Public Infrastructure and Economic Development: Evidence from Postal Systems *

Jon C. Rogowski†
Harvard University

John Gerring‡
University of Texas at Austin

Matthew Maguire§
San Jose State University

Lee Cojocaru¶
Independent Scholar

December 5, 2019

Abstract

While postal systems have been central to statebuilding efforts around the globe, their contributions to development are largely unclear. We argue that the post office affected economic development in both the short and long terms. To test our argument, we combine original data on the cross-national distribution of postal systems from 1875 to 2007 with granular county-level data in the U.S. from 1850 to 2000. In both country- and county-level analyses, we show that the spread of postal systems affected economic outcomes and persisted over the long term. The results are robust across dependent variables, model specifications, and estimation strategies. We provide additional evidence that suggests these effects were generated by reducing transaction costs and strengthening social capital. Our findings highlight the role of public infrastructure in promoting economic growth, documenting a channel through which state institutions precede growth, and suggest that statebuilding efforts have longstanding effects on relevant communities.

Word count: 9,907

The materials required to verify the computational reproducibility of the procedures and analyses in this article are available on the *American Journal of Political Science* Dataverse within the Harvard Dataverse Network. The data required to verify the computational reproducibility of the results are available from [Repository Name], under protected access, as described on the American Journal of Political Science Dataverse, at: http://dx.doi.org/XXX.

*We thank Alex Bluestone, Michael Byrne, Christopher Gibson, Madelyn Josel, Sophie Schuit, and Joseph Sutherland for research assistance, and Boston University, Harvard University, and Washington University in St. Louis for research support. We also thank Daron Acemoglu, Jacob Moscona, and Jim Robinson for sharing some of the data used in this project. For helpful comments and suggestions, we are grateful to Kathy Bawn, Matt Blackwell, Cameron Blevins, Fernanda Brollo, Dan Carpenter, Ryan Enos, Sean Gailmard, Peter Hall, Jennifer Hochschild, Florian Hollenbach, Richard John, Carl Henrik Knutsen, Horacio Larreguy, Johannes Lindvall, Patricia Maclachlan, Gwyneth McClendon, Pablo Montagnes, Carlo Prato, Ron Rogowski, Ken Shepsle, Dan Smith, Jim Snyder, Chris Tausanovitch, Yuhua Wang, Stephane Wolton, John Zaller, workshop audiences at Harvard University and the University of California, Los Angeles, and participants in the 2016 LSE-NYU Political Economy Conference, the 2016 annual meeting of the American Political Science Association, and the 2017 Development Economics Research Group of the German Economic Association.

†Associate Professor, Department of Government; rogowski@fas.harvard.edu.
‡Professor, Department of Government; jgerring@austin.utexas.edu.
§Assistant Professor, School of Management; matthew.maguire@sjsu.edu.
¶cojocaru@bu.edu

Few institutions have been as central to modern statebuilding as the post office (Gallagher 2016; Howe 2007; John 1995; Maclachlan 2004). Postal expansion in Western Europe and the United States in the nineteenth century produced "greater strides in the improvement of communication than had taken place in all previous centuries" (Howe 2007, 5). By enhancing communication, states knit together farflung regions, projected state authority, and advanced the idea of nationhood. Reflecting its prominence, theoretically-oriented studies on state development have focused on the post office as an example of market regulation (Crew and Kleindorfer 1998), government bureaucracy (Carpenter 2001; Kernell and McDonald 1999; Rogowski 2015, 2016; Skowronek 1982), political change (John 1998; Perlman and Schuster 2015), and technological innovation (Acemoglu, Moscona and Robinson 2016).

Despite the centrality of postal systems in historical and social science accounts, its economic implications remain unclear.[1] Note that postal systems operate somewhat differently from other infrastructural factors such as transportation, including railroads and roads (e.g., Donaldson 2016; Nall 2018), insofar as they facilitate the spread of information, ideas, and human and social capital in addition to goods and financial instruments. As such, they promise a broader array of services than most other types of infrastructure. These services may have been especially impactful in the infrastructure-poor setting of the nineteenth and early twentieth centuries.

We argue that postal systems affected economic development through three channels: reducing transaction costs, diffusing new information, and strengthening social capital. We test our argument at two levels of analysis. In the first, we introduce original data on the spread of postal services around the world from 1875 to 2007. In the second, we document the distribution of post offices across counties in the U.S. from 1845 to 1896. With parallel analyses, we hope to address questions of generalizability (using global data) along with challenges to internal validity (using county-level data). Throughout, we pay attention to both short- and long-term effects as economic theory suggests that infrastructure should have distal effects on economic development, the latter of which is largely overlooked in existing literature (e.g., Donaldson 2018; Duflo and Pande 2007).

[1] Although Acemoglu, Moscona and Robinson (2016) document the association between the postal system and patent applications, they do not address the impact of patents on growth.

Beyond its substantive interest, the post office offers important advantages as a case through which to study development. First, postal systems are generally run by the state, either as public corporations or government agencies. Although private mail systems sometimes challenged this monopoly, nowhere did the private sector displace public systems of mail distribution. Moreover, postal systems were central components of national bureaucracies in the nineteenth and early twentieth centuries, employing a majority of federal workers in the United States (Blevins 2015, 13; John 1998).[2] Other infrastructure projects – such as railroads, telegraphs, and steamships – generally require less bureaucratic effort or are shared between public and private providers and less clearly tied to state activity. Second, the post office was (and is, in many places) deeply political, due to the patronage opportunities it provided. In the U.S., post office appointments were often made "far less for service than for electoral fidelity" (Carpenter 2001, 66), and the location of post offices (Rogowski 2016; see also Moskowitz and Rogowski 2019; Rogowski and Gibson 2016) and expansion of free delivery (Kernell and McDonald 1999) were responsive to the political affiliations of local constituencies.[3] Our focus on the consequences of postal systems therefore provides evidence about how the responsiveness of state infrastructure to local political interests shapes the developmental trajectories of local communities.

Our findings provide strong support for the centrality of public infrastructure in modern economic growth. In both country- and county-level analyses, the spread of postal systems affected economic outcomes and persisted over the long term. These results are robust across dependent variables, model specifications, and estimation strategies, and support a plausibly causal interpretation of the relationship between postal services and growth. Together, our findings highlight the role of public infrastructure in promoting economic growth, documenting a channel through which state institutions precede growth. The results also suggest that the politics of infrastructural projects have longstanding effects on relevant communities.

[2]The United States Postal Service remains the country's second-largest employer today and is not atypical in this regard. China's state-run post employs nearly one million staff, and national post offices in Europe generally account for about one percent of the total workforce (for comparison, Wal-Mart employs 1% of the U.S. workforce).

[3]Similar processes are documented in, among others, Chile (Paley 2001), Britain (Daunton 2015), and India (Clarke 1921).

Infrastructure, Postal Services, and Development

Postal systems extend back to ancient times, though access was often limited to a small group of elites (e.g., Scheele 1970; Zilliacus 1956). Beginning in the nineteenth century, post services expanded dramatically, becoming a mass form of communication. The expansion of government services usually adopted the following principles of organization: government monopoly (partial or complete) over postal delivery, universal coverage of post offices throughout settled territories, and inexpensive pre-paid postage with uniform rates. Underlying these foundational principles was an overall objective to foster communication, and with it, commerce. This replaced older objectives in which postal systems were primarily designed to raise revenue and serve state elites. New state-run postal systems provided rapid and dependable written communication for anyone who could afford a postage stamp.

Primary and secondary accounts emphasize the transformative impact of postal systems on politics and society. For instance, after the American Revolution, Benjamin Rush ([1787] 1918, 203) urged the adoption of a nationwide postal system as "the true non-electric wire of government." Nineteenth-century philosopher Francis Lieber (1832, 289) counted postal systems along with the compass and the printing press as "one of the most effective elements of civilization." In Britain, reformer Rowland Hill (1837, 7) argued that the post office was "a powerful engine of civilization." Howe (2007, 5) describes the nineteenth-century U.S. post office as a "driving force in the history of the era" which helped democratize American political life (231). More broadly, Behringer (2006, 383) argues that the postal system's "importance is as fundamental as that of the Scientific Revolution, the Industrial Revolution, and the revolutions in politics that took place in the same period."

We posit that the impact of post systems on economic development was equally transformative. Communication networks played a key role in the industrial revolution (Lerner 1958; Pye 1963) and the post was the dominant means of (non face-to-face) communication prior to the mid-twentieth century. We argue that the extension of postal systems to mass publics in the nineteenth century helped catalyze economic activity by reducing transaction costs, diffusing new information, and strengthening social capital.

Transaction costs. Postal systems reduced transaction costs, facilitating contracts and business relationships. Fuller (1972, 88) observed that the US Post Office served as "the good right arm of business in antebellum America." It allowed sellers to advertise their wares (e.g., through sales catalogs such as those produced by Sears Roebuck and Montgomery Ward) and to consummate sales (often via mail orders) without travel to and from urban centers. It provided a system of rural banking, remittances, and postal orders; facilitated job searches between employers and potential employees during a period of economic transition; and allowed investors to seek, pursue, and monitor investment opportunities, enhancing the productivity of capital. "Americans relied on the mails to conduct financial transactions," Henkin (2006, 52) argues, and "[t]he government's commitment to postal service formed part of the foundation for commercial growth."

The early post office served as a handmaiden of commerce. According to Roper (1917, 258), "The instruments of trade and banking pass through the countless postal channels, and can pass in no other way." The material Americans sent through the mail "made up the commercial lifeblood of the nation, from bank-notes to commodity prices to speculative rumors" (Blevins 2015, 10), which generated widespread support for the post office among businesses of all kinds. Business correspondence accounted for a majority of total mail volume in the mid-nineteenth century as "[l]etter-writing was . . . the paradigmatic activity of the business world" (Henkin 2006, 95).

Access to postal services benefited consumers as well as businesses. Paper money was commonly sent through the mail in the antebellum United States, but these funds were unsecured and subject to frequent robberies. Secured money orders purchased through the post, available beginning in 1864, largely solved this problem. Money orders soon "functioned as a national currency" (Cushing 1893, 205-207) and by 1910 accounted for nearly a third of the value of currency held by the public (Hines and Velk 2011, 14). Because ordinary Americans could access the money order system through their local post when local banks were not yet common, this postal innovation "democratized America's financial services" (Gallagher 2016, 152).

The relationship between business and the post extended beyond the United States. For instance, an act passed by the British Parliament in 1657 suggested that the postal system "hath been and is the best means . . . to maintain a certain and constant intercourse of trade and com-

merce betwixt all the said places."[4] Similarly, in Japan, the post office "engineered the transfer of information, goods, and money ... and helped integrate localities and consumers into the wider market and commercial world" (Hunter 2012, 236; see also Maclachlan 2011).

Diffusion. Modern postal systems also facilitated the diffusion of new ideas and technology. Just as the printing press allowed for the duplication of written documents, the postal service allowed written material to be widely disseminated. Indeed, government subsidy of the post was motivated principally by the desire to spread information, educating the masses, and strengthening the bonds of nationhood. Nineteenth-century mail services were freighted with political and religious tracts. But they also carried newspapers (often at reduced fees), which included news and information particularly about commercial matters. Mail services also conveyed samples, seeds, and industrial and agricultural circulars – including new methods of agricultural and industrial production – and (in the US) served as a mechanism for patent registration (Acemoglu, Moscona and Robinson 2016). Through these means, mail services helped facilitate economic progress via the dissemination of information.

Social capital. Postal services, finally, enhanced social capital and integrated far-flung communities with national markets. Prior to the postal service, social ties were limited to those living in close proximity, or required costly and time-consuming (and often dangerous) voyages by land or water. Rush ([1787] 1918, 203) argued that the post office "[tied] together ... every part of the United States." A recent historical account vindicates Rush's optimism, as Blevins (2015, 15) concludes that "the U.S. Post's far-reaching geography ... connected more people in more places than any other single institution" and became "the great spatial infrastructure propping up nineteenth-century society."

Postal systems also provided a sense of the state in communities located far away from a nation's political and economic centers. Indeed, for most rural Americans the nineteenth-century post office was their only source of interaction with state institutions (John 1995). In Canada, an even more diffusely settled land, the post office helped to bring "the various rural markets of Canada into an integrated national economy" (Amyot and Willis 2003, 136-137). The ability to exchange letters through the mail also encouraged people to relocate without severing so-

[4] "Postage of England, Scotland, and Ireland settled," [1657] 1844.

cial and familial ties (Henkin 2006, 95). Finally, post offices functioned as local meeting points, lending greater cohesiveness to those living in a township or county (John 1995, 161). Historical accounts suggest that these local and extra-local communication networks generated trust, fostered compliance with community norms, and facilitated the formation of voluntary associations and political participation.

The three causal mechanisms introduced here – transaction costs, diffusion, and social capital – overlap, complicating efforts to distinguish the relative effects of each. Nonetheless, a strong prima facie case can be made that the postal service stimulated these mechanisms and that these mechanisms, in turn, generated economic development. We further expect that these effects were generated in the short term and persisted over time as the initial shocks to economic outcomes led to the development of formal and informal institutions that sustained these effects over the long term.

Empirical Strategy

We adopt a multi-tiered approach to testing our hypotheses about the relationship between postal systems and economic growth. First, to establish a plausible causal association between the provision of post offices and economic outcomes, we employ a panel design to study within-unit changes in economic growth that are associated with changes in the presence of post offices. In doing so, we test our hypothesis that post offices generate economic benefits in the short run. Second, we explore the distal effects of post offices in a cross-sectional setting by studying how the provision of post offices at the turn of the twentieth century was associated with economic outcomes a century later.

We leverage two unique and complementary data sources in the tests that follow. First, we study the association between postal systems and economic outcomes using original country-level data from 1875 to 2007. These data help guard against potential spillovers and externalities. At the same time, these analyses are necessarily preliminary. While our panel analyses recover an estimate of an average effect across all the countries in the sample, postal systems around the world varied in important ways and the relationship between postal systems and economic out-

comes was likely moderated by these country-specific factors. Moreover, we cannot rule out the potential for endogeneity as the assignment mechanism for post offices is not well-documented and undoubtedly varied across countries. Our aim for the cross-country analyses is to establish a plausible case for a global association between postal services and economic outcomes.

We supplement this country-level data with data on the distribution of post offices in U.S. counties during a similar time period. By focusing on a single country, we control for many factors that could potentially confound or moderate country-level analyses. At the same time, the analyses are conceptually distinct in several important ways. The borders between U.S. counties are much more porous than those between countries; therefore, the county-level analyses may be more vulnerable to concerns about spillovers as residents in a county could access postal services available in an adjacent county. [5] The mechanisms we described above may also operate somewhat differently or at different scales. For instance, greater postal infrastructure within U.S. counties may increase the general level of information and/or ease of conducting financial transactions, while the composition of the postal networks may interact with a country's existing international connections to affect how our posited mechanisms affect economic growth in the cross-national analysis. By combining data at both levels of analysis, we hope to leverage their respective advantages while mitigating their limitations.

Postal Systems and Development: Cross-National Evidence

We estimate the relationship between postal systems and economic development using original data on post offices at the country level from 1875 to 2007. These data were collected from publications of the Universal Postal Union (UPU). The UPU statistical abstract was published annually or semi-annually until it was replaced by the UPU web site. These data were digitized by hand and then cross-checked with the original copy to limit data entry errors.[6]

Our principal measure of postal service development is the number of post offices within a country or colony in a given year. This includes all establishments where users can receive postal

[5] In principle, this could be addressed with granular data on the locations of post offices within counties; unfortunately, our data on county-level post offices are not geolocated.

[6] Appendix B contains complete descriptions of data used in the cross-national analysis.

services with the exception of those that only sell stamps.[7] Our database includes information about postal systems in virtually all countries for at least a portion of the relevant time period, therefore characterizing the distribution of state infrastructure even for places which typically rate on the lower end of development. Missing data within a country time-series (generally for spells of just a few years) is linearly interpolated for the panel analysis.

Due to its right skew, we use the logged number of post offices (+1) in each country as our key independent variable. The distribution of post offices varied substantially across space and time.[8] Figure 1 shows the distribution in the number of post offices in the year 2000. Several of the Pacific Islands had only a single post office while India had the most with more than 150,000. The mean and median numbers are 3129 and 270, respectively. During the latter part of the nineteenth century, when our data begin, the overall median number of post offices per 100,000 varied between 8 and 30. This figure stabilized around 15 post offices per 100,000 during the first half of the twentieth century before gradually declining to about seven by the end of the time series (2007).

