

# Appendix for Online Publication

## Real Effects of Supplying Safe Private Money

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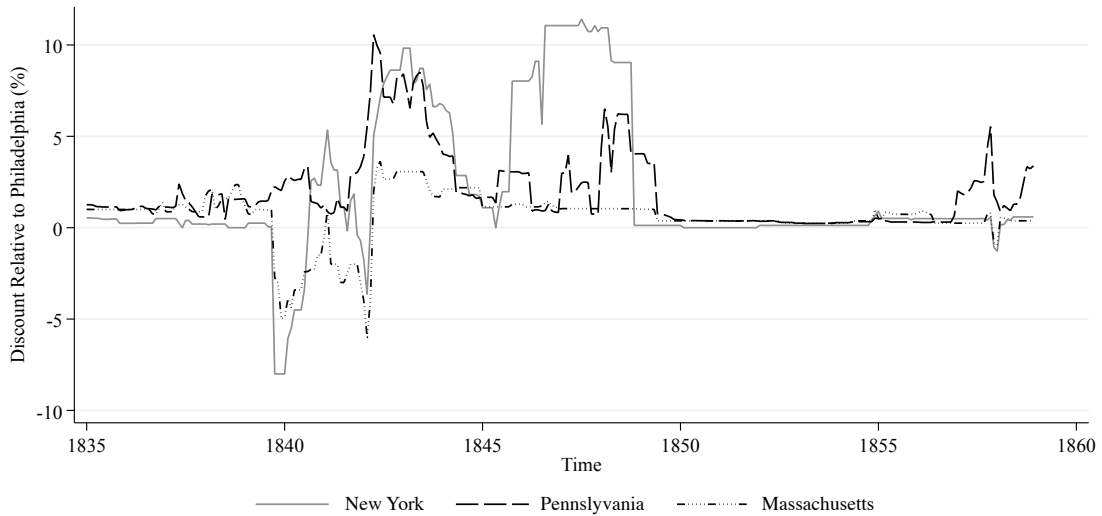
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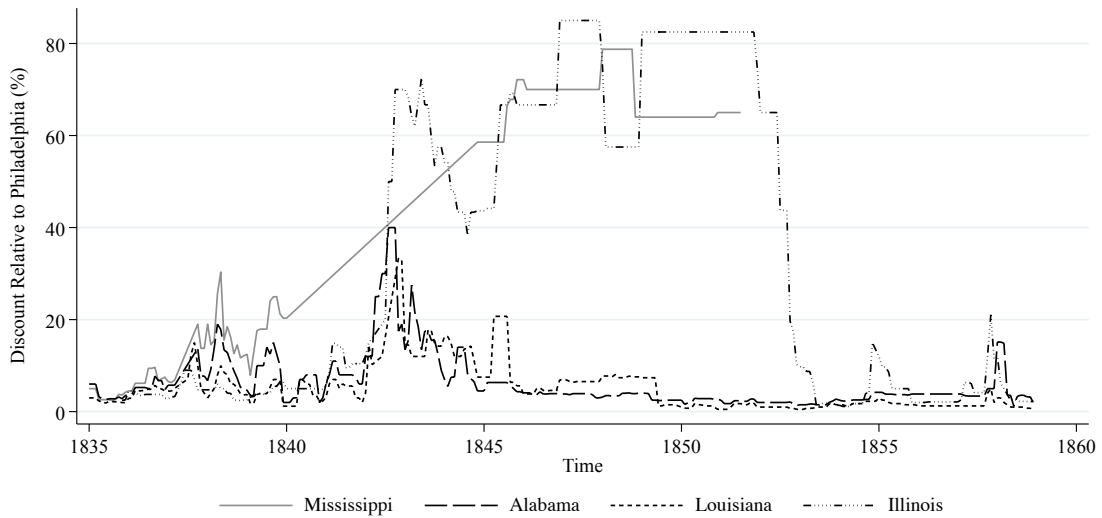
# 1 Additional Figures and Tables

Figure A.1: Discounts on state bank notes relative to Philadelphia

(a) Regions close to Philadelphia



(b) Regions far from Philadelphia



Notes: Figure A.1 plots the monthly average discounts on state bank notes from each listed state relative to banks in Philadelphia (Ales, Carapella, Maziero and Weber, 2008). States are split by region with the Northeast categorized as “Close” (Figure A.1a) and the remainder in the South and Midwest as “Far” (Figure A.1b). The original source is *Van Court’s Bank Note Reporter and Counterfeit Detector* published monthly in Philadelphia between February 1839 and December 1858.

Figure A.2: Bank note from the Pittsfield Bank in Massachusetts

(a) Bank note from the Pittsfield Bank in Massachusetts



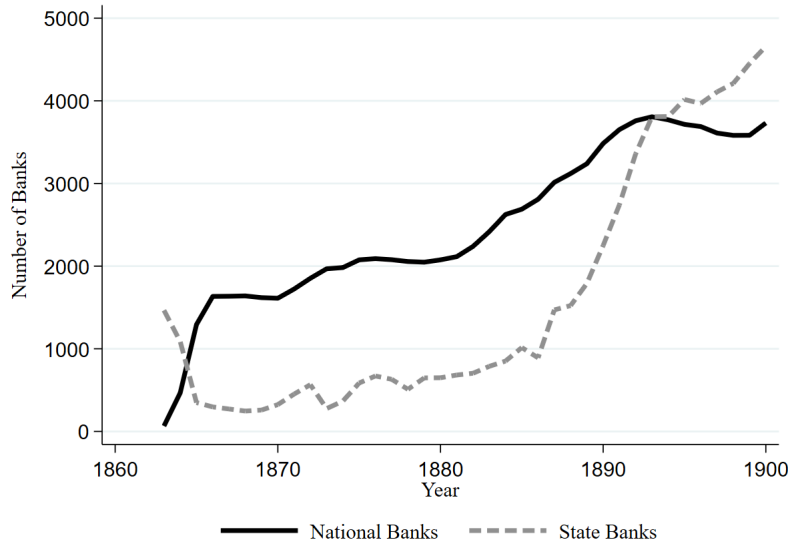
(b) Page from *Hodges' New Bank Note Safe-Guard*

4 HODGES' NEW BANK NOTE SAFE-GUARD.					
<b>IVE</b> Spread eagle and flags bearing the name of each State in the Union. <b>V</b> PITTSFIELD BANK, Pittsfield, Mass. Portrait.	<b>5</b>	<b>L</b> Female seated on a bale; steamship and sail vessels in the distance. Portrait of female. PROVINCETOWN BANK, Provincetown, Mass.	<b>50</b>	<b>100</b> Spread eagle, railroad and canal. Vulture the blacksmith. ROLLSTONE BANK, Fitchburg, Mass. Female.	<b>100</b>
<b>X</b> Portrait. Steamship. PITTSFIELD BANK, Pittsfield, Mass. Indian.	<b>TEN</b>	<b>C</b> Large Ship. PROVINCETOWN BANK, Provincetown, Mass. Large C in the middle of the bill printed in red.	<b>100</b> Sailor leaning upon a capstan.	<b>1</b> Machinery, Ship, Bee and factories. Three female figures. SALEM BANK, Salem, Mass.	<b>1</b> Portrait of Washington.
<b>20</b> Santa Claus in sleigh, drawn by reindeer over roofs of houses. PITTSFIELD BANK, Pittsfield, Mass. Indian.	<b>20</b> Portrait.	<b>ONE</b> Female seated on the ground; factory village in the distance. ROLLSTONE BANK, Fitchburg, Mass.	<b>1</b> Female and 3 cherubs.	<b>2</b> Maps, carts, fruit &c. Ship, Female Farming, Ship, Female Farming, Ship, Female Farming. SALEM BANK, Salem, Mass.	<b>TWO</b> <b>2</b> Female crowning a bust of Washington.

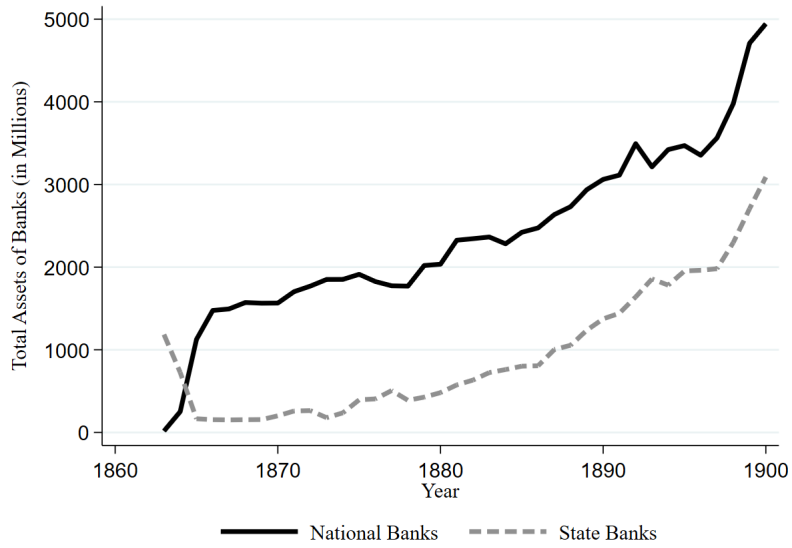
Notes: Figure A.2a gives an example of a private banknote that was printed in 1853. The note is for twenty dollars, redeemable for specie at the Pittsfield bank. Figure A.2b displays a page from the *Hodges' New Bank Note Safe-Guard*, first published in 1859. It is an example of one of the many publications dedicated in helping merchants and brokers to detect counterfeit bank notes. It describes the physical appearance of over 10,000 bank notes, “embracing every genuine note issued in the United States and Canada.” The description for the Pittsfield bank \$20 note from figure A.2a is shown in the bottom row of the first column and accurately describes the note.

