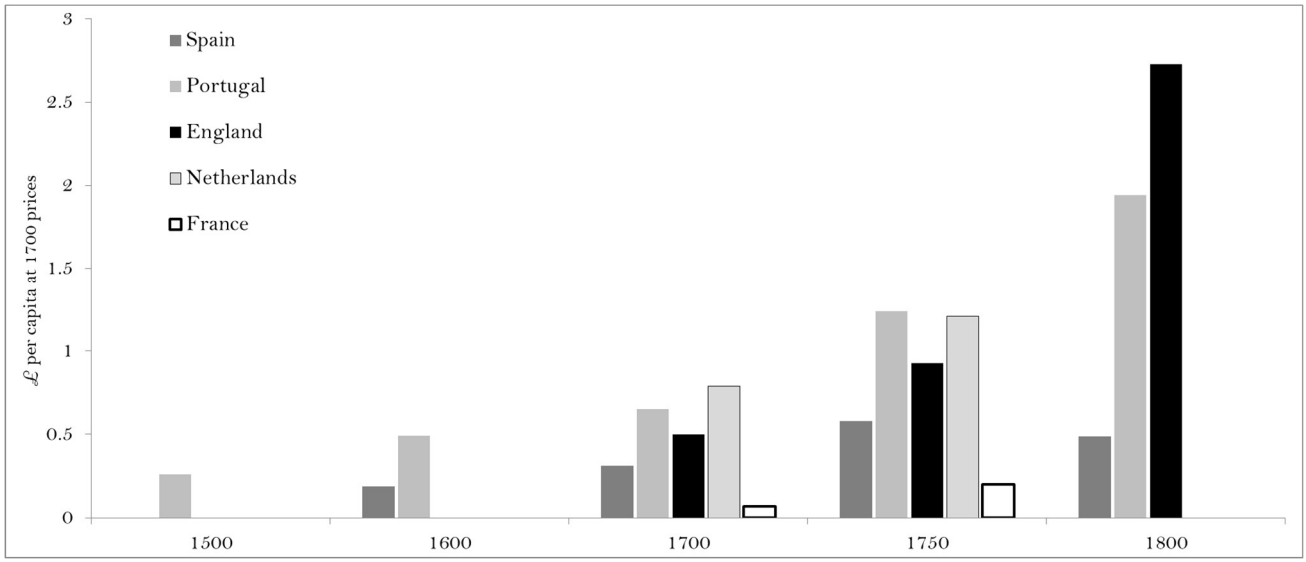
State capacity and empire building had consequences for the market. One view about the rise of taxes during the eighteenth century is that it negatively impacted economic incentives (Clark 2001, 2008; Allen 2009, p. 5). But in the last few years, several papers and books have looked at the theoretical and comparative empirical foundations of the relationship between taxation, state building and economic growth. The conclusion of much of this literature is that states which cannot provide public goods due to insufficient revenues from taxation are as much a barrier to modern economic growth as states in which a small elite abuses power in order to expropriate goods from the citizens (Epstein 2000; Besley and Persson 2011; Besley et al. 2013; O'Brien 2011). As discussed elsewhere in this essay, the Bank contributed towards the build-up of state capacity. Britain rose from a comparatively unimportant colonial trader as late as the mid-seventeenth century to a major colonial power over the course of the eighteenth century. With the notable exception of the American War, England – and after the early eighteenth century, Great Britain – won or took net positive gains from every conflict in which it was involved during the period 1651 to 1815.[44] A comparison of intercontinental trade data for England over time with that of other European powers shows that it became dominant during the eighteenth century (Figure 6).[45] Returns from the empire promoted economic growth and structural change, as is suggested from the growth of London (Palma 2016), and led to a high-wage economy which induced technological change (Allen 2009).

[44] Wars before the French Revolution were not total wars with winners or losers, so even when it found itself on the losing side, as happened with the War of the Spanish Succession, it was able to take out net economic gains, including Manhattan, Malta, numerous naval bases and islands, and cod fisheries, all of which cumulated into its growing maritime empire.

[45] Furthermore, in the Netherlands, intercontinental trade decreased dramatically after 1780; the exact numbers after that date were negligible and we set them to zero in Figure 6. In Costa et al. (2015), numbers for the Netherlands correspond to 1780, but we prefer to use 1800 in this graph to show that, unlike with England, the previous level of intercontinental trade of the Netherlands was not sustainable. By the late eighteenth century, England led intercontinental trade by a large margin and that trend would continue into the nineteenth century. Note additionally that the numbers for Spain and Portugal in the Figure include precious metals, which were an important share of trade for the Iberian economies but also had negative long-term consequences for them (Palma 2020).

