

# Does Substituting Home Care for Institutional Care Lead to a Reduction in Medicaid Expenditures: Evidence from Home and Community Based Services Waivers

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## Abstract

In 1981 Congress introduced Home and Community Based Services (HCBS) waivers in an attempt to contain Medicaid long-term care expenditures. This paper analyzes the efficacy of the waiver program. To date, little is known about its impact on cost containment. Using state-level Medicaid data on expenditures and the number of individuals participating in HCBS waivers between 1992 and 2000, I estimate the impact of HCBS waivers on total Medicaid expenditures as well as on Medicaid institutional, home health and pharmaceutical expenditures. I use a difference-in-difference model which compares Medicaid expenditures using variation from both the implementation of an HCBS waiver program and the size of an HCBS waiver program across states and over time. The results, robust across multiple specifications, show increases rather than decreases in total Medicaid spending as well as increases in the other Medicaid spending categories analyzed. This implies that there is no evidence of substitution from institutional care to the HCBS waiver program or that cost-shifting is occurring. In fact the large magnitude of the estimated spending increases suggests the waivers may induce more people to enter the Medicaid program.

- *Keywords:* Home and Community-Based Services, Medicaid, Long-term care, 1915 (c) waivers
- *JEL Codes:* I18, H72, J14, J18

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# 1 Introduction

In 1970 national health expenditures were \$19.7 billion.<sup>1</sup> Since 1970 these expenditures have been growing at an average annual rate of 4.9 percent to reach an all-time high of \$1,571.2 billion in 2003 (Centers for Medicare and Medicaid Services). Two causes of the increase in health expenditures are an aging population and rising prices (Office of the Assistant Secretary for Planning and Evaluation (2005)). One category within the health industry that is experiencing growth due to both of these factors is long-term care, defined as a variety of services that includes both medical and non-medical care for individuals who have a chronic illness or disability. The primary goal of long-term care is not to provide rehabilitative care, but to assist individuals with support services for activities of daily living. Because long-term care is a unique bundle of services designed for an individual, it can be provided in a variety of environments ranging from an individual's home to an institutional setting such as a skilled nursing facility.

Between 1970 and 2003 long-term care services represented on average 8.6 percent of national health expenditures and grew at an average annual rate of 6.2 percent.<sup>2</sup> Since 1970 public funds have on average accounted for 54 percent of long-term care expenses, 76 percent of which were covered through Medicaid. From 1970 to 2003 annual Medicaid expenditures on long-term care increased from \$4.2 billion to \$57.1 billion (Centers for Medicare and Medicaid Services).

The growth rate in Medicaid expenditures averaged more than 9 percent per year throughout the 1970s. These costs have continued to rise throughout the remainder of the twentieth century. In 2005, Health and Human Services Secretary Michael Leavitt stated, "... this year (2005), for the first time ever, states spent more on Medicaid than they did on education."<sup>3</sup> Passage of Section 2176 of the Omnibus Budget Reconciliation Act of 1982 allowed states to respond to these rising costs by altering the bundle of services states provide, including

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<sup>1</sup>All dollar figures presented are expressed in 2000 dollars.

<sup>2</sup>For the purpose of these estimates long-term care expenditures consist of nursing home expenditures and home health expenditures. Individual components available from Centers for Medicare and Medicaid Services.

<sup>3</sup>Press release: "Releasing the HHS Proposed Budget for FY 2006"

substituting home based care for institutional care. The Act introduced Medicaid 1915 (c) waivers for home and community based services (HCBS) as the vehicle for the substitution. These Medicaid waivers provide states greater flexibility by allowing states to waive specific Medicaid rules and thereby offer a greater variety of services that may not have been available to specific target populations. These target populations must be deemed eligible for institutional care. The intent behind allowing states to provide additional services to individuals in the community is that it will cost less than having to care for the individuals in an institution where room, board, and twenty-four hour care are provided by the state. However, as will be discussed in greater detail in Section 2, the details in the law have made it possible for average cost per individual to stay the same or decrease while total expenditures continue to rise. This can easily be explained if the total number of individuals served increases.

With states implementing these waivers for various target populations and offering a variety of additional services, there is significant variation in waivers across states. In this paper I use variation due to HCBS waivers and analyze state-level panel data from 1992 through 2000 to determine if these waivers lead to reductions in state Medicaid expenditures.

According to Gruber's extensive review of the Medicaid literature, there is little evidence of cost-effectiveness in the HCBS waiver program (Gruber (2003)). Current literature regarding the HCBS waiver program is primarily descriptive in nature or focuses on determining the driving forces behind participation in the HCBS waiver program or its expenditures. This literature has not addressed the question of how the HCBS waiver program affects Medicaid expenditures.

Drawing on Centers for Medicaid and Medicare Services data, I compile a state-year panel of Medicaid expenditures and combine it with information on HCBS waiver participation between 1992 and 2000. To compare Medicaid expenditures across states and over time, I estimate a difference-in-difference model using variation from the implementation of HCBS waivers as well as from the size of the HCBS waiver program. Variables are included to control for institutional supply, the supply of family care-giving, changes in the economy, and states' participation in Temporary Assistance for Needy Families (TANF), welfare reforms,

and Aid to Families with Dependent Children (AFDC) benefit levels. This approach allows me to identify the impact of the average participant in an HCBS waiver program on Medicaid expenditures using the timing, incidence, and magnitude of HCBS waiver participation across states.

In this paper I test if the anticipated cost saving from HCBS waiver participation is realized. I do not directly compare HCBS to institutional care but I do demonstrate that when a state participates in the HCBS program, the individuals that are eligible for those services do not decrease their expenditures in other Medicaid categories (such as nursing facilities). Other things the same, the results show that a state with greater HCBS participation does not have lower Medicaid spending per caseload in any category analyzed. First, as might be expected one more HCBS participant increases HCBS waiver program expenditures by \$11,135. The surprising result is that other components of Medicaid expenditures also increase by a very large \$54,591 with an additional HCBS participant. The results are robust across specifications suggesting that individuals participating in the HCBS waiver program receive more than HCBS waiver services and that there is no evidence of substitution or cost savings.

The remainder of this paper is divided into the following sections. Section 2 provides background details of the HCBS waiver program. Section 3 develops the empirical model and the data are described in Section 4. Results are reported in Section 5 followed by a discussion in Section 6 and the final section concludes.

