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FREE BANKING AND BANK ENTRY IN NINETEENTH-CENTURY NEW YORK

Howard Bodenhorn

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ABSTRACT

Previous studies of entry under New York's free banking law of 1838 have generated conflicting results. This article shows that different measures of entry lead to different conclusions about the competitive effects of free banking. Measured by the entry of new banks, New York's free banking law led to increased rates of entry relative to both other states and New York before 1838. New York's free banking law, however, did not generate significant increases in per capita bank capital relative to other states or to New York prior to 1838. This discrepancy results from the practical effect of New York's law, which led to the entry of many small banks. Thus bond collateral requirements created effective barriers to entry comparable to the costs associated with obtaining a legislative charter.

Howard Bodenhorn
Department of Economics
Lafayette College
Easton, PA 18042
and NBER
bodenhoh@lafayette.edu

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Entry plays a crucial role in achieving competitive efficiencies. In markets where entry is deterred, prices may diverge from costs allowing existing firms to earn quasi-rents. When entry is free and unrestricted prices tend toward marginal costs and profits tend toward the competitive norm, market shares are less stable and entry, or even just the threat of entry, diminishes the effectiveness of overt or tacit collusion.[1] Nearly every modern introductory economics textbook includes free entry as a defining characteristic of competitive markets. Historians hold that free banking represented a significant break from the system of legislative chartering that preceded it, creating a system more nearly resembling the textbook norm of free and unfettered entry that resulted in more competitive markets.[2] Indeed, Bray Hammond concludes that free banking reflected such a fundamental change that mid-nineteenth-century New Yorkers might have found it "somewhat harder to become a banker than a brick-layer, but not much."[3]

Modern cliometric studies, however, have yielded conflicting results about the effects of free banking on entry. Kenneth Ng finds that the growth in bank assets in states passing free banking laws did not systematically grow relative to regional or national comparison groups.[4] Similarly, after controlling for a number of factors likely to influence bank entry, Howard Bodenhorn finds that free banking had little

[1] See Bodenhorn, "Entry, Rivalry and Free Banking," for a discussion of increasing instability of market share associated with free banking.

[2] Hammond, *History of Politics in New York*; Hammond, *Banks and Politics*; Benson, *Concept of Jacksonian Democracy*; Miller, *Enterprise of a Free People*.

[3] Hammond, *Banks and Politics*, p. 572.

[4] Ng, "Free Banking Laws."

influence on the entry of banks into six antebellum urban banking markets.[5] But in their study of ten free banking states Andrew Economopoulos and Heather O'Neill find that growth in bank capital and net entry was more responsive to underlying economic influences under free banking than under traditional legislative chartering.[6] Thus it is unclear if free banking led to greater rates of bank entry, whether measured as a rising number of banks or as incremental increases to aggregate bank capital or assets.

This article tests for the entry effects of free banking by considering the experience of three states (Massachusetts, New York and Pennsylvania) in two periods (the 1830s and the 1850s) . There are several obvious disadvantages to using a subset of the available evidence, notably the possibility that the results may not be representative of the whole. In this case, however, the advantages of using a restricted geographic and temporal sample outweigh the disadvantages. In restricting the study to these three states, the analysis can compare markedly different chartering policies and yet remain confident that policies in one state were not significantly influenced by policy innovations in others. Massachusetts liberalized chartering early in the nineteenth century, so much so that prospective bankers made little use of a free banking statute passed in 1851.[7] Bankers preferred having a legislative imprimatur to free banking and the legislature accommodated the capable ones with charters. New York instituted free banking in 1838, an event that marked a fundamental change in chartering policy, one driven more by internal political matters than by broader macroeconomic events.[8] Pennsylvania, though surrounded by free banking states, remained a stingy supplier of bank charters throughout the antebellum period, keeping a very tight rein on the banking system up to 1860.[9] Thus, the

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[5] Bodenhorn, "Business Cycle and Entry."

[6] Economopoulos and O'Neill, "Bank Entry."

[7] Rockoff, *Free Banking Era*; Sylla, "Early American Banking." See Handlin and Handlin, *Commonwealth*, for a more general discussion of Massachusetts liberal nineteenth-century chartering policies, especially for "improvement" corporations, such as canals, bridges, and banks.

[8] Bodenhorn, "Bank Chartering and Political Corruption."

[9] Pennsylvania finally passed a free banking law in 1860, but few banks organized under the law before it was preempted by the National Banking System. New York, New Jersey and Ohio all passed free banking laws; Virginia significantly liberalized its chartering policies (Rolnick and Weber, "Free Banking," p. 12). For descriptions

experiences of these three states capture the three principal chartering regimes of the era, regimes that were not endogenous, at least in the short term, to policy changes in neighboring states.[10] An additional advantage of restricting attention to these three states is that, with the exception of an abortive experiment with branch banking in Pennsylvania in the 1810s, all three were unit bank states.

Finally, this article compares bank entry in Massachusetts, New York and Pennsylvania in two periods, the boom periods of the 1830s (1830-1837) and the 1850s (1850-1857). In focusing on these periods, the analysis controls as well as is possible given the poor quality of extant data for business cycle effects. The first seven years of each decade was marked by secular expansion brought to an abrupt end by a financial panic. In using the 1850s as a test case for free banking, the analysis also allows enough time to have passed after the enactment of free banking for economic and political actors to have litigated their way to a legal acceptance and a broad understanding of the microeconomics of the new regime. New York's free banking law was passed over serious constitutional concerns that were not quickly resolved and that surely deterred at least some prospective bankers in the short run.[11] Moreover, many of the operating costs of banking under bond-secured note issue, namely the potentially high opportunity costs of issuing notes, were neither immediately apparent nor fully understood in 1838.[12] They were in 1850.

The results show that free banking, as it was instituted in New York, had peculiar effects on entry. Measured by the number of new banks, free banking created entry conditions consistent, perhaps not with Hammond's brick-layer analogy, but with Massachusetts' liberal-chartering regime. Measured by additions

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of Pennsylvania's illiberal chartering policies see Daniels, *Pennsylvania, Birthplace of Banking*; and Holdsworth, TITLE.

[10] Indeed, Wallis, Sylla and Legler, "Interaction of Taxation," argue that Massachusetts' and Pennsylvania's chartering policies were driven by fiscal motivations, were established in the early in the century, and were not substantially altered prior to the Civil War.

[11] Hammond, *Banks and Politics*, Chapter 18, and Bodenhorn and Haupert, "Was there a Note Issue Conundrum" discuss the constitutionality of New York's free banking act and the entry-deterring effects of the legal wrangling that followed.

[12] See Bodenhorn and Haupert, "Was There a Note Issue Conundrum;" and "Note Issue Paradox" for studies of the opportunity costs and the low issue of banknotes during the free banking era.

to aggregate state bank capital stock, New York free banking resembled something more akin to Pennsylvania's restrictive chartering regime. How could this be? It appears that New York's free banking law created conditions of easy entry for small banks. But even as the number of banks grew, growth in bank capital lagged behind growth rates in states such as Massachusetts that pursued liberal chartering policies. Ng concludes that the move from chartered banking to free banking may have done little more than trade one set of entry barriers for another. Economopoulos and O'Neill disagree, but for New York, at least, Ng's interpretation may be accurate.