Why did Britain's growth in intercontinental trade diverge from that of its Dutch, Spanish, and French rivals over the eighteenth century? Three related factors contributed to this. First, its state capacity – which had lagged behind that of continental powers until the English civil wars of the mid-seventeenth century – rapidly caught up thereafter, even surpassing that of most other countries over the course of the eighteenth century (Karaman and Pamuk 2010, 2017). This allowed for the building of the world's hegemonic navy. Second, Britain's geographical situation meant that its external borders were comparatively easy to protect (O'Brien 2014).[46] The borders could be defended through heavy investment in a navy and a relatively small army. Third, Britain benefited from the development of an institutional framework which nurtured comparatively effective institutions, including the Bank of England, which ultimately protected its independence.

Figure 6. Per capita intercontinental trade, at constant £ per capita of 1700



Source: adapted from Costa et al. (2015, p. 9).

[46] In this, it contrasted sharply with the case of other high (per capita) fiscal-capacity states such as the Netherlands or Venice.

V

The Bank of England supported the British state and economy during the eighteenth century. It was a private institution that provided the state with essential services for profit. The relationship was symbiotic, since it benefited from lending and its privileged position, but it also supported the state by providing it with credit, especially during critical moments when the private market would have dried up. The ease with which the Bank could, in practice, deny funding to the state varied with respect to different contingencies, such as the state of reserves, whether a war was occurring or a charter renewal was approaching (Broz and Grossman 2004). But overall, and because the Directors of the Bank perceived that the safety of the Bank would not be compromised, it acted with a large degree of autonomy, which turned out to be beneficial to the state in the long run.[47] Fiscal capacity was positively affected, which meant that it was possible for the state to increasingly demand funds without credibility problems affecting the ability to repay at equilibrium interest rates. A positive loop ensued. The transformation of sovereign debt into money was in turn transmitted to the private economy, and this elastic supply of liquidity supported long-run economic growth and financial development.[48]

While limited short-term evidence may suggest some degree of crowding out through diversion of funds from private to public expenditures (Temin and Voth 2013), the net effect of this for long-run growth is far from clear-cut once the beneficial indirect effects of external security and warfare are factored in.[49] Most public spending was military, and this complemented private spending, rather than substituting for it. In the long run there was a net downward effect on interest rates. There was hence a positive joint causality between warfare and the expansion of

[47] It was in the long-term interests of the state that the Bank remained autonomous – that was how credibility was built up over time.
[48] As the successive re-chartering of the Bank always required taking on more sovereign debt, that become increasingly the basis on which the Bank had to assess risk to the price stability of its note issue (Hotson 2017).
[49] See the conclusion to Temin and Voth (2005), and also Temin and Voth (2013, p. 175).

both state capacity and financial intermediation. These findings lend support to the fiscal-military state literature. Lending by the Bank to the state led to higher fiscal, administrative, and military capacity. This lending was supplemented by individuals and companies who borrowed from the Bank and in turn lent to the state.[50]

War was a necessary, but not sufficient, condition for this development. Other European economies were also mobilized for warfare, though at levels of intensity presently hard to compare with those which applied to Britain. A plausible hypothesis seems to be that the effect of war was conditioned by a set of geographical and institutional factors which, in the British case, were conducive to an elastic supply of liquidity and for the development of the economy. From the late eighteenth century, the extraordinary danger represented by the war against France and its allies called and allowed for much bolder monetary experiments than would have otherwise been possible either in "normal" times or in continental countries where institutions of a comparable standing to that of the Bank of England did not exist. At the beginning of these unusual wars, ministers and contemporary observers knew full well that the outcome of the war was far from certain (Knight 2013). Support provided by the Bank of England turned out to be essential.

A wider message of our paper is that under a stable institutional framework, discretionary and unorthodox monetary policy can play a useful role in responding to extreme, "black swan"-type events for which the odds of alternative outcomes are difficult to calculate (Kay and King 2020). Napoleon was hoping for an *assignat*-type crash in English money markets from around 1797 onwards, but despite the pessimism echoed by Gillray and other political commentators, that never materialized. Unlike France and elsewhere on the Continent, paper money retained its value, and circulated

[50] O'Brien (1967, chapter 5, pp. 99-168) discusses the individual case of loan contractors who dealt with government borrowing. From the late 1760s, the Bank also provided secondary national debt market services, which in turn facilitated the issuing of new debt (Kynaston 2017, p. 41).

often at comparatively small discount, peaking at only around 35 per cent.[51]

The success of the Bank Restriction Act which suspended convertibility altogether – not to be restored until about a year after the war was over[52] – instead led to unprecedented amounts of lending from the Bank of England to the state being effectively added to the money supply, increasing the levels of monetization of the economy. Well into the nineteenth century, the Bank of England remained an institution widely admired, and eventually imitated, by continental powers.