## **2 Background**

This section provides more detailed information on the HCBS waiver program. The structure of the HCBS waiver program is described in Section 2.1. A brief summary of the size of the HCBS waiver program and its relative components will be discussed in Section 2.2 while Section 2.3 provides a brief review of the relevant literature.

## 2.1 HCBS Waiver Details

A state has choices when creating its state Medicaid plan as well as its HCBS waiver program. A fundamental difference between the two is that when determining the eligibility criteria and services to include in the state Medicaid plan, they apply to the entire state as opposed to the fixed number of individuals the HCBS waiver targets. The eligibility criteria a state chooses for its state Medicaid plan will change the choices available for eligibility criteria into the HCBS waiver program as well as an individual's incentives to participate in an HCBS waiver. The basic Medicaid plan, without any of the eligibility choices exercised, has an individual qualifying for Medicaid financially at 100 percent of Supplemental Security Income. A state can expand eligibility to individuals that spend down on medical expenses to the eligibility threshold, this is known as the "medically needy" option. Options that apply to elderly or disabled populations only include, expanding eligibility to 100 percent of the poverty line to all elderly or individuals with disabilities, or expanding eligibility to 300 percent of Supplemental Security Income to individuals residing in an institutional setting.

Once the eligibility criteria for the state Medicaid program is known, each state designs its own HCBS waiver program. Several decisions must be considered. First, it must consider the Medicaid eligibility criteria. If it is a state that has expanded eligibility to 300 percent of Supplemental Security Income to individuals residing in an institutional setting, it has the option of increasing the eligibility cutoffs for HCBS waiver participants to 300 percent of Supplemental Security Income also. With the option of increasing the financial eligibility cutoff, states are attempting to decrease the incentive individuals have to move to an institutional facility and increase the incentive individuals have to move from an institutional facility back to the community. Increasing the financial eligibility cutoff for HCBS waivers will potentially allow more people to receive care outside of an institution.

Second, a state has the ability to waive the state-wide requirement of Medicaid and apply the waiver only to specific geographic regions within the state. 6.4 percent of the waiver administrators responding to a survey done by Kitchener et al. (2004) did not provide coverage to the entire state and used a geographic criteria to limit coverage. Currently the geographic

eligibility of each waiver is not readily available. It is reported on each state's initial application for an HCBS waiver with Centers for Medicare and Medicaid Services but the information has not been organized and made available.

Third, a state can provide additional services that go beyond its state plan and are not generally covered by Medicaid. Providing additional services that are beyond the scope of the state Medicaid plan is one of the key features that separates the HCBS waiver program from Medicaid home health. These additional services may allow individuals to stay in their home rather than move to an institution or provide them the ability to move from an institution back to their home. Examples of the types of services a state may choose to provide in its HCBS waiver include respite care, home modifications, case management, homemaker services, personal care, and adult day care.

Fourth, a state sets a maximum number of individuals or 'slots' that it will serve. This has led to large numbers of waiting lists for waivers. According to the waiver administrators responding to Kitchener et al. (2004) 40.4 percent of waivers had waiting lists. This represented 157,640 individuals on waiting lists with an average waiting time of 10.6 months.

Fifth, a state can target specific populations (i.e. the elderly) or conditions (i.e. AIDS/AIDS related conditions) to serve. This is helpful when the state does decide to offer additional services that are beyond the scope of the state's Medicaid plan. It allows the state to tailor the additional services to the population the waiver is targeting (e.g. individuals with traumatic brain injuries).

A state also does not need to limit itself to only one waiver. Most states have multiple waivers in order to meet the needs of its various target populations as well as span multiple geographic areas within the state. Other options states have when designing their waivers to control expenditures include limiting the total hours of care provided, restricting access to specific forms of care, and capping overall expenditures.

Centers for Medicare and Medicaid Services is responsible for reviewing and approving states' requests for HCBS waivers. These reviews focus on two issues. First, they are also responsible for ensuring that states have the necessary safety measures in place to protect the

individuals receiving services through waiver programs. Second, Centers for Medicare and Medicaid Services (CMS) assesses the waiver's effect on cost. CMS has tried to ensure cost containment by requiring a state to show that the waiver program will be cost neutral or decrease cost before it will grant the waiver. CMS considers a program to be cost neutral if the average cost per person in the presence of the waiver will be less than or equal to the average cost per person in the absence of the waiver.

Since the purpose of HCBS waivers is to contain long-term care costs, it is reasonable to assume CMS's goal is to minimize total costs. However, the cost neutrality requirement applying to HCBS waivers in section 1915 (c) of the Social Security Act is defined in terms of average cost.<sup>4</sup> Two assumptions must be made to reconcile this discrepancy. First, the CMS requirement implicitly assumes that everyone that is served by a waiver would be in an institution if the waiver did not exist. This may not be true if, for example, individuals who are not willing to leave their homes to move to an institution are willing to fill an HCBS waiver slot and receive home based services. This is commonly referred to as the woodwork effect. Once these individuals are in the Medicaid program, they not only use the HCBS waiver services, but also other services provided by Medicaid. The second assumption is that the total number of individuals served is held constant. If average costs are held constant but the total number of individuals served increase, total costs will increase and the waivers will not serve the original purpose of containing costs.

## 2.2 Size of the HCBS Program

The total number of individuals served through the various HCBS waiver programs increased substantially between 1992 and 2000. During this period there was a 226 percent increase in the number of participants. These individuals were participating in one of eight target populations including children, mentally retarded/developmentally disabled,

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<sup>4</sup>42 U.S.C. 1396n(c)(2)(D) Section 1915 (c)(2)(D) states "under such waiver the average per capita expenditure estimated by the State in any fiscal year for medical assistance provided with respect to such individuals does not exceed 100 percent of the average per capita expenditure that the State reasonably estimates would have been made in that fiscal year for expenditures under the State plan for such individuals if the waiver had not been granted"

aged, aged/disabled, those with AIDS/AIDS related conditions, children, mental health conditions, and those with traumatic brain injuries.

The number of states operating HCBS waivers also increased during this time period. In 1992, 48 states had at least one HCBS waiver. This increased to 49 states in 1994. By 1999, every state and the District of Columbia were operating at least one HCBS waiver.<sup>5</sup> The populations targeted most often by states for waivers were the mentally retarded/developmentally disabled (MR/DD) and aged and or disabled populations (AGED).<sup>6</sup> There were dramatic increases over this period in the number of individuals served in every one of the target populations. Figure 1 shows the increase in the number of waiver participants over this time period. Table 1 shows the number of individuals participating in waivers in each year between 1992 and 2000 as well as the percentage change in participants between years.