Figure A.3: National and state banks 1863–1900

(a) Number of banks



(b) Total assets by bank type



Notes: Figure A.3 plots the total numbers and assets of national and state banks in the United States between 1863 and 1900. Data is obtained from EH.net operated by the Economic History Association.

Figure A.4: Exhibits of data sources

(a) Decennial Census: 1880 and 1890

MINOR CIVIL DIVISIONS.	1880.	1890.	REMARKS.
PLYMOUTH—continued.			
Marshfield town .....	1,781	1,659	
Northampton town .....	1,905	1,901	
Middleborough town .....	5,237	4,687	
Pembroke town .....	1,405	1,447	
Plymouth town .....	7,030	6,238	
Plympton town .....	694	804	
Rochester town .....	1,643	1,024	
Rockland town .....	4,553	.....	In 1874, from part of Abington.
Scituate town .....	2,460	2,350	In 1875, fr. pts. of Abington, East Bridgewater, and Brockton, and part to Brockton.
South Abington town .....	3,024	.....	
South Scituate town .....	1,820	1,661	
Wareham town .....	2,809	3,008	
West Bridgewater town .....	1,035	1,803	

(b) Annual Report of the Comptroller of Currency (1875)

**MASSACHUSETTS.**  
**Neponset National Bank, Canton.**

CHAS. H. FRENCH, *President.*                      No. 663.                      F. W. DEANE, *Cashier.*

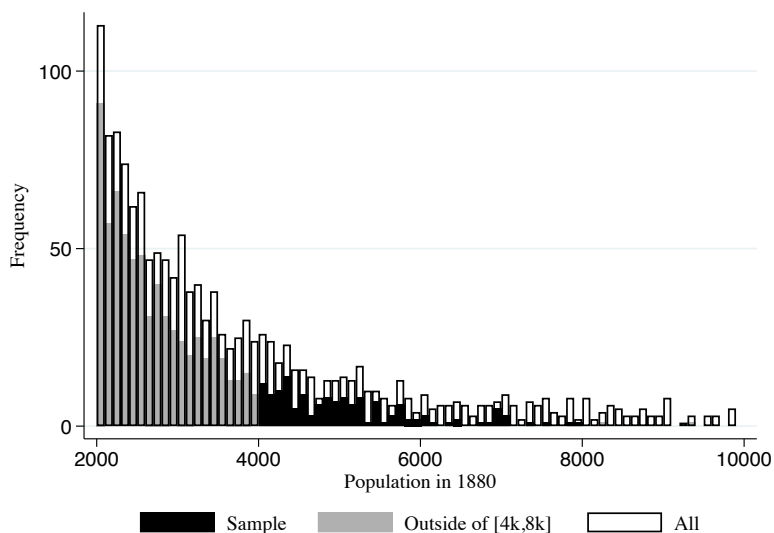
Resources.		Liabilities.	
Loans and discounts .....	\$375,351 71	Capital stock paid in .....	\$250,000 00
Overdrafts .....	501 43	Surplus fund .....	35,991 03
U. S. bonds to secure circulation .....	250,000 00	Other undivided profits .....	51,823 64
U. S. bonds to secure deposits .....	.....	National bank notes outstanding .....	218,400 00
U. S. bonds on hand .....	.....	State bank notes outstanding .....	.....
Other stocks, bonds, and mortgages .....	.....	Dividends unpaid .....	11,275 68
Due from approved reserve agents .....	5,363 50	Individual deposits .....	84,222 74
Due from other banks and bankers .....	3,200 00	United States deposits .....	.....
Real estate, furniture, and fixtures .....	.....	Deposits of U. S. disbursing officers .....	.....
Current expenses and taxes paid .....	38 00	Due to other national banks .....	.....
Premiums paid .....	.....	Due to State banks and bankers .....	.....
Checks and other cash items .....	386 78	Notes and bills re-discounted .....	.....
Exchanges for clearing house .....	.....	Bills payable .....	.....
Bills of other national banks .....	3,118 00	.....	.....
Fractional currency .....	312 69	.....	.....
Specie .....	.....	.....	.....
Legal tender notes .....	2,101 00	.....	.....
U. S. certificates of deposit .....	.....	.....	.....
Redemption fund with U. S. Treasurer .....	11,250 00	.....	.....
<b>Total .....</b>	<b>631,713 11</b>	<b>Total .....</b>	<b>651,713 11</b>

(c) The Banker's Almanac and Register (1885)

Place.	County.	Name.	No.
Mount Pulaski ..	Logan .....	Scroggin & Son .....	.....
Mount Sterling ..	Brown .....	First National Bank .....	(2402)
" ..	" .....	Glass, J. B. .....	.....
Mount Vernon ..	Jefferson .....	Mt. Vernon National Bank (1996)	.....
" ..	" .....	Evans, Wilbanks & Co. ....	.....
Moweaqua .....	Shelby .....	Snyder & Co., V. ....	.....
Murphysboro' ..	Jackson .....	Miners' Savings Bank .....	.....
Maperville .....	Du Page .....	Scott & Co., Willard .....	.....
Nashville .....	Washington ..	Washington County Bank .....	.....
Nat'l Stock Yard ..	St. Clair .....	Stock Yard Bank .....	.....
Neoga .....	Cumberland ..	Cumberland Co. Bank. (Wilson,	.....
Neponset .....	Bureau .....	Exchange Bank .....	.....
" ..	" .....	Russell, J. A. .....	.....
Newark .....	Kendall .....	Coy, John A. .....	.....
New Berlin .....	Sangamon .....	Warren, W. M. .....	.....
New Boston .....	Mercer .....	Gore, George .....	.....

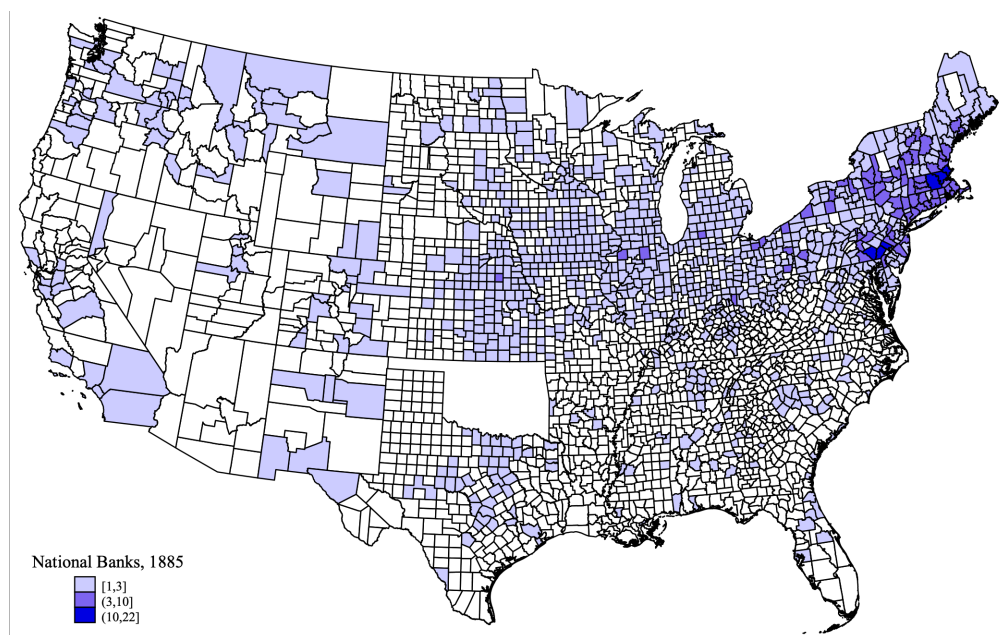
Notes: Figure A.4 displays screenshots of data sources that require hand-digitization used in this study. Figure A.4a shows the town-level population data source, A.4b shows an example from the 1875 Annual Report of the Comptroller of the Currency, where banks reported their location and balance sheet conditions. A.4c shows bank location information from the *Banker's Almanac and Register* in 1885.

Figure A.5: Distribution of town population in 1880



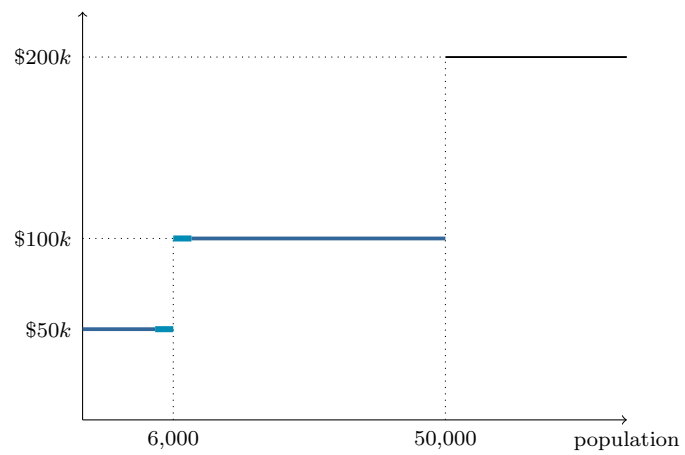
Notes: Figure A.5 plots the frequency of all towns with 2,000 to 10,000 population in 1880 census (labeled “All”), as well as after restricting the sample to having below 6,000 population in 1870 and not having a national bank in 1875 (black and gray). The final sample (black bars) consists of the subset that have population between 4,000 and 8,000 people in 1880.

