

Emerging financial markets and early US growth[☆]

Peter L. Rousseau^{a,*} and Richard Sylla^b

^a *Department of Economics, Vanderbilt University, Box 1819 Station B, Nashville, TN 37235, USA*

^b *Department of Economics, Leonard N. Stern School of Business, New York University,
44 West 4th Street, New York, NY 10012, USA*

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Abstract

Studies of early US growth traditionally emphasize real-sector explanations for an acceleration that is evident by the period 1815–1840. Interestingly, establishment of the nation's modern financial structure predated by three decades the transportation improvements and widespread use of water- and steam-powered machinery that are thought to have triggered modernization. We argue that an innovative and expanding financial system, by providing debt and equity financing to businesses and governments as new technologies emerged, was central to early growth and modernization. To test the hypothesis, we employ a set of multivariate time series models that relate measures of banking and equity market activity to investment and business incorporations from 1790 to 1850. The results support the hypothesis of “finance-led” growth. Our new view is at odds with earlier views that emphasize the deficiencies rather than the advantages of the early US financial system.

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* Corresponding author. Fax: 1-615-343-8495.

E-mail addresses: peter.l.rousseau@vanderbilt.edu (P.L. Rousseau), rsylla@stern.nyu.edu (R. Sylla).

1. Introduction

Half a century ago, Joan Robinson contended that, “By and large . . . where enterprise leads finance follows” (1952, p. 86). Since then, a considerable body of work by economists and economic historians indicates that close to the opposite may be more nearly the case. There is a growing consensus that financial development promotes entrepreneurial efforts and economic growth.

The consensus derives in part from theoretical insights suggesting that good finance is central to mobilizing capital and applying it to its most productive uses, as well as to reducing informational asymmetries between savers, investors, and entrepreneurs (e.g., Bencivenga and Smith, 1991; Diamond, 1984; Greenwood and Jovanovic, 1990; McKinnon, 1973; Rousseau, 1998). It derives also from econometric studies of groups of countries over long periods of recent history (e.g., Goldsmith, 1969; King and Levine, 1993; Rousseau, 2003; Rousseau and Wachtel, 1998) that make a case for financial development as a good predictor of economic performance. And finally, it derives from the work of economic historians in documenting the role of “financial revolutions” in the rise of the Dutch Republic and England to leading-economy status in the 17th and 18th centuries, and the role of banking in the early modernization of many of today’s advanced economies (e.g., Cameron et al., 1967; De Vries and van der Woude, 1997; Dickson, 1967; Neal, 1990).

Our paper unites the interests of economists and economic historians in studying the role of financial developments two centuries ago in launching the modern economic growth of the United States. The US case is instructive. A newly independent country with a small population, the United States had a primitive financial system and was effectively bankrupt in the 1780s. In the 1790s, it experienced a financial revolution that established a modern, articulated financial system. In short order, the United States attracted the capital and labor of other nations on such a scale that it can be considered history’s most successful emerging market. A celebrated example of this is the Louisiana Purchase of 1803, which doubled the geographic size of the country. It was financed by selling newly printed, dollar-denominated US government securities to European investors, a feat the country’s shaky credit would not have allowed a mere 15 years earlier. Within a century after 1790, the United States was the world’s largest economy and has remained that to the present day.

Previous studies of early US economic growth, such as those by North (1961), David (1967), Gallman (1986), and Weiss (1994), emphasized *real* explanations for what has come to be regarded as a gradual acceleration in the rate of growth to its subsequent trend rate between 1790 and 1840. Central to these accounts are increases in the productivity of labor, the adoption of manufacturing and transportation technologies, the expansion of foreign commerce, and the growth of cotton exports in particular or westward agricultural expansion in general.

Economic historians are becoming increasingly aware, however, that the emergence of the nation’s modern financial structure predated by several decades major investments in canals and railroads and the widespread use of water- and steam-powered machinery. Within 5 years of ratifying the Federal Constitution, the

new nation had stabilized its public finances, restructured its War of Independence debts, introduced the US dollar as a convertible currency, formed both a banking system and a national bank with branches, established and linked securities markets in major cities, and gained the confidence and capital of European investors (Sylla, 1998, 1999, 2002). Such financial development, having occurred previously only in the Dutch Republic and England, was rare in history. And nowhere did it occur as rapidly as in the young United States. When the real-sector developments adverted to above occurred, a modern financial system was already in place to finance them.

In this paper, we investigate the hypothesis that US economic growth and development were “finance led.” We begin by demonstrating that the United States, which in the 1780s lacked nearly all the elements of a modern financial system, by the 1820s had a financial system that was innovative, large, and perhaps the equal of any in the world. What one of us has termed “the Federalist financial revolution,” led by Secretary of the Treasury Alexander Hamilton in the early 1790s, was at the heart of these developments (Sylla, 1998). Next, we formally test our hypothesis. Limitations of available data make attempts at formal hypothesis tests challenging in the context of the country’s earliest decades, which have been dubbed a statistical dark age. For example, until the ones presented here, time-series estimates of the US money stock have not been available for years prior to 1820. Moreover, systematic information on the extent and sophistication of early US securities markets has only recently been compiled (Rousseau, 1999; Sylla, 1998; Sylla et al., 1997; Wright, 1999, 2002). Our paper synthesizes the progress made thus far in collecting such quantitative information to offer a comprehensive view of the early US financial system and how it compared with that of contemporary England, the country widely regarded by historians as the 19th-century financial leader.¹

Our hypothesis tests are conducted in the context of multivariate time series models that include measures of banking activity, the money stock, and securities listings, as well as indicators of real investment and entrepreneurial activity from 1790 to 1850. Several of these measures are newly developed and used here in tests for the first time. Our approach is simple because the limitations of early US data make us unable to distinguish cleanly, as analysts with richer modern-period data might, between the various channels through which finance may affect growth. At the same time we do find that the financial variables Granger-cause our measures of real activity. We take this as limited evidence, albeit for an important historical case, in favor of revising or reversing Joan Robinson’s contention: By and large, where finance leads, enterprise follows.

¹ Because the full dimensions of financial change in the early United States are only now becoming clear, comparisons with England are rare. In the 1830s, the American economist Henry Carey and the English banker James Gilbart debated the relative merits of the two countries’ banking systems (see Sylla, 1985). In the modern literature, for comparative discussions pertaining to later periods of the 19th century, see Davis (1966), Davis and Gallman (2000), and Michie (1987).

2. The emergence of US financial markets, 1790–1850

By any standard, modern or otherwise, the speed and success with which a banking system and capital markets emerged in the United States after 1790 is remarkable. In the 1780s, the Confederation government was burdened by huge debts left over from the Revolutionary War. Because it lacked taxing powers, it could not service, much less pay down, these debts. Evidences of debts—essentially junk bonds in default—traded for small fractions of par value in unorganized and illiquid markets. The states were in a similar position but at least had revenues to service their debts.

The entire intermediating sector of the 1780s consisted of but three just-organized banks (one each in Philadelphia, New York, and Boston) that supported local commercial interests and could not yet be considered a banking *system*.² The nation's money stock, if it could be described as such, consisted of foreign coins and specie, fiat paper moneys issued by each of the 13 states, and the notes and deposits of the three banks having only local circulation. Against this background, a sense of urgency arose among the nation's leaders to facilitate the development of an institutional structure that could mobilize the resources needed to link the nation's land mass, promote domestic and foreign trade, and build a modern sector. The new Constitution hammered out at the Philadelphia convention of 1787 spoke to these issues.