We use these data to explore the proximal and distal associations between postal systems and economic growth. To do so, we conduct parallel panel and cross-sectional analyses. In our panel analyses, we study the association between postal systems and growth at five-year intervals by regressing economic outcomes for country i in year t on a measure of each country's stock of per capita post offices in year $t - 5$.[9] The dependent variable measures economic growth using the percentage change in per-capita GDP across each five-year period based on data on countries' per capita gross domestic product (GDP) from Bolt and van Zanden (2014).[10] Year

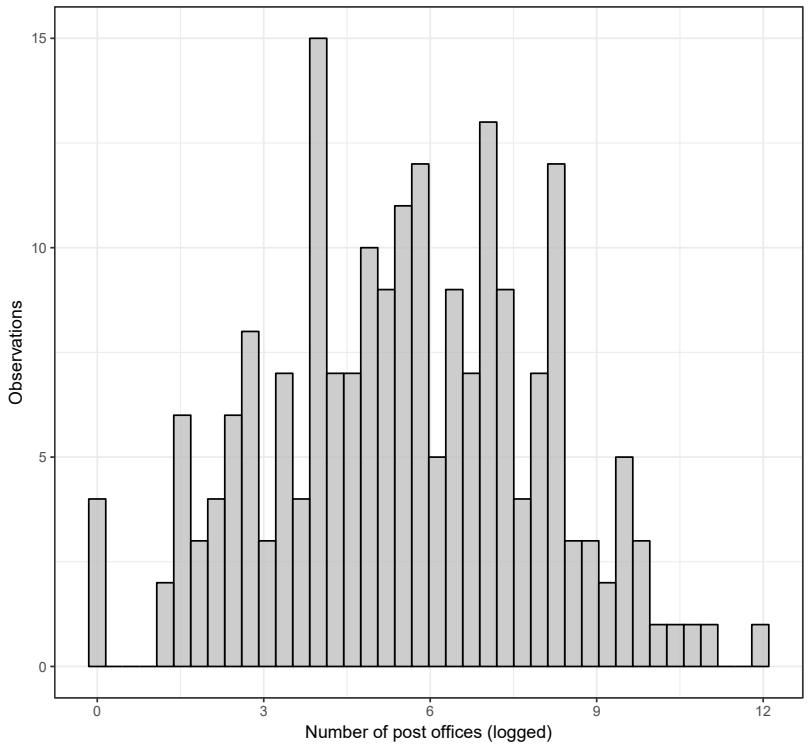
[7] Our measure is susceptible to measurement error as postal systems adopted door-to-door delivery services that reduced the need for post offices in diffusely-settled areas. Our analyses below help address this with year fixed effects to account for temporal trends in postal systems, as the introduction of door-to-door delivery occurred more or less simultaneously in the early twentieth century. Additionally, the raw number of post offices may be a somewhat a noisy measure of the quality of postal systems, which could moderate the relationship between postal services and growth.

[8] Detailed descriptive statistics are shown in Figures A.1 through A.3.

[9] We construct a stock measure of this variable by calculating a country's post office density from the first data point in the UPU dataset (1875 or later), with a one percent annual depreciation rate (following Gerring et al. 2005), which follows our expectation that the impact of postal infrastructure on national-level growth performance accumulates over a long period of time.

[10] Our dependent variable follows the standard approach in the literature for evaluating the effects of economic development (see also, e.g., Doucouliagos and Ulubaşoğlu 2008). However, our panel analyses produce substantively

Figure 1: Number of post offices, 2000



Note: Data obtained from the Universal Postal Union. Data represent the logged number of post offices by country in the year 2000.

fixed effects account for time-specific shocks that have common effects on the distribution of post offices and/or economic outcomes around the world, while country fixed effects account for time-invariant features of countries that could confound the relationship between postal services and growth. Our design thus captures the within-country relationship between postal systems and growth, while clustering standard errors by country.

Cross-sectional analyses investigate the long-term consequences of postal systems for economic outcomes. We predict the long-term association between postal systems measured in 1900 and country GDP measured in 2000. We also estimate heteroskedastic-robust standard errors.

In both sets of analyses, we estimate models which control for potential confounders, including population (log), urbanization, democracy (measured by the Polity2 index), and years since independence. In our long-term analyses, each of these covariates is measured in the year 1900.

identical relationships when using the logged per capita GDP (rather than growth) as the dependent variable. See Table A.1.

We impute missing data for background covariates in the cross-sectional analysis.

The results of our country-level analyses are shown in Table 1. The first two columns show results from the panel analyses of the relationship between postal systems and short-term economic growth.[11] In column (1), the coefficient for post offices is positive and statistically significant, indicating that post offices provide some economic returns in the short run though their effects may be substantively modest. When controlling for other background country-level characteristics, as column (2) shows, the coefficient estimate for post offices is slightly larger and again provides evidence of a positive relationship between post offices and growth. In this setting, we also find that, as expected, more prosperous and more populous countries experience lower growth rates, while the coefficient estimates for the other control variables fall short of statistical significance.[12]

Columns (3) and (4) provide evidence that postal systems are associated with long-term economic benefits. The estimates in both columns suggest that a 20% increase in post offices per capita in 1900 is associated with a 3% increase in GDP in 2000. Despite the many perturbations of the twentieth century – two world wars, the emergence of many new technologies, and a plethora of other intervening factors – which introduce considerable noise into the analysis, we find a robust association between postal services in 1900 and per capita GDP in 2000.

Table 1 provides evidence of a plausible association between postal systems and growth in both the short and long terms. Despite our efforts to account for potential confounders and address other issues of causality, we acknowledge that these results may be impaired by differences in the nature of postal systems and the mechanisms by which postal systems were constructed. To more directly address these issues, we turn to an analysis of postal systems and economic outcomes in U.S. counties.

[11] Table 1 shows results for an unbalanced panel, yet we find similar patterns when using the smaller yet balanced panel. See Table A.2.

[12] The panel results are robust across a variety of robustness checks. Table A.3 shows similar results when using GDP and per-capita GDP, respectively, as the dependent variables. Table A.4 shows models estimated with a variety of lags and leads, showing that (a) future levels of post office provision do not predict current values of economic growth, (b) several lags of the postal variable significantly predict current values of growth, and (c) including lagged measures of growth do not affect our inferences about the effects of postal systems. Table A.5 shows that our results are robust to accounting for other forms of infrastructure that serve as potential confounders, including the density of rail lines and presence of the telephone.

Table 1: Postal Infrastructure and Development, Cross-national Evidence

	Short-term		Long-term	
	(1)	(2)	(3)	(4)
	DV=per capita GDP growth Panel, five-year lag		DV= per capita GDP, 2000 Cross-sectional	
Post offices (ln, stock)	0.013**	0.020***		
	(0.004)	(0.005)		
Post offices (ln, 1900)			0.158***	0.174*
			(0.037)	(0.078)
GDP per capita (ln)	−2.985***	−4.013***		
	(0.441)	(0.619)		
GDP per capita (ln, 1900)			0.897***	0.716***
			(0.118)	(0.153)
Population (ln)		−1.947**		
		(0.631)		
Population (ln, 1900)				−0.078
				(0.079)
Urbanization		−3.142		
		(2.973)		
Urbanization (1900)				0.349
				(0.684)
Regime-type (Polity2)				0.009
				(0.014)
Years since independence		0.030		
		(0.028)		
Years since independence (measured in 1900)				0.003
				(0.002)
(Intercept)	22.790***	59.202***	1.233	3.141*
	(3.091)	(12.026)	(0.707)	(1.477)
N (observations)	1,835	1,540	77	77
N (countries)	153	147	77	77
R^2	.194	.240	.203	.203
Country fixed effects	✓	✓		
Year fixed effects	✓	✓		

Note: Entries are linear regression coefficients and standard errors (clustered on country in models 1-2). The dependent variables are the logged values of the outcomes listed at the top of each column. Countries are observed at five-year intervals in the panel analyses.

* indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$ (two-tailed tests).

Postal Systems and Development: Evidence from U.S. Counties

We study the proximal effects of infrastructure using panel data from approximately 2,700 U.S. counties. The number of post offices in each county is measured in 1846, 1855, 1867, 1876, 1886, and 1896 while economic outcomes are measured in 1850, 1860, 1870, 1880, 1890, and 1900.[13] We conclude our panel study at the end of the nineteenth century, after which many rural post offices were closed in preference for household mail delivery.[14]

We evaluate the short-term association between economic outcomes and the post office using a lagged measure of county post offices that varies from three to five years (dependent upon data availability), as described above.[15] Since estimates of household income (and similar measures) are unavailable prior to the mid-twentieth century, we focus on three indicators of local economic performance gathered from nineteenth century census reports: (a) farm values, (b) value of manufacturing output, and (c) capital investment in manufacturing.[16] Data on this set of outcomes come from the decennial U.S. Census and are available beginning in 1850. Each of these dependent variables is converted to 1900 real values and parameterized in the form $\log(1 + x)$.

In our baseline models, we regress the dependent variables discussed above on $\log(1 + \textit{post offices})$ and include county and year fixed effects.[17] In additional models, we account for time-varying factors that might confound the relationship of interest, including county population and the percentage of the county population born outside of the U.S., both of which are parameterized as $\log(1 + x)$ and are measured in the census year prior to the measurement of the dependent variable.[18] County fixed effects account for fixed local characteristics, such as waterfront access

[13] Data for 1846, 1855, and 1867 are drawn from Acemoglu, Moscona and Robinson (2016). Post office data for 1876, 1886, and 1896 are drawn from Rogowski (2015, 2016).

[14] Below we attempt to distinguish RFD's contribution to the post office's potential long-term impacts.

[15] For expositional clarity, we refer to this as the "current value" of post offices. In additional analyses, we have estimated models that include additional lagged measures of post offices, though we are reluctant to place too much emphasis on these models given the relatively small number of periods in our panel. See Table A.6.

[16] These variables were obtained from ICPSR study #2896 ("Historical, Demographic, Economic, and Social Data: The United States, 1790-2002").

[17] We have also estimated our models using per capita measures of the dependent variables, though we are concerned about using post-treatment measures of variables (such as population) which plausibly could be affected by the provision of post offices (see Table A.7). All results are consistent with Table 2.

[18] While total population data is available for 1840, data on county foreign-born populations are not available prior

and soil quality, that are stable across time and may also be related to economic outcomes, while year fixed effects account for temporal changes over time in development and the provision of post offices.[19] Standard errors are clustered by county. We report results from both an unbalanced panel of more than 2,700 unique counties (top panel) and a balanced panel of 1,117 unique counties (bottom panel).

Table 2 displays results from these panel regressions. The coefficients for the number of post offices are consistently positive and statistically significant, indicating that increases in post offices contributed to increased economic development as measured by farm values, the value of manufacturing output, and capital investments in manufacturing. These findings are consistent across model specifications that omit and include covariates and across both the unbalanced and balanced panels. The magnitudes of the estimated effects are somewhat lower when covariates are included and are smaller in the balanced panel of counties.

The most conservative coefficient estimates indicate that the post office had economically significant returns. Overall, the models with covariates in panel B indicate that a 25 percent increase in the number of post offices in a given county is associated with a five percent increase in county farm values, manufacturing outputs and capital investments in manufacturing. In concrete terms, opening a single post office in a county that previously had none is estimated to increase economic outputs by about 17 percent; relative to the mean values of each variable, this would amount to an increase of approximately $854,000 in farm value (from $5,019,405 to $5,872,704), $657,735 in manufacturing output (from $3,869,029 to $4,526,764), and $434,490 in manufacturing capital (from $2,555,824 to $2,990,314). In comparison, the effect of adding a single post office is estimated to be smaller in counties with the mean level of post offices (around 21), where an additional post office is predicted to have increased economic outputs by about $52,086, $40,149, and $26,522 for farm values, manufacturing output, and manufacturing capital, respectively.

to 1850; therefore, we use its 1850 values to predict economic outcomes for both 1850 and 1860. This decision does not materially affect our results, however; Tables A.8 and A.9 show, respectively, that our findings from Table 2 are nearly identical when omitting foreign-born population as a control and when including it but beginning the analysis in 1860 rather than 1850.

[19] Below we discuss results from models that account for other time-varying factors that might have affected economic outcomes, including railroad access and patenting activity.

Table 2: Proximal Effects of Postal Infrastructure in U.S. Counties, 1850-1900

	Farm value		Manufacturing output		Manufacturing capital	
Panel A: Unbalanced panel of all counties						
Post offices (ln)	0.522***	0.314***	0.876***	0.631***	0.862***	0.625***
	(0.037)	(0.028)	(0.070)	(0.063)	(0.067)	(0.060)
Population (ln)		0.529***		0.588***		0.562***
		(0.025)		(0.050)		(0.047)
Foreign-born (%, ln)		−0.268		1.626		2.033*
		(0.477)		(0.979)		(0.923)
Intercept	12.780***	8.703***	8.599***	3.936***	8.152***	3.664***
	(0.084)	(0.218)	(0.163)	(0.426)	(0.156)	(0.401)
N (observations)	12,254	12,254	12,017	12,017	12,017	12,017
N (counties)	2,771	2,771	2,738	2,738	2,738	2,738
Adj-R^2	0.403	0.554	0.295	0.330	0.354	0.386
County fixed effects	✓	✓	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓	✓	✓
Panel B: Balanced panel of counties						
Post offices (ln)	0.395***	0.222***	0.439***	0.236***	0.449***	0.239***
	(0.042)	(0.029)	(0.057)	(0.049)	(0.056)	(0.048)
Population (ln)		0.784***		0.912***		0.936***
		(0.053)		(0.100)		(0.095)
Foreign-born (%, ln)		0.388		2.793**		3.436***
		(0.759)		(0.910)		(0.866)
Intercept	13.332***	6.560***	10.240***	2.255*	9.722***	1.497
	(0.107)	(0.492)	(0.153)	(0.911)	(0.149)	(0.861)
N (observations)	6,702	6,702	6,702	6,702	6,702	6,702
N (counties)	1,117	1,117	1,117	1,117	1,117	1,117
Adj-R^2	0.352	0.530	0.312	0.356	0.362	0.409
County fixed effects	✓	✓	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓	✓	✓

Note: Entries are linear regression coefficients and standard errors, clustered by county. The dependent variables are the logged values of the outcomes listed at the top of each column. Panel A reports results from all unique counties found in the data while Panel B reports results for a balanced panel of counties that existed in 1840 and for which full data were available for all successive decades.

* indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$ (two-tailed tests).

Our findings are robust across a number of additional analyses, the full results of which are shown in the Supporting Information.[20] We used several approaches to consider issues of causality. First, we estimate models where we include each county's baseline covariates (measured in 1840) and interact them with the decadal indicators, therefore accounting for differential economic trends across counties that are related to these covariates. These models produce coefficient estimates on *Post offices* that are positive and statistically significant for each dependent variable, and their magnitudes are similar to that for the balanced panel (note that this sample is limited to counties that existed in 1840).[21]

Second, we estimate two sets of placebo tests to address the possibility of reverse causality. First, we estimate the models above while including the leading values of post offices in addition to the current values. The coefficients for the current values of post offices are positive, statistically significant, and similar in magnitude to those in Table 2. In contrast, the estimates for the leading value of post offices are positive yet quite small; in several models the coefficient is less than half the magnitude of the coefficient for the current value of post offices, and in others it is less than one-fifth as large. The comparatively small magnitudes of these estimates help weigh against the concern that economic activity led to greater numbers of post offices rather than the other way around.

In our second set of placebo tests, we study whether future values of post offices predict current values of economic outcomes. We regress economic outcomes in the decade t - 1 on the number of post offices in decade t. In our fully-specified models, the estimates for post offices are negatively signed, small in magnitude, and not statistically significant, providing additional suggestive evidence that economic activity was not the primary driver of new post office locations. While neither placebo test is dispositive, together they support our claim about the causal relationship between postal services and economic outcomes.[22]

Third, we obtain similar results when studying whether county-specific trends in economic activity account for our results. When estimating models with county-specific linear and quadratic

[20] We estimate our supplementary models using the unbalanced panel to leverage the full data set.
[21] See Table A.10.
[22] See Table A.11.

trends, we find coefficient estimates similar to those in the models in Table 2. Quadratic trends produce somewhat larger coefficient estimates for the farm value dependent variables but slightly smaller coefficients for the manufacturing dependent variables.[23] Our results appear to be robust to differential trends in economic activity across counties.