Figure A.6: Distribution of national banks in 1885



Notes: Figure A.6 plots the density of the national banking network at the county level using the *Annual Report of the Comptroller of the Currency* published in 1886.

Figure A.7: National Banking Act regulatory capital requirements by population



*Notes:* Figure A.7 plots the capital that national banks incorporated in towns within each population bracket had to raise in order to obtain a charter. We focus on the first threshold around 6,000 (in dark blue), and in particular on towns within a narrow population bandwidth around the threshold (light blue).

Table A.1: Comparison of national banks and state banks

	State banks	National banks
Bank notes	various backing	backed 110% by federal bonds → uniform value
Capital requirement	low	high → more costly to establish
Monitoring	2 reports/year to state	5 reports/year to OCC → more oversight
Stability	2.5% failure rate	0.25% failure rate → more stable
Lending	no restrictions	high restrictions → less lending to farms

Notes: Table A.1 lists key distinctions between national banks and state banks. Bank failure rates are calculated for the period between 1875 and 1890.

Table A.2: First stage relationship for gaining a national bank directly

	I(National Bank)				
	(1)	(2)	(3)	(4)	(5)
I(pop<6k)	0.194* (0.104)	0.461*** (0.105)	0.458*** (0.104)	0.461*** (0.105)	0.378*** (0.103)
Δ Pop		Y	Y	Y	Y
tMA (1870)			Y	Y	Y
Railroads (1875)				Y	Y
State banks (1876)					Y
State FE	Y	Y	Y	Y	Y
F-stat	3.505	19.17	19.46	19.49	13.48
N	147	147	147	147	147

Notes: Table A.2 estimates the first stage relationship:  $I(Nationalbank_{i,s}) = \beta I(Pop1880 < 6000)_{i,s} + \Gamma' X_{i,s} + \eta_s + \varepsilon_{i,s}$  where the dependent variable is an indicator for the presence of a national bank in 1885. ΔPop refers to the population change from 1870 to 1880. The log of transport market access cost (tMA) is calculated in 1870, and the number of railroads and state banks are measured in 1875 and 1876, respectively. Regressions are weighted by the share of the town population that is within our relevant sample for the instrument within each county. The F-stat is the first stage KP F. State FEs are included in all specifications, and standard errors are clustered by county. \* p<0.1, \*\* p<0.05, \*\*\* p<0.01.



Table A.3: First stage relationship for different values of  $\theta$ 

	$\Delta\text{MMA} (\theta = 4)$		$\Delta\text{MMA} (\theta = 1)$		$\Delta\text{MMA} (\theta = 2)$		$\Delta\text{MMA} (\theta = 8)$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\mathbb{I}(\text{pop}<6\text{k})$	0.715*** (0.264)	0.619*** (0.200)	0.717*** (0.258)	0.622*** (0.199)	0.720*** (0.260)	0.624*** (0.200)	0.684** (0.272)	0.575*** (0.194)
$\Delta$ Pop	Y	Y	Y	Y	Y	Y	Y	Y
Controls		Y		Y		Y		Y
State FE	Y	Y	Y	Y	Y	Y	Y	Y
$F$ -stat	7.353	9.583	7.738	9.808	7.650	9.780	6.309	8.815
N	147	147	147	147	147	147	147	147

Notes: Table A.3 estimates the first stage relationship:  $\Delta\text{MMA} = \beta\mathbb{I}(\text{Pop1880} < 6000)_{i,s} + \Gamma' X_{i,s} + \eta_s + \varepsilon_{i,s}$ .  $\Delta\text{MMA}$  is the log difference in monetary market access between 1885 and 1875, calculated according to Equation 1. Column headers denote the parameterization of  $\theta$  that we use to calculate MMA in 1875 and 1885.  $\Delta\text{Pop}$  refers to the population change from 1870 to 1880. The vector of control variables includes the log of transport market access cost (tMA) is calculated in 1870, and the number of railroads and state banks are measured in 1875 and 1876, respectively. Regressions are weighted by the share of the town population that is within our relevant sample for the instrument within each county. The  $F$ -stat is the first stage KP  $F$ . State FEs are included in all specifications, and standard errors are clustered by county. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table A.4: First stage relationship for  $\Delta\text{MMA}_{\text{rail80}}$ 

	$\Delta\text{MMA}$				
	(1)	(2)	(3)	(4)	(5)
$\mathbb{I}(\text{pop}<6\text{k})$	0.585 (0.375)	1.359*** (0.422)	1.104*** (0.288)	1.109*** (0.288)	0.978*** (0.247)
$\Delta$ Pop		Y	Y	Y	Y
tMA (1870)			Y	Y	Y
Railroads (1875)				Y	Y
State banks (1876)					Y
State FE	Y	Y	Y	Y	Y
$F$ -stat	2.425	10.39	14.73	14.80	15.74
N	147	147	147	147	147

Notes: Table A.4 estimates the first stage relationship:  $\Delta\text{MMA} = \beta\mathbb{I}(\text{Pop1880} < 6000)_{i,s} + \Gamma' X_{i,s} + \eta_s + \varepsilon_{i,s}$ .  $\Delta\text{MMA}$  is the log difference in monetary market access between 1885 and 1875, calculated according to Equation 1 where we allow physical transport costs to vary at each decade instead of holding it fixed to the 1870 levels.  $\Delta\text{Pop}$  refers to the population change from 1870 to 1880. The log of transport market access cost (tMA) is calculated in 1870, and the number of railroads and state banks are measured in 1875 and 1876, respectively. Regressions are weighted by the share of the town population that is within our relevant sample for the instrument within each county. The  $F$ -stat is the first stage KP  $F$ . State FEs are included in all specifications, and standard errors are clustered by county. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table A.5: First stage relationship between population threshold and  $\Delta\text{MMA}$

	$\Delta\text{MMA}$							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\mathbb{I}(\text{pop}<6\text{k})$	0.406*	0.715***	0.634***	0.640***	0.619***	0.446***	0.623***	0.447**
	(0.223)	(0.264)	(0.207)	(0.207)	(0.200)	(0.169)	(0.202)	(0.173)
$\Delta\text{Pop}$		Y	Y	Y	Y	Y	Y	Y
tMA (1870)			Y	Y	Y	Y	Y	Y
Railroads (1875)				Y	Y	Y	Y	Y
State banks (1876)					Y	Y	Y	Y
Loans <sub>o</sub> (1885)						Y		Y
Loans <sub>d</sub> (1885)							Y	Y
State FE	Y	Y	Y	Y	Y	Y	Y	Y
$F$ -stat	3.296	7.353	9.413	9.565	9.583	6.948	9.520	6.697
N	147	147	147	147	147	147	147	147

*Notes:* Table A.5 estimates the first stage relationship:  $\Delta\text{MMA} = \beta\mathbb{I}(\text{Pop1880} < 6000)_{i,s} + \Gamma'X_{i,s} + \eta_s + \varepsilon_{i,s}$ .  $\Delta\text{MMA}$  is the log difference in monetary market access between 1885 and 1875.  $\Delta\text{Pop}$  refers to the population change from 1870 to 1880. The log of transport market access cost (tMA) is calculated in 1870, and the number of railroads and state banks are measured in 1875 and 1876, respectively. The control variable for “Loans<sub>o</sub>” is the log value of lending by national banks in 1885. The control variable “Loans<sub>d</sub>” is the average change in log lending by national banks at destinations, with destinations weighted by physical transport proximity. Regressions are weighted by the share of the town population that is within our relevant sample for the instrument within each county. The  $F$ -stat is the first stage KP  $F$ . State FEs are included in all specifications, and standard errors are clustered by county. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table A.6: Robustness for tradables output

	$\theta = 1$	$\theta = 2$	$\theta = 4$	$\theta = 8$	Unweighted	$\widehat{\Delta MMA}_{rail80}$
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{\Delta MMA}$	115.3** (50.74)	115.8** (50.83)	116.7** (50.91)	125.5** (53.18)	202.5** (89.15)	130.7* (71.87)
CLR [95% CI] ( <i>p-value</i> )	[15.73, 651.33] (0.04)	[15.71, 646.05] (0.04)	[15.63, 642.14] (0.04)	[16.40, 693.98] (0.04)	[15.63, 642.14] (0.04)	[13.72, 608.72] (0.04)
State FE	Y	Y	Y	Y	Y	Y
$\Delta Pop$	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Loans <sub>o</sub>	Y	Y	Y	Y	Y	Y
Loans <sub>d</sub>	Y	Y	Y	Y	Y	Y
Mean of Dep. Var.	775.6	775.6	775.6	775.6	775.6	775.6
N	147	147	147	147	147	147