Hamilton, appointed as the new federal government's Treasury Secretary in 1789, became the architect of US financial strategy. Congress implemented the federal taxation, mostly customs duties, allowed by the Constitution, and Hamilton's Treasury Department built the system of revenue collection. That system became the basis in 1790 for restructuring old Confederation and assumed state debts via fresh issues of federal securities that paid interest quarterly in hard money. These features raised the value of the new securities to domestic investors and their appeal to foreign investors. In 1791, Hamilton persuaded Congress to charter a Bank of the United States (BUS) as a mixed (publicly and privately owned) corporation whose shares the private investors could purchase by tendering the new federal debt. The Bank helped to achieve the dual purposes of raising the nation's credit standing and establishing a more uniform currency. Also in 1791, Hamilton drew up plans for the US dollar, defined in terms of both gold and silver, as the nation's monetary unit and base, and called for establishing a federal mint to make US coins.

This strategy, formulated and adopted in a two-year burst of activity from 1789 to 1791, worked. By 1792, the new 6% securities sold at or above par in rapidly emerging securities markets, and the national bank was fully subscribed. State governments began to retire their fiat currencies, which were replaced by a monetary base of specie along with the convertible note and deposit liabilities of the BUS and a growing number of banks chartered by the states. The financial revolution launched with these measures in the early 1790s continued vigorously for decades.

² One of these institutions, the Bank of New York, failed repeatedly to obtain a state charter of incorporation from 1784, when it was organized, until 1791. Another, Philadelphia's Bank of North America, had its 1782 Pennsylvania charter revoked in 1785, obtained a new one from Delaware in 1786, and then had the Pennsylvania charter re-instituted in 1787.

2.1. The rise of state banking

Starting with only three banks in 1789, 28 new banks obtained state charters in the 1790s and another 73 were chartered in the decade that followed (Fenstermaker, 1965a, p. 13). The profitability of these early banks, for which annual dividends of more than 8% were common, sparked a rapid expansion that reached a high-water mark of 834 state banks by 1840. After declining in the depression of the early 1840s, the number of state banks nearly doubled again by 1860, when there were some 1600 state banks. Fig. 1 shows this evolution (to 1850) along with estimates of paid-in capital. Like the rise in number, the increase in capital (in 1860\$) from \$3 million in 1790 to \$4.26 million by 1840 reflects the growing role of banks in mobilizing resources and in providing credit and other financial services.³

The state-chartered banks, like the federally chartered BUS, were corporations with limited liability, which is a major reason why they were able to attract so much capital. The early Americans did not invent the banking corporation, but as of 1790 the world had seen few examples of it, and these were privileged monopolies such as the Bank of England. What the Americans did, uniquely when they did it, was to charter so many banking corporations that they had to compete with one another rather than enjoy monopolistic privileges. From the 1790s to the middle of the 19th century nowhere else in the world was the banking corporation developed as a competitive business enterprise to the extent that it was in the United States (see Schwartz, 1947). Only then, six or seven decades after the US innovation, did the older nations of the world begin to emulate the United States by allowing limited liability for banks and other business enterprises (Maier, 1993; Sylla, 1985).

The significance of these developments is underscored by a comparison with England. It is a stylized fact among economic historians that England was the financial leader of the 19th century. The pound sterling was the world's leading currency, London and the Bank of England were at the center of the world's finances, and the London capital market intermediated the international flow of capital. Less known and appreciated is that as early as 1825, the United States, with a population still smaller than that of England and Wales (11.1 versus 12.9 million), had roughly 2.4 times the banking capital of the latter (Sylla, 1998, p. 93). This was not entirely the result of the US financial revolution. England's policy, in particular the monopoly privileges of the Bank of England and the restriction of all other banks to unlimited-liability partnerships of six or fewer people, slowed banking development in that country until 1825, when the policy was altered to allow joint-stock banking with unlimited liability. Only in the 1850s did changes in English law make limited liability an option for

³ We extend backward the series of paid-in capital for 1837–1850 that appears in the *Historical Statistics of the United States* (US Bureau of the Census, 1975, series X587) by multiplying the paid-in capital of reporting state banks in each year from 1803 to 1837 by the ratio of the total number of state banks to the number of reporting ones (Fenstermaker, 1965a, pp. 66–68; 1965b, p. 406), and joining the result to the Census series. We then used percent changes in the authorized capital of all state banks from 1790 to 1802 (Fenstermaker, 1965a, p. 13) to approximate the series through 1790. We convert to 1860 dollars using the consumer price index of David and Solar (1977, p. 16).

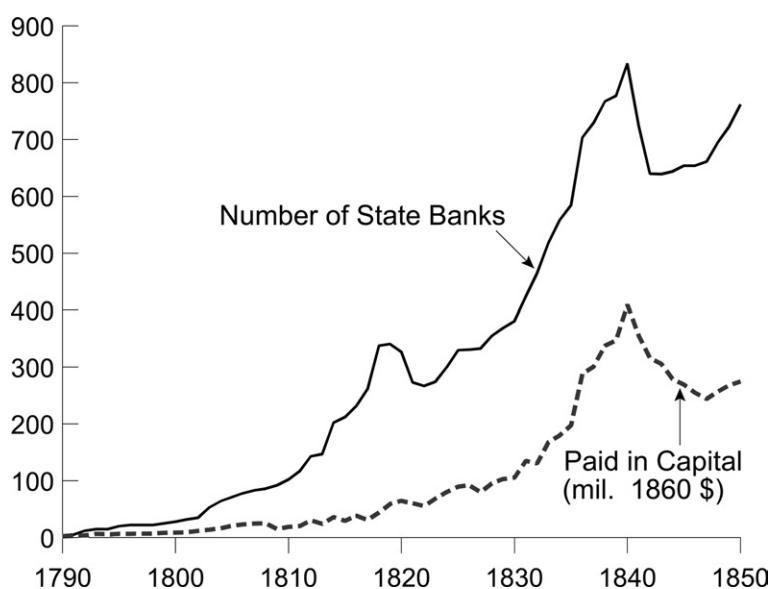


Fig. 1. The rise of state banking, 1790–1850.

banks and other business enterprises. By that time the United States had seven decades of experience with limited liability and thousands of banks and other corporations.

2.2. The emergence of securities markets

The precocity of US banking development was duplicated in the securities markets. Following the debt refinancing of 1790 and the launch of the BUS a year later, active securities markets sprang up virtually overnight in the major cities (Philadelphia, New York, Boston, and Baltimore) to provide regular trading opportunities for the new claims. The “national market” securities, which then included the US debt issues and Bank stock, traded in each city and were joined by steadily growing lists of “local” securities. Even a securities market crash in early 1792 did not for long arrest the development of these markets, where ever increasing numbers of securities issues could be liquidated at lower costs than would have obtained otherwise. This leap in asset liquidity allowed investors, both domestic and foreign, to overcome their reluctance to hold US securities. By 1803, more than half of the government’s debt and the stock of the Bank, and fully half of all American securities issued to that date were held by European investors (Sylla, 1998; Sylla et al., 1997). For the United States, capital market globalization arrived early in the nation’s history, long before the more celebrated capital market globalizations of the late 19th and late 20th centuries.