Fourth, and most suggestively, we use an instrumental variables approach to address the assignment of post offices to counties. Rogowski (2016) proposes that the partisan alignment between the party of the president and a locality's congressional representative were associated with the distribution of U.S. post offices in the late nineteenth century. Accordingly, we instrument for the provision of post offices using county vote shares for the congressional candidates from the incumbent president's party in the election immediately preceding our measure of a county's post offices.[24] At the outset, we acknowledge the limitations of this approach; namely, this instrument might reflect government economic policies other than the establishment of post offices, thereby violating the exclusion restriction. Even so, postal services were the major infrastructural project of the federal government in the nineteenth century, while initiatives such as railways, roads, and waterways were undertaken primarily at the state level (e.g., Callen 2016) and therefore should be responsive to state politics rather than national politics.

The first stage equations provide empirical support for our instrument, as a county's votes for congressional candidates from the president's party are positively and significantly associated with the provision of post offices. The instrument is quite strong, producing an F-statistic of 245. In the second stage, the results are consistent with our OLS models as increases in the number of post offices are significantly associated with economic growth.[25] The local average treatment effects estimated by our instrumental variables strategy are similar in magnitude to the OLS estimates for the farming dependent variable, but are two to three times as large for the manufacturing dependent variables. While we do not wish to overinterpret these findings given the potential limitations of our instrument, they provide additional evidence in support of a causal interpretation of our findings.

[23] See Table A.12.

[24] These data were obtained from ICPSR study #8611, "Electoral Data for Counties in the United States: Presidential and Congressional Races, 1840-1972."

[25] See Table A.13, which also shows the reduced form.

We also estimate additional models to address other potential issues of confounding. Post offices were not the only form of infrastructure found in local communities in the nineteenth century, nor were post offices the sole means through which the federal government could influence economic activity. First, because the railroad was among the largest infrastructure projects in the nineteenth century and was arguably the most important form of transport, we used data on the county-level presence of railroads from the 1840s to the 1890s.[26] We characterized each county's rail access for each of the decades in our panel analysis. We estimate our models from Table 2 while controlling for several measures of railroad access: whether counties had access to at least one rail line (yes/no; mean = 0.27), the number of rail connections in the county (mean = 1.32), and the logged value of this quantity (plus one, due to many zeroes). We find no evidence that accounting for railroad presence substantively diminishes our estimated effects of the post office. The coefficients on *Post offices* from Table 2 are virtually unchanged, while the models generally show that railroad access also contributed to increased economic activity.[27]

We also evaluated potential confounding due to patenting. We used data on the number of patents per county issued in each decade during the period of study.[28] We estimate the models from Table 2 while including the logged number of patents (plus one) issued in the prior decade.[29] The results from these models support those in Table 2. We also find that patenting activity had economic returns, though the magnitudes of the coefficients are smaller than the post office coefficients.[30] While these analyses do not address every potential confounder, they help rule out confounding by two of the most likely factors.

Overall, we find strong and consistent evidence that government-run postal services generated economic benefits across U.S. counties. The relationship is robust across a variety of speci-

[26]These data were retrieved from: Jeremy Atack, "Historical Geographic Information Systems (GIS) database of U.S. Railroads for 1830-1898," May 2016; available at https://my.vanderbilt.edu/jeremyatack/files/2016/05/RR1826-1911Modified0509161.zip (last accessed January 7, 2019).

[27]See Table A.14.

[28]Patent data were obtained from: Marco, Alan C. and Carley, Michael and Jackson, Steven and Myers, Amanda F., The USPTO Historical Patent Data Files: Two Centuries of Innovation (June 1, 2015). SSRN working paper, available at http://ssrn.com/abstract=2616724.

[29]Though we lack the research design to conduct a formal mediation analysis, roughly speaking we would expect the coefficients on post offices to attenuate toward zero if their economic impact flows exclusively through the patenting channel.

[30]See Table A.15.

fications and identification strategies and several measures of economic performance. Moreover, our robustness checks support a causal interpretation of the relationship between post offices and economic outcomes. In the short run, counties that received greater allocations of post offices in the nineteenth century experienced faster economic development.

Long-Term Consequences of Postal Systems

We now examine the distal effects of postal infrastructure on economic development. To do so, we measure the former in 1896 and the latter in 2000. Our main dependent variable is median income (logged),[31] which we supplement with data on the number of county manufacturing establishments. The latter measures a certain type of economic development and is available for all decennial Census years in the latter half of the twentieth century.[32]

We regress county-level development in 2000 on post offices in 1896 along with additional covariates, which serve as potential confounders. Our basic specification includes controls for population, percentage of the population born outside the U.S., and population density (to account for variation in county size and urbanicity), each measured from the 1890 Census. We use the logged values (plus one) of these variables. We also estimate models with additional covariates to attempt to alleviate potential confounding between post offices and subsequent development. While many additional county-level features likely affected economic development during the twentieth century, e.g., the growing military-industrial complex, localized effects of the Great Depression, New Deal programs, globalization, demographic changes, migration, and suburbanization, accounting for these factors could introduce potential post-treatment biases (Gelman and Hill 2007, 189). Heteroskedastic robust standard errors are used in all models.

Our results are shown in Table 3. Panel A focuses on median income and Panel B on manufacturing establishments. The coefficient estimates in Model (1) show results from a model estimated with the number of post offices in 1896 and the three covariates noted above. A county's economic circumstances in the year 2000 are positively and significantly associated with the provision of post offices a century prior. The coefficient for the provision of post offices is virtually

[31]The Census reported median income at the household level for 2000 and at the family level from 1960 to 1990.
[32]This dependent variable is parameterized by log $(1 + x)$.

unchanged when state fixed effects are included, as Model (2) indicates. We regard Model (2) as our benchmark model.

Models (3) through (6) include lagged measures of county economic conditions to account for the possibilities that a county's economic circumstances in the late nineteenth century could have precipitated additional post offices and that a county's current economic conditions are in part a reflection of their past. We measure county economic production in the late nineteenth century with the value of farms and manufacturing output, logged and standardized to 2000 real dollars. In Model (3) we include these measures from the 1890 Census, and then include these measures from each decennial Census back to 1860 in Models (4) through (6). Across these four models, the point estimates for the provision of post offices are remarkably stable and are statistically significant in each.

Models (7) through (9) account for other characteristics of counties that may have been associated with their economic circumstances, provision of post offices, or both. In Model (7), we include indicators for access to railroad lines and waterways in 1860 (the most recent year prior to 1896 in which these variables were reported by the Census). Model (8) includes the slave percentage of the population, also measured in the year 1860. Finally, in Model (9) we add the longitude and latitude of each county's centroid to account for varying patterns of economic growth and post office provision that were associated with a county's geographic location. The coefficient for the number of post offices in 1896 continues to be positive and statistically significant in all models.

The substantive magnitudes of the estimated effects are consequential. Our benchmark specification (model 2) implies that increasing a county's post offices by 25 percent in 1896 yielded a 1.8 percent increase in median income in the year 2000. For a county with the mean value of median income in 2000 ($32,940) and post offices in 1896 (25), an increase of six post offices is predicted to increase median household income by approximately $600 in the year 2000. At the aggregate level, this increase in post offices would have provided nearly $22 million in additional income to a county with the mean population.[33] To the extent the economic consequences indexed by

[33]This figure is estimated by dividing the mean population (94,312) by 2.62, Census estimates for persons per household in the year 2000, and multiplying the resulting total (35,997) by $608, or the predicted increase in median

median income are relatively comparable to the farming and manufacturing outcomes used in our panel analysis, the long-term impact of post offices is roughly one-quarter to one-third the magnitude of the shorter-term consequences of post offices.

We find similar results when analyzing the distribution of manufacturing establishments, as shown in Panel B. Across the nine models, the coefficient for the number of post offices in 1896 is positive and statistically significant, and it is relatively stable across the various specifications. These results also suggest an economically significant long-term effect of post offices. Model (2) implies that a 25 percent increase in post offices produced a six percent increase in the number of manufacturing establishments. Such an increase is predicted to increase the number of manufacturing establishments in a county with the mean number from 171 to 186. Altogether, the results in Table 3 provide consistent evidence that postal systems produce economic benefits sustained over long periods of time.

household income from a 25 percent increase in the number of post offices.

Table 3: Distal Effects of Postal Infrastructure in U.S. Counties

Panel A *DV = Median income*	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post offices (ln), 1896	0.081***	0.082***	0.055***	0.064***	0.069***	0.067***	0.078***	0.072***	0.071***
	(0.010)	(0.011)	(0.012)	(0.011)	(0.012)	(0.014)	(0.014)	(0.014)	(0.015)
Population (ln), 1890	−0.053***	−0.074***	−0.155***	−0.164***	−0.187***	−0.242***	−0.243***	−0.236***	−0.234***
	(0.011)	(0.012)	(0.015)	(0.015)	(0.016)	(0.020)	(0.019)	(0.020)	(0.020)
Population density (ln), 1890	0.057***	0.080***	0.076***	0.076***	0.079***	0.089***	0.089***	0.087***	0.087***
	(0.006)	(0.008)	(0.008)	(0.008)	(0.009)	(0.011)	(0.011)	(0.011)	(0.011)
Foreign-born (%, ln), 1896	0.836***	0.322***	0.599***	0.637***	0.770***	0.861***	0.793***	0.785***	0.752***
	(0.046)	(0.079)	(0.076)	(0.074)	(0.082)	(0.094)	(0.096)	(0.096)	(0.102)
(Intercept)	3.483***	3.515***	2.881***	2.773***	2.654***	2.427***	2.602***	2.582***	2.213***
	(0.071)	(0.077)	(0.100)	(0.099)	(0.110)	(0.121)	(0.124)	(0.125)	(0.319)
State fixed effects		✓	✓	✓	✓	✓	✓	✓	✓
Economic development, 1890			✓	✓	✓	✓	✓	✓	✓
Economic development, 1880				✓	✓	✓	✓	✓	✓
Economic development, 1870					✓	✓	✓	✓	✓
Economic development, 1860						✓	✓	✓	✓
Rail + water access, 1860							✓	✓	✓
Slave population, 1860								✓	✓
Latitude + longitude									✓
Observations	2,551	2,551	2,442	2,406	2,147	1,674	1,674	1,674	1,674
Adj-R^2	.193	.360	.410	.432	.468	.493	.506	.507	.507

Panel B *DV = Number of manufacturing establishments*	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post offices (ln), 1896	0.246***	0.280***	0.264***	0.275***	0.336***	0.353***	0.398***	0.260***	0.268***
	(0.060)	(0.068)	(0.068)	(0.068)	(0.070)	(0.074)	(0.074)	(0.075)	(0.074)
Population (ln), 1890	0.726***	0.526***	0.267**	0.312***	0.339***	0.176	0.172	0.319**	0.278**
	(0.078)	(0.082)	(0.093)	(0.093)	(0.098)	(0.107)	(0.107)	(0.106)	(0.102)
Population density (ln), 1890	−0.162***	0.091	0.098	0.156**	0.160**	0.243***	0.247***	0.186**	0.192***
	(0.042)	(0.049)	(0.051)	(0.051)	(0.056)	(0.062)	(0.062)	(0.061)	(0.057)
Foreign-born (%, ln), 1896	2.962***	3.840***	4.055***	3.505***	3.762***	3.246***	3.241***	3.134***	3.626***
	(0.244)	(0.470)	(0.517)	(0.493)	(0.529)	(0.577)	(0.579)	(0.547)	(0.553)
(Intercept)	−3.485***	−2.653***	−4.439***	−5.002***	−5.315***	−5.831***	−5.058***	−5.593***	−0.301
	(0.579)	(0.642)	(0.7638)	(0.586)	(0.600)	(0.654)	(0.663)	(0.657)	(1.756)
State fixed effects		✓	✓	✓	✓	✓	✓	✓	✓
Economic development, 1890			✓	✓	✓	✓	✓	✓	✓
Economic development, 1880				✓	✓	✓	✓	✓	✓
Economic development, 1870					✓	✓	✓	✓	✓
Economic development, 1860						✓	✓	✓	✓
Rail + water access, 1860							✓	✓	✓
Slave population, 1860								✓	✓
Latitude + longitude									✓
Observations	1,887	1,887	1,846	1,839	1,744	1,448	1,448	1,448	1,448
Adj-R^2	.365	.501	.550	.574	.585	.627	.634	.649	.655

Note: Entries are linear regression coefficients with robust standard errors in parentheses. The dependent variables are the logged values of the economic outcomes listed at the top of each panel, measured in the year 2000. The economic development control variables describe the value of the county's farms and manufacturing output from decennial Census data.

* indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$ (two-tailed tests).

The results in Table 3 are robust to a wide range of alternative empirical investigations. First, we find consistent patterns when studying county economic outcomes across the second-half of the twentieth century. Table 4 displays estimates from our benchmark models when predicted economic outcomes in each decennial Census from 1960 through 2000.[34] We find statistically significant evidence of a relationship between our economic measures and the provision of post offices when using data from each decade. These patterns indicate that the results from Table 3 are not an artifact of economic circumstances specific to the year 2000. Moreover, they also suggest that the short-term effects of post offices documented in Table 2 continue to accumulate over time as economic productivity begets additional productivity.

Second, our results are robust to considering geographic changes in county borders. We re-estimated our benchmark models focusing only on counties in states in which no county borders underwent changes between 1896 and 2000, which includes thirteen state. We also re-estimated our models for those states where county lines changed minimally over this time period, based on whether the total number of counties changed by no more than two and in which changes to county borders affected a very small overall proportion of the state's land area (14 states). Finally, we estimated models for observations from either category. Across these counties whose boundaries remained stable during the period under investigation, we continue to find results consistent with Table 3.[35]

Third, we used the per-capita share of manufacturing establishments as the dependent variable rather than the raw number.[36] While these models are subject to potential post-treatment biases because the dependent variable is denominated by a variable (population) which itself could have been affected by the provision of post offices, the results continue to support those in Table 3.

Fourth, we included additional lagged values of the post office measure. Specifically, we included the number of post offices in a county in the years 1876 and 1886.[37] The inclusion of the

[34] Median income values were standardized to real values in the year 2000.

[35] See Table A.16.

[36] See Table A.17.

[37] We selected two additional lags because extending farther back in time would result in missing values for the postal variables for greater numbers of counties.

Table 4: Distal Effects of Postal Infrastructure in U.S. Counties, 1960-2000

Panel A	1960	1970	1980	1990	2000
DV = Median Income					
Post offices (ln), 1896	0.033*	0.047***	0.050***	0.069***	0.082***
	(0.015)	(0.012)	(0.011)	(0.011)	(0.011)
Population (ln), 1890	0.002	−0.021	−0.038**	−0.047***	−0.074***
	(0.016)	(0.012)	(0.012)	(0.012)	(0.012)
Population density (ln), 1890	0.016	0.045***	0.048***	0.072***	0.080***
	(0.009)	(0.008)	(0.008)	(0.008)	(0.008)
Foreign-born (%, ln), 1896	0.657***	0.391***	0.420***	0.289***	0.322***
	(0.101)	(0.084)	(0.081)	(0.083)	(0.079)
Intercept	2.634***	2.888***	3.246***	3.486***	3.515***
	(0.109)	(0.084)	(0.078)	(0.076)	(0.077)
Observations	2,547	2,550	2,551	2,551	2,551
State fixed effects	✓	✓	✓	✓	✓
Adj-R^2	0.516	0.476	0.350	0.421	0.360

Panel B	1960	1970	1980	1990	2000
DV = Number of manufacturing establishments					
Post offices (ln), 1896	0.234***	0.259***	0.358***	0.442***	0.280***
	(0.060)	(0.060)	(0.060)	(0.062)	(0.068)
Population (ln), 1890	0.698***	0.693***	0.604***	0.547***	0.526***
	(0.071)	(0.072)	(0.072)	(0.074)	(0.082)
Population density (ln), 1890	−0.088*	−0.088*	−0.018*	0.020	0.091
	(0.041)	(0.042)	(0.043)	(0.044)	(0.049)
Foreign-born (%, ln), 1896	2.841***	2.854***	2.835***	3.230***	3.840***
	(0.418)	(0.431)	(0.439)	(0.434)	(0.470)
Intercept	−3.683*	−3.459*	−3.014*	−2.901*	−2.653*
	(0.493)	(0.505)	(0.502)	(0.515)	(0.642)
Observations	2,555	2,550	2,551	2,551	1,887
State fixed effects	✓	✓	✓	✓	✓
Adj-R^2	0.638	0.609	0.597	0.597	0.501

Note: Entries are linear regression coefficients with robust standard errors in parentheses. The dependent variables are the logged values of the economic outcomes listed at the top of each panel, measured in Census years indicated at the top of each column. Median income is in real 2000 dollars. Model specifications follow column (2) of Table 3. * indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$ (two-tailed tests).

additional lags does not meaningfully change the estimates for the coefficient associated with the distribution of post offices in 1896. Relatively few of the coefficients for the lagged values are statistically significant and some are negatively signed.[38]

Fifth, we accounted for additional confounders by estimating the models shown in Table 3 and including the other measures of infrastructure and explanations for economic activity that we

[38]See Table A.18.

used in our panel analyses, railroad access and patenting activity prior to 1900. The coefficients for both variables are generally positive and statistically significant, indicating that rail access and innovation in the nineteenth century generated economic returns a century later. However, the inclusion of these additional covariates does not meaningfully change the coefficient estimates for the long-term effects of post offices.[39]

Sixth, we attempted to distinguish the effects of post office locations from rural free delivery (RFD). While both forms of mail service are examples of communications infrastructure, their effects could operate through somewhat different mechanisms. In particular, mail delivery absent a post office location does not provide the same access to financial instruments and mailing services, such as money orders and the ability to send large parcels, respectively. Moreover, to the extent post office buildings were important gathering sites and helped provide a physical sense of the state, delivery alone may not have had the same economic impact as postal office locations due to the absence of enhanced social capital and social integration. We used data from Feigenbaum and Rotemberg (2017) to identify counties with rural free delivery routes in existence by 1900 and created an indicator to distinguish counties with routes in place.[40] We then estimated the models from 3 and included this covariate. The coefficient estimates for both the number of post offices and RFD access were consistently positive; the former is statistically significant in all models while the latter is statistically significant in many (but not all).[41] However, the magnitudes of the RFD coefficients are about a quarter to a third the size of the estimates for the number of post offices. While RFD undoubtedly had economic impacts (Feigenbaum and Rotemberg 2017), particularly in the short-term, in the longer term the evidence suggests that the physical presence of the post office was a more important contributor to economic development.[42]

Finally, to account for the nonrandom distribution of post offices we apply the instrumental variables strategy in our panel analysis to the long-term analysis. We instrument for post offices in 1896 using a county's vote share in 1894 for the incumbent president's copartisan congres-

[39]See Tables A.19 and A.20.