*Notes:* Table A.6 presents the instrumented second stage of the regression in Equation 3 where the dependent variable is the change in per capita (male population over age 21) value of total manufacturing and agricultural production from 1880 to 1890. The vector of control variables includes the number of railroads and state banks measured in 1875 and 1876, respectively, and the log value of transport market access in 1870. The control variable for “Loans<sub>o</sub>” is the log value of lending by national banks in 1885. The control variable “Loans<sub>d</sub>” is the average change in log lending by national banks at destinations, with destinations weighted by physical transport proximity.  $\Delta Pop$  refers to the population change from 1870 to 1880.  $\widehat{\Delta MMA}$  is the log change in MMA from 1875 to 1885, calculated according to Equation 1 where we parameterize  $\theta$  to values of 1 (column 1), 2 (column 2), 4 (column 3), and 8 (column 4). Regressions are weighted by the share of town population within a county in all columns except 5. In column 5, we present the unweighted regression. In column 6,  $\widehat{\Delta MMA}_{rail80}$  is the log difference in monetary market access between 1885 and 1875, calculated according to Equation 1 where we allow physical transport costs to vary at each decade instead of holding it fixed to the 1870 levels. We also calculate CLR confidence intervals from Moreira (2003), which we report at the 95% level in brackets along with their *p*-value of significance in italicized parentheses. All specifications include state fixed effects, and standard errors in parentheses below the coefficients are clustered by county. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table A.7: Robustness for commodities share

	$\theta = 1$	$\theta = 2$	$\theta = 4$	$\theta = 8$	Unweighted	$\widehat{\Delta MMA}_{rail80}$
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{\Delta MMA}$	0.0213** (0.00924)	0.0214** (0.00923)	0.0216** (0.00913)	0.0232** (0.00914)	0.0400* (0.0205)	0.0242* (0.0131)
CLR [95% CI] ( <i>p-value</i> )	[0.00, 0.12] ( <i>0.06</i> )	[0.00, 0.12] ( <i>0.06</i> )	[0.00, 0.12] ( <i>0.06</i> )	[0.00, 0.13] ( <i>0.06</i> )	[0.00, 0.12] ( <i>0.06</i> )	[0.00, 0.12] ( <i>0.06</i> )
State FE	Y	Y	Y	Y	Y	Y
$\Delta Pop$	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Loans <sub>o</sub>	Y	Y	Y	Y	Y	Y
Loans <sub>d</sub>	Y	Y	Y	Y	Y	Y
Mean of Dep. Var.	0.905	0.905	0.905	0.905	0.905	0.905
N	147	147	147	147	147	147

*Notes:* Table A.7 presents the instrumented second stage of the regression in Equation 3 where the dependent variable is the share of commodities production from 1880 to 1890. The vector of control variables includes the number of railroads and state banks measured in 1875 and 1876, respectively, and the log value of transport market access in 1870. The control variable for “Loans<sub>o</sub>” is the log value of lending by national banks in 1885. The control variable “Loans<sub>d</sub>” is the average change in log lending by national banks at destinations, with destinations weighted by physical transport proximity.  $\Delta Pop$  refers to the population change from 1870 to 1880.  $\widehat{\Delta MMA}$  is the log change in MMA from 1875 to 1885, calculated according to Equation 1 where we parameterize  $\theta$  to values of 1 (column 1), 2 (column 2), 4 (column 3), and 8 (column 4). Regressions are weighted by the share of town population within a county in all columns except 5. In column 5, we present the unweighted regression. In column 6,  $\Delta MMA_{rail80}$  is the log difference in monetary market access between 1885 and 1875, calculated according to Equation 1 where we allow physical transport costs to vary at each decade instead of holding it fixed to the 1870 levels. We also calculate CLR confidence intervals from Moreira (2003), which we report at the 95% level in brackets along with their *p*-value of significance in italicized parentheses. All specifications include state fixed effects, and standard errors in parentheses below the coefficients are clustered by county. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table A.8: Robustness for manufacturing production

	$\theta = 1$	$\theta = 2$	$\theta = 4$	$\theta = 8$	Unweighted	$\widehat{\Delta MMA}_{rail80}$
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{\Delta MMA}$	118.1** (49.47)	118.6** (49.57)	119.5** (49.77)	128.5** (52.54)	217.0** (92.02)	133.9* (69.91)
CLR [95% CI] ( <i>p-value</i> )	[29.59, 694.23] (0.03)	[29.56, 688.55] (0.03)	[29.38, 685.17] (0.03)	[30.64, 745.05] (0.03)	[29.38, 685.17] (0.03)	[26.19, 639.34] (0.03)
State FE	Y	Y	Y	Y	Y	Y
$\Delta$ Pop	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Loans <sub>o</sub>	Y	Y	Y	Y	Y	Y
Loans <sub>d</sub>	Y	Y	Y	Y	Y	Y
Mean of Dep. Var.	626.4	626.4	626.4	626.4	626.4	626.4
N	147	147	147	147	147	147

*Notes:* Table A.8 presents the instrumented second stage of the regression in Equation 3 where the dependent variable is the change in per capita (male population over age 21) manufacturing production from 1880 to 1890. The vector of control variables includes the number of railroads and state banks measured in 1875 and 1876, respectively, and the log value of transport market access in 1870. The control variable for “Loans<sub>o</sub>” is the log value of lending by national banks in 1885. The control variable “Loans<sub>d</sub>” is the average change in log lending by national banks at destinations, with destinations weighted by physical transport proximity.  $\Delta$ Pop refers to the population change from 1870 to 1880.  $\widehat{\Delta MMA}$  is the log change in MMA from 1875 to 1885, calculated according to Equation 1 where we parameterize  $\theta$  to values of 1 (column 1), 2 (column 2), 4 (column 3), and 8 (column 4). Regressions are weighted by the share of town population within a county in all columns except 5. In column 5, we present the unweighted regression. In column 6,  $\widehat{\Delta MMA}_{rail80}$  is the log difference in monetary market access between 1885 and 1875, calculated according to Equation 1 where we allow physical transport costs to vary at each decade instead of holding it fixed to the 1870 levels. We also calculate CLR confidence intervals from Moreira (2003), which we report at the 95% level in brackets along with their *p*-value of significance in italicized parentheses. All specifications include state fixed effects, and standard errors in parentheses below the coefficients are clustered by county. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table A.9: Robustness for manufacturing inputs

	$\theta = 1$	$\theta = 2$	$\theta = 4$	$\theta = 8$	Unweighted	$\widehat{\Delta MMA}_{rail80}$
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{\Delta MMA}$	68.40*** (25.37)	68.66*** (25.40)	69.23*** (25.44)	74.44*** (26.64)	108.5** (49.86)	77.53** (36.50)
CLR [95% CI] ( <i>p-value</i> )	[-1.41, 357.03] (0.05)	[-1.41, 353.75] (0.05)	[-1.41, 350.83] (0.05)	[-1.48, 377.76] (0.05)	[-1.41, 350.83] (0.05)	[-1.24, 329.91] (0.05)
State FE	Y	Y	Y	Y	Y	Y
$\Delta$ Pop	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Loans <sub>o</sub>	Y	Y	Y	Y	Y	Y
Loans <sub>d</sub>	Y	Y	Y	Y	Y	Y
Mean of Dep. Var.	380.9	380.9	380.9	380.9	380.9	380.9
N	147	147	147	147	147	147

*Notes:* Table A.9 presents the instrumented second stage of the regression in Equation 3 where the dependent variable is the change in per capita (male population over age 21) manufacturing inputs usage from 1880 to 1890. The vector of control variables includes the number of railroads and state banks measured in 1875 and 1876, respectively, and the log value of transport market access in 1870. The control variable for “Loans” is the log value of lending by national banks in 1885.  $\Delta$ Pop refers to the population change from 1870 to 1880.  $\widehat{\Delta MMA}$  is the log change in MMA from 1875 to 1885, calculated according to Equation 1 where we parameterize  $\theta$  to values of 1 (column 1), 2 (column 2), 4 (column 3), and 8 (column 4). Regressions are weighted by the share of town population within a county in all columns except 5. In column 5, we present the unweighted regression. In column 6,  $\widehat{\Delta MMA}_{rail80}$  is the log difference in monetary market access between 1885 and 1875, calculated according to Equation 1 where we allow physical transport costs to vary at each decade instead of holding it fixed to the 1870 levels. We also calculate CLR confidence intervals from Moreira (2003), which we report at the 95% level in brackets along with their *p*-value of significance in italicized parentheses. All specifications include state fixed effects, and standard errors in parentheses below the coefficients are clustered by county. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table A.10: Robustness for manufacturing capital

	$\theta = 1$	$\theta = 2$	$\theta = 4$	$\theta = 8$	Unweighted	$\widehat{\Delta MMA}_{rail80}$
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{\Delta MMA}$	5.998 (66.62)	6.036 (67.03)	6.132 (68.06)	6.727 (74.51)	17.76 (111.3)	6.809 (76.21)
CLR [95% CI] ( <i>p-value</i> )	[-306.95, 229.50] (0.86)	[-309.41, 230.23] (0.86)	[-321.80, 233.80] (0.86)	[-398.15, 254.96] (0.86)	[-321.80, 233.80] (0.86)	[-230.61, 241.99] (0.86)
State FE	Y	Y	Y	Y	Y	Y
$\Delta Pop$	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Loans <sub>o</sub>	Y	Y	Y	Y	Y	Y
Mean of Dep. Var.	373.2	373.2	373.2	373.2	373.2	373.2
N	147	147	147	147	147	147

