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THE LASTING IMPACT OF THE HILL-BURTON PROGRAM ON THE HOSPITAL INDUSTRY

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ABSTRACT

The hospital industry is one of the most important industries in the U.S., and industry structure can have profound effects on the functioning of markets. Using county-level panel data, we study the effect of public subsidies from the Hospital Survey and Construction Act of 1946, known as the Hill-Burton program, on hospital capacity, organization of the hospital industry, and utilization. We find that the program generated substantial increases in capacity and these changes were highly persistent, lasting well beyond twenty years. However the increases in capacity at non-profit and public hospitals were partially offset by reductions in capacity at for-profit hospitals. Nonetheless, we estimate that the Hill-Burton program accounted for a net increase of over 70,000 beds nationwide, which is roughly 17 percent of the total growth in hospital beds in the U.S. from 1948 to 1975. We also show that differences across counties in the number of hospital beds per capita were greatly reduced over this period. Differences between high and low income counties, rural and urban counties, and the South and the rest of the country fell substantially. We conclude that the program largely achieved its goals, and had substantial and long lasting effects on the hospital industry in the U.S..

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1 Introduction

Health care is a large part of the U.S. economy (\$2.9 trillion, 17.4% of GDP in 2013), and the hospital industry is a large part of this sector (31% of health care spending and 5.6% of GDP) (Hartman et al., 2015). The functioning of the hospital industry is critical to the overall performance of health care. While hospital pricing, output, quality, and technology adoption have been the subject of a great deal of study, there has been relatively little attention focused on the determinants of the structure of this industry. Industry structure obviously plays a critical role on the supply side, but also affects demand. Location affects travel time, capacity affects waiting time, market structure affects strategic interactions among providers, and these then feed back into equilibrium price and quality determination. Yet in spite of the importance of industry structure, relatively little attention has been paid to this topic.[1]

The structure of the hospital industry has changed substantially over time, in terms of the total number of hospitals, their capacity, and ownership composition. Beginning in the post-WWII era, the industry grew substantially, from 4,375 non-federal short-term general hospitals in 1948 to 5,875 in 1975.[2] Most of the growth over this period came from non-profit and public hospitals, with a decline in the number of for-profit hospitals. Over this same period the hospital industry was the target of a large federal government program designed to affect industry structure: the Hill-Burton program. This program provided substantial subsidies for construction to non-profit and public hospitals, but not to for-profits. A logical question that emerges is what the impact of this program was on the hospital industry in terms of size, location, and ownership composition. A government program directed toward capital investment could have profound, long lasting impacts on an industry.

An obvious second question concerns crowd-out. Economists have extensively debated the issue of public-private crowd-out, which was a central concern in the reaction against Keynesian economic theory and the use of expansionary fiscal policy. Drawing on this initial work that considered fiscal policy in general terms, various streams of literature have developed evaluating crowd-out in specific contexts such as health insurance (e.g., Cutler and Gruber, 1996), charitable giving (e.g., Gruber and Hungerman, 2007), and education (e.g., Cellini, 2009). Governments at all levels expend considerable resources in producing a variety of goods and services that are also available from the private sector. Public provision or subsidization almost certainly expands "access" and the use of services such as health care and health insurance, education, arts and culture, and social services. However any increases in public provision may be offset by reductions in private provision of these services. This diminishes the net impact of public expenditures. Moreover if public sector involvement distorts incentives in an otherwise well functioning market, there is the potential for a wasteful misallocation of resources.

[1] For some important exceptions, see Gowrisankaran and Town (1997), Finkelstein (2007), and Abraham et al. (2007).

[2] Non-federal short term general hospitals are what are commonly thought of as "hospitals." This excludes veterans and military hospitals as well as specialized facilities (e.g., rehabilitation or psychiatric hospitals).

In this paper we examine the impact of this large federal program on the hospital industry, and measure the extent of crowd-out that resulted from this investment. The Hospital Survey and Construction Act of 1946, commonly referred to as the Hill-Burton program, marked the federal government's first major entrance into the general health care services sector (David, 2010; Stevens, 1999). This intervention was motivated by a perceived lack of supply of health care for workers in war production facilities during the Second World War, as well as a lack of access to health care for individuals in poor, rural areas of the U.S. The Hill-Burton program remains the largest piece of federal legislation to provide subsidies for the construction of non-profit and local governmental hospitals. From July 1947 through June 1971, $28 billion in funds were distributed for the construction and modernization of health care institutions.[3]

A program of this magnitude can have substantial impacts through changes in service capacity, changes in the number of firms, and changes in the ownership mix.[4] Furthermore, little is known about the long-term consequences for supply and utilization. We estimate the effects of the Hill-Burton program on supply, organization and utilization in the hospital industry, and the extent to which this large federal investment in non-profit and public hospitals may have displaced growth at hospitals that otherwise would have occurred, particularly at for-profits.

To our knowledge, we are the first to use historical records from the American Hospital Association to document changes in the hospital industry brought on by the Hill-Burton program. Specifically, we estimate the impact of the program on the supply of hospitals and beds over time in counties that received the federal subsidies. We find large and persistent increases in hospital bed capacity, which then led to increases in the utilization of hospital services. However the increases in capacity at subsidized hospitals were partially offset by reductions in capacity, particularly at for-profit hospitals. The amount of crowd-out, measured as the net increase in total beds from each planned bed, was substantial, but far from complete. We estimate that as much as 70% of the beds added by the program were offset by crowd-out effects.

These results are consistent with a body of research finding substantial crowd-out in the case of public health insurance programs. As examples of the many papers studying Medicaid expansions, Cutler and Gruber (1996) and Gruber and Simon (2008) estimate that about one-half of the coverage increases in Medicaid in the 1980s and 1990s were offset by reductions in private coverage.[5] On Medicare, Lichtenberg (2002) estimates that two-fifths of the fluctuations in the program's expenditures over time were offset by associated changes in private health insurance expenditures. The results from Finkelstein and McKnight (2008) indicate that two thirds of the initial increase in public spending on 65-74 year-olds from Medicare were offset by reductions in private health insurance spending.[6]

[3] Inflation-adjusted to 2012 dollars.

[4] For example, Finkelstein (2007)) finds large impacts from the introduction of the Medicare program.

[5] See Gruber and Simon (2008) for an extensive review of the literature on crowd-out from Medicaid expansions.

[6] They report a differential increase in public spending on 65-74 year-olds, relative to 55-64 year-olds, of

There is a smaller, but growing, literature examining how public subsidies, either in the forms of grants or tax benefits, crowd out private organizations. Cohen et al. (2013) use a structural entry model to investigate whether public funds to outpatient substance abuse treatment clinics crowd out private clinics. They estimate a 70-78% crowd-out of private clinics. Cellini (2009) uses data from 1995-2003 on two-year community colleges in California and finds that an increase of $100 million in funding to community colleges in a county results in two fewer proprietary schools in that county. Harrison and Seim (2014) study the fitness center market and estimate an equilibrium model with non-profit (YMCA) and for-profit firms. They do not find evidence of crowd-out of for-profit fitness centers, suggesting that non-profit tax exemptions do not put for-profits at a competitive disadvantage.

The literature studying the impact of the Hill-Burton program itself is surprisingly sparse, given the large scale of the program. A notable exception is Lave and Lave (1974), who find a significant association between Hill-Burton funds per capita and an increase in total hospital beds per capita. However, their measure includes tuberculosis, mental health, and chronic disease beds in addition to general acute care beds. They do not find a significant increase in short-term general beds per capita when they include population and socioeconomic control variables. Further, their use of state-level data masks variation in responses to the program within each state, and since all states received some funding, there are no control groups with which to compare a counterfactual outcome.[7] We use counties rather than states as the unit of analysis, which is a more accurate reflection of how the program worked. Additionally, the existing literature on the Hill-Burton program has not considered the issue of crowd-out or estimated the response of for-profit organizations.[8]

We provide detailed background information on how the Hill-Burton program was operationalized in Section 2. Section 3 contains information on the data and explains our identification strategy, which draws on certain institutional details provided in Section 2. The empirical results of our main model specification are presented in Section 4. We also include the results from several robustness checks, including a falsification exercise with the leads of the treatment (Section 4.2) and an instrumental variables approach (Section 4.3), which verify our main results. Section 5 assesses the crowd-out effects of the program, potential spillovers to neighboring counties, and cost of the program per bed generated. Section 6 addresses the impact of the program on health care utilization, and Section 7 provides descriptive evidence about long-run effects and changes in the distribution of the supply of hospital beds. We conclude in Section 8.

$766 and a differential decrease in private spending of $510 when Medicare was introduced.

[7] In our county-level data, there are a number of counties that received no funding over the life of the program.

[8] Another study by Clark et al. (1980) uses a more descriptive approach to study the re-distributional effects of the program. They find that only about one-third as much of the relative convergence in bed supply would have occurred in 1950-1970 had there been no Hill-Burton program. Brinker and Walker (1962) also evaluate the impact of the program, but only focus on the first 7 years of the program in Alabama and Oklahoma. They find that the program resulted in increases in bed capacity. However, conclusions about the program at the national level cannot be drawn from their paper.

2 The Hill-Burton Program

The Hill-Burton program was enacted with the Hospital Survey and Construction Act of 1946. At the time of its inception, the program was a response to the shortage of health facilities for war production workers, as well as the perceived scarcity of health resources in parts of the country, particularly in the South (Stevens, 1999). When initially enacted, the Hill-Burton program provided for $75 million ($714 million in 2012 dollars) in funds annually to be distributed among states over 4 years.[9] This amount was raised to $150 million ($1.45 billion in 2012 dollars) annually in 1949. Figure 1 depicts the geographic distribution of hospital beds per capita in 1948, at the start of the program. Based on data from the American Hospital Association, there were a total of 4,375 short-term acute care hospitals in the U.S. in 1948. Lighter shading denotes fewer beds per capita. In 1948, 667 of the 3,100 counties in the U.S. (about 22%) had no hospital. The majority of southern counties and counties in the middle of the country had little or no supply of hospital beds.

The central federal authority for the program was the Federal Hospital Council at the U.S. Department of Health, Education and Welfare. Hill-Burton funds were allocated in two steps. First, an allotment formula was used to determine how the money would be disbursed among the states. In order for any state to receive its share of the funds, it had to submit a state plan to the Surgeon General of the U.S. Public Health Service, and the Surgeon General had to approve the plan. The second step in the allocation process required that states then distribute funds to projects in accordance with their state plan.

Table 1 shows the allotment formula used to distribute the funds to the states, using the example of 3 hypothetical states with the same population but with high, average, and low per capita income, respectively.[10] The formula, which involved the squared differences between state per capita income and the national average, was designed to provide lower income states with a relatively larger portion of the Hill-Burton funds, but with no state receiving less than $10,000. For example, in 1950 Georgia was one of the lowest per capita income states and received $2.6 million in funding, which amounts to $0.76 per person. Meanwhile California, one of the wealthiest states, received $1.6 million, or $0.15 per person. The funds from the program were used to cover up to one-third of the construction costs of facilities. Throughout the life of the program, the federal government spent over $3.7 billion ($28 billion in 2012 dollars), which spurred about $12.8 billion ($96 billion in 2012 dollars) in construction, addition, replacement and remodeling of health care facilities.

Continuing to use Georgia as an example to illustrate the process, the Georgia Department of Public Health first took an inventory of all hospitals to determine which hospitals and how many beds were acceptable based on fire and health standards. It used this information to develop the state plan, which was submitted in 1947 and approved by the Surgeon

[9]The average construction cost of hospitals newly built with Hill-Burton funds between 1948-1950 was $866,300, or $8.3 million in 2012 dollars.

[10]Once a state had 4.5 beds per 1,000 people, Hill-Burton funds could no longer be distributed to that state. However, no state in the U.S. ever reached that limit (Feshbach (1979)).

General on November 18, 1947. An excerpt from a summary table in Georgia's State Plan is provided in Figure 2. The state is broken down into counties and prioritized based on whether or not a county was rural, its population, and bed need. Bed need was determined by comparing the number of acceptable beds per capita with the target of 4.5 beds per 1,000. We highlight Greensboro, which was given a priority of "A," meaning that it was in the highest group. All state plans included this sort of prioritization, as well as various administrative details regarding how the program would operate in that particular state.

Next, once a state plan was approved by the Surgeon General, the state was entitled to their specified allotment to cover one third of expenditures for construction, additions and remodeling of health care facilities. The state plan then became the roadmap for distributing funds within a state, and states were required to ensure that funds were distributed roughly in accordance with their priority list. The state did not actually distribute the funds until a construction application was approved for a specific project, and each project had to be approved by both the state agency and the Federal Hospital Council. The applicants proposing specific Hill-Burton construction projects included the states themselves, local governments, public agencies, and non-profit agencies. They submitted their applications to the state agency overseeing the program, which processed the applications in the order of priority and then forwarded them to the Surgeon General. However if a higher priority project did not have the financial resources necessary for the construction, maintenance and operation of the project, then lower priority projects would be forwarded to the Surgeon General out of order of priority.

While it is hard to tell how often counties went "out of order" across the U.S., in Georgia at least, 5 out of the 8 counties ranked the highest priority were the first to receive funding in 1948. The other 3 received funding in 1949.

In Greensboro, the county (Greene County) submitted a construction application to build Minnie G. Boswell Memorial Hospital. These applications had to include the following: 1) description of the project site, 2) plans and specifications for the proposed project, 3) "reasonable assurance that title to such site is or will be vested solely with the applicant" (Federal Security Agency 1948), and 4) assurance that there would be adequate financial resources for construction and for the maintenance and operation of the hospital. There was also a requirement that the proposed hospital's construction contract would provide adequate wages for labor for construction.

Once such an application was approved, the funds were distributed by the state to the county to build the specific project that was approved. In the case of Minnie G. Boswell Memorial Hospital, the application was approved in February 1948 for the construction of 28 beds with \$133,750 in federal Hill-Burton money for a total construction cost of \$401,250. The non-federal share of funding came from a single donor, James Griffin Boswell, who was the founder of the J. G. Boswell Company, which today is the country's largest cotton producer. Upon donating the funding for the hospital, Boswell requested the hospital be named after his mother. Construction finished a year later, and it became the first hospital built with Hill-Burton funding. Figures 3 and 4 summarize both steps of the allocation process and distribution of funds. We can see that disbursement of these funds occurred at the state level with enforcement and monitoring at the federal level. However, final control of the program was placed with the Federal Hospital Council. Table 2 provides summary statistics on the projects and funding amounts approved over time (the table is discussed in the next section).

The maps in Figures 5 and 6 provide additional detail regarding the distribution of funds to states. Figure 5 details the approval of Hill-Burton funds across states in 1948 (normalized by state population). We see that funds were concentrated in southern states, with Alabama, Mississippi and New Mexico receiving the most funding per capita. Figure 6 summarizes total approved funding over the length of the program, from 1947-1971. Again, we see that the majority of funding went to the southern states, particualrly Mississippi and Arkansas.

3 Data and Methods

3.1 Data

We use three main data sources in this paper: the Hill-Burton Project Register, the American Hospital Association Survey of Hospitals, and the Area Resource File. The relevant summary statistics are presented in Tables 2 and 3 and Appendix Table A1. The details are discussed below.

Hill-Burton Project Register

The Hill-Burton Project Register is a publication by the U.S. Department of Health, Education and Welfare and contains data that are a compilation of all hospital and medical facility projects approved under the Hill-Burton program from 1947 to 1971 (U.S. Department of Health, Education and Welfare, U.S. Public Health Service (1971)). It includes information on the following variables for each project approved under the program: unique project number, location of the project (city, county and state), name of the facility, ownership (public or non-profit), type of facility (general acute care, tuberculosis, mental hospital, etc.), type of construction (new construction, remodel, replacement, addition, etc.), dollar amount of federal funds, total estimated construction cost, number of beds planned, and date of approval. We restrict the analysis to Hill-Burton funds spent on non-federal short-term general (acute care) hospitals. These short-term general hospitals are the focus of this paper because they are the facilities that are open to the general public and provide a broad range of services.[11]

[11] Short term general hospitals are what are generally meant by the term "hospital." Other types of hospitals are long term or specialized facilities, e.g., psychiatric, rehabilitation, orthopedic, etc. Federal hospitals are not open to the general public. The overwhelming majority of U.S. hospitals are non-federal short-term general hospitals.

There were a total of 10,490 projects funded by the Hill-Burton program (excluding U.S. territories) at a total federal cost of $27.3 billion (in 2012 dollars). When we limit the projects to short-term general hospitals, there are 5,567 total projects with $19.5 billion spent on those projects. Table 2 lists the number of such projects approved each year, with the total number of beds, proposed construction costs, and federal subsidy amounts. There is variation from year to year in the number of projects and the total subsidy amounts because the approval of funding depended on the submission and review of projects on an individual basis, as described in the previous section.

American Hospital Association Annual Survey of Hospitals

Our data on the primary outcomes in terms of capacity and utilization come from the annual American Hospital Association (AHA) survey of hospitals for the years 1948 to 1975, which includes data on the characteristics of all hospitals registered with the AHA in the United States. These data are available in hard copy form in the annual August issue of *Hospitals: The Journal of the American Hospital Association.*[12] While the AHA survey data have been used by many to study the hospital industry, few have used these older data to study the industry in its more formative years.

The unit of observation in the AHA survey is a hospital-year, and we have data on the following variables: hospital name, city, county, state, total beds, admissions, days, payroll expenditures, total expenditures and full-time equivalent (FTE) staff (total expenditures and FTEs are only available from 1951 onward). We also observe the ownership structure of the hospital (non-profit, non-federal public, federal, and for-profit) and the type of hospital (short-term, long-term, general, non-general). We eliminate federal hospitals, such as Public Health Service, military, and Veterans Administration hospitals (about 5% of hospitals each year), and keep only short-term general hospitals (excluded are long-term stay hospitals, children's hospitals, maternity hospitals, etc.). There are no AHA survey data for 1954, so we interpolate values for each variable in that year by taking the averages of their values in 1953 and 1955. We aggregate the AHA data to the county level by summing all hospital beds by ownership type and counting the number of hospitals in a county. We aggregate to the county level because Hill-Burton funds were typically prioritized by county (we discuss this further in the next section, 3.2, on methodology).

The average and median numbers of beds, admissions, and hospitals by ownership type are shown in Table 3, for the entire sample and separately for counties that received Hill-Burton funding and those that did not. The never-funded counties are on average smaller than the funded counties and have fewer hospitals, but they have roughly the same number of beds per capita as the funded counties in the year when those counties were first funded. Appendix Table A1 gives these figures for counties separated into population terciles. The bottom two terciles are similar in terms of hospital beds and admissions per capita, while

[12]These data are known for their accuracy and completeness. See Appendix A1.1 for a brief discussion and Finkelstein (2007) Appendix for additional details.

the counties in the largest tercile have more beds and admissions on average.

Figure 7 shows national trends over time in the average numbers of beds and admissions per capita in total and by ownership type. This was a period of rapid expansion in the hospital industry: from 1948 to 1975 the total number of beds per 1,000 population increased from about 3 to almost 4.5. The growth of non-profit and public hospitals accounted for most of this increase. The number of for-profit beds per capita initially declined, but had a modest net increase of 0.2 beds per 1,000 over the full time period. The number of admissions per 1,000 population almost doubled over this time period from 85 to 150, due to increases in non-profit and public admissions. For-profit admissions decreased slightly over this time period from 0.093 to 0.088 per 1,000.

Area Resource File

The Area Resource File (ARF) contains data on county-level characteristics compiled from a variety of sources, such as the U.S. Census Bureau, American Medical Association, and the Bureau of Labor Statistics (Area Resource File (1983)). While there are hundreds of variables available in the ARF, very few of these are available from the 1940s. For that period we can obtain data on Census population estimates (totals and shares by age and race), median family income, and the number of non-federal physicians.

Because of substantional changes in county boundaries that occurred in the 1970s in the state of Virginia, we were unable to match county-level characteristics with the AHA data in the state of Virginia. For this reason, we exclude Virginia from the anlaysis. In addition, we exclude Alaska and Hawaii from our analyses as they became U.S. states in the middle of our sample period.

Summary statistics for the ARF data are contained in Table 3. On average, the population in counties in our sample in 1953 was about 51,940, comprised of about 9.7% over the age of 65 and about 11.7% under age 5. Counties on average had about 10.9% of the population that was non-white and a median family income of $24,352 (in $2012). On average, counties had about 0.5 medical doctors (non-federal) per 1,000. Funded counties were more populous, with almost 4 times the average population of counties that never received funding. These counties were also slightly richer, with a higher average median family income compared to never funded counties.

3.2 Overview of Methodology

We choose the unit of analysis as the county because Hill-Burton funds were prioritized by county (or groups of counties at the Health Service Area level).[13] While it is possible to

[13]Unfortunately, these Health Service Areas are not available electronically for use in our analysis. Thus, we are assuming that counties grouped in the same service area were equally likely to receive funding. This

proceed with a more aggregate analysis at the state level, allowing finer granularity in the unit of analysis is preferable since a state level analysis would overlook substantial within-state variations in capacity. Further, a state level analysis will have no "untreated" units, because all states received funding in the first year of the program. Because not all counties received Hill-Burton funds, we are able assess how hospital capacity changed in counties that received Hill-Burton funding compared to those that did not. In addition we exploit the timing of when a county was funded relative to others that did as well.

We define a county as being exposed to the Hill-Burton program starting in the first year any funding was approved for a project in the county. Accordingly we create an indicator $Treat_{it}$ that equals 1 in the year that funding was approved for the first Hill-Burton project in county i, and 0 otherwise. Throughout the period 1948 through 1971, counties were treated in this way at different points in time. In order to take into account the staggered nature of receipt of Hill-Burton funds, we use an "event study" framework and estimate how outcomes changed over time relative to the first year of treatment. To do this we use a series of lags of the first-treated dummy, $Treat_{i,t-m}$, to trace out the effect of receiving first funding m years ago, where m ranges from 0 to 20 years.[14]

The effect of the Hill-Burton program on hospital capacity should be captured by the treatment variable and its lags. However there may be other factors that shift the demand and supply for hospital beds and therefore also determine hospital capacity. We control for observed factors using county-level socioeconomic variables that are likely associated with demand shifts. In addition, it is possible that there are unobserved factors that determine the number of beds in a county and are thus still present in the error term. We take advantage of the fact that we have panel data by including county fixed effects, which control for any unobserved characteristics of counties that do not change over time. We also include year fixed effects to capture any secular national trends that may affect the number of beds per capita. Last, since non-profit and public hospitals were eligible for Hill-Burton funding, but for-profits were not, we estimate regressions both for the net effect on total beds and separately for beds at non-profit or public hospitals and at for-profit hospitals.

The regression equations are as follows:

$$\text{Total Beds per 1,000}_{it} = \theta + \sum_{m=0}^{m=20} \beta_m Treat_{i,t-m} + X'_{it}\delta + c_i + \lambda_t + \varepsilon_{it} \tag{1}$$

$$\text{Non-Profit/Public Beds per 1,000}_{it} = \theta + \sum_{m=0}^{m=20} \beta_m Treat_{i,t-m} + X'_{it}\delta + c_i + \lambda_t + \varepsilon_{it} \tag{2}$$

$$\text{For-Profit Beds per 1,000}_{it} = \theta + \sum_{m=0}^{m=20} \beta_m Treat_{i,t-m} + X'_{it}\delta + c_i + \lambda_t + \varepsilon_{it} \tag{3}$$

where the $Treat_{i,t-m}$ are the dummy variables indicating if the county first received Hill-

seems probable since groups of rural counties were grouped with each other rather than being grouped with urban counties. Similarly, urban counties were grouped together.

[14] This is a similar approach to Wolfers (2006), who studies how divorce reform laws adopted at different times by different states affect a variety of outcomes, such as suicide rates and domestic violence.

Burton funding m years ago, the X_{it} are observable county socioeconomic and demographic variables, the c_i are county fixed effects, the λ_t are year effects, and the ε_{it} are random error terms. The coefficients β_m indicate the effects on bed supply due to first receiving Hill-Burton funding m years ago.

Since our data are from 1948 to 1975, we choose $m = 0, \ldots, 20$ so that we can track the longer term impacts on capacity for counties treated in the earlier part of the program. We include one additional indicator for lags of 21 years or more. The X_{it} are controls for county characteristics that likely affect the overall demand for beds, including total population and socioeconomic factors measured as median family income and the percentage of population that is non-white. We also include the percentages of the population over the age of 65 and under the age of 5 since these two age groups are more likely to demand higher levels of health care services. Last, we include the number of non-federal physicians per 1,000 population, as the presence of more physicians in a county likely relates to a greater demand for hospital beds. All regressions are estimated using weights for county population.[15] To capture the important heterogeneity in treatment effects by population we also estimate these regressions separately for each population tercile.

3.3 Identification

3.3.1 Possible Challenges to Identification

The inclusion of year and county fixed effects in our model means that the treatment effect parameters (β_m) are identified from within county variation. Thus our model controls for any fixed differences across counties that are correlated both with our explanatory variables and with hospital capacity.[16] Nonetheless, the $Treat_{it}$ variable may still be endogenous. It is possible, for example, that counties where there was (unobservably) low hospital demand or high construction costs were more likely to receive Hill-Burton funding. This would introduce a negative correlation with the error term in the regression equations, thus leading us to underestimate the effect of the program. Alternatively, the opposite could be the case – counties that were well prepared and would have added hospital beds anyway are the ones that received funding. In this case we would overestimate the impact of the program.

Thus our regressions may produce biased estimates of the effect of the Hill-Burton program on bed capacity if there are any omitted factors that vary within counties over time and are correlated with the Hill-Burton treatment variable. For this to be an issue it must be that there are unobservable time varying factors that are correlated with the exact timing

[15] Whether or not to use weights is not a straightforward matter in this context (Solon et al. (2015)), and accordingly we have reproduced all analyses without weights (see the Supplemental Appendix). The unweighted average treatment effects are larger than the weighted estimates. We prefer the weighted estimates because they are more conservative, and they have the advantage of aggregating more easily to national-level impacts.

[16] In addition, our results are robust if we include county-specific linear or quadratic time trends.

of first receiving funding, given the staggered nature of the treatment and the outcomes that we observe.

Though we cannot test if such omitted variables exist, we assess the exogeneity of the timing of treatment in multiple ways. We estimate the above regressions with leads of the treatment indicator, and find no evidence of substantial trends prior to receiving funding (Section 4.2). We also use the priority rankings in the state plans to instrument for counties being treated early in the program, and this analysis indicates a large local average treatment effect among these counties (Section 4.3). Third, we consider whether spillovers to adjacent counties could contaminate the control observations and bias our estimates, and we find no changes in the treatment effect when such spillovers are incorporated (Section 5.2). Below we discuss institutional factors that we believe support the assumption of exogeneity for the exact timing of treatment.