A rough measure of the size of securities markets is the number of claims listed therein. Early government documents contain much information about banks and their condition, and have long been used by historians to study banking development. But these documents are virtually silent on the topic of securities markets. For-

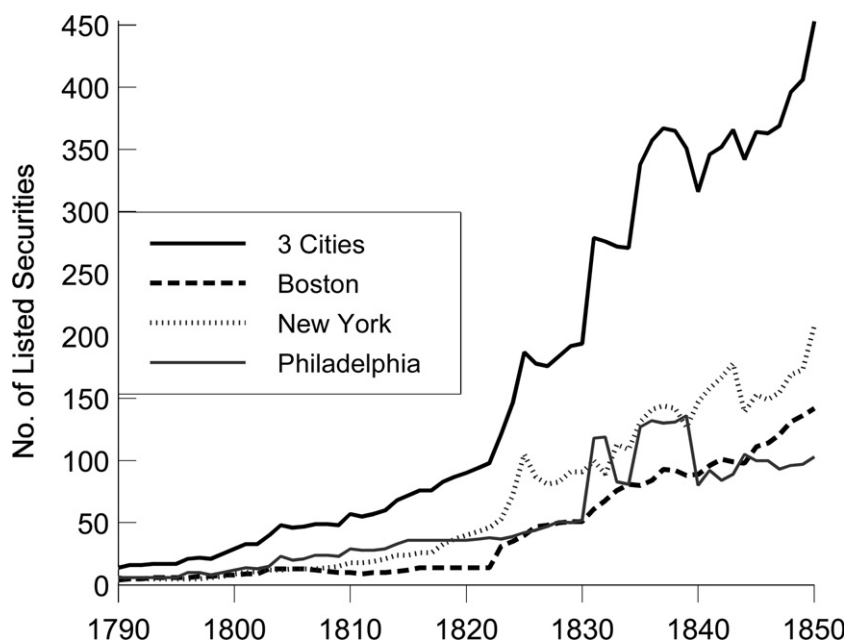


Fig. 2. The number of listed securities in three cities, 1790–1850.

tunately, the newspapers of the time contain the raw materials needed to build a view of the early US securities markets. Fig. 2 depicts the number of securities listed and quoted in the New York, Philadelphia, and Boston newspapers on or around June 30 of each year from 1790 to 1850.^{4,5} Table 1 shows the average growth rates by decade. Though a sharp rise in listings is evident from Fig. 2 for the 1820s in all three markets, the first column of Table 1 shows that this surge was preceded by vigorous *growth* in listings over the first two decades of the financial revolution, 1790–1809.

The other columns in Table 1 give a breakdown of listings by category for government, financial, transportation and other (including manufacturing) sectors. Listings for financial institutions (i.e., banks and insurance companies) grew particularly fast from 1790 to 1809. This suggests that a fundamental transformation in the way

⁴ The sources for New York are the *New York Daily Advertiser*, the *New York Shipping and Commercial List*, and *New York Prices Current*. For Philadelphia, the sources are the *New York Shipping and Commercial List*, *Philadelphia Prices Current*, *Grotjan's Philadelphia Public Sale Report*, *Poulson's American Daily Advertiser*, and the *Gazette of the United States*. Listings for Boston are from Martin (1873). Early newspaper listings of securities quotations appear to include larger and more actively traded issues. Smaller issues and issues of corporations located at some distance from the urban centers did not make it into the newspaper listings, though they may have occasionally traded in the urban centers.

⁵ There is some double counting in our total listings from newspapers, as issues of US debt and Bank stock were traded in all cities and were not consolidated. Our view is that these issues were the blue-chip securities in each market, and that consolidation would result in underestimating the size of the market that emerged in each of the cities.

Table 1

Average annual growth rates of listed securities by decade, 1790–1860

Period	Total listed	Governments	Financial	Transport
1790–1799	7.9%	4.6%	18.0%	0.0%
1800–1809	7.4	–1.1	11.6	18.0
1810–1819	4.8	9.0	4.1	0.2
1820–1829	8.5	4.2	8.9	18.7
1830–1839	6.0	6.5	3.8	18.0
1840–1849	3.8	11.6	0.3	7.4
1790–1849	6.4	5.8	7.7	10.4

Note. The table includes securities listed in New York, Philadelphia, and Boston.

that the nation mobilized and allocated capital began long before the 1830s, a period historians often associate with the rapid expansion of banking. Transportation listings also grew rapidly between 1800 and 1809, suggesting that the early capital markets met with some success in raising funds for internal improvements such as turnpike roads and bridges.

As with bank capital, we can make a rough comparison of the size of the US and English securities markets in 1825. For the three large cities whose markets are portrayed in Fig. 1, 187 securities entered the 1825 listings. Adding in Baltimore (33 securities) and Charleston (12 securities), we arrive at a total of 232 securities listings in 1825. The newspaper of record for the English market, Wetenhall's *Course of the Exchange*, lists 320 English securities and a number of foreign issues in mid-1825. On that reckoning, the US markets were somewhat smaller than the English, but already in the same league.⁶

Course of the Exchange also provides sufficient information (number of shares and par value per share) to estimate the capitalization of the English equity market in 1825. Our calculations put it at £38 million, or \$183 million.⁷ This estimate of English equity in 1825 is not that much larger than the paid-up equity of US banks alone in that year, which including the BUS and state-chartered banks came to

⁶ The English source, *Course of the Exchange*, covers the London market, whereas the US sources cover several city markets. Our 1825 comparison of the two countries is valid, however, because English newspapers did not list securities traded outside London before 1830, and English provincial stock exchanges did not appear until the late 1830s and 1840s (Thomas, 1973).

⁷ The English national debt, comprising 27 of the 320 securities listed in Wetenhall's *Course of the Exchange*, and including Bank, South Sea, and East India stock since these companies were capitalized by government debt, was vastly larger (£820 million, or nearly \$4 billion) than the US government debt (\$84 million) and indeed all US public debts in 1825. England had fought many wars over a far longer period than had the young United States. If we look just at equity markets, however, a different comparison emerges. For most of the 293 English securities that were not part of the national debt, *Course of the Exchange* lists the number and par value of company shares, as well as the par value of a small number of non-national debt issues (which came to £7.2 million or \$34.3 million dollars). The total value of English equity issues that can be calculated came to £32.79 million. For 42 of the 293 issues, or about 14% of the listings, there was insufficient information to calculate capitalization at par. Some of these, perhaps most, were new issues just beginning to be traded, but if we assume that they were on average of the same capitalization as issues whose par capitalization could be measured, a liberal estimate of the total size of the English equity market in 1825 is some £38 million or \$183 million.

\$138 million. The total US equity market was, of course, larger, but how much larger is not yet known. A rough estimate can be derived from the data of Goldsmith (1985), indicating that the US equity market came to \$40 million around 1803 and \$890 million in 1850. If we assume constant continuous growth (which works out to be 6.6% per year over the period), we arrive at an estimate of \$171 million for the size of the US equity market in 1825.

The conclusion we draw from these exercises may seem surprising: by 1825, the size of the US and English equity markets was virtually the same. And this despite the fact that the English had been developing their market for fully a century before the Americans got started on developing theirs. Thus, when the two financial systems are compared, conventional views that the English were far and away the financial leaders of the 19th century, and that the United States ca. 1825 was just beginning to develop in modern ways, would seem to require revision. Financially, the United States had developed quite a lot in the decades before 1825.

