The Historical Roots of Local Pubic Finance and the Provision of Public Health, 1900-1930 *

Lauren Hoehn-Velasco†

November 13, 2019
[Updated Version]

This study examines the factors that influenced the provision of local public health through both municipal and county health departments over 1900-1933. I discover that the state capacity of local municipalities and counties, measured by taxation, is the primary factor explaining the adoption of health departments. This finding deviates from related work linking public spending to political alignment and economic need (Wallis, 1984, 1998; Fishback et al., 2003; Fishback and Wallis, 2012; Bailey and Duquette, 2014). The distinct findings in this study highlight the early 20th-century emphasis on local property tax revenues prior to the transition to intergovernmental grants throughout the 1930s (Wallis, 2000; Wallis and Oates, 1998).

JEL codes: H75, I18, N32, N42, O18.

Keywords: public health, property taxes, public finance.

*I am grateful to Claudia Olivetti, S Anukriti, and Robert Margo for their gracious feedback on this project. I thank all the participants at the Boston College Applied Micro Workshop, the Boston College Dissertation Workshop, the Boston University Economic History Reading Group, the 2016 NBER DAE Summer Institute, and the 2016 EHA Annual Meeting for their valuable suggestions and comments.

†Bryn Mawr College, Department of Economics. Email: lvelasco@brynmawr.edu

1 Introduction

What factors produce inequalities in health access? The foundations of modern education expenditure, public health provision, and other local public goods were all set at the beginning of the 20th century when the majority of government finance occurred at the local level (Wallis, 2000). These historical institutions persist into our modern structure of public administration, and while they have been somewhat alleviated through federal and state grants (Wallis and Oates, 1998; Wallis, 2000), understanding the historical framework can give us insight into persistent access gaps. As a case study into the historical influence of local government in the provision of public services, I study the early 20th-century adoption of municipal and county health departments throughout the United States. I consider why some states had widespread adoption of health departments while others had few full-time units. I find that states that were saturated with health departments at the municipal level were wealthier and had stronger preexisting health administration. By contrast, states that provided county-level services were no different in terms of per capita wealth or taxation. Instead, county-level states had a single unifying feature, they all had stronger county governments relative to municipal forms of government.

To test this finding empirically, I show that states with stronger county governments, measured by taxes at the county level, had widespread adoption of health departments at the county level. States with higher taxation at the town, city, or township level experienced municipal-level adoption. While municipal adoption is also correlated with state-level wealth and preexisting health administration, county-level adoption is not correlated with other demographic factors. The results suggest that the scope of the county enabled the provision of health administration regardless of preexisting wealth. This state-level finding fits into a larger literature trying to understand the historical factors that lead to public provision of services (Wallis, 1984, 1998; Fishback et al., 2003; Moehling and Thomasson, 2012; Fishback and Wallis, 2012; Bailey and Duquette, 2014). The municipal-level findings reflect the current literature (Moehling and Thomasson, 2012), but the emphasis on the structure of local government is unique to this study.[1] The remainder of the state-level findings run contrary to related work linking participation in New Deal programs to political attempts to create an electoral consensus (Wallis (1984), Wallis (1998), Fishback et al. (2003), Fishback and Wallis (2012)).

The distinction between this study and related work can be explained by the pre-New Deal Era emphasis on local government finance. The pattern of health department adoption throughout the United States illustrates the importance of local government in the foundation of 20th-century public services. The spread of health departments provides a case study into the provision of public services during the *Era of Property Finance and Local Government* (Wallis, 2000). During this historical era, local property taxes determined public investment in education, highways, water systems, and public health (Wallis and Oates, 1998; Wallis, 2000). The spread of health departments throughout the United States provides a window into the provision of public services before New Deal spending transformed public finance during the 1930s. Beginning the 1930s, the New Deal programs fundamentally altered adoption of public services through intergovernmental grants (Wallis and Oates, 1998; Wallis, 2000).

[1] Closely related, Moehling and Thomasson (2012) links state-level participation in the Sheppard-Towner Program to sizeable prior public health spending.

This new funding structure helped alleviate some of the limitations inherent in property tax finance that are described in this paper.

While the relative strength of municipal versus county governments explains state-level adoption, it cannot explain within-state adoption as local government structure is uniform within each state.[2] Instead, within-state provision is explained by the size and scope of local government, which I measure with the total taxation. Anecdotal evidence for the importance of local state capacity suggests that for health departments to operate successfully, the locality "must possess sufficient taxable wealth" (Graves (1930) and Bishop (1931)). In towns and townships, the "limited wealth and population preclude the employment of full-time professional personnel" (pg 43 (Ferrell et al., 1929)). I test this claim and corroborate this hypothesis using log of taxation to measure the scope of the locality. The results suggest that pretreatment local tax revenue is the sole factor explaining county-level health department adoption within state.

For municipal health departments, by contrast, adoption is more complex, and the factors varied in their explanation. Municipal health departments appear in wealthier, more urban counties with a preexisting tendency towards health administration. These findings more readily corroborate findings in related work (Moehling and Thomasson, 2012; Bailey and Duquette, 2014), as compared to county-level adoption. This association is intriguing as it suggests that the county-level of government allowed health services to be provided to rural areas as well as large cities throughout the United States. The main areas left out of this public health movement were the towns and townships. While many of these localities may have had higher per capita wealth, they did not have the scale to provide full-time administration. These findings suggest that there is a coordination problem inherent in small-town local government that requires counties, states, or federal authorities to overcome.

A few limitations of this study are worth noting before proceeding to the main analysis. First, throughout the early twentieth century, an intricate network of health administration began to evolve in the United States. This health administration eventually encompassed federal, state, local, private, and non-profit organizations. The full description of the history of public health administration is complex, but interesting in its own right. For the purposes of this paper, I will primarily focus on the factors that influenced the provision of full-time local health departments and only briefly mention the private and state influences that helped shaped them. Second, I primarily focus on the spread of health departments throughout the United States and leave discussion of the activities and effectiveness to other studies. Related work has shown that the county-level health departments were effective at preventing infant mortality (Hoehn-Velasco et al., 2018) and improving long-run outcomes (Hoehn-Velasco, 2019).

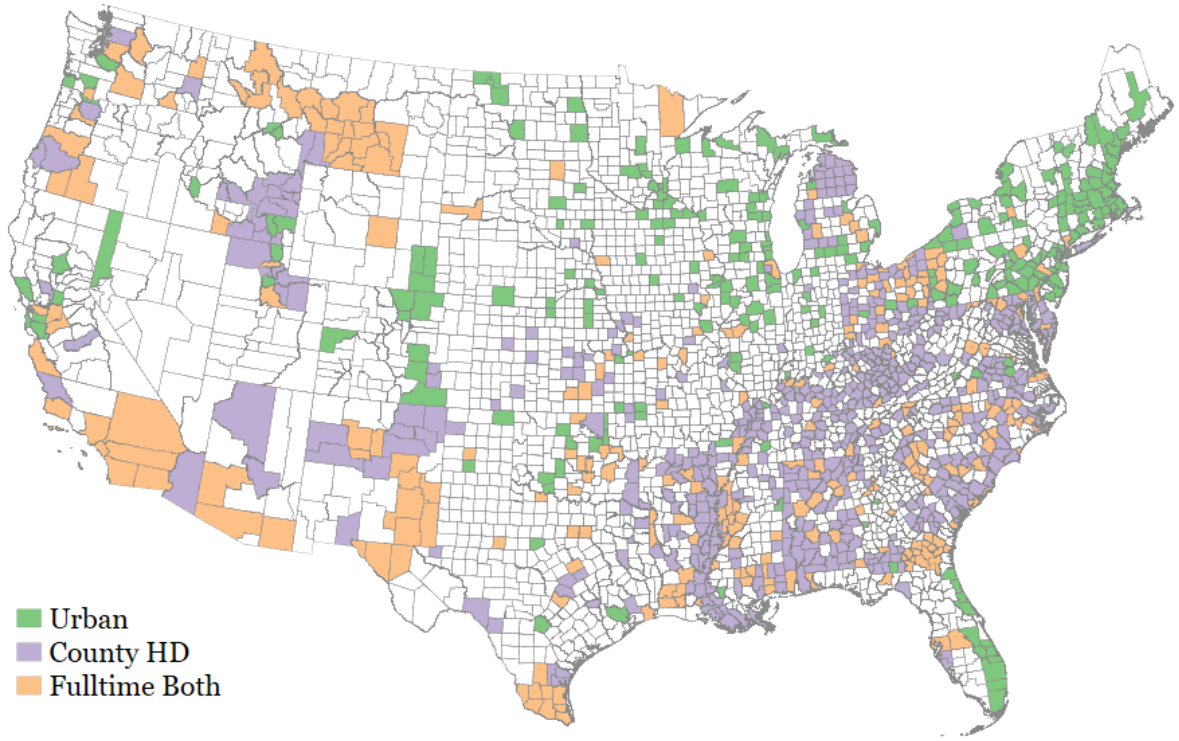
The remainder of this study proceeds as follows. Section 2 covers the history of health department adoption. Section 3 describes the health department data, with the main demographic controls described in Section B. Section 4 examines the factors behind state-level adoption. Section 5 considers county-level provision. Section 6 concludes.

[2]Exceptions exist to this rule, including states such as NY, PA, IN, and IL.

2 County v. Municipal Heath Work

During the nineteenth century, local health boards operated within individual counties, cities, and towns. These part-time health boards governed at the county, city, township, or town level, depending on the existing structure of local government. The north-central United States preferred the town (or township) level, and the West and South defaulted to the county. It was this structure of local governments, rather than demographic or health factors, that laid the foundation for municipal or county-level health departments (Lancaster (1937), Mountin (1934)). In states that are the exception to the rule, including Ohio and Michigan, legislation was passed that required the organization of county-level services. This legislation intended to create more efficient organizations that could operate with enough scale to be effective against illness.[3]

Figure I: Distribution of Health Departments Across the United States



SOURCE: Administrative records covering CHD operation are retrieved from the *History of County Health Organizations in the United States* published in U.S. Public Health Bulletin 222. City health department records from public health reports from volumes entitle: *City Health Officers: Directory of Those in Cities of 10,000 or More Population* for years 1916-1932.

This existing structure of local government was ingrained throughout the United States before full-time health departments were widespread. Public health services followed the same local govern-

[3] At least two states passed legislation enabling county-level services to form, despite being more township-oriented states. This is how Michigan and Ohio came to participate in the county-level health department movement. In Ohio, the start of the movement came with the passage of the Hughes-Griswold Act passed in 1919. This law was acclaimed as a major health accomplishment, and required all cities and counties to organize into health districts and employ a full-time health officer, a nurse and a clerk. The Act also released state funds to contribute up to $2,000 for each district (See Duffy (1992).) The act was signed into law under James M. Cox, a progressive leaning governor.(Morris (1920))

ment structure that had historically organized the funding of elections, property value assessment, and local roads. In some states, this unit was the county, and for others the town or the township (Lancaster (1937), Mountin (1934), Chapin (1916), and Duffy (1992)). Over the early twentieth century, as the public health needs of the United States grew, these local boards transformed into full-time boards that operated preventative health services. This transformation meant that the part-time boards of health became full-time throughout the early 1900s. For cities, the adoption process occurred easily in larger cities. For towns, townships, and rural areas, on the other hand, the full-time provision of a health department was more difficult.

Eventually, for rural areas, the county-level appeared as the default provider for areas outside of major cities as the "the town and village or other subdivisions of the county are usually too small for a sound organization" (Bishop et al. (1932) p. 18). While the nineteenth-century part-time county boards had been ineffective at both the county and township level, the township-level services were particularly stunted due to the small population served. States that had preexisting administration at the county-level were able to adopt full-time services and therefore serve rural areas as well as municipalities. For the town and township states, however, the part-time town-level boards were unable to organize preventative public health. Thus, gaps in the provision of health occurred in these municipal-oriented states.

