Subsidies and Structure: The Lasting Impact of the Hill-Burton Program on the Hospital Industry*

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PRELIMINARY AND INCOMPLETE

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Abstract

We study the effect of public subsidies from the Hospital Survey and Construction Act of 1946, known as the Hill-Burton program, on the capacity and organization of the hospital industry, and the extent to which these subsidies crowded out for-profit hospitals. Using panel data at the county level we estimate the program's impact on the number of hospital beds per capita, both in total and by ownership type. We find the program generated substantial increases in capacity that were highly persistent, with growth continuing for over 15 years. However there was substantial crowd-out of capacity at for-profit hospitals which offset 30 percent of the growth in beds at non-profit and public hospitals in the early years after counties received funding. We also estimate effects on the number of hospitals by ownership type, on utilization in terms of admissions per capita, and on expenditures in the Medicare program. Instrumental variables estimates of the effect on the number of beds support our main results.

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1 Introduction

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, substantial literatures have developed evaluating crowd-out in specific contexts such as health insurance, charitable giving, and education. Governments at all levels expend considerable resources 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.

In this paper we examine the impact of a large federal investment in the hospital industry, the Hill-Burton program, and measure the extent of crowd-out that resulted from this investment. The hospital industry accounts for 5.4% of the U.S. economy[1] and has substantial public sector involvement, ranging from the Medicare and Medicaid programs, which pay for care, state and federal regulations on what hospitals must do, to the approximately 1,000 hospitals nationwide that are owned and operated by state and local governments. The federal government currently provides direct subsidies for medical education at teaching hospitals and for construction at rural hospitals, among many other programs, as well as a tax benefit to all non-profit hospitals.

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). 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, $33.1 billion in funds were distributed for the construction and modernization of health care institutions (Clark 1980).[2]

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. Furthermore, little is known about the long-term consequences for supply and utilization. We estimate the effects of the Hill-Burton program on supply and organization in hospital industry, and

[1] This makes it roughly twice the size of automobile manufacturing, agriculture, or mining, and larger than all manufacturing sectors except food and beverage and tobacco products, which is approximately the same size.

[2] Inflation-adjusted to 2010 dollars.

the extent to which this large federal investment in non-profit and public hospitals may have displaced private, for-profit hospitals. To our knowledge, we are the first to use historical data from the American Hospital Association to document changes in the general short-term acute care 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 the numbers of hospitals and their capacity, which then led to increases in the utilization of hospital services. However the increases in capacity at non-profit and public hospitals were partially offset by reductions in capacity at for-profit hospitals. The amount of crowd-out, measured as the proportion of the increase in non-profit and public beds that was offset by a reduction in for-profit beds, fell over time from 30 percent five years after a county was first funded to 15 percent 21 years or more after the first funding.

These results contrast with a body of research finding substantial crowd-out in the case of public health insurance programs like Medicaid and Medicare. Cutler and Gruber (1996) and Gruber and Simon (2008) find that about one half of the coverage increases in Medicaid in the 1980s and 1990s were offset by reductions in private coverage. Lichtenberg (2002) estimates that increases in Medicare expenditures from the 1960s to 1990s were associated with reductions in private health insurance expenditures which offset 43% of the growth in public expenditures. Finkelstein and McKnight (2008) show that when Medicare was introduced, private health insurance spending decreased on average by $510 among 65-74 year-olds relative to 55-64 year-olds, while public spending increased by $766.

There is a smaller, but growing, literature examining how public subsidies, either in the forms of grants or tax benefits, crowd-out private organizations. Freeborn et al. (2011) use a structural entry model to investigate whether public funds to outpatient substance abuse treatment clinics crowd-out private clinics. They estimate 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 local community colleges results in two fewer proprietary schools in that county. Harrison and Seim (2012) 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. However, 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.[3] 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.[4]

We provide detailed background information on how the Hill-Burton program was operationalized in Section 2. Section 3.1 contains information on the data and explains our identification strategy, which draws on certain institutional details provided in Section 2. We review our methods in Section 3.2. 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 treatment (Section 4.3) and an instrumental variables approach (Section 4.5), which verify our main results. Section 5 addresses the impact of the program on health care utilization. We conclude in Section 6.

2 The Hill-Burton Program

At the time of its inception, the Hill-Burton 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. When initially enacted, the Hill-Burton program provided for $75 million ($672 million in 2010 dollars[5]) in funds annually to be distributed among states over 4 years. This amount was raised to $150 million ($1.4 billion in 2010 dollars) annually in 1949. Figure 1 depicts the distribution of beds per capita in 1948, at the start of the program. 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 (about 22%) had no hospital. Figure 1 illustrates patterns in the distribution of beds at the start of the Hill-Burton program. The majority of southern counties and counties in the middle of the country had no or very little supply of beds.

The central federal authority of the program was the Federal Hospital Council at the US Department of Health, Education and Welfare. Hill-Burton grants were allocated in two steps: First, an allotment formula was used to determine how funds would be dispersed among the states. In order for any state to receive its share of the funds, it had to submit

[3] In our county-level data, there are some counties that received no funding over the 25 years that the program existed.

[4] 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, aggregate conclusions about the program at the national level cannot be drawn from their paper.

[5] The average construction cost of hospitals built with Hill-Burton funds in 1947 was $544,800, or $5.3 million in 2010 dollars.

a State Plan to the Surgeon General of the 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 specific projects as detailed in their State Plan.

Table 1 shows the specific formula used to distribute the funds, using the example of 3 hypothetical states with high, average and low per capita income. One can see from Table 1 that the allotment formula was determined by the state's population and per capita income.[6] The formula 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. Throughout the life of the program, the federal government spent over $3.7 billion ($21 billion in 2010 dollars), which spurred about $12.8 billion ($71 billion in 2010 dollars) in the construction, addition, replacement and remodeling of health care facilities.

Continuing with Georgia as an example to illustrate the process, in 1947 it submitted its State Plan which was approved by the Surgeon General on November 18, 1947. An excerpt of a summary of 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 calculated by taking an inventory of all hospitals in the state, determining which beds were "acceptable" based on fire and health standards, and then comparing those beds with the target number of beds of 4.5 beds per capita. We highlight Greensboro, which was given a priority of "A," meaning that it was highest on Georgia's priority list. All State Plans included this sort of prioritization, as well as various other logistical issues 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 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.

[6]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).

While it is hard to tell how often counties went "out of order" across the US, in Georgia at least, of the 8 counties ranked the highest priority, 5 of those counties were the first to receive funding in 1948. The other 3 received funding in 1949. In Greensboro, Georgia (located in Greene County, GA), Greene County submitted a construction application to build Minnie G. Boswell Memorial Hospital. These applications had to assure the following: 1) description of the project site 2) plans and specifications of such sites 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 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. Final control of the program was placed with the Federal Hospital Council. Table 2 provides summary statistics of the allocation of Hill-Burton funds over the years.

The maps in Figures 5 and 6 provide additional detail regarding the distribution of funds to states. Figure 5 shows how Hill-Burton funds were allocated across states in 1948 (normalized by state population). In the early years of the program, 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 funding over the length of the program, from 1947-1971. Again, we see that the majority of funding went to the southern states. More information on our data on Hill-Burton funding is provided in the following section.

3 Data and Methods

3.1 Data

We use three main data sources in this paper, the AHA Survey of Hospitals, Hill-Burton Project Register Data, and the Area Resource File. The relevant summary statistics are presented in Tables 2 and 3 and Figures 5 and 6. The details are discussed below.

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*. While the AHA survey data have been used by many to study the hospital industry, few have used these older data to study the hospital sector in its more formative years. We provide a brief discussion of the accuracy and completeness these AHA data in the Appendix and refer the reader to Finkelstein's (2007) Appendix for additional details.

The data set is missing data for 1954. We interpolate the values for 1954 beds by taking a simple average of beds in 1953 and 1955. The unit of observation is a hospital-year, and we have the following variables: hospital name, state, city, county, total beds, admissions, days, payroll expenditures, total expenditures and FTE (total expenditures and FTE are only available from 1951 onward). We can 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 kept only short-term general hospitals (excluded long-term stay hospitals, children hospitals, maternity hospitals, etc.). Short-term general hospitals are of interest in this paper because these are the facilities that are open to the general public and that treat acute care cases. We collapse 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 provide a more detailed discussion of why we choose to use the county as the unit of analysis in our empirical framework.

Hill-Burton Project Register Data

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. 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 nonprofit), 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 beds planned, and date of approval. We restrict the analysis to Hill-Burton funds spent toward expanding general short-term, acute care hospitals to match the restrictions placed on the AHA data. As noted above, we focus on short-term general acute care beds, and not long-term care or nursing home construction, since these are the types of facilities that the general public can use.

There were a total of 10,490 projects funded by the Hill-Burton program (excluding U.S. territories) at a total federal cost of $3.59 billion. When we limit the projects to short-term general hospitals, there are 5,567 total projects with $2.52 billion spent on those projects. Furthermore, we collapse these data to the county level to determine the funding levels by county. There is quite a bit of variation in the year-to-year changes in funding during the program. Yearly summary statistics of the funding data are provided in Table 2. Figures 5 and 6 provide additional summary information regarding the distribution of funding across the U.S. in 1948 only and from 1947-1971.