Chartered Banking and Free Banking

Prior to the passage of free banking acts, state legislatures issued individual bank charters, though it was common for states to establish uniform banking codes that applied to all subsequently chartered banks. Whether the relevant corporate restrictions were detailed in each bank's charter or were separately established, they included several common elements. A charter invariably established a bank's official corporate name, place of operation (*places* if the bank was allowed branches), and authorized capital stock. Other restrictions found in charters and uniform banking codes typically included: provisions for shareholder liability;[13] maximum assets or liabilities; legally allowable operating ratios, such as banknotes-to-capital or retained earnings-to-capital, but only rarely a reserve ratio; responsibilities of directors and other corporate officers; whether the bank was subject to taxation and of what type; and sundry other conditions. Under the broad umbrella of chartered banking, states could adopt diverse policies. A state might charter liberally or not. It might charter large banks or small. A state might charter unit banks or branch banks exclusively, or it might charter both depending on who made the request and when. Massachusetts, New York and Pennsylvania represent three distinct chartering regimes that represent the most important choices made in

[13] Early American banks operated under one of three broad liability schemes: single, or corporate, liability where shareholders were responsible for their share investment; double liability, where shareholders' personal assets could be attached up to the amount of their shareholdings at the time of failure; and unlimited liability.

the northeastern United States.

Massachusetts, and New England more generally, has historically been considered to have followed a liberal chartering regime. Oscar and Mary Handlin portray Massachusetts as the archetypal commonwealth, one that demonstrated a commitment to freedom of corporate association. Although the state chartered the Bank of Massachusetts in 1784 with an implicit understanding that it would retain its monopoly indefinitely, public concerns about the bank's favored status led the legislature to abandon the bank's monopoly. Up to 1804 the state chartered 20 new banks, including two in Boston, one of which was the Union Bank in which the state took a sizable interest. In Massachusetts, according to the Handlins, the corporate form was too valuable a tool in the promotion of new and lucrative ventures to restrict its use. Moreover, the "political balance defeated any notion of keeping the device exclusive" despite the state's having taken a financial stake in an existing bank.[14]

In the late eighteenth and early nineteenth centuries, the state was circumspect in its allocation of banks and bank capital. Those few towns worthy of a bank received one and, with the exception of Boston, Portland and Salem, only one. It was not long, however, before the exception proved the rule in Massachusetts. By the second decade of the nineteenth century, small town dealers and farmers yelped so much about the lack of credit that state legislators felt compelled to charter banks to serve them. By the 1830s even small towns often had two or more banks. Although the state had a financial interest in the earliest banks it continued to charter new ones, often because existing banks refused to increase their capital to meet growing demands for credit and because the state had an interest in increasing the pool of bank capital because it imposed a 1 percent annual tax on capital.[15] Unlike legislators in other states, moreover, the establishment of the Suffolk System in 1819 calmed legislative fears of monetary anarchy as the number of

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[14] Handlin and Handlin, *Commonwealth*, p. 113.

[15] Indeed, there were long lags between incorporation and changes in authorized capital for Massachusetts banks and, interestingly, there were nearly as many reductions in capital as increases up to the 1830s. See Fenstermaker, *Development*, pp. 139-49. For the states' financial interests in banks, see Sylla, Legler and Wallis, "Banks and State Public Finance;" and Wallis, Sylla, and Legler, "Interaction of Taxation."

banks increased.

The Handlins argue that Massachusetts was singularly unsuccessful in bending the banking system to its will.[16] But it is not clear that it ever really tried to do so. A report issued by the state senate's standing committee on banks reported the criteria long used in determining which charter petitions merited a chartering act.[17] The committee's determination hinged on three questions: Were the petitioners capable bankers? Was the proposed location in need of additional banking capital? And, would these bankers attract sufficient investment capital? When the committee was satisfied with the answers they made a recommendation to the full chamber. Thus, according to these reports, banks were chartered in Massachusetts in response to demographic and economic, not political considerations. The evidence does not preclude the possibility that politics mattered, but the historiography of incorporation in Massachusetts is fundamentally different than that of New York or Pennsylvania, states where politics clearly mattered but in different ways in each.

In the market for corporate charters, the state can be either a seller or a renter. Massachusetts was a seller. Pennsylvania became a renter. In 1793 Pennsylvania chartered the Bank of Pennsylvania to compete with the Bank of North America, previously chartered by the Continental Congress. The Bank of Pennsylvania's charter specified a $3 million capital and a 25-year renewable charter, among other features. In 1793 the state did not extract an up-front payment in return for its charter (such payments were commonly called "bonuses"). Instead, the state exchanged heavily depreciated US bonds for a one-half equity stake in the bank. In return the Bank of Pennsylvania was designated the state's fiscal agent. Public moneys were held at the bank in exchange for an open line of credit for the state treasury.

Within a decade the demand for banking services in Philadelphia outstripped the Bank of Pennsylvania's resources. A new bank was organized and its promoters sought a charter.[18] That the petition

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[16] Handlin and Handlin, *Commonwealth*, p. 142.

[17] Massachusetts. Senate. "Report of the Joint Committee."

[18] Daniels, *Pennsylvania, Birthplace of Banking*; Schwartz, "Beginning of Competitive Banking;" and Wainwright, *History*, provide details of the wrangling surrounding the chartering of Philadelphia's early banks.

was taken seriously by the legislature surprised the directors of the Bank of Pennsylvania, who considered the state's commitment to the current duopoly a near contractual guarantee. To overcome the legislature's qualms about disrupting the duopoloy, the organizers of the upstart Philadelphia Bank promised the state treasury a one-time payment in addition to an open line of credit. The Bank of Pennsylvania countered with a comparable offer, including a hefty bonus payment, to not charter the new bank. In the end, the Pennsylvania Bank's counteroffer was rejected in favor of the Philadelphia Bank's offer of an initial bonus payment of $135,000 plus an equity position amounting to $523,000 of the bank's $1 million capital. Although the state extracted smaller bonuses in return for additional charters issued after 1804, its actions are consistent with the actions of a durable-goods monopolist renter in a dynamic setting with stochastically expanding demand. [19] Indeed, the relatively high and consistent dividends paid by Philadelphia's banks suggests that entry was limited and did not significantly reduce profitability.[20]

Pennsylvania's policies toward chartering banks in Philadelphia carried over into the charters granted to small-town banks. Charters were granted for limited terms, typically 25 or 30 years; the state received shares in the banks, which entitled the state to receive dividends and vote for directors; and included clauses reserving for the state a specific line of credit. At the end of the charter term, banks were forced to reapply for a charter at which time the state again extracted sizable rents. Whereas Massachusetts had divested itself of its bank shareholdings by 1812, dividends accruing to Pennsylvania's shareholdings represented a substantial share of the state's annual revenues. Dividend income peaked at nearly $315,000 in 1815 and in 1817 the state levied a tax on dividends, which yielded approximately $100,00 per annum in the 1840s increasing to about $200,000 in the 1850s.[21] Although Pennsylvania inflicted serious damage on its banks in the 1840s by dragging them into the financial fiasco that was the Pennsylvania Main-Line Canal, the state

[19] See Bulow, "Durable-Good Monopolists;" and Carlton and Perloff, *Modern Industrial Organization*, Chapter 19 for discussions of leasing versus selling in durable-goods monopoly markets.