To illustrate the organization of full-time health administration throughout the United States, Figure I shows the distribution of county and municipal health departments. Green counties indicate only municipal adoption. Orange counties indicate a full-time county and municipal health department. Purple indicates only county-level adoption. Throughout the Northeast and central Midwest, municipal health departments dominate the map. In the South and West, more county health departments and combination municipal-county health departments appear.

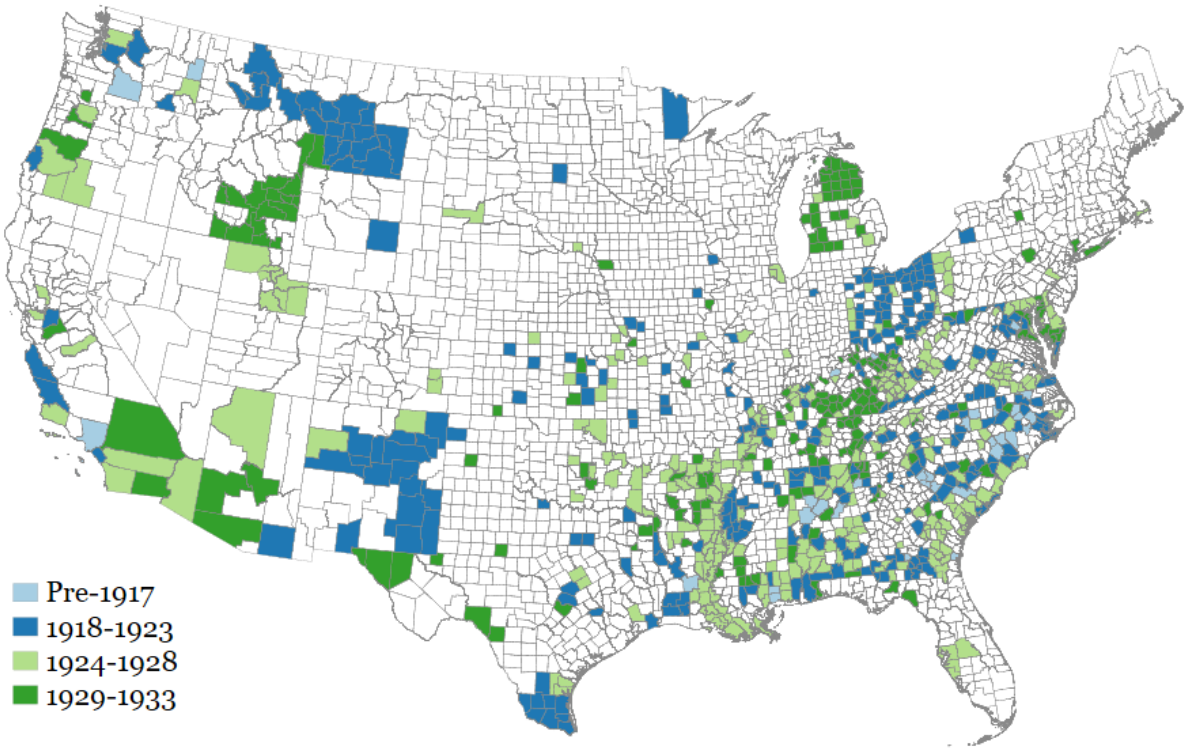
3 Health Department Administrative Records

County Health Departments The *History of County Health Organizations* (Ferrell et al. (1936)) tracks the rollout of county-level health departments from 1908 until 1933. The data reports annual records of the staff members employed, the annual budget by source, and the name of the health officer overseeing the department. I digitized the data from the original document, issued by the USPHS, with examples of the source tables included in Figure A.1. This document was printed as a public health report and claims that it provides a complete record of full-time county-level health departments in the United States. For a more detailed description of this data, and the health services provided by the movement, see Hoehn-Velasco et al. (2018) and Hoehn-Velasco (2019).

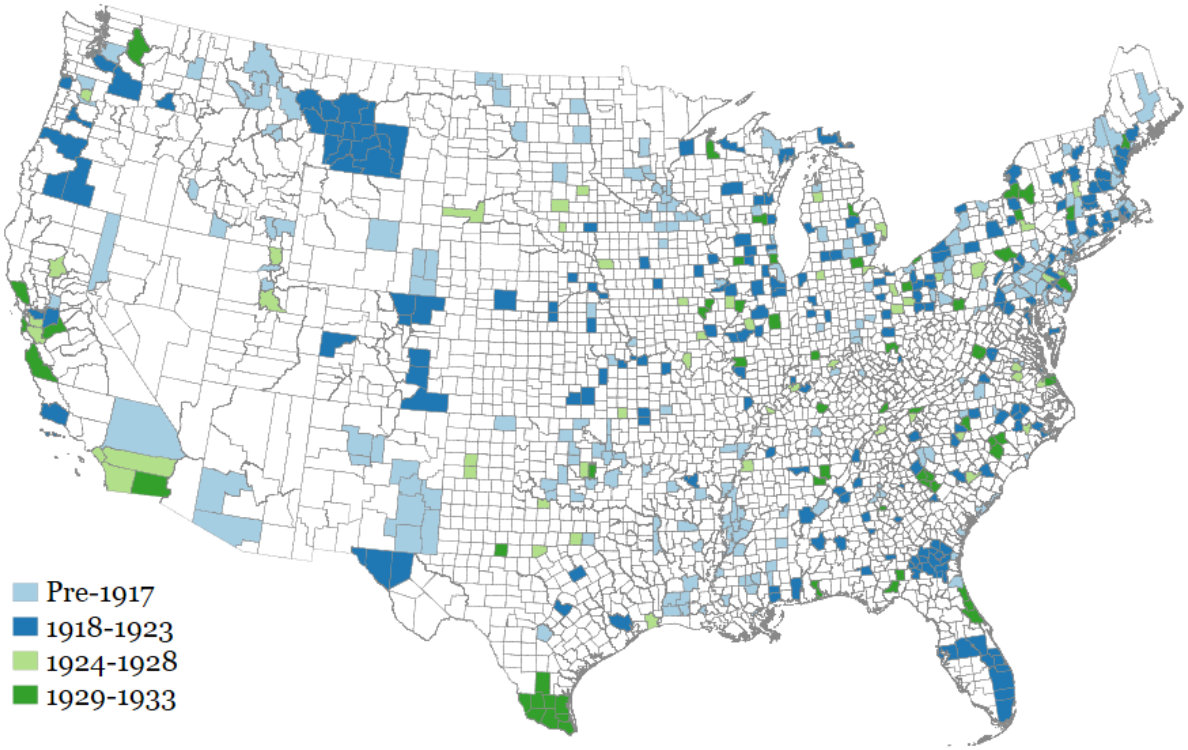
To illustrate the timing and geographic distribution of county-level health departments, Figure II, plots the distribution across the United States. Blue areas represent earlier health department adoption and green counties show later adoption. The map reveals a cluster of departments in the South, sporadically in the West, and throughout Michigan and Ohio in the Midwest. The middle of the nation, as well as the Northeast, has limited investment from this movement. For the purposes of this paper, I

Figure II: Timing of Health Departments, Municipal versus County

Panel A: County



Panel B: Municipal



SOURCE: Administrative records covering CHD operation are retrieved from the *History of County Health Organizations in the United States* published in U.S. Public Health Bulletin 222. City health department records from public health reports from volumes entitle: *City Health Officers: Directory of Those in Cities of 10,000 or More Population* for years 1916-1932.

focus on the binary adoption decision displayed on the map.

Municipal Health Departments Municipal health departments, for the purposes of this paper, will be defined as health departments that serve towns and cities with more than 10,000 persons. The spread and adoption of these health departments varied, and the factors that affected adoption were also distinct. Unlike the county health department movement, to my knowledge, there is no complete written history of municipal health work. Instead, I piece together information on the location and full-time operation of municipal health departments from *City Health Officers: Directory of Those in Cities of 10,000 or More Population* (1916-1933). This data is a directory of the city and town health departments from 1916 to 1933. The data includes the name of the health officer and whether the health department was full time. This directory includes all municipalities with a population of over 10,000 persons. Figure A.2 shows the original source document.

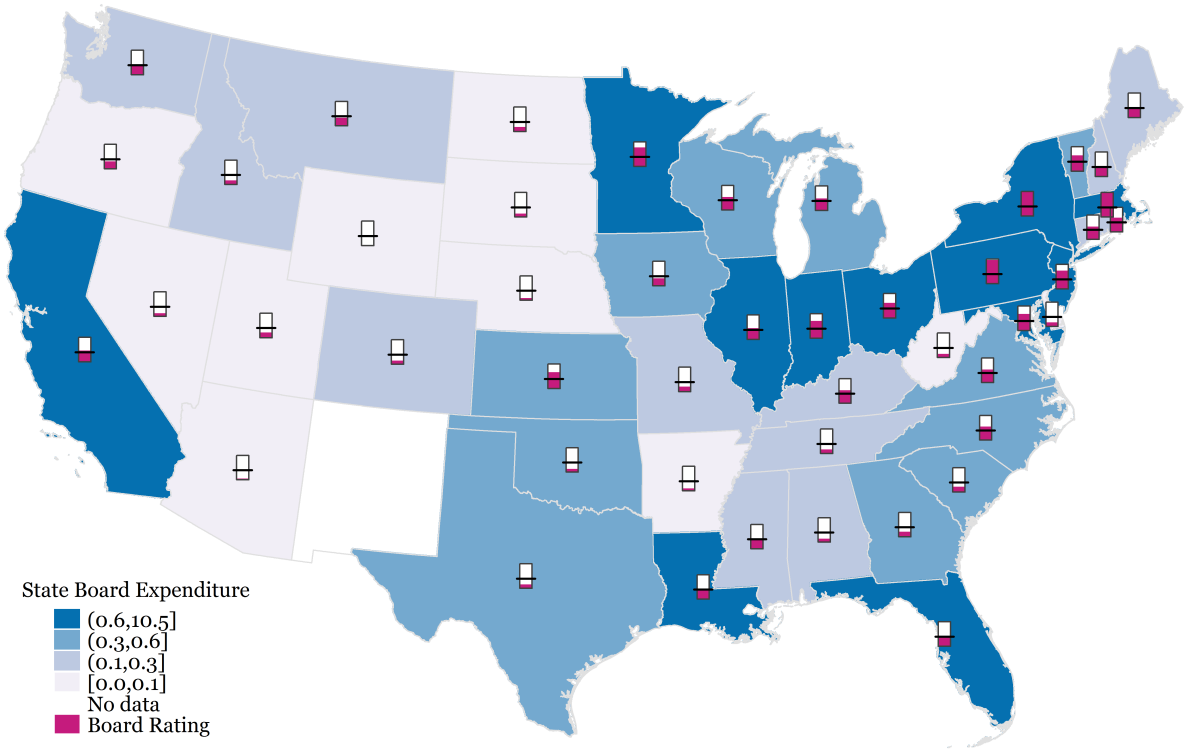
I measure the presence of a municipal health officer as a binary adoption choice. I focus on the full-time provision of health departments and rely on the definition of full time provided in *City Health Officers: Directory of Those in Cities of 10,000 or More Population* (1916-1933). While this data source includes municipalities that had part-time boards, I focus this study on the factors that influenced the full-time administration of public health. Much of the anecdotal evidence suggests that part-time boards were ineffective and provided little-to-no preventative work.[4] To illustrate the location of municipal health departments throughout the United States, Figure II maps the location and timing. Light blue shows early adoption, pre-1917. Dark blue indicates adoption through the early 1920s, and green counties indicate adoption in the later 1920s and early 1930s. From the map, there is no clear adoption pattern. Municipal health departments appear sporadically throughout the United States. Unfortunately, a limitation of this data is that it does not include the date when the health department began operation, and begins in 1916.