It is sometimes argued that the British industrial revolution had little to do with the state or with political institutions (e.g. Mokyr 1985; Clark 2008), or that England industrialized despite the negative effects of the state and the banking system (Cameron 1967, p. 21; Calomiris and Haber 2014, pp. 85, 93, and 110). The evidence we have presented here – taking the Bank of England as a case-study – suggests otherwise.

[51] See O'Brien and Palma (2020, p. 396). By contrast, very large discount in banknotes occurred not only in France but also in continental European countries that tried to implement similar policies (see for instance Hamilton 1947, p. 4; Madureira 1997, pp. 290-1). Roberds and Velde (2016, p. 488) write that 'In countries such as Austria, Prussia, and Sweden, finance of military operations resulted in significant inflations … The exceptional case of England, which experienced only mild wartime inflation despite heavy banknote issue, is ironically best remembered. The Bank of England's success at dealing with the temptations posed by banknote issue provided evident proof that a (largely) fiscally backed money was not only possible, but practicable'.

[52] The legal framework for the resumption of the gold standard (Peel's Act) was enacted in July 1819. Convertibility was implemented 1 May 1821. This slowed down but did not prevent further expansion altogether because the gold standard was more flexible than is often assumed (Redish 1993).

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ONLINE APPENDIX

"Not an ordinary Bank but a Great Engine of State: The Bank of England and the British Economy, 1694-1844", by Patrick O'Brien and Nuno Palma

A1. Reserves management

In appendix A1 of O'Brien and Palma (2020) we reviewed the relationship between the Bank of England and the money market. Here, we consider the matter of reserves management. The Bank never enunciated principles for the regulation of credit in the eighteenth century and it is not easy to make unequivocal statements on the subject. A survey of practice over time supported by somewhat vague statements made by its Directors to Parliamentary Committees allows historians to deduce, if not principles, at least rules of thumb. First, since the Bank's liabilities represented promises to pay on demand a certain sum in specie, the gold reserve ultimately regulated the issue of notes and deposits. Only the rules governing the amount of liabilities incurred by the Bank on a given reserve of bullion are in doubt. Lovell's article and statistics covering the period 1720-97 reveal that the Bank did not maintain anything that could be termed a fixed ratio of bullion to either its note issue or its total outstanding liabilities of notes plus deposits.[53] Although the range of variation ran from a minimum of 5 per cent to a maximum of 66 per cent, for 58 of the 75 years covered by the data, the ratio fluctuated between 20 per cent and 50 per cent; for ten years it fell below 20 per cent and for seven years rose above 50 per cent.[54]

In 1797 the Directors explicitly repudiated the idea that they regulated credit on anything but highly variable specie ratios. When asked by the Committee on Suspension, 'Will it appear from any documents laid before the Committee in what proportion the Bank regulates its issues?', Bosanquet, then a senior Director, replied: 'No I conceive it will not because although the Directors have

[53] Lovell (1957), Horsefield (1953, pp. 59 and 65); Clapham (1944, p. 156).
[54] Parliamentary Papers 1831-32 (6).

attention to the state of their cash they have no stated or precise rule to regulate their conduct'. When asked why the Bank wished to suspend specie payments in 1797 though they had more gold on hand than in 1783 Bosanquet admitted: 'It is possible for the Bank to be a much safer situation with a smaller sum in specie when public affairs are prosperous'. He also revealed that the Bank judged the quantity of gold necessary for its safety 'from a probability of permanent abundance. Whenever there is an influx of bullion the Bank has nothing to fear, when a drain takes place it is a period for them to be alarmed'. For the Directors, predicted indications of actual or potential movements in specie included changes in the volume of exports and imports and anticipated remittances on capital account of the balance of payments.[55] The data available to them to make informed judgments were, needless to say, inadequate.

Clearly, the Directors could not be pinned down either in 1797 or at any other time in the eighteenth century. Lovell's seminal study of the occasions when the Bank actually limited credit and of situations when its low bullion reserve might have prompted limitation leaves the impression that they acted upon a variety of purely *ad hoc* criteria. It depended on the circumstances of the moment and upon the Directors' own hunches about future changes in the economy. And yet, it is clear that the Directors cared about the reputation of the Bank and would not risk low bullion reserves for long if this meant their credibility would be at risk. For this reason, as far as the Bank of England was concerned, until the last decade of the century, bullion and paper money were complements, not substitutes. This view is not in contradiction to the conclusions of Lovell.