That the United States had an equity market capitalization virtually the same as England's in 1825, but with fewer securities listed, implies that the average listed US equity was more highly capitalized than the average English equity. This likely was a consequence of the United States taking the lead in chartering corporations, particularly banks in the early period, with limited liability. The corporate form of organization, as often noted, is conducive to larger enterprises.

In a number of ways, the US and English equity markets were similar. Both listed insurance and transportation companies, utilities, and miscellaneous companies including manufacturing. The great difference between the two markets was in banking. The Americans had banks in spades. The English market in 1825 listed but two, one the Bank of England—more a government security than a private equity, and treated by the English as such—and the other not an English bank at all, but the Provincial Bank of Ireland. Apart from the Bank of England, up to 1825 virtually all English banks were small proprietorships or partnerships, whereas US banks were mostly large corporations with stockholders.

2.3. *The stock of money*

Another way to measure financial development is through growth in liquid assets, or the money stock. This includes note and deposit obligations of banks to the public and specie outside of banks. Increases in the real stock of these assets reflect more widespread use of the market economy. As the United States modernized, expanded its international trade, and gained the confidence of foreign investors, specie inflows and the expansion of bank credits encouraged imports, modern production activities, and the start of internal improvements.

Any estimate of the money stock before 1850 must necessarily be based on incomplete data. This is primarily because the most important component in the early years, specie in the hands of the public, is difficult to determine with confidence. Here, we start with Temin's (1969) estimates of the money stock for 1820–1850 and replicate his method as closely as possible to extend the series backward to 1790. The result is the first attempt to provide a continuous view of growth in the

money stock before 1820, and to our knowledge makes the best possible use of available data. Appendix A offers a detailed description of its construction.

Fig. 3 presents the series, which indicates a threefold increase in the nominal money stock between 1790 and 1820—a compounded average annual growth rate of about 3.7%. During the next one and one-half decades, to the mid-1830s, the number of state banks roughly doubled and the money stock rose at a rate of more than 7% per year. The money stock shrank to less than three-fifths of its 1836 level during several financial panics that occurred between 1837 and 1842, but recovered rapidly at a rate of 8% per year in the late antebellum era (1842–1858). Over the six decades portrayed in Fig. 3, the money stock grew at an annual rate of 4.3%.

The tripling of the US money stock from 1790 to 1820 can be compared with the behavior of the English money stock in approximately the same era. According to Cameron, a narrow version of the money stock of England and Wales doubled in size between 1800/1801 and 1831, while a broader version including bills of exchange barely grew at all (Cameron et al., 1967, Table II.2, p. 42). So the US money stock, along with the US population and economy, was growing faster than England's in the early 19th century. But the English money stock, even the narrow version of it, was about four times larger than the US stock in 1820/1821. The English economy was more fully commercialized and monetized than that of the United States. Indeed, the two economies were quite different, with England having no equivalent of a plantation South or a western frontier of recent settlement. Early US financial development occurred mostly in the New England and Middle Atlantic states. This Northeastern region possessed an economy more like England's and was comparable with, if not actually ahead in some respects, of the mother country in financial development.

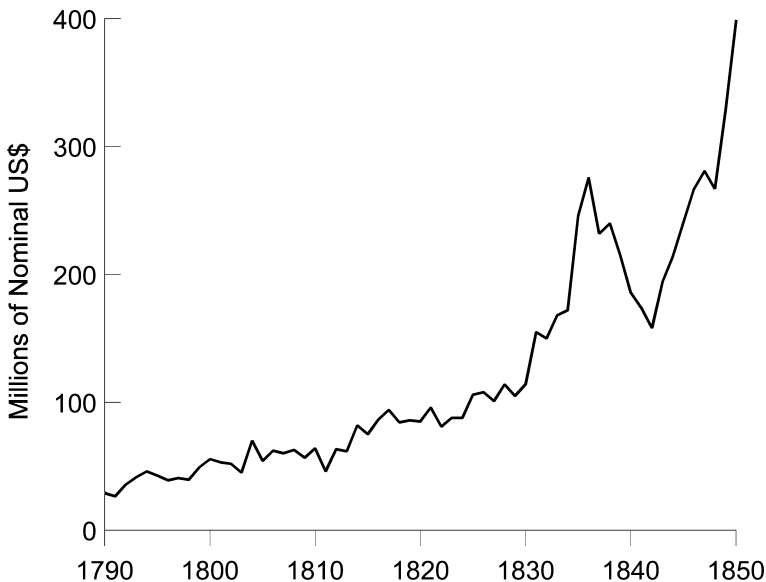


Fig. 3. The stock of money, 1790–1850.

3. Indicators of real economic activity in the early United States

To test quantitatively the hypothesis that financial developments jump-started US economic modernization in the nation's early decades, we need aggregate measures of modernization for that period. Such measures are not numerous, but there are a few. The ones that we discuss here are estimates of GNP, investment, and business incorporations. We consider GNP, dominated by agriculture, to be too broad a concept to capture adequately the behavior of the initially small but rapidly growing commercial and industrial sector likely to have been most affected by the financial revolution. Investment and business incorporations we deem more promising measures of modernization.

3.1. *National accounts aggregates*

Much of what economic historians know about the growth rate of US output (or income) in the pre-1840 period is summarized in Weiss's (1994) refinements of David's (1967) conjectural GNP estimates. The consensus view abandons any notion of a "take off" in favor of a gradual acceleration in the trend rate of output growth over the 1800–1840 period, although questions remain as to whether waves of more rapid growth occurred in the periods 1790–1807, 1820–1835, and 1845–1855. In addition, there are annual estimates, also somewhat conjectural (Berry, 1968, 1988).

The inclusiveness of existing early GNP estimates, which reflect the dominance of agriculture, makes GNP fluctuations unlikely to reflect activity in the smaller but presumably more productive "modern" sector that eventually displaced the dominance of agriculture. For example, the panic of 1837 and the subsequent downturn do not produce a sharp decline in Berry's GNP series even though the use of modern technologies in commerce, transportation, and manufacturing was well underway by the 1820s and had already changed the complexion of the US economy. Thus, GNP estimates might not indicate, but would not preclude, a "take off" or acceleration in the growth of the modern sector at some time prior to 1820.

A narrower concept, investment, is more likely to reflect developments in the modern sector than would GNP. Berry (1988) builds an annual series for investment by subtracting consumption, net foreign investment and government expenditure from his series for GNP. We will use it in our empirical investigation.⁸ The series, presented in Fig. 4, rises vigorously from 1799 to 1807, and also increases sharply in the War of 1812 era and in the decade after 1825. The series falls by more than

⁸ Berry estimated GNP and its components using from 10 to 26 extrapolators between 1789 and 1850 and linking the resulting "consensus pattern" with the Department of Commerce concept of annual GNP for 1876 onward. The authorized capital and deposits of US banks are the only financial variables among the extrapolators, and are thus unlikely to have had a large effect on the evolution of the aggregates. Indeed, an earlier version of Berry's GNP series (1968) that does not include financial variables until 1816 has a correlation coefficient of 0.989 for 1790–1850 and 0.955 for 1790–1815 with the revised (1988) series. See Berry (1968, 1988) for a complete discussion.