*Notes:* Table A.10 presents the instrumented second stage of the regression in Equation 3 where the dependent variable is the change in per capita (male population over age 21) manufacturing capital from 1880 to 1890. The vector of control variables includes the number of railroads and state banks measured in 1875 and 1876, respectively, and the log value of transport market access in 1870. The control variable for “Loans<sub>o</sub>” is the log value of lending by national banks in 1885. The control variable “Loans<sub>d</sub>” is the average change in log lending by national banks at destinations, with destinations weighted by physical transport proximity.  $\Delta Pop$  refers to the population change from 1870 to 1880.  $\widehat{\Delta MMA}$  is the log change in MMA from 1875 to 1885, calculated according to Equation 1 where we parameterize  $\theta$  to values of 1 (column 1), 2 (column 2), 4 (column 3), and 8 (column 4). Regressions are weighted by the share of town population within a county in all columns except 5. In column 5, we present the unweighted regression. In column 6,  $\widehat{\Delta MMA}_{rail80}$  is the log difference in monetary market access between 1885 and 1875, calculated according to Equation 1 where we allow physical transport costs to vary at each decade instead of holding it fixed to the 1870 levels. We also calculate CLR confidence intervals from Moreira (2003), which we report at the 95% level in brackets along with their *p*-value of significance in italicized parentheses. All specifications include state fixed effects, and standard errors in parentheses below the coefficients are clustered by county. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table A.11: Robustness for manufacturing production share

	$\theta = 1$	$\theta = 2$	$\theta = 4$	$\theta = 8$	Unweighted	$\widehat{\Delta MMA}_{rail80}$
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{\Delta MMA}$	0.0683** (0.0306)	0.0685** (0.0308)	0.0691** (0.0311)	0.0743** (0.0339)	0.0379 (0.0367)	0.0774* (0.0412)
CLR [95% CI] ( <i>p-value</i> )	[-0.12, 0.16] (0.50)	[-0.12, 0.16] (0.50)	[-0.12, 0.16] (0.50)	[-0.13, 0.17] (0.50)	[-0.12, 0.16] (0.50)	[-0.10, 0.15] (0.50)
State FE	Y	Y	Y	Y	Y	Y
$\Delta Pop$	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Loans <sub>o</sub>	Y	Y	Y	Y	Y	Y
Loans <sub>d</sub>	Y	Y	Y	Y	Y	Y
Mean of Dep. Var.	0.721	0.721	0.721	0.721	0.721	0.721
N	147	147	147	147	147	147

*Notes:* Table A.11 presents the instrumented second stage of the regression in Equation 3 where the dependent variable is the change in the manufacturing share of employment (calculated as the share of manufacturing employment in male population over age 21) from 1880 to 1890. The vector of control variables includes the number of railroads and state banks measured in 1875 and 1876, respectively, and the log value of transport market access in 1870. The control variable for “Loans<sub>o</sub>” is the log value of lending by national banks in 1885. The control variable “Loans<sub>d</sub>” is the average change in log lending by national banks at destinations, with destinations weighted by physical transport proximity.  $\Delta Pop$  refers to the population change from 1870 to 1880.  $\widehat{\Delta MMA}$  is the log change in MMA from 1875 to 1885, calculated according to Equation 1 where we parameterize  $\theta$  to values of 1 (column 1), 2 (column 2), 4 (column 3), and 8 (column 4). Regressions are weighted by the share of town population within a county in all columns except 5. In column 5, we present the unweighted regression. In column 6,  $\widehat{\Delta MMA}_{rail80}$  is the log difference in monetary market access between 1885 and 1875, calculated according to Equation 1 where we allow physical transport costs to vary at each decade instead of holding it fixed to the 1870 levels. We also calculate CLR confidence intervals from Moreira (2003), which we report at the 95% level in brackets along with their *p*-value of significance in italicized parentheses. All specifications include state fixed effects, and standard errors in parentheses below the coefficients are clustered by county. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table A.12: Robustness for manufacturing employment share

	$\theta = 1$	$\theta = 2$	$\theta = 4$	$\theta = 8$	Unweighted	$\widehat{\Delta MMA}_{rail80}$
	(1)	(2)	(3)	(4)	(5)	(6)
$\widehat{\Delta MMA}$	0.0981*** (0.0325)	0.0984*** (0.0325)	0.0992*** (0.0326)	0.107*** (0.0348)	0.107** (0.0512)	0.111*** (0.0398)
CLR [95% CI] ( <i>p-value</i> )	[-0.01, 0.34] (0.07)	[-0.01, 0.34] (0.07)	[-0.01, 0.33] (0.07)	[-0.01, 0.36] (0.07)	[-0.01, 0.33] (0.07)	[-0.01, 0.30] (0.07)
State FE	Y	Y	Y	Y	Y	Y
$\Delta Pop$	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y
Loans <sub>o</sub>	Y	Y	Y	Y	Y	Y
Loans <sub>d</sub>	Y	Y	Y	Y	Y	Y
Mean of Dep. Var.	0.329	0.329	0.329	0.329	0.329	0.329
N	147	147	147	147	147	147

*Notes:* Table A.12 presents the instrumented second stage of the regression in Equation 3 where the dependent variable is the change in the manufacturing share of employment (calculated as the share of manufacturing employment in male population over age 21) from 1880 to 1890. The vector of control variables includes the number of railroads and state banks measured in 1875 and 1876, respectively, and the log value of transport market access in 1870. The control variable for “Loans<sub>o</sub>” is the log value of lending by national banks in 1885. The control variable “Loans<sub>d</sub>” is the average change in log lending by national banks at destinations, with destinations weighted by physical transport proximity.  $\Delta Pop$  refers to the population change from 1870 to 1880.  $\widehat{\Delta MMA}$  is the log change in MMA from 1875 to 1885, calculated according to Equation 1 where we parameterize  $\theta$  to values of 1 (column 1), 2 (column 2), 4 (column 3), and 8 (column 4). Regressions are weighted by the share of town population within a county in all columns except 5. In column 5, we present the unweighted regression. In column 6,  $\widehat{\Delta MMA}_{rail80}$  is the log difference in monetary market access between 1885 and 1875, calculated according to Equation 1 where we allow physical transport costs to vary at each decade instead of holding it fixed to the 1870 levels. We also calculate CLR confidence intervals from Moreira (2003), which we report at the 95% level in brackets along with their *p*-value of significance in italicized parentheses. All specifications include state fixed effects, and standard errors in parentheses below the coefficients are clustered by county. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .



Table A.13: Robustness for traded output (1880 – 1890)

	Tradeables production				Commodities share			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta\text{MMA}_{-O}$	44.04 (26.82)	45.09* (24.76)	51.02** (25.01)	41.98* (23.30)	0.0191*** (0.00688)	0.0142** (0.00660)	0.0136** (0.00651)	0.0146** (0.00678)
$\Delta\text{MMA}_{-od25}$	45.84* (26.98)	49.42* (25.33)	56.21** (25.60)	46.01* (23.81)	0.0194*** (0.00691)	0.0149** (0.00680)	0.0144** (0.00674)	0.0154** (0.00702)
$\Delta\text{MMA}_{-od50}$	41.33 (27.34)	43.06* (25.52)	49.57* (26.02)	39.99 (24.09)	0.0186*** (0.00688)	0.0138** (0.00667)	0.0133* (0.00667)	0.0142** (0.00687)
$\Delta\text{MMA}_{-od100}$	41.31 (27.43)	43.04* (25.63)	49.52* (26.14)	39.95 (24.21)	0.0186*** (0.00689)	0.0138** (0.00670)	0.0133* (0.00670)	0.0142** (0.00690)
State FE	Y	Y	Y	Y	Y	Y	Y	Y
Controls		Y	Y	Y		Y	Y	Y
Loans <sub>o</sub>			Y				Y	
Loans <sub>d</sub>				Y				Y
Mean of Dep. Var.	775.6	775.6	775.6	775.6	0.905	0.905	0.905	0.905
N	147	147	147	147	147	147	147	147

*Notes:* Table A.13 presents the OLS results where we adopt new measures of  $\Delta\text{MMA}$ . The independent variable  $\Delta\text{MMA}_{-O}$  is the log change in MMA from 1875 to 1885, calculated according to Equation 1 and based on changes outside a location assuming that its own national bank status does not change.  $\Delta\text{MMA}_{-od25}$ ,  $\Delta\text{MMA}_{-od50}$ , and  $\Delta\text{MMA}_{-od100}$  are the changes outside a location with distance variation assuming that its own national bank status does not change, separately excluding the changes to national banks in counties within the 25, 50, and 100 mile ranges. The inputs to MMA are bilateral transport costs measured in 1870 using the measures from [Donaldson and Hornbeck \(2016\)](#), populations in 1870 and 1880 from the respective censuses of population, and the locations of national banks in 1885 from the *Annual Reports of the Comptroller of the Currency*. There are no national banks in the locations in our sample in 1875 by construction. We use  $\theta = 4$ . All regressions include state fixed effects. The vector of control variables includes the number of railroads and state banks measured in 1875 and 1876, respectively, and the log value of transport market access in 1870. The control variable for “Loans<sub>o</sub>” is the log value of lending by national banks in 1885. The control variable “Loans<sub>d</sub>” is the average change in log lending by national banks at destinations, with destinations weighted by physical transport proximity. We report the mean of the dependent variable measured in 1880. Regressions are weighted by the share of town population within a county, and standard errors are clustered at the county level. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table A.14: Robustness for manufacturing sector production (1880 – 1890)