3.3.2 Institutional Details and the Exogeneity of Treatment

Because the distribution of funds was established at the state level, a discussion of how states may have selectively picked counties to receive funding is in order. In other words, because we are looking at the changes in availability of beds in counties year over year, we want to assess how a county's propensity to be "exposed" to the program was related to the change in beds before the program started. For example, states may have selected counties they felt were "mature" and ready for growth. In that case, we may suspect that consumer or hospital advocacy groups may have been able to lobby for funding, and thus, played a role in determining whether a county would receive funds. These "behind the scene" political bargaining events may be unobserved and correlated with the change in beds in that county and would also be correlated with whether or not a county received funds. If such selection did occur, we would expect our estimates of the impact on non-profit/public beds and total beds to be biased upward since if counties that were going to grow anyway were the ones that got the funds, then our estimate would overestimate the effect of the program. On the other hand, if counties that were less likely to add hospital capacity (either due to weak demand, high construction costs, or credit constraints) were selected, then we will underestimate the effect of the program.

However, there is some strong evidence that politics played a limited role, if any, in the allocative process of the program. Feshbach (1979) has an interesting discussion of the de-politicized nature of the allocative process of distributing Hill-Burton grants.

> "Bureaucratic procedure rather than direct political conflict determined the allocation of Hill-Burton funds. The distribution of Hill-Burton grants was depoliticized. Unlike federal project grants, Hill-Burton funds were not allocated by announcing the availability of funds, receiving a set of applicants and then making a decision based on the appropriateness of the application and the relative power and resources each applicant can bring to bear on the decision-making

> process....The rules and regulations [of the Act] reduced the importance of the direct use of power by individual hospitals, the entire industry, or other program beneficiaries in allocating Hill-Burton grants."
>
> "The Hill-Burton Program disbursed funds geographically through the use of a formula which determined each Health Service Area's 'need' for hospital beds. Each area was ranked according to its need and then funds were distributed automatically. This automatic formula allocation system reduced popular and partisan political influence on individual grant allocations...Applicants had little space to exercise influence except when competing applications existed from one area or when the states had surplus of funds to disburse at the end of the fiscal year."

This is echoed in Starr (1982).

> "The law carefully limited political, especially federal, discretion. ... While the law set procedural guidelines for state distribution of the money, it specifically barred any federal regulation of hospital policy. The states were to estimate regional hospital needs; when an applicant from an area received a grant, the area would go to the bottom of the list and wait another turn. These arrangements were meant to minimize "politics"; the entire process was presented as a scientific exercise."

Thus, we believe the implementation of the program was largely insulated from political influence. The highly structured rules and regulations written into the Act ensured that political struggles would be minimized.

As mentioned previously, it is also possible that states provided funding only to counties that they perceived as slow growing. In this case, we would expect that our estimates on the impact of the program would be biased downward. For this to be true, there would have to be some unobserved component of those counties that states used as a criterion for selecting them for treatment. One would think that the main drivers of growth, without the program, would have been demand factors, such as population, income, and the racial composition of the county. We already control for these basic demographic characteristics, so we would need some variable that would affect selection even after controlling for these factors. We further control for time-invariant characteristics of counties that might contribute to being slower growing counties by adding in county fixed effects.

4 Effects on Hospital Capacity

4.1 Average Effects on Capacity

Figure 8 plots the estimates of the the coefficients β_m in regressions (1) to (3), which give the program's treatment effect over time. These coefficients are also listed in Appendix Table A2. Overall, there is a large and statistically significant increase in the supply of beds in response to a county receiving Hill-Burton funds. The top panel plots the effect of receiving Hill-Burton funds on hospital beds in the targeted sectors: non-profit and public hospitals. Much of the impact occurs within the first 3 to 4 years, the typical length of time to complete a hospital construction project. However there is further growth over the remainder of our follow-up period, which reflects the impact of additional projects within the same county and projects that took longer to complete.[17] The estimated effects are substantial. Five years after the first Hill-Burton project was approved, treated counties have 0.4 additional beds in non-profit and public hospitals per 1,000 population. The average effect continues to rise to 0.6 beds per 1,000 after 20 years from when the first project was approved.

The second panel shows the effect on beds in for-profit hospitals. The average supply of for-profit beds drops when a county receives Hill-Burton funds, and levels off at a decrease of about 0.1 beds per 1,000 after three years. This provides one indication of a crowding out effect of the program, as the subsidy was not available to for-profit hospitals. However crowd-out was also possible within the non-profit sector, which represented the vast majority of the hospital industry at that time. (See Section 5 for the analysis of the overall amount of crowd-out.)

The bottom panel plots the effect on total hospital beds in a county; i.e., the net effect of the program accounting for the equilibrium response of other entities in the market. The estimates show that the Hill-Burton program had large and lasting effects on hospital capacity. After 20 years, the long-run effect was a net increase of about 0.5 beds per 1,000 population. This represents a 20 percent increase over the pre-treatment average of 2.36 beds per 1,000 in counties that were funded. In an average sized funded county (population 65,900), these effects would translate to a net growth of about 20 beds after 5 years and about 30 beds after 20 years.

There is substantial heterogeneity in the average treatment effects across the terciles of county population, as shown in Figure 9 (full coefficients are reported in Appendix Table A3). This is not surprising given the large differences in average funding amounts per capita, which are reported in Appendix Table A1. Among funded counties, the average subsidy amount over the life of the program was \$219 per capita in the first population tercile, \$140 in the second, and \$76 in the third (in \$2012).[18] In the first tercile the net effect on hospital beds

[17] Additionally, if earlier projects were larger on average, this would increase the longer-run effects which are estimated from counties treated in the early years of the program.

[18] Regression models including the subsidy amounts are presented in Section 5.3. As discussed there, including these amounts explains much of the heterogeneity seen across population terciles.

was an increase of nearly one bed per 1,000 after 5 years and reached two beds per 1,000 after 20 years. In the second tercile the effect was smaller but still substantial: 0.6 beds after 5 years and 1.4 beds after 20 years. In the third tercile the effect was much smaller but still (marginally) statistically significant, with a long-run effect of 0.4 beds per 1,000 after 20 years (though a wide confidence range). These differences in the funding amounts and treatment effects are in line with the goals of the program to increase hospital capacity in rural and other underserved areas.

Overall, these results indicate that the Hill-Burton program had a substantial net positive effect on U.S. hospital capacity.[19] Funding led to large and long lasting increases in the number of hospital beds. However, the program did crowd out private, for-profit hospitals.

In other words, counties that received Hill-Burton funds saw large increases in non-profit and public capacity and in those same counties, for-profit hospitals decreased capacity, converted to non-profit status, or exited altogether. As a consequence, not only did the Hill-Burton program affect capacity in terms of the number of beds, it had a lasting and profound impact on the composition of the hospital industry. For-profit hospitals were a small portion of the hospital industry to begin with, and the Hill-Burton program further marginalized these hospitals by providing construction and expansion grants to their non-profit and public competitors. The newer non-profit and public health facilities may have drawn patients away from the smaller for-profit hospitals, thereby reducing demand for for-profit hospitals, which ultimately caused them to decrease their presence in these markets.

4.2 Assessment of Pre-Trends

Given the staggered implementation of the program, our panel regression models can be extended to include leads of the treatment indicator. This allows us to test for the presence of pre-trends in hospital capacity prior to receiving funding. However, because the nature of the Hill-Burton program required applicants to develop construction proposals in advance of applying for funding, we need to allow some time for an adjustment period before funding was approved. We consider there to be a 6-year adjustment period leading up to funding, following Lave and Lave's (1974) documentation that the pre-construction planning period averaged about 6.5 years during the Hill-Burton program. In order to test for differences prior to this adjustment period, we include up to 9-year leads of the treatment variable.[20]

[19] The Medicare program was implemented during our sample period (in 1965), so it is possible our results could be contaminated by the Medicare implementation. In order to examine that, we restrict our sample to the period prior to the establishment of Medicare and estimate the same specification. The signs, magnitudes, and significance of the coefficients are essentially unchanged. Therefore it does not appear that our results are due to the implementation of Medicare. Column 1 in Appendix Table A4 lists these results.

[20] The regression specification is as follows:

$$\text{Beds per 1,000}_{it} = \theta + \sum_{m=-9}^{m=20} \beta_m Treat_{i,t-m} + X_{it}'\delta + c_i + \lambda_t + \varepsilon_{it}$$

The estimated treatment effects from these models, and their point-wise confidence bands, are plotted in Figure 10 (the full coefficients are reported in Appendix Table A5). Visually we can see there is little change to the overall patterns found in the regressions without treatment leads. The top panel in the figure plots the effect of receiving Hill-Burton funds on non-profit and public beds. The estimates are very close to zero and not statistically significant (individually) prior to the year a county was funded. To formally test for pre-trends we evaluate the joint significance of the leads prior to the adjustment period, i.e., in years 7, 8, and 9 before funding. We get an F-statistic of 0.23, with a p-value of 0.87. Thus, we find no evidence of a trend prior to treatment. This suggests that those counties which did receive funding were neither more nor less likely to grow in the absence of funding. This should alleviate some of the concern that the treatment coefficients could be picking up growth or decline at non-profit or public hospitals that would have occurred without the program.

The middle panel plots the average changes in for-profit beds before and after a county received Hill-Burton funds. Here the effects between years 7 and 9 prior to funding are statistically different from zero (F-stat=2.42, p-value=0.065), although the magnitudes are quite small (about -0.07 beds per 1,000).[21] The decline in for-profit beds becomes more pronounced two years before a county is first funded, and about half of the total, long-run decrease in for-profit capacity has already occurred by the time that funding is approved. This may suggest that for-profit hospitals were decreasing capacity relative to non-treated counties in response to Hill-Burton funds, even before a county actually received any funding. It is plausible that for-profit hospitals were anticipating the impacts of the program since funding information was publicly available at the start of the program.[22] It is also possible that these are small pre-existing trends. If that is the case, then our estimates will somewhat overstate the magnitude of the crowd-out effect on for-profit hospitals.

The bottom panel plots the results using total beds as the dependent variable. The pre-trend of 7, 8 and 9 years prior to funding are not statistically different from zero (F-stat=0.69, p-value=0.56). There is a downward trend in total beds closer to the year of treatment, which is driven by for-profit beds. The long-run net effect of the program is smaller here than in the regression without leads, and the treatment effects are no longer (individually) statistically significant (see Appendix Table A5). This is in contrast to the long-run effect on non-profit and public beds, which is quite similar in the specifications with and without leads.

To explore this difference, and to further examine the heterogeneity in treatment effects, we present estimates from regressions with leads that are estimated separately by population tercile. These appear in Figure 11 and Appendix Figure A1 (full coefficients are in Appendix Table A6). For the first and second terciles, the estimates of the net effect of the program

As before, there are separate regressions for total beds, non-profit and public beds, and for-profit beds.

[21]If this in fact indicates an endogeneity bias due to the selection of counties that were losing for-profit beds, the bias is clearly small and would tend to reduce our estimates of the program's net impact.

[22]Prior work has found that for-profit hospitals respond rapidly to changes in their economic environment (Hansmann et al., 2003; Chakravarty et al., 2006).

are very similar between the specifications with and without leads. Only in the third tercile is there a notable difference when leads are included. This likely reflects a difficulty in obtaining precise estimates for the full span of leads and lags, as most large counties were treated relatively early in the program.[23]

4.3 Instrumental Variables Analysis

As discussed previously, the main empirical analysis assumes no selection on unobservables. In other words, we assume that there are no time-varying unobservable factors that relate to the exact timing of when counties received Hill-Burton funding. While we feel this is quite plausible based on the institutional details of the program, to mitigate concerns about the exogeneity of funding we also employ an instrumental variables strategy to see how our estimates may change. We have no instruments available that vary at the county level over time. Instead we use a cross-sectional instrument, the priority rankings in the State Plans, to estimate a treatment effect for counties funded during the first 3 years of the Hill-Burton program. This is the time when we might think that there would be the most non-random selection of counties to receive funding.

Because the instrument is cross-sectional, we examine a single 5-year difference in the number of beds. The regression model is as follows:

$$\Delta_{5yr}(\text{Total Beds / 1,000})_i = \pi_0 + \pi_1 Treat_{i,1948-50} + \Delta_{5yr} X_i' \delta + W_i' \theta + u_i$$

(because there are no county fixed-effects, two time-invariant regressors are included as W_i: land area and rural status). We do not use longer differences (e.g., 10 years) because doing so would contaminate the control group as more counties would receive funding during the time over which we take the difference.[24] This contamination would bias the estimates of the program's effect downward. For the 5-year differences, we define counties to be treated if they were first funded in 1948, 1949, or 1950, and we take differences with the number of beds in these counties in 1953, 1954, or 1955, respectively. For counties without their own treatment ($Treat_{i,\text{1948-50}} = 0$), the 5-year difference is taken from 1949 to 1954. We choose to use the 5-year difference from 1949-1954 so that the controls would be in the middle of the range used for treated counties. Thus our estimate of the growth in beds in the control counties would only be contaminated by counties receiving funding in 1951 and 1952. We know from our prior estimates that, on average, it took roughly three years after a project was approved for counties to show additional non-profit or public beds. So we think the

[23]The estimates for the third tercile are sensitive to the inclusion of a handful of very large counties that were treated relatively late in the program, so that they would be the most informative observations for the estimates of the longer leads.

[24]For example, to focus on just counties first funded in 1948, one could take the 10-year difference in beds from 1948 to 1958. The "controls" for these counties would be all others that did not receive funding in 1948, and we would also take a 10-year difference for those counties. But it is possible that many of these counties would receive funding in the interim, say in 1953, and would thus also experience growth in beds from 1953 to 1958 due to the program.

potential contamination bias from counties first funded in 1951 and 1952 is limited because it would require the new beds to appear within one or two years from the time of approval.

We use each county's initial priority ranking in the State Plans as the instrument. Counties received priority rankings of A through G, with A representing the highest priority for funding. We converted these ranking into numbers such that a prioirty rank of 1 coincided with a priority of A. Thus, a county with a better priority ranking (lower number) had a higher probability of obtaining funding, but it was by no means a guarantee. Of the 420 counties nationwide with a priority rank of 1, 121 were funded during 1948-1950, 113 were funded after 1950, and 186 were never funded. For those with a priority rank of 2, 88 were funded in 1948-1950, 122 after 1950, and 102 were never funded. For the remaining 867 counties with lower priority scores, 183 were funded during 1948-1950, 409 eventually, and 276 were never funded. Thus the probability of being funded in 1948-1950 was clearly higher for counties with ranks of 1 or 2.

The instrument appears well suited to address at least one hypothetical reason for violations of the exogeneity of the timing of treatment. If projects tended to be proposed for Hill-Burton subsidies at a time when the relevant entities within a county were particularly well organized and resourced, these entities may have been prepared to add hospital capacity even without the program. This would bias the estimated treatment effects upward. The priority rankings did not take into account local organizational capabilities, so the instrument should be orthogonal to such factors.

We report the instrumental variable results in Table 4. Column (1) shows the first-stage estimates (a linear probability model for being funded in 1948-50). As can be seen, the priority ranking had a strong and highly significant impact on the probability a county received Hill-Burton funding early in the program. The F-statistic on the instrument equals 50.60 (p-value <0.001). Column (2) contains the instrumental variable estimate of the effect of receiving Hill-Burton funding on the 5-year change in the total hospital beds per capita in a county. The effect is large and precisely estimated at about 1.5 beds per 1,000. The effect on non-profit and public beds in column (3) is similar in magnitude and precision, while the effect on for-profit beds in column (4) is essentially zero and imprecisely estimated. Column (5) presents the OLS estimate of the same 5-year effect on total beds for comparison. It is much smaller at 0.5 beds per 1,000, which indicates that counties induced into treatment by their priority ranking had substantially larger (local average) treatment effects than the average effect during this time period. The fact that the local average treatment effects estimated with this approach are larger than the corresponding estimates from our regression models provides further evidence that our main estimates do not overstate the program's effect.

5 Crowd-Out, Spillovers, and Cost per Bed

We now provide an assessment of the crowd-out effects of the Hill-Burton program, and consider the related question of possible spillovers across counties. We then use data on the subsidy amounts per project to estimate the average cost per bed generated by the program, net of crowd-out effects.

5.1 Using Planned Beds to Estimate Crowd-Out

The Hill-Burton Project Register contains the number of hospital beds that were planned to be added with each project. Assuming these beds were indeed built, we can use this information in our panel regression framework to quantify the crowd-out effects of the program. Specifically, we estimate the effect that the number of planned beds in Hill-Burton projects had on the total number of beds in a county, and trace out this effect over time much like we did with the overall treatment effect. The amount of crowd-out is then reflected by the extent to which the long-run effect of a planned bed is less than one.[25]

To include the number of planned beds in our regressions we define a variable $PlanBedPC_{it}$, as the number of beds (per 1,000 population) that were planned to be added in projects approved in county i in year t, along with a simple indicator $Apprv_{it}$ for the approval of one or more projects. The panel regression model is then as follows:

$$\text{Beds per 1,000}_{it} = \theta + \sum_{m=0}^{20} \alpha_m PlanBedPC_{i,t-m} + \sum_{m=0}^{20} \beta_m Apprv_{i,t-m} + X'_{it}\delta + c_i + \lambda_t + \varepsilon_{it} \tag{4}$$

The coefficients on planned beds ($\alpha_m, m = 0, \dots, 20$) give the net increase in total beds (per 1,000) from each planned bed (per 1,000) that was proposed in a project approved m years ago. The approval dummies $Apprv_{it}$ are similar to the treatment indicators $Treat_{it}$ in our main specification, except that the variable $Apprv_{it}$ is set to one each time a new project is approved. This allows for an effect of a Hill-Burton project that is distinct from the effect of number of beds in the project.

The estimates of α_m are graphed in Figure 12 and the full coefficients appear in Appendix Table A7 . The net effect on total beds in a county 5 years after a project was approved is 0.16 per planned bed (both per 1,000 population). This continues to rise throughout the follow-up period, reaching 0.28 net additional beds after 20 years, relative to the counterfactual scenario with no treatment. Thus, if all planned beds were built, up to 0.72 of each bed directly added by the Hill-Burton program was offset by reductions in hospital capacity that would have otherwise occurred. In other words, about seventy percent of the program's

[25]This is an upper bound on crowd-out, since it is possible that not all of the beds planned were actually built.

direct impact was offset by crowd-out effects. As we will see below, however, the average federal expenditure per net bed was not necessarily excessive, despite this offset.

5.2 Spillovers from Neighboring Counties

The analysis above considers crowd-out effects that occurred entirely within the treated counties. A related concern is spillovers across counties, whereby one county would be less likely to add hospital capacity if a neighboring county received Hill-Burton subsidies. Such spillovers, if present, would bias our estimates of the treatment effect by contaminating the untreated counties.

To assess this issue, we estimate regressions that include indicators for whether a neighboring county was treated. However, there is little variation after the initial years of our data because over half of the counties in the sample have a neighbor treated by 1949. Accordingly, rather than using panel models, we estimate the effect of being treated ($Treat_i$) or having a neighbor treated ($Treat_j$) in 1948-50 on the growth in beds over a single 5-year period (like the IV analysis discussed previously). These regressions take the following form:

$$\Delta_{5yr}(\text{Beds per 1,000})_i = \pi_0 + \pi_1 Treat_{i,1948-50} + \pi_2 Treat_{j,1948-50} + \Delta_{5yr} X'_{it}\delta + W'_i\theta + u_i. \quad (5)$$

The dependent variable is the 5-year difference in the total number of beds per 1,000 in a county.[26] The control variables (X_{it}) are the same as before; also, because there are no county fixed-effects, we include two time-invariant regressors (W_i): county land area and rural status. The reference county (i) is defined to be treated ($Treat_{i,\text{1948-50}} = 1$) if it was first funded in 1948, 1949, or 1950, and the 5-year difference in beds per 1,000 is taken to 1953, 1954, or 1955, accordingly. The indicator for treatment in an adjacent county similarly reflects whether any neighbor was first funded in 1948 to 1950. Similar to the IV analysis, for counties without their own treatment ($Treat_{i,\text{1948-50}} = 0$), the 5-year difference is taken from 1949 to 1954.

The results from these regressions, estimated nationwide and within each population tercile, are presented in Table 5. In each of these samples there is almost no change in the estimated treatment effects when the indicator for treatment in an adjacent county is added. There appear to be modest positive spillovers from adjacent counties in the top tercile, although these results may be driven by a small number of counties with very large populations. For counties in the first and second terciles, the estimated spillovers are statistically insignificant and negligible relative to the actual treatment effects. Thus, unlike the within-county crowd-out effect, it appears that any cross-county geographic spillovers were minimal.

[26] We do not use longer differences (e.g., 10 years) because doing so would contaminate the control group as more counties would receive funding during the time over which we take the difference. This would bias the estimates of the program's effect downward. See the description of the IV analysis for further discussion on this point.

5.3 Subsidy Amounts and Cost per Bed

The amount of crowd-out within counties raises a question about the net cost per bed from the program. Here we use the information on the federal subsidy for each project, from the Project Register, to provide one assessment of the issue. We define the cost per bed as the average federal expenditure per bed that was generated, net of the crowd-out effect. In addition, the subsidy amounts provide information on the intensity of treatment, which can help to explain the heterogeneity in treatment effects seen across population terciles.

The federal subsidy amounts for each project can be included in our panel regressions in the same way as the number of proposed beds was previously. We define a variable $FundPC_{it}$ as the per capita dollar amount of Hill-Burton subsidies approved for projects in county i in year t (in \$2012). The panel regression model is then as follows:

$$\text{Beds per 1,000}_{it} = \theta + \sum_{m=0}^{20} \alpha_m FundPC_{i,t-m} + \sum_{m=0}^{20} \beta_m Apprv_{i,t-m} + X_{it}'\delta + c_i + \lambda_t + \varepsilon_{it} \tag{6}$$

The funding coefficients ($\alpha_m, m = 0, \ldots, 20$) give the gain in beds per 1,000 population from an additional dollar per person in funding (or equivalently, an additional \$1,000 per 1,000 population) that was approved m years ago. The approval dummies $Apprv_{it}$ are defined as before, and are included to distinguish between the effect of any funding being approved and the effect of the amount of funding.

The estimates of α_m are reported in Table 6, and the full coefficients from this model appear in Appendix Table A8. For example, five years after funding was approved the effect is 0.0032 per dollar. This is the increase in the number of hospital beds per 1,000 population, net of any crowd-out effects, for every \$1 per person of Hill-Burton funding. These effects on capacity continue to rise throughout the follow-up period. Twenty years after funding was approved, every \$1 per capita of Hill-Burton funding resulted in a net increase of over 0.0063 beds per 1,000 population.

Using the latter number as our estimate of the long-run effect, we can say that there would be an additional 1 bed per 1,000 population for every additional \$160 per person (= \$1/0.0063) of Hill-Burton funding. Multiplying out the per capita units on both sides, this indicates that about \$160,000 in Hill-Burton funds were spent per bed added, on net, as a result of the program. On the other hand, data from the Hill-Burton Project Register indicate that the average subsidy amount per planned bed was \$55,000 (in \$2012). This in fact indicates a similar proportion of crowd-out as did our previous analysis using the number of planned beds. Here, the actual cost per net additional bed (\$160,000) is three times larger than the direct subsidy per bed (\$55,000), which suggests that approximately two-thirds of the funding effort was offset (i.e., the subsidy amount only covered about one-third of the actual cost of a bed).

Additionally, this specification shows that the subsidy amounts can account for a large portion of the heterogeneity in average treatment effects across population terciles. For example, in our base specification the average treatment effects 15 years post-approval (β_{15}) by tercile are 1.71, 1.10, and 0.40 beds per 1,000 in terciles 1, 2, and 3 respectively (from Appendix Table A3). If we multiply the average per capita subsidy amounts for each tercile (from Appendix Table A1) by the funding coefficient for 15 years post-approval in the present specification (α_{15}) and add the treatment dummies, this gives us average effects of 1.41, 0.70, and 0.21 beds per 1,000 in terciles 1, 2, and 3.[27] The average treatment effects using the funding amounts are close to the treatment effects estimated from the base specification, indicating a large part of the difference in the average treatment effects between small and large counties can be accounted for by differences in the per capita subsidy amounts.

6 Effects on Utilization

The goal of the Hill-Burton program was to address perceived shortage and access problems in health care, particularly in poor, rural counties. The mechanism was to fund increased capacity. As we have demonstrated, the program was quite successful in terms of increasing the number of hospital beds. The logical next question is whether there was an increase in utilization commensurate with this increase in capacity.

We estimate the program's effects on utilization with the same regression specifications as equations (1) to (3), but now using hospital admissions per 1,000 as the dependent variable. The results are shown in Figure 13, which plots the estimated treatment effects over time (i.e., $\beta_m, m = 0, \ldots, 20$). The full coefficients are reported in Appendix Table A9. The increases in utilization follow the increases in capacity very closely (see Figure 8 for comparison). Five years after the first Hill-Burton funding was approved for a county, admissions at non-profit and public hospitals increased by 13 per 1,000. This was offset by an average decrease in admissions at for-profit hospitals of 3.7 per 1,000. The long-run net effect of the program was an average increase of about 15 total admissions per 1,000. This is an 18 percent increase over the pre-treatment average of 82 admissions per 1,000 in counties that were funded, which is similar to the net proportional increase in bed supply. In an average sized funded county (population 65,900), the long-run effect translates to a net addition of almost 1,000 hospital admissions annually after 20 years.[28]

We can use these estimates to generate a rough calculation of the occupancy rate in the beds added by the Hill-Burton program. This provides a way to assess whether the increase in utilization attributed to the program was commensurate with the increase in capacity. The program resulted in a net increase of 0.45 beds and 15 admissions per 1,000 population after 20 years. Our AHA data show the average length of stay during our sample period to be 7.8 days. Applying this to the increase in admissions suggests there were 117 additional bed-days per 1,000 people in a county, 20 years after the first Hill-Burton project

[27] The calculations for the average treatment effects are as follows: Tercile 1: $(0.00256 \times 219.36 + 0.855) = 1.41$; Tercile 2: $(0.00238 \times 140.25) + 0.366 = 0.70$ Tercile 3: $(0.00284 \times 75.7) + 0.0497 = 0.21$.

[28] Column 2 in Appendix Table A4 lists estimates for the effect on admissions, limiting the sample to the period before Medicare. Like the capacity analysis, our results are robust to this sample restriction.

was approved.[29] Comparing this to the increase in available bed days (0.45 beds $\times$ 365 days) yields an occupancy rate of 71%. This in line with the estimates of national average hospital occupancy rates for SMSAs given in Chiswick (1976): 73.7% for 1950, 71.7% for 1955, and 74.6% for 1960. Thus it seems the beds added by the Hill-Burton program were used nearly as much as those in other hospitals throughout the country.

As with the increases in hospital capacity, there is also substantial heterogeneity across terciles in the effect on admissions. Figure 14 shows the estimated treatment effects on total admissions estimated separately by tercile (full coefficients are listed in Appendix Table A10. In the smallest tercile the average long-run effect is over 50 admissions per 1,000, and in the middle tercile the long-run effect is also quite large and exceeds 40 admissions per 1,000.

This large expansion in utilization suggests that there was unmet excess (or latent) demand for hospital services in many locations prior to the implementation of the Hill-Burton program. One possible explanation for the lack of a supply response on the part of the industry is the presence of capital constraints. At present U.S. hospitals are large businesses and capital is overwhelmingly obtained through markets (debt for non-profits and equity for for-profits). However, during the period of the Hill-Burton program, that was not the case. Hospitals were heavily dependent on private philanthropic contributions. Stevens (1999) (p. 33) states that

> "Capital came almost entirely from private gifts, endowments, and donations until after World War II, and predominantly from these sources until the 1970s."