[40]We note that this measure is somewhat crude in that it does not allow us to identify how widely RFD was provided in a given county.

[41]See Table A.21.

[42]Unfortunately, the onset of RFD near the end of our panel analyses prevents us from studying its short-term effects.

sional candidate (a Democrat). The results continue to provide strong evidence of the long-term economic effects of post offices.[43] The second-stage results confirm the patterns from Tables 3 and 4. When predicting median income, the coefficient estimates for post office provision are positive and statistically significant for each Census from 1960 to 2000. The estimates for the analyses of manufacturing establishments are consistently positive, though they are estimated with greater noise for several Census years. As with our panel analyses, the coefficients from the 2SLS models are larger in magnitude than the OLS estimates. The same limitations of our instrument in the panel setting are present in this context, however, and thus we note the same caveats.

In both panel and cross-sectional analyses and across a wide range of robustness checks, we find strong and consistent evidence that the provision of post offices affected economic outcomes in U.S. counties. Supplementary analyses support a plausibly causal interpretation of our findings. Our data reveal that postal systems generate economic benefits in the short-run and these returns persisted over at least a century. The interpretation of our findings is strengthened further by considering the many advances in communication technology over the period under study, including the land-line telephone, radio, television, the internet, and cellular phones, each of which threatened some portion of the post office's relevance.

Evaluating Potential Mechanisms

Our theoretical argument identified several potential mechanisms through which postal systems affected economic development. Here, we discuss preliminary evidence to evaluate whether these pathways generated the economic returns documented above. We regard these analyses as suggestive, but not conclusive. The mechanisms are not randomly assigned; they overlap with each other; and they are difficult to measure. Moreover, it is not possible to conduct a formal mediation analysis. Nonetheless, we can examine the apparent relationship between post offices and several outcomes that may be regarded as likely mechanisms, according to our theoretical account. We focus on U.S. counties for issues of data availability.

[43] See Table A.22.

First, we studied whether increased numbers of post offices resulted in greater numbers of money orders purchased in those areas, which would be consistent with the claim that the post office expanded access to commerce. We collected data from the *Annual Reports of the Postmaster General* on the number of domestic money orders issued in each state for even years between 1890 and 1912 and the number of post offices in each state for the same time period.[44] We regressed the logged value of money orders on lagged measures of post offices (logged) and population (logged). The coefficient estimate for a single lag of post offices is positive but not statistically significant; however, we also estimated models with up to four lags, where we find that the second, third, and fourth lags are all positive and statistically significant. Summing together the coefficients from these estimates, the results suggest that a ten percent increase in the number of post offices increased the number of money orders issued by about two percent.[45]

Second, we studied whether postal systems helped increase social capital in local communities. We evaluate this claim using the earliest county-level data on social capital known to us, which describe the number of community organizations and associations in 1990 (from Rupasingha, Goetz, and Freshwater 2006). We regressed this measure (logged) on the other covariates from the benchmark model from Table 2. Consistent with our argument, the results provide evidence of a long-term link between postal services and social capital, as the coefficient estimate suggests that a 10 percent increase in the provision of post offices in 1896 is associated with about 2.5% more associational groups in 1990.[46]

Finally, we tested whether newspaper access, which characterizes one aspect of information dissemination, may be responsible for the results presented above. Recent research by Feigenbaum and Rotemberg (2017) and Perlman and Schuster (2015) documents the political and economic effects of rural free delivery and attribute them to increased newspaper circulation. Second, because it is difficult to directly measure information diffusion, we used the presence and circula-

[44]Unfortunately, data at the county level do not exist for money orders or related outcomes.

[45]Note that in this analysis, each additional lag corresponds to a two-year time period, whereas in our main county-level analyses each lag corresponds to a ten-year period. It is possible that post offices may take longer to affect patterns of financial transactions than other outcomes, such as social capital, due to potential transaction costs associated with changing means of financial exchange. However, given this difference in the length of time periods and our use of states (rather than counties) as units of analysis, we are reluctant to overstate this contrast. See Table A.23 and Figures A.4 through A.6.

[46]See Table A.24.

tion of newspapers as a proxy. We used county-level data from Gentzkow, Shapiro, and Sinkinson (2011) which measures the number of local newspapers and total newspaper circulation during presidential election years. In both panel and cross-sectional regressions, however, we find little systematic evidence that the number of post offices was associated with greater numbers of daily newspapers or newspaper circulation within U.S. counties.[47] Though not dispositive, these findings provide little support for our argument that the distribution of information via the post office contributed to economic growth.

Overall, we find evidence for several of the mechanisms implicated by our argument. While we do not wish to overinterpret the evidence given the limitations of the data and our ability to identify the mediating effects of the proposed mechanisms, the results provide a plausible case that post offices generated economic growth by reducing the costs of financial transactions and increasing social capital, though we find less evidence to support information dissemination as a potential mechanism.

Conclusion

Postal systems were among the most visible imprints of the state and most prominent forms of public infrastructure during the nineteenth and early twentieth centuries. We argued that the post office facilitated both short-term and long-term economic development. Evidence from original cross-national data and fine-grained data at the U.S. county level is consistent with our argument. Additional evidence suggest that these effects were generated by reducing transaction costs and enhancing social capital.

These findings have important implications for research on state-building and political development. While most research on American state-building focuses on how states developed administrative capacity (e.g., Carpenter 2001; Skowronek 1982) and distributed resources (Gordon and Simpson 2018; Moskowitz and Rogowski 2019*a*, 2019*b*; Rogowski 2016; Skocpol 1993), scholars have paid less attention to the developmental consequences of state-building activities.[48]

[47] In panel regressions, the coefficients on post offices are negative and statistically significant, while in the long-term cross-sectional analyses they are inconsistently signed and never statistically distinguishable from zero. See Tables A.25 and A.26.

[48] See, e.g., Nall (2018) and Rogowski (2018) for important exceptions.

We note three key implications of our research for this literature. First, while the expansion of a state's capacity may enhance its territorial control, our results suggests that its power can also be used to facilitate local development. Second, we offer evidence that state institutions – here, postal offices – precede development, validating a key premise of the institutionalist paradigm. Third, we show that political control over the distribution of post offices, at least in the U.S., had important consequences for the developmental trajectories of local communities. Somewhat more speculatively, our results suggest that political decisions about the siting of post offices made more than a century ago have contributed to economic inequalities between counties in the longer term.

Finally, we note several key limitations of our research and opportunities for further investigation. First, our causal claims are limited by our research design. Post offices were not distributed randomly and the assignment mechanism is not well-known, particularly outside the U.S. Though we estimated a variety of robustness checks to assess the plausibility of our causal interpretation, it is susceptible to the limitations that commonly accompany causal inference in observational settings. Second, while we presented evidence consistent with our hypothesized mechanisms, we cannot evaluate the relative contributions of each. Further research on both mechanisms and moderators would help distinguish potentially competing theoretical expectations. Third, it is unclear how our results generalize to other forms of infrastructure. While our results suggest that evaluating the effect of other infrastructural projects, such as roads, bridges, and broadband internet, requires a long-memoried approach to track their consequences over decades, different forms of infrastructure are likely to operate through different mechanisms. Additional research, both theoretical and empirical, is necessary to evaluate these questions.

References

Acemoglu, Daron, Jacob Moscona and James A. Robinson. 2016. "State Capacity and American Technology: Evidence from the Nineteenth Century." *American Economic Review* 106:61–67.

Behringer, Wolfgang. 2006. "Communications Revolutions: A Historiographical Concept." *German History* 24:333–374.

Blevins, Cameron. 2015. "The Postal West: Spatial Integration And The American West, 1865-1902." PhD Dissertation, Department of History, Stanford University.

Bolt, Jutta and Jan Luiten van Zanden. 2015. "The Madison Project: Collaborative Research on Historical National Accounts." *Economic History Review* 67(3):627–651.

Callen, Zachary. 2016. *Railroads and American Political Development: Infrastructure, Federalism, and State Building*. Lawrence: University Press of Kansas.

Carpenter, Daniel P. 2001. *The Forging of Bureaucratic Autonomy: Networks, Reputations and Policy Innovation in Executive Agencies, 1862-1928*. Princeton, NJ: Princeton University Press.

Crew, Michael A. and Paul R. Kleindorfer. 1998. "Efficient Entry, Monopoly, and the Universal Service Obligation in Postal Service." *Journal of Regulatory Economics* 14:103–125.

Cushing, Marshall. 1893. *Story of Our Post Office*. Boston, MA: A.M. Thayer and Company.

Donaldson, Dave. 2016. "Railroads of the Raj: Estimating the Impact of Transportation Infrastructure." *American Economic Review* (Forthcoming).

Doucouliagos, Hristos and Mehmet Ali Ulubaşoğlu. 2008. "Democracy and Economic Growth: A Meta-Analysis." *American Journal of Political Science* 52(1):62–83.

Duflo, Esther and Rohini Pande. 2007. "Dams." *Quarterly Journal of Economics* pp. 601–646.

Feigenbaum, James J. and Martin Rotemberg. 2017. "Communication and Manufacturing: Evidence from the Expansion of Postal Services." Working paper. Available at https://scholar.harvard.edu/files/feigenbaum_and_rotemberg_-_rural_free_delivery.pdf.

Fuller, Wayne E. 1972. *American Mail: Enlarger of the Common Life*. Chicago: University of Chicago Press.

Gentzkow, Matthew, Jesse M. Shapiro and Michael Simkinson. 2011. "The Effect of Newspaper Entry and Exit on Electoral Politics." *American Economic Review* 101(7):2980–3018.

Gerring, John, Philip Bond, William Barndt and Carola Moreno. 2005. "Democracy and Growth: A Historical Perspective." *World Politics* 57:323–364.

Gordon, Sanford C. and Hannah K. Simpson. 2018. "The Birth of Pork: Local Appropriations in America's First Century." *American Political Science Review* 112(3):564–579.

Granovetter, Mark S. 1973. "The Strength of Weak Ties." *American Journal of Sociology* 78:1360–1380.

Hunter, Janet. 2012. People and Post Offices: Consumption and Postal Services in Japan from the 1870s to the 1970s. In *The Historical Consumer*, ed. Penelope Francks and Janet Hunter. London: Palgrave Macmillan.

John, Richard R. 1995. *Spreading the News: The American Postal System from Franklin to Morse.* Cambridge, MA: Harvard University Press.

John, Richard R. 1998. "The Politics of Innovation." *Daedalus* 127:187–214.

Kernell, Samuel and Michael P. McDonald. 1999. "Congress and America's Political Development: The Transformation of the Post Office from Patronage to Service." *American Journal of Political Science* 43:792–811.

Kielbowicz, Richard B. 1989. *News in the Mail: The Press, Post Office, and Public Information, 1700-1860s.* Westport, CT: Green.

Knack, Stephen and Philip Keefer. 1997. "Does Social Capital Have an Economic Payoff?: A Cross-Country Investigation." *Quarterly Journal of Economics* 112:1251–1288.

Lerner, Daniel. 1958. *The Passing of Traditional Society: Modernizing the Middle East.* New York: Free Press.

Maclachlan, Patricia L. 2011. *The People's Post Office: The History and Politics of the Japanese Postal System, 1871-2010.* Cambridge: Harvard University Asia Center.

Moskowitz, Daniel J. and Jon C. Rogowski. 2019*a*. "Democracy Thrives in Secret? Ballot Reform and Representation in the United States." Presented at the annual meeting of the Mid-West Political Science Association, Chicago, IL; available at https://scholar.harvard.edu/files/rogowski/files/moskowitz_rogowski.pdf.

Moskowitz, Daniel J. and Jon C. Rogowski. 2019*b*. "Politics and Administration: Evidence from the U.S. Patent Office, 1837–2015." Presented at the Executive Politics Conference, Columbus, OH; available at https://scholar.harvard.edu/files/rogowski/files/patent-paper.pdf.

Nall, Clayton. 2018. *The Road to Inequality: How the Federal Highway Program Polarized America and Undermined Cities*. New York: Cambridge University Press.

Perlman, Elisabeth Ruth and Steven Sprick Schuster. 2016. "Delivering the Vote: The Political Effect of Free Mail Delivery in Early Twentieth Century America." *Journal of Economic History* 76:769–802.

Pye, Lucien, ed. 1963. *Communications and Political Development*. Princeton: Princeton University Press.

Rogowski, Jon C. 2015. "Presidential Incentives, Bureaucratic Control, and Party Building in the Republican Era." *Presidential Studies Quarterly* 45:796–811.

Rogowski, Jon C. 2016. "Presidential Influence in an Era of Congressional Dominance." *American Political Science Review* 110:325–341.

Rogowski, Jon C. 2018. "Reconstruction and the State: The Political and Economic Consequences of the Freedmen's Bureau." Presented at the annual meeting of the American Political Science Association, Boston, MA (available at https://bit.ly/2SUtnXU).

Rogowski, Jon C. and Chris Gibson. 2016. "Returns to Sender? Legislative Accountability and the Expansion of the U.S. Postal System, 1876-1896." Presented at the annual meeting of the Mid-West Political Science Association, Chicago, IL; available at https://bit.ly/2S0UHiG.

Roper, Daniel C. 1917. *The United States Post Office: Its Past Record, Present Condition, and Potential Relation to the New World Era.* New York: Funk and Wagnalls.

Rupasingha, Anil, Stephan J.Goetz and David Freshwater. 2006. "The Production of Social Capital in U.S. Counties." *The Journal of Socio-Economics* 35(1):83–101.

Rush, Benjamin. [1787] 1918. *Benjamin Rush and His Services to American Education.* Berne, Indiana: Witness Press.

Scheele, Carl H. 1970. *A Short History of the Mail Service.* Washington, D.C.: Smithsonian Institution Press.

Skocpol, Theda. 1993. "America's First Social Security System: The Expansion of Benefits for Civil War Veterans." *Political Science Quarterly* 108(1):85–116.

Zilliacus, Laurin. 1956. *From Pillar to Post: The Troubled History of the Mail.* New York: William Heinemann.