At the same time HCBS waivers were expanding across the states, states were increasing the number of individuals participating in waivers. HCBS spending was also increasing. Figure 2 shows that between 1992 and 2000 there was a 361 percent increase in real HCBS waiver expenditures and an average yearly increase of 21 percent between 1992 and 2000.

Calculating the HCBS expenditures per waiver participant between 1992 and 2001 shows that not only was the total number of participants increasing but the amount spent on each participant was increasing as well. Comparing Medicaid nursing facility expenditures per beneficiary between 1992 and 2001 to HCBS expenditures per waiver participant, 26 states spent more on average on HCBS waiver participants, for waiver services, than on nursing facility beneficiaries, for institutional care, in at least on year.<sup>7</sup> Moreover, there appears to be regional differences in this phenomenon. Figure 3 highlights these regional differences, while Table 2 shows their range. The average difference in expenditures per participant during these years range from \$343 in Iowa to \$22,294 in Maryland. As these data suggest, the HCBS waiver program may not unambiguously lower the cost of long-term care as section

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<sup>5</sup>Arizona is an exception as it chooses to operate its HCBS program under an 1115 waiver designed for experimental, pilot, or demonstration projects rather than a 1915 (c) waiver.

<sup>6</sup>This group consists of Aged waivers, Aged/Physically Disabled waivers, and Physically Disabled waivers.

<sup>7</sup>Medicaid nursing facility expenditures per beneficiary was calculated by dividing Medicaid nursing facility expenditures by nursing facility beneficiaries in each year. Medicaid nursing facility beneficiary data was obtained from Centers for Medicare and Medicaid Services.

1915 (c) of the Social Security Act implies.

## 2.3 Literature Review

Past work sheds some light on the substitutability of home for institutional care and the potential for government cost savings. The federal government sponsored the National Long Term Care Demonstration between 1981 and 1985. This demonstration was expected to “channel” participants into home and community based long-term care case management in ten cities throughout the U.S.. Thus channeling was expected to provide a substitute for nursing facility care and reduce long-term care expenditures. Kemper (1988) found that “improved case management and community services beyond what already exists does not lead to overall cost savings”. The primary factors that led to cost increases were that individuals did not substitute away from nursing facility care. Those already living in the community substantially increased their use of formal community services and most importantly it appears that only a small portion of the population would have used a nursing facility in the absence of channeling.

Medicaid waivers for HCBS are similar to channeling in that they are both designed to provide a substitute for nursing care, and provide case management. Unlike the HCBS waiver program, individuals in the channeling experiment were not generally eligible for Medicaid and because the program was only implemented at ten cities across the country its results are not generalizable. Medicaid home health, another type of government-funded home care that also has the possibility to substitute for institutional care is analyzed by Hoerger et al. (1996) using the National Long-Term Care Survey. The authors determined the effect of a public subsidy, Medicaid home health, on the living arrangements of the elderly. Using a multinomial probit analysis, they found that state policies that subsidize community living have little effect on nursing home entry and increase the probability of living independently rather than in an intergenerational household. It is unclear however, how generalizable this study is to populations other than the elderly. The theory was developed to be applied to a parent deciding between living in a nursing facility, with his/her child in an intergenerational

household, or independently and the sample studied was comprised entirely of the elderly.

The literature dealing specifically with HCBS waivers tends to be primarily descriptive in nature. For example, LeBlanc et al. (2000) provides state-level data for 1997 on the number of individuals participating in the HCBS waiver program, total waiver expenditures, and whether waiver had any cost caps. Kitchener et al. (2005) describes various cost control policies used by HCBS waiver programs nationwide. While Miller (1992) provides a history of the first ten years of the HCBS waiver program including the number of waivers and waiver participants by year. Miller et al. (1999) also provides state-level data on HCBS expenditures and what target groups each state served. None of these, however, analyze the question of substitution or cost neutrality of the HCBS waiver program, nor do they posit any causal relationships. Kitchener et al. (2006) is an exception. They provide a per person public cost estimate of HCBS waivers and institutional care using one year of data. The authors report that after excluding room and board costs from institutional care, HCBS waivers are less expensive than institutional care.

Two papers go beyond a descriptive analysis of HCBS waivers. Both Harrington et al. (2000) and Miller et al. (2001) use a state-level panel to determine the state-level factors that explain HCBS expenditures. They run similar specifications with many of the same control variables. While these analyses may be useful for deciding which control variables to include in my model, the results in these papers are non-robust across specifications. Harrington et al. (2000) also uses a state-level panel of HCBS participants with the goal of determining the state-level factors that drive participation. In this paper I extend the analysis to use both participation and expenditures simultaneously and look at participation in HCBS and expenditures in other Medicaid programs.

## 3 Model

### 3.1 Empirical Model

A difference-in-difference model is used to estimate the impact of HCBS waivers on overall Medicaid expenditures using state-level data from 47 states and the District of Columbia between 1992 to 2000. Because state-level data is used, with the exception of expenditures for the HCBS waiver program, I do not know what is spent on HCBS waiver participants. I regress Medicaid expenditures on the number of waiver participants to estimate the change in Medicaid expenditures as the number of waiver participants increases. The particular specification chosen is

$$EXPENDCASE_{s,t} = \beta_0 + \beta_1 * WAIVERCASE_{s,t} + \beta_2 * X_{s,t} + \beta_3 * state_s + \beta_4 * year_t + \varepsilon_{s,t}, \quad (1)$$

where  $EXPENDCASE_{s,t}$  is the Medicaid expenditure per adult Medicaid caseload in state  $s$  in year  $t$ .<sup>8</sup> The policy variable,  $WAIVERCASE_{s,t}$ , is the number of waiver participants per adult Medicaid caseload in state  $s$  in year  $t$ . Both the policy variable and the expenditures are divided by the state adult Medicaid caseload to control for differences in the number of participants and expenditures in smaller and larger states.  $X_{s,t}$  is a vector of control variables. The number of skilled nursing beds in state  $s$  in year  $t$  is used to capture the supply of institutional care. The women's labor force participation rate in state  $s$  in year  $t$  is included to control for the supply of family care-giving. Several control variables are included to capture variation that may be due to other policy changes during this time period. An indicator variable is included if state  $s$  implemented TANF before March of year  $t$ . Also, an indicator variable is included if state  $s$  implemented a welfare waiver before March of year  $t$  and had not implemented TANF. The maximum AFDC benefits for a family of three in