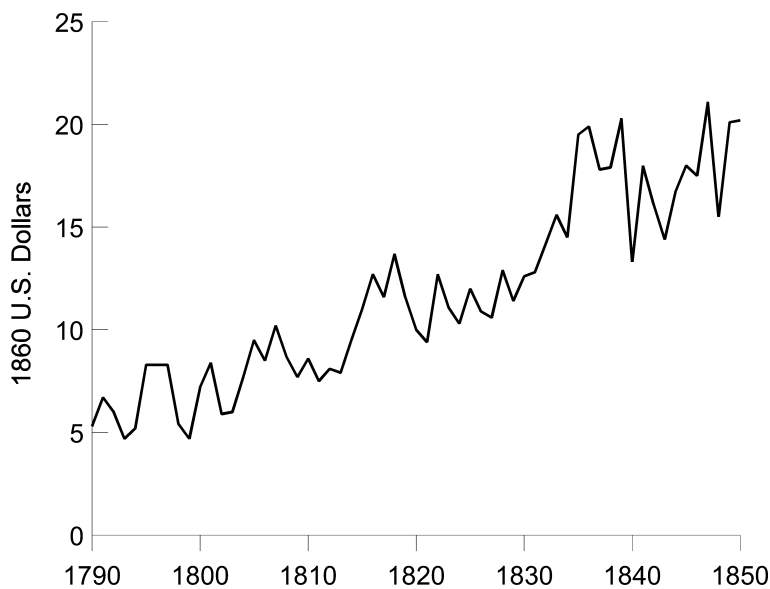


Fig. 4. Real investment per capita, 1790–1850.

25% between 1837 and 1843, suggesting that the downturn may have affected the modern sector more sharply than the agricultural sector that dominates the GNP estimates.⁹

3.2. *Business incorporations*

A different approach to studying the development of the modern sector is through the activities of entrepreneurs who launched business corporations, an area in which the early United States was far ahead of all other countries. These entrepreneurs recognized early in the nation's history the potential of the corporate form of enterprise for promoting projects that would otherwise remain unstated or would remain stunted due to indivisibilities and inadequate opportunities for diversifying risks. Historians, such as Maier (1993), have called attention to the uniqueness of corporate development in the United States after the Revolution.¹⁰ As the corporate form facilitated the subscription of large amounts of capital, incorporated firms also provided a stimulus to smaller unincorporated businesses to supply inputs to, and utilize

⁹ Temin (1974, p. 221) also notes that monetary disturbances in the late 1830s had severe effects on bankruptcies that were not reflected in early measures of aggregate income.

¹⁰ Maier (p. 83) notes that the corporation was moribund in 18th-century England, when it was "salvaged" by Americans who "utilized its capacity to empower individuals whose resources were unequal to their imaginations."

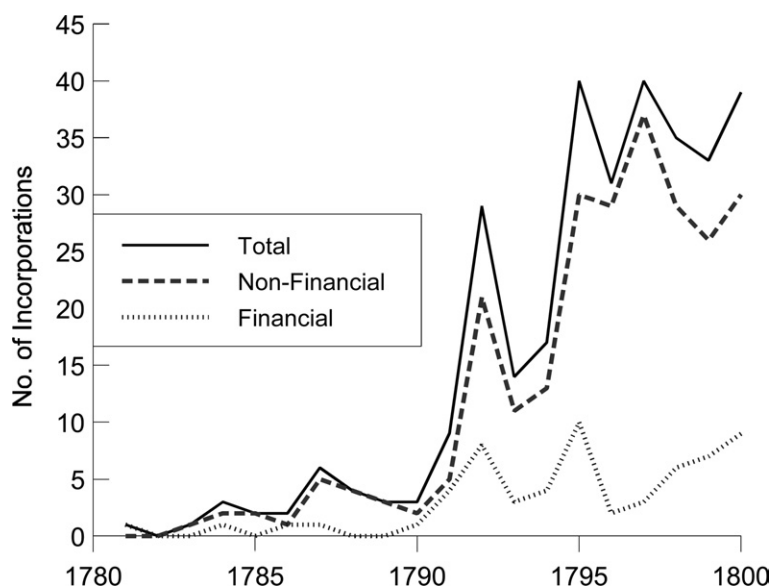


Fig. 5. Annual business incorporations, 1781–1800.

the outputs of, corporate enterprise. Thus, widespread incorporations of businesses had an influence on the modern sector that extended beyond corporations actually chartered by state governments. Moreover, because the vast majority of corporate charters granted before 1850 were by special legislative acts rather than general laws, the legislative nature of the incorporation process encouraged scrutiny of applicants, which may have led to corporate enterprises of higher quality than might have otherwise arisen.¹¹

Much of the formidable task of organizing corporate chartering information was completed decades ago by Davis (1917) and Evans (1948), although much remains to be done. Davis's account, which covers the period from 1781 to 1800 on a sectoral basis for 16 states, is the most comprehensive, covering ostensibly all incorporations. Fig. 5 presents the number of annual financial and non-financial incorporations from Davis's survey.¹² Most striking are the sharp increases in incorporations after 1790 and the degree to which financial and non-financial incorporations fluctuated similarly over time. The controversial granting of a federal charter to the BUS in 1791 encouraged individual states to exercise their incorporation-granting authority

¹¹ Some precursors of general incorporation laws were enacted by states for non-business entities and for special purpose businesses such as the provision of aqueducts, yet the only general laws enacted for businesses over the period of our study were by New York in 1811 and New Jersey in 1846. In New York, 317 of 1436 incorporations (22.1%) between 1811 and 1846 fell under the 1811 act. In New Jersey, 22 of 142 charters (15.5%) between 1846 and 1850 were taken out under the general law (Evans, 1948, p. 12).

¹² Davis's totals include renewals and incorporations of a single entity by more than one state. Fig. 6 adjusts these figures for multiple charters (see Davis, 1917, Table V, p. 30) to reflect the number of business units that actually received corporate status.

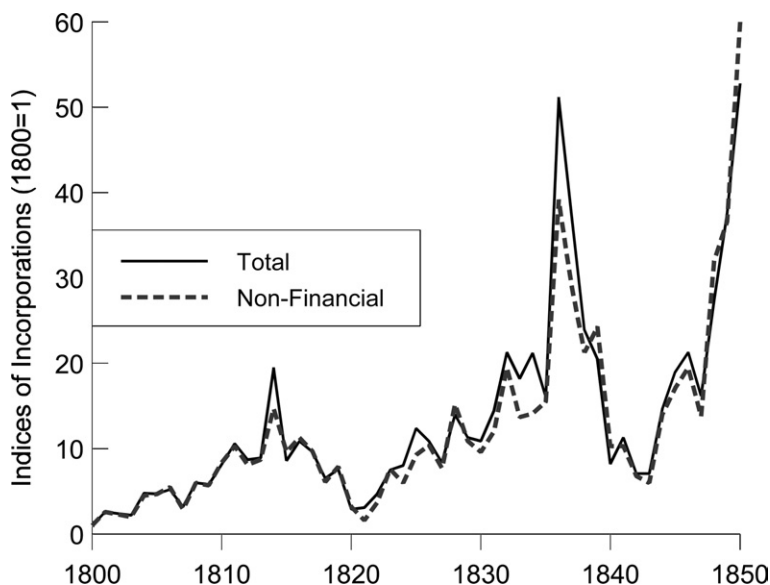


Fig. 6. Index of annual business incorporations, 1800–1850.

more liberally and could account for some of the increases. The federal bank could (and did) open branches in several states, and the states did not want to cede banking authority by default to the federal institution, so they accelerated their own chartering activities.