State Health Departments At the beginning of the twentieth-century health administration was focused at the state and local level rather than the national level. As of 1900, state boards of health frequently served an advisory role to local boards (Chapin, 1900), but the state boards slowly gained strength over the following 30 years. The first state board of health was established in Massachusetts in 1869, and by 1900, 38 other states had formalized boards of health (Ferrell et al., 1929). By 1914 all states excluding New Mexico had state boards of health Chapin (1916). These state boards of health were the central administrators who worked together with local boards to provide preventative health services and infectious disease control. Even though nearly all states had functioning boards of health in the early 1900s, not all were the same quality. To illustrate the state-level differences in quality, I collect data on the spending and quality ratings from Chapin (1916). These measures are mapped across the United States in Figure III. Dark blue shading reflects higher per capita expenditure by the state board.

[4] Many of these boards were also part-time and did not offer full-time preventative services(Ravenel, 1921) reports that as of 1921, "in every state some legal provision for local health organizations, though actually, in the great majority of small towns and rural districts, there is no board of health, or health officer, or else they are entirely inefficient" (pg. 138). While many cities had acting boards of health, towns and townships were frequently left out of organization. According to a 1930 history of health departments in the United States: *The township, governmental unit for purposes health in the absence of large towns, as a rule has not afforded a satisfactory unit for local health work. Its limited wealth and population preclude the employment of full-time professional personnel. Accordingly, in the States where the township rather than the county is the local unit of government, it is necessary to centralize the State health department...* (pg 43 (Ferrell et al., 1929))

Red bars present the rating of each state department of health in 1914, where higher scores represent better state-level services. The four states that stand out for their expenditures are Massachusetts, Ohio, Pennsylvania, and New York.

Figure III: State Health Board Spending and Rating



NOTES: The map displays the per capita state board of health expenditure in 1914. The red bar shows the rating of the state board of health in 1914, with a higher number reflecting a better functioning board of health. New Mexico is missing from the data because of its lack of health-related activities in 1914.

SOURCE: Data sourced from Chapin (1916).

Summary Statistics by Health Department Type Before testing the factors that led to health department adoption, I consider summary statistics across county-types. Similar to Figure I, Table 1 breaks counties into those that provided no full-time health departments, counties that provides county-level health departments, counties that only offered only a municipal health department, and counties that provided both a county-level and municipal-level health department. I also show the differences in means across (1) counties without a health department and counties that adopted a county-level health department and (2) municipal health department versus counties that provided both.

Considering the areas that did *not* adopt a health department versus county-level adoption over the first three columns, areas that did not provide health departments are larger, more white, have higher property taxes, property values, and per capita property taxes and values. Thus, counter-intuitively, areas that did not provide county-level health departments are actually wealthier and larger than those that did. The distinction between the adoption is in the relative strength of the local government, which I measure with the municipal versus county taxes. Areas that did not participate in the program have higher municipal taxes, while counties that had county-level health departments had higher county-level taxes.

Table 1: Summary Statistics by County Type

	No HD	County HD	Diff-erence	Municipal HD	Fulltime Both	Diff-erence
	Mean	Mean	Est.	Mean	Mean	Est.
Population						
Population (K)	1.51	1.99	-0.48***	9.45	6.08	3.37**
Rural Population (K)	1.11	1.61	-0.50***	2.36	2.27	0.10
Population Urban	0.40	0.38	0.02	7.08	3.82	3.27**
Demographic						
Urban	0.08	0.06	0.01**	0.49	0.36	0.12***
Farm	0.56	0.59	-0.02**	0.27	0.36	-0.10***
White	0.89	0.77	0.12***	0.95	0.77	0.18***
Black	0.10	0.23	-0.13***	0.04	0.22	-0.18***
Physicians/10,000	13.89	12.77	1.12***	15.73	15.96	-0.23
Under 5	0.13	0.14	-0.01***	0.11	0.12	-0.01***
Under 1	0.03	0.03	-0.00***	0.02	0.02	-0.00***
Total Value Taxes						
Taxes (10K)	10.72	9.04	1.68***	105.82	66.21	39.61*
Property Values (10K)	402.84	439.65	-36.81	4,082.29	1,898.62	2,183.66***
County Taxes	5.68	5.79	-0.11	22.55	27.80	-5.25
State Taxes	1.85	2.11	-0.26	10.60	9.66	0.94
Other Divisions Taxes	4.86	4.58	0.29	94.33	58.20	36.13*
Share Taxes						
P.C. Municipal Taxes	0.26	0.20	0.06***	0.58	0.43	0.15***
P.C. County Taxes	0.54	0.56	-0.02*	0.30	0.40	-0.10***
P.C. State Taxes	0.19	0.24	-0.05***	0.11	0.16	-0.05***
P.C. Municipal School Taxes	0.68	0.45	0.23***	0.77	0.59	0.18***
P.C. County School Taxes	0.14	0.24	-0.10***	0.07	0.18	-0.11***
P.C. State School Taxes	0.18	0.31	-0.13***	0.16	0.23	-0.06**
Per Capita Taxes						
Property Tax	10.11	14.20	-4.09	11.33	8.71	2.62***
Property Values	504.24	707.78	-203.54	386.20	317.71	68.49***
P.C. Municipal Taxes	3.53	2.04	1.49***	8.93	6.83	2.10**
P.C. County Taxes	9.52	3.48	6.05***	4.83	6.62	-1.78**
Per Capita Expenditures						
P.C. Health Exp.	0.07	0.07	0.01	0.58	0.49	0.09*
P.C. County Health Exp.	0.04	0.04	-0.00	0.16	0.11	0.04
P.C. Urban Health Exp.	0.35	0.31	0.03	0.82	0.85	-0.04
P.C. General Exp.	6.04	3.97	2.07***	10.68	9.80	0.88
P.C. County General Exp.	5.74	3.73	2.01***	10.32	10.68	-0.36
P.C. Urban General Exp.	9.51	8.16	1.35***	12.51	10.88	1.63***
P.C. School Exp.	1.44	1.39	0.06	3.38	3.30	0.08
P.C. County School Exp.	1.06	1.12	-0.05	1.45	2.75	-1.31**
P.C. Urban School Exp.	4.91	3.87	1.04***	5.13	4.26	0.86***
N	1,862	512	2,374	256	213	469

Sources: Administrative records covering CHD operation are retrieved from the *History of County Health Organizations in the United States* published in U.S. Public Health Bulletin 222. City health department records from public health reports from volumes entitle: *City Health Officers: Directory of Those in Cities of 10,000 or More Population* for years 1916-1932. County-level data on property taxes, property values, and public debt are available in Census publications entitled *Wealth, Public Debt, and Taxation.* County-level demographic characteristics are calculated from the IPUMs Restricted Complete Count Census data.

Notes: Demographic variables and total tax values are from 1900. Due to limited data availability, the taxes by type and the expenditure by type are only available in 1910. Significance levels at the 10, 5, and 1 percent.

Next, considering counties the provided municipal health departments versus both types of health departments over Columns (4)-(6), counties that provided municipal health departments are the largest in population size. This is likely because they had very limited rural areas within their boundaries. The urban emphasis is corroborated by the share urban and the total urban populations. Municipal-level health departments also operate in areas with higher property values and higher property taxes at the municipal level. Areas that provided both municipal and county-level health departments have higher taxes at the county level. The importance of the municipal-level of government for municipal adoption and county-level government for county-level adoption aligns with the historical background information emphasizing the importance of the relative strength of the local government.

4 State-level Adoption

I begin by examining the state-level spread of county and municipal health departments. The overall picture painted in Table 1 corroborates the historical evidence suggesting that the state-level spread of health departments depended on the relative strength of local government. I capture this state-level adoption as the share of counties in the state that have instituted either municipal-level or county-level health departments.

I then test the share of counties with municipal-level and county-level health departments as:

$$\left(\frac{\text{\# HD Counties}}{\text{\# Counties}}\right)_s = \beta_0 + \beta_1 \text{ Local Taxation}_s + \mathbf{X}_s'\gamma + \epsilon_s \tag{1}$$

Where the local taxation measures the relative strength of each type of government in 1910 in state s. $\mathbf{X}_s'$ is set of state-level demographic characteristics from 1900. ϵ_s is the regression error. Table 2 shows results. The outcome, share of counties adopting either a municipal or county-level health department, is estimated over the state-level per capita taxes and share of taxes at each level of government. Panel A shows the adoption of a municipal-level health department, and Panel B shows the county-level adoption of a health department.

Focusing on municipal-level health departments in Panel A. Over Columns (1) and (2), states with a higher share of taxes at the municipal level are more likely to implement municipal health departments. This result also holds over the per capita measure of municipal taxes in Columns (3) and (4). Across Panels (1)-(4), the theme of the results is clear, higher municipal taxation (either per capita or share of total taxes) leads to state-level spread of municipal health departments. I then check whether county-level taxes are correlated with the presence of a municipal health department. In Columns (5)-(8), it is clear that these municipal-adopting states have lower county-level taxes (both the share and per capita). Over Panel A, states with strong preexisting municipal governments are more likely to operate health departments at the municipal level.

In Panel B, the story is reversed. County health departments saturate states with higher county taxes and lower municipal taxes. Columns (1)-(4) show that states with higher adoption of the county-

level program had lower municipal taxes (both share and per capita). They also have higher per capita taxes at the county level in Columns (7) and (8). This difference in the per capita and share of tax revenue at each level of government reveals the relative power structure across adopting and non-adopting states. County governments were relatively strong in areas that adopted county-level administration and municipal governments were stronger in states that adopted municipal-level health departments. The pre-defined structure of local government predicts the provision of public health administration.

Table 2: State-level Share of Participating Counties and Taxation

Panel A: Share of Counties Adopting a Municipal Health Department

	Municipal Taxes				County Taxes				Assessment			
	Share		P.C.		Share		P.C.		County		Municipal	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Measure of Taxation	0.510***	0.410***	0.0237***	0.0124*	-0.00766**	-0.0113**	-0.698***	-0.578***	-0.411***	-0.338***	0.287***	0.299***
	(0.103)	(0.124)	(0.00541)	(0.00621)	(0.00339)	(0.00438)	(0.130)	(0.121)	(0.0993)	(0.0710)	(0.103)	(0.0823)
Observations	48	48	48	48	48	48	48	48	48	48	48	48
Adjusted R-sq.	0.39	0.53	0.40	0.45	0.04	0.49	0.45	0.63	0.27	0.58	0.14	0.55
Mean Dependent	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23	0.23
Controls		X		X		X		X		X		X

Panel B: Share of Counties Adopting a County Health Department

	Municipal Taxes				County Taxes				Assessment			
	Share		P.C.		Share		P.C.		County		Municipal	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Measure of Taxation	-0.271*	-0.309**	-0.0221***	-0.0321**	-0.00864*	-0.00610	0.371**	0.436**	0.369***	0.204*	-0.467***	-0.283**
	(0.140)	(0.131)	(0.00551)	(0.0127)	(0.00448)	(0.00785)	(0.174)	(0.174)	(0.120)	(0.121)	(0.125)	(0.113)
Observations	48	48	48	48	48	48	48	48	48	48	48	48
Adjusted R-sq.	0.03	0.29	0.14	0.40	0.01	0.27	0.04	0.32	0.08	0.29	0.17	0.32
Mean Dependent	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
Controls		X		X		X		X		X		X

NOTES: OLS coefficients reported. Controls include the log of the population, the share nonwhite and the share urban. Demographic variables and total tax values are from 1900. Due to limited data availability, the taxes by type and the expenditure by type are only available in 1910. Robust standard errors are reported with significance levels at the 10, 5, and 1 percent.

SOURCES: Administrative records covering CHD operation are retrieved from the *History of County Health Organizations in the United States* published in U.S. Public Health Bulletin 222. City health department records from public health reports from volumes entitle: *City Health Officers: Directory of Those in Cities of 10,000 or More Population* for years 1916-1932. County-level data on property taxes, property values, and public debt are available in Census publications entitled *Wealth, Public Debt, and Taxation.* County-level demographic characteristics are calculated from the IPUMs Restricted Complete Count Census data.