[20] Rockoff, *Free Banking Era*.

[21] Sylla, Legler and Wallis, "Banks and State Public Finance," p. 396.

protected their privileged positions throughout the antebellum era.[22] Unlike Massachusetts, where even the most modest town had a bank or two, Pennsylvania's hinterlands were not littered with banks. Pennsylvania created regional monopolies and then protected them, not wishing to undermine a significant source of tax revenue.

New York's chartering practices (1791-1836) differed from both Massachusetts and Pennsylvania. Alexander Hamilton's Bank of New York, chartered in 1791, received official state sanction only after a prolonged legislative battle, during which the bank operated extra-legally. Up through 1810, the legislature chartered just nine additional banks, three of which were located in New York City and two in Albany. Table 1 demonstrates that, despite its growing commercial preeminence, New York was the relative laggard in providing banking facilities to its citizens. Bank capital per capita in New York ranged between 50 and 70 percent of Massachusetts' values.[23] There was a rush of chartering in the early 1810s, but increases in bank capital after 1815 barely kept pace with population growth, even while per capita bank capital continued to rise steadily in Massachusetts up to the panic of 1837.

New York's slow rate of bank growth did not result from a Pennsylvania-style partnership between the state and its banks. New York did not explicitly establish and protect regional monopolies and oligopolies and extract rents, though the practical result was not substantially different. Indeed, New York never raised more than 11 percent of treasury revenues through taxes or bonus payments from banks in the antebellum era.[24] Instead of official fiscal concerns, New York's banking sector expanded slowly due to the corruption and the political favoritism surrounding the chartering process.

Whatever negative consequences Pennsylvania's system of rent extraction may have had for that

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[22] Bodenhorn, *State Banking*, pp. 145-52.

[23] Capital per capita figures are used in Table 1 because they are available for more years and were more accurately reported than bank assets. Despite many missing values for the earliest years, a table comparing per capita bank assets over the same period generates the same conclusions. New York and Pennsylvania were far behind Massachusetts and the gap widened somewhat as the era wore on.

[24] Sylla, Legler and Wallis, "Banks and State Public Finance," p. 401.

state's financial sector the state extracted most of the available rents, leaving little for politicians to expropriate for themselves or to subvert the political process for private economic gain. In New York, on the other hand, rumors of bribery circulated around most early charters, but the shenanigans surrounding the 1812 charter of the Bank of America of New York City became public scandal. The bank's Federalist petitioners hired two prominent Republican lobbyists who spread influence and cash (or promises thereof) liberally on both sides of the aisle. Events quickly spun out of control and the governor exercised his constitutional right to suspend both houses of the legislature for sixty days. In his message, Governor Tompkins alluded to charges of bribery in the previous legislative session and accused four Federalist members of the Assembly and one state senator of accepting bribes from the petitioners' lobbyists.[25] Tompkins asked the attorney general to investigate. Several men were indicted and a few, including a former clergyman, eventually served prison sentences. Ultimately, the governor's decision to suspend the legislature had no discernible effect; the Bank of America was chartered when the legislature reconvened. Charges of bribery resurfaced with nearly every subsequent charters, but none rose to the level of the Bank of America scandal.

Martin Van Buren entered the state senate in 1813 and by 1819 controlled an incipient party machine that became the blueprint upon which most later nineteenth-century machines were built.[26] Van Buren realized that machines need fuel to operate and, after being elected governor in 1829, harnessed the chartering system to feed his expanding patronage machine. At the end of 1828, crisis loomed for New York's banking system. As Table 1 reveals, with just $9 in per capita bank capital, New York was financially underdeveloped relative to both Massachusetts (about $28 per capita) and Pennsylvania (about $12). Moreover, the charters of 30 of the 40 existing banks were due to expire in the next five years. Corruption and a constitutional clause requiring a two-thirds majority vote for bank chartering acts had created a chartering logjam.

Van Buren broke the logjam by reforming the state's banking system in two ways. The Safety Fund

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[25] Cole, *Martin Van Buren*, pp. 27-28.

[26] This and the following paragraph is drawn from Bodenhorn, "Bank Chartering and Political Corruption."

System, adopted in 1829, created a bank liability insurance fund, protecting creditors (namely, banknote holders and depositors) from losses due to bank failures.[27] Safety Fund guarantees reduced legislative concerns that prospective bankers received charters not because they were capable bankers but because they were capable bribers. Second, under Van Buren's leadership of the New York Democratic Party, the nature not the extent of corruption changed. Political spoils permeated the system, from appointments to low-level municipal posts all the way up to the high-levels of the administration and spoils similarly permeated bank chartering and, more importantly, the distribution of equity shares in newly chartered banks. Van Buren's machine created the corporations and then determined who could participate in initial public offerings. Charges of favoritism and insider dealing were as common in New York in the 1830s as in the tech boom of the 1990s. Party insiders received lucrative bank charters. Other party insiders then allocated shares to themselves and a small circles of local party regulars. In 1836 the distribution of stock in 12 newly-chartered banks was so partisan that even the party-appointed bank commissioners criticized them.[28]

By 1837, however, the public had little remaining tolerance for the Democrats' spoils system and the use of the political system to dispense economic favors. Flagrantly inequitable practices, such as the highly partisan distribution of bank shares, had fallen from favor and the legislature moved to correct them. An 1837 act required that shares in initial public offering be sold at public auctions and limited the number of shares an individual could purchase. Ultimately, the 1837 act was a dead letter because New York failed to charter another bank prior to the Civil War.

Fanning the flames of frustration over the electorate's growing frustration with the spoils system and capitalizing on the long tradition of voting out incumbents during a recession, Whigs took advantage of the 1837 panic and swept Van Buren's Democrats from office in 1838. In the opening days of the 1838 legislative session the senate established a committee to report on a revision to the banking laws. The

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[27] See Calomiris, "Deposit Insurance," and Bodenhorn, "Quis Custodiet," for modern interpretations of the Safety Fund.

[28] Chaddock, *Safety Fund Banking System*, p. 252.

committee reported back that the time had come to replace the current system, mostly because it was "utterly at war with equal rights and free government."[29] As the end of the legislative session approached, a free banking act was passed.

New York's free banking act stripped the legislature of its prerogative to issue corporate charters. The act depoliticized incorporation and made it a purely administrative function. Any prospective banker who could meet the minimum requirements was allowed to operate a note-issuing, deposit-taking bank. The act imposed minimum capital requirements, one for joint-stock banks and a much lower one for partnerships or proprietorships. The defining characteristic of free banking, however, was bond-secured note issue. Bankers were required to deposit with the state comptroller acceptable government bonds – mostly New York and U.S. – or mortgages on improved, unencumbered property and received engraved banknotes of equal value in return. With banknotes in hand, the banker could lend and engage in most other common contemporary banking functions.