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<sup>8</sup>The adult Medicaid caseload is used in order to avoid using any variation that may be due to Medicaid expansions which increased the number of families eligible for Medicaid as well as the Balanced Budget Act of 1997 that established the State Children's Health Insurance Program (SCHIP) which led to increases in the number of children on Medicaid.

state  $s$  in year  $t$  is included along with controls for the business cycle, the unemployment rate, and the employment growth rate.  $state_s$  is a vector of state fixed effects which are included to control for any omitted factors that are fixed over time but vary across states and are correlated with the policy variable. Similarly,  $year_t$  is a vector of time fixed effects included to capture any trends that may be occurring over time constant across all states.  $\varepsilon_{s,t}$  is a random error term.

Table 3 includes summary statistics for the variables included in the regressions. Averaging across all states and years in the analysis, the average percent of Medicaid caseload participating in an HCBS waiver program between 1992 and 2000 was 3.4 percent. The HCBS expenditures per adult Medicaid participant, not per HCBS waiver participants, during this period was \$596.<sup>9</sup> Medicaid institutional expenditures per adult Medicaid participant averaged \$2,710. Total Medicaid expenditures per adult Medicaid participants during this period averaged \$9,584.

As shown in Table 4 average HCBS waiver expenditures per waiver participant are \$18,370. Although this is in line with previous estimates of average HCBS waiver expenditures, it does suggest that the expenditures for this population are high relative to the total average Medicaid expenditures for aged and disabled Medicaid beneficiaries, \$10,388 and \$9,729 respectively.<sup>10</sup> HCBS waiver participants are spending more in the waiver program than other aged or disabled Medicaid beneficiaries are spending in the entire Medicaid program. The regression will enable us to also estimate the impact on other expenditures.

This model is estimated for multiple expenditure categories. The expenditure categories include Medicaid categories disabled populations are likely to use, such as the HCBS waiver program, institutional care, home health care and pharmaceutical expenditures. The model is also estimated using total Medicaid expenditures.<sup>11</sup> I estimate the model with various expenditure categories to determine if there is cost shifting as a result of the HCBS waiver

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<sup>9</sup>All expenditure values are expressed in 2000 dollars.

<sup>10</sup>Using 1997 individual-level data Harrington et al. (2001) found average HCBS waiver expenditures of \$15,038.

<sup>11</sup>The Medicaid categories chosen to estimate are not collectively exhaustive and represent 52% of total Medicaid expenditures. Total Medicaid expenditures do include HCBS waiver expenditures.

program. All regressions are weighted by the state population age 65 and older and standard errors are clustered at the state-level to control for serial correlation at the state-level (Bertrand et al. (2004)).

The key parameter of interest is  $\beta_1$ , which measures the impact of increasing the fraction of the state Medicaid caseload participating in the waivers on Medicaid expenditures per caseload. Variation in the policy variable comes from timing of states implementation of HCBS waivers, as well as variation across states in the size of their HCBS waiver programs. Combined, these create variation in the fraction of the state Medicaid caseload participating in these waivers across states and over time.

As mentioned previously, states may have multiple waivers serving the same target population in the same year and each waiver may serve a vastly different number of individuals. Additionally, these waivers may only serve a limited geographic region within the state. As defined, WAIVERCASE does not depend upon whether a state has multiple waivers, waivers that serve different geographic regions or various target populations. WAIVERCASE is the sum of all waiver participants in a state divided by the state adult Medicaid caseload.<sup>12</sup>

An analysis shows that neither the expenditure measures used nor the number of participants in the HCBS waiver program appear to have outliers or distributions that are skewed to the right.<sup>13</sup> For this reason a linear specification is estimated. State-years with no HCBS waiver expenditures or participants do not skew the distribution to the left.

## 3.2 Expectations

The key parameter of interest in equation 1 is  $\beta_1$  whose expected sign and magnitude will depend on the expenditure category estimated. Table 5 summarizes the expectations.

In order to determine the expected impacts of HCBS waiver participants on Medicaid

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<sup>12</sup>A specification that included an indicator variable as the policy variable would not be able to adequately control for the variation across states in size of HCBS waiver programs. A larger problem with an indicator variable specification is that by 1999 every state had an HCBS waiver program, which eliminates any control states for the difference-in-difference model. The policy variable would then not be able to identify the impact of the HCBS waiver program after 1998 even though states continue to expand their waiver programs.

<sup>13</sup>Details are available from author on request.

expenditures it is useful to group those potentially affected by waivers into three categories.<sup>14</sup> The first category consists of individuals that do not participate in Medicaid until they are able to participate in HCBS waivers. This category is commonly referred to as the ‘woodwork effect’ because participants come out of the woodwork to participate in the HCBS program. These individuals have a straightforward impact on spending. The expansion of the HCBS waiver program cannot decrease expenditures in any spending category because these participants had no Medicaid expenditures prior to participating in the waiver program.

The second category contains Medicaid recipients that are currently receiving long-term institutional care while the third category contains current Medicaid recipients that are eligible for long-term care services but do not currently use them. By definition, this third group resides in the community prior to the implementation of HCBS waivers. The remainder of this section will focus on the second and third category of individuals.

Regardless of the target population that is the focus or the category receiving services, it is expected that expenditures for HCBS will increase with the expansion of the HCBS waiver program. Providing additional HCBS services will increase HCBS expenditures.

Medicaid HCBS waivers for the MR/DD and AGED populations, specifically, were developed to substitute home care for more expensive institutional care. Assume for the remainder that individuals prefer to reside in their own homes in the community over residing in an institution. If individuals are currently residing in an institution and the expansion of HCBS waivers allow for an individual to return to the community, it is expected that this will decrease institutional expenditures.