Stevens (1999) Table 11.2 documents that non-profit hospitals financed 40.7 percent of construction costs from private contributions in 1965, versus 24.2 percent by borrowing. Another source in Stevens (Table 11.3) shows that in 1968, 21 percent of funding for all hospitals' (not just non-profits) construction costs came from philanthropy and 38 percent from debt. While these data are not definitive, they suggest that capital markets for hospitals were not well developed at the time of the Hill-Burton program, and so hospitals may have faced significant capital constraints.

In addition, the analysis of utilization provides a further opportunity to check for spillovers across counties. It is certainly possible that additional hospital capacity in one county might have drawn patients from neighboring counties. This would bias our estimates of the program's effects on utilization, as control counties that are adjacent to a treated county would see a decrease in admissions at their hospitals. To assess this, we estimate regressions similar to (5), but now with the 5-year change in admissions per 1,000 as the dependent variable. The results shown in Appendix Table A11 show no significant effects on admissions if a neighboring county was funded (although marginally significant in Tercile 2), and no changes in the estimated treatment effects.

[29]This assumes the average length of stay was similar in treated and untreated counties. We have assessed this assumption with regressions similar to (1) where the dependent variable is the LOS, and have found no evidence of large changes after treatment.

7 Aggregate and Long-Run Impacts of Hill-Burton

To conclude the analysis, here we offer some assessments of the aggregate and long-run impacts of the Hill-Burton program. First we use the most flexible version of our panel regressions (those with the subsidy amounts) to project the program's contribution to the growth in hospital bed supply nationwide during the life of the program (see Table 6). Then we provide two descriptive analyses that, while they do not follow our main empirical approach, may offer valuable additional insights. The first estimates the association between total funding amounts and hospital capacity many years after the program ended. The second shows the substantial decline in the variation in bed supply based on county income and location, which occurred concurrently with the program. To be clear, we regard these analyses as descriptive in nature, but they are useful to portray the broad scope of the possible impacts of the Hill-Burton program.

First, we use our panel models that include the subsidy amounts to compute the aggregate impact of the Hill-Burton program. The results are shown in Table 7, which uses regression (4) estimated both nationally and by population tercile (coefficient estimates in Appendix Table A12). The estimated models generate baseline predictions for the number of beds per capita in each county, which we then aggregate by multiplying out the county population and adding across counties. The baseline predictions are fairly close to the observed numbers of hospital beds both nationwide and in each tercile in 1948 and 1975.[30] Then we make counterfactual predictions for 1975 using the estimated models but setting the funding amounts ($FundPC_{it}$) and approval dummies ($Apprv_{it}$) to zero. This projects the counterfactual number of beds per 1,000 in each county in 1975 without the Hill-Burton program. The difference between the aggregate number of beds in the counterfactual vs. the baseline prediction for 1975 is our measure of the program's total impact. We prefer the results using regressions estimated separately by tercile as this is the most flexible specification which allows for further heterogeneity in the treatment effects. These results are shown in column (5). The overall impact attributed to the program from this approach is nearly 73,000 beds (858,532 – 785,643), which represents 17 percent of the total growth from 1948 to 1975 in the baseline predictions (858,532 – 427,711).

Next, to provide descriptive evidence on the program's effects long after it ended, we estimate cross-sectional regressions for the association between total Hill-Burton subsidies and the number of beds per capita by ownership type in 1990. These regressions are at the county level and include our usual control variables as well as state fixed effects.[31] Table 8 reports the results of these regressions, which include separate estimates for 1975 as a reference point. The association between total Hill-Burton subsidies per capita over the life of the program and the number of beds per 1,000 in a county in 1975 is 0.005. This means

[30] The aggregated predictions do not exactly match the observed amounts due to restrictions in the regression specifications such as the fact that county fixed effects cannot vary over time. Were we to use the actual dependent variable instead, i.e., the national average of beds per 1,000 in a county, the baseline predictions would of course match the observed amounts exactly.

[31] Regressions without state fixed effects yield similar results.

that an additional $100 of funding per capita is associated with an additional 0.5 beds per 1,000. The association drops only modestly by 1990, to 0.004. Multiplying this with the average funding amount of $130 would account for a difference of 0.55 beds per 1,000. This is a substantial amount, and it suggests the large effects of the program on hospital capacity may have continued decades after the program ended.

Finally we provide some information on distributional changes that occurred during the time of the program. The Hill-Burton program was intended to address perceived shortages of hospital capacity in areas that were predominately poor and rural. One would therefore expect it to have an impact on the distribution of bed supply based on these factors. Table 9 shows the changes from 1948 to 1975 in the distribution of hospital beds per 1,000 conditional on median family income, location, and rural status. Over the life of the Hill-Burton program, areas with relatively low bed supply largely caught up with areas that initially had more capacity. Counties with median family income in the bottom quintile saw an increase of 2.3 beds per 1,000 while the growth in the top quintile was only 0.5 beds. The South added 1.8 beds per 1,000 while the Northeast added only 0.7 beds. Rural counties had an increase of 2.4 beds per 1,000 while non-rural counties actually saw a decrease of 0.25 beds over this time period. Overall the standard deviation of beds per 1,000 across counties decreased from 5.9 in 1948 to 2.5 in 1975. While this does not prove that the Hill-Burton program caused these changes, it is clear that substantial progress was made toward the goals of expanding hospital capacity in underserved areas and equalizing access to hospitals throughout the U.S.

8 Summary and Conclusions

Our analysis of the Hill-Burton program on hospital capacity provides evidence on the impact of this program on the evolution of the U.S. hospital industry and feeds into the larger debate about how government spending may crowd out private activity. Billions of governmental dollars were poured into the hospital sector during the time-period we study. This program had a profound and lasting impact on the U.S. hospital industry. Our capacity estimates show a large growth in non-profit and public beds per capita in response to the program.

We find long-lasting impacts of the Hill-Burton program on the hospital industry, with the gains in beds lasting over 20 years. This has implications for how the hospital market structure changed over this time period to evolve into what it is today. Large gains in capacity or the entry and exit of hospitals affects the quantity and quality of hospital services provided as well as pricing behavior of hospitals. Our results reveal that the Hill-Burton program was particularly pivotal in shaping the market structure of the hospital industry by introducing large gains in the supply of beds over a 25-year period, as well as subsidizing the growth of non-profit and public hospitals, while crowding out growth by for-profits.

Even though there was a non-trivial amount of crowd-out, the program still had substantial net effects. Further, the Hill-Burton program resulted in a large expansion in hospital utilization, suggesting that there was excess or latent demand for hospital services in many locations prior to the implementation of the program. Finally, over the life of the program areas with relatively low numbers of beds per capita (areas with low income, rural areas, and the South) largely caught up with areas that had greater hospital capacity.

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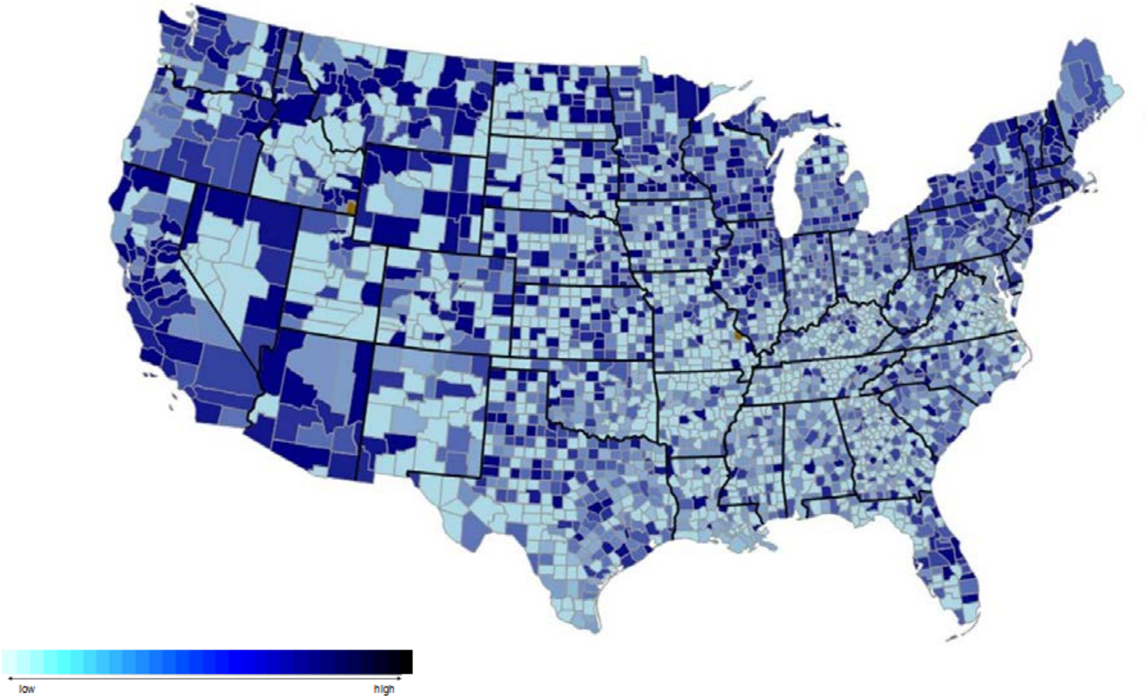
Figures

Figure 1: Distribution of Hospital Beds Per Capita in the U.S., 1948



Source: American Hospital Association

Figure 2: Excerpt from Georgia's State Plan

GENERAL HOSPITALS

Existing Facilities, Total Needs, and Net Additional Beds Needed by Regions and Areas, and Other Selected Data

REGIONS AND AREAS	POPULATION	EXISTING FACILITIES		EXISTING BEDS				ESTIMATED TOTAL NEED		NET ADDITIONAL BEDS NEEDED	AREA PRIORITY	PERCENT RURAL *	PER CAPITA INCOME **
		TOTAL	TOTALLY OR PARTLY ACCEPTABLE	TOTAL	NON-ACCEPTABLE	ACCEPTABLE		FACILITIES	BEDS				
						NUMBER	PER 1,000 POPULATION						
Augusta Region	799,965	43	32	1,923	74	1,849	2.3	42	3,608	1,759	-	67.1	600
B- 2 Augusta	190,726	6	6	570	-	570	3.0	10	1,108	538	C	59.9	593
I- 6 Savannah	230,082	13	12	688	8	680	2.7	14	1,404	724	D	54.1	764
R- 15 Greensboro	16,575	-	-	-	-	-	-	1	50	50	A	100.0	388
R- 16 Milledgeville	56,536	3	3	142	-	142	2.5	3	192	50	D	83.1	482
R- 17 Dublin	42,824	2	2	88	-	88	2.1	2	157	69	C	85.6	521
R- 18 Swainsboro	47,090	6	3	82	23	59	1.3	4	159	100	A	86.9	514
R- 19 Douglas	59,696	6	2	69	27	42	.7	4	149	107	A	88.1	496
R- 20 Waycross	62,562	4	2	115	10	105	1.7	2	206	101	C	75.5	575
R- 21 Brunswick	73,074	3	2	169	6	163	2.2	2	183	20	D	63.2	406
Unallocated	-	-	-	-	-	-	-	-	515	515	-	-	-

1/ Georgia State Plan approved Nov. 18, 1947.
2/ Estimated civilian population, July 1, 1946, Bureau of Census, Current Population Reports, Series P-25, No. 2, Aug. 15, 1947. Processed.
3/ Area priorities based on following percentages of need met: A- 0-39.9, B- 40.0-49.9, C- 50.0-59.9, D- 60.0-100.
* Percent of the population residing in places of less than 2,500 persons, 1940. Bureau of the Census, Sixteenth Census of the United States, Population, Vol. 1.
** Net Income, 1946. Sales Management, "Survey of Buying Power", May 10, 1947, Copyright, Sales Management, Inc. (Further reproduction not licensed.)

Figure 3: Step 1 of Hill-Burton Allocation Process

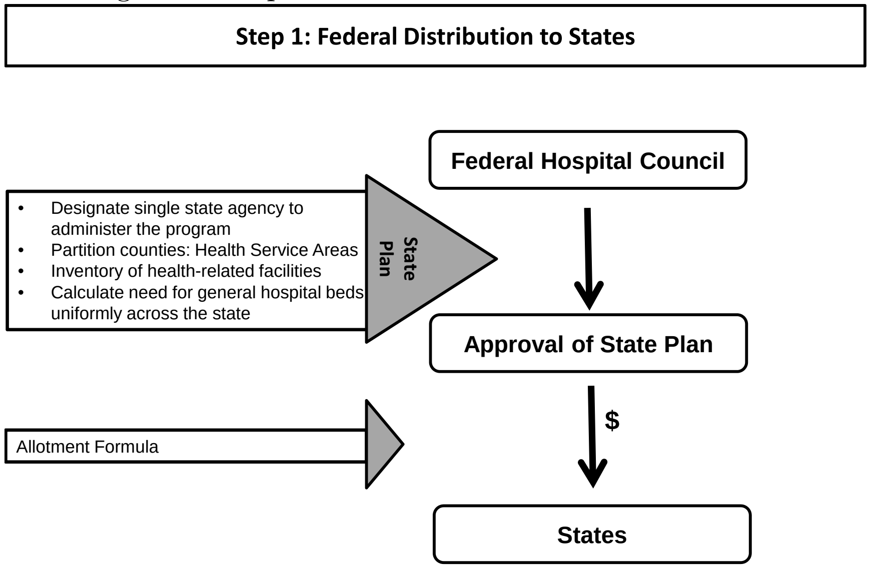


Figure 4: Step 2 of Hill-Burton Allocation Process

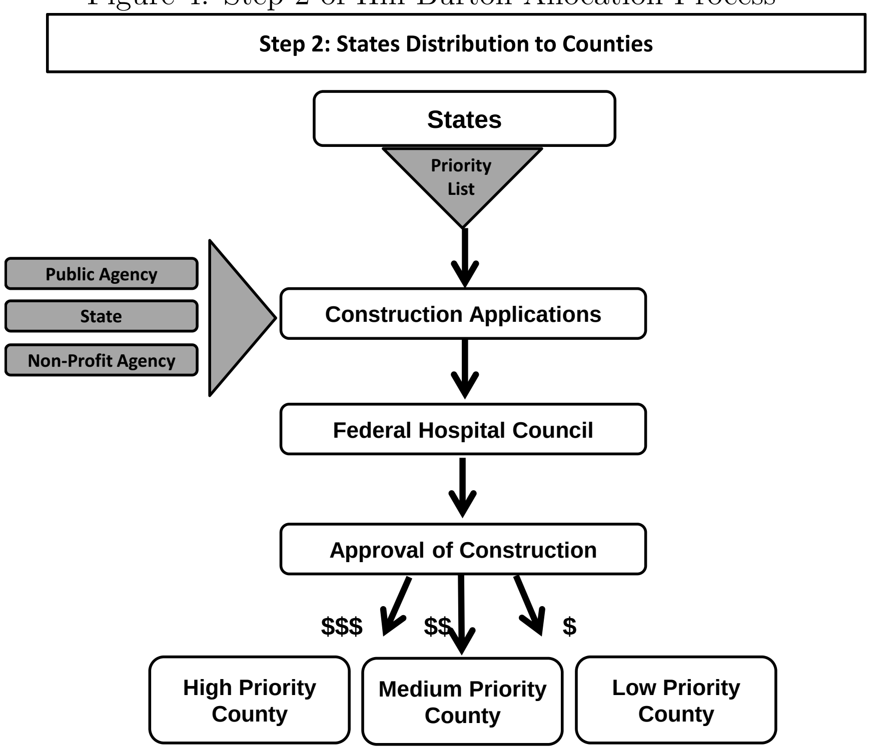
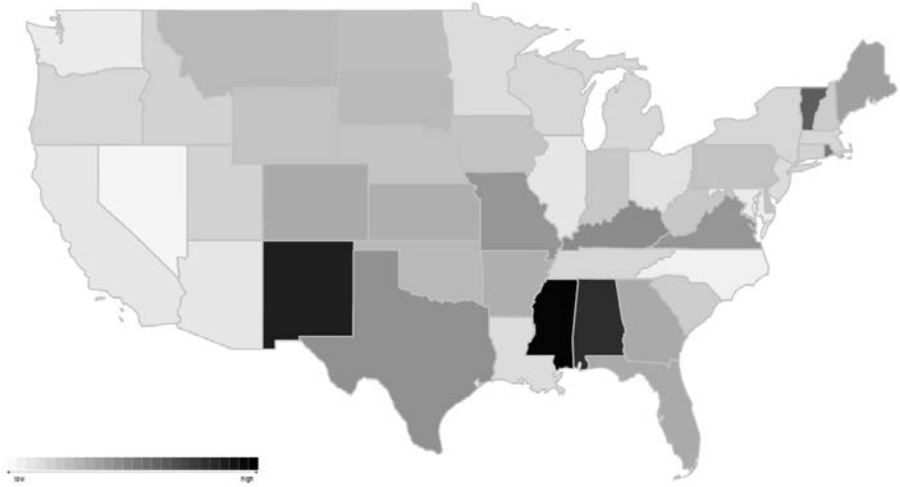


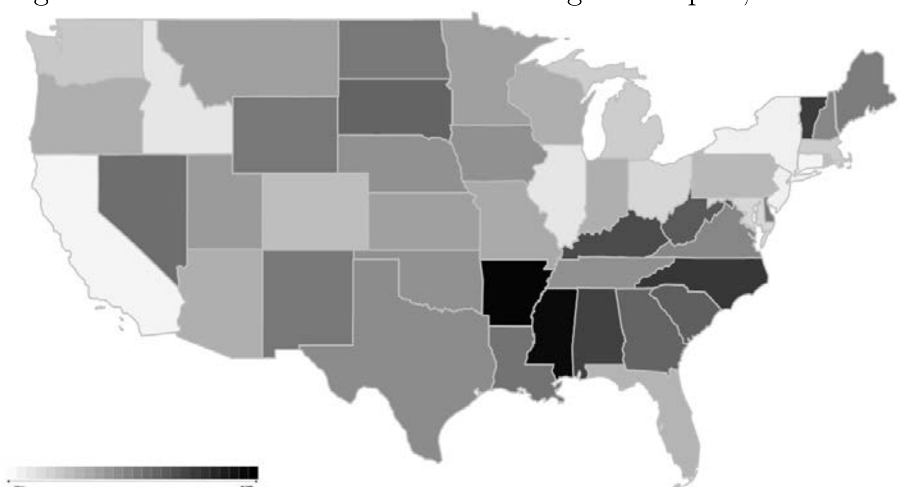
Figure 5: State-Level Hill-Burton Funding Per Capita, 1948



Range is from \$0 per capita in NV to \$32.2 in MS (in 2012 \$)

Source: Hill-Burton Project Register

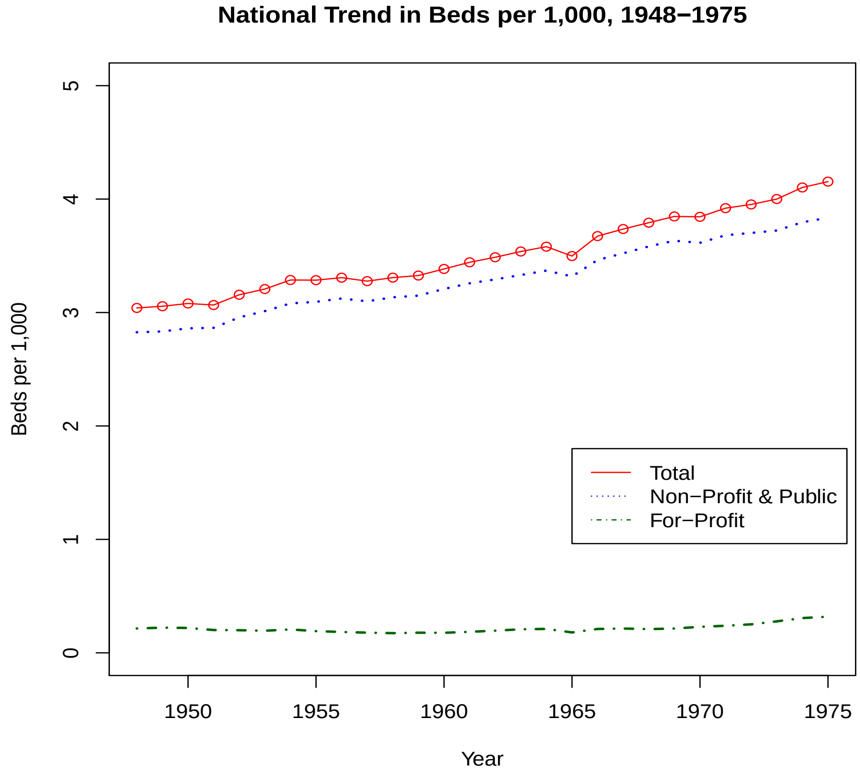
Figure 6: State-Level Hill-Burton Funding Per Capita, 1947-1971



Range is from \$57.3 in CA to \$236.6 per capita in AR (in 2012 \$)

Source: Hill-Burton Project Register

Figure 7: National Trend in Beds and Admissions Per Capita (PC), 1948-1975



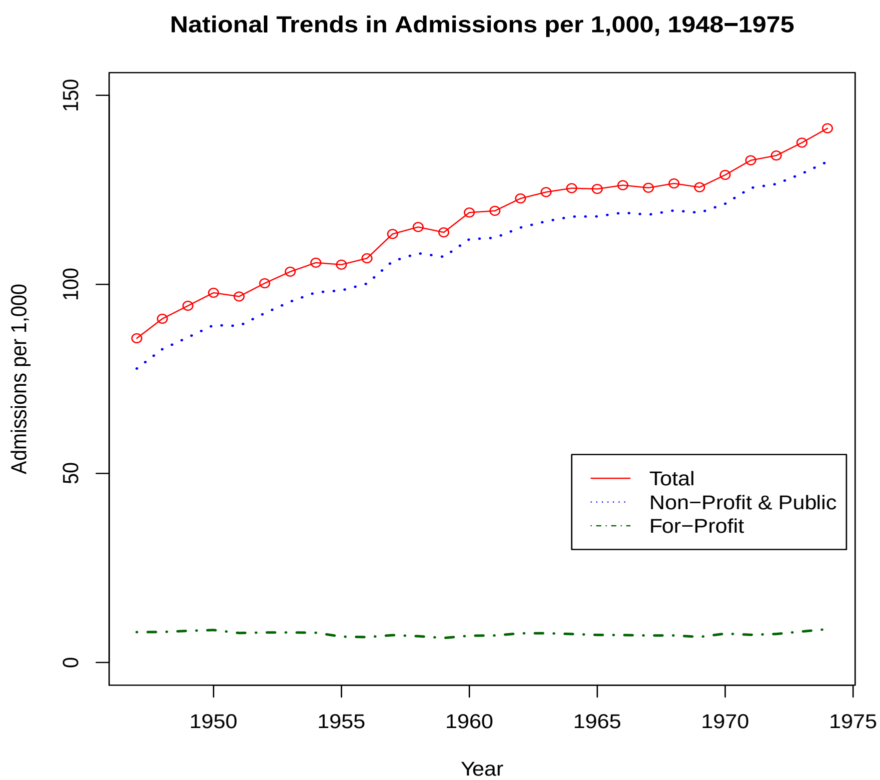


Figure 8: Effect of Hill-Burton Program on Hospital Beds per 1,000

Figure plots estimates of treatment effects ($\hat{\beta}_m$) and 95% confidence intervals from equations (1) *to* (3)

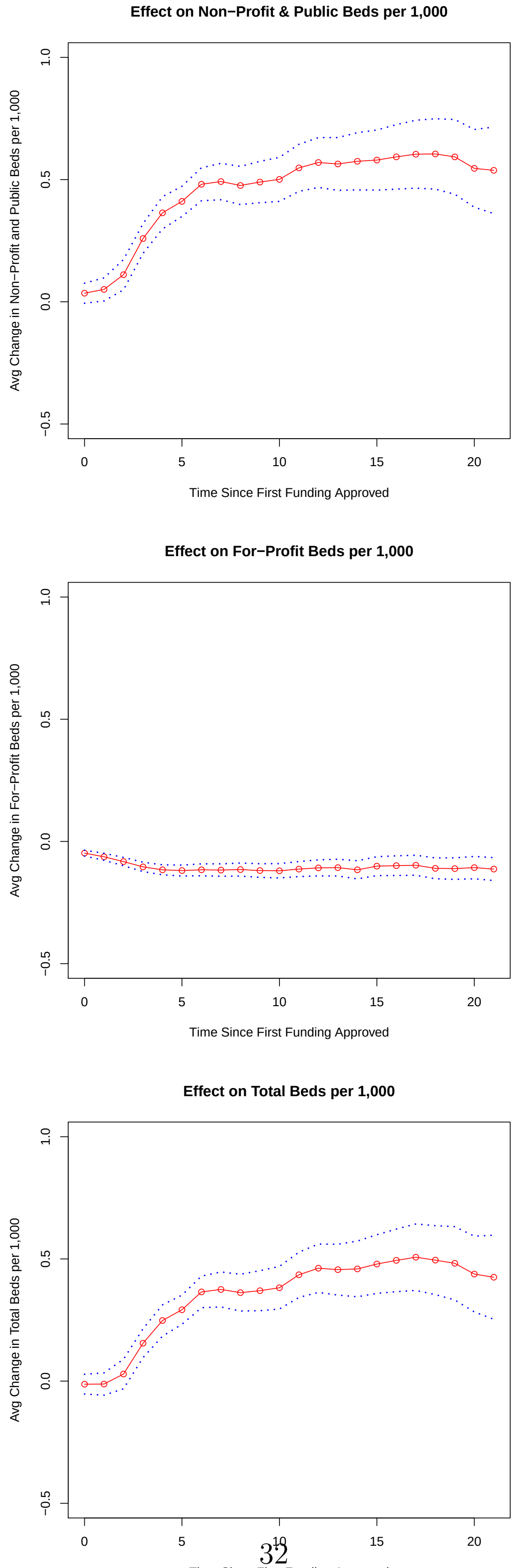


Figure 9: Effect on Hospital Beds per 1,000 by Population Tercile

Figure plots $\hat{\beta}_m$ *and 95% confidence intervals from equation* (1) *estimated separately by tercile.*

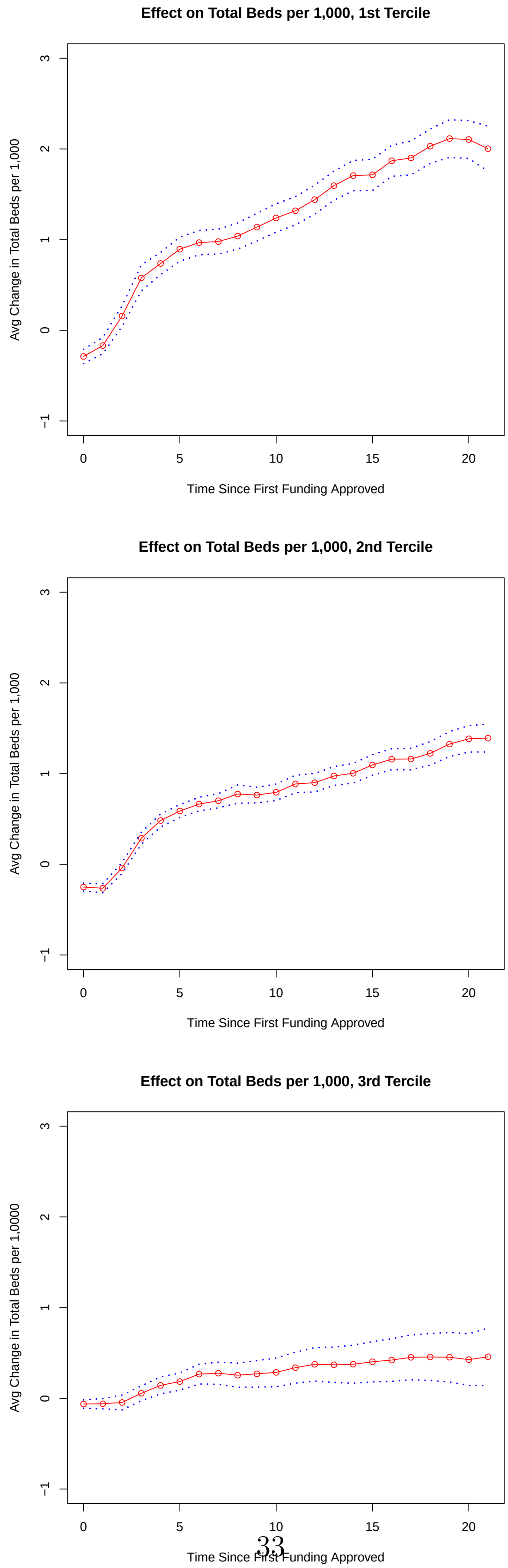


Figure 10: Effect of Hill-Burton Program on Hospital Beds per 1,000, with Leads
Figure plots estimates of treatment effects ($\hat{\beta}_m$) and 95% confidence intervals from equations (1) to (3), with leads of the treatment indicator.