	Manu production share				Manu employment share			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta\text{MMA}_{-O}$	0.0173 (0.0159)	0.0532*** (0.0190)	0.0595*** (0.0219)	0.0543*** (0.0190)	0.0284** (0.0142)	0.0267* (0.0143)	0.0283** (0.0141)	0.0258* (0.0138)
$\Delta\text{MMA}_{-od25}$	0.0205 (0.0159)	0.0590*** (0.0188)	0.0665*** (0.0218)	0.0604*** (0.0188)	0.0298** (0.0142)	0.0290* (0.0147)	0.0311** (0.0145)	0.0282* (0.0143)
$\Delta\text{MMA}_{-od50}$	0.0192 (0.0156)	0.0568*** (0.0186)	0.0648*** (0.0218)	0.0580*** (0.0186)	0.0284** (0.0140)	0.0273* (0.0143)	0.0295** (0.0142)	0.0265* (0.0138)
$\Delta\text{MMA}_{-od100}$	0.0191 (0.0156)	0.0568*** (0.0186)	0.0647*** (0.0219)	0.0579*** (0.0187)	0.0284** (0.0141)	0.0273* (0.0143)	0.0294** (0.0142)	0.0265* (0.0138)
State FE	Y	Y	Y	Y	Y	Y	Y	Y
Controls		Y	Y	Y		Y	Y	Y
Loans <sub>o</sub>			Y				Y	
Loans <sub>d</sub>				Y				Y
Mean of Dep. Var.	0.721	0.721	0.721	0.721	0.329	0.329	0.329	0.329
N	147	147	147	147	147	147	147	147

*Notes:* Table A.14 presents the OLS results where we adopt new measures of  $\Delta\text{MMA}$ . The independent variable  $\Delta\text{MMA}_{-O}$  is the log change in MMA from 1875 to 1885, calculated according to Equation 1 and based on changes outside a location assuming that its own national bank status does not change.  $\Delta\text{MMA}_{-od25}$ ,  $\Delta\text{MMA}_{-od50}$ , and  $\Delta\text{MMA}_{-od100}$  are the changes outside a location with distance variation assuming that its own national bank status does not change, separately excluding the changes to national banks in counties within the 25, 50, and 100 mile ranges. The inputs to MMA are bilateral transport costs measured in 1870 using the measures from Donaldson and Hornbeck (2016), populations in 1870 and 1880 from the respective censuses of population, and the locations of national banks in 1885 from the *Annual Reports of the Comptroller of the Currency*. There are no national banks in the locations in our sample in 1875 by construction. We use  $\theta = 4$ . All regressions include state fixed effects. The vector of control variables includes the number of railroads and state banks measured in 1875 and 1876, respectively, and the log value of transport market access in 1870. The control variable for “Loans<sub>o</sub>” is the log value of lending by national banks in 1885. The control variable “Loans<sub>d</sub>” is the average change in log lending by national banks at destinations, with destinations weighted by physical transport proximity. We report the mean of the dependent variable measured in 1880. Regressions are weighted by the share of town population within a county, and standard errors are clustered at the county level. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table A.15: Robustness for structural transformation (1880 – 1890)

	Manu production				Manu inputs			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
$\Delta\text{MMA}_{-O}$	38.69 (24.67)	41.63* (23.14)	48.64** (24.46)	39.84* (22.24)	24.56 (14.92)	23.15 (14.29)	25.40* (14.83)	23.43 (14.13)
$\Delta\text{MMA}_{-od25}$	41.56* (24.57)	47.33** (23.31)	55.43** (24.68)	45.42** (22.34)	26.08* (14.94)	26.01* (14.51)	28.78* (15.09)	26.39* (14.34)
$\Delta\text{MMA}_{-od50}$	37.63 (24.90)	41.92* (23.48)	49.94** (25.10)	40.17* (22.61)	24.85* (14.73)	24.48* (14.17)	27.37* (14.92)	24.78* (14.03)
$\Delta\text{MMA}_{-od100}$	37.57 (24.98)	41.86* (23.59)	49.83* (25.20)	40.09* (22.71)	24.82* (14.77)	24.43* (14.22)	27.31* (14.96)	24.73* (14.08)
State FE	Y	Y	Y	Y	Y	Y	Y	Y
Controls		Y	Y	Y		Y	Y	Y
Loans <sub>o</sub>			Y				Y	
Loans <sub>d</sub>				Y				Y
Mean of Dep. Var.	626.4	626.4	626.4	626.4	380.9	380.9	380.9	380.9
N	147	147	147	147	147	147	147	147

*Notes:* Table A.15 presents the OLS results where we adopt new measures of  $\Delta\text{MMA}$ . The independent variable  $\Delta\text{MMA}_{-O}$  is the log change in MMA from 1875 to 1885, calculated according to Equation 1 and based on changes outside a location assuming that its own national bank status does not change.  $\Delta\text{MMA}_{-od25}$ ,  $\Delta\text{MMA}_{-od50}$ , and  $\Delta\text{MMA}_{-od100}$  are the changes outside a location with distance variation assuming that its own national bank status does not change, separately excluding the changes to national banks in counties within the 25, 50, and 100 mile ranges. The inputs to MMA are bilateral transport costs measured in 1870 using the measures from [Donaldson and Hornbeck \(2016\)](#), populations in 1870 and 1880 from the respective censuses of population, and the locations of national banks in 1885 from the *Annual Reports of the Comptroller of the Currency*. There are no national banks in the locations in our sample in 1875 by construction. We use  $\theta = 4$ . All regressions include state fixed effects. The vector of control variables includes the number of railroads and state banks measured in 1875 and 1876, respectively, and the log value of transport market access in 1870. The control variable for “Loans<sub>o</sub>” is the log value of lending by national banks in 1885. The control variable “Loans<sub>d</sub>” is the average change in log lending by national banks at destinations, with destinations weighted by physical transport proximity. We report the mean of the dependent variable measured in 1880. Regressions are weighted by the share of town population within a county, and standard errors are clustered at the county level. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

Table A.16: Robustness: higher order polynomial controls for change in population

	Tradables production		Commodities share		Manu prod		Manu inputs		Manu prod share		Manu employ share	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<b>OLS</b>												
$\Delta\widehat{MMA}$	83.48*** (19.43)	84.38*** (19.39)	0.0211*** (0.00609)	0.0210*** (0.00628)	83.58*** (17.87)	85.26*** (17.09)	44.76*** (11.10)	45.97*** (10.61)	0.0828*** (0.0149)	0.0829*** (0.0152)	0.0542*** (0.0119)	0.0554*** (0.0115)
<b>IV: Second Stage</b>												
$\Delta\widehat{MMA}$	113.0** (48.68)	109.5** (45.66)	0.0209** (0.00882)	0.0212** (0.00845)	115.8** (47.56)	110.0** (44.16)	66.72*** (24.42)	62.58*** (22.73)	0.0652** (0.0289)	0.0655** (0.0284)	0.0944*** (0.0303)	0.0897*** (0.0277)
State FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Loans <sub>o</sub>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Loans <sub>d</sub>	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Polynomial order	2nd	3rd	2nd	3rd	2nd	3rd	2nd	3rd	2nd	3rd	2nd	3rd
Mean of Dep. Var.	775.6	775.6	0.905	0.905	626.4	626.4	380.9	380.9	0.721	0.721	0.329	0.329
N	147	147	147	147	147	147	147	147	147	147	147	147

*Notes:* Table A.16 presents the OLS (panel 1) and instrumented second stage of the regression in Equation 3 (panel 2) controlling for higher degree polynomials of the population change from 1870 to 1880. Odd numbered columns control for second-order polynomials and even numbered columns control for third-order polynomials. The independent variable  $\Delta\widehat{MMA}$  is the log change in MMA from 1875 to 1885, calculated according to Equation 1. The inputs to MMA are bilateral transport costs measured in 1870 using the measures from Donaldson and Hornbeck (2016), populations in 1870 and 1880 from the respective censuses of population, and the locations of national banks in 1885 from the *Annual Reports of the Comptroller of the Currency*. There are no national banks in the locations in our sample in 1875 by construction. We use  $\theta = 4$  in our baseline measure. All regressions include state fixed effects. The vector of control variables includes the number of railroads and state banks measured in 1875 and 1876, respectively, and the log value of transport market access in 1870. The control variable for “Loans<sub>o</sub>” is the log value of lending by national banks in 1885. The control variable “Loans<sub>d</sub>” is the average change in log lending by national banks at destinations, with destinations weighted by physical transport proximity. The dependent variable in columns 1 and 2 is the change in per capita (male population over age 21) value of total manufacturing and agricultural production from 1880 to 1890 is the change in per capita (male population over age 21) manufacturing production; in columns 3 and 4 it is the share of agricultural production in commodity goods measured in terms of acreage of farmland used. The dependent variable in columns 5 and 6 is manufacturing production per capita (male population over age 21); in columns 7 and 8 it is the manufacturing inputs (columns 7 and 8) per capita (10 is the change in the share of production in the manufacturing secf the dependent variable meassions are weighted by the share of town population within a county, and standard errors are clustered at the county level. \* p<0.1, \*\* p<0.05, \*\*\* p<0.01.