For individuals that are not currently residing in an institution, the aversion to institutional care will determine the impact of HCBS waivers on institutional expenditures. If individuals are averse to institutional care, they will stay at home at all cost and the implementation of the waiver program should not increase institutional expenditures as it provides another option for individuals to stay at home. Moreover, if any of these individuals were originally in the first category, those that joined Medicaid in order to participate in the HCBS program, the

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<sup>14</sup>Data regarding the size of each category as well as which category each individual belongs to is unavailable making this exercise primarily a thought experiment.

aversion to institutional care may decrease once they are in Medicaid and receiving services. This would increase institutional expenditures. Regardless of the target population, HCBS waivers are designed for individuals at an institutional level of care, thus implying predictions similar to those developed to substitute for institutional care. However, institutional care may be less of a substitute for the other target populations (e.g. AIDS/AIDS related conditions, children).

Waiver expansion for any target population is clearly expected to increase expenditures for Medicaid home health. Medicaid home health allows individuals to receive services from its program while receiving services from an HCBS waiver. Individuals participating in HCBS have case managers that determine their needs and the information on additional programs the individual may qualify for. Qualifying for Medicaid home health provides individuals with additional hours of home care that the waiver program does not need to support. Case managers have an incentive to have their clients participate in as many programs other than HCBS as possible so they can keep the HCBS hours and expenditures to a minimum. Additionally, individuals that were originally living in institutions and were not able to participate in Medicaid home health now have the potential to go from zero expenditures to positive expenditures.

Those individuals previously residing in an institution were given medications in a timely fashion multiple times a day. When returning to the community, care providers will not be there multiple times a day when medications need to be taken. This may result in missed doses; thereby individuals may not need to refill their medications as often. The opposite is equally plausible, individuals, may take medications more often than necessary, but are not able to refill more than monthly. So expenditures may decrease but not increase. Additionally, for individuals already residing in the community, case managers may notice ailments that need to be treated, which results in additional medications. This will result in increases in pharmaceutical expenditures.

The impact of a waiver expansion on total costs depends on both the increase in the number of individuals that are using Medicaid long-term care and the number of individuals

that substitute away from institutional care. The increases in the number of individuals using Medicaid long-term care will depend on the changes in eligibility limits and cost sharing arrangements for those qualifying at higher limits. The final mix of individuals served will be a combination of individuals coming from institutions and the community. A way to ensure large declines in Medicaid expenditures is for a large fraction of the HCBS waiver participants to transition from institutions back into the community and to minimize the size of the woodwork effect. This is due to the high price of institutional care as compared to home care and the potential of HCBS waivers to provide long-term care to increasing populations.

## 4 Data

The empirical analysis is performed on yearly state-level data from 1992 to 2000.<sup>15</sup> It includes administrative data on HCBS waiver participation rates and Medicaid expenditures. The participation data were prepared by Kitchener et al. (2003) and contain information on the number of individuals participating in each HCBS waiver as well as the population the HCBS waiver targeted. The data do not provide information on each HCBS waiver's different rules across regions within a state (e.g., geographic limits on participation). Therefore, participation is aggregated to the state-level.

The expenditure data were compiled from state-level Centers for Medicare and Medicaid Services Form 64 reports.<sup>16</sup> These reports include Medicaid expenditure breakdowns for over 40 spending categories including the HCBS waiver program. These reports represent state claims to the Federal government of expenditures that states believe are eligible for Federal matching funds. Individuals eligible for HCBS waivers must be considered in poor enough health to be at an institutional level of care regardless of where they reside. This implies a specific set of services they are most likely to use. The focus of this analysis is on the set of

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<sup>15</sup>Arizona, Hawaii, and Oklahoma were excluded from the analysis because Arizona does not run its HCBS program through Medicaid 1915 (c) waivers and Hawaii and Oklahoma do not have caseload data available for all years

<sup>16</sup>Form 64 expenditure data for 1997-2001 are available from the Centers for Medicare and Medicaid Services website at <http://www.cms.hhs.gov/medicaid/mbes/ofs-64.asp> prior years were obtained directly from Centers for Medicare and Medicaid Services.

services whose spending categories are listed in Table 3.

State Medicaid caseload data is obtained from Centers for Medicare and Medicaid Services. They include only adult Medicaid beneficiaries that received services during the calendar year. Children are excluded from this measure due to large increases in the number of children participating in Medicaid during this time period.

Information on nursing facility beds in each state is obtained from reports on nursing facilities, staffing, residents, and deficiencies (Harrington et al. (1999), Harrington et al. (2003)). Women's labor force participation is calculated from Current Population Survey data. Population data are obtained from the Census Bureau website. Data on TANF, Welfare reform and business cycles obtained from the authors of Bitler et al. (2006) and Bitler et al. (2005).

## 5 Results

### 5.1 Basic Specification

The results of the estimation of Equation 1, using all HCBS waiver participants are reported in Table 6. The estimated coefficients can be interpreted as the marginal impacts of a one person increase in HCBS participants on expenditures.<sup>17</sup>

The results in Table 6 do not suggest any cost shifting as a result of the overall HCBS waiver program. In every category spending increases significantly with increases in WAIVERCASE, the number of HCBS waiver participants per adult Medicaid caseload. As expected, increasing WAIVERCASE significantly increases HCBS expenditures per adult Medicaid caseload. The estimated coefficient of 11,136 is significant at the 1% confidence level, which represents an estimated impact of an additional HCBS waiver participant on HCBS waiver expenditures of \$11,135. The average expenditure per HCBS waiver participant over this time period is \$18,370. It is possible that states that already have an HCBS waiver in place and add an

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<sup>17</sup>The marginal impacts represent the impact on expenditures of a one person increase in waiver participants. Marginal impacts were within \$10 of the coefficient estimates. Calculation of the marginal impacts entails first predicting expenditures per caseload from the coefficient estimates. Then the number of participants must be increased by one and predicted again to obtain new expenditures per caseload. Both sets of expenditures per caseload must be multiplied by caseload and then subtracted from each other to obtain the change in expenditures.

additional HCBS waiver use the infrastructure already in place. This would suggest high fixed costs of each state’s initial HCBS waiver program and economies of scale associated with program expansion, and thus explain why the marginal impact is less than the average expenditure.

There are no a priori expectations for institutional expenditures. However, the estimated coefficient, 14,519, is significant at the 1% confidence level. This is much less than the average institutional facility expenditures per Medicaid institutional resident, which is \$24,059. It is also greater than the impact on HCBS expenditures of an additional waiver participant. This can be explained by lower utilization than the average institutional resident.