L. Ray Gunn contends that New York's free banking law represented "one of the most important pieces of legislation in the first half of the nineteenth century."[30] It reflected a fundamental transformation in the role of the state, one away from the Handlins notion of the state as commonwealth. Incorporation passed from being based on the principle of the common weal to one of private gain. The legislature relinquished its power to bestow privilege to a few and created a bureaucracy charged with treating all alike. Thus, the corporation lost its essentially public character and became a purely private matter. The question addressed here is whether this fundamental political change, in New York at least, represented a substantive shift in the economics of bank entry.

A Model of Bank Entry and Capital Formation

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[29] New York. Senate. (1838), p. 4.

[30] Gunn, *Decline of Authority*, p. 229.

Following previous studies of bank entry, assume that the desired stock supply of bank capital in county j at time t (C_{jt}^{S*}) is a function of the expected profitability of banking and the expected return to the next-best alternative investment.[31] We can write a highly stylized supply function as:

(1) $C_{jt}^{S*} = f(R_{bt}, R_{at})$

where R_{bt} represents the expected, risk-adjusted returns to banking and R_{at} represents the expected risk-adjusted returns to an alternative investment. Thus, capital will flow into banking should the risks or costs of banking increase for a given expected rate of return in the industry. Differences in chartering regimes, including corruption, can influence entry by altering the ongoing, operating costs of banking or by changing the risks, for given expected rates of return.

The desired demand stock of bank capital depends inversely on the banks' expected cost of capital (R_{bt}), and positively on the expected transaction or monetary services (liquidity, divisibility, storage) and expected intermediary services (loans) provided by banks:

(2) $C_{jt}^{D*} = F(R_{bt}, TS_t, IS_t)$

where TS represents transaction services and IS represents intermediary services.

Setting equations (1) and (2) equal and solving for the optimal level of bank capital yields a reduced-form equation:

(3) $C_{jt}^{*} = G(R_{bt}, R_{at}, TS_t, IS_t)$

Entry (or exit) will occur when the current capital stock deviates from the desired stock of capital. Changes in capital in time t for county j can be expressed as:

(4) $C_{jt} - C_{jt-1} = L[C_{jt}^{*} - C_{jt-1}]$

where L is the coefficient of adjustment between the desired and actual capital stock. Assuming that the actual change in capital responds to desired changes, and substituting equation (3) into equation (4) yields:

(5) $C_{jt} - C_{jt-1} = L[G(R_{bt}, R_{at}, TS_t, IS_t) - C_{jt-1}]$

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[31] Peltzman, "Entry into Commercial Banking;" Dwyer, "Effects of Banking Acts;" Economopoulos and O'Neill, "Bank Entry."

Equation (5) is a highly stylized reduced-form equation for incremental changes in capital, and assumes that changes can take place either through the entry or exit of new banks or incremental additions to or deletions from the capital of existing banks. A variant of equation (5) can be written as:

(6) $E_{jt} = l\,[g(R_{bt}, R_{at}, TS_t, IS_t) - C_{jt-1}]$

where E_{jt} represents new bank entry and l is the coefficient of adjustment. Different regimes, such as liberal chartering Massachusetts, illiberal chartering in Pennsylvania, or corruption and subsequent free banking in New York, will generate different rates of adjustment, depending on whether they prefer to incorporate new banks or augment the capital of existing banks.

Unfortunately, none of the variables of interest (R_{bt}, R_{at}, TS, and IS) are observable to the economic historian, and any estimates of them at the county level would be subject to substantial error. But there are some available proxies that are likely to have influenced the supply and demand of banking services. Holding the expected returns to banking and alternative investments constant, we would expect potential bankers to find larger, more rapidly growing markets more attractive. Similarly, a more urbanized, wealthier county, with a larger percentage of the work force engaged in nonagricultural employments was likely to generate a larger demand for liquidity and intermediary services. While entrepreneurial decisions to enter likely depended on potentially more sophisticated, if unarticulated, criteria than these, there is evidence that these were the objective criteria on which legislators based their decisions.

Massachusetts's Senate in 1853 committee on banks and banking provided a list of petitions for increased bank capital and new banks, followed by a discussion how the legislature might choose between them.[32] The committee argued that the legislature should respond to the legitimate needs of business, but recognizing the difficulty of quantifying that, turned to a discussion of local population, population growth, assessed or taxable wealth, and current bank capital. Similarly, a New York legislator argued in 1837 that

[32] Massachusetts. Senate. "Report of the Joint Committee."

banking services should expand as "population, wealth, and business increase."[33] Comparable statements can be found in legislative debates in other states.[34] An empirical model that explicitly considers those factors deemed important by legislators making chartering decisions should be capable of uncovering how and how well allocation decisions were made.

Bank Entry under Alternative Bank Chartering Regimes in the 1830s

This section provides tests the entry consequences of different chartering practices in Massachusetts, Pennsylvania, and New York in the 1830s. Table 2 provides summary statistics of variables, or close proxy variables, deemed important by contemporary legislators. The dependent variables in the regressions are either the number of bank charters issued to residents of a county or the change in per capita bank capital between 1830 and 1837. The unit of observation is the county over the seven-year period 1830 to 1837. Thus, the mean county in the sample, across the three states, had 1.17 more banks and an additional $5.10 in bank capital per capita in 1837 compared to 1830.

Legislators in all three states repeatedly wrote that the "needs of business" drove legislative chartering decisions, but such needs were sufficiently vague that they offer little empirical content. Nevertheless, the Massachusetts documents previously mentioned suggested several factors likely to influence legislative decisions, including: population; recent population growth; whether a canal passed through the county; the percentage of the population engaged in nonagricultural employment; and the proportion of the county residing in an urban area, defined here as a city or town of more than 2,500 inhabitants. The inclusion of population and population growth captures whether legislators responded in a timely manner to secularly increasing demand for financial services. Ken Sokoloff finds that proximity to a canal had a significant influence on market orientation and inventive activity, both of which would be expected to increase the

[33] *Albany Evening Journal*, 8 February 1837.

[34] Pennsylvania. House. "Report of the Committee on Banks."

demand for banking services.[35] Moreover, the fact that a canal passed through the county in question may reflect other political factors influencing the decision to allocate "improvement" companies to a county independent of the canal's effect on the demand for financial services.

Two additional independent variables included to capture potential demand-side effects are the percentage of a county's population employed in nonagricultural occupations and the percentage of the county population residing in a city or town.[36] Both measures should reflect the extent to which commerce and manufacturing had penetrated a county. Nonagricultural employment matters because, although farmers yelped about the lack of adequate credit throughout the antebellum era, Massachusetts, Pennsylvania and New York did not, despite Redlich's general criticism of the era's chartering practices, encourage mortgage banking and farm lending by chartering banks in small, rural towns.[37] Early nineteenth-century lending philosophy centered on the real-bills doctrine, which favored providing firms with short-term working capital. Although bankers regularly violated the rule, it was followed in the main.[38] Mercantile firms and manufacturers were simply more attractive borrowers than farmers because they turned their stock more often and generated less seasonal cash flows.