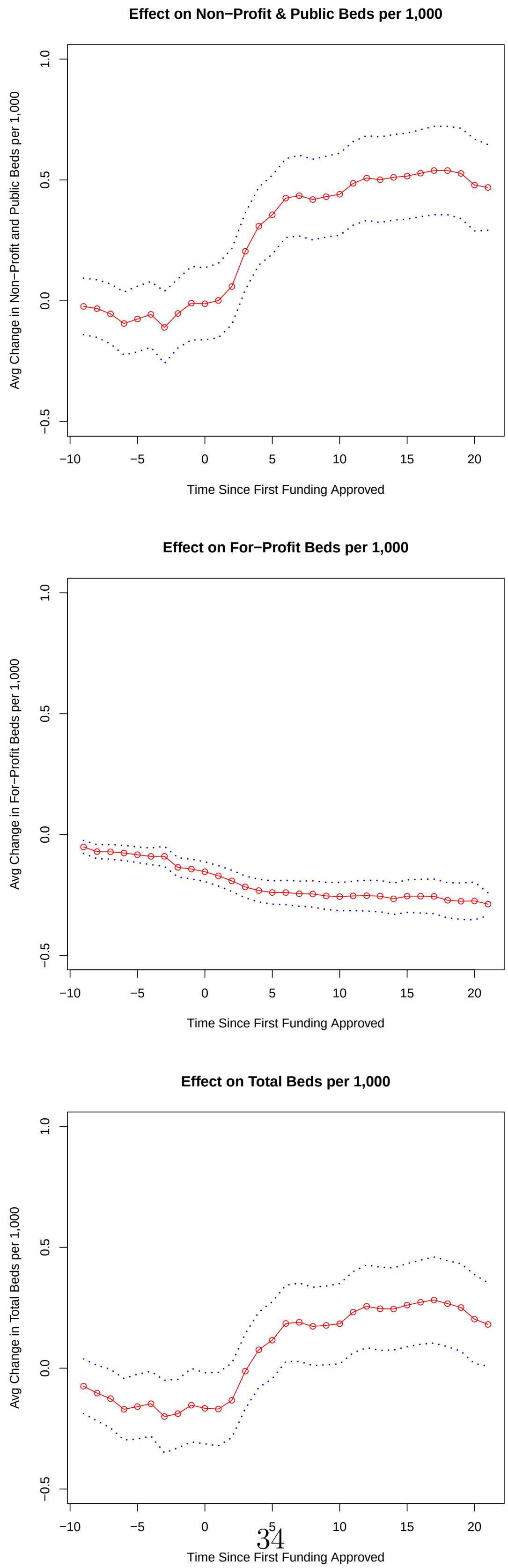
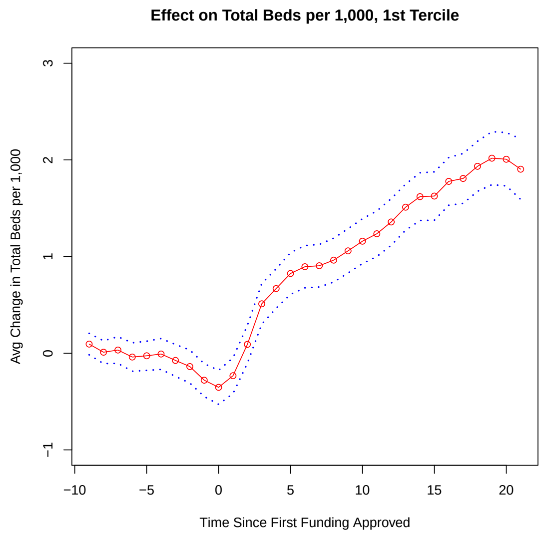
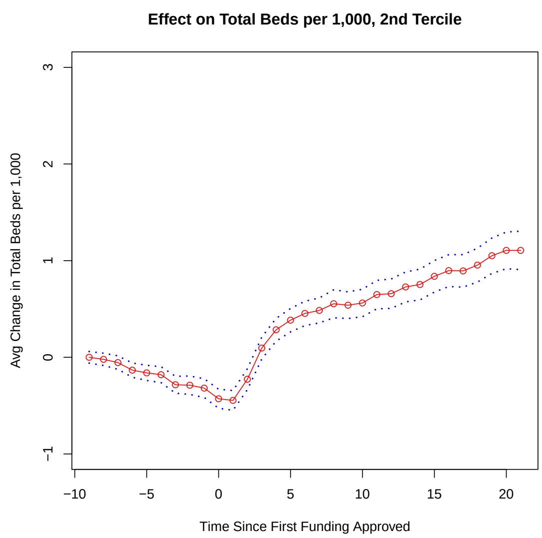


Figure 11: Effect on Hospital Beds per 1,000 by Population Tercile, with Leads
Figure plots $\hat{\beta}_m$ and 95% confidence intervals from equation (1) with leads, estimated separately by tercile.





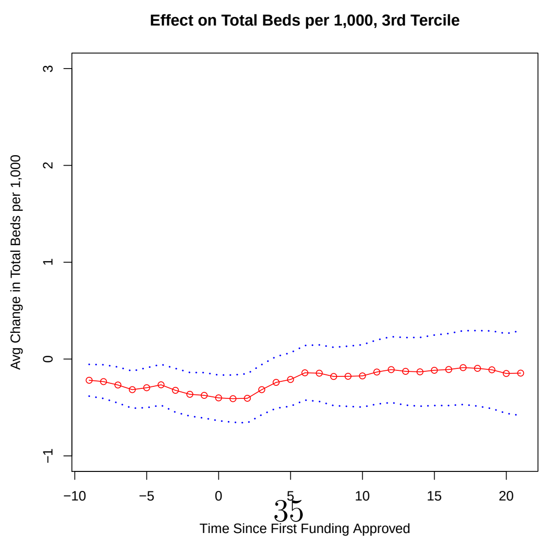


Figure 12: Effect of Planned Beds on Hospital Beds per 1,000
Figure plots $\hat{\alpha}_m$ *and 95% confidence intervals from equation* (4).

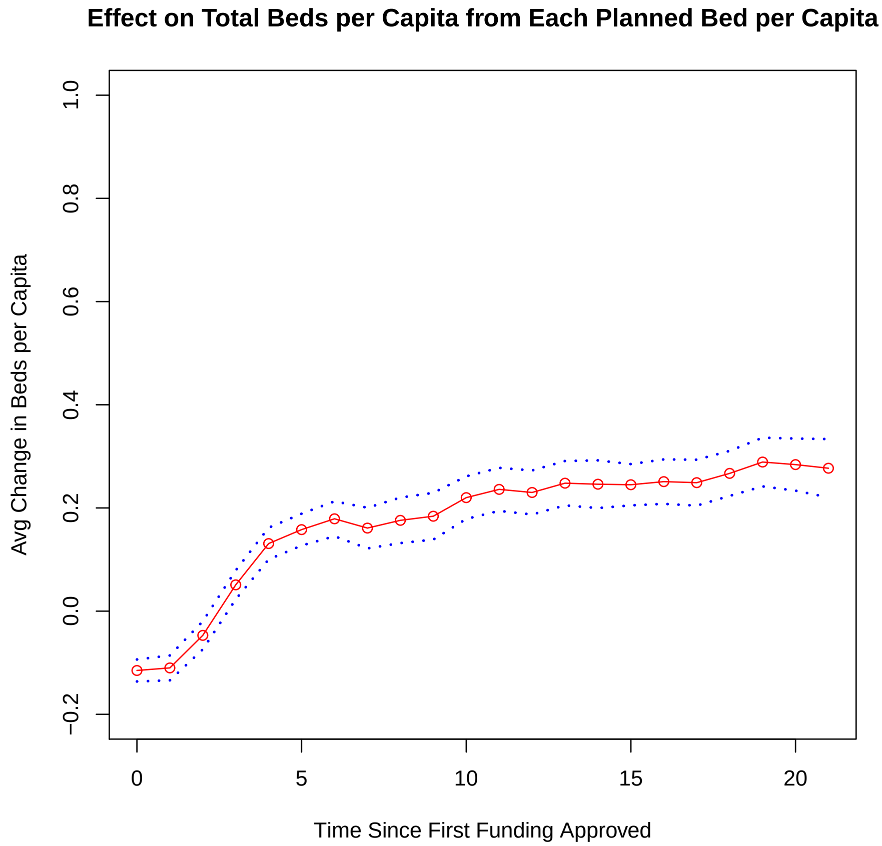


Figure 13: Effect of Hill-Burton Program on Hospital Admissions per 1,000
Figure plots estimates of treatment effects ($\hat{\beta}_m$) and 95% confidence intervals from equations (1) *to* (3), *with hospital admissions per 1,000 as the dependent variable.*

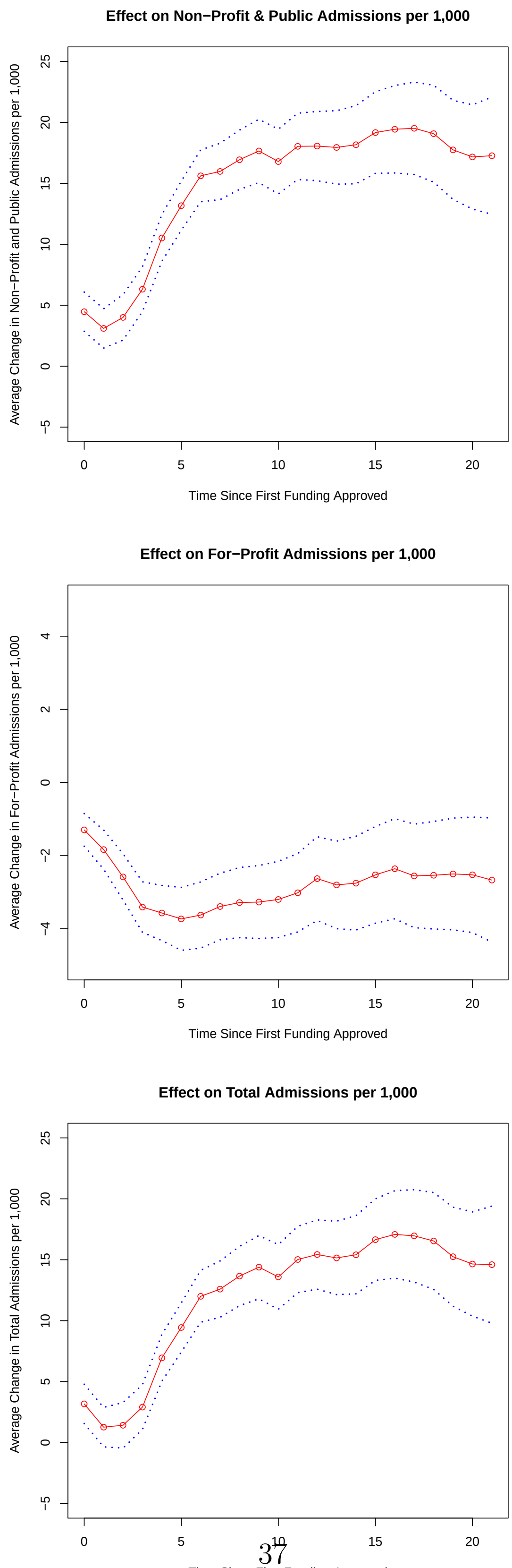
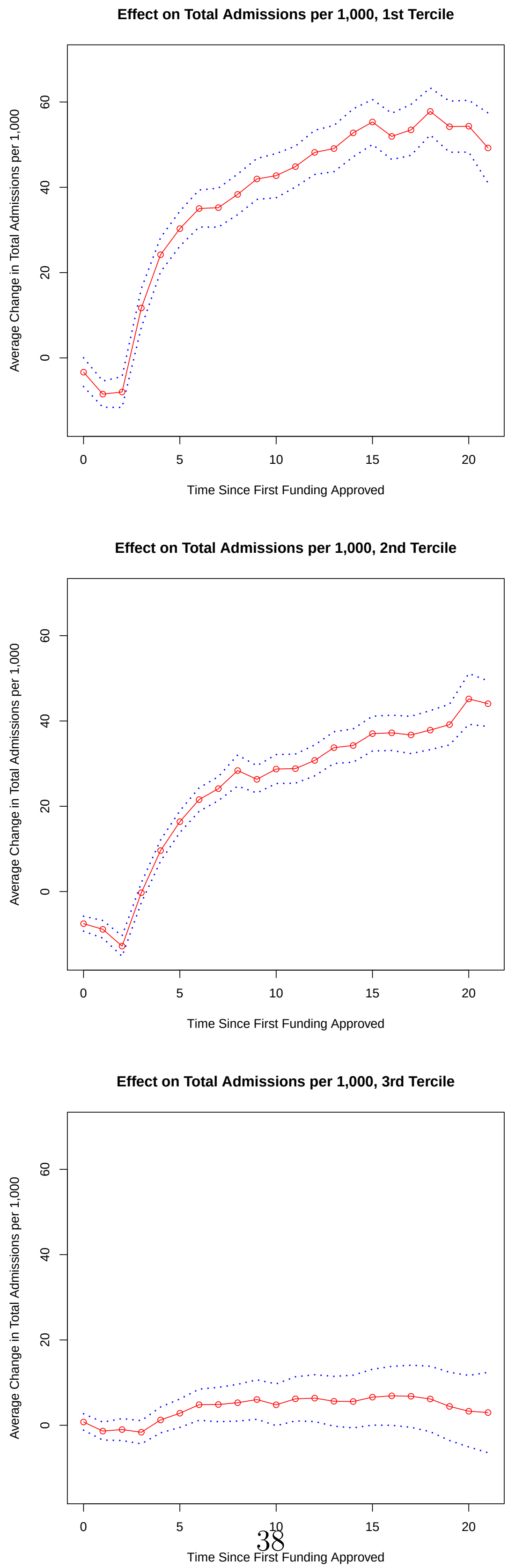


Figure 14: Effect on Hospital Admissions per 1,000 by Population Tercile

Figure plots $\hat{\beta}_m$ and 95% confidence intervals from equation (1), with hospital admissions per 1,000 as the dependent variable, estimated separately by tercile.



Tables

Table 1: Flow of Hill-Burton Funds to States – Hypothetical Example

State	Per Capita Income	Index of Per Capita Income	Half of Index of PC Income	Allotment %	Allotment % Squared
		$= \left(\frac{State\ PC\ Income}{Natl\ Avc\ PC\ Income}\right)$	$= \frac{1}{2} Index$	$= 1 - \frac{1}{2} Index$	$= Allotment\%^2$
Richest	\$2,000	1.33	0.667	0.333	0.1109
Average	1,500	1.00	0.500	0.500	0.2500
Poorest	750	0.50	0.250	0.750	0.5625

State	Population	Weighted Population	% Share	Share of Yearly HB Funding Appropriations
		$= Population\ X\ Allotment\%Squared$	$= \frac{WeightedPop}{US\ Total}$	$= 150M\ X\ \%\ Share$
Richest	3M	332,700	0.00792	\$1.188M
Average	3M	750,000	0.01786	\$2.679M
Poorest	3M	1,687,500	0.04018	\$6.027
US Total	150M	42M	1.00000	\$150M

Adapted from: U.S. Congress, House Committee on Interstate and Foreign Commerce, Hearings on H.R. 7341, 83d Cong., 2d Sess., February 4 and 5, I954, 88.

Summarizing the above examples, the formula for the share of annual Hill-Burton funding allocated to state s is as follows:

$$\text{Share}_s = \left[\frac{\left\{1 - \frac{1}{2}\left(\frac{\text{Per Capita Inc}_s}{\text{Nat'l Avg Inc}}\right)\right\}^2 \times \text{Pop}_s}{\sum_{k \in \text{U.S.}} \left\{1 - \frac{1}{2}\left(\frac{\text{Per Capita Inc}_k}{\text{Nat'l Avg Inc}}\right)\right\}^2 \times \text{Pop}_k} \right]$$

Table 2: Summary of Hill-Burton Project Data by Year of Approval*

Year Approved	Non-Profit Approved Projects: No. of Projects	No. of Beds	Construction Cost ($M)**	H-B Share ($M)**	Public Approved Projects: No. of Projects	No. of Beds	Construction Cost ($M)**	H-B Share ($M)**
1947	14	729	$105.5	$34.7	48	1,876	$242.3	$88.2
1948	188	11,909	$1,748.7	$616.3	212	9,341	$1,169.6	$433.7
1949	151	8,663	$1,501.2	$545.6	119	5,744	$939.9	$348.6
1950	215	12,087	$2,379	$816.4	112	5,417	$1,015.5	$352.4
1951	84	5,220	$951.3	$261	72	3,404	$489.6	$212.7
1952	113	7,754	$1,384.2	$401.5	68	3,980	$552.4	$182.8
1953	71	3,670	$865.0	$201.6	60	2,831	$612.2	$158.7
1954	70	3,498	$656.4	$171.6	52	2,731	$473.4	$138.8
1955	101	6,118	$1,348.1	$318.9	75	2,401	$419.5	$163.6
1956	142	8,543	$1,768.6	$448.6	96	5,169	$848.3	$281.4
1957	175	9,297	$1,801.8	$485.7	83	4,898	$764.9	$308.9
1958	213	13,056	$2,603.4	$701.5	118	5,792	$877.3	$327.9
1959	160	10,562	$2,013.1	$556.3	113	4,867	$804.0	$321.1
1960	147	10,870	$2,313.8	$640.6	108	5,134	$833.5	$389.3
1961	144	9,617	$1,801.2	$550.3	109	5,381	$839.1	$329.2
1962	161	11,481	$2,444.4	$648.4	109	4,883	$797.7	$333.1
1963	153	12,645	$2,744.2	$672.5	88	4,200	$719.7	$298.5
1964	129	10,748	$2,399.4	$598.9	71	3,889	$626.1	$224.7
1965	150	9,941	$2,674.1	$659.7	89	5,551	$1,201.7	$391.8
1966	102	7,886	$2,095.6	$475.4	117	7,151	$1,349.4	$452.7
1967	138	11,204	$2,717.4	$671.4	84	5,350	$1,264.3	$399.7
1968	205	14,274	$3,801	$869.7	105	5,507	$1,123.0	$381.6
1969	151	12,200	$3,664.4	$701.7	82	4,234	$1,135.9	$253.7
1970	79	4,943	$1,443.8	$253.2	48	2,888	$750.1	$127.7
1971	51	4,149	$1,190.1	$196.1	22	774	$218.2	$65.9
Total	3,307	221,064	$48,415.7	$12,497.2	2,260	113,393	$20,067.5	$6,966.6

* Sample is limited to short-term general hospitals.

** Funding amounts are in 2012 dollars.

Table 3: Summary of County Level Data

	All Observations (N=2,967)		Received Funding* (N=2,106)		Never Funded* (N=862)	
Variable (Source)	Mean	Median	Mean	Median	Mean	Median
Hospitals (AHA)						
Non-Profit / Public	1.28	1.0	1.50	1.0	0.39	0
For-Profit	0.33	0	0.34	0	0.26	0
Total	1.60	1.0	1.84	1.0	0.64	0
Beds per 1,000 pop. (AHA)						
Non-Profit / Public	2.30	1.70	2.09	1.76	1.86	0
For-Profit	0.33	0	0.27	0	0.39	0
Total	2.63	2.15	2.36	2.06	2.25	0
Admits. per 1,000 pop. (AHA)						
Non-Profit / Public	72.13	56.13	72.51	67.00	52.37	0.14
For-Profit	11.99	0.08	9.37	0.06	14.92	0.13
Total	84.06	74.28	81.83	76.13	67.17	0.24
County Characteristics (ARF)						
Population	51,940	18,570	65,889	24,282	14,516	9,970
Median Family Income	$24,352	$24,720	$28,248	$26,931	$21,493	$21,381
% Population Over 65	9.7%	9.3%	9.6%	9.3%	10.6%	9.5%
% Population Under 5	11.7%	11.3%	11.0%	11.0%	12.5%	11.3%
% Non-White	10.9%	2.1%	10.8%	2.9%	11.7%	1.0%
Non-Fed. MDs per 1,000	0.7	0.6	0.7	0.6	0.6	0.5
HB Funding (HBPR)						
Total Funding	- - -	- - -	$3.46M	$2.38M	- - -	- - -
Total Funding per Capita	- - -	- - -	$129.98	$102.41	- - -	- - -

* For counties that received Hill-Burton funding, means and medians are reported for the year they first received funding. The median year that these counties first received funding was 1953. For all counties that were never funded, means and medians are reported for 1953 to match the median year among the funded counties.

Table 4: Instrumental Variable Estimates of Effect on Hospital Capacity

Dependent variables: single difference from 1948-50 to 1953-55
in beds by ownership type per 1,000 population.

Explanatory Variable	(first stage) Treated 1948-50 (1)	Total Beds (2)	(second stage) N-P / Pub. Beds (3)	For-Prof. Beds (4)	(OLS) Total Beds (5)
Priority Level	-0.0642***				
	(0.00902)				
Treated 1948-50		1.491***	1.500***	-0.00410	0.514***
		(0.336)	(0.327)	(0.129)	(0.0573)
$\Delta Population$	-0.0693**	-0.147**	-0.114*	-0.0320	-0.177***
	(0.0292)	(0.0698)	(0.0679)	(0.0268)	(0.0629)
$\Delta NonWhPopn$	5.33e-06***	-6.08e-06***	-6.10e-06***	8.83e-09	-2.18e-06
	(8.27e-07)	(2.33e-06)	(2.27e-06)	(8.96e-07)	(1.77e-06)
$\Delta Pop65+$	0.531	7.104*	7.968**	-0.715	6.983**
	(1.611)	(3.847)	(3.741)	(1.480)	(3.510)
$\Delta Pop < 5$	-1.510	0.862	5.665	-4.946**	-4.165
	(2.351)	(5.713)	(5.556)	(2.198)	(5.073)
$\Delta MedFamIncome$	2.71e-05***	-3.57e-05*	-4.39e-05**	7.48e-06	-1.01e-05
	(7.02e-06)	(1.85e-05)	(1.80e-05)	(7.13e-06)	(1.53e-05)
$\Delta MDs/1,000$	0.382***	1.655***	1.498***	0.156	2.072***
	(0.0920)	(0.263)	(0.256)	(0.101)	(0.202)
Rural (binary)	-0.398***	0.790***	0.811***	-0.0227	0.441***
	(0.0328)	(0.141)	(0.137)	(0.0544)	(0.0731)
Land Area	4.10e-05***	-0.000102***	-9.78e-05***	-4.34e-06	-5.88e-05***
	(9.98e-06)	(2.84e-05)	(2.77e-05)	(1.09e-05)	(2.19e-05)
Constant	0.716***	-0.486**	-0.459**	-0.0276	-0.0208
	(0.0673)	(0.219)	(0.213)	(0.0841)	(0.133)
First-stage F-stat	50.60				
Observations	1,410	1,410	1,410	1,410	1,423
R-squared	0.240	0.035	0.034	0.011	0.201

Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Effect of Hill-Burton Projects in Own vs. Adjacent Counties on Hospital Beds

Dependent variable: single difference from 1948-50 to 1953-55 in hospital beds per 1,000 population.

Explanatory Variable	Nationwide (1)	Nationwide (2)	Tercile 1 (3)	Tercile 1 (4)	Tercile 2 (5)	Tercile 2 (6)	Tercile 3 (7)	Tercile 3 (8)
HB Funded	0.466***	0.467***	1.490***	1.494***	0.802***	0.805***	0.405***	0.401***
	(0.0408)	(0.0410)	(0.147)	(0.147)	(0.0965)	(0.0962)	(0.0604)	(0.0608)
Adj County HB Funded	0.229***		0.138		0.0418		0.273***	
	(0.0473)		(0.115)		(0.101)		(0.0725)	
$\Delta Population$	0.0355*	0.0386*	-3.681	-3.677	-0.181	-0.0915	0.0311	0.0327
	(0.0199)	(0.0200)	(4.032)	(4.033)	(2.023)	(2.011)	(0.0283)	(0.0285)
$\Delta NonWhPopn$	-1.26e-06	-1.29e-06*	-6.49e-05	-6.05e-05	-0.000207*	-0.000212*	-9.61e-07	-9.56e-07
	(7.81e-07)	(7.84e-07)	(0.000416)	(0.000416)	(0.000122)	(0.000122)	(1.09e-06)	(1.10e-06)
$\Delta Pop65+$	17.19***	16.79***	12.96**	12.45*	24.09***	23.92***	16.19***	15.88***
	(3.175)	(3.187)	(6.394)	(6.381)	(6.596)	(6.579)	(5.168)	(5.202)
$\Delta Pop < 5$	-14.40***	-15.27***	11.43	11.08	0.693	0.235	-18.88***	-19.82***
	(3.776)	(3.788)	(8.592)	(8.589)	(8.678)	(8.604)	(5.784)	(5.818)
$\Delta MedFamIncome$	-1.22e-05	-3.65e-06	7.41e-06	7.38e-06	1.98e-05	2.00e-05	-1.19e-05	1.10e-06
	(1.18e-05)	(1.17e-05)	(2.31e-05)	(2.31e-05)	(2.42e-05)	(2.42e-05)	(1.90e-05)	(1.89e-05)
$\Delta MDs/1,000$	0.761***	0.733***	1.847***	1.868***	0.971**	0.972**	0.701***	0.669***
	(0.0782)	(0.0783)	(0.486)	(0.486)	(0.449)	(0.449)	(0.109)	(0.109)
Rural (binary)	0.430***	0.449***	-0.0315	-0.0725	-1.224***	-1.233***	0.352***	0.383***
	(0.0500)	(0.0500)	(0.763)	(0.763)	(0.444)	(0.443)	(0.0735)	(0.0736)
Land Area	-5.92e-05***	-5.78e-05***	1.13e-05	1.12e-05	-2.53e-05	-2.52e-05	-6.96e-05***	-6.71e-05***
	(1.26e-05)	(1.27e-05)	(3.38e-05)	(3.38e-05)	(3.03e-05)	(3.03e-05)	(1.88e-05)	(1.90e-05)
Constant	-0.282**	-0.172	0.111	0.247	1.278***	1.317***	-0.249	-0.139
	(0.110)	(0.108)	(0.800)	(0.792)	(0.477)	(0.468)	(0.173)	(0.172)
Observations	2,703	2,703	826	826	894	894	976	976
R-squared	0.165	0.157	0.183	0.181	0.117	0.116	0.181	0.169

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Effect of Amount of Funding on Hospital Beds per 1,000

Dependent variable: total hospital beds per 1,000 population.