For example, there is no record of discount contraction by the Bank in 1720-21 or 1725-26 when the ratio of bullion to liabilities outstanding had fallen well below the normal level and exchange rates with Hamburg had dropped below par.[56] But an internal drain of gold associated with the victories of the Young Pretender prompted the Bank to limit discounts in the last quarter of

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[55] Parliamentary Papers 1826 (3), 15-7, 22-5, 39-41, and 73; Parliamentary Papers 1810 (3), 151, 158, 160 and 247.
[56] Parliamentary Papers 1831-32 (6); Ashton (1955, p. 253); Lovell (1957, pp. 166-89).

1745. On this occasion no action was taken until the ratio of gold to liabilities had fallen to the exceptionally low level of 14 per cent.[57] No limitations of discounts are recorded at the Bank in 1761 and 1762 when the exchange had fallen sufficiently below par to make it profitable to export bullion.[58] In 1763 Dutch capital left London and British bankers supported their Dutch correspondents in a post-war, European-wide credit crisis by loans of bullion. The exchange on Amsterdam fell below par and the Bank's ratio of bullion to liabilities stood at its lowest level for the entire century, yet commercial discounts continued to expand.[59] Throughout the years 1766-73 the reserve ratio at the Bank was at a low level: heavy investment in houses, turnpikes, canals, and other public works had been in process for several years at a rate that probably tended to outrun current savings. Credit was over-expanded, and in the summer of 1772 private bank failures occurred first in Scotland and then England and spread in the latter months of the year to Amsterdam. Bullion again left England in the early months of 1773 to restore confidence in Amsterdam.

Clapham's statement that the Bank early in 1772 'had tried to put a brake on over-trading' is misleading. At the height of the crisis in the summer of 1772 the Bank discounted liberally and throughout the period of strain on the gold reserve the Bank's reaction had simply been to reject private securities that the Directors had reason to dismiss as "doubtful", such as the paper of certain Scottish banks or Jewish houses involved in speculation on the Amsterdam Bourse.[60] A decade later, from August 1780 to August 1784, the Bank's bullion reserve fell steadily. Total note issues were reduced with the diminution of government expenditure at the end of the war, but not sufficiently to prevent the ratio of bullion to liabilities falling to the very low level of 8 per cent in 1784. Bullion outflows in 1780 and 1782 had been connected with the government specie payments to the British Army in the United States.[61] In April 1782 the Governor of the Bank complained that the exchange

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[57] Clapham (1944, pp. 233-4); Ashton (1959, p. 123).
[58] Ashton (1959, p. 125); Mushet (1810, p. 96).
[59] Wilson (1941, p. 168); Chalmers (1812, p. 138); Mushet (1810).
[60] Parliamentary Papers 1831-32 (6); Ashton (1959, pp. 127-8); Wilson (1941, pp. 176-7); Clapham (2008, p. 245).
[61] Macleod (1855, p. 61); Clapham (2008, p. 245); Mushet (1810, p. 100).

on Hamburg continued to be adverse enough to produce a heavy drain.[62] When peace came at the beginning of 1783 Dutch investors again repatriated capital and the exchange remained below par until 1785.[63]

At the close of the war the demand for credit had been stimulated in Britain by speculation exports sent to the United States and a boom in the cotton industry.[64] The Bank's reaction to this apparently unfavourable situation was to limit discounts early in 1783 and in May it refused to make advances on the scrip of the government loan raised for that year.[65] But by June commercial discounting was again heavy and in October, with bullion still at an extremely low level, the Directors felt safe enough to reverse their policy and make advances to holders of scrip. The policy pursued by the Bank was described by Bosanquet in these words:

> The drain of cash proceeded from the great extension of commerce which followed the peace, and which occasioned so considerable an export of the commodities of this country that the circulation was hardly sufficient to support it. It was evident that if this drain could be supported for a short time the influx of wealth that must follow from the return of the amount of the Exports would amply compensate for the preceding drain – and so it turned out. The Bank Directors, therefore, without opening the state of their affairs to the Administration, took a bold step on their own authority and refused to make the advances on the loan of that year; this answered the purpose of making a temporary suspension in the drain of specie. The time at which they had most grounds of alarm was not when their cash was at the lowest, but about April or May when they refused advance on the loan, and although in October their cash was lower than before, *yet* they had such reason to expect a turn in their favour by a fa-

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[62] Ashton (1955, p. 253); Clapham (1944, p. 253).
[63] McPherson (1805, p. 34); Mushet (1810).
[64] Macleod (1855); Ashton (1959, p. 131); Pressnell (1956, p. 91).
[65] Macleod (1855, pp. 66-7); Clapham (1944, pp. 255-6).