Evans (1948) studied incorporations on a sectoral basis for as many as seven states prior to 1850. The coverage includes Maryland 1800–1850, New Jersey 1800–1850, Pennsylvania 1800–1850, New York 1800–1845, Ohio 1803–1850, Maine 1820–1850, and Connecticut 1837–1850. The lack of representation for New England before 1820 is unfortunate, as Davis shows that these states were the most active in chartering activity prior to 1800. Evans (1948, p. 10) recognized that his coverage was far from complete, but noted that his sample included states in which incorporations were numerous. It is interesting, and likely no coincidence, that in Evans's sample the most incorporations occurred in states that hosted rapidly developing securities markets, namely New York, Pennsylvania, and Maryland.

Since the number of incorporations is not available continuously for all of the states in Evans's sample for the period 1800–1850, we build an index of incorporation activity by summing the number of incorporations available in each year and dividing the sample into segments for which the composition by state is steady. We then join the segments and set the index equal to unity in 1800. The resulting indices for both total and non-financial incorporations, presented in Fig. 6, rise sharply between 1800 and 1814, between 1820 and 1835, and after 1843.¹³

¹³ Given that both the total and non-financial incorporations indices are set to unity in the starting year and have different growth rates, it is natural that the two series would occasionally cross.

4. Econometric tests of “finance-led” growth

The preceding discussion indicates that the foundations of the US financial system were largely in place by 1800, that facilities for banking and securities trading had already begun to see regular use, and that US securities markets grew steadily in the decades that followed despite varied and sometimes severe shocks associated with business cycles and geopolitics. We now more formally examine the hypothesis that growth of the financial sector, and securities markets in particular, played a leading role in promoting this modernization between 1790 and 1850.

4.1. *Model selection and analytical framework*

Our approach begins with selecting multivariate systems for quantifying the effects of financial markets on real activity. The annual frequency of our series and their availability for 60 years facilitate investigation in a vector autoregressive (VAR) framework. We will use these reduced forms to test the joint hypothesis that financial markets operated positively through any or all of the channels identified in the recent theoretical literature.

We begin with the broadest measure of economic activity that might capture our concept of the modern sector—real per capita investment. To this end, our first tri-variate VAR includes investment as well as the number of listed securities per capita in three (Boston, New York, and Philadelphia) and then four (adding Baltimore after 1802) cities. The latter measure is intended to reflect the breadth of early US securities markets. As fluctuations in real activity may also be linked to the availability of both the circulating medium and the resources of the banking system, our estimate of the real per capita stock of money is included as a control variable.

We then focus on measures that may reflect activity in the modern sector even more closely, namely indices of cumulative total and non-financial business incorporations. We build these indices by joining the series for incorporations based on the Davis and Evans samples and cumulating the annual changes. Such an accumulation can only approximate the stock of corporate entities at a point in time because the fragmentary nature of information on corporate disappearances and non-starts makes correcting for such happenstances virtually impossible. Nevertheless, our indices may reflect a concept broader than businesses that actually succeed—namely, the stock of corporate start-ups arising from America’s entrepreneurs. In our study, where emphasis is on the long-run impact of financial market development, we think that the stock of start-ups reflected in corporate chartering, as it cumulates over time, should be related to the size and depth of financial markets (also stock measures) more closely than year-to-year fluctuations in the flow of incorporations. As business incorporations before 1850 were more likely influenced by possibilities for external finance rather than merely the stock of money, we choose the number of state-chartered banks as a control that reflects the importance of the banking sector in promoting new businesses. When included with the number of listed securities, this choice

also allows us to shed some light on the nature of interactions between banks and securities markets.

The VAR methodology permits an investigation of dynamic interactions in a multivariate system without imposing a priori structural restrictions. It involves estimating a separate regression equation for each variable on its own lags and those of the other variables in the system. For example, the first VAR described above has the form:

$$x_{1,t} = a_{1,0} + \sum_{i=1}^k a_{1,i}x_{1,t-i} + \sum_{i=1}^k b_{1,i}x_{2,t-i} + \sum_{i=1}^k c_{1,i}x_{3,t-i} + u_{1,t}, \quad (1a)$$

$$x_{2,t} = a_{2,0} + \sum_{i=1}^k a_{2,i}x_{1,t-i} + \sum_{i=1}^k b_{2,i}x_{2,t-i} + \sum_{i=1}^k c_{2,i}x_{3,t-i} + u_{2,t}, \quad (1b)$$

$$x_{3,t} = a_{3,0} + \sum_{i=1}^k a_{3,i}x_{1,t-i} + \sum_{i=1}^k b_{3,i}x_{2,t-i} + \sum_{i=1}^k c_{3,i}x_{3,t-i} + u_{3,t}, \quad (1c)$$

where x_1 is investment, x_2 is the money stock, x_3 is the number of listed securities, and k is the number of lags. We use a series of nested likelihood ratio tests to select the lag order.

Stationarity of a VAR is critical in building exact tests for Granger non-causality, that is, the hypothesis that past values of one variable do not jointly improve one-step ahead forecasts of another. In general, the distributions of these tests are non-standard when a VAR contains variables with unit roots, and differencing is usually required to ensure stationarity. Sims et al. (1990), however, show that Granger tests conform to standard distributions in tri-variate VARs with unit roots so long as a single cointegrating relationship exists among the system variables. This result is important for the tri-variate systems that we estimate here. The Augmented Dickey–Fuller (ADF) tests for unit roots shown in Table 2 do

Table 2
ADF test statistics, 1790–1850

	Levels	First difference
Real investment per capita	−2.50	−4.32**
Cumulative incorporations	−2.39	−2.39
Cumulative non-financial incorporations	−2.81	−2.73*
Real money stock per capita	−2.38	−3.65**
No. of state chartered banks	−1.44	−3.67**
No. of securities listed in three markets	−1.58	−3.61**
No. of securities listed in four markets	−0.97	−2.95**

Note. All variables are in logs. The test regressions use four lags, and include constant and trend for the levels variables and constant only for first differences. * and ** denote rejection of the null hypothesis of a unit root at the 10 and 5% levels, respectively, using finite sample critical values from Fuller (1976), Table 8.5.2.

Table 3

Johansen test statistics for cointegration, 1790–1850

VAR system	Trace		Maximum eigenvalue		
	$r = 0$	$r \leq 1$	$r = 0$	$r \leq 1$	$r \leq 2$
Investment, money stock, and number of securities listed in:					
Three markets ($K = 4$)	28.72*	9.30	19.42*	6.98	2.31
Four markets ($K = 4$)	32.45**	8.95	23.50**	6.29	2.65
Business incorporations, number of banks, and number of securities listed in:					
Three markets ($K = 3$)	36.15**	10.95	25.19**	9.01	1.95
Four markets ($K = 3$)	37.16**	11.29	25.87**	9.25	2.04
Non-financial incorporations, number of banks, and number of securities listed in:					
Three markets ($K = 3$)	41.69**	12.25	29.44**	10.03	2.22
Four markets ($K = 3$)	42.85**	12.90	29.94**	10.55	2.35

Note. K is the lag at which the levels terms enter the test regressions. The columns labeled $r = 0$ test a null hypothesis of no cointegration, while the ($r \leq 1$, $r \leq 2$) columns test a null of at most one (two) cointegrating vectors. * and ** denote rejections of the null at the 10 and 5% levels, respectively, with critical values from Osterwald-Lenum (1992), Table 1.

not reject a null hypothesis of non-stationarity for any of the variables used in our analysis. Table 3 presents Johansen (1991) tests for cointegration that indicate the presence of a single cointegrating relationship in each of the systems. Thus, levels specifications are appropriate for drawing Granger-causal inferences in the VAR systems that we consider.