ONLINE APPENDIX

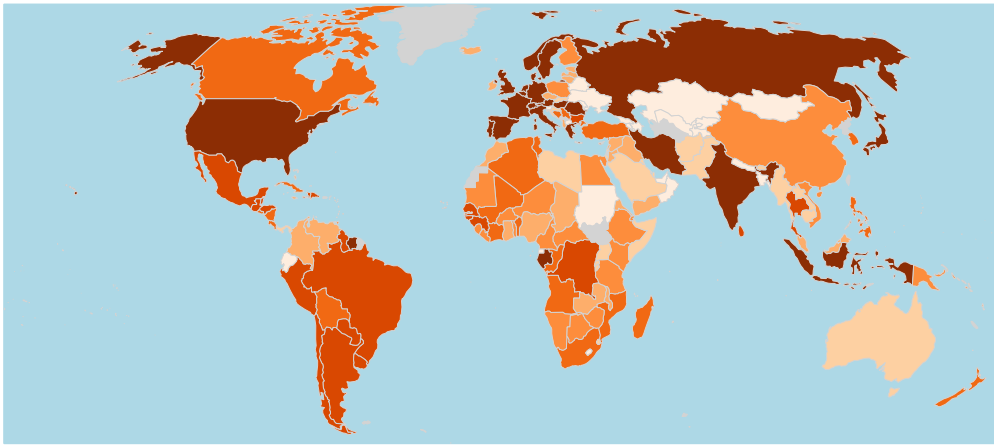
Robustness Checks and Supplementary Analyses for

Public Infrastructure and Economic Development:
Evidence from Postal Systems

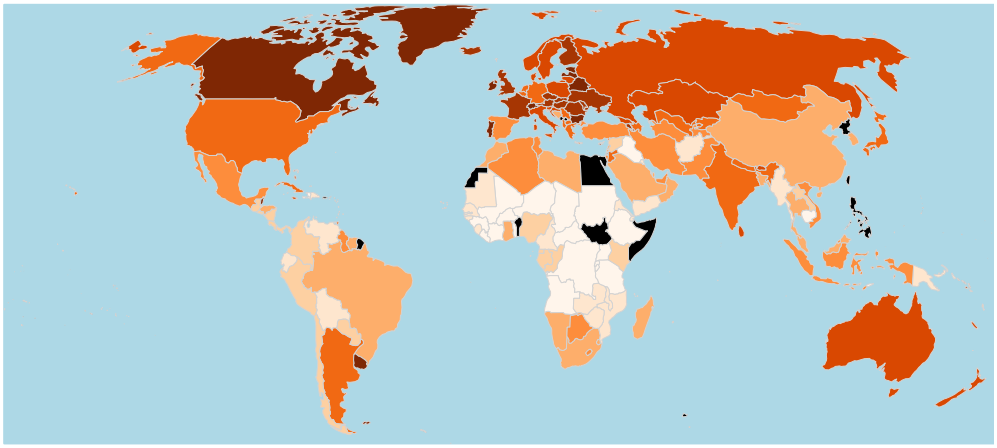
A.1 Descriptive Statistics, Cross-National Data

Figure A.1: Cross-national data on postal services

(a) Data coverage, 1875-2007



(b) Post offices per capita (2000)



Note: Data obtained from the Universal Postal Union. The top panel shows the countries represented in the data, with darker colors indicating countries for which data were available over a longer time period. The bottom panel shows the distribution of post offices per 100,000 population across countries in the year 2000, with darker colors indicating countries with greater numbers of post offices. Countries with missing data are shown in black.

Figure A.2: Post offices per capita, 1875 to 2007

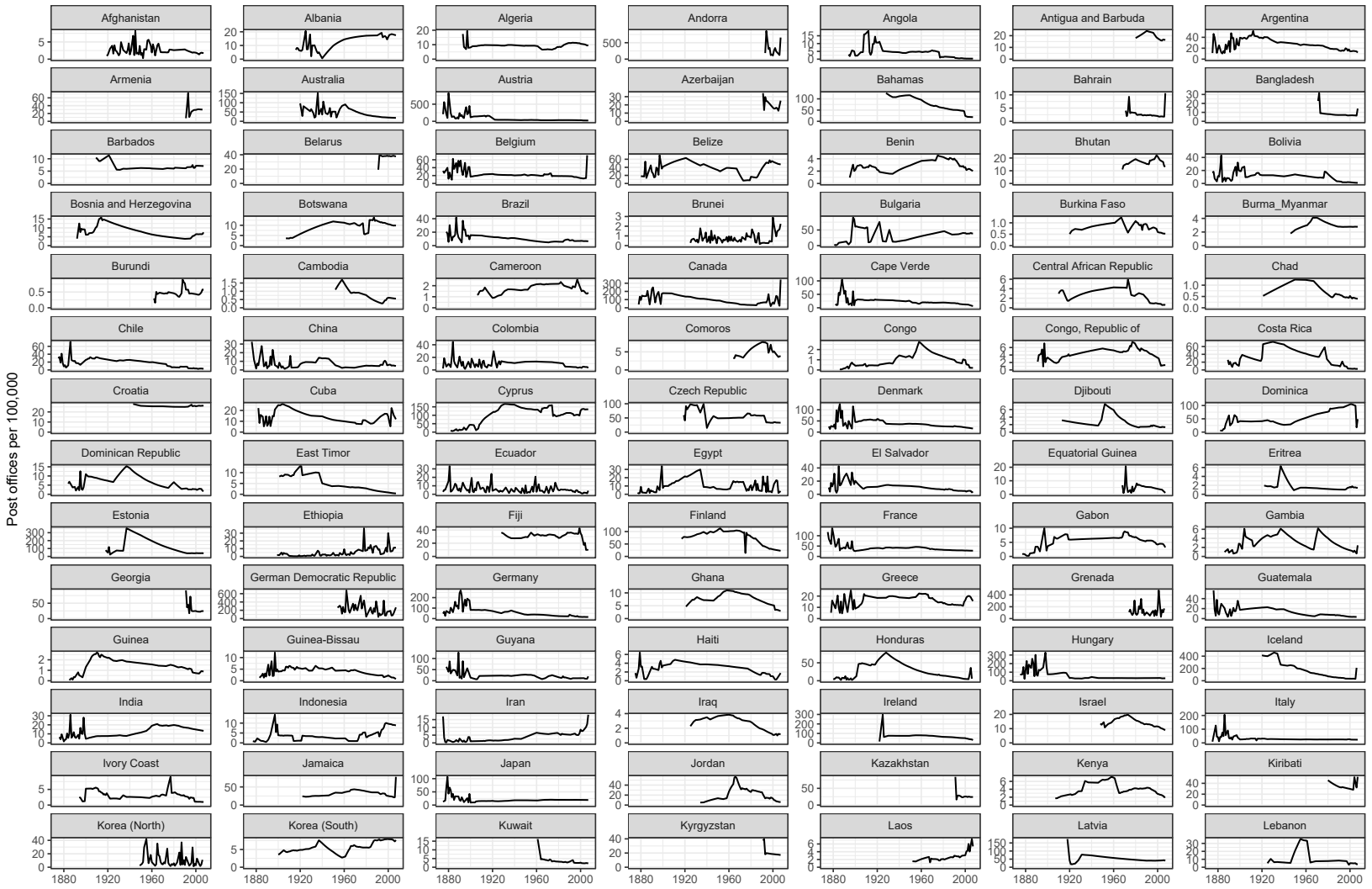
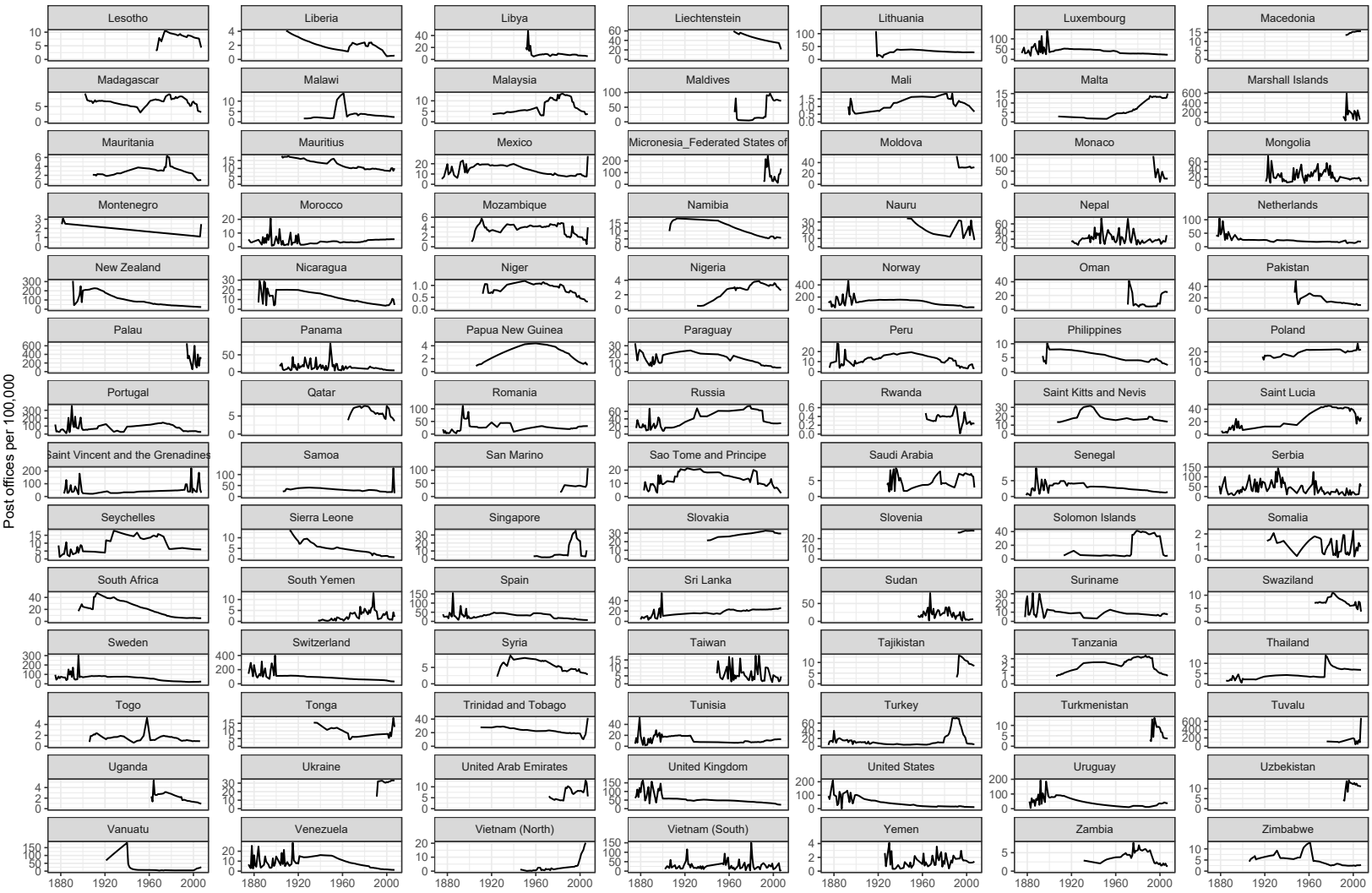


Figure A.3: Post offices per capita, 1875 to 2007



A.2 Robustness Checks, Cross-National Analysis

Table A.1: Postal Infrastructure and Development, Cross-national Evidence: Using Economic Activity Rather than Growth as the Dependent Variable

	(1)	(2)
Post offices (ln, stock)	0.003***	0.003***
	(0.001)	(0.001)
Population (ln)		−0.471***
		(0.077)
Urbanization		0.571
		(0.490)
Regime-type (Polity2)		0.002
		(0.002)
Years since independence		0.006
		(0.004)
(Intercept)	7.023***	13.973***
	(0.159)	(1.139)
N (observations)	1,835	1,540
N (countries)	153	147
Within-R^2	.751	.793
Country fixed effects	✓	✓
Year fixed effects	✓	✓

Note: Entries are linear regression coefficients and standard errors, clustered on country. The dependent variable is the logged value of per capita GDP. Countries are observed at five-year intervals.
* indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$ (two-tailed tests).

Table A.2: Postal Infrastructure and Development, Cross-national Evidence (Balanced Panel): 1960-2005

	(1)	(2)
Post offices (ln, stock)	0.030**	0.031**
	(0.011)	(0.010)
GDP per capita (ln)	−3.315***	−3.670***
	(0.633)	(0.714)
Population (ln)		−1.775
		(0.947)
Urbanization		−6.129
		(4.021)
Regime-type (Polity2)		−0.024
		(0.022)
Years since independence		0.174***
		(0.064)
(Intercept)	17.604*	35.653*
	(6.943)	(17.336)
N (observations)	738	738
N (countries)	82	82
Within-R^2	.203	.203
Country fixed effects	✓	✓
Year fixed effects	✓	✓

Note: Entries are linear regression coefficients and standard errors, clustered on country. The dependent variable is the logged value of per capita GDP growth over a five-year period. Data include all countries for whom full data are available from 1960 to 2005. Countries are observed at five-year intervals.

* indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$ (two-tailed tests).

Table A.3: Postal Infrastructure and Development, Cross-national Evidence

	(1)	(2)	(3)	(4)	(5)
	DV = GDP (logged)		DV= per capita GDP (logged)		
Post offices (ln, stock)	0.004***	0.004***	0.003***	0.0005**	0.0007***
	(0.001)	(0.001)	(0.001)	(0.0002)	(0.0002)
GDP per capita (ln)				0.889***	0.875***
				(0.024)	(0.027)
Population (ln)	0.466***	0.485***		−0.094***	−0.080***
	(0.086)	(0.097)		(0.026)	(0.029)
Urbanization		0.594			−0.239
		(0.490)			(0.143)
Regime-type (Polity2)		0.001			0.000
		(0.021)		(0.001)	
Years since independence		0.005			0.002
		(0.005)			(0.001)
(Intercept)	1.343	1.124	6.947***	2.232***	2.217***
	(1.239)	(1.427)	(0.050)	(0.515)	(0.553)
N (observations)	2,450	1,932	2,008	1,793	1,603
N (countries)	180	158	153	150	147
Within-R^2	.822	.879	.748	.938	.943
Country fixed effects	✓	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓	✓

Note: Entries are linear regression coefficients and standard errors, clustered on country. The dependent variables are listed at the top of each column. Countries are observed at five-year intervals.

* indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$ (two-tailed tests).

Table A.4: Postal Infrastructure and Development, Cross-national Panel Evidence: Lags and Leads

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Lags and leads of independent variables					Lagged dependent variables	
	t+1	t	t-1	t-2	t-3		
Post offices (ln, stock)	−0.002	−0.001	0.013**	0.013**	0.007	0.013**	0.016**
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
GDP per capita (ln)	1.123*	1.121**	−3.635***	−2.960***	−2.673***	−3.676***	−4.046***
	(0.503)	(0.412)	(0.575)	(0.475)	(0.450)	(0.544)	(0.601)
GDP growth per capita (ln), one lag						0.055	0.058
						(0.030)	(0.031)
GDP growth per capita (ln), two lags							0.020
							(0.038)
Population (ln)	−1.012	−0.544	−2.350***	−1.222*	−1.556***	−2.253***	−2.253***
	(0.692)	(0.573)	(0.579)	(0.536)	(0.477)	(0.567)	(0.567)
(Intercept)	8.532	1.639	66.340***	42.151***	43.817***	64.854***	65.011***
	(13.075)	(10.749)	(13.093)	(10.960)	(8.968)	(12.691)	(14.139)
N (observations)	1,694	1,816	1,700	1,576	1,542	1,674	1,581
N (countries)	151	151	150	138	135	150	148
Within-R^2	.160	.154	.210	.185	.173	.211	.223
Country fixed effects	✓	✓	✓	✓	✓	✓	✓
Country fixed effects	✓	✓	✓	✓	✓	✓	✓

Note: Entries are linear regression coefficients and standard errors, clustered on country. The dependent variable is the logged value of growth in per-capita GDP. In models (1) through (5), the post office variable is measured in the year corresponding to the column heading. Results in columns (1) and (2) show that future and current values of post offices, respectively, do not predict current values of per-capita GDP, and columns (3) through (5) indicate that the lag structure does not appear to extend beyond two periods. In columns (6) and (7), we report results when including additional lagged values of the dependent variable. Countries are observed at five-year intervals.
* indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$ (two-tailed tests).