Table A.17: Robustness: different configurations of control variables

	Tradables production		Commodities share		Manu prod		Manu inputs		Manu prod share		Manu employ share	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
<b>OLS</b>												
$\Delta MMA$	80.21*** (21.60)	58.42*** (20.24)	0.0208*** (0.00613)	0.0179*** (0.00550)	80.84*** (19.54)	56.94*** (17.97)	43.53*** (11.74)	32.41*** (10.86)	0.0805*** (0.0163)	0.0591*** (0.0129)	0.0514*** (0.0134)	0.0394*** (0.0128)
<b>IV: Second Stage</b>												
$\widehat{\Delta MMA}$	104.4** (53.12)	76.70** (37.53)	0.0223** (0.00870)	0.0179** (0.00716)	111.5** (50.50)	76.66** (35.57)	68.81*** (25.79)	46.98*** (17.86)	0.0705** (0.0316)	0.0474** (0.0235)	0.0949*** (0.0319)	0.0680*** (0.0196)
State FE	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Controls	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Loans <sub>o</sub>	Y		Y		Y		Y		Y		Y	
Loans <sub>d</sub>		Y		Y		Y		Y		Y		Y
Mean of Dep. Var.	775.6	775.6	0.905	0.905	626.4	626.4	380.9	380.9	0.721	0.721	0.329	0.329
N	147	147	147	147	147	147	147	147	147	147	147	147

*Notes:* Table A.16 presents the OLS (panel 1) and instrumented second stage of the regression in Equation 3 (panel 2) controlling for higher degree polynomials of the population change from 1870 to 1880. The independent variable  $\widehat{\Delta MMA}$  is the log change in MMA from 1875 to 1885, calculated according to Equation 1. The inputs to MMA are bilateral transport costs measured in 1870 using the measures from Donaldson and Hornbeck (2016), populations in 1870 and 1880 from the respective censuses of population, and the locations of national banks in 1885 from the *Annual Reports of the Comptroller of the Currency*. There are no national banks in the locations in our sample in 1875 by construction. We use  $\theta = 4$  in our baseline measure. All regressions include state fixed effects. The vector of control variables includes the number of railroads and state banks measured in 1875 and 1876, respectively, and the log value of transport market access in 1870. The control variable for “Loans<sub>o</sub>” is the log value of lending by national banks in 1885. The control variable “Loans<sub>d</sub>” is the average change in log lending by national banks at destinations, with destinations weighted by physical transport proximity. The dependent variable in columns 1 and 2 is the change in per capita (male population over age 21) value of total manufacturing and agricultural production from 1880 to 1890 is the change in per capita (male population over age 21) manufacturing production; in columns 3 and 4 it is the share of agricultural production in commodity goods measured in terms of acreage of farmland used. The dependent variable in columns 5 and 6 is manufacturing production per capita (male population over age 21); in columns 7 and 8 it is the manufacturing inputs (columns 7 and 8) per capita (10 is the change in the share of production in the manufacturing secf the dependent variable meassions are weighted by the share of town population within a county, and standard errors are clustered at the county level. \*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ .

## B Additional historical context

### B.1 Banking system before the National Banking Act

The idea of establishing a unified banking system across the United States was several decades earlier than the passage of the National Banking Act. The First Bank of the United States, chartered for a term of twenty years by the Congress on February, 1791, operated in Philadelphia and was the nation's *de facto* central bank. Alexander Hamilton, the first Secretary of the Treasury, believed a national bank was necessary to stabilize and improve the nation's credit, and proposed federal mint as common currency. However, the bank faced widespread resistance due to concerns of expanding federal power, which was famously led by the Secretary of State Thomas Jefferson. The bank charter was not renewed and expired in 1811.

In 1816, the Second National Bank started operation with similar functions as the First Bank of the United States. As of 1832, the Second National Bank operated more than 30 branches nationwide. During this period, the paper money circulation was comprised of private bank notes issued by state-regulated banks, plus the notes of the Bank of the United States. While the state banks were formally regulated by their individual state governments, the national network of the Bank of the United States could better enforce those regulations. In particular, the Bank of the United States could return notes to issuing banks and demand specie, which it did for any notes that traded at a discount. Therefore the presence of this pseudo central bank prevented the competing private monies of this period from exhibiting the instability of the Free Banking Era.

However, this system with its centralized control of the banking system, was unpopular with many bankers, and there were many objections to it. The end of the Second Bank of the United States occurred when President Andrew Jackson failed to renew the bank's charter in 1836, which marked the beginning of the Free Banking Era.

### B.2 Additional evidence of bank debt illiquidity in the Free Banking Era

The large number of floating exchange rates created inconvenience in economic activity. For example, a case record compilation of the United States supreme court between 1843 and 1846 (Stephen K. Williams, 1901) contains a case regarding the value of a loan, and how its value had changed over time:

[...] the defendant did [...] receive the amount of said loans from the plaintiffs in the bank notes of Virginia and of other States, which, [...] were depreciated considerably below the current value of the bank notes of this district [...]

The frictions stemmed from state bank notes illiquidity was especially detrimental to interstate transactions. As a contemporary traveler illustrated the magnitude of the cost in his diary (Dewey, 1910):

Started from Virginia with Virginia money; reached the Ohio River; exchanged \$20 Virginia note for shinplasters and a \$3 note of the Bank of West Union

[...] At Maysville wanted Virginia money; couldn't get it.

[...] reached Fredericktown; there neither Virginia nor Kentucky money current; paid a \$5 Wheeling note for breakfast and dinner; received in change two \$1 notes of some Pennsylvania bank, \$1 Baltimore and Ohio Railroad, and balance in Good Intent shinplasters; 100 yards from the tavern door all notes refused. [...]

Monetary frictions were also present in coins, which made them an unsuitable substitute for payments (Ware, 1990):

In routine business transactions Americans had to calculate in three currencies: one decimal; another based on halves, quarters, and eighths; and another on twelfths and twentieths.

## B.3 National Banking Act legislation

### B.3.1 Bank note issuance

#### Bank notes have uniform value, redeemable at all national banks

- Act June 3, 1864 Sec. 5196: National banks to take notes of other national banks at par.

Every national banking association formed or existing under this Title, **shall take and receive at par**, for any debt or liability to it, any and all notes or bills issued by **any lawfully organized national banking association**. But this provision shall not apply to any association organized for the purpose of issuing notes payable in gold.

#### Bank notes backed 110 percent by US Treasury Bonds

- Act July 12, 1882 Sec. 8: Amount of bonds required to be on deposit; reduction of amount or retirement in full of circulating notes.

That national banks now organized or here-after organized, having a capital of **one hundred and fifty thousand dollars, or less**, shall not be required to keep on deposit or deposit with the Treasurer of the United States **bonds in excess of one-fourth of their capital stock as security** for their circulating notes; but such banks shall keep on deposit or deposit with the Treasurer of the United States the amount of bonds as herein required. And such of those banks having on deposit bonds in excess of that amount are authorized to reduce their circulation by the de-posit of lawful money as provided by law ; [provided, **that the amount of such circulating notes shall not in any case exceed ninety per centum of the par value of the bonds deposited as herein provided**.] Provided further, That the national banks which shall hereafter make deposits of lawful money for the retirement in full of their circulation shall at the time of their deposit be assessed for the **cost of transporting and redeeming their notes then outstanding**, a sum equal to the average cost of the redemption of national-hank notes during the pre-ceding year, and shall thereupon pay such assessment. And all national banks which have heretofore made or shall hereafter make deposits of lawful money for the reduction of their circulation shall be assessed and shall pay an assessment in the manner specified in section three of the act approved June 20, 1874, for the cost of transporting and redeeming their notes redeemed from such deposits subsequently to June 30, 1881.

- Act June 3, 1864 Sec. 5153: National banking associations to be depositaries of public moneys.

All national banking associations, designated for that purpose by the Secre-tary of the Treasury, shall be **depositaries of public money**, under such regulations as may be prescribed by the Secretary ; and they may also be employed as **financial agents of the Government**; and they shall perform all such reasonable duties, as depositaries of public money and financial agents of the Government, as may be required of them. The Secretary of the Treasury shall require the associations thus designated to give **satisfactory security, by the deposit of United States bonds and otherwise, for the safe-keeping and prompt payment of the public money deposited with them**, and for the faith-ful performance of their duties as financial agents of the Government: Provided, That the Secretary. shall, on or before the first of January of each year, make a public statement of the securities required during that year for such deposits. And every association so designated as receiver or depositary of the public money shall **take and receive at par all of the national currency bills, by what-ever association issued**, which have been paid into the Government for internal revenue, or for loans or stocks: Provided, That the Secretary of the Treasury shall dis-tribute the deposits herein provided for, as far as prac-ticable, equitably between the different States and sections.

- Act June 3, 1864 Sec. 5159: Deposit of bonds required before issue of circulating notes.

Every association, after having complied with the provisions of this Title, preliminary to the commencement of the banking business, and before it shall be authorized to commence banking business under this Title, shall transfer and deliver to the Treasurer of the United States any United States registered bonds, bearing interest, [**to an amount not less than thirty thousand dollars and not less than one-third of the capital stock paid in.**] Such bonds shall be received by the Treasurer upon deposit and shall be by him safely kept in his office, until they shall be otherwise disposed of, in pursuance of the provisions of this Title.

NOTE.—The italicized words are held to be modified by the acts of June 20, 1874, and July 12, 1882. Section 4, act of June 20, 1874, which follows section 5167, provides in part that **the amount of bonds on deposit for circulation shall not be reduced below 50,000** dollars. This determines the amount of bonds required to be deposited by banks organizing with capital stock over 150,000 dollars. Banks having a capital of 150,000 dollars, or less, are not required to keep on deposit **bonds in excess of one-fourth of the capital stock** as security for their circulating notes, by act July 12, 1882, chapter 290, section 8. This act follows section 5167, Revised Statutes.

#### Losses in face value supplemented with additional bonds

- Act June 3, 1864 Sec. 5167: General provisions respecting bonds.