Time Relative to Year of Funding	Total Beds
Year of HB Funding	-0.000601*
	(0.000312)
1 Years Later	-0.000603*
	(0.000343)
2 Years Later	0.000241
	(0.000396)
3 Years Later	0.00147***
	(0.000394)
4 Years Later	0.00260***
	(0.00044)
5 Years Later	0.00323***
	(0.000445)
6 Years Later	0.00349***
	(0.000472)
7 Years Later	0.00344***
	(0.00054)
8 Years Later	0.00378***
	(0.000605)
9 Years Later	0.00396***
	(0.000646)
10 Years Later	0.00463***
	(0.000563)
11 Years Later	0.00500***
	(0.000559)
12 Years Later	0.00504***
	(0.000575)
13 Years Later	0.00529***
	(0.000613)
14 Years Later	0.00524***
	(0.000622)
15 Years Later	0.00521***
	(0.000613)
16 Years Later	0.00566***
	(0.000663)
17 Years Later	0.00593***
	(0.000707)
18 Years Later	0.00629***
	(0.000707)
19 Years Later	0.00664***
	(0.000766)
20 Years Later	0.00646***
	(0.000825)
21+ Years Later	0.00630***
	(0.00085)
Observations	83,002
R-squared	0.956

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Aggregate Effect of Hill-Burton Program on Hospital Capacity

Variable	**National** (1)	**Tercile 1** (2)	**Tercile 2** (3)	**Tercile 3** (4)	**T1+T2+T3** (5)
From regressions with funding amounts:					
Baseline Predicted Total Beds in 1948	427,712	13,827	33,183	380,701	427,711
Baseline Predicted Total Beds in 1975	859,267	36,733	81,434	740,365	858,532
Counterfactual Predicted Total Beds in 1975 (w/out Hill-Burton)	819,942	28,785	63,335	693,523	785,643
Observed quantities:					
Total Beds in 1948	435,220	16,218	35,247	383,754	435,219
Total Beds in 1975	871,019	40,264	85,249	744,766	870,279
N	2968	989	989	989	

Table 8: Long-Run Effects of Hill-Burton Funding on Hospital Capacity

Dependent variables: beds by ownership type per 1,000 population.

Explanatory Variable	Total Beds in 1975 (1)	Total Beds in 1990 (2)	N-P / Pub. in 1975 (3)	N-P / Pub. in 1990 (4)	For-Prof. in 1975 (5)	For-Prof. in 1990 (6)
H-B $ per capita	0.504***	0.424***	0.593***	0.446***	-0.0894***	-0.0228*
(1948-75)	(0.041)	(0.030)	(0.040)	(0.030)	(0.012)	(0.0128)
Population	0.000656	0.00777***	-0.00879***	0.000429	0.00944***	0.00734***
	(0.00343)	(0.00215)	(0.00340)	(0.00215)	(0.00099)	(0.000907)
Med. Fam. Inc.	6.37E-07	-1.73e-05***	-4.45E-06	-2.03e-05***	5.08e-06***	3.03e-06**
	(4.99E-06)	(2.95E-06)	(4.95E-06)	(2.96E-06)	(1.43E-06)	(1.25e-06)
Prop. Pop. 65+	14.07***	15.38***	13.28***	13.58***	0.787	1.799***
	(1.905)	(1.288)	(1.887)	(1.289)	(0.546)	(0.543)
Prop. Pop. <5	22.49***	35.46***	23.15***	31.25***	-0.66	4.209**
	(6.035)	(5.019)	(5.980)	(5.023)	(1.731)	(2.118)
MDs per 1,000	0.959***	0.696***	0.938***	0.653***	0.0206*	0.0425***
	(0.0430)	(0.0249)	(0.0426)	(0.0250)	(0.0123)	(0.0105)
Prop. NonWhite	-0.275	-1.361***	0.329	-1.075***	-0.604***	-0.286**
	(0.483)	(0.308)	(0.478)	(0.308)	(0.138)	(0.130)
State FEs	yes	yes	yes	yes	yes	yes
Observations	2,968	2,964	2,968	2,964	2,968	2,964
R-squared	0.331	0.428	0.353	0.429	0.323	0.317

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 9: Distribution of Beds per 1,000 by County Income, Census Region, and Rural Status

All calculations are weighted by county population.

	Means in 1948	**Means in 1975**	**Change, 1948 to 1975**
Median Family Income			
Quintile 1	0.839	3.136	2.297
Quintile 2	1.725	3.699	1.974
Quintile 3	2.413	3.757	1.344
Quintile 4	3.269	4.950	1.681
Quintile 5	3.491	4.060	0.569
Diff: High – Low Quintile	2.652	1.814	-
Census Region			
Midwest	3.347	4.601	1.254
Northeast	2.890	3.617	0.727
South	2.508	4.323	1.815
West	3.585	3.692	0.107
Diff: Northeast – South	0.351	-0.706	-
Rural/Nonrural			
Nonrural	3.853	4.466	0.613
Rural	2.148	3.682	1.534
Diff Nonrural-Rural	1.705	0.784	-

	StdDev in 1948	**StdDev in 1975**	**Change, 1948 to 1975**
Beds per 1,000	3.000	2.308	-0.692

A Appendix

A1.1 AHA Data

The American Hospital Association is an organization that represents all hospitals in the nation. The AHA survey data are a commonly used data set used to study the hospital industry. The AHA sends surveys to all hospitals registered with the organization, and for these historical surveys, the response rate is over 90% and often over 96%. They then publish these data in the August issue of the year following the survey. The survey asks hospitals for data on expenditures, employment and patient days for the 12-month period ending September 30th of the year prior to the year in which the data are published. For data on the number of beds, it is less clear whether the survey response was before February of the publication or as of September 30th of the year prior. For our analysis, following Finkelstein (2007), we take the year to be the year prior to the publication issue (e.g. 1950 data were published in the 1951 August issue). For additional information on the historical AHA data, we refer the reader to Finkelstein (2007)'s appendix.

A1.2 Appendix Figures and Tables

Figure A1: Effect on Beds by Tercile and Ownership Type, with Leads

Figure plots $\hat{\beta}_m$ *and 95% CIs from equations* (2)-(3) *estimated separately by tercile.*

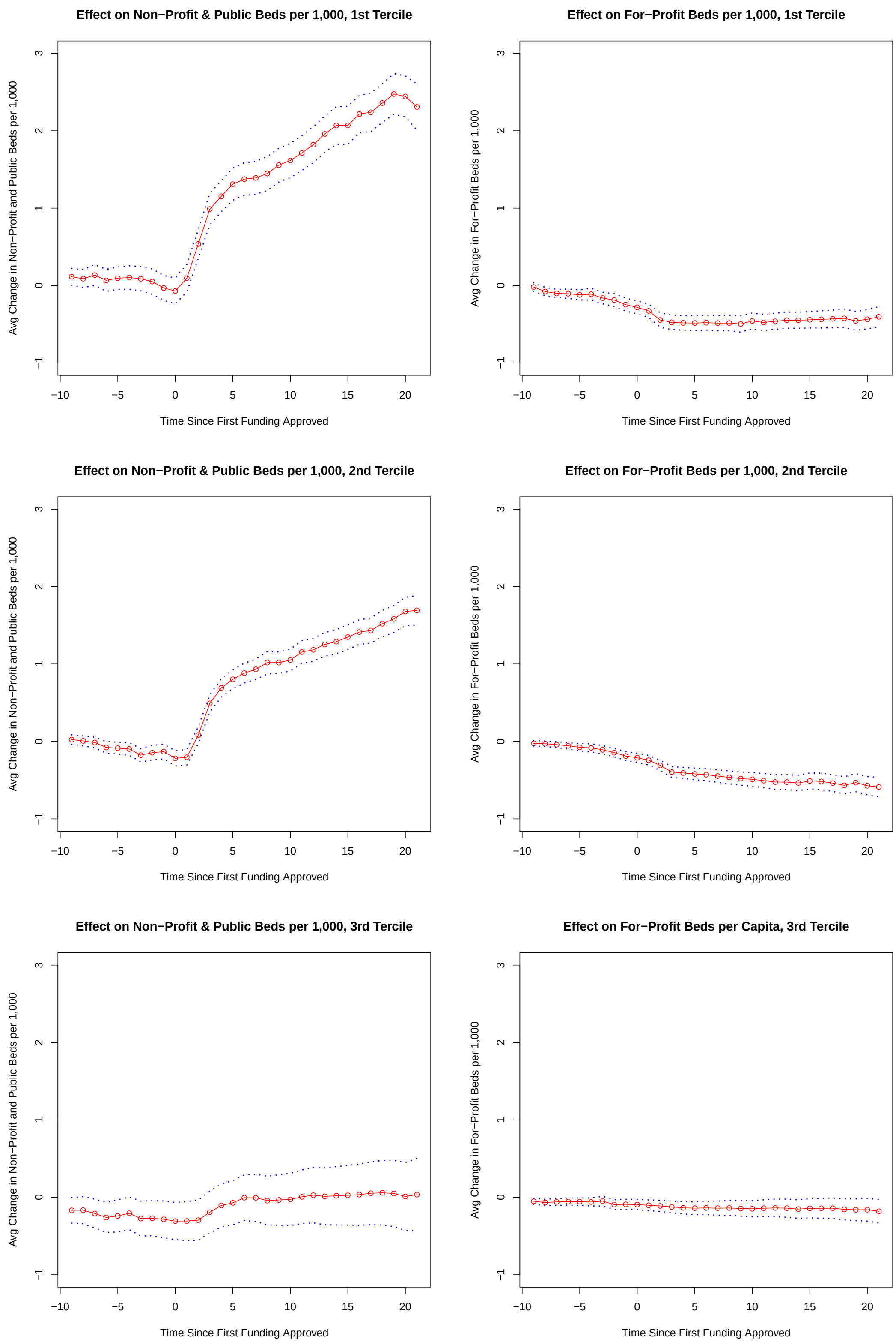


Figure A2: Effect on Admissions by Tercile and Ownership Type, with Leads

Figure plots $\hat{\beta}_m$ *and 95% CIs from equations* (2)-(3) *estimated separately by tercile.*

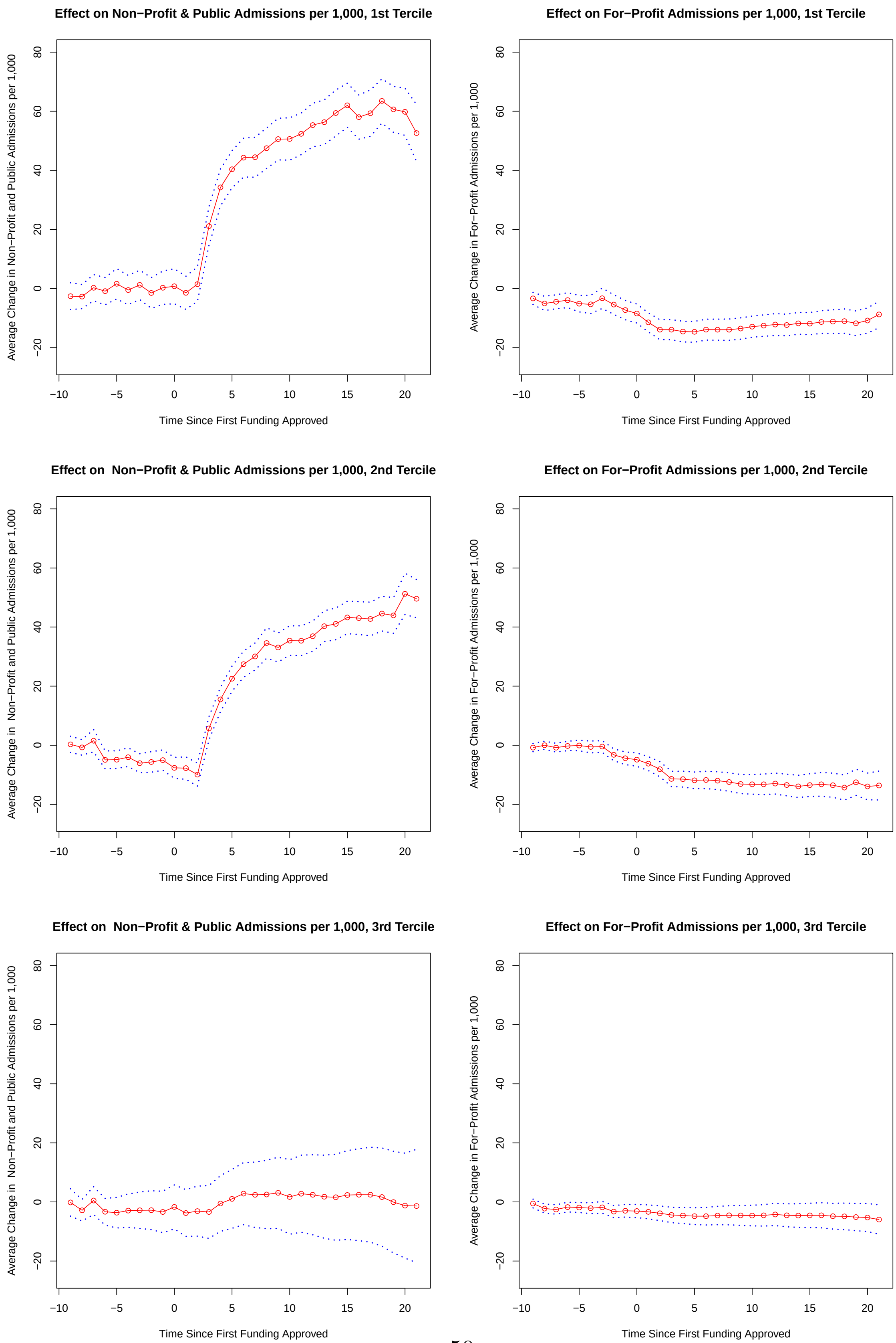


Table A1: Summary of County-Level Data, by Population Tercile

Variable (Source)	Tercile 1* (N=988) Mean	Tercile 1* (N=988) Median	Tercile 2* (N=989) Mean	Tercile 2* (N=989) Median	Tercile 3* (N=989) Mean	Tercile 3* (N=989) Median
Hospitals (AHA)						
Non-Profit / Public	0.40	0	0.77	1.0	2.66	2.0
For-Profit	0.14	0	0.31	0	0.53	0
Total	0.53	0	1.08	1.0	3.19	2.0
Beds per 1,000 pop. (AHA)						
Non-Profit / Public	2.05	0	1.81	1.55	3.05	2.70
For-Profit	0.32	0	0.40	0	0.27	0
Total	2.37	0	2.20	2.01	3.32	2.91
Admits. per 1,000 pop. (AHA)						
Non-Profit / Public	57.51	0.18	59.14	50.51	99.70	95.99
For-Profit	9.90	0.13	14.72	0.06	11.43	0.02
Total	67.22	0.26	73.81	68.42	111.11	106.64
County Characteristics (ARF)						
Population	7,409	7,480	19,202	18,510	129,180	51,730
Median Family Income	$22,141	$22,213	$22,077	$22,666	$28,789	$29,783
% Population Over 65	10.5%	9.3%	9.8%	9.8%	8.7%	8.7%
% Population Under 5	12.4%	11.4%	11.4%	11.3%	11.4%	11.2%
% Non-White	10.0%	0.8%	11.9%	1.9%	11.0%	3.8%
Non-Fed. MDs per 1,000	0.5	0.4	0.6	0.6	0.9	0.8
*HB Funding (HBPR)***						
Pct. of Counties Treated	47.4%	- - -	73.6%	- - -	91.9%	- - -
Total Funding if Treated	$1.71M	$1.39M	$2.74M	$2.27M	$4.93M	$3.52M
Total Funding per Capita	$219.36	$182.50	$140.25	$120.00	$75.70	$55.33

* Funded and unfunded counties combined. For counties that received Hill-Burton funding, means and medians are reported for the year they first received funding. For all counties that were never funded, means and medians are reported for 1953 to match the median year among the funded counties.

** Among funded counties only.

Table A2: Effect of Hill-Burton Program on Hospital Beds per 1,000

Time Relative to First Year of Funding	Total Beds (1)	N-P / Pub. Beds (2)	For-Prof. Beds (3)
Year of Funding	-0.0125	0.0352	-0.0477***
	(0.0404)	(0.0410)	(0.0119)
1 Years Later	-0.0119	0.0508	-0.0627***
	(0.0457)	(0.0472)	(0.0144)
2 Years Later	0.0290	0.111*	-0.0823***
	(0.0605)	(0.0620)	(0.0170)
3 Years Later	0.155***	0.259***	-0.104***
	(0.0590)	(0.0608)	(0.0191)
4 Years Later	0.248***	0.364***	-0.116***
	(0.0640)	(0.0659)	(0.0204)
5 Years Later	0.292***	0.411***	-0.119***
	(0.0596)	(0.0619)	(0.0224)
6 Years Later	0.365***	0.481***	-0.116***
	(0.0646)	(0.0675)	(0.0243)
7 Years Later	0.375***	0.492***	-0.117***
	(0.0715)	(0.0745)	(0.0254)
8 Years Later	0.362***	0.476***	-0.115***
	(0.0752)	(0.0780)	(0.0267)
9 Years Later	0.370***	0.490***	-0.119***
	(0.0819)	(0.0846)	(0.0279)
10 Years Later	0.382***	0.501***	-0.120***
	(0.0871)	(0.0900)	(0.0294)
11 Years Later	0.435***	0.548***	-0.113***
	(0.0926)	(0.0963)	(0.0307)
12 Years Later	0.462***	0.570***	-0.108***
	(0.0988)	(0.102)	(0.0328)
13 Years Later	0.456***	0.564***	-0.107***
	(0.104)	(0.108)	(0.0343)
14 Years Later	0.459***	0.575***	-0.116***
	(0.114)	(0.117)	(0.0371)
15 Years Later	0.479***	0.580***	-0.101***
	(0.120)	(0.123)	(0.0386)
16 Years Later	0.494***	0.593***	-0.0990**
	(0.128)	(0.132)	(0.0403)
17 Years Later	0.507***	0.604***	-0.0972**
	(0.136)	(0.139)	(0.0410)
18 Years Later	0.495***	0.605***	-0.110**
	(0.141)	(0.144)	(0.0426)
19 Years Later	0.482***	0.593***	-0.111**
	(0.150)	(0.153)	(0.0440)
20 Years Later	0.438***	0.546***	-0.107**
	(0.155)	(0.159)	(0.0457)
21+ Years Later	0.425**	0.538***	-0.113**
	(0.172)	(0.177)	(0.0469)
Population	0.0234**	-0.0148	0.0382***
	(0.0116)	(0.0127)	(0.00463)
Med Fam Income	2.17e-06	-1.58e-06	3.76e-06
	(1.31e-05)	(1.27e-05)	(2.71e-06)
Prop. Pop 65+	41.51***	41.17***	0.347
	(2.942)	(2.976)	(0.551)
Prop. Pop <5	42.44***	43.73***	-1.290
	(3.469)	(3.311)	(0.803)
MDs per 1,000	0.391***	0.372***	0.0186
	(0.0635)	(0.0781)	(0.0236)
Prop. Pop NonWh	-4.736***	-5.051***	0.315
	(1.533)	(1.584)	(0.319)
Observations	83,002	83,002	83,002
R-squared	0.954	0.954	0.735

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A3: Effect on Hospital Beds per 1,000 by Population Tercile

Time Relative to First Year of Funding	Tercile 1 (1)	Tercile 2 (2)	Tercile 3 (3)
Year of Funding	-0.288***	-0.251***	-0.0632
	(0.0782)	(0.0434)	(0.0463)
1 Years Later	-0.168*	-0.264***	-0.0597
	(0.0904)	(0.0501)	(0.0559)
2 Years Later	0.157	-0.0399	-0.0457
	(0.113)	(0.0592)	(0.0816)
3 Years Later	0.578***	0.288***	0.0554
	(0.143)	(0.0659)	(0.0823)
4 Years Later	0.737***	0.483***	0.143
	(0.122)	(0.0714)	(0.0932)
5 Years Later	0.895***	0.588***	0.185*
	(0.133)	(0.0706)	(0.0943)
6 Years Later	0.967***	0.664***	0.267**
	(0.134)	(0.0751)	(0.109)
7 Years Later	0.979***	0.701***	0.277**
	(0.137)	(0.0784)	(0.122)
8 Years Later	1.039***	0.775***	0.255*
	(0.144)	(0.101)	(0.133)
9 Years Later	1.138***	0.764***	0.270*
	(0.153)	(0.0865)	(0.146)
10 Years Later	1.239***	0.794***	0.286*
	(0.156)	(0.0907)	(0.158)
11 Years Later	1.318***	0.886***	0.338**
	(0.156)	(0.0964)	(0.171)
12 Years Later	1.440***	0.900***	0.375**
	(0.160)	(0.102)	(0.184)
13 Years Later	1.595***	0.974***	0.370*
	(0.160)	(0.104)	(0.195)
14 Years Later	1.706***	1.004***	0.376*
	(0.167)	(0.108)	(0.210)
15 Years Later	1.714***	1.096***	0.403*
	(0.172)	(0.114)	(0.222)
16 Years Later	1.869***	1.159***	0.422*
	(0.171)	(0.116)	(0.235)
17 Years Later	1.901***	1.161***	0.452*
	(0.187)	(0.119)	(0.247)
18 Years Later	2.030***	1.224***	0.456*
	(0.189)	(0.129)	(0.259)
19 Years Later	2.114***	1.326***	0.453*
	(0.208)	(0.137)	(0.273)
20 Years Later	2.104***	1.384***	0.427
	(0.208)	(0.146)	(0.284)
21+ Years Later	2.002***	1.392***	0.458
	(0.249)	(0.153)	(0.317)
Population	-0.215	-2.001***	0.0319***
	(0.160)	(0.480)	(0.00694)
Med Fam Income	8.92e-06	3.92e-05***	-3.30e-05***
	(2.61e-05)	(9.30e-06)	(8.66e-06)
Prop. Pop 65+	29.78***	16.10***	12.31***
	(2.263)	(2.023)	(3.486)
Prop. Pop <5	40.79***	2.785	-6.183*
	(10.43)	(3.399)	(3.706)
MDs per 1,000	0.288**	0.656***	0.209**
	(0.134)	(0.178)	(0.0913)
Prop. Pop NonWh	2.313	-0.216	-4.152***
	(5.353)	(0.968)	(1.314)
Observations	27,611	27,684	27,681
R-squared	0.994	0.759	0.880

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A4: Effect on Hospital Beds and Admissions per 1,000, pre-Medicare

Time Relative to First Year of Funding	Admissions PC 1 (1)	Admissions PC (2)
Year of Funding	-0.0383	1.837
	(0.0371)	(1.342)
1 Years Later	-0.0346	-0.384
	(0.0446)	(1.284)
2 Years Later	0.0141	0.125
	(0.0734)	(1.555)
3 Years Later	0.134*	1.161
	(0.0728)	(1.455)
4 Years Later	0.225***	5.446***
	(0.0832)	(1.611)
5 Years Later	0.267***	7.700***
	(0.0792)	(1.748)
6 Years Later	0.326***	9.595***
	(0.0827)	(1.944)
7 Years Later	0.356***	10.78***
	(0.0933)	(2.205)
8 Years Later	0.321***	11.26***
	(0.102)	(2.372)
9 Years Later	0.295***	11.32***
	(0.109)	(2.641)
10 Years Later	0.284**	9.641***
	(0.119)	(2.836)
11 Years Later	0.290**	9.141***
	(0.129)	(2.983)
12 Years Later	0.299**	8.790***
	(0.140)	(3.296)
13 Years Later	0.274*	7.898**
	(0.152)	(3.711)
14 Years Later	0.193	5.929
	(0.180)	(4.226)
15 Years Later	0.108	5.612
	(0.206)	(5.074)
16+ Years Later	0.0269	2.545
	(0.228)	(6.952)
Population	0.00969	0.457
	(0.0119)	(0.496)
Med Fam Income	-2.10e-05*	-0.000321
	(1.28e-05)	(0.000393)
Prop. Pop 65+	44.85***	1,045***
	(3.138)	(86.30)
Prop. Pop <5	36.29***	846.2***
	(3.371)	(97.01)
MDs per 1,000	0.382***	12.70***
	(0.0376)	(1.306)
Prop. Pop NonWh	-3.460**	-15.31
	(1.641)	(53.51)
Observations	50,366	50,366
R-squared	0.982	0.965

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A5: Effect of Hill-Burton Program on Hospital Beds per 1,000, with Leads

Time Relative to First Year of Funding	Total Beds (1)	N-P / Pub. Beds (2)	For-Prof. Beds (3)
9 Years Prior	-0.0746	-0.0231	-0.0516*
	(0.113)	(0.117)	(0.0269)
8 Years Prior	-0.103	-0.0321	-0.0709**
	(0.115)	(0.119)	(0.0292)
7 Years Prior	-0.126	-0.0541	-0.0717**
	(0.121)	(0.124)	(0.0302)
6 Years Prior	-0.17	-0.0939	-0.0765**
	(0.127)	(0.130)	(0.0312)
5 Years Prior	-0.159	-0.0754	-0.0837***
	(0.134)	(0.136)	(0.0324)
4 Years Prior	-0.147	-0.0562	-0.0905***
	(0.134)	(0.136)	(0.0342)
3 Years Prior	-0.2	-0.11	-0.0902**
	(0.150)	(0.149)	(0.0417)
2 Years Prior	-0.188	-0.0523	-0.136***
	(0.142)	(0.143)	(0.0401)
1 Years Prior	-0.153	-0.0096	-0.143***
	(0.152)	(0.152)	(0.0406)
Year of Funding	-0.166	-0.0122	-0.154***
	(0.147)	(0.149)	(0.0407)
1 Years Later	-0.169	0.00139	-0.171***
	(0.152)	(0.154)	(0.0422)
2 Years Later	-0.133	0.0594	-0.192***
	(0.154)	(0.157)	(0.0438)
3 Years Later	-0.0122	0.205	-0.217***
	(0.155)	(0.159)	(0.0452)
4 Years Later	0.0763	0.309*	-0.232***
	(0.156)	(0.161)	(0.0468)
5 Years Later	0.116	0.356**	-0.240***
	(0.159)	(0.163)	(0.0482)
6 Years Later	0.185	0.425***	-0.240***
	(0.158)	(0.163)	(0.0502)
7 Years Later	0.190	0.435***	-0.245***
	(0.162)	(0.167)	(0.0521)
8 Years Later	0.173	0.419**	-0.246***
	(0.162)	(0.167)	(0.0543)
9 Years Later	0.177	0.431**	-0.254***
	(0.163)	(0.167)	(0.0562)
10 Years Later	0.184	0.441***	-0.257***
	(0.166)	(0.170)	(0.0582)
11 Years Later	0.232	0.486***	-0.254***
	(0.168)	(0.173)	(0.0608)
12 Years Later	0.256	0.508***	-0.253***
	(0.171)	(0.175)	(0.0636)
13 Years Later	0.246	0.501***	-0.255***
	(0.172)	(0.177)	(0.0647)
14 Years Later	0.245	0.511***	-0.266***
	(0.170)	(0.177)	(0.0648)