Table A.5: Postal Infrastructure and Development, Cross-national Panel Evidence: Accounting for other potential confounders

	(1)	(2)	(3)
Post offices (ln, stock)	0.009	0.025*	0.026*
	(0.005)	(0.010)	(0.010)
GDP per capita (ln)	−3.148***	−5.109***	−4.512***
	(0.746)	(0.652)	(0.826)
Population (ln)	−2.027**	−3.333***	−3.595**
	(0.694)	(0.938)	(1.177)
Railroads (miles, ln)	−0.328		−0.474
	(0.178)		(0.954)
Telephone mainlines (number, ln)		−0.392	−0.392
		(0.349)	(0.349)
(Intercept)	57.506***	91.433***	96.154***
	(14.040)	(17.838)	(21.214)
N (observations)	1,199	819	600
N (countries)	95	121	89
Within-R^2	.208	.250	261
Country fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓

Note: Entries are linear regression coefficients and standard errors, clustered on country. The dependent variable is the logged value of growth in per-capita GDP. Countries are observed at five-year intervals.
* indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$ (two-tailed tests).

A.3 Robustness Checks, U.S. Panel Analysis

Table A.6: Proximal Effects of Postal Infrastructure in U.S. Counties, 1850-1900 (Additional lags)

	Farm value		Manufacturing output		Manufacturing capital	
Post offices (ln)	0.439*	0.283*	0.796*	0.600*	0.783*	0.593*
	(0.032)	(0.027)	(0.067)	(0.062)	(0.064)	(0.060)
Post offices (ln, one additional lag)	0.372*	0.109*	0.298*	−0.020	0.291*	−0.015
	(0.017)	(0.016)	(0.036)	(0.042)	(0.035)	(0.040)
Population (ln)		0.557*		0.662*		0.634*
		(0.030)		(0.062)		(0.058)
Foreign-born (%, ln)		0.267		1.662		2.107*
		(0.487)		(0.986)		(0.932)
Intercept	12.456*	8.238*	8.411*	3.425*	7.971*	3.169*
	(0.089)	(0.240)	(0.170)	(0.499)	(0.163)	(0.470)
N (observations)	11,931	11,931	11,734	11,734	11,734	11,734
N (counties)	2,647	2,647	2,625	2,625	2,625	2,625
Adj-R^2	0.471	0.581	0.304	0.334	0.362	0.391
County fixed effects	✓	✓	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓	✓	✓
Post offices (ln)	0.302*	0.223*	0.596*	0.498*	0.613*	0.512*
	(0.026)	(0.023)	(0.066)	(0.063)	(0.064)	(0.061)
Post offices (ln, one additional lag)	0.182*	0.034	0.206*	0.033	0.182*	0.009
	(0.019)	(0.018)	(0.042)	(0.045)	(0.042)	(0.045)
Post offices (ln, two additional lags)	0.182*	0.096*	0.086*	−0.012	0.072*	−0.025
	(0.011)	(0.012)	(0.027)	(0.030)	(0.026)	(0.030)
Population (ln)		0.547*		0.624*		0.623*
		(0.048)		(0.103)		(0.098)
Foreign-born (%, ln)		−0.606		1.264		1.892
		(0.464)		(1.328)		(1.238)
Intercept	12.456*	8.328*	8.441*	3.425*	7.971*	3.169*
	(0.089)	(0.240)	(0.170)	(0.499)	(0.163)	(0.470)
N (observations)	9,418	9,418	9,273	9,273	9,273	9,273
N (counties)	2,406	2,406	2,401	2,401	2,401	2,401
Adj-R^2	0.442	0.527	0.270	0.290	0.358	0.377
County fixed effects	✓	✓	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓	✓	✓

Note: Entries are linear regression coefficients and standard errors, clustered by county. The dependent variables are the logged values of the outcomes listed at the top of each column. Models report results for the inclusion of one additional lag (top panel) and two additional lags (bottom panel).

* indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$ (two-tailed tests).

Table A.7: Proximal Effects of Postal Infrastructure in U.S. Counties, 1850-1900 (per capita measures of dependent variables)

	Farm value	Manufacturing output	Manufacturing capital
Post offices (ln)	0.112*	0.183*	0.160*
	(0.016)	(0.022)	(0.021)
Population (ln)	0.243*	0.123*	0.098*
	(0.013)	(0.017)	(0.015)
Foreign-born (%, ln)	−0.907*	1.085*	1.391*
	(0.295)	(0.356)	(0.316)
Intercept	2.598*	0.717*	0.557*
	(0.114)	(0.140)	(0.128)
N (observations)	12,254	12,016	12,016
N (counties)	2,771	2,738	2,738
Adj-R^2	0.331	0.348	0.444
County fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓

Entries are linear regression coefficients and standard errors, clustered by county. The dependent variables are the logged per-capita values of the outcomes listed at the top of each column. * indicates $p < 0.05$ (two-tailed tests).

Table A.8: Proximal Effects of Postal Infrastructure in U.S. Counties, 1850-1900 (Excluding foreign-born)

	Farm value	Manufacturing output	Manufacturing capital
Post offices (ln)	0.313*	0.635*	0.630*
	(0.028)	(0.063)	(0.060)
Population (ln)	0.526*	0.603*	0.581*
	(0.025)	(0.049)	(0.046)
Intercept	8.708*	3.925*	3.650*
	(0.218)	(0.426)	(0.400)
N (observations)	12,256	12,019	12,019
N (counties)	2,772	2,739	2,739
Adj-R^2	0.554	0.330	0.385
County fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓

Entries are linear regression coefficients and standard errors, clustered by county. The dependent variables are the logged values of the outcomes listed at the top of each column. * indicates $p < 0.05$ (two-tailed tests).

Table A.9: Proximal Effects of Postal Infrastructure in U.S. Counties, 1860-1900

	Farm value	Manufacturing output	Manufacturing capital
Post offices (ln)	0.311*	0.704*	0.702*
	(0.026)	(0.070)	(0.067)
Population (ln)	0.486*	0.536*	0.499*
	(0.026)	(0.053)	(0.050)
Foreign-born (%, ln)	−0.238	1.503	1.913
	(0.439)	(1.038)	(0.979)
Intercept	9.592*	5.344*	5.051*
	(0.218)	(0.453)	(0.427)
N (observations)	10,993	10,754	10,754
N (counties)	2,771	2,737	2,737
Adj-R^2	0.561	0.319	0.397
County fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓

Entries are linear regression coefficients and standard errors, clustered by county. The dependent variables are the logged values of the outcomes listed at the top of each column. * indicates $p < 0.05$ (two-tailed tests).

Table A.10: Proximal Effects of Postal Infrastructure in U.S. Counties, 1850-1900 (Using baseline covariates)

	Farm value	Manufacturing output	Manufacturing capital
Post offices (ln)	0.261*	0.348*	0.362*
	(0.025)	(0.056)	(0.055)
Intercept	13.553*	10.164*	9.656*
	(0.060)	(0.134)	(0.133)
N (observations)	7,473	7,385	7,385
N (counties)	1,274	1,274	1,274
Adj-R^2	0.544	0.348	0.389
County fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓

Entries are linear regression coefficients and standard errors, clustered by county. The dependent variables are the logged values of the outcomes listed at the top of each column. * indicates $p < 0.05$ (two-tailed tests).

Table A.11: Proximal Effects of Postal Infrastructure in U.S. Counties, 1850-1900 (Placebo tests)

Independent Variables	*Farm Value*		*# of Manufacturing Establishments*		*Amount of Manufacturing Capital*	
Panel A: Including the leading number of post offices						
Number of post offices (ln)	0.521*	0.303*	0.730*	0.468*	0.728*	0.468*
	(0.041)	(0.033)	(0.077)	(0.070)	(0.073)	(0.067)
Leading number of post offices (ln)	0.093*	0.134*	0.157*	0.204*	0.146*	0.194*
	(0.034)	(0.028)	(0.069)	(0.067)	(0.067)	(0.064)
Controls		✓		✓		✓
Panel B: Substituting lagged values of the dependent variables						
Number of post offices (ln)	0.481*	−0.047	0.490*	−0.144*	0.478*	−0.121
	(0.063)	(0.036)	(0.086)	(0.067)	(0.082)	(0.064)
Controls		✓		✓		✓

Entries are regression coefficients with standard errors (clustered on county) in parentheses. The dependent variables are the logged values of the outcomes listed at the top of each column. The logged values of population and foreign-born percentage of population are included as controls in models where indicated. Decade and county fixed effects are included in all models. * indicates $p < 0.05$ (two-tailed tests).

Table A.12: Proximal Effects of Postal Infrastructure in U.S. Counties, 1850-1900 (County-specific trends)

DV = Farm value				
Post offices (ln)	0.611*	0.473*	0.885*	0.540*
	(0.018)	(0.040)	(0.040)	(0.047)
Intercept	−22.939*	−13.186*	11.895*	10.307*
	(1.476)	(2.258)	(2.258)	(0.225)
N (observations)	13,438	12,254	13,438	12,254
N (counties)	2,788	2,771	2,788	2,771
County fixed effects	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓
Trend	Linear	Linear	Quadratic	Quadratic
Controls		✓		✓
DV = Manufacturing output				
Post offices (ln)	0.895*	0.515*	1.257*	0.595*
	(0.045)	(0.082)	(0.090)	(0.087)
Intercept	−81.190	−77.655*	8.061*	5.852*
	(3.626)	(6.797)	(0.163)	(0.707)
N (observations)	13,098	12,017	13,098	12,017
N (counties)	2,756	2,738	2,756	2,738
County fixed effects	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓
Trend	Linear	Linear	Quadratic	Quadratic
Controls		✓		✓
DV = Manufacturing capital				
Post offices (ln)	0.768*	0.648*	1.211*	0.646*
	(0.038)	(0.082)	(0.084)	(0.084)
Intercept	−97.907*	−86.296*	7.452*	5.510*
	(3.129)	(6.346)	(0.153)	(0.650)
N (observations)	14,354	12,017	14,354	12,017
N (counties)	2,756	2,738	2,756	2,738
County fixed effects	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓
Trend	Linear	Linear	Quadratic	Quadratic
Controls		✓		✓

Note: Entries are linear regression coefficients and standard errors, clustered by county. The dependent variables are the logged values of the outcomes listed at the top of each panel.

* indicates $p < .05$ (two-tailed tests).

Table A.13: Proximal Effects of Postal Infrastructure in U.S. Counties, 1850-1900 (Instrumental variables)

	First-stage	Farm value	Manufacturing output	Manufacturing capital
2SLS				
Vote for president's party in Congress	0.375*			
	(0.024)			
Post offices (ln)		0.362*	1.579*	1.836*
		(0.075)	(0.233)	(0.237)
Population (ln)	0.172*	0.577*	0.465*	0.411*
	(0.014)	(0.032)	(0.066)	(0.064)
Foreign-born (%, ln)	0.104	0.042	1.173	1.427
	(0.219)	(0.447)	(0.963)	(0.945)
N (observations)	8,850	8,850	8,674	8,674
N (counties)	2,258	2,258	2,226	2,226
County fixed effects	✓	✓	✓	✓
Year fixed effects	✓	✓	✓	✓
Reduced form				
Vote for president's party in Congress		0.136*	0.592*	0.688*
		(0.027)	(0.082)	(0.081)
Population (ln)		0.639*	0.734*	0.724*
		(0.032)	(0.058)	(0.056)
Foreign-born (%, ln)		0.080	1.488	1.793
		(0.473)	(0.996)	(0.965)
N (observations)		9,186	9,004	9,004
N (counties)		2,594	2,555	2,555
County fixed effects		✓	✓	✓
Year fixed effects		✓	✓	✓

Entries are regression coefficients and standard errors, clustered by county. The dependent variables are the logged values of the outcomes listed at the top of each column. First-stage F-statistic = 245.30. * indicates $p < 0.05$ (two-tailed tests).

Table A.14: Proximal Effects of Postal Infrastructure in U.S. Counties, 1850-1900 (Accounting for rail lines)

	Farm value	Manufacturing output	Manufacturing capital
Post offices (ln)	0.313*	0.620*	0.613*
	(0.029)	(0.064)	(0.061)
Any rail connection	0.010	0.301*	0.307*
	(0.029)	(0.078)	(0.076)
Population (ln)	0.529*	0.598*	0.572*
	(0.025)	(0.051)	(0.048)
Foreign-born (%, ln)	−0.264	1.731	2.140*
	(0.478)	(1.006)	(0.950)
Intercept	8.627*	3.798*	3.526*
	(0.218)	(0.436)	(0.411)
Post offices (ln)	0.316*	0.643*	0.636*
	(0.029)	(0.064)	(0.062)
Number of rail lines	−0.011*	−0.006	−0.003
	(0.003)	(0.007)	(0.006)
Population (ln)	0.528*	0.594*	0.569*
	(0.025)	(0.051)	(0.048)
Foreign-born (%, ln)	−0.295	1.627	2.043*
	(0.474)	(1.002)	(0.946)
Intercept	8.627*	3.786*	3.513*
	(0.217)	(0.436)	(0.410)
Post offices (ln)	0.317*	0.634*	0.626*
	(0.029)	(0.064)	(0.062)
Number of rail lines (ln)	−0.031	0.066	0.087*
	(0.019)	(0.046)	(0.044)
Population (ln)	0.529*	0.596*	0.571*
	(0.025)	(0.051)	(0.048)
Foreign-born (%, ln)	−0.285	1.689	2.110*
	(0.477)	(1.005)	(0.950)
Intercept	8.624*	3.790*	3.519*
	(0.218)	(0.436)	(0.411)
N (observations)	12,254	12,017	12,017
N (counties)	2,771	2,738	2,738
County fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓

Entries are linear regression coefficients and standard errors, clustered by county. The dependent variables are the logged values of the outcomes listed at the top of each column. * indicates $p < 0.05$ (two-tailed tests).

Table A.15: Proximal Effects of Postal Infrastructure in U.S. Counties, 1850-1900 (Controlling for patenting activity)

	Farm value	Manufacturing output	Manufacturing capital
Post offices (ln)	0.302*	0.619*	0.616*
	(0.028)	(0.063)	(0.061)
Patents (ln)	0.125*	0.018	0.078*
	(0.012)	(0.031)	(0.030)
Population (ln)	0.495*	0.602*	0.551*
	(0.027)	(0.055)	(0.052)
Foreign-born (%, ln)	−0.164	1.410	1.478
	(0.471)	(1.012)	(0.957)
Intercept	8.920*	3.883*	3.802*
	(0.236)	(0.485)	(0.458)
N (observations)	11,728	11,537	11,537
N (counties)	2,560	2,543	2,543
Adj-R^2	0.531	0.328	0.379
County fixed effects	✓	✓	✓
Year fixed effects	✓	✓	✓

Entries are linear regression coefficients and standard errors, clustered by county. The dependent variables are the logged values of the outcomes listed at the top of each column. * indicates $p < 0.05$ (two-tailed tests).

A.4 Robustness Checks, U.S. Long-Term Analysis

Table A.16: Distal Effects of Postal Infrastructure in U.S. Counties, 2000 (Counties with stable boundaries)

Panel A: ***DV = Median Income***	No change	Minor change	No change or minor change
Post offices (ln), 1896	0.044	0.103*	0.078*
	(0.023)	(0.021)	(0.015)
Population (ln), 1890	−0.032	−0.056*	−0.045*
	(0.027)	(0.022)	(0.017)
Population density (ln), 1890	0.071*	0.075*	0.072*
	(0.021)	(0.014)	(0.012)
Foreign-born (%, ln), 1896	0.375*	0.421*	0.393*
	(0.116)	(0.166)	(0.094)
(Intercept)	3.638*	3.281*	3.263*
	(0.163)	(0.144)	(0.106)
State fixed effects	✓	✓	✓
Adj-R^2	0.315	0.459	0.407
Observations	805	788	1,593

Panel B: ***DV = Number of manufacturing establishments***	No change	Minor change	No change or minor change
Post offices (ln), 1896	0.194	0.554*	0.382*
	(0.137)	(0.102)	(0.081)
Population (ln), 1890	0.708*	0.617*	0.689*
	(0.166)	(0.113)	(0.093)
Population density (ln), 1890	0.268*	0.167*	0.179*
	(0.126)	(0.074)	(0.066)
Foreign-born (%, ln), 1896	2.729*	3.953*	3.010*
	(0.565)	(0.751)	(0.456)
(Intercept)	−4.405*	−4.755*	−4.908*
	(0.905)	(0.746)	(0.575)
State fixed effects	✓	✓	✓
Adj-R^2	0.590	0.674	0.634
Observations	617	638	1,255

Entries are linear regression coefficients with robust standard errors in parentheses. Panel labels indicate the dependent variables. Column headings indicate the subset of counties included in each analysis based on the stability of their boundaries between 1896 and 2000. States with no border changes include: Connecticut, Delaware, Illinois, Indiana, Iowa, Kansas, Michigan, Missouri, New Hampshire, Ohio, Pennsylvania, Vermont, and West Virginia. States with minor changes include: Alabama, Arkansas, California, Kentucky, Massachusetts, Maine, Nebraska, New Jersey, New York, North Carolina, Rhode Island, Tennessee, Utah, and Wisconsin. (Most of these changes were truly trivial; for instance, in the mid-twentieth century the town of Block Island, Rhode Island was transferred from one county to another.)
indicates $p < 0.05$ (two-tailed tests).