vourable alteration of the exchanges that they were under much less apprehension.[66]

The Bank's guides to action in the eighteenth century appear to have been straightforward: Discount all first-class bills of exchange for respectable members of the London mercantile community at fixed rates of interest but with regard for the safety of the treasure. Directors of the Bank had exercised this concern with a high degree of flexibility both in peace and war. When the rate of exchange fell below par they made no attempts to maintain either a fixed ratio of bullion to liabilities or to restrict advances. In fact, only two accounts of discount limitation are on record. One was in the unusual circumstances of the Jacobite Rebellion in 1745, the other, at the end of the American War of Independence, lasted for a short time only. On no occasion did the Bank refuse to provide the government with credit required for the public service, although it did limit advances to contractors on the scrip of the public loan for 1785. With the two exceptions cited above, the same is true for the private sector. Established London businessmen, willing to pay interest at 5 per cent and who offered the Bank secure bills of short maturity, seldom had their requests rejected. As Horsefield (1941) observed, 'the chief intellectual basis of banking theory at the end of the eighteenth century was a belief that to supply the needs of trade was not only to fulfil most adequately the purpose of banking but to avoid any danger of over issue'. The Bank's pragmatic approach grew out of, and seemed suited to, a century when confidence in credit of all kinds increased steadily and for most of the time the country probably enjoyed the luxury of an active balance of payments on the income account. Lord North described the Bank in 1781 as 'part of the constitution'.[67]

At the outbreak of war in 1793 if historical experience in peace and war alike formed any guide, the Treasury, the London business community, and the financial sector at large could have expected support from the Directors for their respective concerns. Before this famous conjuncture in

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[66] Parliamentary Papers 1810 (3), 24-5 and 73.
[67] Clapham (2008, p. 181); Fetter (1965, pp. 1-19).

the kingdom's geopolitical and economic history, decades before Britain's industrial revolution, the economy's internal trade, external commerce, agriculture, and manufacturing sectors had been serviced by a system of financial intermediation operating more or less effectively upon fluctuating reserves of bullion. Above all, it relied upon the accumulation of a fiscally well serviced public debt incurred by the state to wage geopolitical and mercantilist warfare for the defence of the realm and the expansion of British interests overseas. By the late eighteenth century this process was contributing not only to the extension of the market for capital and credit, but to its integration (Buchinsky and Polak 1993).

The extension and stability of the system rested ultimately on the confidence displayed by the public that notes issued, deposits created, and drawing rights sanctioned by banks (including a range of proto banks) held and used for all kinds of transactions, could be redeemed on demand either directly into specie with stable values or would remain readily convertible into a reserve currency in the form of notes issued or deposits created by the Bank of England.[68] In turn the Bank's redeemable notes and deposits were backed by its own reserves of specie, by real assets behind the private bills of exchange and other securities held in its portfolio. Most importantly, and in the highest proportion, they were backed by the bonds and bills of the state issued on the security of inflowing tax revenues.[69]

The data available to reconstruct the Bank's liabilities backed by assets, especially the symbolically important bullion but increasingly private and public securities, is available for the entire period 1694–1821.[70] The figures reveal that the significance of bullion (gold and silver) as the traditionally acceptable reserve asset behind the expansion of the supply of paper credit to support the growth of the kingdom's commerce, trade, industry, and agriculture fluctuated year by year in no straightforwardly predictable way (Lovell 1957). Nevertheless, the data do indicate that for a period

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[68] Cameron (1967); Anderson and Cottrell (1974); Dawes and Ward-Perkins (2001).
[69] Clapham (1941); Rabents and Kynaston (1994).
[70] Bank of England (1967).

still supposedly obsessed with bullion the significance of specie to some extent diminished over time in favour of real assets. These were accepted as security for credits and loans offered to the private sector but to a much larger extent as the outcome of extending the Bank's notes, deposits and drawing rights to departments of state.[71] In short, the supply of widely acceptable reserve assets to promote the long-run development of the financial services sector of the British economy depended very largely on the state's increasing needs for liquidity, the rapid accumulation of a national debt and upon its growing fiscal capacities and commitment to service such debt.

By the outbreak of the protracted and costly wars with Revolutionary and Napoleonic France public and business confidence in the combined operations of the State, the Treasury, and the Bank had grown to the point where the British monetary and financial system was less than four years away from a suspension of specie payments and from conducting a highly successful experiment with fiat money based upon reserve assets issued as liabilities of the Bank of England.[72] Unlike Britain, several of its rivals on the mainland were never able (even during the years of costly warfare 1797–1822) to implement similarly successful monetary policies for the support of the state and the economy.[73]

[71] Fetter (1965).
[72] Cannan (1919); Silberling (1924); O'Brien and Palma (2020).
[73] Prados de la Escosura (2004); Bordo and White (1991, pp. 303-16).