The bonds transferred to and deposited with the Treasurer of the United States, by any association, for the security of its circulating notes, shall be held **exclusively for that purpose**, until such notes are redeemed, except as provided in this Title. The Comptroller of the Currency shall give to any such association powers of attorney to receive and appropriate to its own use the interest on the bonds which it has so transferred to the Treasurer; but such powers shall become **inoperative whenever such association fails to redeem its circulating notes**. Whenever the market or cash value of any bonds thus deposited with the Treasurer is **reduced below the amount of the circulation issued** for the same, **the Comptroller may demand and receive the amount of such depreciation in other United States bonds at cash value, or in money, from the association, to be deposited with the Treasurer as long as such depreciation continues**. And the Comptroller, upon the terms prescribed by the Secretary of the Treasury, may permit an **exchange to be made of any of the bonds deposited with the Treasurer by any association for other bonds of the United States authorized to be received as security for circulating notes**, if he is of opinion that such an exchange can be made without prejudice to the United States; and he may direct the **return of any bonds to the association which transferred the same, in sums of not less than one thousand dollars, upon the surrender to him and the cancellation of a proportionate amount of such circulating notes** : Provided, That the remaining bonds which shall have been transferred by the association offering to surrender circulating notes are equal to the amount required for the circulating notes not surrendered by such association, and that the amount of bonds in the hands of the Treasurer is not diminished below the amount required to be kept on deposit with him, and that there has been no failure by the association to redeem its circulating notes, nor any other violation by it of the provisions of this Title, and that the market or cash value of the remaining bonds is not below the amount required for the circulation issued for the same.

#### OCC regulates national banks



- Act June 3, 1864 Sec. 324: Bureau of the Comptroller of the Currency.

There shall be in the Department of the Treasury a Bureau charged with the execution of all laws passed by Congress relating to the **issue and regulation of a national currency secured by United States bonds**, the chief officer of which Bureau shall be called the **Comptroller of the Currency**, and shall perform his duties under the general direction of the Secretary of the Treasury.

- Act June 3, 1864 Sec. 5168: Comptroller to determine if association can commence business.

Whenever a certificate is transmitted to the Comptroller of the Currency, as provided in this Title, and the association transmitting the same notifies the Comptroller that **at least fifty per centum of its capital stock has been duly paid in**, and that such association has complied with all the provisions of this Title required to be complied with before an association shall be authorized to commence the business of banking, **the Comptroller shall examine into the condition of such association**, ascertain especially the amount of money paid in on account of its capital, the name and place of residence of each of its directors, and the amount of the capital stock of which each is the owner in good faith, and generally whether such association has complied with all the provisions of this Title required to entitle it to engage in the business of banking; and shall cause to be made and attested by the oaths of a majority of the directors, and by the President or cashier of the association, a statement of all the facts necessary to **enable the Comptroller to determine whether the association is lawfully entitled to commence the business of banking**.

#### OCC oversees liquidation process for failure & prioritizes note holders from losses for failure

- Act Mar. 3, 1878 Sec. 5205: Assessment for failure to pay up capital stock or for impairment of capital.

Every association which shall have **failed to pay up its capital stock**, as required by law, and every association whose capital stock shall have become impaired by losses or otherwise, shall, **within three months after receiving notice thereof from the Comptroller of the Currency, pay the deficiency in the capital stock**, by assessment upon the shareholders pro rata for the amount of capital stock held by each: and the Treasurer of the United States shall **withhold the interest upon all bonds held by him in trust for any such association**, upon notification from the Comptroller of the Currency, until otherwise notified by him. If any such association shall fail to pay up its capital stock. and shall refuse to go into liquidation, as provided by law, for three months after receiving notice from the Comptroller, **a receiver may be appointed to close up the business of the association**, according to the provisions of section fifty-two hundred and thirty-four : And provided, That if any shareholder or shareholders of such bank shall neglect or refuse, after three months' notice, to pay the assessment, as provided in this section, **it shall be the duty of the board of directors to cause a sufficient amount of the capital stock of such shareholder or shareholders to be sold at public auction** (after thirty days' notice shall be given by posting such notice of sale in the office of the bank, and by publishing such notice in a newspaper of the city or town in which the bank is located, or in a newspaper published nearest thereto) **to make good the deficiency**, and the balance, if any, shall be returned to such delinquent shareholder or shareholders.

- Act June 3, 1864 Sec. 5224: Reassignment of bonds and redemption of notes of liquidating banks.

Whenever a sufficient deposit of lawful money to redeem the outstanding circulation of an association proposing to close its business has been made, the bonds deposited by

the association to secure payment of its notes shall be reassigned to it, in the manner prescribed by section fifty-one hundred and sixty-two. And thereafter the association and its shareholders shall stand discharged from all liabilities upon the circulating notes, and **those notes shall be redeemed at the Treasury of the United States.** And if any such bank shall fail to make the deposit and take up its bonds thirty days after the expiration of the time specified, **the Comptroller of the Currency shall have power to sell the bonds pledged for the circulation of said bank, at public auction in New York City,** and, after providing for the redemption and cancellation of said circulation, and the necessary expenses of the sale, to pay over any balance remaining to the bank or its legal representatives.

### B.3.2 Capital requirements

- Act June 3, 1864 Sec. 5138: Requisite amount of capital.

No association shall be organized with a **less capital than one hundred thousand dollars**, except that banks with a **capital of not less than fifty thousand dollars** may, with the approval of the Secretary of the Treasury, be organized in any place the population of which does not exceed **six thousand inhabitants**, and except that banks with a capital of not less than **twenty-five thousand dollars** may, with the sanction of the Secretary of the Treasury, be organized in any place the population of which does not exceed **three thousand inhabitants**. No association shall be organized in a city the population of which exceeds **fifty thousand persons** with a capital of less than **two hundred thousand dollars**.

#### 75 percent of directors have to reside locally

- Act June 3, 1864 Sec. 5146: Requisite qualification of directors.

Every director must, during his whole term of service, be a **citizen of the United States**, and at least **three fourths of the directors must have resided in the State, Territory, or District in which the association is located for at least one year immediately preceding their election and must be residents therein during their continuance in office.** Every director must own in his own right **at least ten shares of the capital stock** of the association of which he is a director, unless the capital of the bank shall not exceed **twenty-five thousand dollars**, in which case he must own in his own right **at least five shares of such capital stock**. Any director who ceases to be the owner of the required number of shares of the stock, or who becomes in any other manner disqualified, shall thereby vacate his place.

### B.3.3 Loan restrictions

#### Not allowed to take land as collateral

- Act June 3, 1864 Sec. 5137: Power to hold real property.

A national banking association may **purchase, hold, and convey real estate for the following purposes, and for no others:** First. Such as shall be necessary for its **immediate accommodation** in the transaction of its business. Second. Such as shall be **mortgaged to it in good faith by way of security for debts previously contracted.** Third. Such as shall be conveyed to it in **satisfaction of debts previously contracted** in the course of its dealings. Fourth. Such as it shall **purchase at sales under judgments, decrees, or mortgages** held by the association, or shall purchase to secure debts due to it. But no such association shall hold the possession of any real

estate under mortgage, or the title and possession of any real estate purchased to secure any debts due to it, **for a longer period than five years.**

#### **10 percent tax on state bank notes**

- Act Feb. 5, 1875 Sec. 19: Tax on circulation of banks other than national banks.

That every person, firm, association, **other than national-bank associations**, and every corporation, State bank, or State banking association **shall pay a tax of ten per centum on the amount of their own notes** used for circulation and paid out by them.

#### **Conversions from state banks**

- Act Mar. 3, 1865 Sec. 5155: State banks having branches.

It shall be lawful for **any bank or banking association organized under State laws**, and having branches, the capital being joint and assigned to and used by the mother-bank and branches in definite proportions, to **become a national banking association** in conformity with existing laws, and to retain and keep in operation its branches, or such one or more of them as it may elect to retain; the amount of the circulation redeemable at the mother-bank, and each branch, to be regulated by the amount of capital assigned to and used by each.

- Act March 3, 1865 Sec. 3416: State banks converted into national banks; returns, how made.

Whenever any State bank or banking association has been converted into a national banking association, and such national banking association has **assumed the liabilities of such State bank or banking association**, including the redemption of its bills, by any agreement or understanding whatever with the representatives of such State bank or banking association, **such national banking association shall be held to make the required return and payment on the circulation outstanding**, so long as such circulation shall **exceed five per centum of the capital** before such conversion of such State bank or banking association.

## References

- Ales, Laurence, Francesca Carapella, Pricila Maziero, and Warren E. Weber.** 2008. “A model of banknote discounts.” *Journal of Economic Theory*, 142(1): 5–27.
- Dewey, Davis R.** 1910. “State banking before the Civil War.” *National Monetary Commission, 61st Congress, 2nd Session*.
- Donaldson, Dave, and Richard Hornbeck.** 2016. “Railroads and American economic growth: A “market access” approach.” *Quarterly Journal of Economics*, 131(2): 799–858.
- Moreira, Marcelo J.** 2003. “A conditional likelihood ratio test for structural models.” *Econometrica*, 71(4): 1027–1048.
- Stephen K. Williams, LLD,** ed. 1901. *Reports of cases argued and decided in the Supreme Court of the United States (1843-1846)*. The Lawyer’s Co-Operative Publishing Company.
- Ware, Lynn Willoughby.** 1990. “Cotton money: Antebellum currency conditions in the Apalachicola/Chattahoochee River Valley.” *The Georgia Historical Quarterly*, 74(2): 215–233.