I then consider an alternative measure of local government strength. I test the anecdotal claim in the historical literature (Lancaster (1937) and Mountin (1934)) that health departments were adopted according to the existing structure of services provided by the local government. To measure the existing structure of services, I have collected data from the 1910 version of *Wealth, Debt, and Taxation* (Bureau (1915)) documenting the level of local of property assessment in each state. I record the level of government hiring the tax assessor for each state and calculate the percentage of total employees at each level – county, state, and municipal. To exemplify this approach, Figure IV displays the listed tax officers employed in Maine (left) and Oregon (right). In Maine, for the three levels of assessment, two officials are employed at the town-level, one at the state level, and none at the county level. In Oregon, by contrast, five officers are appointed at the county level and one at the state level, while none are hired at the municipal level. To aggregate this qualitative measure, I consider the percentage of the tax officers who were employed at each level of government: county, municipal, and state.

Figure IV: Assessment Officers Example

MAINE

OFFICERS.

The officers most directly concerned with taxation are:

(1) The town assessors, elected annually, as many as the town shall determine; the number is almost universally three; if the town fails to elect these officers, the selectmen shall act as assessors.

Towns having a population of 6,000 or over may elect a board of assessors to serve for a term of three years, one assessor being elected each year.

(2) The town tax collectors, elected annually; the treasurer or the constable may be tax collector.

(3) The board of state assessors, consisting of three members appointed by the governor for a term of six years, one being selected every two years. This board assesses "wild lands," has supervision over the local assessors, acts as a board of equalization, and administers the laws as to the taxation of corporations.

OREGON

OFFICERS.

The officers most directly concerned with taxation are:

(1) County assessor, elected for a term of four years.

(2) Sheriff of the county, elected for two years, who is the tax collector.

(3) The county board of equalization, consisting of the county judge, county clerk, and assessor of each county.

(4) The "county court," which refers to the board of county commissioners in counties which have a separate board for county business, and the county judge and commissioners in other counties. There are two county commissioners in each county, elected for four years.

(5) Board of state tax commissioners composed of the governor, secretary of state, state treasurer, and two others, expert in matters of taxation, to be appointed by a majority of the three former.

SOURCE: Data sourced from *Wealth, Debt, and Taxation* (Bureau (1915)). Maine, a township state, is shown on the left. Oregon, a county state is shown on the right.

I use the share of assessors employed at the municipal level versus county level as my new measure of the relative strength of the existing local government. This measure is shown in Table 2 Columns (9)-(12). In Panel A, municipal-level adoption of a health department is predicted by a higher share of municipal assessors. For county-level adoption, states that had more county-level assessors provided county-level health departments. This finding corroborates the historical evidence emphasizing the importance of the existing scope of local government.[5] This finding also aligns with the findings over Columns (1)-(8) and suggests that the existing structure of local government determined the government entity in charge of public health administration

I conclude the state-level analysis by considering the alternative explanation that the preexisting state-level health administration explains the rollout of health departments throughout the United States (Moehling and Thomasson, 2012). Using the quality measures for the state boards of health from Figure III, I test whether per capita spending or the rating of the state board influenced the spread of local health departments. Table 3 shows the results. Heterogeneity in the results appears across municipalities and counties. For the municipal-level spread of health departments, prior state board quality is predictive of local health administration. For county-level adoption, neither state board spending nor the quality predicts adoption. Previous health administration only predicts the municipal spread of health departments but is not correlated with county-level health departments.

[5]For rural health work, it was "generally agreed that the county is the smallest feasible unit from the standpoint of efficiency of service and administration. In most sections, the use of the county makes it possible to abandon the large number of ineffective organizations found in villages and townships" (Lancaster (1937)). The township level of health department usually only can finance a layperson or a part-time physician, and generally, it was infeasible for the township to provide preventative health work Ferrell et al. (1929). These town and township units were "unable to afford the personnel or the equipment needed to carry out a health program of any sort....The health officers employed are more often than not, untrained, serve in their spare time, are paid only nominal salaries, and are quite unconvinced of the value of the scientific health measures recommended by the state department" (Mountin (1934) p. 336). For township states, this meant a large number of tiny units continued to operate with part-time officers. These units were so numerous that at the beginning of the twentieth century Michigan had 1,160 township health officers, Minnesota had 2,700 and Ohio had 2,500 local health authorities, and "in the New England town was everywhere the health unit" (Lancaster (1937) p. 335). Eventually, some states recognized that the number of service providers actually hindered the provision of health. Ferrell et al. (1929) writes that "townships, as a governmental unit for health purposes in the absence of large towns, as a rule has not afforded a satisfactory unit for local health work. Its limited population and wealth preclude the employment of full-time professional personal" (page 43).

Table 3: State-level Share of Participating Counties and Characteristics of the Boards of Health

	Share with Municipal Health Department						Share with County Health Department					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Quality	0.0520***	0.0442***	0.00762				-0.0227	-0.0295	0.0128			
	(0.0127)	(0.0117)	(0.00874)				(0.0181)	(0.0213)	(0.0227)			
Amount PC				0.0174*	0.0103*	0.0000111				-0.00454	-0.0128	-0.00545
				(0.00928)	(0.00594)	(0.00312)				(0.0134)	(0.0130)	(0.0138)
Log Population		-0.0628***	-0.0265		-0.0231	-0.0213		0.00784	-0.0386		-0.0232	-0.0345
		(0.0168)	(0.0185)		(0.0155)	(0.0159)		(0.0431)	(0.0516)		(0.0444)	(0.0451)
Share Nonwhite		0.0500	0.238***		-0.0552	0.244***		0.945***	0.0824		1.039***	0.116
		(0.0973)	(0.0860)		(0.111)	(0.0874)		(0.239)	(0.324)		(0.231)	(0.319)
Share Urban		0.539***	0.399***		0.676***	0.421***		0.409	0.460*		0.355	0.519**
		(0.135)	(0.106)		(0.152)	(0.105)		(0.342)	(0.230)		(0.329)	(0.244)
Midwest			-0.302***			-0.315***			0.225**			0.191*
			(0.0483)			(0.0509)			(0.105)			(0.101)
South			-0.354***			-0.372***			0.612***			0.569***
			(0.0508)			(0.0531)			(0.144)			(0.146)
West			-0.287***			-0.302***			0.268***			0.227***
			(0.0488)			(0.0491)			(0.0790)			(0.0800)
Observations	48	48	48	48	48	48	48	48	48	48	48	48
Adjusted R-sq.	0.31	0.53	0.79	0.07	0.44	0.79	0.01	0.29	0.48	-0.02	0.28	0.48

NOTES: OLS coefficients reported. Robust standard errors are reported with significance levels at the 10, 5, and 1 percent.

SOURCES: Administrative records covering CHD operation are retrieved from the *History of County Health Organizations in the United States* published in U.S. Public Health Bulletin 222. City health department records from public health reports from volumes entitle: *City Health Officers: Directory of Those in Cities of 10,000 or More Population* for years 1916-1932. County-level data on property taxes, property values, and public debt are available in Census publications entitled *Wealth, Public Debt, and Taxation.* County-level demographic characteristics are calculated from the IPUMs Restricted Complete Count Census data.

The results for state-level provision of local health administration are clear; the existing structure of local government appears to explains local administration of health. For municipal-level health departments, there is also a link between the quality of the state board and adoption, but this fails to be true for county-level administration.

5 Local Adoption

I now focus on an empirical examination of county-level adoption and consider the unifying factors that prompted some areas to invest in health administration within each state. While municipalities and counties acted individually to provide a health department, there are common themes that encouraged the spread of health administration throughout the United States. Based on the anecdotal claim that counties "must possess sufficient taxable wealth" (Graves (1930) and Bishop (1931)). I propose that the state capacity of local government, as measured by taxation, allowed individual localities to adopt health departments.

To measure state capacity, I use local property taxes. Property taxes are key to measuring the size and scope of local government during the early twentieth century. Wallis (2000) demonstrates that local property taxes accounted for 57 percent of state revenues and 73 percent of local revenues at the turn of the 20th century. To measure whether adoption of a health department is correlated with property taxes and other local characteristics, I test whether the 1900 taxation level predicts local adoption at the municipal or county level. More specifically, I examine whether the arrival of a health

department in county j is predicted by a set of demographic controls as well as the local taxation:

$$HD_{js} = \alpha + \beta \text{ Taxation}_j + \mathbf{X}_j'\gamma + \eta_s + \epsilon_{js} \tag{2}$$

where health department arrival over 1900-1933 at the municipal or county level in county j and state s is considered over a set of demographic characteristics from the 1900 census, $\mathbf{X}_j'$, and state fixed effects, η_s.

Figure V separately considers each 1900 demographic characteristic while controlling for the log of county taxation. Each plotted pair of points represents the results from a bivariate regression considering the binary adoption decision over the log of total county taxation and each 1900 demographic control. State fixed effects are included. For completeness, I also show the simple regressions without the log of county taxation in Table A.1 and multivariate regressions in Table A.3. I further present the results from the bivariate regression in table format in Table A.2.

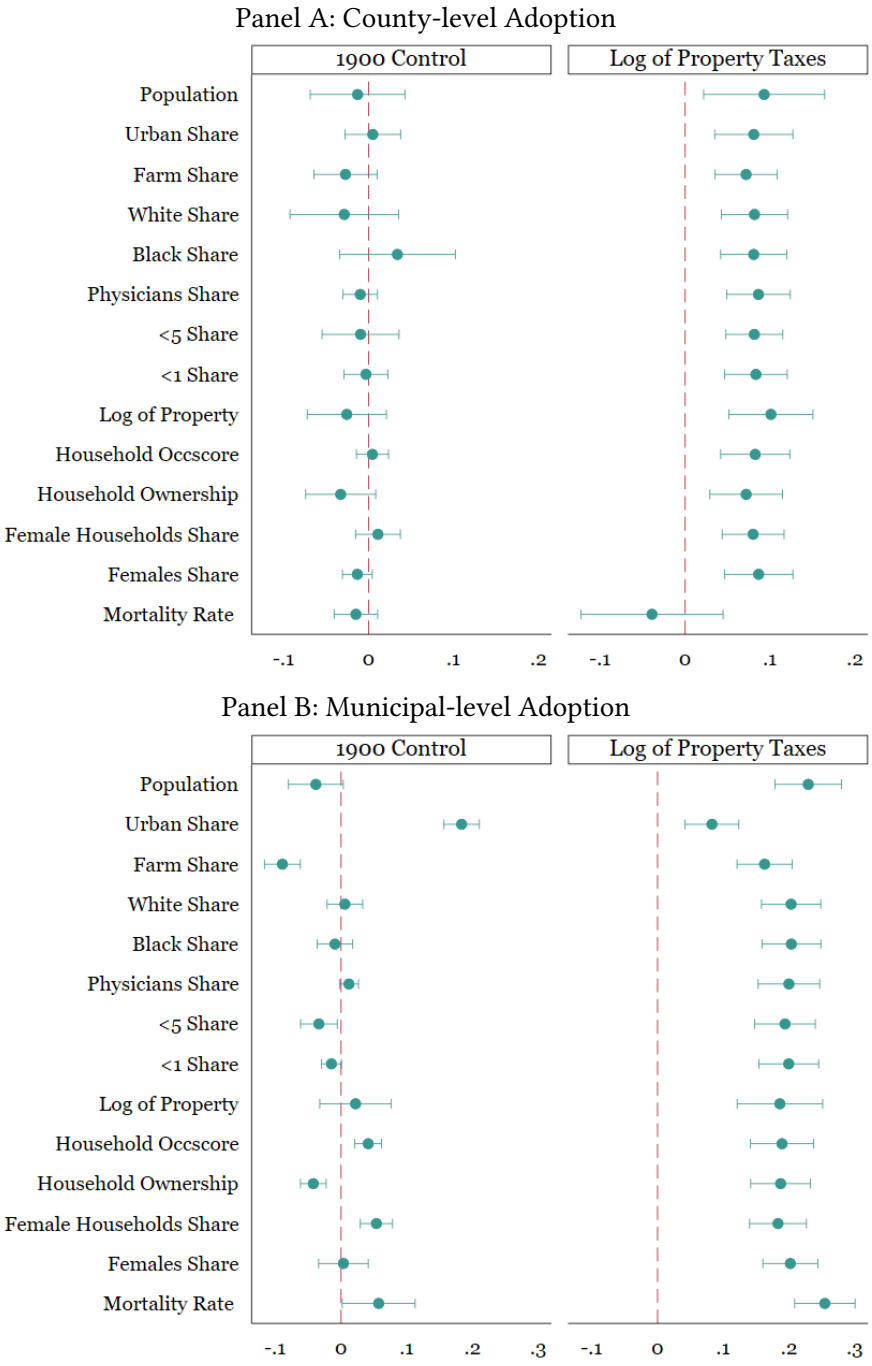
For the county-level adoption in Panel A, when controlling for the log of taxation, no other characteristics predict the adoption pattern of county-level health departments. The figure shows the separate estimations for various controls, including the population, the average household occupational score, the log of property values, the county-level mortality rate,[6] and the shares of urban, farm, white, black, physicians, under 5, under 1, homeowners, female household heads, and share of women. Once controls are added for the size of property taxes all demographic characteristics fail to predict adoption of a county-level health department. This finding holds across the bivariate regressions in Figure V and Table A.2 as well as the multivariate regressions in Table A.3.[7]