Table 3 reports the results of six regressions. Because the percentage of the county population engaged in nonagricultural employment and urbanization are highly correlated, they are included as regressors in separate specifications. The table also reports separate regressions with per capita bank capital in 1830 as a regressor. This variable was highly correlated with both nonagricultural employment and urbanization, so it is included separately to avoid multicollinearity. Its inclusion as a separate regressor may

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[35] Sokoloff, "Inventive Activity."

[36] The published censuses of 1820 and 1840 report the number of persons employed in agriculture, commerce, manufacturing, and professions for counties and smaller civil divisions. The 1830 figure for each county is calculated as the arithmetic mean of the 1820 and 1840 figures.

[37] Redlich, *Men and Molding*.

[38] Bodenhorn, "Private Banking," and "Engine of Growth."

also capture any path-dependent effects; namely, whether places with an existing bank were more attractive places to add a second bank or to make additions to an existing bank's capital.

Equations (1) through (3) report the results of ordered probit models with the number of newly chartered banks as the dependent variable. Counties with larger populations were significantly more likely to receive a new bank, as were faster growing counties. These results are consistent with the hypothesis that legislators responded to secularly increasing demand for financial services. Counties situated on a canal were also significantly more likely to receive a new bank charter. This may reflect greater opportunities for banking in counties contiguous to a canal. It may also reflect an "improvement" effect in that counties believed to be more deserving of one kind of internal improvement were believed to be more deserving of other improvement companies as well.

Although nonagricultural employment did not have a significant influence on legislative chartering decisions, urbanization and the initial level of per capita bank capital did. These measures should proxy for the elusive "needs of business" justification for additional banks. To the extent that these variables capture the needs of business, higher urbanization rates and a larger existing financial sector were correlated with bank entry. Finally, the regressions include state dummy variables for New York and Pennsylvania. The results are consistent with the historiography. Pennsylvania was the most reluctant of the three to charter new banks, but the coefficients on the New York dummy variable are large, negative, and highly significant. After Van Buren's Regency took control of New York legislature, they limited the number of bank charters, most likely to protect the rents they had promised to party insiders. Pennsylvania, too, protected its existing banks, but because the state itself had an interest in protecting those previously favored.

Equations (4) through (6) report ordinary least squares (OLS) estimates where the dependent variable is the change in county-level per capita bank capital between 1830 and 1837. In the OLS regressions, only the natural logarithm of population and the rate of population growth are consistently statistically significant. Using the coefficient estimates for equation (4), a county with a population one standard deviation larger than

the mean increased its per capita bank capital by about $12.79. Similarly, a county experiencing an average annual population growth rate one standard deviation greater than the mean received an additional $5.57 in per capita bank capital. Coefficients on the other measures that proxy for changes in demand – nonagricultural employment, urbanization, and initial per capita bank capital – take on the expected sign, but are statistically insignificant at standard levels.

Differences in the basic results reported in equations (1) through (3) relative to equations (4) through (6) suggest why previous researchers have disagreed about the effectiveness of free banking laws in promoting entry. There appear to have been different determinants for bank entry and changes in bank capital. Whereas the dummy variables in the ordered probit bank entry regressions, for example, are large and statistically significant, they are large, but not statistically significant in the OLS change in bank capital regressions. Nevertheless, after controlling for other factors, New York counties received between $3.68 and $6.96 less in per capita bank capital between 1830 and 1837. Pennsylvania counties received between $3.21 and $5.40 less.

Table 4 explores the possibility that interstate differences in chartering regimes manifested themselves in more complex ways that a simple state-level intercept shift term. In these specifications, the New York and Pennsylvania state dummy variables are interacted with the relevant regressors, including the natural logarithm of population, population growth, canal, nonagricultural employment, urbanization, and initial per capita bank capital.[39] Interaction terms are included because likelihood ratio tests rejected the null hypothesis that the eight interaction terms are jointly zero at the 99 percent level for two specifications and at the 95 percent level for the third.

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[39] William Greene, *Econometric Analysis*, pp. 248-51, shows that including interaction terms is equivalent to running separate regressions and contends that separate regressions are preferable if the error variances are not equal. When there are few observations for some of the potentially separate regressions, however, it is preferable to combine the data and control for heteroskedasticity. The City variable is not interacted with the state terms because City equals 1 for New York City, Boston, and Philadelphia. Greene, *Econometric Analysis*, p. 197, also notes that an interaction term would generate a dummy variable with a 1 in a single cell, which in OLS has the effect of deleting that observation from the computation.

The results of the ordered probit regressions [Equations (1) to (3)] in Table 4 corroborate the results in Table 3; namely that chartering policies in New York and Pennsylvania in the 1830s had large and significant negative consequences on bank entry relative to the more liberal policy followed in Massachusetts. Although counties with larger populations were more likely to receive a bank charter, the interaction terms for New York and Pennsylvania and population are large and negative. Indeed, the negative interaction effects are large enough to nearly offset the positive direct effect. The inclusion of the interaction terms reduces the size and significance of the population growth effect and the presence of a canal, with the exception of barely significant effects in Equation (3) which imply that New York and Pennsylvania counties with a canal were more likely to receive a new bank than counties without a canal.

Coefficient estimates on the three variables designed to proxy for the ever-nebulous "needs of business" criterion for bank charters also confirm that chartering policies in New York and Pennsylvania differed markedly from Massachusetts. The coefficient on nonagricultural employment is barely significant at usual levels, and the interaction terms, while not statistically significant, are negative. The estimated coefficients on the urbanization variables and the interaction terms are significant and, once again, the negative interaction terms are large enough to fully offset the direct effect. The regressions that include initial per capita bank capital as a regressor are similar. Counties with an existing bank were more likely to receive a new bank, except the interaction effects are again negative and large. Moreover, the coefficient estimates are consistent with traditional historical interpretation that Pennsylvania better protected existing banks from new competition. The regression results offer broad support for Ronald Seavoy's contention that New York's bank chartering policies did not "facilitate the orderly expansion of credit where it was needed."[40]

Equations (4) through (6) of Table 4, again, provide some hints for why previous writers have come to different conclusions about the consequences of free banking. Whereas bank entry seemingly responded mostly to population growth and the "needs of business," incremental changes to per capita bank capital were

[40] Seavoy, *Origins*, p. 138.

more heavily influenced by population growth and proximity to a canal. And as with the entry regressions, interaction terms in the per capita bank capital regressions are large, negative and statistically significant.

It is clear, regardless of how the chartering regimes are characterized that New York and Pennsylvania followed very different policies from those followed by liberal chartering states in the Northeast, including Massachusetts. Whether chartering policy is measured by changes in the number of bank or changes in bank capital, New York and Pennsylvania restricted entry, protecting existing banks from the competitive pressures inherent to actual, or even potential, entry. To the extent that economic growth follows financial development, a policy that inhibited capital formation in the financial sector surely had larger macroeconomic consequences. This empirical analysis of chartering practices in the 1830s also holds out the potential to reconcile the debate about the entry effects of free banking, the issue to which we now turn.