A2. Implications for the crowding-out debate

Government securities were more liquid and carried less risk than most mercantile bills of exchange. It seems reasonable to assume that in the short run, the quantity of loanable funds available for the private sector dried up at times of higher supply of government securities, as suggested by the evidence of Hoare's bank (Temin and Voth 2013; see however, Joslin 1954). But times of war were also times of increased domestic uncertainty, and at these times government borrowing tended to increase while private investment fell. Hence, a negative temporal correlation between government borrowing and that of the private sector, as well as higher market interest rates for borrowing, is not by itself valid evidence in favour of crowding out. Britain in fact benefited positively from capital flows during the French Wars (Neal 1991).[74]

Even if some crowding out occurred, it was a static effect which operated over short time horizons. Over the long run, the extension of credit to the government supported state building and national defence. Warfare in the colonies also benefited and in a positive feedback loop supported economic growth back home. Hence the engagement by the state in borrowing in times of warfare – and the associated actions by the Bank in lending to the state and the private sector – may well have been dynamically efficient. It allowed for a comparatively stable environment for low-risk investment in Britain, and induced city growth and structural change. In the long run, these effects "grew the cake" and surely overwhelmed those of short-run crowding out, which implies that the net effect of warfare on credit availability was positive.[75]

The Bank could divert demands from the Treasury to the market, and it held powers to re-

[74] In the words of Neal (1991, p. 15), 'there is a *prima facie* case that rather than British government war expenditures "crowding out" private domestic investment, the dominant effect at times was that revolutionary measures by the French government "crowded in" flight capital to Britain'.
[75] If agents were able to anticipate these effects (e.g. under rational expectations) there may have even been a positive short-run effect on the availability of credit, hence a crowding-*in* effect.

fuse to discount bills for, or make advances to, the private sector. At times, when the Bank was concerned about the state of its reserves (such as December 1795 to February 1797) it did force the Treasury into the market while rationing credit to the private sector. But this behaviour was never typical (Lovell 1957). In times of war, when high profits could be made from speculation in public securities, investors who found it difficult to borrow from London bankers could turn to the Bank of England.[76] As the Bank's loans increased, the supply of reserve currency available to London bankers rose and credit conditions in London did not become stringent (Clapham 1941).

The critical question to answer in assessing the plausibility of crowding-out claims is: Did military expenditures substitute or complement private consumption and investment? Only if they were replacements can a case be made for crowding out. We submit that they were complementary: military spending, especially on the navy, served to protect the external borders and the expansion of the empire. This in turn had a positive feedback loop to higher fiscal capacity through state building and accelerated economic growth. Although governments and their bureaucracy did generate considerable amounts of waste, it is not credible to assume that warfare was "pure waste". After all, what was crowded out was the landing of French infantry on the beaches of East Anglia (O'Brien 2014, 2017a, 2017b). Relatedly, Britain in fact benefited from considerable capital inflows from abroad which coincided with the Restriction period (Neal 1991).

For example, during the Napoleonic wars, the Bank of England suspended convertibility, a policy which succeeded thanks to the Bank's reputation among the public combined with the credibility of government debt (O'Brien and Palma 2020). In 1811 Spencer Perceval, the Prime Minister and Chancellor of the Exchequer, recognized that while the war with France lasted, the Bullion Report's conclusions suggesting premature resumption could not be adopted because the

[76] Pressnell (1960, pp. 157 and 175); Parliamentary Papers 1826 (3), 17, 43, 71, 145 and 207.