Area Resource File

The Area Resource File (ARF) data compiles county-level characteristics from a variety sources, such as the U.S. Census Bureau, American Medical Association, and the Bureau of Labor Statistics. While there are hundreds of variables available in the ARF, very few of these are available from 1940s. We can obtain population census information, data on median family income, and the racial composition of counties. Summary statistics of the ARF and AHA data are in Table 3.

3.2 Overview of Methodology

Our goal is to to be able to make causal inferences about the effect of Hill-Burton funding on hospital capacity. We define 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).[7] While it is possible to 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 within-state variations in capacity. Further, a state level analysis will have no "untreated" units, because all states received at least some funding by 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 get any funding. We also estimate the impact of the amount of Hill-Burton funding received. Finally, because we observe ownership type and for-profit hospitals were ineligible for program funds, we are able to assess any unintended crowd-out effects of declining for-profit capacity in counties that received funding. This speaks to the larger question of how the market structure of the hospital industry was shaped by this policy.

We define a county as being exposed to the Hill-Burton program starting in the first year

[7]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 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.

any funding went to a project in the county. Accordingly we create a dummy indicator $Treat_{it}$ that equals 1 in the year that county i received its first Hill-Burton funding. Throughout the period 1948 through 1971, counties were first "treated" in this way at different points in time. In order to take into account the staggered nature of access to 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, say $Treat_{i,t-m}$, to trace out the effect of receiving first funding m years ago, where m spans from 0 to 20 years.[8]

The effect of the Hill-Burton program on hospital capacity should be captured by the treatment variable and this series of 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 and which affect capacity. We also include year fixed effects to capture any secular national trends that may affect the number of beds on average. Last, since non-profit and public hospitals were eligible for Hill-Burton funding, but for-profits were not, we estimate regressions for the total effect and separately for beds in non-profit or public hospitals and beds in for-profit hospitals. The regression equations are as follows:

$$\text{Total Beds per capita}_{it} = \theta_o + \sum_{m=0}^{m=20} \beta_m Treat_{i,t-m} + X'_{it}\delta + c_i + \lambda_t + \varepsilon_{it} \quad (1)$$

$$\text{Non-Profit/Public Beds per capita}_{it} = \theta_o + \sum_{m=0}^{m=20} \beta_m Treat_{i,t-m} + X'_{it}\delta + c_i + \lambda_t + \varepsilon_{it} \quad (2)$$

$$\text{For-Profit Beds per capita}_{it} = \theta_o + \sum_{m=0}^{m=20} \beta_m Treat_{i,t-m} + X'_{it}\delta + c_i + \lambda_t + \varepsilon_{it} \quad (3)$$

where the $Treat_{i,t-m}$ are the dummy variables indicating if the county first received Hill-Burton funding m years ago, the X_{it} are observable county socioeconomic variables, the c_i are time-invariant county indicators, the λ_t are location-invariant year indicators, and the ϵ_{it} are random error terms.

The coefficients β_m indicate the effect 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. The X_{it} are controls for county characteristics that likely affect the demand for beds, including population, median family income, and percent of population

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

that is non-white. We also include the population over the age of 65 and the population less than 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 medical doctors in a county in X_{it}.

The inclusion of year and county fixed effects in our model means that the β_m's are identified using within county variation. Thus our model controls for any fixed differences across counties that are correlated both with our explanatory variables and capacity.[9] 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 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, the next subsection provides a discussion of why we believe we can proceed under the assumption that ε_{it} does not contain any of these omitted factors. This argument draws on the institutional details of the program.

In Section 4.5 we provide an instrumental variables analysis that supports our main results. In addition, our model specification easily allows us to perform a falsification exercise by including leads of the $Treat_{it}$ variable. If the above variation in the supply of beds during the Hill-Burton program is valid, we would expect no trend in the supply of beds prior to the year in which counties received Hill-Burton funds. Those results will be presented in Section 4.3.

3.3 Exogeneity of Hill-Burton Funding

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

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

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 over-estimate 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 under-estimate 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."

Thus, 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. We know that states had allocation rules, and they applied them uniformly to counties across the state in order to assign priority to a county. Thus, we have little reason to believe that this sort of selection is a big issue in the evaluation of this program.

4 Empirical Results

4.1 Initial Descriptive Results

As an initial look at the data, we aggregate the data to the state level and group the top 10 and bottom 10 states in terms of funding per capita. We graph the trends in average public, non-profit and for-profit beds per capita in those states from 1948-1965 in Figure 7. The first column of graphs are for the top 10 funded states and the second column of graphs are the trends in the bottom 10 states. We see that the trend in those states that received the most funding per capita saw an increase in non-profit and public beds, with an annual growth of 0.032 and 0.033 beds per capita, respectively. Meanwhile those same states also saw a decrease in for-profit capacity, with an annual loss of 0.002 beds per capita. Those states that received the lowest per capita funding had a decline in public beds and a smaller growth in non-profit beds with a loss of 0.016 public beds yearly and a 0.025 growth in non-profit capacity. Those states also saw an increase in for-profit capacity, with a growth rate of 0.0045. These aggregated state level graphs show some general patterns which we explore further with a more explicit econometric specification using our county-level data.

In order to further examine patterns in the data we run the following regression:

$$Y_{it} = \theta_0 + \sum_{m=0}^{m=20} \beta_m Treat_{i,t-m} + \epsilon_{it}$$

where Y_{it} is a measure of capacity for county i in calendar year t, θ_o is an overall intercept term and ϵ_{it} is an idiosyncratic error term. Running OLS on the above model measures the correlation between capacity, which we measure here as the number of hospital beds per 1,000 population, and receiving Hill-Burton funding (up to 20 years after initial funding). The coefficients, reported in Table 4, depict the changes over time in funded counties compared to unfunded counties relative to the year in which funding occurred.

The descriptive results show some distinctive patterns in the data of an increase in non-profit and public beds and a decrease in the number of for-profit beds in funded counties compared to those that did not receive Hill-Burton funds. The coefficients themselves are negative, which indicate that counties that got funded had fewer beds per capita, on average.

This makes sense given the stated goals of the program. However, we observe that the number of non-profit and public beds gets less negative, while the number of for-profit beds becomes more negative. This indicates that the program funding is associated with a gain in non-profit, but a decrease in for-profit beds. Of course, we want to control for any differences across counties that would affect their ability to produce beds. Specifically, we need to account for any exogenous shifts driven by demand level factors that would affect capacity. The most salient of these is the population level of counties since counties with more people would likely have more beds, and also some measure of the socioeconomic status of residents in the county. Poorer counties may have less beds since they lack the capital to pay for such beds. Alternatively, those counties may have more beds since more sicker people would drive the demand for more beds. Regardless of which is true, we want to control for those factors since we believe it may impact capacity in a given county. Another important factor we need to account for is any secular trends over time at the national level. We now move to the estimates of causal effects.

4.2 Effect of Receiving Any Hill-Burton Funding on Capacity

Table 5 reports the coefficients β_m for our three separate model specifications in equations (1), (2), and (3). The standard errors allow for clustering at the county level.[10] Overall, there is a large and statistically significant increase in the supply of total beds and non-profit or public beds in response to a county receiving Hill-Burton funds. Initially, the effect is negative, perhaps reflecting some selection effects in the counties receiving funding. After 3-4 years (the typical length of time to complete a hospital construction project), the effect of receiving funding is positive, and increases over the following 20 years post-funding. The estimated effects are substantial. For example, for an average size county receiving funding (population 65,500), the estimated impact 3-4 years after receiving funding is an addition of nearly 28 beds (for the entire county). That increases to over 45 beds added after 5 years, and nearly 96 beds added due to the Hill-Burton program after 21 or more years. Thus, we see that the program had long lasting impacts on capacity in those counties which received funding.

The effects on non-profit and public beds, listed in the second column of Table 5, are much larger than the increases in total beds. Counties receiving Hill-Burton funds increased non-profit and public bed capacity on average by 45 beds 3-4 years after receiving funding, nearly 64 beds 5-6 years after the initial funding and over 112 beds 21 years or more after the first Hill-Burton funding. The last column of Table 5 shows our estimates for for-profit capacity. These results indicate crowd-out effects on for-profit beds. Counties that received Hill-Burton funding had decreases on average of approximately 17.5 beds 3-4 years after funding, 18 beds 5 years later, and 16.4 beds 21 or more years later, relative to counties not receiving funding. While the effect of the program increases for quite some time for

[10] Due to space limitations, we suppress the coefficients on our control variables in X_{it}

non-profit and public beds, the effect on for-profit beds seems to level off 3-4 years after a county received funding. Accordingly the percentage of crowd-out is greatest in the years immediately following the initial funding, and then falls over time. At 3-4 years after the initial funding, the crowd-out is almost 40 percent ($-0.267/0.688$). By 5-6 years it falls to 30 percent ($-0.278/0.973$), and 21 or more years after the initial funding it is down to 15 percent ($-0.251/1.715$).

Thus, these results imply that overall the Hill-Burton program had a net positive effect on U.S. hospital capacity. Funding led to substantial 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. While for-profit hospitals were a smaller portion of the hospital industry to begin with, 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 from the smaller for-profit hospitals, thereby reducing demand for for-profit hospitals, which ultimately caused them to decrease their presence in these markets.

4.3 Model with Leads and Lags

Our specification of the treatment indicator allows us to include both lags and leads of the treatment to test for any pre-trends in capacity prior to receiving funding. Because the nature of the Hill-Burton program allowed for counties to put together construction applications even in advance of applying for funding, we need to build in an adjustment lag. We use a 6 year adjustment time 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.