The Determinants of Bank Entry under Free and Chartered Banking

What were the consequences of free banking on bank entry? What were the determinants of bank entry a decade after the Regency lost power and 12 years after New York's Free Banking Act was passed? Previous studies, including Ng's, attempt to understand the consequences of free banking by considering a window shortly after free banking was enacted. Although free banking, once established, prevailed throughout the remainder of the antebellum period in New York and elsewhere, its passage did not make it a *fait accompli*. The law was passed unconstitutionally and was repeatedly challenged through the 1840s. Its continuation depended on appellate court justices more concerned with the spirit of the legislation than the legislature's strict adherence to constitutional niceties. Events unfolded so that free banking withstood a number of legal challenges, but that outcome was not the only possible, nor even the most likely, one. By empirically analyzing the entry effects of free banking in the 1850s, the analysis can better capture economic decisions free of legal concerns. By the early 1850s, the legal issues were resolved, free banking was entrenched, and potential bankers could be sure that their property would be protected by and from the state.

Statistics reported in Table 1 present a seeming paradox. Free banking made bank incorporation a purely administrative matter, stripping it of its political character. Under free banking, aspiring bankers had only to buy specified government securities or high-grade mortgages, place them on deposit with the state comptroller as a guaranty for note holders, pay to have the banknote plates engraved, rent a place of business, hang out a shingle, put up a flagpole, and open for business. In eliminating the corrupt and partisan practices followed by the Regency for nearly two decades, it would not have been unexpected for the law to have created a gold-rush mentality. And, indeed, it did. In 1838 and 1839 alone, 92 banks incorporated in New York. The rate of incorporation slowed during the depression of the early 1840s, but accelerated in the 1850s. Whereas Massachusetts had been the leading bank incorporator (among these three states, at least) between about 1820 and 1837, New York took the lead in 1839. By 1860, New York had incorporated more than 600 banks. Massachusetts incorporated fewer than half that number, Pennsylvania about one-sixth. Yet Table 1 reveals a curious result. Despite the rash of incorporations, New York made little headway in per capita bank capital relative to other states. Indeed, New York had less bank capital per inhabitant in 1850 than it had in the year before free banking was passed. The panics of 1837 and 1839 and the depression of the early 1840s surely played a role, but even in the expansionary 1850s, New York never effectively closed the bank capital gap with Massachusetts. Problems in funding its massive state debts wracked Pennsylvania's treasury through the 1840s. Because the state and the banks were so closely connected, Pennsylvania's financial woes plagued the banking sector as well. Poor policy choices undermined the state's banks, policies from which the sector only slowly recovered and that surely reduced the attractiveness of entry.[41]

Table 5 reports the results from regressions comparable to those reported in Table 3. Once again, the unit of observation is the county over the seven-year window 1850 to 1857. The dependent variable is either the number of banks incorporating and opening or additions to per capita bank capital in a given county during that time. The independent variables are the same, with the exception of nonagricultural employment,

[41] See Bodenhorn, *State Banking*, pp. 145-52 for the details of Pennsylvania's policies in the 1840s.

which the 1850 census did not report.

Equations (1) and (2) in Table 5 are ordered probit regressions where the dependent variable equals the number of bank incorporations per county.[42] The results for the free banking period largely mirror those of the previous period of chartered banking. Bank incorporation responded positively to population, population growth, and proximity to a canal. Incorporations also responded positively to initial per capita bank capital, implying that early entrants chose profitable locations that still appeared profitable to later entrants. Urbanization had no statistically significant effect on bank incorporation. The noteworthy result is that by making banking incorporation a purely administrative function, bank incorporation decisions in New York in the 1850s did not significantly differ from those of liberal chartering Massachusetts. Note, however, that even into the 1850s, Pennsylvania operated under a significantly different chartering regime. Relative to Massachusetts and New York, the typical Pennsylvania county had between 1.7 and 2.2 fewer bank incorporations between 1850 and 1857 (note that the sample mean reported in Table 2 for the 1850s is just 2.14).

Columns (3) and (4) of Table 5 report the results of OLS regressions in which the change in per capita bank capital is the dependent variable. These regressions perform poorly, with virtually no statistically significant regressors.[43] Although incorporations responded positively to the underlying determinants of demand, changes in bank capital did not. The intriguing results, and the one that has led to disagreement among previous writers is that the statistically significant negative shift coefficient on the New York dummy variables are of similar orders of magnitude in the 1830/37 and 1850/57 regressions (compare to columns 5 and 6 in Table 3). Free banking in New York may have encouraged incorporation, but it did not accelerate

[42] The New York figures are for all banks the registered with the New York Comptroller. Figures for Pennsylvania and Massachusetts are for banks that received a charter *and* opened. Four banks received charters that did not subsequently open. The use of banks that actually opened rather than all bank chartered does not materially affect the results.

[43] Economopoulos and O'Neill, "Bank Entry," p. 1081 also have difficulty identifying the determinants of bank entry, especially in non-free banking states.

the pace at which banking capital adjusted to changes in demand. Pennsylvania, too, lagged far behind in adding per capita bank capital.[44]

In one regard free banking had the expected and desired effect. It freed bank incorporation from potentially corrupt and expensive practices that slowed the rate of bank formation. Aspiring bankers were free to establish a bank in any region of the state where previously the legislature had determined, often through political means, when and where and even if an aspiring banker could locate. On the other hand, free banking did not significantly reduce the adjustment lags in per capita bank capital. The result was that arguably the most economically developed state in the Union circa 1860 was not the most financial developed.

There are two potential resolutions to the paradox of free banking's effect on entry. First, New York's free banking act encouraged the entry of small, note-issuing private banks. New York had prohibited private banking, even those not issuing banknotes, in the early nineteenth century. Beginning in 1825 several bids to lift the prohibition on private banking were killed in the legislature, and the 1838 act actually combined two separate proposals. One plan aimed at lifting the ban on private banking; the second, and more ambitious, plan was to allow free entry to joint-stock companies. The final bill included both, giving the right of note issue to what would otherwise have been small private banks. The result was the creation of many small banks. Joint-stock banks faced a $100,000 minimum capital requirement, but individuals and partnerships could open a bank with as little as $10,000 in capital. In March 1850, 29 of 47 of these "individual" banks had $20,000 or less in capital, and between 1840 and 1850 the capitalization of the average free bank declined from $263,000 to $176,000. In promoting small banks, the law assuaged a common contemporary fear: the connection between economic size (or power) and political influence.

A second likely explanation for the slow growth in bank capital in New York under free banking has

[44] Regressions with interaction terms similar to those reported in Table 4 are not reported here because the null hypothesis that the interaction terms are jointly zero could not be rejected at the 1% level for regressions (1) and (2) and at the 5% level for Equation (4).

been offered by Howard Bodenhorn and Michael Haupert.[45] The bond-security provisions of New York's free banking law imposed large costs on free banks that were not borne by chartered banks. Bond collateral requirements meant that free bank portfolios were top-heavy with low return state and federal bonds. The collateral requirements also exposed free banks to term structure and holding period risks given the maturity gap between a free bank's assets and liabilities. Moreover, securities markets were still thin in the 1840s and 1850s so that selling a collateral security to meet unusual redemption calls could lead to substantial capital losses. This combination of costs and risks made free banking less attractive than previously believed. Prospective bankers took advantage of the law, but the results reported here and by Ng bring into question the traditional tale of a virtual banking gold rush. After a brief flurry of entry in the eighteen months following the law's passage, entry slowed, partly because of the economic downturn and partly because bankers quickly came to understand the hidden costs of the law's bond collateral provisions.