The remainder of the results in Table 6 also show increases in expenditures. Medicaid home health expenditures increase by \$1,523 with a marginal increase in the number of HCBS participants. Pharmaceutical expenditures increase by \$4,712 with an additional HCBS participant while an increase in the HCBS waiver program of one participant increases total Medicaid expenditures by \$54,591.<sup>18</sup>

## 5.2 Robustness Checks

The estimated coefficients from Equation 1 are able to control for unobserved factors that may be correlated with the dependent variable that are fixed over time but vary across states or are fixed across states and vary over time. A bias may exist however, if there are unobserved factors that are correlated with the dependent variable that vary across states and over time. A model that allows for the interaction of state dummies and time dummies cannot be estimated due to the level of aggregation of the data. As an alternative, I estimate a model that includes a state-specific linear time trend. Equation 1 then becomes

$$EXPENDCASE_{s,t} = \beta_0 + \beta_1 * WAIVERCASE_{s,t} + \beta_2 * X_{s,t} + \beta_3 * state_s + \beta_4 * year_t + \beta_5 * state_s * t + \varepsilon_{s,t}, \quad (2)$$

---

<sup>18</sup>The sum of marginal impacts on the individual Medicaid categories do not sum to the marginal impact on total Medicaid expenditures because total Medicaid expenditures is comprised of more than these four individual categories.

where  $state_s * t$  controls for any state-specific trend in Medicaid expenditures. The state and year fixed effects are the same as in Equation 1. In effect, estimates of Equation 2 measure the impact on Medicaid expenditures in a given state of a growing percentage of Medicaid participants entering the waiver program after controlling for a linear trend over time in Medicaid expenditures in that state.

The results are reported in Table 7. In general, these estimates is similar to those shown in Table 6 in that there is again no evidence of cost-shifting as a result of the HCBS waiver program. In three of the four spending categories, increasing *WAIVERCASE* significantly increases expenditures. The estimated impact of an additional waiver participant on HCBS waiver expenditures decreases in this model to \$9,451 while the impact of an additional participant on institutional, pharmaceutical and total medicaid expenditures increases. These impacts are \$20,018, \$4,805, and \$78,299 respectively.

Because *WIVERCASE* significantly increases expenditures in most spending categories, an additional equation is estimated.

$$EXPENDCASE_{s,t} = \beta_0 + \beta_1 * WAIVERCASE_{s,t} + \beta_2 * WAIVERCASE_{s,t+2} + \beta_3 * X_{s,t} + \beta_4 * state_s + \beta_5 * year_t + \beta_6 * state_s * t + \varepsilon_{s,t}, \quad (3)$$

This regression includes a “placebo” policy variable,  $WAIVERCASE_{s,t+2}$ , that we know cannot affect  $EXPENDCASE_{s,t}$ . Future waiver participants can not impact past expenditures. A comparison of the statistical significance of the estimated coefficients for  $WAIVERCASE_{s,t}$  and  $WAIVERCASE_{s,t+2}$  demonstrates the comparative efficacy of the “real” policy variable.

Table 8 reports the results of the estimation of equation 3. As expected  $WAIVERCASE_{s,t+2}$  is not statistically different from zero in any of the regressions. The “real” policy variable,  $WAIVERCASE_{s,t}$ , is of similar magnitude in all of the regressions and significantly different from zero in three of the five, HCBS, institutional and total Medicaid expenditures.

It is possible that states with increasing Medicaid expenditure trajectories are states that use the HCBS waiver program more extensively. In order to examine this possibility, I test

whether the HCBS waiver program is associated with increased Medicaid expenditures in categories that waiver participants do not use. This is done by estimating equations 1 and 2 with two other dependent variables, expenditures on Medicaid sterilizations per Medicaid caseload and expenditures on Medicaid abortions per Medicaid caseload. Table 9 shows the results of these regressions. As expected there is no impact of increasing the percentage of Medicaid participating in HCBS waivers on Medicaid expenditures toward sterilizations or abortions for all waivers. Overall this suggests that the results from Equation 1 are not merely picking up a correlation between high expenditure states using the HCBS waiver program more extensively.

## 6 Discussion

The results reported in Section 5 have some interesting interpretations in light of how the HCBS waiver program operates. The most important of these are discussed here. HCBS waiver participants must be deemed at an institutional level of care prior to qualifying for a waiver slot. As a result of this population's poor health its spending in Medicaid is expected to be higher than the average Medicaid spending for the aged or disabled. Table 4 highlights this by pointing out that the average spending per HCBS waiver participants on HCBS waiver services, \$18,370, is greater than the average spending per aged or disabled Medicaid participant in all Medicaid categories combined, \$10,388 and \$9,729 respectively. The average spending per waiver participant on HCBS services is similar to the average Medicaid institutional spending per Medicaid institutional facility resident, \$24,059. The institutional care population is an expensive sub-population of the Medicaid caseload.

While contrary to the cost-containment goal of the waiver program, the result that the estimated impact of an additional waiver participant increases institutional expenditures \$14,523 is consistent with other evidence of cost increases. Suppose an individual enters the HCBS waiver program and then realizes he needs more support. He may then transition to an institution. A report by the U.S. General Accounting Office (2003) on the federal oversight of

the HCBS waiver program found that services were not being provided, were stopped without notice, and some participants were not receiving adequate amounts of care. This report notes that the Centers for Medicare and Medicaid Services' regional office in Dallas found that waiver participants in Oklahoma were not receiving the appropriate amounts of personal care services. 7,773 participants (49%) received only half of their authorized services and 4,303 participants (27%) received none of their authorized services. "While the consequences for the beneficiaries were not identified in the review, failure to provide authorized needed services may result in harm and could affect the continued ability of beneficiaries to be cared for at home" (U.S. General Accounting Office (2003)). In short, the introduction of waivers can provide the perverse incentive to enter the more expensive institution. Moreover, the high cost of institutional care relative to the costs of the other services helps explain the relatively large magnitude of this estimated coefficient.

The Colorado Fast Track program described by Holtz and Eiken (2003) suggests how easily the cost saving can be undermined by creating inappropriate incentives. The Fast Track program identifies and informs individuals in the hospital that they are eligible for the HCBS program. If individuals have not yet qualified for Medicaid prior to leaving the hospital, they are discharged to nursing facilities because nursing facilities are allowed to bill for up to three months of care while Medicaid eligibility is determined. Case managers from the Fast Track program continue to work with the individual until he transitions back to the community and participates in the HCBS program, is denied Medicaid eligibility, or decides to stay in the nursing facility.