We augment the regression model by including 9 year leads of the treatment variable. As a robustness check we should see effect 7, 8 and 9 years prior to a county receiving funding. We cannot include 9 year leads for counties that received funding in 1950, for example, since our earliest year in our data set is 1948. Because of this, we restrict our sample to counties that received funding after 1957. We include up to 17 year lags instead of 20+ year lags since we cannot use a 20 year lag for counties receiving funding in 1958.

The coefficients from of these regression models and their point-wise confidence bands (dotted lines) are reported in Figure 8, and the coefficients are reported in Table 6. 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 prior to the year a county was funded. To test for a pre-trend, we test if the slope between 7 and 9 years before funding are significantly different from zero. We get an F-statistic of 0.20, with a p-value of 0.6557. Thus, we find no evidence of a trend prior to treatment. Furthermore, the effect of the program does not begin to "pick up" until roughly 2 years after a county receives funding. The slope between 1 to 2 years after funding is significantly different from zero with a p-value < 0.0001. Again, this seems logical given the number of resources required to build facilities and beds. This suggests that those counties that did receive funding were neither more or less likely to grow in the absence of funding. This should alleviate some of the concern that the treatment coefficients are picking up growth/decline that would have occurred without the program.

The middle panel plots the percent change in for-profit beds as a result of a county receiving Hill-Burton funds.The slope between years 7 and 9 is not statistically different from zero (F-stat=0.73, p-value=0.3933). There is a negative trend that is relatively stable, and then a sharp decline roughly 2 years prior to a county receiving funding. 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 got any funding. We believe that these for-profit entities were anticipating funding since funding information was publicly available at the start of the program. This is in line with research done by Hansmann et al. (2003) and Chakravarty et al. (2006) that shows evidence that for-profit hospitals exit (and enter) more quickly. This might suggest that we may actually be overstating the magnitude of for-profit crowd-out.

Last, the bottom graph depicts total beds as the dependent variable. The pre-trend of 7, 8 and 9 years prior to funding are not statistically different from zero. We test the slope between 7 and 9 years prior and find that the slope of the trend is not statistically different from zero, with an F-stat of 0.30 (p-value=0.5859). We observe a slight downward trend in beds beginning 1-2 years prior to treatment and the coefficients on these are significant. Again, we can see that this is being driven by for-profit beds. The growth in total beds was not as large as that of non-profit and public beds, as it was offset by crowd-out of for-profit beds in those counties.

The coefficients are presented in Table 6. The results indicate a net gain of 1.04 additional beds per 1,000 in counties that received Hill-Burton funds compared to those that did not, 10 years after the initial funding. At that point there was an increase of 1.46 non-profit or public beds per 1,000 that was partially offset by a decrease of 0.42 for-profit beds per 1,000, which equates to a 29 percent crowd-out of the increase.

4.4 Effect of Hill-Burton Funding Dollars

We also estimate models using the funding amounts that were approved for each county in *each year*, rather than the indicator for initial funding only. This takes a closer look at how Hill-Burton funding translated into additional capacity over time, using the detailed information on when particular amounts were approved for specific projects in each county. In addition these estimates of the capacity gained for each dollar of funding allow us to estimate the average program cost of adding a bed.

Since, by design, counties with more people received more funding, we normalize the funding amounts by county population. Thus our variable of interest is the dollar amount per capita of Hill-Burton funding that was approved for projects in county i in year t, denoted $FundPC_{it}$. These amounts are inflation adjusted to 1948. We use this in regressions that are similar to our baseline specification, as follows:

$$\text{Total Beds per capita}_{it} = \theta_o + \sum_m \alpha_m FundPC_{i,t-m} + X'_{it}\delta + c_i + \lambda_t + \epsilon_{it} \quad (4)$$

$$\text{Non-Profit/Public Beds per capita}_{it} = \theta_o + \sum_m \alpha_m FundPC_{i,t-m} + X'_{it}\delta + c_i + \lambda_t + \epsilon_{it} \quad (5)$$

$$\text{For-Profit Beds per capita}_{it} = \theta_o + \sum_m \alpha_m FundPC_{i,t-m} + X'_{it}\delta + c_i + \lambda_t + \epsilon_{it} \quad (6)$$

We can interpret the funding coefficients ($\alpha_m, m = 0, \ldots, 20$) as 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. Similar to the baseline specification, the lags shows how the impact of approved funding developed over time.

The estimates for equations (4), (5) and (6) are reported in Table 7. The net effect 5 years after funding was approved is 0.0489, which means an increase of roughly 0.05 total beds per 1,000 population for every \$1 per person of Hill-Burton funding. For an average population size county (65,500) receiving funding, this is about 3.25 beds added to the county for an additional dollar per capita in Hill-Burton funding. Again, the capacity increases persist over time. For example, 15 years after a county received funding, every \$1 per capita of Hill-Burton funding resulted in a net increase of 0.11 beds per 1,000 population. Thus for every additional \$9.10 per person (= \$1/0.11) of Hill-Burton funding, there would be an increase of 1 bed per 1,000. Multiplying out the per capita units on both sides, this indicates that about \$9,100 in Hill-Burton funds were spent per bed built over the course of the program.

The coefficients in column (2) show the effect on non-profit and public beds. Similar to total beds, these estimates suggest a lag of 3 years until capacity increases were seen. Five years after funding was approved, for every \$1 per capita counties saw a 0.0539 increase, on average, in non-profit and public beds per 1,000 population. By 15 years out, counties saw almost 0.101 additional non-profit and public beds per 1,000 population for each additional dollar of funding per capita. Following similar calculations as previously, these estimates suggest that there were \$9,900 in Hill-Burton funds per non-profit or public bed built.

Data from the Hill-Burton Project Register indicate that the average total cost of construction per bed during this time period was approximately $27,000 (not adjusted for inflation). The Hill-Burton federal share of this was $7,500 per bed. However the project register data only provide information on "planned" beds for non-profit and public hospitals, rather than the actual number of beds built, and they do not include for-profit hospitals. We can attribute the difference in our estimated $9,900 per bed compared to the $7,500 per bed calculated from the raw data to a few factors: (1) it is possible that the number of planned beds differed from the true number of beds built due to changes that could occur during the course of construction; (2) our estimates take into account the average effect of funding dollars on capacity compared to the counterfactual outcome observed in untreated counties, rather than simply taking total dollars spent divided by total beds planned; (3) our estimates also control for county-level socioeconomic characteristics as well as county and year fixed effects that the raw ratios will not account for.

Last, the estimates in column (3) show small initial decreases in for-profit capacity. Five years after funding was approved for a particular project, an additional $1 per capita from the Hill-Burton program is associated with a 0.005 decrease in for-profit beds per 1,000 population. Unlike the total and non-profit/public bed capacity, however, the decreased capacity for for-profit hospitals does not persist over time, but rather, is no longer statistically significant by 6 years post funding. Thus it appears that crowd-out was mainly associated with the presence of any Hill-Burton funding in a county, as captured by the initial treatment indicators, rather than with greater or lesser funding amounts over time.

Overall, our empirical results using the funding amounts are consistent with the results using a binary indicator for whether or not a county received funding. We find that counties that received more funding per capita saw larger increases in non-profit and public bed capacity. Again, overall there is a positive effect on total bed capacity, with some crowding out of for-profit beds.

4.5 Instrumental Variables Approach

As discussed previously, the main model specification 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 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. We do not use longer differences (e.g., 10 years) because doing so would allow for more counties to be "treated" during the time over which we take the difference. For example, for counties first funded in 1948, one would take the 10-year difference in beds from 1948-1958. 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 these counties received funding in 1953, for example, and would thus also experience growth in beds from 1953 to 1958 due to the program. 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, and 1950, and we take differences with the number of beds in these counties in 1953, 1954, and 1955, respectively. The controls are all counties not funded in 1948-50, and for them we take differences in the number of beds from 1948 to 1953. Thus our estimate of the growth in beds in the control counties will 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 potential contamination bias from counties first funded in 1951 and 1952 is limited because it would require the new beds to appear within a one or two-year time span.

We use each county's initial priority ranking in the State Plans as the instrument. Counties received priority rankings of 1 through 8, with lower numbers indicating a higher priority for funding. 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 420 counties receiving 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. The probability of being funded in 1948-1950 is higher for counties with ranks of 1 or 2, and counties with a rank of 1 are substantially more likely to eventually receive funding than those with a lower rank.

We report the IV estimates in Table 8. Column (1) reports the first-stage estimates (a linear probability model for being funded in 1948-50). As can be seen, the priority rank has a very strong and strongly significant impact on the probability a county received Hill-Burton funding. The effect is estimated very precisely. The point estimate is more than 6 times larger than its standard error. Column (2) contains the instrumental variable estimate of the impact of receiving Hill-Burton funding on the 5 year change in county beds per capita. The impact is positive, large, and precisely estimated. The impact on non-profit and public beds per capita in column (3) is also precisely estimated, and is somewhat larger in magnitude than the total effect. This suggests the presence of crowdout among for-profits. However, although the coefficient on receiving Hill-Burton funding is negative for for-profits, it is not precisely estimated. Therefore, we cannot reject a hypothesis of no crowdout with these estimates, although the patterns of the coefficients are similar to what we found previously.