One surprising result from county-level adoption is the lack of relationship with physician access. As suggested in the state adoption section, county-level adoption may be related to the presence of existing health authorities. Doctors signal a propensity toward health, and because local health officers and state boards of health were staffed and run by medical doctors, local ties between doctors and state boards of health could increase program adoption. On the other hand, there is evidence that doctors may have been negatively related to adoption, particularly in rural areas. The animosity between rural physicians and public health proponents was a reported problem in remote areas, with rural physicians going out of their way to ignore public health measures. In one county, "the health officer complained that doctors avoided public health responsibilities and refused to enforce a law that was 'for their benefit, & their children, and & children's' children to a thousand generations'" (Link (1997) p. 22). Even rural doctors who were informed about the benefits of public health sometimes complained that public health might reduce their customer base (Link, 1997). The lack of significant effect in Figure V suggests the relative power of local physicians did not influence adoption, or the contrasting effects cancel each other out.

[6] Unfortunately, mortality is only reported for select counties in 1900. This results in only 10% of the sample reporting estimates.

[7] An exception should be made for the share black, which in the multivariate regressions is slightly significant. Because share black and white are highly corrected, both are significant in Table A.3. Neither are significant in the bivariate regressions in Table A.2.

Figure V: Pre-Adoption Demographic Characteristics



NOTES: Each point represents the estimated coefficient on the 1910 population control, with the estimation including state fixed effects. Lines represent the 95 percent confidence intervals on the point estimates. Robust standard errors are clustered at the state level. Variables have been standardized to enable the coefficients to be plotted on the same graph. For particular point estimates see Table A.2.

SOURCES: Administrative records covering CHD operation are retrieved from the *History of County Health Organizations in the United States* published in U.S. Public Health Bulletin 222. City health department records from public health reports from volumes entitle: *City Health Officers: Directory of Those in Cities of 10,000 or More Population* for years 1916-1932. Vital statistics are from U.S. Vital Statistics for rural areas. County-level data on property taxes, property values, and public debt are available in Census publications entitled *Wealth, Public Debt, and Taxation.* County-level demographic characteristics are calculated from the IPUMs Restricted Complete Count Census data.

Another interesting finding is the absence of a relationship between existing health conditions and the adoption of health services, measured by the mortality rate. Anecdotal claims emphasize that

sanitation services were need-based programs spurred by poor health conditions or epidemics in the area. Public health during the late 19th century and early 20th century also frequently appeared as a reactionary effort following the threat of the epidemic disease. At the national level, health disasters brought "acceptance of the supremacy of the Federal Government" (Furman (1973) p. 283). At the state level, when the "presence or threat of a particular disease or diseases was sufficient to arouse public apprehension, the state legislature might respond by voting a specific appropriation or by delegating further responsibility or authority to the board" (Duffy (1992) p. 223). The fear aroused with epidemic conditions at the local level should increase the resident's willingness to provide funding for health departments. Based on Figure V, counties that decided to invest in a health department show no difference in their pre-treatment health conditions. One significant limitation of the interpretation, however, is the limited mortality data for the period. These findings are also corroborated by the analysis in Hoehn-Velasco et al. (2018) that shows that mortality did not rise before health department entry.

At the municipal-level, the results are distinct. Health departments are provided in wealthier areas (higher occscore) and areas with higher preexisting health services, measured by the doctors per capita. Municipal health departments also appear in more urban counties with fewer farms. The combined results across county-level adoption and municipal-level adoption suggest that state capacity of local counties enabled these services to be provided to more rural areas. For municipalities, however, health departments are only provided in areas with a larger urban share and more developed preexisting health authorities. Thus, previous propensity towards health predicts subsequent adoption of health administration in urban areas. From the multivariate regressions in Table A.3, the main factors that predict an urban health department are the share of urban residents and log of property taxes.

To elaborate on the factors that spurred local administration of public health, I next consider municipal and county health department adoption over health expenditure at the turn of the twentieth century. While the majority of municipalities and counties did not have a full-time health department at the time, there were local boards of health that performed part-time health work. To measure whether local health spending in 1910 predicts subsequent adoption of a health department at either the county or the municipal level, I show the relationship between adoption and total county, municipal (city or town), and county-specific expenditure in Table 4. One limitation of this data is that it was unavailable at the municipal level in 1900. Thus, I use 1910 expenditure instead.

For county-level adoption in Columns (6)-(7), once controls are added for the population size and the demographic composition, prior health expenditure does not predict health department adoption. These findings corroborate the findings in Figure V. Counties that adopted health departments are no different in prior health spending. Then, I consider health spending and municipal adoption over Columns (1)-(2). Urban health department arrival does appear to be correlated with prior health spending. Similar to the findings with state participation, while prior health strength is not predictive of county-level adoption, it is predictive of municipal adoption. A caveat to these results is that the expenditure data is for 1910. Thus some health departments may have been operating in cities already during that period.

I also show the results across per capita general expenditure at the municipal and county level.

Table 4: Per Capita Expenditure and Per Capita Taxes

	Municipal Health Department					County Health Department				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Log of Population	-0.0308**	-0.00888	-0.000653	-0.0293**	-0.0367**	-0.0168	-0.0149	-0.00872	-0.0141	-0.00881
	(0.0130)	(0.0218)	(0.0220)	(0.0133)	(0.0143)	(0.0267)	(0.0279)	(0.0280)	(0.0273)	(0.0302)
White	0.00690	-0.122	-0.120	0.00551	0.000546	-0.130	-0.156	-0.146	-0.132	-0.145
	(0.0502)	(0.157)	(0.164)	(0.0496)	(0.0495)	(0.156)	(0.179)	(0.183)	(0.156)	(0.156)
Urban	0.889***	0.616***	0.665***	0.873***	0.867***	0.0520	-0.106	-0.0908	0.0265	0.0287
	(0.0615)	(0.0749)	(0.0834)	(0.0626)	(0.0596)	(0.0772)	(0.0743)	(0.0787)	(0.0769)	(0.0816)
Log Total Taxes 1900	0.110***	0.147***	0.154***	0.108***	0.113***	0.0970**	0.0760**	0.0703**	0.0936**	0.0839*
	(0.0252)	(0.0380)	(0.0399)	(0.0261)	(0.0239)	(0.0406)	(0.0301)	(0.0275)	(0.0414)	(0.0441)
P.C. County Health Exp.	-0.0212					-0.0267				
	(0.0363)					(0.0303)				
P.C. Urban Health Exp.		0.123***					0.0571			
		(0.0423)					(0.0373)			
P.C. Urban General Exp.			0.0110*					0.0104*		
			(0.00648)					(0.00542)		
P.C. County General Exp.				0.000787					0.00147	
				(0.00172)					(0.00170)	
P.C. Taxes 1900					-0.0988***					0.102
					(0.0280)					(0.0638)
Observations	2,715	1,309	1,309	2,715	2,722	2,715	1,309	1,309	2,715	2,722
Adjusted R-sq.	0.45	0.39	0.38	0.45	0.46	0.33	0.35	0.35	0.33	0.32
State FE	X	X	X	X	X	X	X	X	X	X

Notes: OLS coefficients reported. Robust standard errors are clustered at the state level with significance levels at the 10, 5, and 1 percent. Demographic variables and total tax values are from 1900. Due to limited data availability, the taxes by type and the expenditure by type are only available in 1910.

Sources: Administrative records covering CHD operation are retrieved from the *History of County Health Organizations in the United States* published in U.S. Public Health Bulletin 222. City health department records from public health reports from volumes entitle: *City Health Officers: Directory of Those in Cities of 10,000 or More Population* for years 1916-1932. County-level data on property taxes, property values, and public debt are available in Census publications entitled *Wealth, Public Debt, and Taxation.* County-level demographic characteristics are calculated from the IPUMs Restricted Complete Count Census data.

Municipal health departments do appear weakly related to urban expenditure in 1910. County health departments also are weakly related to general spending, but not county-specific general spending in Column (9). This relationship may be due to joint city-county health departments throughout the South. Then, in Columns (5) and (10), I distinguish between per capita taxes and the size of the tax base. Per capita taxes are distinct from the log of total taxation which captures the capacity of the local government to tax residents. Per capita measures instead illustrate the wealth per person. In Column (10), county adoption does not appear related to per capita taxation. In Column (5) municipal adoption is negatively related to per capita taxation (while holding total taxation constant).

The results for municipal health departments suggest that health departments are placed in larger, more urban counties with a more sizeable taxable base. For county-level adoption of a health department, the coefficients suggest that only the total taxation level predicts adoption. Per capita taxes, prior health expenditure, and demographic controls all fail to predict adoption of a health department. I also show the results for changes over time in the appendix. At the county level, changes over time do not appear to predict health department adoption. In urban areas, however, health administration adoption over time appears to be correlated with lower physician shares, lower wealth, and higher shares of children.

6 Conclusion

In this paper, I study the early 20th-century adoption of municipal and county health departments throughout the United States. I show that between-state adoption of county health departments is predicted by the share of taxes at the county level relative to the municipal level, which captures the size and scope of the local government. By contrast, states with higher taxation at the municipal level are saturated with municipal-level health departments. The state-level spread of municipal health departments is also predicted by the share urban and prior spending on health. While these findings may seem obvious, they illustrate a key aspect of local public finance at the turn of the twentieth century – the size and scope of the local government influenced whether public services were provided. I then consider within-state adoption of health departments. For county-level adoption within each state, county health departments appear in areas with higher taxation, signifying a greater state capacity. Municipal health departments have more varied adoption patterns. Within-state adoption of urban health departments is predicted by the size of the county, the share urban, and the strength of preexisting health authorities.

I conclude by reconciling the evidence with the existing historical literature. First, based on the findings in Figure V, funding decisions do not appear to be targeting poorer areas or designed to mitigate racial inequalities. These results show the distinct nature of local public finance versus the federal grants, such as the War on Poverty (Bailey and Duquette, 2014). Second, as shown above, while municipal health departments were related to prior public health spending, similar to Moehling and Thomasson (2012), county-level health departments were not. City-level public health may have been influenced by preexisting spending levels, but county-level provision appears to be unrelated. Third, I show that poor health conditions did not predict adoption. This hypothesis is based on the anecdotal claim that public health appeared as a reaction to the threat of the epidemic disease and may have temporarily increased local government power.[8] I find no evidence suggesting that health department placement is related to health conditions of the state or county, and this finding is corroborated in Hoehn-Velasco et al. (2018).