Changes in eligibility requirements for HCBS waivers also can give individuals an incentive to enter the Medicaid program. Each HCBS waiver program must set its financial eligibility criteria between 100 percent of Supplemental Security Income and the institutional level of qualifying at 300 percent of Supplemental Security Income. In an attempt to discourage institutional care, states have raised the financial eligibility cutoff for the waiver program. According to a survey done by Kitchener et al. (2004) 67 percent of the waivers in 2002 had increased the financial eligibility criteria to 300 percent of Supplemental Security Income, only

eight percent used the standard 100 percent of Supplemental Security Income, and the rest used other limits between 100 and 300 percent. It is these individuals that qualify at the higher limits that increase Medicaid caseloads. This is an example of how the previously mentioned woodwork effect can occur. Without the HCBS waiver program these individuals would not have the option of participating in Medicaid without moving to an institution. Presumably, these individuals are already at an institutional level of care in order to receive HCBS waiver services. If these individuals are living in the community their aversion to institutional care must be high. The HCBS waiver program subsidizes this aversion to institutional care.

## 7 Conclusion

Using state-level panel data and a difference-in-difference estimation strategy this paper demonstrates that despite the goal of controlling long-term care expenditures, there is no evidence that the HCBS waivers provide any cost-savings. In fact spending increases in virtually every waiver type and expenditure category estimated. Regardless of the target population that is the focus or specification estimated, the same conclusion is reached. The HCBS waiver program shows no evidence that it is a cost-control mechanism. Due to the details of the laws writing, total Medicaid expenditures actually increase by a substantial \$54,591.

The results reported here are a first step. Individual-level data would allow testing hypothesis as to *why* expenditures go up. One possibility is that the HCBS waiver program is attracting individuals that had no intention of ever using institutional care, the woodwork effect. Individual-level data, such as the Medicaid Analytic Extract available from Centers for Medicare and Medicaid Services, would allow for the size of the woodwork effect to be determined and to determine if these individuals then go on to use institutional care as the results from this paper suggest. Individual-level data would also allow for testing the degree of substitutability between the HCBS waiver program and institutional care. This would require following individuals over time to see how they respond to new incentives created by

the HCBS waiver program.

Hypotheses generated from this paper's results can also be tested with individual-level data. For example, might people enter the waiver program then transition to institutional care when they realize they need more support? Individual-level data allows for following individuals that are participating in the HCBS waiver program to determine a survival function of transitioning to institutional care. These issues will become increasingly important as Medicaid expenditures comprise an ever-increasing share of state budgets and the elderly population continues to grow.

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Table 1: Growth in HCBS Waiver Participation (persons)

Year	All HCBS Waivers (% Change)
1992	235,580
1993	297,088 (26%)
1994	353,011 (19%)
1995	418,890 (19%)
1996	478,822 (14%)
1997	561,680 (17%)
1998	619,546 (10%)
1999	698,046 (13%)
2000	768,375 (10%)
% increase from 1992-2000	
	226%
Avg. Yearly % Change	
	16%

*Notes:*

Definitions: All HCBS Waivers represents the number of unduplicated individuals participating in an HCBS waiver. Percentage change calculated by author. Source: Kitchener et al. (2003)

Table 2: States Where HCBS Expenditures per Participant Were Greater Than Nursing Facility Expenditures per Beneficiary In Any Year

State	# of years	Average difference for those years	Average difference for all years
Maryland	9	\$22,294	\$19,356
Oklahoma	8	\$18,674	\$14,122
Texas	10	\$15,474	\$15,474
Pennsylvania	7	\$15,246	\$7,584
Tennessee	7	\$13,282	\$8,980
New Mexico	8	\$12,815	\$9,233
Rhode Island	9	\$12,222	\$10,924
Maine	6	\$10,732	\$4,853
Wyoming	10	\$10,237	\$10,237
Michigan	2	\$9,339	-\$3,651
Vermont	10	\$8,716	\$8,716
New England	7	\$6,894	\$3,806
Connecticut	8	\$6,627	\$4,634
Louisiana	7	\$6,362	\$2,539
Indiana	3	\$5,747	-\$4,924
North Carolina	4	\$5,569	-\$1,486
Massachusetts	7	\$4,852	\$1,675
New Hampshire	10	\$4,702	\$4,702
South Dakota	9	\$4,291	\$3,203
Utah	9	\$4,166	\$919
Colorado	1	\$2,799	-\$3,538
Delaware	2	\$2,676	-\$3,984
Montana	1	\$2,319	-\$2,910
Kansas	5	\$1,912	-\$612
West Virginia	1	\$671	-\$5,149
Iowa	1	\$343	-\$6,101
<b>Average</b>	<b>6</b>	<b>\$8,037</b>	<b>-\$3,528</b>
Total number of states:	26		

Notes:

Average HCBS *Expenditures* =  $\frac{HCBS\text{expenditures}}{HCBS\text{participants}}$ , Average Nursing Facility *Expenditures* =  $\frac{nursing\text{facilityexpenditures}}{nursing\text{facilitybeneficiaries}}$ . All calculations by author. Source of nursing facility beneficiaries: Information on nursing facility beneficiaries come from Centers for Medicare and Medicaid Services (1992-2001b). Information on HCBS waiver participants from Kitchener et al. (2003). Data on HCBS waiver and nursing facility expenditures from Centers for Medicare and Medicaid Services. All calculations by author.