Table A.17: Distal Effects of Postal Infrastructure in U.S. Counties (using manufacturing establishments per thousand)

	1960	1970	1980	1990	2000
Post offices (ln), 1896	0.060*	0.074*	0.134*	0.192*	0.219*
	(0.014)	(0.015)	(0.016)	(0.018)	(0.023)
Population (ln), 1890	−0.022	−0.023	−0.078*	−0.122*	−0.239*
	(0.018)	(0.017)	(0.019)	(0.021)	(0.026)
Population density (ln), 1890	0.020	0.021	0.063*	0.092*	0.145*
	(0.014)	(0.013)	(0.013)	(0.014)	(0.018)
Foreign-born (%, ln), 1896	0.182	0.159	0.181	0.368*	0.291*
	(0.106)	(0.104)	(0.108)	(0.118)	(0.145)
(Intercept)	0.806*	0.935*	1.215*	1.323*	2.050*
	(0.121)	(0.118)	(0.126)	(0.133)	(0.172)
State fixed effects	✓	✓	✓	✓	✓
Observations	2,555	2,550	2,551	2,551	1,887
Adj-R^2	.343	.296	.302	.329	.236

Entries are linear regression coefficients with robust standard errors in parentheses. The dependent variable is logged number of manufacturing establishments per thousand residents based on decennial Census data. * indicates $p < 0.05$ (two-tailed tests).

Table A.18: Distal Effects of Postal Infrastructure in U.S. Counties: Multiple Lags of Post Office Measures

Panel A *DV = Median income*	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post offices (ln), 1896	0.007	0.043*	0.050**	0.058**	0.060**	0.055**	0.059**	0.057*	0.057*
	(0.016)	(0.018)	(0.018)	(0.018)	(0.019)	(0.023)	(0.023)	(0.023)	(0.023)
Post offices (ln), 1886	0.030	0.014	−0.015	−0.013	−0.009	0.024	0.035	0.033	0.034
	(0.019)	(0.019)	(0.019)	(0.019)	(0.021)	(0.026)	(0.026)	(0.026)	(0.026)
Post offices (ln), 1876	0.065***	0.042***	0.024*	0.015	0.020	−0.018	−0.021	−0.022	−0.023
	(0.010)	(0.011)	(0.011)	(0.011)	(0.015)	(0.017)	(0.017)	(0.017)	(0.017)
(Intercept)	3.488***	3.364***	2.694***	2.648***	2.676***	2.367***	2.556***	2.533***	2.088***
	(0.084)	(0.099)	(0.123)	(0.123)	(0.135)	(0.142)	(0.143)	(0.146)	(0.335)
State fixed effects		✓	✓	✓	✓	✓	✓	✓	✓
Economic development, 1890			✓	✓	✓	✓	✓	✓	✓
Economic development, 1880				✓	✓	✓	✓	✓	✓
Economic development, 1870					✓	✓	✓	✓	✓
Economic development, 1860						✓	✓	✓	✓
Rail + water access, 1860							✓	✓	✓
Slave population, 1860								✓	✓
Latitude + longitude									✓
Observations	2,336	2,336	2,266	2,259	2,097	1,643	1,643	1,643	1,643
Adj-R^2	.250	.389	.437	.444	.465	.494	.507	.507	.508

Panel B *DV = Number of manufacturing establishments*	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post offices (ln), 1896	0.562***	0.315**	0.442***	0.368***	0.372***	0.374**	0.383**	0.313**	0.317**
	(0.113)	(0.118)	(0.117)	(0.106)	(0.113)	(0.119)	(0.119)	(0.116)	(0.115)
Post offices (ln), 1886	−0.196	−0.015	−0.195	−0.129	−0.077	−0.061	−0.007	−0.050	−0.052
	(0.121)	(0.121)	(0.121)	(0.112)	(0.126)	(0.135)	(0.137)	(0.130)	(0.128)
Post offices (ln), 1876	−0.139	−0.002	0.008	0.020	0.019	0.013	0.001	−0.042	−0.038
	(0.071)	(0.062)	(0.064)	(0.065)	(0.074)	(0.080)	(0.081)	(0.081)	(0.078)
(Intercept)	−5.244***	−4.213***	−5.564***	−5.334***	−5.292***	−5.971***	−5.155***	−5.872***	−0.045
	(0.456)	(0.515)	(0.660)	(0.643)	(0.671)	(0.712)	(0.721)	(0.716)	(1.818)
State fixed effects		✓	✓	✓	✓	✓	✓	✓	✓
Economic development, 1890			✓	✓	✓	✓	✓	✓	✓
Economic development, 1880				✓	✓	✓	✓	✓	✓
Economic development, 1870					✓	✓	✓	✓	✓
Economic development, 1860						✓	✓	✓	✓
Rail + water access, 1860							✓	✓	✓
Slave population, 1860								✓	✓
Latitude + longitude									✓
Observations	1,811	1,811	1,778	1,776	1,701	1,420	1,420	1,420	1,420
Adj-R^2	.418	.552	.581	.587	.589	.629	.637	.652	.658

Note: Entries are linear regression coefficients with robust standard errors in parentheses. The dependent variables are the logged values of the economic outcomes listed at the top of each panel, measured in the year 2000. The economic development control variables describe the value of the county's farms and manufacturing output from decennial Census data. In addition to the covariates noted at the bottom of the panels, all models include measures of population, population density, and foreign-born population.

* indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$ (two-tailed tests).

Table A.19: Distal Effects of Postal Infrastructure in U.S. Counties: Accounting for Patent Activity

Panel A *DV = Median income*	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post offices (ln), 1896	0.090***	0.098***	0.074***	0.079***	0.086***	0.076***	0.085***	0.079***	0.079***
	(0.010)	(0.011)	(0.012)	(0.011)	(0.012)	(0.014)	(0.014)	(0.015)	(0.015)
Patents (ln), 1841-1896	0.064***	0.057***	0.046***	0.044***	0.039***	0.022***	0.019***	0.018**	0.018**
	(0.004)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
(Intercept)	4.133***	3.997***	3.344***	3.255***	3.171***	2.755***	2.869***	2.837***	2.449***
	(0.069)	(0.077)	(0.104)	(0.104)	(0.116)	(0.127)	(0.130)	(0.131)	(0.322)
State fixed effects		✓	✓	✓	✓	✓	✓	✓	✓
Economic development, 1890			✓	✓	✓	✓	✓	✓	✓
Economic development, 1880				✓	✓	✓	✓	✓	✓
Economic development, 1870					✓	✓	✓	✓	✓
Economic development, 1860						✓	✓	✓	✓
Rail + water access, 1860							✓	✓	✓
Slave population, 1860								✓	✓
Latitude + longitude									✓
Observations	2,427	2,427	2,344	2,324	2,091	1,651	1,651	1,651	1,651
Adj-R^2	.291	.407	.440	.451	.473	.493	.504	.505	.505

Panel B *DV = Number of manufacturing establishments*	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post offices (ln), 1896	0.237***	0.378***	0.387***	0.396***	0.454***	0.445***	0.480***	0.353***	0.364***
	(0.056)	(0.062)	(0.063)	(0.063)	(0.065)	(0.071)	(0.071)	(0.074)	(0.072)
Patents (ln), 1841-1896	0.242***	0.361***	0.309***	0.299***	0.293***	0.237***	0.224***	0.201***	0.200***
	(0.029)	(0.035)	(0.028)	(0.028)	(0.029)	(0.032)	(0.032)	(0.031)	(0.031)
(Intercept)	−1.407*	0.535	−0.710	−1.023	−1.327	−2.252**	−1.777*	−2.548**	2.366
	(0.674)	(0.768)	(0.686)	(0.683)	(0.693)	(0.819)	(0.823)	(0.818)	(1.792)
State fixed effects		✓	✓	✓	✓	✓	✓	✓	✓
Economic development, 1890			✓	✓	✓	✓	✓	✓	✓
Economic development, 1880				✓	✓	✓	✓	✓	✓
Economic development, 1870					✓	✓	✓	✓	✓
Economic development, 1860						✓	✓	✓	✓
Rail + water access, 1860							✓	✓	✓
Slave population, 1860								✓	✓
Latitude + longitude									✓
Observations	1,850	1,850	1,816	1,812	1,722	1,437	1,437	1,437	1,437
Adj-R^2	.425	.578	.605	.609	.619	.646	.652	.663	.668

Note: Entries are linear regression coefficients with robust standard errors in parentheses. The dependent variables are the logged values of the economic outcomes listed at the top of each panel, measured in the year 2000. The economic development control variables describe the value of the county's farms and manufacturing output from decennial Census data. In addition to the covariates noted at the bottom of the panels, all models include measures of population, population density, and foreign-born population.

* indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$ (two-tailed tests).

Table A.20: Distal Effects of Postal Infrastructure in U.S. Counties: Accounting for Railroad Access

Panel A *DV = Median income*	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post offices (ln), 1896	0.078***	0.082***	0.055***	0.064***	0.069***	0.067***	0.077***	0.071***	0.071***
	(0.010)	(0.011)	(0.012)	(0.012)	(0.012)	(0.013)	(0.014)	(0.014)	(0.015)
Rail access, 1896	−0.031**	0.006	−0.011	−0.010	−0.001	−0.007	−0.012	−0.010	−0.009
	(0.012)	(0.012)	(0.012)	(0.012)	(0.013)	(0.014)	(0.014)	(0.014)	(0.014)
(Intercept)	3.481***	3.517***	2.879***	2.773***	2.654***	2.424***	2.599***	2.580***	2.210***
	(0.071)	(0.077)	(0.099)	(0.099)	(0.110)	(0.121)	(0.124)	(0.125)	(0.319)
State fixed effects		✓	✓	✓	✓	✓	✓	✓	✓
Economic development, 1890			✓	✓	✓	✓	✓	✓	✓
Economic development, 1880				✓	✓	✓	✓	✓	✓
Economic development, 1870					✓	✓	✓	✓	✓
Economic development, 1860						✓	✓	✓	✓
Rail + water access, 1860							✓	✓	✓
Slave population, 1860								✓	✓
Latitude + longitude									✓
Observations	2,551	2,551	2,442	2,406	2,147	1,674	1,674	1,674	1,674
Adj-R^2	.195	.360	.410	.432	.467	.493	.506	.507	.507

Panel B *DV = Number of manufacturing establishments*	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post offices (ln), 1896	0.218***	0.267***	0.250***	0.261***	0.321***	0.337***	0.384***	0.255***	0.270***
	(0.062)	(0.067)	(0.067)	(0.067)	(0.070)	(0.073)	(0.073)	(0.074)	(0.072)
Rail access, 1896	−0.180**	−0.325***	−0.375***	−0.338***	−0.289***	−0.361***	−0.382***	−0.334***	−0.390***
	(0.029)	(0.035)	(0.028)	(0.028)	(0.029)	(0.032)	(0.032)	(0.031)	(0.031)
(Intercept)	−3.467*	−2.694	−4.379***	−4.932***	−5.275***	−5.777***	−4.961***	−5.480***	0.141
	(0.575)	(0.631)	(0.629)	(0.580)	(0.598)	(0.647)	(0.653)	(0.647)	(1.702)
State fixed effects		✓	✓	✓	✓	✓	✓	✓	✓
Economic development, 1890			✓	✓	✓	✓	✓	✓	✓
Economic development, 1880				✓	✓	✓	✓	✓	✓
Economic development, 1870					✓	✓	✓	✓	✓
Economic development, 1860						✓	✓	✓	✓
Rail + water access, 1860							✓	✓	✓
Slave population, 1860								✓	✓
Latitude + longitude									✓
Observations	1,887	1,887	1,846	1,839	1,744	1,448	1,448	1,448	1,448
Adj-R^2	.367	.507	.557	.579	.589	.633	.641	.654	.661

Note: Entries are linear regression coefficients with robust standard errors in parentheses. The dependent variables are the logged values of the economic outcomes listed at the top of each panel, measured in the year 2000. The economic development control variables describe the value of the county's farms and manufacturing output from decennial Census data. In addition to the covariates noted at the bottom of the panels, all models include measures of population, population density, and foreign-born population.

* indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$ (two-tailed tests).

Table A.21: Distal Effects of Postal Infrastructure in U.S. Counties: Accounting for Rural Free Delivery

Panel A *DV = Median income*	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post offices (ln), 1896	0.081***	0.082***	0.056***	0.065***	0.071***	0.068***	0.079***	0.073***	0.073***
	(0.010)	(0.011)	(0.012)	(0.012)	(0.012)	(0.014)	(0.014)	(0.014)	(0.015)
Rural free delivery access, 1901	0.106***	0.069***	0.044***	0.039***	0.027**	0.018	0.020	0.018	0.019
	(0.010)	(0.010)	(0.009)	(0.009)	(0.010)	(0.011)	(0.010)	(0.010)	(0.010)
(Intercept)	3.603***	3.599***	2.986***	2.870***	2.736***	2.488***	2.670***	2.647***	2.265***
	(0.069)	(0.077)	(0.104)	(0.104)	(0.116)	(0.127)	(0.130)	(0.131)	(0.322)
State fixed effects		✓	✓	✓	✓	✓	✓	✓	✓
Economic development, 1890			✓	✓	✓	✓	✓	✓	✓
Economic development, 1880				✓	✓	✓	✓	✓	✓
Economic development, 1870					✓	✓	✓	✓	✓
Economic development, 1860						✓	✓	✓	✓
Rail + water access, 1860							✓	✓	✓
Slave population, 1860								✓	✓
Latitude + longitude									✓
Observations	2,549	2,549	2,441	2,405	2,147	1,674	1,674	1,674	1,674
Adj-R^2	.229	.372	.415	.436	.469	.494	.507	.507	.508

Panel B *DV = Number of manufacturing establishments*	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Post offices (ln), 1896	0.246***	0.283***	0.276***	0.287***	0.346***	0.360***	0.406***	0.270***	0.279***
	(0.060)	(0.067)	(0.067)	(0.067)	(0.069)	(0.074)	(0.074)	(0.075)	(0.074)
Rural free delivery access, 1901	0.019	0.243***	0.182***	0.169***	0.153**	0.129*	0.137**	0.112*	0.110*
	(0.053)	(0.052)	(0.050)	(0.048)	(0.049)	(0.052)	(0.051)	(0.051)	(0.051)
(Intercept)	−3.461***	−2.300***	−3.876***	−4.469***	−4.805***	−5.379***	−4.566***	−5.180***	0.016
	(0.597)	(0.646)	(0.665)	(0.604)	(0.614)	(0.671)	(0.681)	(0.676)	(1.757)
State fixed effects		✓	✓	✓	✓	✓	✓	✓	✓
Economic development, 1890			✓	✓	✓	✓	✓	✓	✓
Economic development, 1880				✓	✓	✓	✓	✓	✓
Economic development, 1870					✓	✓	✓	✓	✓
Economic development, 1860						✓	✓	✓	✓
Rail + water access, 1860							✓	✓	✓
Slave population, 1860								✓	✓
Latitude + longitude									✓
Observations	1,887	1,887	1,846	1,839	1,744	1,448	1,448	1,448	1,448
Adj-R^2	.365	.508	.553	.576	.588	.629	.636	.650	.656

Note: Entries are linear regression coefficients with robust standard errors in parentheses. The dependent variables are the logged values of the economic outcomes listed at the top of each panel, measured in the year 2000. The economic development control variables describe the value of the county's farms and manufacturing output from decennial Census data. In addition to the covariates noted at the bottom of the panels, all models include measures of population, population density, and foreign-born population.

* indicates $p < .05$, ** indicates $p < .01$, and *** indicates $p < .001$ (two-tailed tests).