The ability to construct valid tests for Granger causality from a levels specification of the VAR is advantageous since it permits the joint evaluation of both short- and long-run effects of the system variables upon one another. Indeed, as persistent yet gradual increases in market size might be expected to have real effects on the performance of the modern sector that accumulate over time, the implicit inclusion of long-run effects in the cointegrated VARs makes them particularly well suited for our analysis. The tests must be interpreted cautiously, however, since as a statistical device a rejection of the null hypothesis does not necessarily imply causality in an economic sense. In particular, the validity of the tests is predicated on the inclusion of the full information set in the VAR. Since this condition is violated in any finite regression framework, our results can only be interpreted as suggestive of linkages operating within each system.

4.2. Results

We begin with VAR systems that use Berry's (1988) annual estimates of real per capita investment as a measure of macroeconomic performance. When combined with per capita measures of the real money stock and the number of listed securities in either three or four cities, a series of nested likelihood ratio tests select four lags for the systems in logs. Table 4 presents F statistics and p values for each block of coefficients. The results in the left panel indicate that the number of securities in three cities Granger-causes investment at the 1% level and that the

Table 4
F statistics for Granger-causality in VARs with investment, 1790–1850

Dependent variable	Eq.	Three major markets				Four major markets			
		Invest	Money stock	No. listed securities	R_a^2	Invest	Money stock	No. listed securities	R_a^2
Gross private domestic investment	(1a)	1.621 (0.186)	2.223 (0.082)	4.028 (0.007)	0.845	1.311 (0.281)	2.900 (0.032)	4.409 (0.004)	0.848
Money stock	(1b)	1.835 (0.139)	21.15 (0.000)	0.724 (0.580)	0.861	2.661 (0.045)	24.87 (0.000)	1.346 (0.268)	0.868
No. listed securities	(1c)	0.792 (0.537)	0.758 (0.558)	61.88 (0.000)	0.971	1.001 (0.417)	0.731 (0.576)	77.90 (0.000)	0.972

Note. The VARs include four lags of investment, the money stock, and the number of listed securities in three (left panel) or four (right panel) major markets. The three markets are Boston, New York, and Philadelphia, while the right panel also includes Baltimore. All variables are in per capita log levels and represent real quantities. Equation numbers correspond to the text, with (a), (b), and (c) employing investment, money, and listed securities as the respective dependent variables. The columns report the *F* statistic for Granger non-causality on each variable block with the *p* value in parentheses.

Table 5
F statistics for Granger-causality in VARs with measures of modern sector activity, 1790–1850

Modern sector indicator	Eq.	Three major markets				Four major markets			
		Incs.	No. state banks	No. listed securities	R_a^2	Incs.	No. state banks	No. listed securities	R_a^2
Business incorporations	(1a)	285.33 (0.000)	3.849 (0.015)	2.581 (0.065)	0.999	278.31 (0.000)	4.242 (0.010)	3.266 (0.030)	0.999
	(1b)	2.829 (0.048)	24.38 (0.000)	0.392 (0.759)	0.994	0.464 (0.709)	24.52 (0.000)	2.645 (0.060)	0.994
	(1c)	1.004 (0.399)	2.114 (0.111)	157.41 (0.000)	0.992	1.442 (0.243)	3.113 (0.035)	126.57 (0.000)	0.993
Non-financial incorporations	(1a)	346.06 (0.000)	3.771 (0.017)	3.384 (0.026)	0.999	341.17 (0.000)	4.196 (0.010)	3.992 (0.013)	0.999
	(1b)	2.730 (0.055)	29.88 (0.000)	0.670 (0.575)	0.994	2.723 (0.055)	29.74 (0.000)	0.902 (0.448)	0.994
	(1c)	1.479 (0.233)	2.094 (0.114)	154.99 (0.000)	0.992	2.291 (0.091)	3.247 (0.030)	138.42 (0.000)	0.994

Note. Each VAR system includes three lags of cumulative business incorporations, the number of state chartered banks, and the number of listed securities in three (left panel) or four (right panel) major markets. Equation numbers correspond to the text, with (a), (b), and (c) employing the number of cumulative incorporations, state chartered banks and listed securities as the respective dependent variables. The columns report the *F* statistic for Granger non-causality on each variable block with the *p* value in parentheses.

money stock Granger-causes investment at the 10% level, with no evidence of feedback from either investment or the money stock to the number of listed securities. Similar results obtain for the system that includes securities listed in four cities, with the money stock in this case Granger-causing investment at the 5% level.¹⁴

In Table 5, we shift attention to the effects of banks and securities markets on the stock of entrepreneurial start-ups as captured by the number of total and non-financial business incorporations. The system in the left panel includes total cumulative incorporations, the number of state chartered banks, and the number of securities listed in three or four cities. Both systems show clear effects of expansion in banks and securities markets upon the granting of corporate charters. The systems that include non-financial incorporations also suggest that expanded use of the corporation encouraged new banks to form, perhaps to meet the needs of new businesses for additional finance. The results with non-financial corporations are of particular interest since this measure does not include banks and thus can in no way be collinear with the number of state banks, which is the second variable in the system.

To summarize, our first set of VARs (Table 4) are consistent with the view that monetization of the US economy and the expansion of securities markets fueled domestic investment, with no evidence of feedback from investment to money growth or securities markets, at least in the medium-run. The second set of VARs (Table 5) suggests that growth in banking and securities markets also encouraged entrepreneurial activity, as measured by business incorporations, and not the other way around.

5. Conclusion

Our paper describes the rather remarkable financial development that took place in the United States in its earliest decades, starting with the Federalist financial revolution of the 1790s. In the four decades thereafter, and starting virtually from scratch—although there were, to be sure, colonial precedents that had to be abandoned as much as amplified (see Perkins, 1994; for a discussion of these)—the United States built an articulated, innovative, and modern financial system that equaled that of any other country. One consequence of early US financial development was that the country became history's most successful emerging market, attracting the capital

¹⁴ We also estimated VARs using per capita real GNP (from Berry, 1988) in place of investment, and found Granger-causality from money to output, but no statistical link between the number of listed securities and output. This might be expected since the US financial revolution in its earlier phases was an urban development having its greatest impact on the commercial and industrial groups that were a small part of the population, while a large majority of the country's population was engaged in agriculture, much of it traditional and self-sufficient. Agricultural production dominated the nation's GNP, but the agricultural sector would only gradually come to be affected by the new financial system as it extended beyond cities and spread its influences beyond its urban roots.

of investors in older nations seeking higher returns. Another was that a wide range of American entrepreneurs, business enterprises, and governments enjoyed more access to financing, domestic and foreign, than did those of other countries. These developments, it seems, placed the United States of the early 19th century on a trajectory of economic growth higher than that of other nations. That higher trajectory was established as early as the 1790s, earlier than most economic historians have thought. As the financial system continued to develop and promote growth over the course of the 19th century, the United States became the world's largest and, in many dimensions, most advanced economy.