4.6 Effect on the Number of Hospitals

The above analysis of capacity cannot distinguish between the change in capacity due to the changes in existing hospitals versus the entry or exit of hospitals over the course of the Hill-Burton program. Such an analysis would require a more structural model of entry and exit behavior. However we can use our empirical strategy to look at how the number of hospitals changes in counties that received Hill-Burton subsidies compared to those that did not. Instead of using beds as the left hand side variable, we can also use the total number of hospitals, non-profit and public hospitals and for-profit hospitals in a given county. An underlying assumption of this approach is that we are defining a market to be a county. We lack more detailed, patient level data to construct markets based on distance patients travel to receive care. The results of those estimates are produced in Table 9. In summary, we find that counties that received Hill-Burton funds saw, on average, an increase of 0.25 non-profit and public hospitals and a decrease of 0.22 for-profit hospitals 5 years post-funding. In net, the change in the total number of hospitals in a county that received Hill-Burton funds was not statistically different from zero 5 years after a county received funding. Thus, at the firm-level, this suggest that non-profit or public entities took the place of for-profits that would have been built in counties that received funding. Combined with the analysis on bed capacity, it also suggests that the non-profit and public hospitals replacing for-profit hospitals were larger, on average, than the for-profit hospitals that were leaving the market. The estimates also show that the longer term impacts show an overall net increase in the number of hospitals, and that this increase was driven by growth in non-profit and public hospitals. Seventeen years after a county received funding, there were 0.165 more total hospitals, which was composed of 0.346 more non-profit and public hospitals and 0.182 fewer for-profit hospitals in those counties.

5 Impact of Hill-Burton on Health Care Utilization and Health Spending

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 impact on health care utilization, and subsequently, on health spending.

It seems likely that the large growth in bed capacity due to the Hill-Burton program increased utilization of health services, and this has implications for growth in health expenditures at the aggregate level. Between 1950 and 1965, total health expenditures in the U.S. increased from $8.5 to $28.2 billion, and total hospital expenditures increased from $2.0 to $8.3 billion (Rice and Cooper 1969). In order to understand the role that the Hill-Burton

program played in increasing health care utilization, we carry out analyses that look at how the number of inpatient hospital admissions changed in response to the amount of Hill-Burton funds by estimating the same regression equations ((4)-(6)) we used previously for beds per capita, but instead using admissions per capita as the outcome. These analyses will allow us to evaluate whether the increases in capacity translated into proportional increases in utilization.

The results are reported in Table 10. For an additional $1 in Hill-Burton funds, there were an additional 3.05 hospital admissions (total) per 1,000 population 15 years after funding. For an average size county receiving funding, this then translates into nearly 200 additional admissions for each additional dollar of funding per capita. Using the estimates from Table 7, we calculate that an additional $1 in Hill-Burton funding per capita led to an increase of 6.94 beds per 1,000 population 15 years after funding. Taking the average length of stay for that period of 8.41 days, the implied occupancy rate of the beds added via Hill-Burton is 66% ($= (200 \times 8.41)/(6.94 \times 365)$, which seems quite reasonable. Chiswick (1976) reports national average hospital occupancy rates for SMSAs of 73.7% for 1950, 71.7% for 1955, and 74.6% for 1960.

The increases in utilization of health services due to the Hill-Burton program may have been an impetus for growth in health expenditures. While we do not have data on health care spending dating back to the start of the Hill-Burton program, we do have data on Medicare spending per beneficiary from 1967 onward. We compile the total Hill-Burton funding per capita for each county over the course of the program's existence, and use this for cross-sectional analyses relating the total Hill-Burton dollars spent in that county with the subsequent Medicare spending per Medicare enrollee. Thus, assessing the extent to which the program resulted in growth in health expenditures is considerably more speculative than the estimates on capacity and utilization. We estimate the following cross-sectionally for the years 1967 and 1971:

$$\text{Medicare Spending per beneficiary}_i = \beta_0 + \beta_1 FundPC_i + X_i'\delta + \varepsilon_i$$

where Medicare Spending per beneficiary$_i$ is the dollar amount of Medicare spending per beneficiary in county i over 1967-1971, $FundPC_i$ is the total Hill-Burton funding per capita received by county i from 1948-1971 and $X_i$are county-level controls including population, non-white population, median family income, population over 65, total number of beds and total number of admissions. The results are reported in Table 11. We try a number of specifications. The basic results are contained in column (1), which shows that $1 of Hill-Burton per capita led to increased Medicare spending per beneficiary of approximately 21¢. Counties that got more Hill-Burton funding, and thus, more increases in capacity and utilization, had higher spending per beneficiary.

6 Summary and Conclusion

Our analysis of the Hill-Burton program on hospital capacity 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 in response to the program. We also find particularly long-lasting effects of the program on capacity with the gains in beds lasting over 15 years. This has certain 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 changing the market structure of the hospital industry by introducing large gains in hospital 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.

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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				Public Approved Projects			
	No. of Projects	No. of Beds	Construction Cost ($M)*	H-B Share ($M)*	No. of Projects	No. of Beds	Construction Cost ($M)*	H-B Share ($M)*
1947	14	729	$10.2	$3.4	61	2,106	$26.9	$9.7
1948	197	12,578	$193.4	$67.9	339	14,133	$184.3	$63.4
1949	155	8,844	$158.0	$57.4	211	9,310	$142.8	$53.7
1950	222	12,563	$256.2	$88.2	266	10,212	$156.1	$54.5
1951	88	5,408	$111.1	$30.9	125	4,474	$78.6	$32.1
1952	124	8,221	$168.8	$49.4	136	5,647	$89.6	$28.6
1953	72	3,730	$101.3	$23.7	132	3,790	$88.2	$24.5
1954	74	3,573	$77.7	$20.4	114	3,958	$71.3	$21.3
1955	119	6,378	$161.8	$38.9	155	3,223	$72.8	$25.9
1956	298	12,279	$309.2	$80.8	246	7,788	$173.3	$55.1
1957	282	11,431	$272.6	$75.6	213	6,673	$138.2	$56.0
1958	316	15,125	$382.9	$107.9	246	8,592	$195.1	$62.5
1959	268	12,713	$311.1	$90.1	246	7,512	$151.0	$57.0
1960	254	13,364	$364.3	$102.3	264	7,252	$149.2	$66.2
1961	252	11,757	$294.5	$92.6	243	9,387	$174.5	$68.1
1962	303	15,351	$415.9	$115.9	270	8,783	$204.7	$79.3
1963	298	15,856	$474.8	$125.0	240	7,986	$201.9	$72.1
1964	278	14,296	$461.6	$120.0	201	7,383	$169.0	$60.3
1965	323	15,029	$523.4	$140.7	240	9,098	$298.7	$93.2
1966	235	11,594	$413.1	$104.0	290	11,516	$289.4	$103.6
1967	290	16,097	$562.1	$145.9	225	9,538	$289.1	$97.0
1968	362	20,563	$781.0	$194.4	231	8,484	$264.4	$91.5
1969	291	16,790	$796.9	$162.1	215	8,032	$330.6	$79.1
1970	164	7,229	$383.3	$72.9	127	4,477	$197.8	$46.8
1971	113	5,349	$292.9	$53.3	62	1,373	$60.9	$20.4
Total	**5,392**	**276,847**	**$8,278.2**	**$2,163.7**	**5,098**	**180,727**	**$4,198.4**	**$1,421.6**

* Funding amounts are in current dollars.

Table 3: Summary of AHA and ARF County-Level Data

Variable	All Observations (N=2,973) Mean	Median	Received Funding* (N=2,106) Mean	Median	Never Funded* (N=867) Mean	Median
Beds						
Non-Profit / Public	170	30	194	42	75	0
For-Profit	11	0	11	0	11	0
Total	181	40	204	50	87	0
Hospitals						
Non-Profit / Public	1.3	1.0	1.5	1.0	0.5	0
For-Profit	0.3	0	0.3	0	0.3	0
Total	1.6	1.0	1.8	1.0	0.8	0
Admissions						
Non-Profit / Public	5,181	998	6,224	1,572	1,858	0
For-Profit	445	0	411	0	445	0
Total	5,625	1,356	6,634	1,897	2,301	0
Bed Days						
Non-Profit / Public	39,991	5,110	48,536	9,125	18,236	0
For-Profit	2,063	0	2,027	0	2,238	0
Total	42,054	7,300	50,563	10,585	20,474	0
Demographics						
Population	51,680	18,540	65,725	24,280	14,456	9,940
Median Family Inc.	$2,972	$2,874	$3,451	$3,060	$2,990	$2,492
Population Over 65	4,461	1,763	5,549	2,331	1,421	994
Population Under 5	5,691	2,091	6,988	2,688	1,750	1,099
Pct. Non-White	10.9%	2.1%	10.8%	2.9%	11.7%	1.0%
No. of Non-Fed MDs	61	11	81	14	10.5	4.8

* 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: Coefficients of Beds per 1,000 Regressed on Funding Dummies