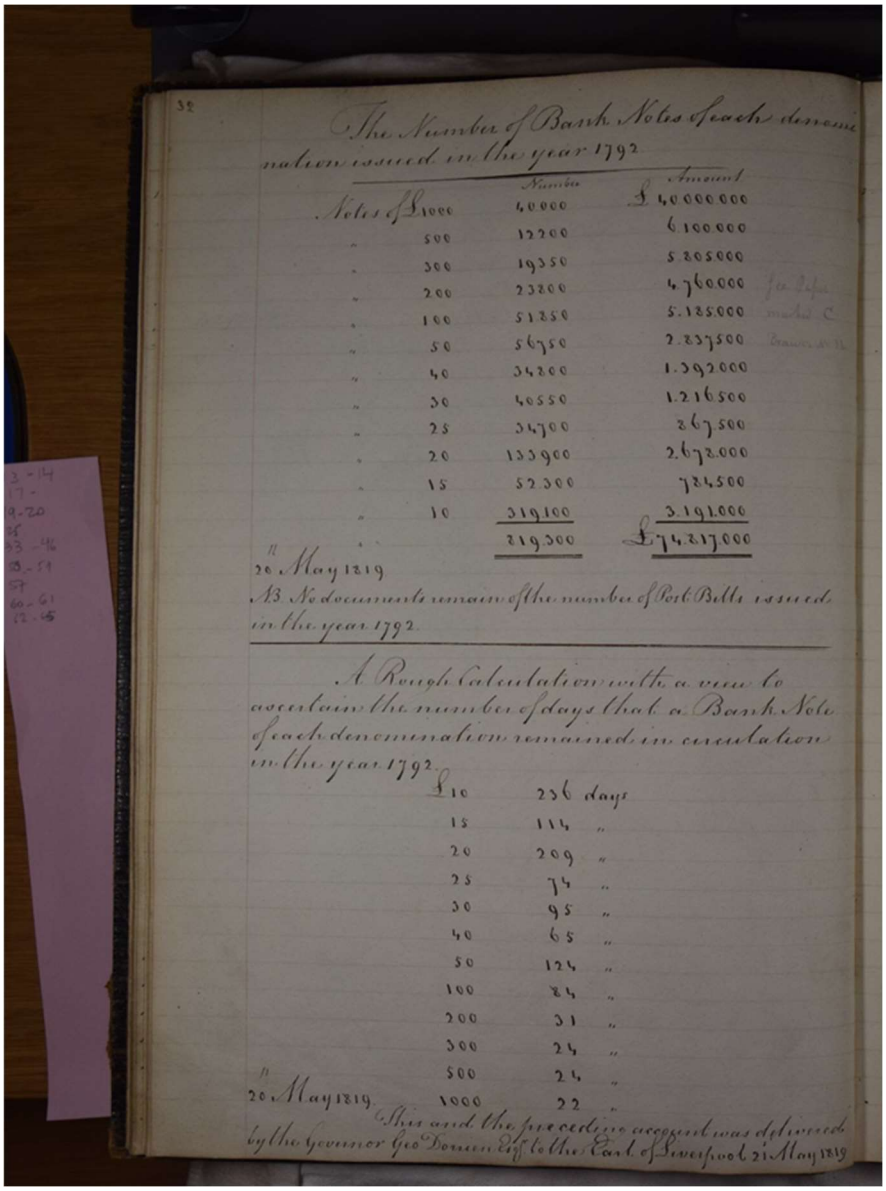
Bank's monetary and financial policies had become indispensable for the security of the country: they allowed specie to be paid to the Army and Navy, to subsidize allies, and to pay for food imports (Kynaston 2017, p. 97).

In sum, national defence was a public good which allowed for investment-friendly internal peace and order and promoted extraordinarily high levels of intercontinental trade per capita (Costa et al. 2015). In turn, these generated returns that accrued to owners of private merchant companies such as the East India Company, but, more importantly, they contributed to the development of London as a great metropolis, generating economic growth from agglomeration effects and possibly incentives for labour-substitution technologies given the high-wage economy (Allen 2009; O'Brien 2014; Palma 2016). Hence, even if some short-term crowding out was present, in retrospect, government policy was dynamically efficient.

A3. Breakdown of Bank of England notes issues before the Restriction period

Evidence from the Bank of England archive shows the breakdown of banknotes forged during the Restriction period.

Figure A1. Number of notes of each denomination issued in 1792 and an estimate of the number of days that each denomination remained in circulation



The Number of Bank Notes of each denomination issued in the year 1792

	Number	Amount
Notes of £1000	40000	£ 40000000
" 500	12200	6100000
" 300	19350	5805000
" 200	23800	4760000
" 100	51250	5125000
" 50	56750	2837500
" 40	34200	1368000
" 30	40550	1216500
" 25	34700	867500
" 20	133900	2678000
" 15	52300	784500
" 10	319100	3191000
	819300	£ 74217000

20 May 1819

N.B. No documents remain of the number of Post Bills issued in the year 1792.

A Rough Calculation with a view to ascertain the number of days that a Bank Note of each denomination remained in circulation in the year 1792.