Finally, a large literature considering the political economy of the New Deal programs has linked participation to political attempts to create an electoral consensus (Wallis (1984), Wallis (1998), Fishback et al. (2003), Fishback and Wallis (2012)). This alternative hypothesis is especially salient due to the plausible connection between county-level health departments and progressive health policy. To test this, I have considered whether the health department movement was related to the political alignment of counties and have found no clear connection. The difference between the findings in this paper and related work is due to the early-twentieth century emphasis on local government finance. The pattern of health department adoption throughout the United States illustrates the importance of local government scope in the provision of public services during the early 20th century. The adoption of health departments provides a case study into the provision of public services during the pre-New Deal era,

[8] At the national level, health disasters brought "acceptance of the supremacy of the Federal Government" (Furman p. 283). At the state level, when the "presence or threat of a particular disease or diseases was sufficient to arouse public apprehension, the state legislature might respond by voting a specific appropriation or by delegating further responsibility or authority to the board" (Duffy (1992) p. 223).

when public programs were dependent on local tax dollars and the scope of the local administration. In related work, the majority of funding initiatives considered include federal grants distributed to localities. In this study, while health departments may have been aided by state and federal authorities, they were primarily based on local taxation. Thus, the health department movement of the early twentieth century helps to highlight the limitations of local public finance in the era before New Deal programs. Following this period, the New Deal fundamentally transformed local public finance with the institution intergovernmental grants that helped alleviate some of the constraints illustrated in this paper (Wallis and Oates, 1998; Wallis, 2000).

References

Bailey, Martha J and Nicolas J Duquette, "How Johnson fought the war on poverty: The economics and politics of funding at the office of economic opportunity," *The journal of economic history*, 2014, *74* (2), 351–388.

Bishop, E.L., "Manual for the Conduct of County Health Departments," *Tennessee State Department of Health*, 1931.

Bishop, Eugene Lindsay, Joseph Walter Mountin et al., "Public health organization," in "White House conference on child health and protection. Sect. II: Public health service and administration. Committee on public health organization." The Century Co. 1932.

Bureau, Census, *Wealth, Debt, and Taxation: 1912*, US Government Printing Office, 1915.

Center, Minnesota Population and Ancestry.com, *IPUMS Restricted Complete Count Data: Version 1.0 [Machine-readable database]*, Minneapolis: University of Minnesota., 2013.

Chapin, Charles Value, *Municipal sanitation in the United States*, Snow & Farnham, 1900.

__ , *A Report on State Public Health Work: Based on a Survey of State Boards of Health*, American Medical Assn., 1916.
City Health Officers: Directory of Those in Cities of 10,000 or More Population

City Health Officers: Directory of Those in Cities of 10,000 or More Population, *Public Health Reports (1896-1970), 1916-1933, 44 (46), 2771–2785.*

Duffy, John, *The sanitarians: a history of American public health, University of Illinois Press, 1992.*

Ferrell, John A, Pauline A Mead et al., *"History of County Health Organizations in the United States 1908-33.," Public Health Bulletin, 1936, (222).*

Ferrell, John Atkinson, Lewis Ryers Thompson, and Rollo Herbert Britten, *Health departments of States and Provinces of the United States and Canada number 180-189, US Government Printing Office, 1929.*

Fishback, Price V and John Joseph Wallis, *"What was new about the New Deal?," Technical Report, National Bureau of Economic Research 2012.*

__ **, Shawn Kantor, and John Joseph Wallis**, *"Can the New Deal's three Rs be rehabilitated? A program-by-program, county-by-county analysis," Explorations in Economic History, 2003, 40 (3), 278–307.*

Furman, Bess, *A Profile of the United States Public Health Service 1798-1948, National Institutes of Health, 1973.*

Graves, Stuart, *"Manual for the Conduct of County Health Departments," The Alabama State Department of Health, 1930.*

Haines, Michael R, *"Interuniversity Consortium for Political and Social Research. Historical, Demographic, Economic, and Social Data: The United States, 1790-2000 [Computer file]. ICPSR02896-v2. Hamilton, NY: Colgate University," Ann Arbor: MI: Interuniversity Consortium for Political and Social Research [producers], 2004.*

Hoehn-Velasco, Lauren, *"The Long-term Impact of Preventative Public Health Programs," 2019.*

__ **et al.**, *"Explaining declines in US rural mortality, 1910–1933: The role of county health departments," Explorations in Economic History, 2018, 70 (C), 42–72.*

Lancaster, Lane, *Government in Rural America, JSTOR, 1937.*

Link, William A, *The paradox of southern progressivism, 1880-1930, Univ of North Carolina Press, 1997.*

Moehling, Carolyn M and Melissa A Thomasson, *"The political economy of saving mothers and babies: The politics of state participation in the Sheppard-Towner program," Technical Report 01 2012.*

Morris, Charles E, *Progressive Democracy of James M. Cox, Bobbs-Merrill Company, 1920.*

Mountin, Joseph W, *"Modern Trends in Public Health Administration County Health Work," American Journal of Public Health and the Nations Health, 1934, 24 (7), 715–721.*

Ravenel, Mazÿck Porcher, *A half century of public health: jubilee historical volume of the American Public Health Association, in commemoration of the fiftieth anniversary celebration of its foundation, New York City, November 14-18, 1921, New York: American Public Health Association, 1921.*

Vollrath, Dietrich, *"Inequality and school funding in the rural United States, 1890," Explorations in Economic History, 2013, 50 (2), 267–284.*

Wallis, John J and Wallace Oates, *"The impact of the New Deal on American federalism," in "The defining moment: The Great Depression and the American economy in the twentieth century," University of Chicago Press, 1998, pp. 155–180.*

Wallis, John Joseph, *"The birth of the old federalism: financing the New Deal, 1932–1940," The Journal of Economic History, 1984, 44 (1), 139–159.*

__ , *"The political economy of New Deal spending revisited, again: With and without Nevada," Explorations in Economic History, 1998, 35 (2), 140–170.*

__ , *"American government finance in the long run: 1790 to 1990," Journal of Economic Perspectives, 2000, 14 (1), 61–82.*

__ , *"A History of the Property Tax in America," Property taxation and local government finance, 2001, pp. 123–47.*

A Additional Figures and Tables

Figure A.1: Original Health Department Record for Alabama and Louisiana (Public Health Bulletin 222)

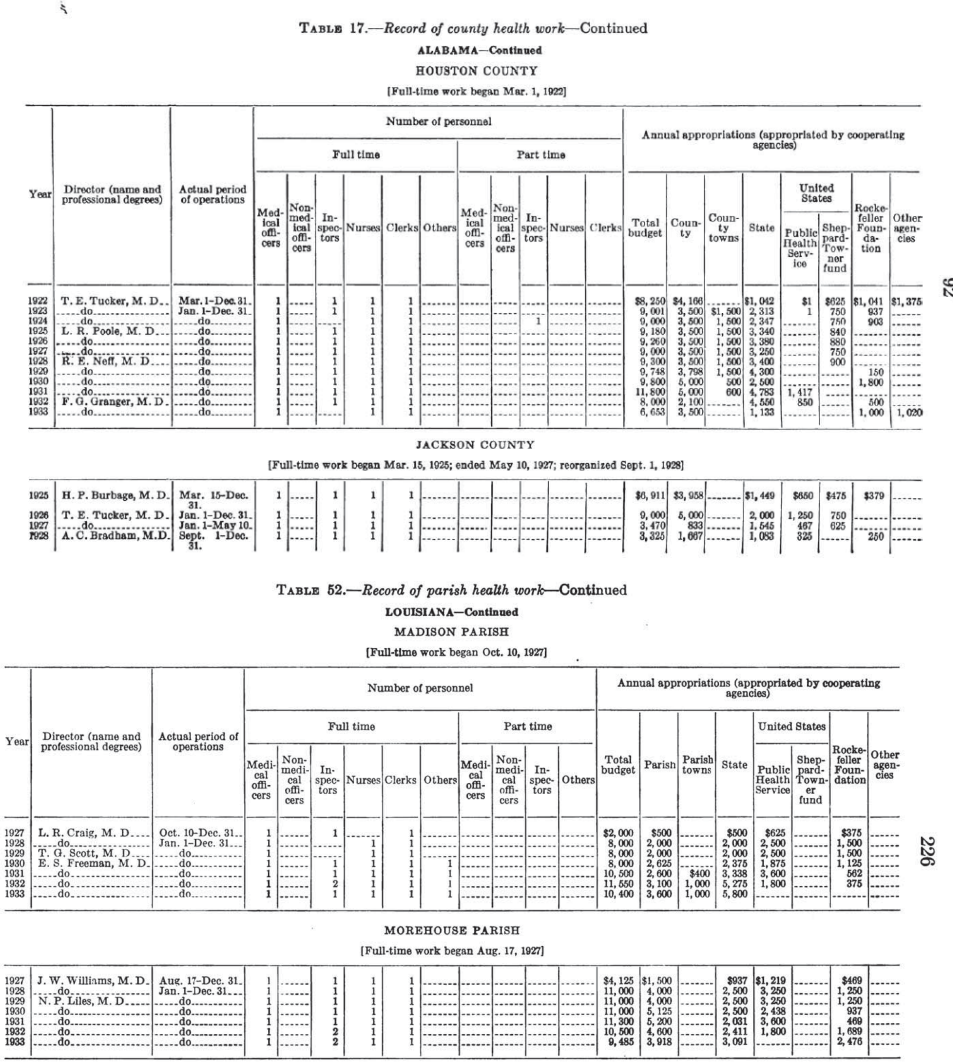


TABLE 17.—*Record of county health work*—Continued

ALABAMA—Continued

HOUSTON COUNTY

[Full-time work began Mar. 1, 1922]

Year	Director (name and professional degrees)	Actual period of operations	Number of personnel: Full time: Medical officers	Non-medical officers	Inspectors	Nurses	Clerks	Others	Part time: Medical officers	Non-medical officers	Inspectors	Nurses	Clerks	Annual appropriations (appropriated by cooperating agencies): Total budget	County	County towns	State	United States: Public Health Service	Shepard-Towner fund	Rockefeller Foundation	Other agencies
1922	T. E. Tucker, M. D.	Mar. 1–Dec. 31.	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	$8,250	$4,166	.....	$1,042	$1	$625	$1,041	$1,375
1923	do	Jan. 1–Dec. 31.	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	9,001	3,500	$1,500	2,313	1	750	937	.....
1924	do	do	1	.....	.....	1	1	.....	.....	.....	1	.....	.....	9,000	3,500	1,500	2,347	.....	750	903	.....
1925	L. R. Poole, M. D.	do	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	9,180	3,500	1,500	3,340	.....	840	.....	.....
1926	do	do	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	9,260	3,500	1,500	3,380	.....	880	.....	.....
1927	do	do	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	9,000	3,500	1,500	3,250	.....	750	.....	.....
1928	R. E. Neff, M. D.	do	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	9,300	3,500	1,500	3,400	.....	900	.....	.....
1929	do	do	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	9,748	3,798	1,500	4,300	.....	.....	150	.....
1930	do	do	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	9,800	5,000	500	2,500	.....	.....	1,800	.....
1931	do	do	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	11,800	5,000	600	4,783	1,417	.....	.....	.....
1932	F. G. Granger, M. D.	do	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	8,000	2,100	.....	4,550	850	.....	500	.....
1933	do	do	1	.....	.....	1	1	.....	.....	.....	.....	.....	.....	6,653	3,500	.....	1,133	.....	.....	1,000	1,020

JACKSON COUNTY

[Full-time work began Mar. 15, 1925; ended May 10, 1927; reorganized Sept. 1, 1928]

1925	H. P. Burbage, M. D.	Mar. 15–Dec. 31.	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	$6,911	$3,958	.....	$1,449	$650	$475	$379	.....
1926	T. E. Tucker, M. D.	Jan. 1–Dec. 31.	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	9,000	5,000	.....	2,000	1,250	750	.....	.....
1927	do	Jan. 1–May 10.	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	3,470	833	.....	1,545	467	625	.....	.....
1928	A. C. Bradham, M.D.	Sept. 1–Dec. 31.	1	.....	1	1	1	.....	.....	.....	.....	.....	.....	3,325	1,667	.....	1,053	325	.....	250	.....