Concluding Remarks

Existing empirical studies of the entry consequences of free banking come to different conclusions. One group of studies previously found that free entry did not lead to substantial entry; another found that it did. This article reconciles these disparate findings by showing that conclusions are highly dependant on the kind of data the researcher considers. Those studies that focus on the entry of new banks find that free banking was associated with substantial increases in the rate of entry. And the results reported here confirm those earlier findings. Compared to the 1830s, bank entry in New York in the 1850s was freer and more closely resembled entry in liberal chartering states like Massachusetts. When the entry effects of free banking, however, are judged by the law's effect on increases in bank capital (or assets), free banking had less substantive consequences. Free banking encouraged the formation of new banks, but the law did not encourage the establishment of large banks with substantial capitals. Thus New York instituted free banking, yet the gap

[45] Bodenhorn and Haupert, "Was there a Conundrum," and "Note Issue Paradox."

in per capita bank capital between it and other states, such as Massachusetts, remained large and was only slowly dissipated. Free banking, as it was constituted in the 1840s and 1850s, was not a particularly enticing invitation to enter, which explains why the myth of the "wildcat" bank was exploded long ago. A still unresolved issue is whether legislators understood the entry-deterring implications of bond-collateralized note issue at the time. In passing free banking laws did legislators appease radical calls for free incorporation without encouraging lots of bad banking? Only further studies of the political economy of free banking will provide an answer.

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Table 1: Bank Capital per Capita in Massachusetts, New York, and Pennsylvania
selected dates

Year	Massachusetts	New York	Pennsylvania
1800	$ 9.01[a]	$ 5.81[b]	$ 8.06[a]
1805	12.22	7.27[b]	10.04
1810	14.16	7.75[b]	7.41[c,d]
1815	23.07	15.93[b]	16.38[d]
1820	20.26	15.38[b,e]	14.02[d,f]
1825	25.74	16.04[b]	na[f]
1830	31.61	12.44[b,e]	10.84[d,f]
1835	45.36	14.72[b,g]	11.65[f]
1837*	54.99	16.43[h]	14.86
1840	45.75	15.15	14.04
1845	36.24	15.94	7.32
1850	37.13	15.29	7.43
1855	53.05	24.19	7.67
1860	54.00	28.72	8.80

Notes and Sources: Unless otherwise noted, estimates are based on capital accounts reported in U.S. Comptroller, *Annual Report*, and U.S. Census Office, Ninth Census, *Compendium*. Population estimates for noncensus years calculated from continuously compounded growth rates between census years.

* Last year of legislative bank chartering in New York State.

[a] Estimates are for 1801.

[b] Bank capital from Williams, *New York Annual Register ...1837*, p. 235. Gallatin, *Considerations*, pp. 97-103 reports slightly different figures: 1811, $7.57; 1815, $16.57; 1820, $13.83; 1830, $12.78.

[c] Estimate for 1811.

[d] Estimates from Gallatin, *Considerations*, pp. 97-103.

[e] Fenstermaker, *Development*, reports for capital imply different figures: 1819, $0.84; 1830, $3.54.

[f] Fenstermaker, *Development*, reports for capital yield different figures: 1820, $6.37; 1825, $7.57; 1830, $9.51; 1835, $12.39.

[g] U.S. Comptroller, *Annual Report*, p. CIII figure implies $14.14

[h] Fenstermaker, *Development*, figure implies $16.21.

Table 2: Bank Chartering in Massachusetts, New York, and Pennsylvania, 1830-1837 and 1850-1857
Summary statistics for county-level data, means and standard deviations

Variable Name	1830-37	1850-57
) per capita Bank Capital	$5.10	$4.04
	(9.29)	(7.83)
) Number of Banks	1.17	2.14
	(2.54)	(4.17)
Initial per capita Bank Capital	6.13	7.60
	(21.44)	(14.43)
Natural Log (Population)	10.08	10.40
	(0.85)	(0.83)
Annual Growth rate of Population	3.13	1.84
	(3.38)	(2.24)
Canal passes through county	0.39	0.36
	(0.49)	(0.48)
Nonagricultural Employment (%)	28.82	—
	(17.44)	—
Urbanization (%) 34.35		39.27
	(30.43)	(32.97)
Massachusetts	0.12	0.10
	(0.32)	(0.31)
New York	0.46	0.43
	(0.50)	(0.50)
Pennsylvania	0.42	0.47
	(0.50)	(0.50)
Observations	121	135

Notes: Population in 1837 and 1857 calculated from continuously compounded growth rates between 1830 and 1840 or 1850 and 1860. Nonagricultural employment in 1830 calculated as average of 1820 and 1840 values.

Sources: Population and Urbanization: U.S. Department of State, Fourth Census, *Census for 1820*; U.S. Department of State, Fifth Census, *Fifth Census*; U.S. Department of State, Sixth Census, *Sixth Census*; U.S. Census Office, Seventh Census, *Seventh Census*; U.S. Census Office, Eighth Census, *Population of the United States*. Nonagricultural Employment: U.S. Department of State, Fourth Census, *Census for 1820*; U.S. Department of State, Sixth Census, *Sixth Census*. Canals: Tanner, *Canals and Railroads*. Bank Capital -- Massachusetts: *Abstract*; U.S. House Executive Doc. No. 172; U.S. House Executive Doc. No. 122; U.S. House Executive Doc. No. 107. Bank Capital – New York: New York State, Assembly Doc. No. 59; New York State, Assembly Doc. No. 71; *Daily Albany Argus* (25 November 1850); New York State, Assembly Doc. No. 4. Bank Capital – Pennsylvania: Pennsylvania, Senate, "Communication;" Pennsylvania *Senate Journal* (1837-38); Pennsylvania, *Senate Journal*, "Tabular Statement;" Pennsylvania, *Legislative Documents*, "Tabular Statement.