Time Relative to First Year of Funding	Total Beds (1)	N-P / Pub. Beds (2)	For-Prof. Beds (3)
First Year of Funding	-27.06***	-24.24***	-2.819***
	(5.211)	(4.696)	(0.524)
1 Year Later	-26.97***	-24.14***	-2.837***
	(5.212)	(4.697)	(0.524)
2 Years Later	-26.69***	-23.79***	-2.897***
	(5.212)	(4.697)	(0.524)
3 Years Later	-26.36***	-23.41***	-2.944***
	(5.212)	(4.697)	(0.524)
4 Years Later	-26.03***	-23.08***	-2.950***
	(5.214)	(4.699)	(0.524)
5 Years Later	-25.90***	-22.95***	-2.954***
	(5.215)	(4.699)	(0.524)
6 Years Later	-25.98***	-23.03***	-2.955***
	(5.211)	(4.695)	(0.524)
7 Years Later	-26.00***	-23.00***	-3.004***
	(5.210)	(4.696)	(0.523)
8 Years Later	-25.98***	-23.00***	-2.976***
	(5.212)	(4.696)	(0.524)
9 Years Later	-25.87***	-22.90***	-2.979***
	(5.214)	(4.698)	(0.524)
10 Years Later	-25.74***	-22.79***	-2.952***
	(5.217)	(4.699)	(0.526)
11 Years Later	-25.57***	-22.61***	-2.956***
	(5.219)	(4.701)	(0.528)
12 Years Later	-25.43***	-22.48***	-2.954***
	(5.221)	(4.703)	(0.528)
13 Years Later	-25.66***	-22.64***	-3.021***
	(5.212)	(4.697)	(0.524)
14 Years Later	-25.56***	-22.55***	-3.019***
	(5.213)	(4.698)	(0.524)
15 Years Later	-25.74***	-22.73***	-3.010***
	(5.209)	(4.693)	(0.524)
16 Years Later	-25.69***	-22.68***	-3.010***
	(5.209)	(4.693)	(0.524)
17 Years Later	-25.66***	-22.65***	-3.008***
	(5.210)	(4.694)	(0.525)
18 Years Later	-25.51***	-22.51***	-2.997***
	(5.211)	(4.694)	(0.526)
19 Years Later	-25.37***	-22.39***	-2.985***
	(5.213)	(4.696)	(0.527)
20 Years Later	-25.33***	-22.36***	-2.978***
	(5.213)	(4.696)	(0.528)
21+ Years Later	-25.07***	-22.16***	-2.910***
	(5.208)	(4.692)	(0.525)
Constant	29.91***	26.75***	3.159***
	(5.205)	(4.690)	(0.522)
Observations	86,128	86,128	86,128
R-squared	0.000	0.000	0.000

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

Table 5: Effect of Receipt of Hill-Burton Funding on Capacity

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

Time Relative to First Year of Funding	Total Beds (1)	N-P / Pub. Beds (2)	For-Prof. Beds (3)
First Year of Funding	-0.196***	-0.0690	-0.127***
	0.0582	0.0524	0.0187
1-2 Years Later	-0.0652	0.121**	-0.186***
	0.0571	0.0548	0.0208
3-4 Years Later	0.421***	0.688***	-0.267***
	0.0664	0.0643	0.0257
5-6 Years Later	0.695***	0.973***	-0.278***
	0.0967	0.0950	0.0281
7-8 Years Later	0.708***	1.000***	-0.292***
	0.0897	0.0870	0.0318
9-10 Years Later	0.765***	1.053***	-0.288***
	0.0907	0.0901	0.0335
11-12 Years Later	0.913***	1.206***	-0.293***
	0.0907	0.0911	0.0351
13-14 Years Later	1.249***	1.486***	-0.237***
	0.273	0.222	0.0669
15-16 Years Later	1.141***	1.442***	-0.302***
	0.139	0.135	0.0401
17-18 Years Later	1.092***	1.380***	-0.288***
	0.127	0.121	0.0424
19-20 Years Later	1.216***	1.501***	-0.285***
	0.131	0.127	0.0441
20+ Years Later	1.464***	1.715***	-0.251***
	0.175	0.156	0.0592
Observations	85,150	85,150	85,150
R-squared	0.903	0.904	0.851

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

Table 6: Effect of Receipt of Hill-Burton Funding, Leads and Lags

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

Time Relative to First Year of Funding	Total Beds (1)	N-P / Pub. Beds (2)	For-Prof. Beds (3)
9 Years Prior	0.0116	0.0517	-0.0401
	0.0792	0.0794	0.0256
8 Year Prior	-0.0430	0.00754	-0.0506*
	0.0796	0.0790	0.0280
7 Years Prior	-0.0405	0.00485	-0.0453
	0.0822	0.0811	0.0294
6 Years Prior	-0.0917	-0.0342	-0.0575*
	0.0870	0.0861	0.0313
5 Years Prior	-0.0877	-0.0157	-0.0720**
	0.0913	0.0891	0.0343
4 Years Prior	-0.110	-0.0183	-0.0918**
	0.0947	0.0916	0.0385
3 Years Prior	-0.179*	-0.0669	-0.112***
	0.100	0.0963	0.0399
2 Years Prior	-0.229	-0.0880	-0.141***
	0.140	0.138	0.0420
1 Years Prior	-0.279**	-0.0918	-0.187***
	0.110	0.106	0.0434
First Year of Funding	-0.323***	-0.104	-0.219***
	0.114	0.111	0.0453
1 Years Later	-0.324***	-0.0508	-0.273***
	0.120	0.117	0.0475
2 Years Later	-0.134	0.222*	-0.355***
	0.133	0.130	0.0493
3 Years Later	0.178	0.576***	-0.398***
	0.139	0.137	0.0513
4 Years Later	0.441***	0.847***	-0.406***
	0.142	0.140	0.0517
5 Years Later	0.633***	1.044***	-0.411***
	0.154	0.151	0.0534
6 Years Later	0.757***	1.169***	-0.412***
	0.166	0.161	0.0557
7 Years Later	0.981***	1.401***	-0.419***
	0.305	0.304	0.0571
8 Years Later	0.815***	1.247***	-0.432***
	0.221	0.216	0.0593
9 Years Later	0.902***	1.350***	-0.448***
	0.249	0.244	0.0628
10 Years Later	1.043***	1.461***	-0.418***
	0.282	0.276	0.0637
11 Years Later	1.300***	1.740***	-0.440***
	0.290	0.283	0.0658
12 Years Later	2.422**	2.615***	-0.194
	1.177	0.932	0.262
13 Years Later	1.349***	1.818***	-0.469***
	0.351	0.340	0.0725
14 Years Later	1.396***	1.866***	-0.470***
	0.416	0.400	0.0783
15 Years Later	1.340***	1.804***	-0.464***
	0.509	0.479	0.0913
16 Years Later	1.281*	1.768***	-0.487***
	0.670	0.621	0.115
17 Years Later	0.997	1.567*	-0.569***
	1.055	0.929	0.193
Observations	45,230	45,230	45,230
R-squared	0.915	0.928	0.577

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

Table 7: Effect of Amount of Hill-Burton Funding on Capacity

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

Time Relative to Each Year of Funding (funding in $ per capita)	Total Beds (1)	N-P / Pub. Beds (2)	For-Prof. Beds (3)
Year of Funding	-0.0138***	-0.0104**	-0.00338***
	0.00392	0.00448	0.000911
1 Year Later	-0.0116**	-0.00780	-0.00377***
	0.00498	0.00541	0.000861
2 Years Later	-0.00596***	0.00104	-0.00700***
	0.00228	0.00281	0.00206
3 Years Later	0.0106***	0.0200***	-0.00949***
	0.00265	0.00445	0.00273
4 Years Later	0.0351**	0.0427***	-0.00769***
	0.0155	0.0158	0.000951
5 Years Later	0.0489**	0.0539***	-0.00502**
	0.0226	0.0208	0.00197
6 Years Later	0.0527**	0.0566***	-0.00383
	0.0230	0.0207	0.00251
7 Years Later	0.0624**	0.0654**	-0.00294
	0.0299	0.0271	0.00293
8 Years Later	0.0686**	0.0674**	0.00127
	0.0334	0.0273	0.00627
9 Years Later	0.0719**	0.0712**	0.000719
	0.0357	0.0295	0.00636
10 Years Later	0.0861**	0.0836**	0.00254
	0.0421	0.0359	0.00634
11 Years Later	0.101**	0.0907**	0.0102
	0.0495	0.0377	0.0119
12 Years Later	0.114*	0.0988**	0.0151
	0.0640	0.0451	0.0190
13 Years Later	0.122*	0.106**	0.0161
	0.0681	0.0490	0.0192
14 Years Later	0.0908**	0.0893***	0.00157
	0.0388	0.0327	0.00619
15 Years Later	0.106**	0.101**	0.00446
	0.0504	0.0431	0.00741
16 Years Later	0.0973**	0.0895***	0.00781
	0.0415	0.0315	0.0102
17 Years Later	0.103**	0.0928***	0.0103
	0.0436	0.0319	0.0118
18 Years Later	0.110**	0.0900***	0.0197
	0.0466	0.0282	0.0187
19 Years Later	0.103**	0.0825***	0.0202
	0.0403	0.0212	0.0194
20 Years Later	0.121**	0.0961***	0.0246
	0.0586	0.0362	0.0225
21+ Years Later	0.144*	0.0950***	0.0493
	0.0750	0.0356	0.0395
Observations	85,150	85,150	85,150
R-squared	0.906	0.907	0.855