92

TABLE 52.—*Record of parish health work*—Continued

LOUISIANA—Continued

MADISON PARISH

[Full-time work began Oct. 10, 1927]

Year	Director (name and professional degrees)	Actual period of operations	Number of personnel: Full time: Medical officers	Non-medical officers	Inspectors	Nurses	Clerks	Others	Part time: Medical officers	Non-medical officers	Inspectors	Others	Annual appropriations (appropriated by cooperating agencies): Total budget	Parish	Parish towns	State	United States: Public Health Service	Shepard-Towner fund	Rockefeller Foundation	Other agencies
1927	L. R. Craig, M. D.	Oct. 10–Dec. 31.	1	.....	1	.....	1	.....	.....	.....	.....	.....	$2,000	$500	.....	$500	$625	.....	$375	.....
1928	do	Jan. 1–Dec. 31.	1	.....	.....	1	1	.....	.....	.....	.....	.....	8,000	2,000	.....	2,000	2,500	.....	1,500	.....
1929	T. G. Scott, M. D.	do	1	.....	.....	1	1	.....	.....	.....	.....	.....	8,000	2,000	.....	2,000	2,500	.....	1,500	.....
1930	E. S. Freeman, M. D.	do	1	.....	1	1	1	1	.....	.....	.....	.....	8,000	2,625	.....	2,375	1,875	.....	1,125	.....
1931	do	do	1	.....	1	1	1	1	.....	.....	.....	.....	10,500	2,600	$400	3,338	3,600	.....	562	.....
1932	do	do	1	.....	2	1	1	1	.....	.....	.....	.....	11,550	3,100	1,000	5,275	1,800	.....	375	.....
1933	do	do	1	.....	1	1	1	1	.....	.....	.....	.....	10,400	3,600	1,000	5,800	.....	.....	.....	.....

MOREHOUSE PARISH

[Full-time work began Aug. 17, 1927]

1927	J. W. Williams, M. D.	Aug. 17–Dec. 31.	1	.....	1	1	1	.....	.....	.....	.....	.....	$4,125	$1,500	.....	$937	$1,219	.....	$469	.....
1928	do	Jan. 1–Dec. 31.	1	.....	1	1	1	.....	.....	.....	.....	.....	11,000	4,000	.....	2,500	3,250	.....	1,250	.....
1929	N. P. Liles, M. D.	do	1	.....	1	1	1	.....	.....	.....	.....	.....	11,000	4,000	.....	2,500	3,250	.....	1,250	.....
1930	do	do	1	.....	1	1	1	.....	.....	.....	.....	.....	11,000	5,125	.....	2,500	2,438	.....	937	.....
1931	do	do	1	.....	1	1	1	.....	.....	.....	.....	.....	11,300	5,200	.....	2,031	3,600	.....	469	.....
1932	do	do	1	.....	2	1	1	.....	.....	.....	.....	.....	10,500	4,600	.....	2,411	1,800	.....	1,689	.....
1933	do	do	1	.....	2	1	1	.....	.....	.....	.....	.....	9,485	3,918	.....	3,091	.....	.....	2,476	.....

226

SOURCES: Administrative records covering CHD operation are retrieved from the *History of County Health Organizations in the United States* published in U.S. Public Health Bulletin 222. City health department records from public health reports from volumes entitle: *City Health Officers: Directory of Those in Cities of 10,000 or More Population* for years 1916-1932.

Figure A.2: Original City-Level Full-Time Health Department Records

CITY HEALTH OFFICERS, 1918.

DIRECTORY OF THOSE IN CITIES OF 10,000 OR MORE POPULATION IN 1910.

Directories of the city health officers in the cities of the United States having a population of 10,000 or more have been published in the Public Health Reports in 1916 and 1917 [1] for the information of health officers and others interested in public health activities. These directories have been compiled from data furnished by the health officers.

The following is a similar directory for 1918:

City.	Name of health officer.	Official title.
Alabama:		
Anniston	C. Hal Cleveland	City health officer.
Bessemer	M. C. Ragsdale, jr., M. D	Do.
Birmingham	J. D. Dowling, M. D.[2]	Health officer.
Mobile	Chas. A. Mohr, M. D	City health officer.
Montgomery	C. G. Laslie, M. D	Do.
Selma	B. B. Rogan, M. D	Do.
Tuscaloosa	D. C. Steelsmith, M.D., C. P. H.[3]	Health officer.
Arizona:		
Phoenix	H. K. Beauchamp, M. D	Do.
Tucson	Meade Clyne, M. D	City health officer.
Arkansas:		
Fort Smith	George Franklin Hynes, M. D	City physician and health officer.
Helena	G. G. Altman, Phar. D., M. D	City health officer.
Hot Springs	John S. Wood, M. D.[4]	Do.
Little Rock	Milton Vaughan, M. D	Health commissioner.
North Little Rock	Arden Thos. McKinney, M. D	City health officer.
Pine Bluff	Fred C. Rowell, M. D	Do.
California:		
Alameda	A. Hieronymus, M. D	Health officer.
Bakersfield	Peter J. Cuneo, M. D	City health commissioner.

SOURCE: City health department records from public health reports from volumes entitle: *City Health Officers: Directory of Those in Cities of 10,000 or More Population* for years 1916-1932.

Table A.1: Adoption of a Health Department, Simple

Panel A: County

	Pop.	Share Urban	Share Farm	Share White	Share Black	Share Physic.	Share <5	Share <1	Log of Property	Occ-score	Home Ownership	Female HH	Share Females	Mort. Rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1900 Control	0.0708***	0.0581***	-0.0691***	-0.0434	0.0521	0.0153	-0.0457*	-0.0240	0.0843***	0.0368***	-0.0725***	0.0497**	0.0113	-0.0263
	(0.0205)	(0.0160)	(0.0196)	(0.0302)	(0.0319)	(0.0150)	(0.0261)	(0.0171)	(0.0228)	(0.0120)	(0.0185)	(0.0192)	(0.00879)	(0.0221)
Observations	2,731	2,731	2,731	2,731	2,731	2,731	2,731	2,731	2,663	2,731	2,731	2,731	2,731	320
Adjusted R-sq.	0.31	0.30	0.30	0.29	0.29	0.29	0.29	0.29	0.31	0.29	0.30	0.30	0.29	0.20
State FE	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Panel B: Municipal

	Pop.	Share Urban	Share Farm	Share White	Share Black	Share Physic.	Share <5	Share <1	Log of Property	Occ-score	Home Ownership	Female HH	Share Females	Mort. Rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1900 Control	0.172***	0.237***	-0.187***	-0.0304**	0.0365***	0.0697***	-0.117***	-0.0632*	0.225***	0.119***	-0.151***	0.143***	0.0609**	0.131***
	(0.0559)	(0.0120)	(0.0268)	(0.0117)	(0.0121)	(0.0216)	(0.0336)	(0.0340)	(0.0222)	(0.0196)	(0.0263)	(0.0270)	(0.0266)	(0.0400)
Observations	2,731	2,731	2,731	2,731	2,731	2,731	2,731	2,731	2,663	2,731	2,731	2,731	2,731	320
Adjusted R-sq.	0.24	0.43	0.26	0.10	0.10	0.12	0.15	0.12	0.31	0.17	0.19	0.19	0.11	0.21
State FE	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Notes: OLS coefficients reported. Robust standard errors are clustered at the state level with significance levels at the 10, 5, and 1 percent.

Sources: Administrative records covering CHD operation are retrieved from the *History of County Health Organizations in the United States* published in U.S. Public Health Bulletin 222. City health department records from public health reports from volumes entitle: *City Health Officers: Directory of Those in Cities of 10,000 or More Population* for years 1916-1932. Vital statistics are from U.S. Vital Statistics for rural areas. County-level data on property taxes, property values, and public debt are available in Census publications entitled *Wealth, Public Debt, and Taxation.* County-level demographic characteristics are calculated from the IPUMs Restricted Complete Count Census data.

Table A.2: Adoption of a Health Department, Bivariate

Panel A: County

	Pop.	Share Urban	Share Farm	Share White	Share Black	Share Physic.	Share <5	Share <1	Log of Property	Occ-score	Home Ownership	Female HH	Share Females	Mort. Rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1900 Control	-0.0130	0.00488	-0.0273	-0.0287	0.0338	-0.00990	-0.00955	-0.00319	-0.0257	0.00444	-0.0329	0.0109	-0.0133	-0.0150
	(0.0277)	(0.0163)	(0.0185)	(0.0318)	(0.0339)	(0.0101)	(0.0225)	(0.0129)	(0.0232)	(0.00938)	(0.0205)	(0.0131)	(0.00873)	(0.0113)
Log of Property Taxes	0.0929**	0.0807***	0.0717***	0.0816***	0.0807***	0.0863***	0.0814***	0.0832***	0.101***	0.0825***	0.0718***	0.0800***	0.0865***	-0.0390
	(0.0354)	(0.0229)	(0.0181)	(0.0193)	(0.0194)	(0.0186)	(0.0166)	(0.0184)	(0.0246)	(0.0202)	(0.0213)	(0.0181)	(0.0200)	(0.0370)
Observations	2,722	2,722	2,722	2,722	2,722	2,722	2,722	2,722	2,663	2,722	2,722	2,722	2,722	320
Adjusted R-sq.	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.21
State FE	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Panel B: Municipal

	Pop.	Share Urban	Share Farm	Share White	Share Black	Share Physic.	Share <5	Share <1	Log of Property	Occ-score	Home Ownership	Female HH	Share Females	Mort. Rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
1900 Control	-0.0383*	0.183***	-0.0891***	0.00585	-0.00930	0.0120	-0.0337**	-0.0147*	0.0220	0.0413***	-0.0421***	0.0538***	0.00363	0.0572**
	(0.0207)	(0.0134)	(0.0136)	(0.0135)	(0.0134)	(0.00718)	(0.0138)	(0.00759)	(0.0270)	(0.0101)	(0.00970)	(0.0122)	(0.0187)	(0.0245)
Log of Property Taxes	0.229***	0.0827***	0.163***	0.203***	0.203***	0.200***	0.194***	0.199***	0.186***	0.189***	0.187***	0.183***	0.202***	0.254***
	(0.0250)	(0.0203)	(0.0208)	(0.0224)	(0.0222)	(0.0232)	(0.0229)	(0.0226)	(0.0323)	(0.0239)	(0.0226)	(0.0215)	(0.0208)	(0.0203)
Observations	2,722	2,722	2,722	2,722	2,722	2,722	2,722	2,722	2,663	2,722	2,722	2,722	2,722	320
Adjusted R-sq.	0.35	0.46	0.38	0.35	0.35	0.35	0.35	0.35	0.35	0.36	0.35	0.36	0.35	0.46
State FE	X	X	X	X	X	X	X	X	X	X	X	X	X	X

Notes: OLS coefficients reported. Robust standard errors are clustered at the state level with significance levels at the 10, 5, and 1 percent.

Sources: Administrative records covering CHD operation are retrieved from the *History of County Health Organizations in the United States* published in U.S. Public Health Bulletin 222. City health department records from public health reports from volumes entitle: *City Health Officers: Directory of Those in Cities of 10,000 or More Population* for years 1916-1932. Vital statistics are from U.S. Vital Statistics for rural areas. County-level data on property taxes, property values, and public debt are available in Census publications entitled *Wealth, Public Debt, and Taxation.* County-level demographic characteristics are calculated from the IPUMs Restricted Complete Count Census data.