(continued table)

Time Relative to First Year of Funding	Total Beds (1)	N-P / Pub. Beds (2)	For-Prof. Beds (3)
15 Years Later	0.261	0.516***	-0.255***
	(0.172)	(0.178)	(0.0674)
16 Years Later	0.273	0.528***	-0.255***
	(0.174)	(0.180)	(0.0698)
17 Years Later	0.282	0.539***	-0.256***
	(0.178)	(0.183)	(0.0714)
18 Years Later	0.267	0.539***	-0.272***
	(0.178)	(0.183)	(0.0730)
19 Years Later	0.251	0.527***	-0.276***
	(0.181)	(0.187)	(0.0751)
20 Years Later	0.203	0.479**	-0.275***
	(0.184)	(0.190)	(0.0782)
21+ Years Later	0.181	0.469**	-0.288***
	(0.192)	(0.197)	(0.0800)
Population	0.0229*	-0.0150	0.0379***
	(0.0117)	(0.0127)	(0.00460)
Med Fam Income	2.39e-06	-1.49e-06	3.88e-06
	(1.31e-05)	(1.27e-05)	(2.71e-06)
Prop. Pop 65+	41.51***	41.17***	0.338
	(2.942)	(2.979)	(0.553)
Prop. Pop <5	42.43***	43.70***	-1.266
	(3.463)	(3.306)	(0.804)
MDs per 1,000	0.390***	0.371***	0.0184
	(0.0636)	(0.0782)	(0.0235)
Prop. Pop NonWh	-4.722***	-5.034***	0.312
	(1.530)	(1.582)	(0.321)
Observations	83,002	83,002	83,002
R-squared	0.954	0.954	0.735

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table A6: Effect of Program on Hospital Beds per 1,000 by Population Tercile, with Leads

Time Relative to First Year of Funding	Tercile 1 (1)	Tercile 2 (2)	Tercile 3 (3)
9 Years Prior	0.0944	-8.79e-05	-0.219
	(0.111)	(0.0602)	(0.164)
8 Years Prior	0.0104	-0.0211	-0.233
	(0.118)	(0.0634)	(0.174)
7 Years Prior	0.0327	-0.0545	-0.268
	(0.138)	(0.0696)	(0.186)
6 Years Prior	-0.0396	-0.133*	-0.316
	(0.147)	(0.0738)	(0.192)
5 Years Prior	-0.0267	-0.161**	-0.296
	(0.151)	(0.0783)	(0.206)
4 Years Prior	-0.00829	-0.180**	-0.266
	(0.160)	(0.0824)	(0.211)
3 Years Prior	-0.0746	-0.284***	-0.323
	(0.165)	(0.0875)	(0.226)
2 Years Prior	-0.138	-0.289***	-0.364
	(0.171)	(0.0954)	(0.225)
1 Years Prior	-0.279	-0.319***	-0.375
	(0.170)	(0.0969)	(0.235)
Year of Funding	-0.353**	-0.429***	-0.401*
	(0.176)	(0.0984)	(0.236)
1 Years Later	-0.233	-0.446***	-0.409*
	(0.185)	(0.102)	(0.244)
2 Years Later	0.0915	-0.227**	-0.405
	(0.196)	(0.108)	(0.254)
3 Years Later	0.511**	0.0958	-0.316
	(0.211)	(0.113)	(0.259)
4 Years Later	0.669***	0.285**	-0.241
	(0.204)	(0.118)	(0.267)
5 Years Later	0.825***	0.384***	-0.211
	(0.216)	(0.121)	(0.276)
6 Years Later	0.895***	0.454***	-0.142
	(0.219)	(0.126)	(0.282)
7 Years Later	0.905***	0.485***	-0.146
	(0.220)	(0.129)	(0.292)
8 Years Later	0.963***	0.554***	-0.180
	(0.227)	(0.145)	(0.301)
9 Years Later	1.059***	0.539***	-0.178
	(0.229)	(0.138)	(0.311)
10 Years Later	1.159***	0.562***	-0.174
	(0.232)	(0.142)	(0.322)
11 Years Later	1.236***	0.649***	-0.134
	(0.236)	(0.147)	(0.331)
12 Years Later	1.358***	0.658***	-0.109
	(0.241)	(0.152)	(0.340)
13 Years Later	1.511***	0.728***	-0.127
	(0.238)	(0.155)	(0.349)
14 Years Later	1.620***	0.753***	-0.132
	(0.247)	(0.159)	(0.355)

(continued table)

Time Relative to First Year of Funding	Tercile 1 (1)	Tercile 2 (2)	Tercile 3 (3)
15 Years Later	1.626***	0.838***	-0.116
	(0.250)	(0.163)	(0.364)
16 Years Later	1.778***	0.897***	-0.108
	(0.247)	(0.165)	(0.372)
17 Years Later	1.808***	0.894***	-0.0884
	(0.258)	(0.168)	(0.381)
18 Years Later	1.934***	0.954***	-0.0959
	(0.259)	(0.175)	(0.390)
19 Years Later	2.018***	1.051***	-0.111
	(0.274)	(0.183)	(0.401)
20 Years Later	2.007***	1.106***	-0.149
	(0.276)	(0.190)	(0.412)
21+ Years Later	1.904***	1.106***	-0.145
	(0.313)	(0.199)	(0.438)
Population	-0.214	-1.972***	0.0315***
	(0.161)	(0.478)	(0.00697)
Med Fam Income	8.85e-06	3.82e-05***	-3.23e-05***
	(2.60e-05)	(9.33e-06)	(8.65e-06)
Prop. Pop 65+	29.82***	15.99***	12.34***
	(2.249)	(2.010)	(3.473)
Prop. Pop <5	40.80***	3.247	-6.088*
	(10.41)	(3.403)	(3.670)
MDs per 1,000	0.289**	0.655***	0.201**
	(0.134)	(0.178)	(0.0881)
Prop. Pop NonWh	2.290	-0.199	-4.179***
	(5.348)	(0.970)	(1.318)
Observations	27,611	27,684	27,681
R-squared	0.994	0.759	0.880

Robust standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table A7: Effect of Planned Beds on Hospital Beds per 1,000

Time Relative to Year of Funding	Total Beds
Planned Beds:	
Planned Beds Year of Funding	-0.115***
	(0.0213)
Planned Beds 1 Year Later	-0.110***
	(0.0241)
Planned Beds 2 Years Later	-0.0469*
	(0.0272)
Planned Beds 3 Years Later	0.0510*
	(0.0280)
Planned Beds 4 Years Later	0.131***
	(0.0307)
Planned Beds 5 Years Later	0.158***
	(0.0309)
Planned Beds 6 Years Later	0.179***
	(0.0338)
Planned Beds 7 Years Later	0.161***
	(0.0394)
Planned Beds 8 Years Later	0.176***
	(0.0441)
Planned Beds 9 Years Later	0.184***
	(0.0453)
Planned Beds 10 Years Later	0.220***
	(0.0413)
Planned Beds 11 Years Later	0.236***
	(0.0417)
Planned Beds 12 Years Later	0.230***
	(0.0427)
Planned Beds 13 Years Later	0.248***
	(0.0430)
Planned Beds 14 Years Later	0.246***
	(0.0462)
Planned Beds 15 Years Later	0.245***
	(0.0400)
Planned Beds 16 Years Later	0.251***
	(0.0431)
Planned Beds 17 Years Later	0.249***
	(0.0445)
Planned Beds 18 Years Later	0.267***
	(0.0436)
Planned Beds 19 Years Later	0.289***
	(0.0472)
Planned Beds 20 Years Later	0.284***
	(0.0505)
Planned Beds 21+ Years Later	0.277***
	(0.0565)

(continued table)

Time Relative to Year of Funding	Total Beds
Treatment Indicators:	
Year of HB Funding	-0.0306
	(0.0278)
1 Year Later	-0.0335
	0.0295
2 Years Later	-0.0226
	0.0343
3 Years Later	0.00660
	0.0241
4 Years Later	0.00283
	0.0251
5 Years Later	0.00335
	0.0241
6 Years Later	-0.00615
	0.0206
7 Years Later	-0.00220
	0.0236
8 Years Later	-0.0193
	0.0290
9 Years Later	-0.0242
	0.0259
10 Years Later	-0.0474**
	0.0226
11 Years Later	-0.0251
	0.0244
12 Years Later	-0.0105
	0.0232
13 Years Later	-0.0265
	0.0227
14 Years Later	0.00834
	0.0249
15 Years Later	0.0345
	0.0252
16 Years Later	0.0279
	0.0285
17 Years Later	0.0263
	0.0290
18 Years Later	-0.0363
	0.0260
19 Years Later	-0.0334
	0.0314
20 Years Later	-0.0515
	0.0418
21+ Years Later	-0.123**
	0.0597

(continued table)

Time Relative to Year of Funding	Total Beds
Other Variables:	
Popiulation	0.0384***
	0.00904
Med Family Income	-0.0225***
	(0.00670)
Prop. Pop 65+	14.39***
	(2.436)
Prop. Pop <5	-2.335
	(3.026)
MDs per 1,000	0.168**
	(0.0811)
Prop. Pop NonWh	-2.374**
	(1.030)
Observations	82,974
R-squared	0.864

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table A8: Effect of Amount of Funding on Hospital Beds per 1,000

Variable	Total Beds (1)	N-P / Pub. Beds (2)	For-Prof. Beds (3)
Treatment Indicators:			
Year of Funding	-0.113***	-0.0991***	-0.0137
	(0.0322)	(0.029)	(0.0107)
1 Years Later	-0.110***	-0.0968***	-0.0136
	(0.0326)	(0.0287)	(0.00974)
2 Years Later	-0.0942**	-0.0805**	-0.0138
	(0.0391)	(0.0353)	(0.0110)
3 Years Later	-0.0503	-0.0451	-0.00519
	(0.0322)	(0.0297)	(0.00828)
4 Years Later	-0.0453	-0.0405	-0.00482
	(0.0323)	(0.0301)	(0.00881)
5 Years Later	-0.0544	-0.0542	-0.000174
	(0.0345)	(0.0334)	(0.00755)
6 Years Later	-0.0603**	-0.0585**	-0.00181
	(0.0296)	(0.0287)	(0.00858)
7 Years Later	-0.0660**	-0.0657**	-0.000340
	(0.0304)	(0.0296)	(0.00795)
8 Years Later	-0.0866**	-0.0914***	0.00487
	(0.0338)	(0.033)	(0.00707)
9 Years Later	-0.0854***	-0.0767**	-0.00872
	(0.03)	(0.0312)	(0.00902)
10 Years Later	-0.0990***	-0.0950***	-0.00403
	(0.0262)	(0.0269)	(0.00796)
11 Years Later	-0.0769***	-0.0796***	0.00271
	(0.0267)	(0.0281)	(0.00866)
12 Years Later	-0.0687***	-0.0648**	-0.00391
	(0.0257)	(0.0267)	(0.0103)
13 Years Later	-0.0839***	-0.0779***	-0.00601
	(0.0238)	(0.0256)	(0.0105)
14 Years Later	-0.0373	-0.0454*	0.00810
	(0.0251)	(0.0262)	(0.00762)
15 Years Later	-0.00848	-0.033	0.0246**
	(0.0246)	(0.0295)	(0.0115)
16 Years Later	-0.0191	-0.039	0.0199*
	(0.0273)	(0.0308)	(0.0120)
17 Years Later	-0.038	-0.0492	0.0112
	(0.0265)	(0.0302)	(0.0118)
18 Years Later	-0.0935***	-0.0949***	0.00142
	(0.0244)	(0.0285)	(0.0166)
19 Years Later	-0.0906***	-0.0838**	-0.00675
	(0.0317)	(0.0344)	(0.0178)
20 Years Later	-0.123***	-0.122***	-0.00165
	(0.0439)	(0.0435)	(0.0212)
21+ Years Later	-0.212***	-0.218***	0.00633
	(0.0723)	(0.073)	(0.0230)

(continued table)

Variable	Total Beds (1)	N-P / Pub. Beds (2)	For-Prof. Beds (3)
Funding Amounts:			
Year of Funding	-0.000601*	-0.000443	-0.000158
	0.000312	0.000309	0.000102
1 Years Later	-0.000603*	-0.000391	-0.000212**
	0.000343	0.000335	0.000103
2 Years Later	0.000241	0.000588	-0.000347***
	0.000396	0.000386	0.000111
3 Years Later	0.00147***	0.00204***	-0.000574***
	0.000394	0.000398	0.000108
4 Years Later	0.00260***	0.00322***	-0.000612***
	0.000440	0.000449	0.000112
5 Years Later	0.00323***	0.00386***	-0.000626***
	0.000445	0.000460	0.000115
6 Years Later	0.00349***	0.00410***	-0.000612***
	0.000472	0.000481	0.000129
7 Years Later	0.00344***	0.00413***	-0.000691***
	0.000540	0.000551	0.000126
8 Years Later	0.00378***	0.00452***	-0.000732***
	0.000605	0.000622	0.000129
9 Years Later	0.00396***	0.00464***	-0.000675***
	0.000646	0.000668	0.000138
10 Years Later	0.00463***	0.00526***	-0.000628***
	0.000563	0.000584	0.000134
11 Years Later	0.00500***	0.00571***	-0.000704***
	0.000559	0.000587	0.000151
12 Years Later	0.00504***	0.00572***	-0.000682***
	0.000575	0.000608	0.000144
13 Years Later	0.00529***	0.00594***	-0.000651***
	0.000613	0.000646	0.000150
14 Years Later	0.00524***	0.00594***	-0.000700***
	0.000622	0.000656	0.000153
15 Years Later	0.00521***	0.00593***	-0.000722***
	0.000613	0.000655	0.000167
16 Years Later	0.00566***	0.00641***	-0.000750***
	0.000663	0.000706	0.000183
17 Years Later	0.00593***	0.00654***	-0.000608***
	0.000707	0.000737	0.000182
18 Years Later	0.00629***	0.00687***	-0.000581***
	0.000707	0.000744	0.000178
19 Years Later	0.00664***	0.00696***	-0.000322
	0.000766	0.000785	0.000206
20 Years Later	0.00646***	0.00687***	-0.000405*
	0.000825	0.000840	0.000233
21+ Years Later	0.00630***	0.00676***	-0.000452*
	0.000850	0.000858	0.000250

(continued table)

Variable	Total Beds (1)	N-P / Pub. Beds (2)	For-Prof. Beds (3)
Other Variables:			
Population	0.0575***	0.0217*	0.0358***
	0.0127	0.0130	0.00522
Med Fam Income	1.61e-05	1.32e-05	2.95e-06
	1.15e-05	1.13e-05	2.74e-06
Prop. Pop 65+	39.00***	38.50***	0.500
	2.565	2.569	0.518
Prop. Pop <5	37.17***	38.13***	-0.969
	2.983	2.802	0.795
MDs per 1,000	0.300***	0.276***	0.0241
	0.0520	0.0664	0.0225
Prop. Pop NonWh	-0.673	-0.743	0.0698
	1.141	1.187	0.281
Observations	83,002	83,002	83,002
R-squared	0.956	0.957	0.736

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table A9: Effect of Hill-Burton Program on Hospital Admissions per 1,000

Time Relative to First Year of Funding	Total Admissions (1)	N-P / Pub. Admissions (2)	For-Prof. Admissions (3)
Year of Funding	3.174**	4.470***	-1.296***
	(1.609)	(1.612)	(0.447)
1 Years Later	1.264	3.099*	-1.835***
	(1.617)	(1.622)	(0.535)
2 Years Later	1.420	4.002**	-2.582***
	(1.868)	(1.891)	(0.632)
3 Years Later	2.910	6.317***	-3.407***
	(1.836)	(1.860)	(0.691)
4 Years Later	6.949***	10.52***	-3.569***
	(1.920)	(1.945)	(0.754)
5 Years Later	9.441***	13.17***	-3.731***
	(2.018)	(2.047)	(0.860)
6 Years Later	12.00***	15.62***	-3.625***
	(2.126)	(2.162)	(0.905)
7 Years Later	12.59***	15.98***	-3.391***
	(2.313)	(2.366)	(0.910)
8 Years Later	13.66***	16.94***	-3.284***
	(2.431)	(2.478)	(0.959)
9 Years Later	14.39***	17.66***	-3.270***
	(2.598)	(2.602)	(0.998)
10 Years Later	13.59***	16.79***	-3.199***
	(2.652)	(2.728)	(1.043)
11 Years Later	15.02***	18.04***	-3.016***
	(2.720)	(2.822)	(1.071)
12 Years Later	15.43***	18.06***	-2.628**
	(2.839)	(2.929)	(1.145)
13 Years Later	15.15***	17.95***	-2.801**
	(3.012)	(3.111)	(1.196)
14 Years Later	15.41***	18.17***	-2.753**
	(3.207)	(3.300)	(1.283)
15 Years Later	16.65***	19.17***	-2.526*
	(3.349)	(3.427)	(1.322)
16 Years Later	17.08***	19.44***	-2.358*
	(3.586)	(3.657)	(1.369)
17 Years Later	16.96***	19.52***	-2.555*
	(3.791)	(3.852)	(1.416)
18 Years Later	16.54***	19.08***	-2.537*
	(3.972)	(4.011)	(1.471)
19 Years Later	15.25***	17.75***	-2.501
	(4.063)	(4.160)	(1.527)
20 Years Later	14.65***	17.17***	-2.525
	(4.275)	(4.363)	(1.579)
21+ Years Later	14.60***	17.27***	-2.669
	(4.807)	(4.897)	(1.697)
Population	0.621	-0.507	1.128***
	(0.415)	(0.431)	(0.117)
Med Fam Income	0.000334	0.000161	0.000173**
	(0.000382)	(0.000384)	(8.61e-05)
Prop. Pop 65+	990.4***	996.9***	-6.421
	(85.55)	(88.59)	(18.06)
Prop. Pop <5	1,063***	1,089***	-25.46
	(84.71)	(85.57)	(25.36)
MDs per 1,000	14.75***	14.24***	0.514
	(1.495)	(1.917)	(0.689)
Prop. Pop NonWh	-96.72**	-108.4**	11.65
	(40.00)	(43.15)	(9.223)
Observations	83,002	83,002	83,002
R-squared	0.936	0.937	0.712

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A10: Effect on Hospital Admissions per 1,000 by Population Tercile

Time Relative to First Year of Funding	Tercile 1 (1)	Tercile 2 (2)	Tercile 3 (3)
Year of Funding	-3.345	-7.520***	0.772
	(3.367)	(1.750)	(1.921)
1 Years Later	-8.492***	-8.843***	-1.361
	(3.067)	(2.062)	(2.102)
2 Years Later	-7.987**	-12.78***	-1.004
	(3.623)	(2.394)	(2.569)
3 Years Later	11.70**	-0.261	-1.634
	(4.545)	(2.323)	(2.718)
4 Years Later	24.20***	9.624***	1.251
	(4.017)	(2.488)	(3.032)
5 Years Later	30.30***	16.39***	2.831
	(4.100)	(2.541)	(3.331)
6 Years Later	35.02***	21.57***	4.823
	(4.343)	(2.753)	(3.646)
7 Years Later	35.23***	24.14***	4.870
	(4.564)	(2.807)	(4.027)
8 Years Later	38.34***	28.38***	5.288
	(4.753)	(3.645)	(4.307)
9 Years Later	41.95***	26.32***	6.034
	(4.802)	(3.199)	(4.625)
10 Years Later	42.73***	28.73***	4.798
	(5.182)	(3.387)	(4.897)
11 Years Later	44.85***	28.83***	6.198
	(4.794)	(3.415)	(5.173)
12 Years Later	48.18***	30.75***	6.361
	(5.181)	(3.620)	(5.488)
13 Years Later	49.08***	33.75***	5.629
	(5.414)	(3.717)	(5.839)
14 Years Later	52.76***	34.25***	5.569
	(5.628)	(3.905)	(6.182)
15 Years Later	55.31***	37.04***	6.592
	(5.273)	(4.075)	(6.551)
16 Years Later	51.93***	37.22***	6.904
	(5.418)	(4.139)	(6.902)
17 Years Later	53.46***	36.73***	6.804
	(5.973)	(4.373)	(7.279)
18 Years Later	57.79***	37.86***	6.166
	(5.514)	(4.572)	(7.680)
19 Years Later	54.21***	39.16***	4.427
	(5.990)	(4.767)	(8.000)
20 Years Later	54.32***	45.17***	3.300
	(6.074)	(5.956)	(8.387)
21+ Years Later	49.23***	44.06***	2.982
	(8.202)	(5.349)	(9.418)
Population	-8.849	-37.81***	0.952***
	(5.690)	(12.48)	(0.267)
Med Fam Income	0.00142***	0.000945***	-0.000664***
	(0.000354)	(0.000297)	(0.000239)
Prop. Pop 65+	642.7***	210.0***	276.3***
	(68.20)	(65.07)	(82.88)
Prop. Pop <5	742.3***	79.74	-185.4*
	(108.9)	(113.3)	(103.9)
MDs per 1,000	7.980***	30.27***	8.371***
	(2.089)	(4.524)	(2.817)
Prop. Pop NonWh	250.4***	1.976	-102.1**
	(71.78)	(35.77)	(39.60)
Observations	27,611	27,684	27,681
R-squared	0.988	0.697	0.864

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table A11: Effect of Hill-Burton Projects in Own vs. Adjacent Counties on Hospital Admissions

Dependent variable: single difference from 1948-50 to 1953-55 in hospital admissions per 1,000 population.

Explanatory Variable	Nationwide (1)	Nationwide (2)	Tercile 1 (3)	Tercile 1 (4)	Tercile 2 (5)	Tercile 2 (6)	Tercile 3 (7)	Tercile 3 (8)
HB Funded	7.767***	7.764***	39.94***	39.96***	24.77***	25.49***	4.254*	4.287*
	(1.724)	(1.724)	(8.011)	(8.004)	(5.035)	(5.030)	(2.187)	(2.187)
Adj County HB Funded	-0.444		0.472		10.26*		-2.404	
	(2.001)		(6.247)		(5.255)		(2.625)	
$\Delta Population$	0.672	0.666	67.07	67.08	-144.3	-122.4	0.742	0.728
	(0.843)	(0.842)	(219.7)	(219.6)	(105.6)	(105.2)	(1.023)	(1.023)
$\Delta NonWhPopn$	1.25e-05	1.26e-05	-0.00374	-0.00372	-0.00380	-0.00486	1.41e-05	1.41e-05
	(3.30e-05)	(3.30e-05)	(0.0227)	(0.0226)	(0.00639)	(0.00638)	(3.94e-05)	(3.94e-05)
$\Delta Pop65+$	368.0***	368.8***	641.1*	639.4*	-60.23	-103.6	480.9**	483.6***
	(134.2)	(134.1)	(348.4)	(347.4)	(344.3)	(344.1)	(187.0)	(187.0)
$\Delta Pop < 5$	-556.1***	-554.4***	676.8	675.6	-513.6	-625.9	-649.9***	-641.7***
	(159.6)	(159.4)	(468.1)	(467.6)	(453.0)	(450.1)	(209.3)	(209.1)
$\Delta MedFamIncome$	-0.000269	-0.000285	0.000681	0.000681	0.00122	0.00128	-0.000366	-0.000480
	(0.000498)	(0.000492)	(0.00126)	(0.00126)	(0.00126)	(0.00126)	(0.000689)	(0.000678)
$\Delta MDs/1,000$	18.19***	18.24***	71.74***	71.81***	2.975	3.230	16.47***	16.75***
	(3.307)	(3.297)	(26.48)	(26.45)	(23.43)	(23.47)	(3.929)	(3.916)
Rural (binary)	8.613***	8.576***	30.26	30.12	-39.51*	-41.57*	7.294***	7.025***
	(2.112)	(2.105)	(41.60)	(41.54)	(23.15)	(23.16)	(2.661)	(2.645)
Land Area	-0.00159***	-0.00159***	0.000629	0.000629	-0.00108	-0.00107	-0.00182***	-0.00184***
	(0.000535)	(0.000534)	(0.00184)	(0.00184)	(0.00158)	(0.00158)	(0.000682)	(0.000682)
Constant	6.051	5.838	-29.37	-28.91	37.75	47.21*	10.71*	9.746
	(4.649)	(4.548)	(43.58)	(43.12)	(24.90)	(24.46)	(6.270)	(6.181)
Observations	2,703	2,703	826	826	894	894	976	976
R-squared	0.056	0.056	0.055	0.055	0.049	0.045	0.093	0.092

*** p<0.01, ** p<0.05, * p<0.1

Table A12: Effect of Amount of Funding on Hospital Beds per 1,000 by Population Tercile

Variable	Tercile 1 (1)	Tercile 2 (2)	Tercile 3 (3)
Treatment Indicators:			
Year of Funding	-0.163	-0.175***	-0.0437*
	(0.142)	(0.0668)	(0.0264)
1 Years Later	0.00945	-0.146*	-0.0409
	(0.160)	(0.0757)	(0.0279)
2 Years Later	0.330*	0.195*	-0.0278
	(0.197)	(0.101)	(0.0341)
3 Years Later	0.388**	0.340***	0.014
	(0.176)	(0.0792)	(0.0246)
4 Years Later	0.354*	0.309***	0.0158
	(0.196)	(0.0851)	(0.0261)
5 Years Later	0.407**	0.302***	0.0133
	(0.187)	(0.0789)	(0.0263)
6 Years Later	0.494***	0.248***	0.00773
	(0.186)	(0.0829)	(0.022)
7 Years Later	0.366**	0.294***	0.00685
	(0.179)	(0.0827)	(0.0258)
8 Years Later	0.516**	0.364***	-0.00767
	(0.202)	(0.0814)	(0.0316)
9 Years Later	0.634***	0.330***	-0.00822
	(0.172)	(0.0942)	(0.0283)
10 Years Later	0.546***	0.343***	-0.0374
	(0.160)	(0.0932)	(0.0242)
11 Years Later	0.502***	0.344***	-0.0167
	(0.131)	(0.102)	(0.0253)
12 Years Later	0.590***	0.291***	-0.00171
	(0.134)	(0.101)	(0.0242)
13 Years Later	0.696***	0.299***	-0.0126
	(0.159)	(0.0942)	(0.0229)
14 Years Later	0.697***	0.365***	0.0235
	(0.174)	(0.0942)	(0.0245)
15 Years Later	0.855***	0.366***	0.0497**
	(0.176)	(0.102)	(0.0237)
16 Years Later	1.003***	0.419***	0.039
	(0.199)	(0.0948)	(0.0281)
17 Years Later	0.903***	0.360***	0.0345
	(0.227)	(0.104)	(0.0278)
18 Years Later	0.922***	0.351***	-0.0246
	(0.233)	(0.127)	(0.0256)
19 Years Later	0.893***	0.424***	-0.0178
	(0.282)	(0.135)	(0.031)
20 Years Later	0.930***	0.480***	-0.0309
	(0.264)	(0.135)	(0.0404)
21+ Years Later	0.886***	0.459***	-0.105*
	(0.278)	(0.124)	(0.0638)