Our new, positive view of early US financial development is at odds with the negative focus and assessment of much historical literature treating the 19th century. When dealing with finance, that literature emphasizes banking failures and panics, so-called wildcat banking, debt defaults by states, stock market crashes, corporate frauds, suspensions of banknote convertibility, and problems arising from the lack of a uniform national currency until the 1860s. We do not deny that there were problems, or even financial “reversals.”¹⁵ In finance, there still are problems, as the recent bubble-crash sequence and corporate malfeasances indicate. In our view, the problems were (and are) mostly episodic, and sometimes dramatic. Most of the time, without much notice or praise, the US financial system did (and does) what a modern financial system is supposed to do, namely mobilize and efficiently allocate capital, and provide opportunities for risk management (such as diversification and insurance). As far as economic history is concerned, it is much more important, we think, to realize that the United States two centuries ago had one of the world's few modern financial systems than it is to dwell on that system's occasional problems. The remarkable point is that it was there at all, not that on occasion it had problems.

We state our case for such a view and document it with traditional historical evidence. We also treat it as a hypothesis and subject it to some of the statistical tests that macroeconomists now apply to rich contemporary, multinational data sets in order to make similar arguments about the effects of financial development on economic growth. Our historical data sets are more limited than contemporary ones. But our test results are consistent with modern findings on the key role of financial development in accounting for differences in the economic growth performance of today's countries. The remarkable economic growth of the United States, we think, may very well have been “finance led.” Judging by US history, the widespread contemporary interest in developing and improving financial systems to foster economic growth is not misplaced.

¹⁵ Rajan and Zingales (2003) draw attention to a number of “great reversals” in national financial systems during the twentieth century. The United States may have experienced such reversals in the nineteenth century when the charters of the first and second Banks of the United States were not renewed for political reasons, when on several occasions (notably 1862–1879) paper currency became inconvertible to the monetary base, and when silver politics undermined domestic and international confidence in the country's commitment to the gold standard.

Appendix A. Construction of series for the money stock, 1790–1820

This appendix explains the methods used to construct a series for the stock of money over the period from 1790 to 1820 and presents the new figures. We begin with estimates for 1820–1850 from Temin (1969), and then replicate Temin's technique as closely as possible to extend the estimates backward to 1790. Our measure of the broad stock of money sums the total liabilities of banks to the public and specie in the hands of the public. At the time, the banking sector included a central bank (the BUS 1790–1811 and the Second BUS 1817–1839), banks chartered by individual states, as well as private (non-chartered) banks. Total liabilities for the latter are generally unavailable before 1850 but considered to be small. We discuss each of these components below.

A.1. Obligations of chartered banks to the public

These obligations are estimated by summing notes in circulation, deposits, and amounts due to other banks, and then subtracting amounts due from other banks and holdings of notes of other banks. Fenstermaker (1965a, Table 10, pp. 66–67) includes these items from 1819 to 1837 for a reasonably broad subset of banks, and also provides the total number of banks in each year. Temin used the ratio of total state banks to those reporting in each year to adjust the bank liabilities for Fenstermaker's subset to reflect the nation as a whole. We compute state bank obligations to the public for 1803–1820 by applying this technique to balance sheet items from Fenstermaker (1965b). This source is less representative. In 1818, coverage includes 43% of the state banks, but this falls to 29% by 1810, 24% by 1805, and only 13% by 1803. For 1803–1804, the sample includes only state banks in Massachusetts. Other states enter the sample as follows: Virginia 1805; Mississippi 1811; Pennsylvania, South Carolina, the District of Columbia, and New Hampshire 1814; New York 1817; Kentucky 1818. The article does not break down the balance sheet items or the number of banks by state. We again adjust these figures using the actual number of chartered banks to estimate obligations.

We then use the amount of bills discounted at the Massachusetts First National Bank of Boston (from Gras, 1937, pp. 650–651) to extend bank liabilities and specie inside banks backward through 1790. Under the strong assumption that the amount of bills discounted by the few banks that had obtained charters over this period fluctuated similarly to the Massachusetts Bank's obligations to the public and specie, we then use the ratio of the capital of the Massachusetts Bank and total banking capital in the US in each year to adjust bills and discounts to a national level. We then splice this item onto both the obligations and specie series in 1803. This places much emphasis on fluctuations in a single bank's balance sheet, yet these records are the only ones available prior to 1803. It is also important to note that only three banks had obtained state charters as late as 1790, and that the obligations of state banks thus account for only a small portion of the money stock at this time.

A.2. Obligations of the first and second Bank of the United States to the public

Wettoreau (1985) includes observations for specie holdings, notes in circulation, individual and government deposits, notes of other banks, and balances due to and from other banks at (or around) the end of each year from 1792 to 1801 from balance sheets of the BUS. This allows computation of total BUS obligations to the public until 1802. Records for 1802–1807 do not appear to have survived, and when observations again become available in 1808 they include only specie, notes in circulation, and deposits. It so happens that the sum of individual and government deposits in 1801 is the same as that for total deposits in 1808. We fill in the intervening years by repeating the 1801 estimates for 1802–1807.

Notes in circulation are 5.08 million in 1801 and 4.5 million in 1808. Blodget (1806) includes a series for total bank notes for 1801–1807. One way to back out figures for 1801–1807 is to treat BUS notes as a residual obtained by subtracting state bank notes from total notes. Here, data on notes in circulation from Fenstermaker (1965a) and Fenstermaker et al. (1984) can be used to estimate those notes attributable to state banks, and the residual should approximate BUS notes. Since there is an overlapping observation in 1801, we use it to join the constructed series (1802–1807) to Wettoreau's figure for 1801. The adjustment of Fenstermaker's data is similar to that described above for total obligations of state banks. Since notes of other banks and balances due to and from other banks are not available for the BUS after 1801, they cannot be included in the total BUS obligations. Rather, we compute obligations without them from 1802 to 1808 and join the result to the total for 1801.

Senate Document 128 (35th Congress, 2nd Session, 1838, pp. 208–211) includes all items required to compute obligations of the second BUS and its branches to the public for 1817–1839.

A.3. Specie in the hands of the public

Temin (1969) obtains official estimates of specie in the hands of the public from 1830 onward, and uses net specie flows to extrapolate the series backward to 1820. Temin's estimate of the specie stock for 1820 (at \$41 million) is 64% higher than that provided by Ezra Seaman for September of that year. We use net specie flows from North (1961) to extend Temin's estimates back to 1807, where Blodget's continuous series (1792–1807) ends. By then, the constructed estimates are 101.5% higher than those of Blodget. Lacking a more acceptable technique for estimating specie from 1808 to 1820, however, we apply it back to 1808, and then join Blodget's series to the result. This probably overstates the level of specie, but the series exhibits the fluctuations of Blodget's series for 1792–1807. Note that continuing to use specie flows before 1807 produces a series that is much less variable than Blodget's series and the later estimates. From this series for specie stock we subtract specie holdings by state banks (constructed with Fenstermaker's data as above) and specie in the first BUS to obtain an estimate of specie in the hands of the public.

The stock of money, 1790–1820 (millions of current dollars)

1790	29.1	1806	62.2
1791	26.4	1807	60.1
1792	35.6	1808	62.8
1793	41.4	1809	56.6
1794	46.0	1810	64.1
1795	42.7	1811	45.9
1796	39.1	1812	63.4
1797	40.8	1813	61.8
1798	39.6	1814	81.9
1799	49.0	1815	75.1
1800	55.5	1816	86.4
1801	53.0	1817	94.1
1802	52.0	1818	84.4
1803	45.0	1819	86.0
1804	70.0	1820	85.0
1805	54.2		

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