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

Table 8: Instrumental Variable Estimates of Effect on Capacity

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

	(first stage)		(second stage)	
Explanatory	Treated 1948-50	Total Beds	N-P / Pub. Beds	For-Prof. Beds
Variable	(1)	(2)	(3)	(4)
Priority Level	-0.0441***			
	(0.00710)			
Treated 1948-50		2.614***	2.817***	-0.179
		(0.584)	(0.596)	(0.259)
$\Delta Population$	-0.210	-1.386***	-1.130**	-0.270
	(0.140)	(0.521)	(0.532)	(0.232)
$\Delta MedFamilyIncome$	-5.36e-07	4.42e-06	4.76e-07	3.96e-06***
	(8.97e-07)	(3.28e-06)	(3.35e-06)	(1.46e-06)
$\Delta NonWhPopn$	-1.53e-06	-1.49e-05	-1.24e-05	-2.62e-06
	(5.53e-06)	(2.01e-05)	(2.05e-05)	(8.93e-06)
$\Delta No.NonFedMDs$	0.00201	0.0110**	0.00909*	0.00193
	(0.00127)	(0.00478)	(0.00488)	(0.00212)
$\Delta Population65+$	1.68e-05	-7.31e-05	-7.02e-05	-2.55e-06
	(1.27e-05)	(4.68e-05)	(4.78e-05)	(2.08e-05)
Rural (binary)	-0.386***	1.095***	1.159***	-0.0562
	(0.0532)	(0.280)	(0.286)	(0.125)
Land Area	3.39e-05***	-9.88e-05**	-9.82e-05**	-1.36e-06
	(9.92e-06)	(3.99e-05)	(4.08e-05)	(1.78e-05)
Constant	0.708***	-0.992***	-1.123***	0.118
	(0.0582)	(0.374)	(0.382)	(0.166)
Observations	1,469	1,469	1,469	1,469
R-squared	0.089			0.013

Standard errors in parentheses.

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

Table 9: Estimate of Number of Firms in Counties

Dependent variables: number of hospitals by ownership type.

Time Relative to First Year of Funding	All Hospitals (1)	N-P / Pub. Hosp's (2)	For-Prof. Hosp's (3)
9 Years Prior	0.0146	0.0370**	-0.0224
	(0.0197)	(0.0170)	(0.0157)
8 Year Prior	-0.000249	0.0284	-0.0287
	(0.0226)	(0.0177)	(0.0200)
7 Years Prior	-0.00726	0.0230	-0.0303
	(0.0235)	(0.0188)	(0.0195)
6 Years Prior	-0.0189	0.0225	-0.0414**
	(0.0262)	(0.0219)	(0.0209)
5 Years Prior	-0.0390	0.0176	-0.0565***
	(0.0277)	(0.0228)	(0.0216)
4 Years Prior	-0.0334	0.0265	-0.0599**
	(0.0305)	(0.0242)	(0.0241)
3 Years Prior	-0.0526	0.0130	-0.0656**
	(0.0323)	(0.0262)	(0.0255)
2 Years Prior	-0.0825**	-0.00372	-0.0788***
	(0.0340)	(0.0279)	(0.0265)
1 Years Prior	-0.0959***	0.00451	-0.100***
	(0.0334)	(0.0271)	(0.0268)
First Year of Funding	-0.112***	0.00402	-0.116***
	(0.0336)	(0.0278)	(0.0275)
1 Years Later	-0.134***	0.00618	-0.141***
	(0.0349)	(0.0293)	(0.0284)
2 Years Later	-0.129***	0.0674**	-0.197***
	(0.0368)	(0.0317)	(0.0286)
3 Years Later	-0.0953**	0.131***	-0.226***
	(0.0382)	(0.0336)	(0.0301)
4 Years Later	-0.0154	0.207***	-0.223***
	(0.0376)	(0.0348)	(0.0302)
5 Years Later	0.0291	0.251***	-0.222***
	(0.0397)	(0.0369)	(0.0306)
6 Years Later	0.0395	0.268***	-0.228***
	(0.0386)	(0.0349)	(0.0318)
7 Years Later	0.0346	0.262***	-0.227***
	(0.0410)	(0.0370)	(0.0324)
8 Years Later	0.0541	0.290***	-0.236***
	(0.0418)	(0.0386)	(0.0319)
9 Years Later	0.0452	0.290***	-0.244***
	(0.0428)	(0.0386)	(0.0331)
10 Years Later	0.0509	0.293***	-0.243***
	(0.0445)	(0.0412)	(0.0344)
11 Years Later	0.0939**	0.338***	-0.244***
	(0.0426)	(0.0383)	(0.0350)
12 Years Later	0.0837*	0.328***	-0.244***
	(0.0444)	(0.0395)	(0.0351)
13 Years Later	0.0864*	0.323***	-0.236***
	(0.0451)	(0.0405)	(0.0362)
14 Years Later	0.0811*	0.315***	-0.234***
	(0.0490)	(0.0446)	(0.0378)
15 Years Later	0.115**	0.311***	-0.196***
	(0.0533)	(0.0492)	(0.0400)
16 Years Later	0.161***	0.358***	-0.196***
	(0.0621)	(0.0553)	(0.0442)
17 Years Later	0.165**	0.346***	-0.182***
	(0.0722)	(0.0651)	(0.0517)
Observations	45,322	45,322	45,322
R-squared	0.933	0.938	0.752

Robust standard errors in parentheses

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

Table 10: Effect of Amount of Hill-Burton Funding on Hospital Admissions

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

Time Relative to Each Year of Funding (funding in $ per capita)	Total Beds (1)	N-P / Pub. Beds (2)	For-Prof. Beds (3)
Year of Funding	-0.178	-0.0332	-0.145***
	0.142	0.181	0.0485
1 Year Later	-0.139	0.0302	-0.169***
	0.265	0.301	0.0489
2 Years Later	-0.177	0.112	-0.289***
	0.271	0.346	0.0844
3 Years Later	0.181	0.627	-0.445**
	0.229	0.399	0.179
4 Years Later	0.745**	1.163***	-0.418***
	0.315	0.447	0.137
5 Years Later	1.223**	1.624***	-0.401***
	0.510	0.629	0.123
6 Years Later	1.654**	2.022***	-0.369***
	0.663	0.767	0.108
7 Years Later	1.820**	2.213**	-0.393***
	0.766	0.903	0.141
8 Years Later	2.101**	2.374**	-0.273***
	0.889	0.935	0.0550
9 Years Later	1.974**	2.404**	-0.430***
	0.817	0.973	0.159
10 Years Later	2.741**	3.166**	-0.425**
	1.241	1.426	0.187
11 Years Later	2.994**	3.038**	-0.0441
	1.364	1.266	0.103
12 Years Later	3.332*	3.294**	0.0372
	1.813	1.603	0.212
13 Years Later	3.615*	3.542**	0.0734
	1.946	1.701	0.248
14 Years Later	2.731**	2.976**	-0.246***
	1.179	1.226	0.0539
15 Years Later	3.053**	3.296**	-0.243***
	1.380	1.443	0.0673
16 Years Later	3.325**	3.448**	-0.123***
	1.521	1.485	0.0443
17 Years Later	3.320**	3.469**	-0.149***
	1.589	1.564	0.0359
18 Years Later	3.426**	3.290**	0.137
	1.679	1.451	0.230
19 Years Later	2.684**	2.801**	-0.117***
	1.186	1.159	0.0371
20 Years Later	4.229*	4.247*	-0.0184
	2.390	2.265	0.127
21+ Years Later	3.980*	3.025**	0.954
	2.201	1.405	0.798
Observations	85,150	85,150	85,150
R-squared	0.854	0.852	0.832

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

Table 11: Hill-Burton Funding and Medicare Spending

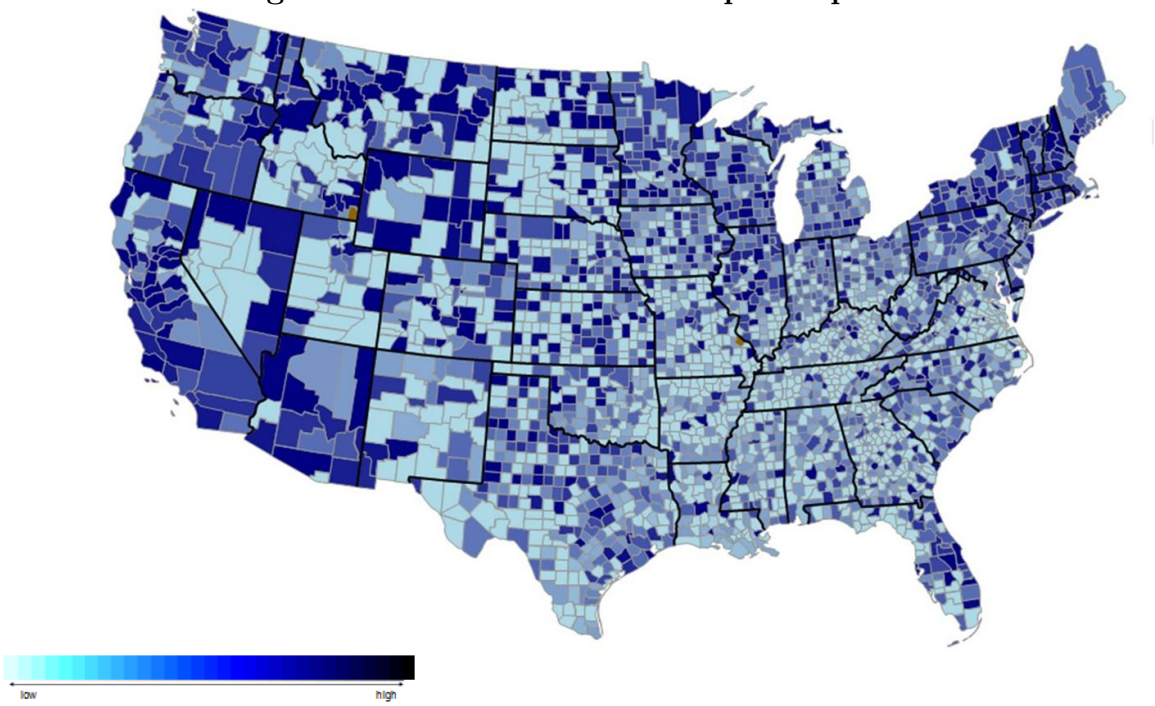
Dependent variable: Medicare Part A reimbursements per enrollee in 1967 or 1972, in current dollars.