(continued table)

Variable	Tercile 1 (1)	Tercile 2 (2)	Tercile 3 (3)
Funding Amounts:			
Year of Funding	-0.00110*	-0.000708	-0.00138***
	(0.000571)	(0.000431)	(0.000438)
1 Years Later	-0.00131**	-0.00104**	-0.00147***
	(0.000650)	(0.000493)	(0.000487)
2 Years Later	-0.00130	-0.00160**	-0.000804
	(0.000808)	(0.000635)	(0.000557)
3 Years Later	0.000193	-0.000717	0.000226
	(0.000837)	(0.000514)	(0.000553)
4 Years Later	0.000956	0.000541	0.00147**
	(0.000827)	(0.000556)	(0.000646)
5 Years Later	0.00132	0.00111**	0.00201***
	(0.000884)	(0.000548)	(0.000621)
6 Years Later	0.00121	0.00167***	0.00216***
	(0.000960)	(0.000566)	(0.000664)
7 Years Later	0.00188**	0.00162***	0.00181**
	(0.000942)	(0.00055)	(0.000803)
8 Years Later	0.00156	0.00157**	0.00192**
	(0.00107)	(0.000609)	(0.000871)
9 Years Later	0.00147*	0.00181***	0.00190**
	(0.000777)	(0.00069)	(0.000924)
10 Years Later	0.00222***	0.00175***	0.00280***
	(0.000756)	(0.000567)	(0.000743)
11 Years Later	0.00272***	0.00207***	0.00318***
	(0.000697)	(0.000642)	(0.000679)
12 Years Later	0.00278***	0.00224***	0.00308***
	(0.000803)	(0.000652)	(0.000696)
13 Years Later	0.00291***	0.00240***	0.00306***
	(0.000983)	(0.000692)	(0.000705)
14 Years Later	0.00334***	0.00209***	0.00295***
	(0.00101)	(0.000672)	(0.000754)
15 Years Later	0.00256**	0.00238***	0.00284***
	(0.00105)	(0.000813)	(0.00071)
16 Years Later	0.00264**	0.00198***	0.00326***
	(0.00112)	(0.000689)	(0.000788)
17 Years Later	0.00342***	0.00228***	0.00345***
	(0.00128)	(0.000814)	(0.000844)
18 Years Later	0.00362***	0.00258**	0.00357***
	(0.00132)	(0.00101)	(0.000773)
19 Years Later	0.00411***	0.00265**	0.00382***
	(0.00155)	(0.0011)	(0.000841)
20 Years Later	0.00342**	0.00255**	0.00337***
	(0.00144)	(0.00115)	(0.000904)
21+ Years Later	0.00272*	0.00235***	0.00363***
	(0.00154)	(0.000791)	(0.000895)

(continued table)

Variable	Tercile 1 (1)	Tercile 2 (2)	Tercile 3 (3)
Other Variables:			
Population	-0.289***	-2.296***	0.0377***
	(0.0900)	(0.583)	(0.0092)
Med Fam Income	4.55e-06	4.07e-05***	-2.50e-05***
	(2.65e-05)	(0.00000931)	(0.00000786)
Prop. Pop 65+	29.23***	16.31***	13.53***
	(2.239)	(2.069)	(3.428)
Prop. Pop <5	41.75***	2.269	-4.83
	(10.42)	(3.406)	(3.75)
MDs per 1,000	0.294**	0.457***	0.178**
	(0.134)	(0.155)	(0.0856)
Prop. Pop NonWh	2.110	-0.00735	-2.563**
	(5.317)	(0.957)	(1.215)
Observations	27,611	27,684	27,681
R-squared	0.994	0.761	0.882

Robust standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Supplemental Appendix

Table S1: Effect of Hill-Burton Program on Hospital Beds per 1,000, Unweighted

Time Relative to First Year of Funding	Total Beds (1)	N-P / Pub. Beds (2)	For-Prof. Beds (3)
Year of Funding	-0.185***	-0.0640**	-0.121***
	(0.0328)	(0.0319)	(0.0174)
1 Years Later	-0.154***	-1.71e-05	-0.154***
	(0.0369)	(0.0358)	(0.0198)
2 Years Later	0.0622	0.280***	-0.218***
	(0.0436)	(0.0425)	(0.0228)
3 Years Later	0.353***	0.617***	-0.264***
	(0.0500)	(0.0491)	(0.0251)
4 Years Later	0.547***	0.821***	-0.274***
	(0.0528)	(0.0527)	(0.0260)
5 Years Later	0.627***	0.907***	-0.280***
	(0.0531)	(0.0532)	(0.0272)
6 Years Later	0.716***	0.995***	-0.280***
	(0.0573)	(0.0571)	(0.0287)
7 Years Later	0.717***	1.007***	-0.289***
	(0.0641)	(0.0644)	(0.0299)
8 Years Later	0.769***	1.060***	-0.292***
	(0.0668)	(0.0669)	(0.0310)
9 Years Later	0.799***	1.096***	-0.297***
	(0.0705)	(0.0707)	(0.0324)
10 Years Later	0.880***	1.163***	-0.283***
	(0.0756)	(0.0749)	(0.0338)
11 Years Later	0.980***	1.275***	-0.296***
	(0.0709)	(0.0712)	(0.0344)
12 Years Later	1.051***	1.347***	-0.296***
	(0.0747)	(0.0744)	(0.0357)
13 Years Later	1.104***	1.398***	-0.294***
	(0.0785)	(0.0781)	(0.0372)
14 Years Later	1.174***	1.470***	-0.296***
	(0.0827)	(0.0819)	(0.0383)
15 Years Later	1.223***	1.503***	-0.281***
	(0.0854)	(0.0843)	(0.0396)
16 Years Later	1.278***	1.563***	-0.285***
	(0.0883)	(0.0867)	(0.0414)
17 Years Later	1.312***	1.596***	-0.285***
	(0.0934)	(0.0912)	(0.0432)
18 Years Later	1.369***	1.664***	-0.295***
	(0.0958)	(0.0933)	(0.0449)
19 Years Later	1.411***	1.707***	-0.296***
	(0.102)	(0.0989)	(0.0468)
20 Years Later	1.388***	1.685***	-0.297***
	(0.106)	(0.104)	(0.0487)
21+ Years Later	1.438***	1.730***	-0.292***
	(0.116)	(0.113)	(0.0535)
Population	-0.250***	-0.317***	0.0666***
	(0.0836)	(0.0926)	(0.0146)
Med Fam Income	1.31e-05*	8.84e-06	4.29e-06***
	(6.73e-06)	(6.87e-06)	(1.56e-06)
Prop. Pop 65+	35.10***	35.51***	-0.410
	(1.429)	(1.382)	(0.584)
Prop. Pop <5	32.69***	32.03***	0.661
	(3.572)	(3.539)	(0.550)
MDs per 1,000	0.242***	0.231***	0.0104
	(0.0310)	(0.0353)	(0.00981)
Prop. Pop NonWh	3.525*	3.673**	-0.147
	(1.812)	(1.823)	(0.323)
Observations	83,002	83,002	83,002
R-squared	0.982	0.982	0.685

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table S2: Effect on Hospital Beds per 1,000 by Population Tercile, Unweighted

Time Relative to First Year of Funding	Tercile 1 (1)	Tercile 2 (2)	Tercile 3 (3)
Year of Funding	-0.356***	-0.237***	-0.0840*
	(0.0820)	(0.0430)	(0.0464)
1 Years Later	-0.238**	-0.245***	-0.0552
	(0.0925)	(0.0500)	(0.0565)
2 Years Later	0.135	-0.0251	0.0842
	(0.113)	(0.0609)	(0.0691)
3 Years Later	0.529***	0.323***	0.279***
	(0.135)	(0.0683)	(0.0781)
4 Years Later	0.761***	0.535***	0.442***
	(0.126)	(0.0770)	(0.0906)
5 Years Later	0.873***	0.656***	0.476***
	(0.127)	(0.0729)	(0.0944)
6 Years Later	1.031***	0.730***	0.544***
	(0.136)	(0.0762)	(0.116)
7 Years Later	1.059***	0.781***	0.491***
	(0.132)	(0.0804)	(0.136)
8 Years Later	1.139***	0.825***	0.519***
	(0.137)	(0.0860)	(0.144)
9 Years Later	1.199***	0.866***	0.527***
	(0.136)	(0.0873)	(0.159)
10 Years Later	1.382***	0.900***	0.588***
	(0.162)	(0.0927)	(0.168)
11 Years Later	1.417***	1.010***	0.713***
	(0.146)	(0.0979)	(0.167)
12 Years Later	1.632***	1.027***	0.762***
	(0.154)	(0.104)	(0.177)
13 Years Later	1.779***	1.091***	0.767***
	(0.168)	(0.106)	(0.187)
14 Years Later	1.900***	1.137***	0.836***
	(0.175)	(0.109)	(0.199)
15 Years Later	1.914***	1.202***	0.882***
	(0.179)	(0.114)	(0.210)
16 Years Later	2.023***	1.256***	0.919***
	(0.183)	(0.117)	(0.222)
17 Years Later	2.040***	1.276***	0.967***
	(0.197)	(0.119)	(0.237)
18 Years Later	2.184***	1.328***	1.020***
	(0.198)	(0.127)	(0.242)
19 Years Later	2.285***	1.402***	1.027***
	(0.222)	(0.136)	(0.251)
20 Years Later	2.285***	1.478***	0.958***
	(0.220)	(0.146)	(0.262)
21+ Years Later	2.229***	1.512***	1.024***
	(0.234)	(0.154)	(0.289)
Population	-0.867**	-2.972***	-0.0928*
	(0.395)	(0.496)	(0.0508)
Med Fam Income	1.94e-05**	4.35e-05***	-3.06e-05***
	(9.19e-06)	(9.33e-06)	(9.93e-06)
Prop. Pop 65+	31.56***	16.93***	18.55***
	(2.606)	(2.170)	(3.868)
Prop. Pop <5	34.12***	4.534	1.043
	(6.499)	(3.857)	(3.418)
MDs per 1,000	0.217**	0.738***	0.342*
	(0.0888)	(0.165)	(0.177)
Prop. Pop NonWh	4.618	-0.152	-2.994**
	(3.923)	(0.995)	(1.256)
Observations	27,611	27,684	27,681
R-squared	0.992	0.730	0.843

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table S3: Effect of Hill-Burton Program on Hospital Beds per 1,000, with Leads, Unweighted

Time Relative to First Year of Funding	Total Beds (1)	N-P / Pub. Beds (2)	For-Prof. Beds (3)
9 Years Prior	0.00255	0.0385	-0.0360
	(0.0598)	(0.0602)	(0.0253)
8 Years Prior	-0.0416	0.0291	-0.0707***
	(0.0628)	(0.0626)	(0.0269)
7 Years Prior	-0.0521	0.0241	-0.0763***
	(0.0673)	(0.0669)	(0.0278)
6 Years Prior	-0.0975	-0.0167	-0.0807***
	(0.0707)	(0.0701)	(0.0296)
5 Years Prior	-0.0865	0.00156	-0.0880***
	(0.0736)	(0.0723)	(0.0324)
4 Years Prior	-0.0757	0.0182	-0.0940***
	(0.0757)	(0.0741)	(0.0353)
3 Years Prior	-0.158**	-0.0295	-0.128***
	(0.0778)	(0.0756)	(0.0360)
2 Years Prior	-0.177*	-0.00787	-0.169***
	(0.0955)	(0.0941)	(0.0374)
1 Years Prior	-0.222***	-0.0107	-0.211***
	(0.0818)	(0.0799)	(0.0389)
Year of Funding	-0.295***	-0.0647	-0.231***
	(0.0837)	(0.0817)	(0.0401)
1 Years Later	-0.266***	-0.000816	-0.265***
	(0.0867)	(0.0845)	(0.0422)
2 Years Later	-0.0520	0.279***	-0.331***
	(0.0901)	(0.0878)	(0.0442)
3 Years Later	0.236**	0.616***	-0.380***
	(0.0942)	(0.0920)	(0.0461)
4 Years Later	0.427***	0.820***	-0.393***
	(0.0968)	(0.0951)	(0.0473)
5 Years Later	0.504***	0.906***	-0.401***
	(0.0990)	(0.0971)	(0.0487)
6 Years Later	0.589***	0.993***	-0.404***
	(0.100)	(0.0981)	(0.0503)
7 Years Later	0.588***	1.004***	-0.416***
	(0.106)	(0.104)	(0.0517)
8 Years Later	0.636***	1.058***	-0.422***
	(0.109)	(0.107)	(0.0530)
9 Years Later	0.664***	1.094***	-0.430***
	(0.112)	(0.110)	(0.0548)
10 Years Later	0.742***	1.160***	-0.418***
	(0.116)	(0.113)	(0.0560)
11 Years Later	0.839***	1.273***	-0.434***
	(0.113)	(0.111)	(0.0570)
12 Years Later	0.908***	1.344***	-0.436***
	(0.116)	(0.114)	(0.0583)
13 Years Later	0.959***	1.395***	-0.436***
	(0.119)	(0.117)	(0.0597)
14 Years Later	1.026***	1.466***	-0.440***
	(0.123)	(0.120)	(0.0608)

(continued table)

Time Relative to First Year of Funding	Total Beds (1)	N-P / Pub. Beds (2)	For-Prof. Beds (3)
15 Years Later	1.072***	1.499***	-0.428***
	(0.124)	(0.121)	(0.0623)
16 Years Later	1.125***	1.559***	-0.434***
	(0.126)	(0.122)	(0.0640)
17 Years Later	1.156***	1.592***	-0.436***
	(0.130)	(0.126)	(0.0659)
18 Years Later	1.211***	1.660***	-0.449***
	(0.133)	(0.128)	(0.0679)
19 Years Later	1.251***	1.702***	-0.451***
	(0.138)	(0.133)	(0.0699)
20 Years Later	1.226***	1.680***	-0.454***
	(0.142)	(0.137)	(0.0717)
21+ Years Later	1.273***	1.725***	-0.452***
	(0.151)	(0.145)	(0.0766)
Population	-0.251***	-0.317***	0.0661***
	(0.0833)	(0.0925)	(0.0147)
Med Fam Income	1.30e-05*	8.85e-06	4.16e-06***
	(6.73e-06)	(6.87e-06)	(1.57e-06)
Prop. Pop 65+	35.06***	35.50***	-0.443
	(1.423)	(1.379)	(0.583)
Prop. Pop <5	32.78***	32.04***	0.732
	(3.570)	(3.540)	(0.551)
MDs per 1,000	0.242***	0.231***	0.0108
	(0.0309)	(0.0353)	(0.00983)
Prop. Pop NonWh	3.506*	3.670**	-0.164
	(1.811)	(1.823)	(0.323)
Observations	83,002	83,002	83,002
R-squared	0.982	0.982	0.685

Robust standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table S4: Effect of Program on Hospital Beds per 1,000 by Population Tercile, with Leads, Unweighted

Time Relative to First Year of Funding	Tercile 1 (1)	Tercile 2 (2)	Tercile 3 (3)
9 Years Prior	0.0931	0.0413	-0.195
	(0.106)	(0.0649)	(0.135)
8 Years Prior	0.0345	0.0204	-0.244*
	(0.108)	(0.0686)	(0.141)
7 Years Prior	0.0686	-0.0152	-0.266*
	(0.119)	(0.0739)	(0.146)
6 Years Prior	0.0185	-0.0868	-0.276*
	(0.130)	(0.0768)	(0.149)
5 Years Prior	0.0349	-0.105	-0.231
	(0.134)	(0.0809)	(0.150)
4 Years Prior	0.0589	-0.131	-0.198
	(0.143)	(0.0848)	(0.148)
3 Years Prior	-0.0326	-0.208**	-0.273*
	(0.146)	(0.0904)	(0.147)
2 Years Prior	-0.0309	-0.219**	-0.360**
	(0.202)	(0.0975)	(0.179)
1 Years Prior	-0.280*	-0.256***	-0.316**
	(0.151)	(0.0974)	(0.150)
Year of Funding	-0.383**	-0.363***	-0.363**
	(0.161)	(0.0986)	(0.150)
1 Years Later	-0.265	-0.374***	-0.343**
	(0.170)	(0.102)	(0.154)
2 Years Later	0.108	-0.157	-0.213
	(0.180)	(0.110)	(0.157)
3 Years Later	0.502***	0.187	-0.0274
	(0.191)	(0.115)	(0.163)
4 Years Later	0.733***	0.395***	0.126
	(0.189)	(0.122)	(0.169)
5 Years Later	0.844***	0.512***	0.151
	(0.193)	(0.123)	(0.172)
6 Years Later	1.001***	0.581***	0.209
	(0.200)	(0.126)	(0.175)
7 Years Later	1.027***	0.628***	0.146
	(0.199)	(0.130)	(0.195)
8 Years Later	1.106***	0.668***	0.164
	(0.203)	(0.136)	(0.199)
9 Years Later	1.164***	0.705***	0.163
	(0.202)	(0.139)	(0.211)
10 Years Later	1.347***	0.735***	0.215
	(0.220)	(0.143)	(0.217)
11 Years Later	1.381***	0.841***	0.330
	(0.212)	(0.148)	(0.207)
12 Years Later	1.596***	0.854***	0.370*
	(0.219)	(0.153)	(0.214)
13 Years Later	1.741***	0.915***	0.366*
	(0.230)	(0.156)	(0.220)
14 Years Later	1.861***	0.957***	0.427*
	(0.237)	(0.159)	(0.228)

(continued table)

Time Relative to First Year of Funding	Tercile 1 (1)	Tercile 2 (2)	Tercile 3 (3)
15 Years Later	1.874***	1.017***	0.465**
	(0.240)	(0.162)	(0.234)
16 Years Later	1.980***	1.067***	0.494**
	(0.244)	(0.165)	(0.242)
17 Years Later	1.996***	1.084***	0.535**
	(0.255)	(0.168)	(0.251)
18 Years Later	2.137***	1.132***	0.579**
	(0.258)	(0.174)	(0.256)
19 Years Later	2.238***	1.203***	0.578**
	(0.278)	(0.182)	(0.265)
20 Years Later	2.236***	1.277***	0.501*
	(0.278)	(0.191)	(0.275)
21+ Years Later	2.181***	1.306***	0.545*
	(0.290)	(0.199)	(0.299)
Population	-0.856**	-2.941***	-0.0935*
	(0.396)	(0.492)	(0.0507)
Med Fam Income	1.93e-05**	4.29e-05***	-3.01e-05***
	(9.18e-06)	(9.36e-06)	(9.82e-06)
Prop. Pop 65+	31.59***	16.88***	18.57***
	(2.606)	(2.162)	(3.871)
Prop. Pop <5	34.13***	4.915	1.008
	(6.497)	(3.855)	(3.379)
MDs per 1,000	0.217**	0.738***	0.334*
	(0.0888)	(0.164)	(0.177)
Prop. Pop NonWh	4.598	-0.139	-3.014**
	(3.923)	(0.996)	(1.257)
Observations	27,611	27,684	27,681
R-squared	0.992	0.731	0.843

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table S5: Effect of Planned Beds on Hospital Beds per 1,000

Time Relative to Year of Funding	Total Beds
Planned Beds:	
Planned Beds Year of Funding	-0.0894***
	0.0157
Planned Beds 1 Years Later	-0.0748***
	0.0175
Planned Beds 2 Years Later	-0.0207
	0.0213
Planned Beds 3 Years Later	0.0682***
	0.0251
Planned Beds 4 Years Later	0.152***
	0.0258
Planned Beds 5 Years Later	0.183***
	0.0249
Planned Beds 6 Years Later	0.221***
	0.0258
Planned Beds 7 Years Later	0.232***
	0.0259
Planned Beds 8 Years Later	0.244***
	0.0284
Planned Beds 9 Years Later	0.256***
	0.0295
Planned Beds 10 Years Later	0.298***
	0.0294
Planned Beds 11 Years Later	0.318***
	0.0285
Planned Beds 12 Years Later	0.350***
	0.0312
Planned Beds 13 Years Later	0.385***
	0.0329
Planned Beds 14 Years Later	0.395***
	0.0347
Planned Beds 15 Years Later	0.389***
	0.0327
Planned Beds 16 Years Later	0.391***
	0.0352
Planned Beds 17 Years Later	0.414***
	0.0368
Planned Beds 18 Years Later	0.436***
	0.0371
Planned Beds 19 Years Later	0.484***
	0.0477
Planned Beds 20 Years Later	0.481***
	0.0498
Planned Beds 21+ Years Later	0.439***

(continued table)

Time Relative to Year of Funding	Total Beds
Treatment Indicators:	
Year of Funding	-0.0840***
	0.0244
1 Years Later	-0.0864***
	0.0234
2 Years Later	0.000837
	0.0270
3 Years Later	0.0743***
	0.0288
4 Years Later	0.0593*
	0.0314
5 Years Later	0.0549*
	0.0282
6 Years Later	0.0281
	0.0289
7 Years Later	0.0242
	0.0297
8 Years Later	0.0211
	0.0278
9 Years Later	0.0238
	0.0308
10 Years Later	-0.00967
	0.0303
11 Years Later	-0.00875
	0.0319
12 Years Later	-0.0328
	0.0343
13 Years Later	-0.0670*
	0.0346
14 Years Later	-0.0450
	0.0366
15 Years Later	-0.00578
	0.0364
16 Years Later	0.00954
	0.0388
17 Years Later	-0.0222
	0.0408
18 Years Later	-0.0856**
	0.0423
19 Years Later	-0.132**
	0.0554
20 Years Later	-0.145***
	0.0529
21+ Years Later	-0.145*
	0.0802

(continued table)

Time Relative to Year of Funding	Total Beds
Other Variables:	
Popiulation	-0.140*
	0.0731
Med Family Income	-0.00314
	0.00529
Prop. Pop 65+	17.10***
	1.719
Prop. Pop <5	-1.457
	1.940
MDs per 1,000	0.376***
	0.116
Prop. Pop NonWh	-0.589
	0.695
Observations	82,974
R-squared	0.790

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table S6: Instrumental Variable Estimates of Effect on Hospital Capacity, Unweighted

Dependent variables: five-year change from 1948 to 1953
in beds by ownership type per 1,000 population.

Explanatory Variable	(first stage) Treated 1948-50 (1)	Total Beds (2)	(second stage) N-P / Pub. Beds (3)	For-Prof. Beds (4)	(OLS) Total Beds (5)
Priority Level	-0.0437***				
	(0.00711)				
Treated 1948-50		2.936***	2.816***	0.135	1.044***
		(0.639)	(0.603)	(0.221)	(0.0906)
$\Delta Population$	0.0134	-0.607	-0.585	-0.0194	-0.564
	(0.0998)	(0.392)	(0.371)	(0.136)	(0.343)
$\Delta NonWhPopn$	6.17e-06	-1.85e-05	-1.70e-05	-1.56e-06	-8.18e-06
	(4.35e-06)	(1.74e-05)	(1.65e-05)	(6.04e-06)	(1.50e-05)
$\Delta Pop65+$	-0.672	16.45***	15.32***	1.464	14.51***
	(1.395)	(5.516)	(5.212)	(1.911)	(4.787)
$\Delta Pop < 5$	-1.920	14.31*	15.85**	-1.796	7.279
	(1.887)	(7.636)	(7.215)	(2.645)	(6.433)
$\Delta MedFamIncome$	1.10e-05**	-4.78e-05**	-4.69e-05**	-2.91e-06	-2.55e-05
	(4.62e-06)	(1.95e-05)	(1.84e-05)	(6.75e-06)	(1.59e-05)
$\Delta MDs/1,000$	0.286***	1.397***	1.263***	0.132	1.950***
	(0.0814)	(0.371)	(0.350)	(0.128)	(0.281)
Rural (binary)	-0.400***	1.242***	1.193***	0.0473	0.542***
	(0.0535)	(0.313)	(0.296)	(0.109)	(0.186)
Land Area	2.96e-05***	-8.24e-05*	-5.98e-05	-2.26e-05	-3.29e-05
	(9.97e-06)	(4.28e-05)	(4.05e-05)	(1.48e-05)	(3.43e-05)
Constant	0.674***	-1.107***	-1.037***	-0.0678	-0.137
	(0.0670)	(0.410)	(0.387)	(0.142)	(0.218)
Observations	1,410	1,410	1,410	1,410	1,423
R-squared	0.104				0.142

Standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table S7: Effect of Hill-Burton Projects in Own vs. Adjacent Counties on Hospital Beds, Unweighted

Dependent variable: five-year change from 1948 to 1953 in hospital beds per 1,000 population.