Table A.3: Adoption of a Health Department, Multivariate

Panel A: County

	Share Black	Share Physic.	Share <5	Share <1	Log of Property	Occ-score	Home Ownership	Female HH	Share Females	Mort. Rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1900 Control	0.0840*	-0.00655	-0.00232	0.00122	-0.0253	0.00834	-0.0265	-0.000485	-0.0137	-0.00919
	(0.0422)	(0.0119)	(0.0208)	(0.0124)	(0.0228)	(0.00806)	(0.0188)	(0.0143)	(0.00937)	(0.0125)
Log of Population Control	-0.0200	-0.0175	-0.0171	-0.0178	-0.0156	-0.0167	-0.0180	-0.0177	-0.00946	-0.0299
	(0.0305)	(0.0303)	(0.0264)	(0.0294)	(0.0310)	(0.0303)	(0.0297)	(0.0309)	(0.0321)	(0.0210)
White	0.0477**	-0.0290	-0.0300	-0.0307	-0.0332	-0.0325	-0.0184	-0.0307	-0.0314	-0.0535
	(0.0218)	(0.0339)	(0.0324)	(0.0321)	(0.0336)	(0.0330)	(0.0328)	(0.0346)	(0.0325)	(0.139)
Urban	0.00504	0.00548	0.00471	0.00518	0.00630	0.00263	-0.00103	0.00517	0.00502	-0.0201
	(0.0162)	(0.0165)	(0.0164)	(0.0162)	(0.0162)	(0.0162)	(0.0157)	(0.0163)	(0.0160)	(0.0138)
Log of Property Taxes	0.0903**	0.0917**	0.0897**	0.0907**	0.105**	0.0885**	0.0858**	0.0905**	0.0873**	-0.000197
	(0.0393)	(0.0378)	(0.0353)	(0.0382)	(0.0413)	(0.0396)	(0.0403)	(0.0389)	(0.0398)	(0.0557)
Observations	2,722	2,722	2,722	2,722	2,660	2,722	2,722	2,722	2,722	320
Adjusted R-sq.	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.21
State FE	X	X	X	X	X	X	X	X	X	X

Panel B: Municipal

	Share Black	Share Physic.	Share <5	Share <1	Log of Property	Occ-score	Home Ownership	Female HH	Share Females	Mort. Rate
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1900 Control	-0.0442	0.00373	-0.00218	-0.00169	0.0171	-0.00112	-0.00143	0.0238**	0.0163	0.0338
	(0.0355)	(0.00618)	(0.0107)	(0.00709)	(0.0226)	(0.00947)	(0.00913)	(0.0102)	(0.0127)	(0.0297)
Log of Population Control	-0.0336**	-0.0349**	-0.0342**	-0.0346**	-0.0337**	-0.0349**	-0.0348**	-0.0373**	-0.0446**	-0.0461
	(0.0145)	(0.0146)	(0.0139)	(0.0144)	(0.0146)	(0.0149)	(0.0145)	(0.0146)	(0.0180)	(0.0792)
White	-0.0409	-0.000607	0.000615	0.000576	0.00292	0.000472	0.000839	0.0125	0.00137	0.0608
	(0.0350)	(0.0106)	(0.0108)	(0.0107)	(0.0105)	(0.00964)	(0.0129)	(0.0110)	(0.0101)	(0.189)
Urban	0.183***	0.183***	0.183***	0.183***	0.182***	0.183***	0.183***	0.177***	0.183***	0.132***
	(0.0128)	(0.0128)	(0.0124)	(0.0125)	(0.0131)	(0.0122)	(0.0129)	(0.0132)	(0.0131)	(0.0250)
Log of Property Taxes	0.107***	0.106***	0.106***	0.107***	0.0941***	0.107***	0.107***	0.105***	0.111***	0.170**
	(0.0239)	(0.0239)	(0.0240)	(0.0239)	(0.0274)	(0.0252)	(0.0246)	(0.0231)	(0.0261)	(0.0661)
Observations	2,722	2,722	2,722	2,722	2,660	2,722	2,722	2,722	2,722	320
Adjusted R-sq.	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.50
State FE	X	X	X	X	X	X	X	X	X	X

NOTES: OLS coefficients reported. Robust standard errors are clustered at the state level with significance levels at the 10, 5, and 1 percent.

SOURCES: Administrative records covering CHD operation are retrieved from the *History of County Health Organizations in the United States* published in U.S. Public Health Bulletin 222. City health department records from public health reports from volumes entitle: *City Health Officers: Directory of Those in Cities of 10,000 or More Population* for years 1916-1932. Vital statistics are from U.S. Vital Statistics for rural areas. County-level data on property taxes, property values, and public debt are available in Census publications entitled *Wealth, Public Debt, and Taxation.* County-level demographic characteristics are calculated from the IPUMs Restricted Complete Count Census data.

B Census Data

Wealth, Debt, and Taxation 1900, 1910, 1920, and 1930 Census volumes include records of local government activities in separate publications entitled, *Wealth, Debt, and Taxation.* I digitized the county and municipal level records for 1900-1940. The data include area-specific property taxes, the tax revenue, and the debt of the local government. For 1910, I also digitize the local government expenditure by activity type. One limitation of this data is that the assessment of property values varied by locality and by state. Local officials were responsible for assessment, and had complete power over the reported property values. While state governments were permitted to levy a property tax, they had little control over the assessment process. This conflict of interest between the state and local officials led local assessors to under-value properties. To prevent these lower property values

from affecting revenues, county officials could then raise the tax rates according to the undervaluation.[9] Thus, the property values frequently do not represent the market values of local property.

Demographic Controls Controls for the county and state demographic characteristics are included from census microdata over the years 1900-1940 as well as the US Farm Land Value data. The data originates from Haines (2004) and the IPUMs Restricted Complete Count Census Data (Minnesota Population Center and Ancestry.com (2013)). When available, I use the calculated figures at the county level from the complete count data.

C Changes in County Characteristics

As an alternative, it is conceivable that the adoption pattern depended on changes in county characteristics rather than the levels. To test whether this is the case, I consider the binary adoption pattern along with demographic characteristics over the two decades of the roll out. This informs whether adoption depended on changes in county characteristics, instead of pretreatment levels. To test this, I estimates whether changes in demographic characteristics predicted adoption over 1910, 1920, 1930, and 1940 as:

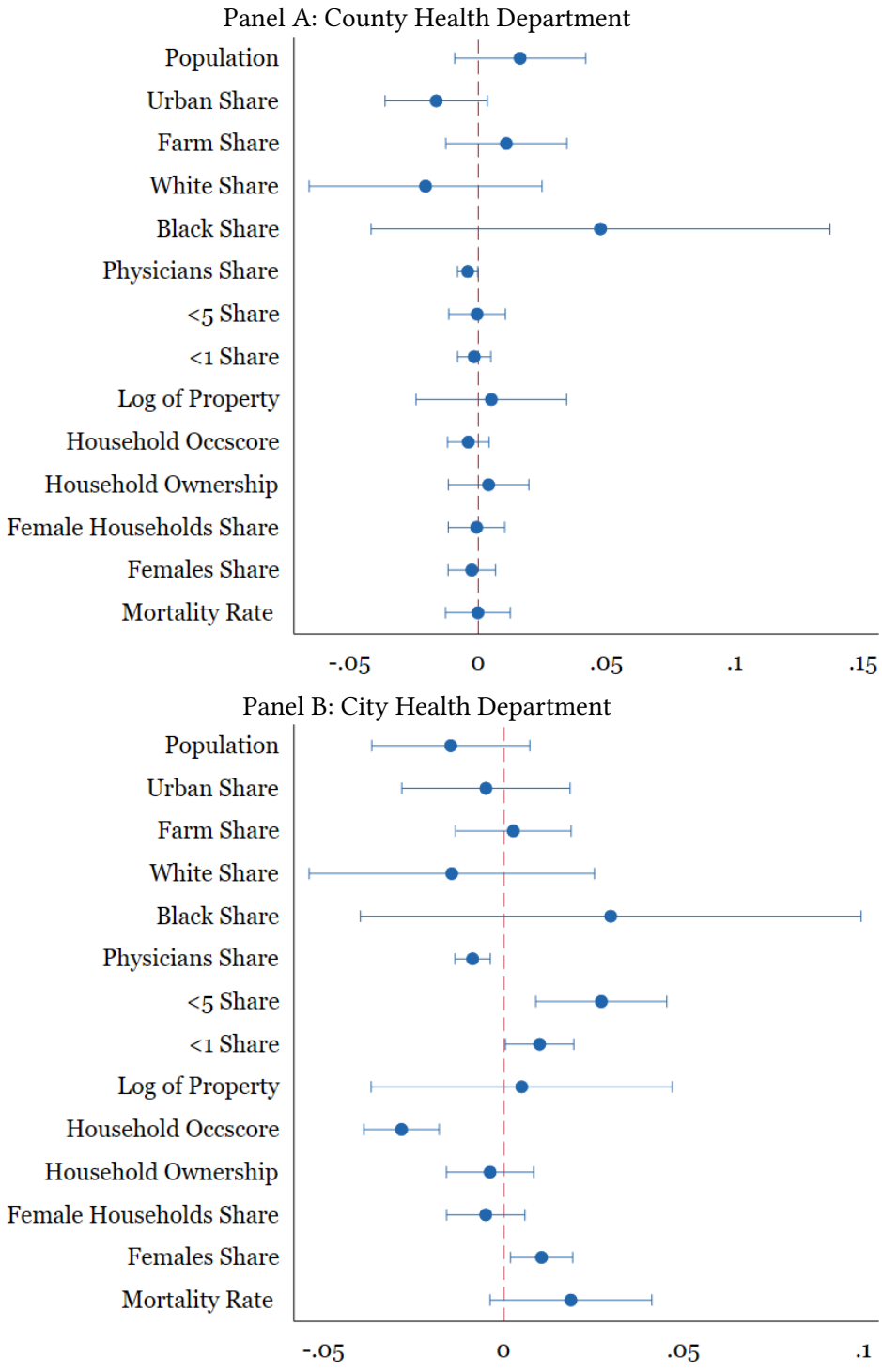
$$HD_{jst} = \alpha + \beta_1 D_{jst} + \beta_2 \log(\text{tax})_{jst} + a_j + \eta_j t + \phi_{st} + \epsilon_{jst} \tag{3}$$

where HD_{jst} is an indicator that equals one if a county adopts a county or municipal health department in that time period $t = 1910, 1920, 1930$. D_{jst} is the demographic characteristics of interest. a_j capture the county fixed effect. $\eta_j t$ captures time-invariant county fixed effects along with a linear time trend. ϕ_{st} captures state-by-year fixed effects. ϵ_{jst} is the regression error.

Figure C.1 shows the results with the time-variant demographic characteristics. Unlike with stagnant adoption, none of the county characteristics appear to predict adoption. For urban areas, the factors are more varied and several demographic characterstics appear to affect adoption.

[9] For more on this, see related discussions in Wallis (2001) and Vollrath (2013)

Figure C.1: Changes in Demographic Characteristics and Health Department Entry



NOTES: Each point represents the estimated coefficient on the 1910 population control, with the estimation including state fixed effects. Plotted points represent the results from a difference-in-differences estimation in Equation 3. Lines represent the 95 percent confidence intervals on the point estimates. Robust standard errors are clustered at the state level. Variables have been standardized to enable the coefficients to be plotted on the same graph.

SOURCES: Administrative records covering CHD operation are retrieved from the *History of County Health Organizations in the United States* published in U.S. Public Health Bulletin 222. City health department records from public health reports from volumes entitle: *City Health Officers: Directory of Those in Cities of 10,000 or More Population* for years 1916-1932. Vital statistics are from U.S. Vital Statistics for rural areas. County-level data on property taxes, property values, and public debt are available in Census publications entitled *Wealth, Public Debt, and Taxation.* County-level demographic characteristics are calculated from the IPUMs Restricted Complete Count Census data.