Explanatory Variable	1967 (1)	1972 (2)	1967 (3)	1972 (4)	1967 (5)	1972 (6)	1967 (7)	1972 (8)
H-B $ per capita through 1967	0.206***		0.192***					
	(0.0488)		(0.0489)					
H-B $ per capita through 1972		0.298***		0.304***				
		(0.0518)		(0.0519)				
Funded (binary) by 1967					9.811***		9.860***	
					(1.871)		(1.869)	
Funded (binary) by 1972						3.149		3.283
						(2.196)		(2.188)
County Population	8.24e-05	-1.09e-05	0.000152**	-4.13e-05	0.000130*	-8.09e-06	0.000177**	-4.24e-05
	(7.40e-05)	(8.68e-05)	(7.44e-05)	(8.68e-05)	(7.46e-05)	(8.73e-05)	(7.56e-05)	(8.73e-05)
Non-White Pop.	-0.000371***	-3.42e-05	-0.000474***	-0.000137***	6.24e-07	-2.37e-05	4.37e-07	-0.000128**
	(4.51e-05)	(4.82e-05)	(4.74e-05)	(5.14e-05)	(2.71e-06)	(4.85e-05)	(2.71e-06)	(5.17e-05)
Median Family Income	0.000433***	0.00893***	0.000414***	0.00875***	0.000470***	0.00874***	0.000466***	0.00855***
	(0.000103)	(0.000516)	(0.000102)	(0.000515)	(0.000104)	(0.000524)	(0.000104)	(0.000523)
Pop. 65+	0.000405	0.000814***	3.28e-05	0.000664**	-9.61e-05	0.000791***	-0.000371	0.000650**
	(0.000270)	(0.000292)	(0.000274)	(0.000292)	(0.000267)	(0.000294)	(0.000276)	(0.000294)
Pop. < 5	-0.000236	-0.000282	-0.000574	0.000690	-0.000942	-0.000337	-0.00133**	0.000594
	(0.000631)	(0.000820)	(0.000652)	(0.000834)	(0.000634)	(0.000825)	(0.000659)	(0.000839)
Total Beds			0.0432***	0.0559***			0.0222***	0.0556***
			(0.00686)	(0.00975)			(0.00660)	(0.00980)
Total Admissions			-0.00119***	-0.00179***			-0.000556**	-0.00172***
			(0.000231)	(0.000315)			(0.000225)	(0.000316)
Constant	161.0***	140.1***	161.0***	141.4***	158.0***	144.0***	158.1***	145.3***
	(1.280)	(4.833)	(1.274)	(4.817)	(1.647)	(4.839)	(1.644)	(4.822)
Observations	3,066	3,068	3,066	3,068	3,068	3,068	3,068	3,068
R-squared	0.064	0.164	0.077	0.173	0.046	0.156	0.051	0.164

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

Figures

Figure 1: Distribution of Beds per Capita in 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	250,882	13	12	688	8	680	2.7	14	1,404	724	D	54.1	765
R- 15 Greensboro	16,215	-	-	-	-	-	-	1	50	50	A	100.0	488
R- 16 Milledgeville	56,535	3	3	142	-	142	2.5	3	192	50	D	89.1	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	88.9	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.
Sixteenth Census of the United States, Population, Vol. 1.

Figure 3: Step 1 of Hill-Burton Allocation Process

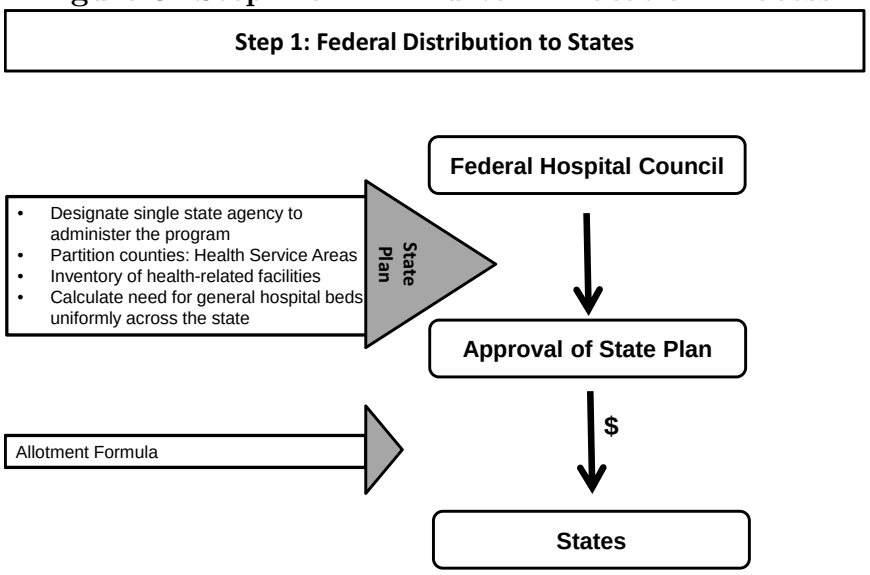


Figure 4: Step 2 of Hill-Burton Allocation Process

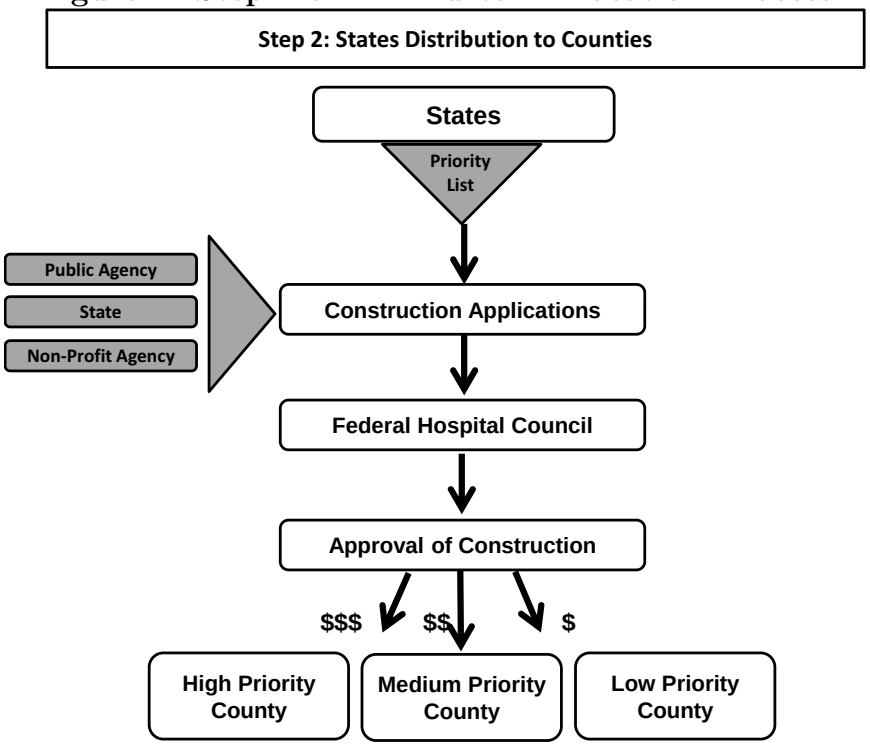
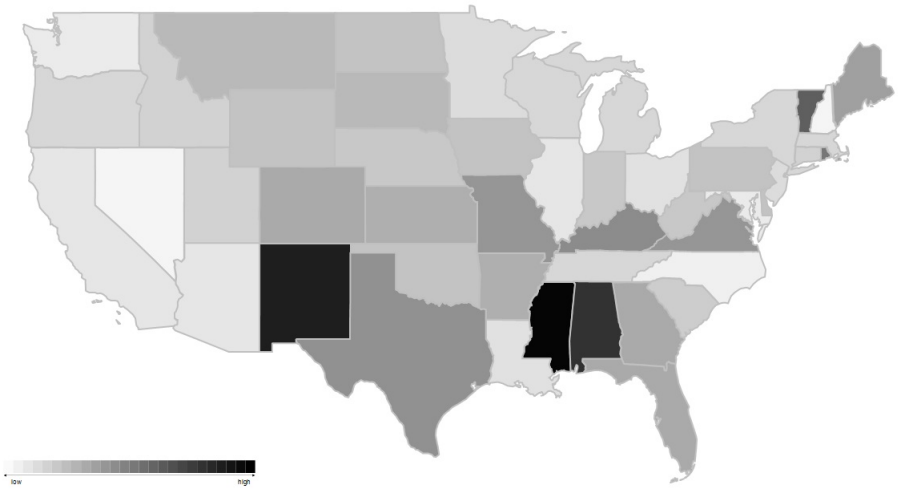
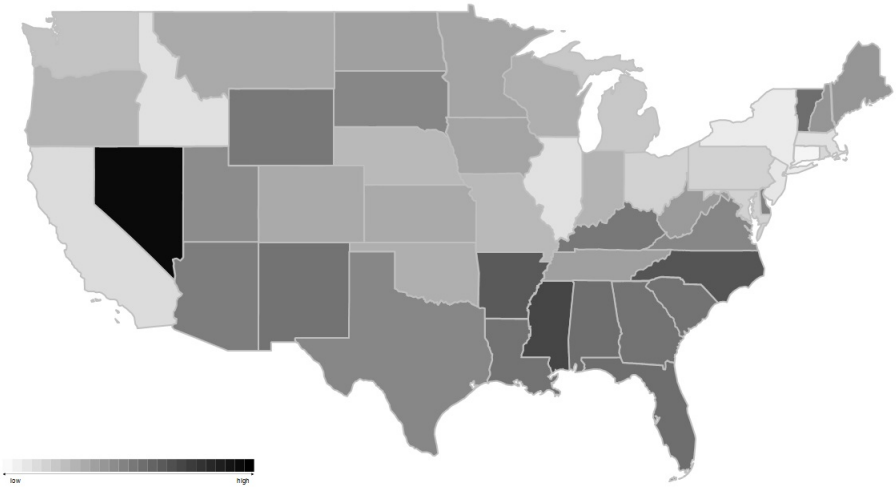