£10	236 days
15	114 "
20	209 "
25	74 "
30	95 "
40	65 "
50	124 "
100	84 "
200	31 "
300	24 "
500	24 "
1000	22 "

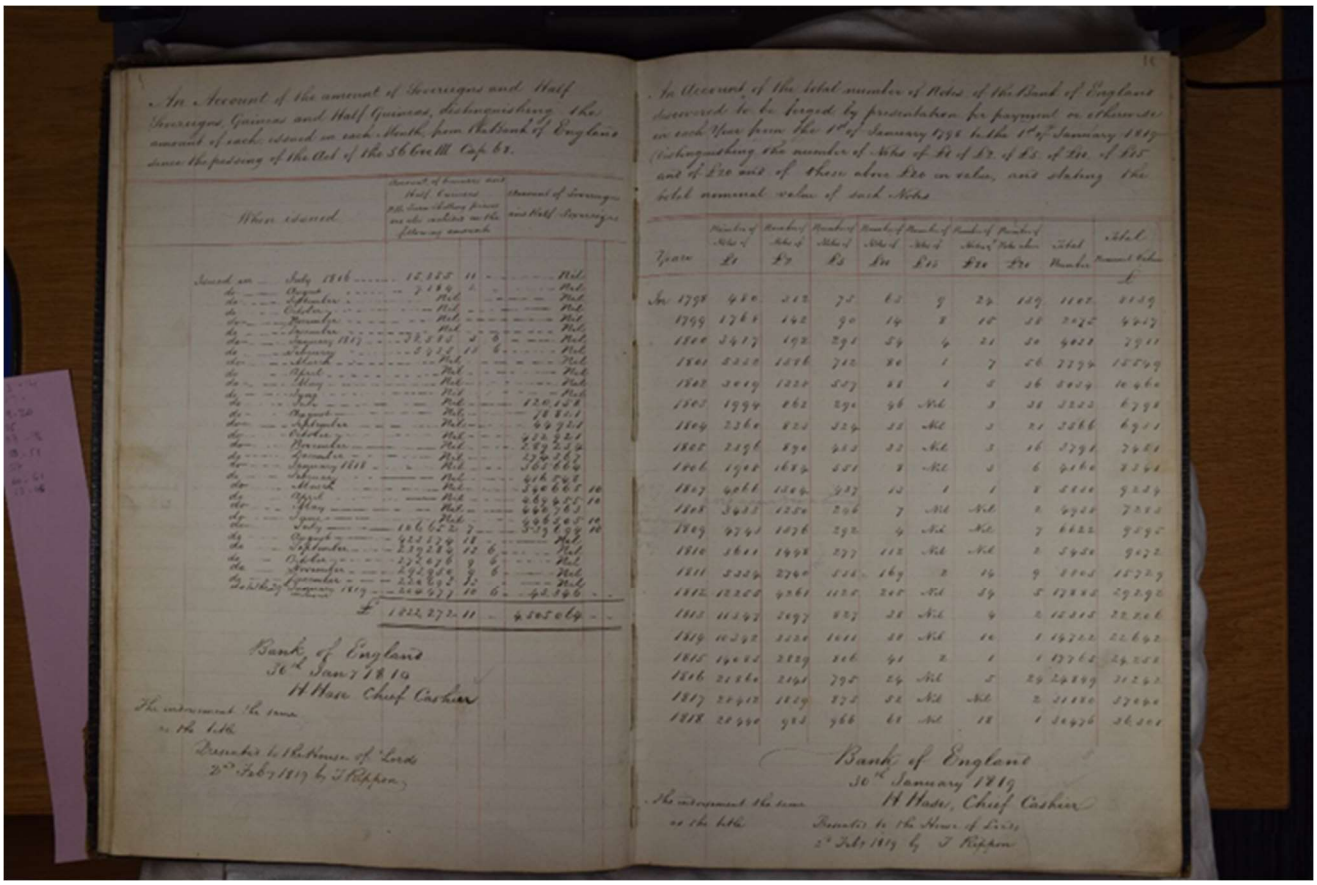
20 May 1819 This and the preceding account was delivered by the Governor Geo Dorien Esq to the Earl of Liverpool 21 May 1819

Source: Bank of England archive, C66, Cashier's department: Memorials, contracts, accounts for Parliament

A4. Forged banknotes

We show here evidence from the Bank of England archive regarding the breakdown of bank-notes forged during the Restriction period. The largest proportion of the counterfeited notes were the smaller-denomination ones.

Figure A2. Number of forged notes, 1798-1818



Source: Bank of England archive, C66, Cashier's department: Memorials, contracts, accounts for Parliament

A5. Additional figures

Figure A3. The Hand-Writing upon the Wall, by James Gillray

Source: Published by James Gillray, 24th August 1803. Hand-coloured etching and aqua-tint; 253 x 345 mm. British Museum Satires 10072.

Figure A4. Midas Transmuting All into Paper, by James Gillray

Source: Published by Hannath Humphrey; 9th March 1979. Hand-coloured etching; 354 x 250 mm. British Museum Satires 8995.

Figure A5. The Effects of Tight Lacing on the Old Lady of Threadneedle Street

Source: Punch cartoon from 1847.

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