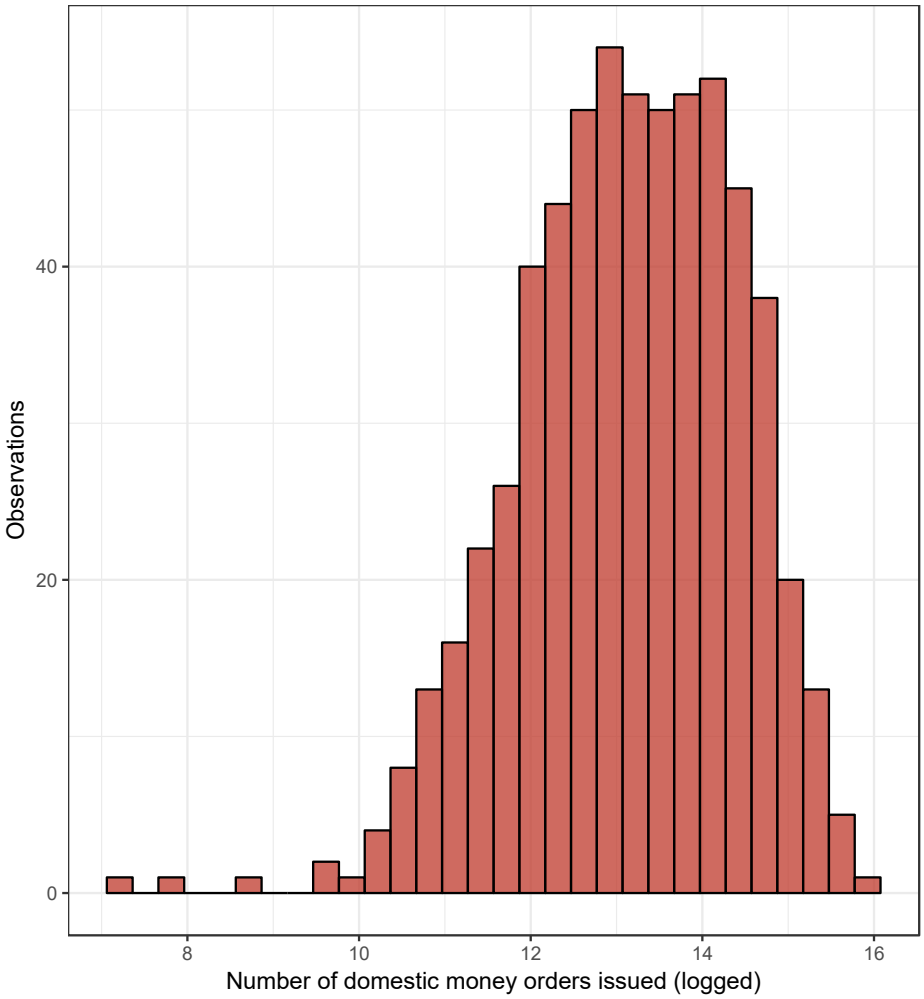
Table A.22: Distal Effects of Postal Infrastructure in U.S. Counties, 1960-2000 (Instrumental variables)

Panel A: ***DV = Median Income***	First-stage	1960	1970	1980	1990	2000
Post offices (ln), 1896		0.503*	0.521*	0.354*	0.510*	0.573*
		(0.190)	(0.160)	(0.134)	(0.145)	(0.150)
Congressional vote, 1894	0.203*					
	(0.045)					
Observations	2,236	2,236	2,239	2,239	2,239	2,239
F (first-stage)	20.816					
Panel B: ***DV = Number of manufacturing establishments***	First-stage	1960	1970	1980	1990	2000
Post offices (ln), 1896		0.634	0.705	1.137*	1.552*	0.805
		(0.459)	(0.505)	(0.545)	(0.605)	(0.501)
Congressional vote, 1894	0.205*					
	(0.045)					
Observations	2,243	2,243	2,239	2,239	2,239	1,741
F (first-stage)	21.037					

Entries are regression coefficients from instrumental variables with robust standard errors in parentheses. The dependent variables are the logged values of the economic outcomes listed at the top of each panel, measured in the year 2000. First-stage regression results are shown in the first column. Population, population density, and foreign-born percentage of population (all measured from the 1890 Census) are included in each model along with state fixed effects. * indicates $p < 0.05$ (two-tailed tests).

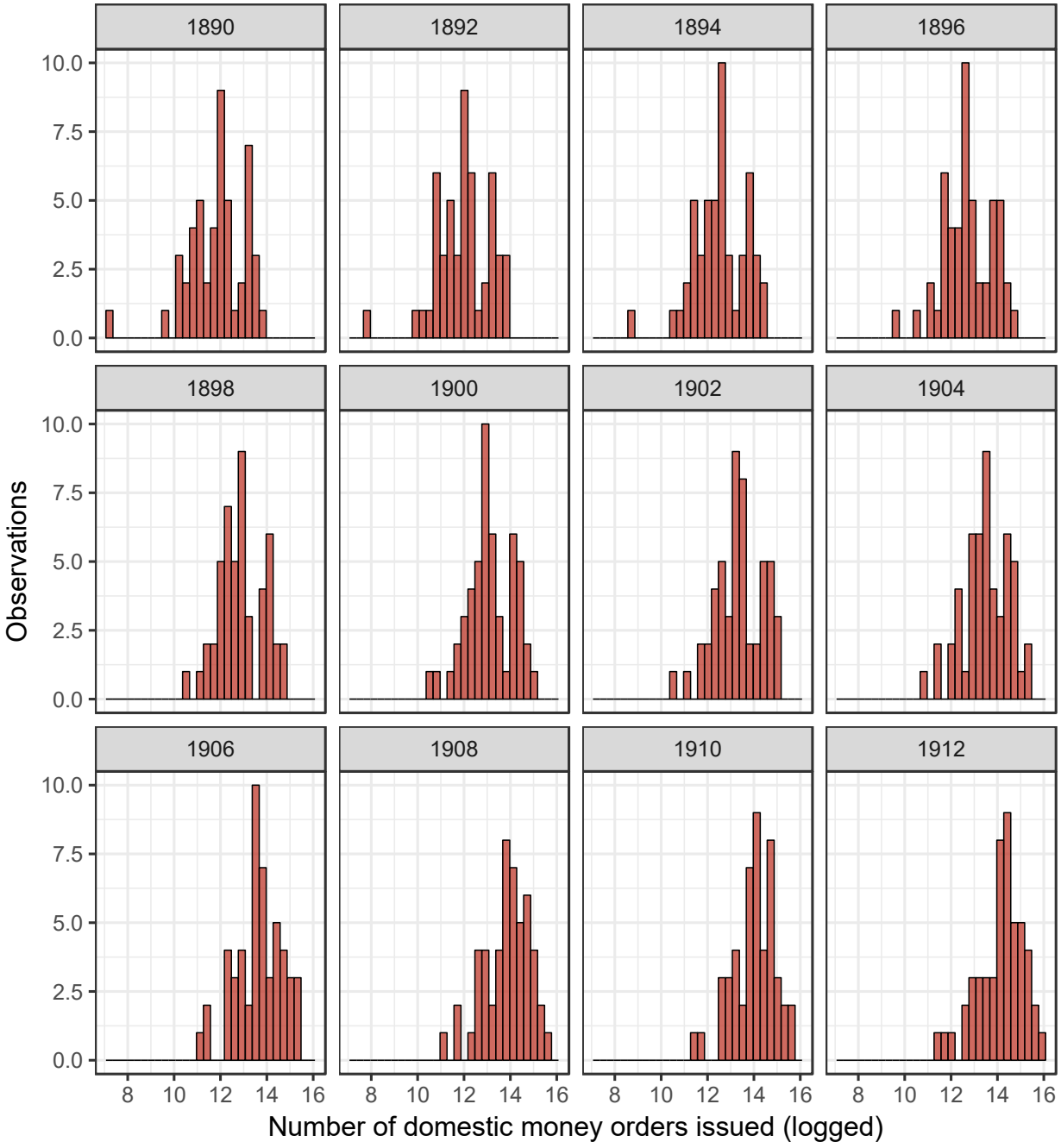
A.5 Descriptive Statistics, Potential Mechanisms

Figure A.4: Distribution of money order transactions, 1890-1912



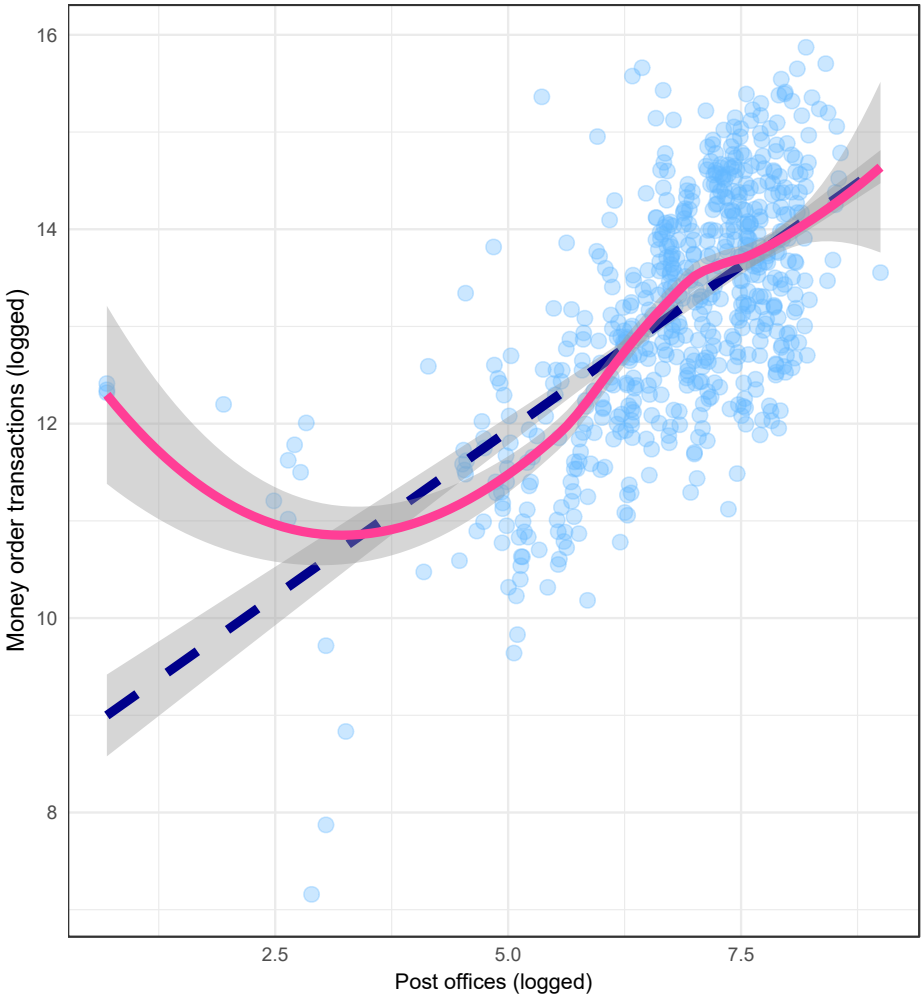
Note: Plot shows the state-level distribution of the number of domestic money orders issued in each even-numbered year, 1890-1912.

Figure A.5: Distribution of money order transactions, 1890-1912



Note: Plots show the state-level distribution of the number of domestic money orders issued in each even-numbered year, 1890-1912.

Figure A.6: The postal service and money order transactions, 1890-1912



Note: Each point represents a state-year observation. The dashed blue lines is the fitted bivariate regression line and the solid red curve is the locally weighted smoother. The correlation between the number of post office locations and money order transactions is 0.62.

A.6 Results from Analyzing Potential Mechanisms

Table A.23: Post offices and financial transactions in U.S. states, 1890-1912

	DV = Money order transactions (logged)	
Post offices (ln), first lag	0.018	−0.011
	(0.032)	(0.020)
Post offices (ln), second lag		0.056
		(0.032)
Post offices (ln), third lag		0.079*
		(0.026)
Post offices (ln), fourth lag		0.068*
		(0.034)
Population (ln)	0.546*	0.424*
	(0.076)	(0.089)
Intercept	4.377	4.888
	(0.972)	(0.944)
N (observations)	580	580
N (units)	51	51
Adj-R^2	0.962	0.964
State fixed effects	✓	✓
Year fixed effects	✓	✓

Entries are linear regression coefficients and standard errors, clustered by state. The dependent variable is the number of domestic money orders issued, parameterized as log(1 + money orders), in each state for even years between 1890 and 1912. * indicates $p < 0.05$ (two-tailed tests).

Table A.24: Postal Infrastructure and Social Capital in U.S. Counties

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
DV = Number of associations, 1990									
Post offices (ln), 1896	0.289*	0.264*	0.164*	0.142*	0.124*	0.159*	0.204*	0.121	0.134*
	(0.056)	(0.064)	(0.057)	(0.057)	(0.057)	(0.061)	(0.061)	(0.062)	(0.062)
Population (ln), 1890	−0.068***	−0.084***	−0.191***	−0.205***	−0.226***	−0.266***	−0.267***	−0.261***	−0.258***
	(0.011)	(0.012)	(0.015)	(0.015)	(0.017)	(0.020)	(0020)	(0.021)	(0.021)
Population density (ln), 1890	−0.097*	−0.048	−0.061	−0.020	0.000	0.063	0.063	0.029	0.037
	(0.032)	(0.042)	(0.041)	(0.042)	(0.045)	(0.045)	(0.049)	(0.049)	(0.049)
Foreign-born (%, ln), 1896	2.330*	2.663*	3.453*	3.055*	2.902*	2.552*	2.262*	2.163*	2.599*
	(0.182)	(0.377)	(0.383)	(0.376)	(0.397)	(0.438)	(0.434)	(0.421)	(0.452)
(Intercept)	−3.657*	−3.613*	−5.358*	−6.300*	−7.757*	−7.985*	−7.229*	−7.493*	−3.901*
	(0.483)	(0.513)	(0.519)	(0.520)	(0.502)	(0.531)	(0.542)	(0.537)	(1.380)
State fixed effects		✓	✓	✓	✓	✓	✓	✓	✓
Economic development, 1890			✓	✓	✓	✓	✓	✓	✓
Economic development, 1880				✓	✓	✓	✓	✓	✓
Economic development, 1870					✓	✓	✓	✓	✓
Economic development, 1860						✓	✓	✓	✓
Rail + water access, 1860							✓	✓	✓
Slave population, 1860								✓	✓
Latitude + longitude									✓
Observations	2,551	2,551	2,442	2,406	2,147	1,674	1,674	1,674	1,674
Adj-R^2	.451	.539	.577	.601	.637	.687	.695	.702	.705

Note: Entries are linear regression coefficients with robust standard errors in parentheses. The dependent variable is the number of associations in U.S. counties in 1990, parameterized as log(1 + associations), which provides an aggregate summary of the number of civic and social associations, bowling and physical fitness facilities, public golf courses, religion organizations, sports and recreation clubs, political organizations, professional organizations, business associations, labor organizations, and other membership groups. Data come from Rupasingha, Goetz, and Freshwater (2006).

* indicates $p < .05$ (two-tailed tests).

Table A.25: Proximal Effects of Postal Infrastructure on Newspapers in U.S. Counties

	Number of daily newspapers	Newspaper circulation
Post offices (ln)	−0.027*	−0.168*
	(0.013)	(0.076)
Population (ln)	0.036*	0.223*
	(0.008)	(0.048)
Foreign-born (%, ln)	0.661*	3.747*
	(0.164)	(1.006)
Intercept	−0.356*	−2.203*
	(0.064)	(0.395)
N (observations)	12,186	12,186
N (counties)	2,724	2,724
Adj-R^2	0.231	0.234
County fixed effects	✓	✓
Year fixed effects	✓	✓

Entries are linear regression coefficients and standard errors, clustered by county. The dependent variables are the logged values of the outcomes listed at the top of each column and are measured in the years 1852, 1860, 1872, 1884, 1892, and 1904. * indicates $p < 0.05$ (two-tailed tests).

Table A.26: Postal Infrastructure and Newspapers in U.S. Counties: Cross-Sectional Analyses

	1900	1920	1940	1960	1980	2000
DV = Number of daily newspapers						
Number of post offices, 1896 (ln)	−0.007	−0.017	−0.012	−0.006	0.016	0.014
	(0.011)	(0.016)	(0.016)	(0.016)	(0.016)	(0.015)
N	2,551	2,551	2,551	2,551	2,551	2,551
DV = Newspaper circulation						
Number of post offices (ln)	0.041	−0.133	−0.032	−0.009	0.179	0.282
	(0.074)	(0.129)	(0.154)	(0.166)	(0.182)	(0.182)
N	2,551	2,551	2,551	2,551	2,551	2,551

Entries are regression coefficients with heteroskedastic robust standard errors in parentheses. The dependent variables (parameterized as $\log(1+x)$) are listed at the top of each panel and the year of measurement is listed at the top of each column. All models include controls for population, population density, and foreign born populations, each measured in the year 1890; lagged values of the dependent variable measured in the year 1896; and state fixed effects. * indicates $p < 0.05$ (two-tailed tests).