Figure 5: State-Level Hill-Burton Funding per Capita, 1948



Source: Hill-Burton Project Register

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



Source: Hill-Burton Project Register

Figure 7: Trend in Beds PC in Top and Bottom Funded States

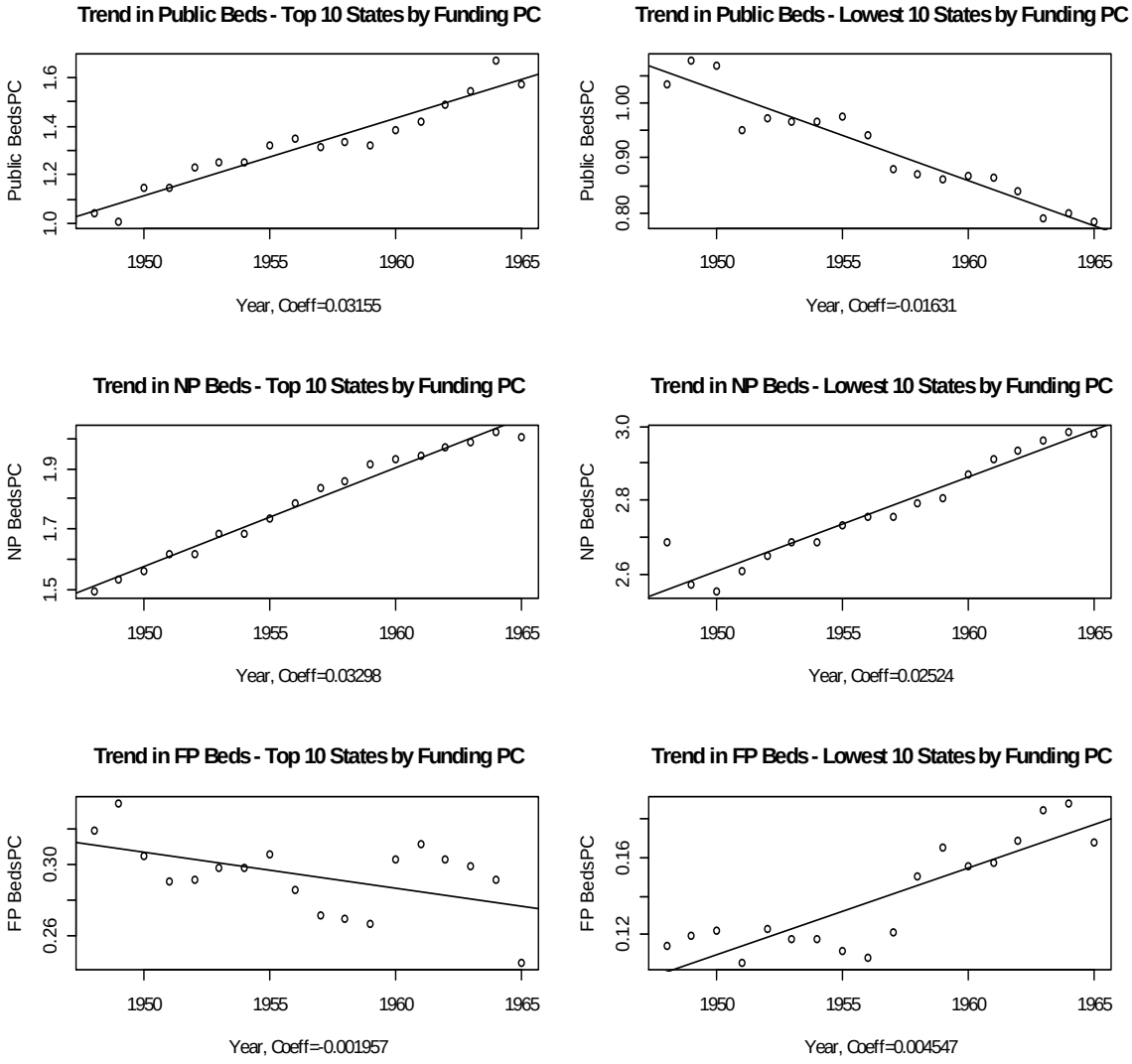
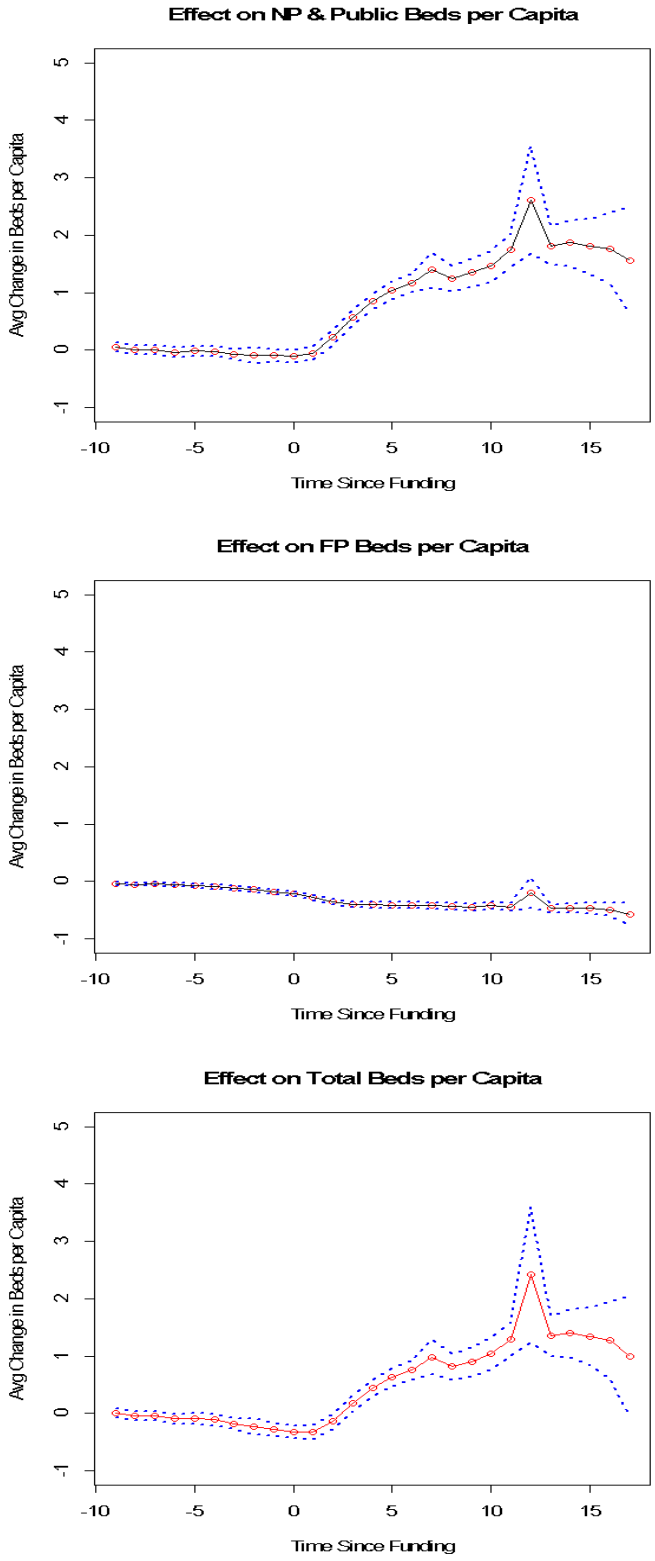


Figure 8: Change in Beds per Capita with Leads and Lags



Appendix

The American Hospital Association is an organization that represents all hospitals in the nation. The AHA survey data are 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.