Explanatory Variable	Nationwide (1)	Nationwide (2)	Tercile 1 (3)	Tercile 1 (4)	Tercile 2 (5)	Tercile 2 (6)	Tercile 3 (7)	Tercile 3 (8)
HB Funded	0.891***	0.894***	1.808***	1.810***	0.822***	0.826***	0.602***	0.603***
	(0.0633)	(0.0632)	(0.174)	(0.174)	(0.100)	(0.100)	(0.0773)	(0.0773)
Adj County HB Funded	0.0404		0.0550		0.0490		0.0870	
	(0.0635)		(0.131)		(0.103)		(0.0932)	
$\Delta Population$	-0.237	-0.233	-7.579	-7.550	-1.530	-1.426	-0.122	-0.118
	(0.159)	(0.159)	(6.059)	(6.056)	(2.602)	(2.592)	(0.134)	(0.134)
$\Delta NonWhPopn$	2.26e-06	2.14e-06	0.000123	0.000121	-0.000154	-0.000159	2.39e-06	2.23e-06
$\Delta Pop65+$	18.78***	18.63***	14.94*	14.85*	24.55***	24.34***	13.83**	13.54**
	(3.935)	(3.927)	(7.906)	(7.899)	(7.308)	(7.292)	(6.139)	(6.131)
$\Delta Pop < 5$	-2.519	-2.639	9.554	9.398	3.392	2.854	-18.57***	-18.50***
	(4.880)	(4.876)	(9.733)	(9.721)	(9.166)	(9.091)	(6.981)	(6.981)
$\Delta MedFamIncome$	-1.22e-05	-1.21e-05	-6.43e-06	-6.42e-06	2.57e-05	2.60e-05	-6.51e-06	-6.03e-06
	(1.24e-05)	(1.24e-05)	(2.03e-05)	(2.03e-05)	(2.50e-05)	(2.50e-05)	(2.42e-05)	(2.41e-05)
$\Delta MDs/1,000$	1.509***	1.510***	1.633***	1.635***	1.079**	1.080**	1.416***	1.416***
	(0.203)	(0.203)	(0.545)	(0.545)	(0.463)	(0.463)	(0.209)	(0.209)
Rural (binary)	0.562***	0.563***	-0.546	-0.563	-1.255**	-1.264**	0.414***	0.421***
	(0.110)	(0.110)	(1.357)	(1.356)	(0.532)	(0.532)	(0.100)	(0.0999)
Land Area	-6.75e-06	-6.82e-06	8.39e-06	8.74e-06	-1.36e-05	-1.35e-05	-6.29e-05**	-6.22e-05*
	(2.03e-05)	(2.03e-05)	(3.85e-05)	(3.85e-05)	(3.50e-05)	(3.50e-05)	(3.19e-05)	(3.19e-05)
Constant	-0.333**	-0.305**	0.723	0.775	1.281**	1.326**	-0.210	-0.150
	(0.155)	(0.148)	(1.380)	(1.373)	(0.562)	(0.553)	(0.223)	(0.213)
Observations	2,703	2,703	826	826	894	894	976	976
R-squared	0.120	0.119	0.152	0.152	0.107	0.107	0.172	0.171

*** p<0.01, ** p<0.05, * p<0.1

Table S8: Effect of Amount of Funding on Hospital Beds per 1,000, Unweighted

Variable	Total Beds (1)	N-P / Pub. Beds (2)	For-Prof. Beds (3)
Treatment Indicators:			
Year of Funding	-0.201***	-0.200***	-0.000926
	0.0308	0.0322	0.00739
1 Years Later	-0.184***	-0.175***	-0.00913
	0.0304	0.0316	0.00746
2 Years Later	-0.0646**	-0.0463	-0.0182**
	0.0317	0.0320	0.00756
3 Years Later	0.0356	0.0575*	-0.0219***
	0.0294	0.0297	0.00794
4 Years Later	0.0431	0.0639**	-0.0208**
	0.0298	0.0307	0.00817
5 Years Later	0.0274	0.0449	-0.0175**
	0.0280	0.0291	0.00818
6 Years Later	0.0195	0.0363	-0.0168**
	0.0291	0.0299	0.00817
7 Years Later	0.00536	0.0227	-0.0174**
	0.0294	0.0303	0.00838
8 Years Later	0.0162	0.0330	-0.0168**
	0.0291	0.0301	0.00812
9 Years Later	0.0283	0.0362	-0.00788
	0.0294	0.0308	0.00918
10 Years Later	0.00826	0.00776	0.000501
	0.0303	0.0315	0.00881
11 Years Later	0.00368	0.00929	-0.00562
	0.0313	0.0329	0.00848
12 Years Later	-0.0109	-0.00773	-0.00319
	0.0333	0.0346	0.00884
13 Years Later	-0.0131	-0.00800	-0.00507
	0.0343	0.0355	0.00995
14 Years Later	0.0262	0.0209	0.00536
	0.0360	0.0376	0.00913
15 Years Later	0.0447	0.0252	0.0195**
	0.0372	0.0391	0.00982
16 Years Later	0.0554	0.0350	0.0204*
	0.0401	0.0419	0.0107
17 Years Later	0.0267	0.000858	0.0258**
	0.0454	0.0471	0.0109
18 Years Later	-0.0262	-0.0431	0.0169
	0.0516	0.0532	0.0115
19 Years Later	-0.0470	-0.0596	0.0126
	0.0635	0.0643	0.0117
20 Years Later	-0.0539	-0.0841	0.0302**
	0.0594	0.0620	0.0133
21+ Years Later	0.0311	-0.0110	0.0421*
	0.0745	0.0752	0.0218

(continued table)

Variable	Total Beds (1)	N-P / Pub. Beds (2)	For-Prof. Beds (3)
Funding Amounts:			
Year of Funding	-0.000725***	-0.000362	-0.000362***
	0.000265	0.000274	9.25e-05
1 Years Later	-0.000740***	-0.000318	-0.000422***
	0.000274	0.000278	9.66e-05
2 Years Later	-0.000198	0.000432	-0.000631***
	0.000302	0.000299	0.000110
3 Years Later	0.000814**	0.00161***	-0.000800***
	0.000321	0.000320	0.000125
4 Years Later	0.00182***	0.00265***	-0.000824***
	0.000323	0.000334	0.000125
5 Years Later	0.00240***	0.00322***	-0.000829***
	0.000329	0.000345	0.000128
6 Years Later	0.00275***	0.00358***	-0.000835***
	0.000347	0.000363	0.000129
7 Years Later	0.00293***	0.00381***	-0.000873***
	0.000346	0.000369	0.000132
8 Years Later	0.00309***	0.00400***	-0.000901***
	0.000396	0.000424	0.000139
9 Years Later	0.00321***	0.00420***	-0.000986***
	0.000404	0.000443	0.000161
10 Years Later	0.00379***	0.00466***	-0.000869***
	0.000401	0.000433	0.000145
11 Years Later	0.00418***	0.00509***	-0.000908***
	0.000405	0.000456	0.000148
12 Years Later	0.00461***	0.00551***	-0.000900***
	0.000466	0.000512	0.000149
13 Years Later	0.00487***	0.00571***	-0.000837***
	0.000519	0.000559	0.000165
14 Years Later	0.00495***	0.00584***	-0.000886***
	0.000533	0.000589	0.000153
15 Years Later	0.00505***	0.00593***	-0.000881***
	0.000583	0.000642	0.000160
16 Years Later	0.00520***	0.00612***	-0.000924***
	0.000648	0.000709	0.000171
17 Years Later	0.00554***	0.00644***	-0.000902***
	0.000729	0.000788	0.000174
18 Years Later	0.00600***	0.00686***	-0.000855***
	0.000855	0.000914	0.000158
19 Years Later	0.00647***	0.00721***	-0.000736***
	0.00103	0.00108	0.000150
20 Years Later	0.00615***	0.00698***	-0.000826***
	0.00104	0.00111	0.000163
21+ Years Later	0.00533***	0.00603***	-0.000692***
	0.000846	0.000882	0.000157

(continued table)

Variable	Total Beds (1)	N-P / Pub. Beds (2)	For-Prof. Beds (3)
Other Variables:			
Population	-0.158**	-0.213***	0.0551***
	0.0678	0.0747	0.0141
Med Fam Income	1.59e-05**	1.19e-05*	4.06e-06***
	6.52e-06	6.61e-06	1.55e-06
Prop. Pop 65+	33.85***	34.05***	-0.195
	1.420	1.363	0.592
Prop. Pop <5	33.00***	32.43***	0.572
	3.578	3.546	0.553
MDs per 1,000	0.229***	0.217***	0.0121
	0.0315	0.0360	0.00995
Prop. Pop NonWh	4.077**	4.300**	-0.223
	1.834	1.843	0.327
Observations	83,002	83,002	83,002
R-squared	0.982	0.982	0.683

Robust standard errors in parentheses.
*** p<0.01, ** p<0.05, * p<0.1

Table S9: Effect of Hill-Burton Projects in Own vs. Adjacent Counties on Hospital Admissions, Unweighted

Dependent variable: five-year change from 1948 to 1953 in hospital admissions per 1,000 population.

Explanatory Variable	Nationwide (1)	Nationwide (2)	Tercile 1 (3)	Tercile 1 (4)	Tercile 2 (5)	Tercile 2 (6)	Tercile 3 (7)	Tercile 3 (8)
HB Funded	22.43***	22.52***	48.57***	48.45***	27.26***	27.77***	7.500***	7.510***
	(2.835)	(2.828)	(8.480)	(8.472)	(4.752)	(4.744)	(2.571)	(2.570)
Adj County HB Funded	1.383		-2.883		7.561		0.585	
	(2.843)		(6.385)		(4.883)		(3.102)	
$\Delta Population$	-7.270	-7.147	-21.14	-22.68	-108.8	-92.72	-3.991	-3.960
	(7.117)	(7.111)	(295.7)	(295.6)	(123.3)	(122.9)	(4.474)	(4.469)
$\Delta NonWhPopn$	0.000119	0.000115	-0.00214	-0.00201	-0.00430	-0.00509	0.000130	0.000129
	(0.000313)	(0.000313)	(0.0262)	(0.0262)	(0.00649)	(0.00648)	(0.000191)	(0.000191)
$\Delta Pop65+$	293.1*	288.1	476.9	481.6	270.4	237.8	108.0	106.0
	(176.1)	(175.8)	(385.9)	(385.6)	(346.2)	(345.8)	(204.3)	(203.9)
$\Delta Pop < 5$	-153.2	-157.3	494.3	502.5	-513.2	-596.2	-581.3**	-580.9**
	(218.5)	(218.3)	(475.1)	(474.5)	(434.1)	(431.1)	(232.3)	(232.2)
$\Delta MedFamIncome$	-0.000406	-0.000399	-0.000331	-0.000332	0.00177	0.00183	-0.00112	-0.00112
	(0.000556)	(0.000556)	(0.000990)	(0.000990)	(0.00119)	(0.00119)	(0.000804)	(0.000803)
$\Delta MDs/1,000$	35.90***	35.93***	53.33**	53.20**	6.761	6.911	31.69***	31.69***
	(9.093)	(9.091)	(26.62)	(26.61)	(21.93)	(21.94)	(6.968)	(6.965)
Rural (binary)	11.26**	11.29**	16.91	17.82	-36.20	-37.68	6.217*	6.267*
	(4.940)	(4.939)	(66.25)	(66.19)	(25.21)	(25.21)	(3.333)	(3.321)
Land Area	-0.000922	-0.000924	-0.000328	-0.000346	-0.00119	-0.00117	-0.00213**	-0.00212**
	(0.000908)	(0.000908)	(0.00188)	(0.00188)	(0.00166)	(0.00166)	(0.00106)	(0.00106)
Constant	0.985	1.956	-6.299	-9.045	30.34	37.22	17.29**	17.70**
	(6.935)	(6.640)	(67.34)	(67.03)	(26.60)	(26.24)	(7.416)	(7.091)
Observations	2,703	2,703	826	826	894	894	976	976
R-squared	0.038	0.038	0.052	0.051	0.055	0.053	0.081	0.081

*** p<0.01, ** p<0.05, * p<0.1

Table S10: Aggregate Effect of Hill-Burton Program on Hospital Capacity, Unweighted

Variable	**National** (1)	**Tercile 1** (2)	**Tercile 2** (3)	**Tercile 3** (4)	**T1+T2+T3** (5)
From regressions with funding amounts:					
Baseline Predicted Total Beds in 1948	375,896	13,480	32,791	368,695	427,711
Baseline Predicted Total Beds in 1975	859,173	34,866	81,094	728,231	858,532
Counterfactual Predicted Total Beds in 1975 (w/out Hill-Burton)	737,055	25,826	59,657	668,838	877,763
Observed quantities:					
Total Beds in 1948	435,220	16,218	35,247	383,754	435,219
Total Beds in 1975	871,019	40,264	85,249	744,766	870,279
N	2968	989	989	989	

Table S11: Long-Run Effects of Hill-Burton Funding on Hospital Capacity, Unweighted

Dependent variables: beds by ownership type per 1,000 population.

Explanatory Variable	Total Beds in 1975 (1)	Total Beds in 1990 (2)	N-P / Pub. in 1975 (3)	N-P / Pub. in 1990 (4)	For-Prof. in 1975 (5)	For-Prof. in 1990 (6)
H-B $ per capita	0.684***	0.602***	0.758***	0.603***	-0.0738***	-0.00152
	0.0319	0.0374	0.0314	0.0377	0.0109	0.0123
Population	-0.0488**	-0.0143	-0.0568***	-0.0271	0.00801	0.0127*
	0.0221	0.0228	0.0217	0.0230	0.00751	0.00749
Med. Fam. Inc.	1.03e-05	-1.86e-05***	8.16e-06	-1.86e-05***	2.17e-06	8.06e-09
	6.57e-06	7.15e-06	6.47e-06	7.21e-06	2.24e-06	2.35e-06
Prop. Pop. 65+	13.05***	18.64***	11.72***	17.63***	1.333**	1.013
	1.787	2.019	1.760	2.036	0.608	0.663
Prop. Pop. <5	8.924*	17.68**	9.013*	14.65*	-0.0889	3.039
	4.982	8.029	4.907	8.097	1.696	2.637
MDs per 1,000	1.529***	1.053***	1.435***	0.970***	0.0937***	0.0831***
	0.0729	0.0633	0.0718	0.0639	0.0248	0.0208
Prop. NonWhite	-0.175	-0.915	0.126	-0.669	-0.301*	-0.246
	0.483	0.582	0.476	0.587	0.164	0.191
State FEs	yes	yes	yes	yes	yes	yes
Observations	2,968	2,964	2,968	2,964	2,968	2,964
R-squared	0.343	0.299	0.365	0.300	0.099	0.105

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table S12: Distribution of Beds per 1,000 by County Income, Census Region, and Rural Status, Unweighted

All calculations are weighted by county population.

	Means in 1948	**Means in 1975**	**Change, 1948 to 1975**
Median Family Income			
Quintile 1	0.601	2.800	2.199
Quintile 2	1.265	3.706	2.441
Quintile 3	1.962	4.266	2.304
Quintile 4	2.478	4.321	1.843
Quintile 5	4.423	3.856	-0.567
Diff: High – Low Quintile	3.822	1.521	-
Census Region			
Midwest	2.799	4.240	1.441
Northeast	2.854	4.023	1.169
South	1.373	3.495	2.122
West	2.515	3.437	0.922
Diff: Northeast – South	1.481	0.528	-
Rural/Nonrural			
Nonrural	6.167	4.622	-1.545
Rural	1.754	3.709	1.955
Diff Nonrural-Rural	4.413	0.913	-

	StdDev in 1948	**StdDev in 1975**	**Change, 1948 to 1975**
Beds per 1,000	12.780	2.995	-9.785

Table S13: Effect on Hospital Beds and Admissions per 1,000, pre-Medicare, Unweighted

Time Relative to First Year of Funding	Admissions PC 1 (1)	Admissions PC (2)
Year of Funding	-0.185***	-0.920
	(0.0329)	(1.298)
1 Years Later	-0.148***	-2.779**
	(0.0391)	(1.303)
2 Years Later	0.113**	-3.417**
	(0.0488)	(1.455)
3 Years Later	0.386***	6.367***
	(0.0545)	(1.570)
4 Years Later	0.587***	17.04***
	(0.0623)	(1.712)
5 Years Later	0.631***	21.77***
	(0.0618)	(1.795)
6 Years Later	0.713***	26.17***
	(0.0671)	(2.057)
7 Years Later	0.715***	26.86***
	(0.0689)	(2.045)
8 Years Later	0.750***	30.63***
	(0.0744)	(2.268)
9 Years Later	0.743***	30.89***
	(0.0768)	(2.201)
10 Years Later	0.813***	33.42***
	(0.0863)	(2.960)
11 Years Later	0.821***	32.01***
	(0.0867)	(2.539)
12 Years Later	0.885***	34.94***
	(0.0899)	(2.641)
13 Years Later	0.951***	36.43***
	(0.0975)	(2.919)
14 Years Later	1.048***	38.90***
	(0.102)	(3.051)
15 Years Later	1.098***	42.87***
	(0.108)	(3.242)
16+ Years Later	1.210***	44.10***
	(0.119)	(3.818)
Population	-0.286**	-7.862**
	(0.123)	(3.266)
Med Fam Income	3.44e-06	0.000598**
	(9.27e-06)	(0.000262)
Prop. Pop 65+	37.84***	739.8***
	(3.741)	(72.27)
Prop. Pop <5	34.33***	507.5***
	(8.155)	(144.0)
MDs per 1,000	0.284**	5.558*
	(0.134)	(2.869)
Prop. Pop NonWh	1.232	316.4***
	(5.750)	(104.6)
Observations	50,366	50,366
R-squared	0.992	0.983

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table S14: Effect of Hill-Burton Program on Hospital Admissions per 1,000, Unwieghted

Time Relative to First Year of Funding	Total Admissions (1)	N-P / Pub. Admissions (2)	For-Prof. Admissions (3)
ear of Funding	-2.237*	1.213	-3.451***
	(1.294)	(1.251)	(0.631)
1 Years Later	-4.224***	0.531	-4.757***
	(1.271)	(1.172)	(0.752)
2 Years Later	-5.863***	0.889	-6.754***
	(1.423)	(1.311)	(0.827)
3 Years Later	3.884**	12.23***	-8.349***
	(1.535)	(1.492)	(0.852)
4 Years Later	13.74***	22.28***	-8.547***
	(1.578)	(1.562)	(0.897)
5 Years Later	19.18***	27.83***	-8.654***
	(1.626)	(1.638)	(0.924)
6 Years Later	23.96***	32.55***	-8.589***
	(1.774)	(1.764)	(0.969)
7 Years Later	24.05***	32.73***	-8.688***
	(1.939)	(1.950)	(0.999)
8 Years Later	27.77***	36.44***	-8.672***
	(2.065)	(2.062)	(1.040)
9 Years Later	28.43***	37.13***	-8.706***
	(2.127)	(2.137)	(1.078)
10 Years Later	30.65***	39.03***	-8.380***
	(2.404)	(2.323)	(1.134)
11 Years Later	32.70***	41.27***	-8.573***
	(2.114)	(2.081)	(1.151)
12 Years Later	34.99***	43.03***	-8.048***
	(2.218)	(2.170)	(1.208)
13 Years Later	36.31***	44.47***	-8.158***
	(2.330)	(2.279)	(1.242)
14 Years Later	38.01***	46.15***	-8.142***
	(2.389)	(2.315)	(1.283)
15 Years Later	40.44***	48.38***	-7.938***
	(2.476)	(2.385)	(1.332)
16 Years Later	40.54***	48.17***	-7.638***
	(2.743)	(2.647)	(1.384)
17 Years Later	40.50***	48.45***	-7.960***
	(2.682)	(2.553)	(1.446)
18 Years Later	41.87***	49.80***	-7.928***
	(2.688)	(2.555)	(1.506)
19 Years Later	41.36***	49.00***	-7.642***
	(2.825)	(2.682)	(1.568)
20 Years Later	43.18***	50.94***	-7.760***
	(3.136)	(3.000)	(1.630)
21+ Years Later	44.45***	51.58***	-7.140***
	(3.106)	(2.911)	(1.791)
Population	-5.715***	-7.538***	1.823***
	(1.917)	(2.109)	(0.417)
Med Fam Income	0.000744***	0.000586***	0.000157***
	(0.000177)	(0.000177)	(5.24e-05)
Prop. Pop 65+	744.2***	773.2***	-28.74
	(35.85)	(33.75)	(18.07)
Prop. Pop <5	808.2***	793.0***	14.94
	(70.28)	(70.58)	(19.61)
MDs per 1,000	10.20***	10.16***	0.0397
	(1.720)	(1.598)	(0.251)
Prop. Pop NonWh	159.1***	152.3***	6.859
	(41.29)	(41.50)	(8.070)
Observations	83,002	83,002	83,002
R-squared	0.969	0.971	0.637

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table S15: Effect on Hospital Admissions per 1,000 by Population Tercile, Unweighted

Time Relative to First Year of Funding	Tercile 1 (1)	Tercile 2 (2)	Tercile 3 (3)
Year of Funding	-7.113**	-7.980***	0.772
	(3.272)	(1.714)	(1.921)
1 Years Later	-11.99***	-8.819***	-1.361
	(2.996)	(2.042)	(2.102)
2 Years Later	-9.872***	-13.16***	-1.004
	(3.501)	(2.344)	(2.569)
3 Years Later	9.512**	-0.344	-1.634
	(4.089)	(2.326)	(2.718)
4 Years Later	23.98***	9.912***	1.251
	(3.850)	(2.467)	(3.032)
5 Years Later	29.10***	17.30***	2.831
	(3.948)	(2.546)	(3.331)
6 Years Later	35.80***	23.69***	4.823
	(4.425)	(2.736)	(3.646)
7 Years Later	33.90***	25.76***	4.870
	(4.404)	(2.804)	(4.027)
8 Years Later	38.72***	29.39***	5.288
	(4.741)	(3.091)	(4.307)
9 Years Later	40.01***	28.73***	6.034
	(4.761)	(3.111)	(4.625)
10 Years Later	44.64***	30.91***	4.798
	(6.576)	(3.331)	(4.897)
11 Years Later	43.40***	32.03***	6.198
	(4.859)	(3.388)	(5.173)
12 Years Later	48.88***	33.77***	6.361
	(5.092)	(3.589)	(5.488)
13 Years Later	50.58***	36.47***	5.629
	(5.277)	(3.724)	(5.839)
14 Years Later	53.09***	37.99***	5.569
	(5.509)	(3.902)	(6.182)
15 Years Later	57.49***	40.26***	6.592
	(5.418)	(4.098)	(6.551)
16 Years Later	51.80***	39.21***	6.904
	(5.538)	(4.210)	(6.902)
17 Years Later	53.92***	39.90***	6.804
	(5.821)	(4.377)	(7.279)
18 Years Later	57.06***	39.81***	6.166
	(5.632)	(4.518)	(7.680)
19 Years Later	52.94***	40.35***	4.427
	(6.523)	(4.731)	(8.000)
20 Years Later	53.81***	47.64***	3.300
	(6.152)	(6.389)	(8.387)
21+ Years Later	50.24***	45.15***	2.982
	(6.703)	(5.261)	(9.418)
Population	-3.981	-63.67***	0.952***
	(18.07)	(14.08)	(0.267)
Med Fam Income	0.000946***	0.00110***	-0.000664***
	(0.000238)	(0.000297)	(0.000239)
Prop. Pop 65+	618.0***	193.2***	276.3***
	(65.74)	(71.36)	(82.88)
Prop. Pop <5	702.4***	35.99	-185.4*
	(114.8)	(119.0)	(103.9)
MDs per 1,000	6.841***	31.83***	8.371***
	(2.072)	(4.304)	(2.817)
Prop. Pop NonWh	285.0***	2.803	-102.1**
	(70.74)	(36.30)	(39.60)
Observations	27,611	27,684	27,681
R-squared	0.986	0.666	0.864

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table S16: Effect of Amount of Funding on Hospital Beds per 1,000 by Population Tercile, Unweighted

Variable	Tercile 1 (1)	Tercile 2 (2)	Tercile 3 (3)
Treatment Indicators:			
Year of Funding	-0.263**	-0.158**	-0.112***
	0.111	0.0697	0.0228
1 Years Later	-0.0865	-0.131*	-0.0858***
	0.125	0.0779	0.0207
2 Years Later	0.179	0.168*	-0.00549
	0.151	0.0901	0.0229
3 Years Later	0.364**	0.379***	0.0661***
	0.153	0.0862	0.0224
4 Years Later	0.384**	0.389***	0.0655***
	0.156	0.0976	0.0235
5 Years Later	0.401**	0.393***	0.0412*
	0.159	0.0778	0.0228
6 Years Later	0.502***	0.344***	0.0395
	0.176	0.0814	0.0262
7 Years Later	0.348**	0.381***	0.0607*
	0.160	0.0808	0.0353
8 Years Later	0.433***	0.426***	0.0557
	0.161	0.0828	0.0354
9 Years Later	0.621***	0.453***	0.0565
	0.163	0.0889	0.0368
10 Years Later	0.600***	0.464***	0.0171
	0.172	0.0819	0.0332
11 Years Later	0.585***	0.472***	-0.00978
	0.159	0.0891	0.0314
12 Years Later	0.744***	0.428***	-0.00724
	0.177	0.0898	0.0318
13 Years Later	0.871***	0.410***	-0.0122
	0.193	0.0948	0.0316
14 Years Later	0.944***	0.508***	0.00674
	0.207	0.0881	0.0317
15 Years Later	0.997***	0.507***	0.0289
	0.210	0.0978	0.0326
16 Years Later	1.098***	0.528***	0.0220
	0.220	0.0905	0.0371
17 Years Later	0.956***	0.497***	0.0270
	0.230	0.101	0.0425
18 Years Later	1.035***	0.460***	-0.0216
	0.222	0.128	0.0454
19 Years Later	0.935***	0.517***	-0.0637
	0.260	0.132	0.0522
20 Years Later	1.038***	0.582***	-0.0848**
	0.257	0.139	0.0391
21+ Years Later	1.034***	0.566***	-0.130
	0.288	0.126	0.0905

(continued table)

Variable	Tercile 1 (1)	Tercile 2 (2)	Tercile 3 (3)
Funding Amounts:			
Year of Funding	-0.000874*	-0.000659	-0.000749*
	0.000446	0.000435	0.000428
1 Years Later	-0.00105**	-0.000942*	-0.00108**
	0.000501	0.000494	0.000469
2 Years Later	-0.000620	-0.00129**	-0.000699
	0.000644	0.000597	0.000530
3 Years Later	0.000166	-0.000606	0.000234
	0.000684	0.000577	0.000559
4 Years Later	0.000956	0.000484	0.00158**
	0.000651	0.000655	0.000646
5 Years Later	0.00137**	0.00102*	0.00223***
	0.000695	0.000578	0.000604
6 Years Later	0.00144*	0.00162***	0.00239***
	0.000762	0.000596	0.000643
7 Years Later	0.00228***	0.00169***	0.00171*
	0.000680	0.000584	0.000878
8 Years Later	0.00229***	0.00169***	0.00169*
	0.000754	0.000643	0.000962
9 Years Later	0.00185***	0.00172**	0.00160
	0.000703	0.000689	0.00106
10 Years Later	0.00253***	0.00171***	0.00262***
	0.000688	0.000554	0.000976
11 Years Later	0.00271***	0.00202***	0.00366***
	0.000694	0.000654	0.000730
12 Years Later	0.00293***	0.00220***	0.00372***
	0.000872	0.000664	0.000751
13 Years Later	0.00290***	0.00254***	0.00354***
	0.000927	0.000778	0.000748
14 Years Later	0.00307***	0.00211***	0.00367***
	0.000898	0.000694	0.000776
15 Years Later	0.00285***	0.00243***	0.00373***
	0.00101	0.000858	0.000753
16 Years Later	0.00281**	0.00210***	0.00428***
	0.00122	0.000731	0.000841
17 Years Later	0.00380***	0.00223***	0.00430***
	0.00126	0.000841	0.000881
18 Years Later	0.00378***	0.00271**	0.00441***
	0.00131	0.00116	0.000795
19 Years Later	0.00476***	0.00271**	0.00497***
	0.00165	0.00121	0.000852
20 Years Later	0.00386**	0.00258**	0.00420***
	0.00164	0.00126	0.000954
21+ Years Later	0.00323**	0.00241***	0.00417***
	0.00155	0.000901	0.000924

(continued table)

Variable	Tercile 1 (1)	Tercile 2 (2)	Tercile 3 (3)
Other Variables:			
Population -0.983***	-3.410***	-0.0637	
	0.345	0.584	0.0439
Med Fam Income	1.74e-05*	4.35e-05***	-2.68e-05***
	9.29e-06	9.32e-06	9.68e-06
Prop. Pop 65+	31.73***	16.59***	17.73***
	2.597	2.177	3.775
Prop. Pop <5	34.30***	3.747	1.095
	6.460	3.799	3.492
MDs per 1,000 0.221**	0.496***	0.288	
	0.0883	0.137	0.185
Prop. Pop NonWh	4.413	-0.118	-1.421
	3.887	0.956	1.169
Observations	27,611	27,684	27,681
R-squared	0.992	0.733	0.844

Robust standard errors in parentheses.
*** $p<0.01$, ** $p<0.05$, * $p<0.1$