Table 3: Determinants of Bank Entry in Massachusetts, New York and Pennsylvania, 1830-1837

	Dependent Variable = Charter (0,1, 2, 3,...) Ordered Probit Estimatation			Dependent Variable =) per capita Bank Capital ($) OLS Estimation		
	(1)	(2)	(3)	(4)	(5)	(6)
Independent Variable	Coefficient (Std Error)	Coefficient (Std Error)	Coefficient (Std Error)	Coefficient (Std Error)	Coefficient (Std Error)	Coefficient (Std Error)
Log population (1830)	0.827*** (0.211)	0.718*** (0.196)	0.863*** (0.210)	2.711** (1.234)	2.106 (1.533)	2.933** (1.147)
Population Growth (1820-1830)	0.102** (0.046)	0.113*** (0.039)	0.096** (0.044)	0.493** (0.222)	0.565*** (0.197)	0.525** (0.207)
Canal	0.485** (0.218)	0.463** (0.225)	0.471** (0.219)	1.135 (1.255)	0.974 (1.199)	1.155 (1.212)
City	1.266 (0.931)	1.800*** (0.556)	0.361 (0.982)	21.448 (14.209)	19.419 (12.919)	9.448 (17.516)
NonAg Employment (1830)	0.017 (0.012)			0.020 (0.116)		
Urbanization		0.012** (0.005)			0.064 (0.056)	
Per capita Bank Capital (1830)			0.026** (0.012)			0.127 (0.122)
New York	-1.302*** (0.447)	-1.915*** (0.458)	-1.332*** (0.475)	-5.566 (3.749)	-6.959* (4.113)	-3.684 (2.692)
Pennsylvania	-2.217*** (0.486)	-2.400*** (0.494)	-2.105*** (0.524)	-5.379 (3.678)	-4.791 (3.279)	-3.208 (2.868)
Constant				-20.473 (13.625)	-15.722 (16.727)	-24.501** (12.187)
Log likelihood	-112.3	-111.4	-111.4			
Wald Chi-Square (7)	70.5***	98.1***	99.5***			
F (7, 113)				2.86***	3.26***	4.02***
R-square	0.28	0.28	0.28	0.33	0.35	0.35

Note: All regressions estimated with robust standard errors. * implies significance at 10%; ** at 5%; *** at 1%.

Table 4: Determinants of Bank Chartering in Massachusetts, New York and Pennsylvania, 1830-1837

	(1)	(2)	(3)	(4)	(5)	(6)
	Ordered Probit Estimates			Ordinary Least Squares Estimates		
Log Population	3.139***	4.958***	4.705***	4.488	6.573**	6.544*
(1830)	(0.750)	(1.099)	(1.36)	(3.595)	(2.987)	(3.567)
NY*Log Pop	-2.251***	-4.117***	-3.897***	-3.346	-6.859**	-5.251
	(0.781)	(1.120)	(1.390)	(3.694)	(3.183)	(3.656)
PA*Log Pop	-2.624***	-4.636***	-4.148***	-2.986	-4.762	-5.421
	(0.865)	(1.227)	(1.440)	(4.164)	(3.618)	(4.317)
Population Growth	-0.006	-0.634	0.843	16.429***	13.007***	12.231***
(1820-1830)	(0.761)	(0.740)	(1.064)	(3.486)	(3.589)	(4.519)
NY*Pop Growth	0.070	0.711	-0.778	-16.125***	-12.571***	-12.895***
	(0.755)	(0.742)	(1.063)	(3.482)	(3.590)	(4.516)
PA*Pop Growth	0.146	0.711	-0.725	-15.365***	-12.340***	-12.752***
	(0.737)	(0.731)	(1.067)	(3.338)	(3.511)	(4.490)
Canal	-0.490	0.016	-1.634*	-16.858***	-12.870***	-12.201**
	(0.910)	(0.996)	(0.940)	(2.862)	(4.693)	(4.692)
NY*Canal	1.017	0.425	2.150**	18.536***	14.743***	13.816***
	(0.969)	(1.037)	(0.996)	(3.208)	(4.842)	(4.946)
PA*Canal	1.229	0.837	2.452**	17.424***	12.853***	14.196***
	(0.975)	(1.056)	(1.022)	(3.466)	(4.994)	(5.210)
NonAg Employment	0.044*			-0.166*		
(1830)	(0.024)			(0.096)		
NY*NonAg	-0.016			0.175		
	(0.024)			(0.115)		
PA*NonAg	-0.275			0.560***		
	(0.029)			(0.137)		
Urbanization		0.080***			-0.017	
		(0.021)			(0.077)	
NY*Urban		-0.072***			0.072	
		(0.021)			(0.083)	
PA*Urban		-0.076***			0.185*	
		(0.025)			(0.108)	

Table 4: continued

Per capita Bank Cap			0.111***			0.056
			(0.035)			(0.082)
NY*Bank Capital			-0.078*			0.016
			(0.041)			(0.132)
PA*Bank Capital			-0.112*			0.633***
			(0.068)			(0.188)
City	2.099**	4.516***	3.465*	5.157	8.704	-2.858
	(0.955)	(1.019)	(2.110)	(7.683)	(7.487)	(11.810)
New York	22.599***	42.565***	40.303***	34.663	72.881**	61.458*
	(8.434)	(11.932)	(14.600)	(38.250)	(32.476)	(37.184)
Pennsylvania	25.329***	47.132***	41.726***	17.786	51.430	60.712
	(9.295)	(13.121)	(15.188)	(43.773)	(37.647)	(44.281)
Constant				-43.766	-70.406**	-72.092**
				(37.399)	(30.780)	(36.403)
Log-likelihood	-103.3	-97.5	-99.7			
Wald Chi-square (15)	87.4***	109.5***	84.8***			
Pseudo R-square	0.34	0.37	0.36			
F(15, 105)				23.9***	12.9***	36.5***
Adj R-square				0.59	0.56	0.56

Notes: Dependent variable in Equation (1) to (3) is number of new banks. Dependent variable in Equations (4) to (6) is change in per capita bank capital. All regressions estimated with robust standard errors. * signifies statistical significance at 10% level; ** at 5%; and *** at 1%.

Sources: See Tables 2

Table 5: Determinants of Bank Entry in Massachusetts, New York and Pennsylvania, 1850-1857

	Dependent Variable = Charter (0,1, 2, 3, ...) Ordered Probit Estimatation		Dependent Variable =) per capita Bank Capital OLS Estimation	
	(1)	(2)	(3)	(4)
Independent Variable	Coefficient (Std Error)	Coefficient (Std Error)	Coefficient (Std Error)	Coefficient (Std Error)
Log population (1850)	0.916*** (0.198)	1.027*** (0.207)	0.843 (0.886)	1.083 (0.767)
Population Growth (1840-1850)	0.177*** (0.048)	0.182*** (0.053)	-0.041 (0.154)	-0.027 (0.166)
Canal	0.382* (0.217)	0.401* (0.218)	-0.547 (1.102)	-0.448 (1.074)
City	-0.669 (1.170)	0.694 (0.983)	16.974 (15.129)	20.510** (9.990)
Urbanization		-0.007 (0.006)		-0.014 (0.027)
Per capita Bank Capital (1850)	0.020** (0.010)		0.053 (0.123)	
New York	0.408 (0.358)	0.221 (0.316)	-6.148** (2.873)	-6.774*** (2.286)
Pennsylvania	-1.700*** (0.423)	-2.209*** (0.472)	-9.892*** (2.857)	-11.293*** (2.763)
Constant			2.021 (9.738)	1.256 (8.867)
Log likelihood	-165.3	-166.1		
Wald Chi-Square (7)	105.6***	97.0***		
F (7, 127)			10.07***	9.20***
R-square	0.31	0.30	0.42	0.42

Note: All regressions estimated with robust standard errors. * implies significance at 10%; ** at 5%; *** at 1%.