Table 3: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
<i>EXPENDCASE</i>					
HCBS Waivers	432	596.18	528.48	0	3,207.70
Institutional	432	2,710.36	1,257.11	556.29	7,255.16
Home Health	432	120.38	121.45	0	802.04
Pharmaceutical	432	620.09	218.02	-0.79	1,605.64
Total	432	9,584.21	3,278.14	3,256.85	3,400.43
<i>WAIVERCASE</i>					
All Waivers	432	.0343	.025	0	.147
<i>Control Variables</i>					
Nursing Facility Beds	432	0.622	0.24	0.097	1.204
Women's LFP	432	64.40	5.21	43.76	76.4
TANF	432	0.41	0.49	0	1
WELFARE	432	0.123	0.33	0	1
AFDC Benefits	432	4.903	1.92	1.39	12.3
Unemployment Rate	432	5.19	1.6	2.2	11.4
Employment Growth Rate	432	2.26	1.35	-2.64	9.86

*Notes:*

Summary statistics cover 1992-2000. Hawaii and Oklahoma are excluded because caseload data is not available for all periods. Arizona is excluded because it runs an 1115 waiver. *EXPENDCASE* variables are Medicaid expenditures per state adult Medicaid caseload. All expenditures are adjusted to 2000 dollars using the CPI-U. Medicaid Pharmaceutical expenditures may take negative values due to the inclusion of state rebates. Medicaid Institutional expenditures include nursing facility expenditures and intermediate care facilities for the mentally retarded/developmentally disabled. All Waivers represents the number of unduplicated individuals participating in an HCBS waiver per state adult Medicaid caseload. Nursing Beds is the number of Medicaid nursing facility beds in each state expressed as a percent of state population in a given year. Women's LFP is the women's labor force participation in each state, expressed as a percent of the state population in a given year. TANF is an indicator variable if state  $s$  implemented TANF before March of year  $t$ . Welfare is an indicator variable if state  $s$  implemented a welfare waiver before March of year  $t$  and TANF had not been implemented. AFDC Benefits are the maximum AFDC Benefits for a family of three, the unemployment rate is the rate of unemployment in state  $s$  in year  $t$  and the employment growth rate is the rate of growth in the employment rate in state  $s$  in year  $t$ . Sources: Kitchener et al. (2003), Centers for Medicare and Medicaid Services, Harrington et al. (1999), Harrington et al. (2003), Current Population Survey, Ku and Garrett (2000).

Table 4: Average Medicaid Medical Payments

Average HCBS Waiver Expenditures per Waiver Participant	
All Waivers	\$18,370
Average Medicaid Payments in 2000	
<i>By Basis of Eligibility</i>	
65 and older	\$10,388.36
Blind/Disabled	\$9,729.04
Adults	\$1,676.00
<i>By Service Category</i>	
Intermediate Care Facility	\$78,881.68
Nursing Facility	\$20,239.57
Home Health	\$3,111.39
Pharmaceutical	\$979.02
Sterilizations	\$932.35
Average Institutional Expenditures*	\$24,059.17

*Notes:*

All calculations made by author. Average Medicaid payments, except where noted, were calculated by dividing payments by number of individuals served. Average institutional expenditures consist of nursing facility payments plus intermediate care facility payments divided by the number of individuals participating in either a nursing facility or intermediate care facility. Average HCBS waiver expenditures per waiver participant were calculated by taking averages at the state-year level. Sources: Medicaid vendor payments and individuals served in 2000 come from Centers for Medicare and Medicaid Services, HCBS waiver participants come from Kitchener et al. (2003), HCBS waiver expenditures come from Centers for Medicare and Medicaid Services.

Table 5: Expected Impact of Additional HCBS Waiver Participants on Medicaid Expenditures

<b>Expenditure Category</b>	<b>HCBS Participants Not Previously in Medicaid</b>	<b>HCBS Participants in Institutions</b>	<b>HCBS Participants in Community</b>	<b>Total Effect</b>
HCBS waivers	( + )	( + )	( + )	( + )
Institutional	( + )	( - )	none	( ? )
Home Health	( + )	( + )	( + )	( + )
Pharmaceutical	( + )	( - )	( + )	( ? )
Total	( + )	( ? )	( ? )	( ? )

*Notes:*

Each cell shows the expected impact of additional HCBS waiver participants on Medicaid expenditures. Institutional expenditures include nursing facility and intermediate care facility for the mentally retarded/developmentally disabled expenditures.

Table 6: Impact of HCBS Waivers on Medicaid Expenditures, Basic Specification

	EXPENDCASE				
	HCBS	Institutional	Home Health	Pharmaceutical	Total
$WAIVERCASE_{s,t}$	<b>11,136***</b> (959.8)	<b>14,519***</b> (4,314)	<b>1,523**</b> (640.5)	<b>4,712***</b> (1,383)	<b>54,601***</b> (17,868)
Nursing Beds	130.26 (166.26)	-12.73 (663.72)	-52.96 (59.49)	101.26 (190.37)	-1,380.92 (1,868.62)
Women's LFP	-5.68 (4.83)	<b>29.37*</b> (16.52)	-0.003 (1.69)	-3.54 (6.65)	20.80 (42.17)
TANF	-37.93 (44.65)	-330.96 (207.69)	-15.42 (15.22)	27.18 (38.78)	-497.32 (484.68)
WELFARE	10.63 (17.72)	-66.99 (103.15)	-21.51 (16.55)	23.68 (49.06)	-75.51 (394.05)
AFDC Benefits	-13.89 (53.76)	<b>255.08*</b> (133.62)	-9.30 (8.54)	<b>40.81*</b> (22.34)	199.59 (233.89)
Unemployment Rate	17.49 (21.71)	50.19 (77.69)	4.35 (6.24)	6.32 (21.82)	<b>237.48*</b> (139.36)
Employment Growth Rate	9.1 (20.83)	51.73 (41.79)	2.05 (4.54)	-0.27 (17.65)	74.03 (101.30)
Constant	<b>24.85*</b> (378.39)	-815.99 (1,488.95)	52.19 (114.23)	3,334.46 (3,205.30)	3,873.81 (3,154.23)
Observations	432	432	432	432	432
R-squared	0.929	0.946	0.914	0.795	0.91
State F.E.	Yes	Yes	Yes	Yes	Yes
Year F.E.	Yes	Yes	Yes	Yes	Yes
State*Trend	No	No	No	No	No

*Notes:*

Equation estimated:  $EXPENDCASE_{s,t} = \beta_0 + \beta_1 * WAIVERCASE_{s,t} + \beta_2 * X_{s,t} + \beta_3 * state_s + \beta_4 * year_t + \varepsilon_{s,t}$  The sample covers 1992-2000. Hawaii and Oklahoma are excluded because caseload data is not available for all periods. Arizona is excluded because it runs an 1115 waiver. WAIVERCASE represents the total number of waiver participants per state adult Medicaid caseload. EXPENDCASE represents Medicaid expenditures and is divided by state adult Medicaid caseload. All regressions include controls for Nursing beds as a percent of the state population, Women's LFP expressed as a percent of state population, an indicator variable if TANF was implemented in state  $s$  before March of year  $t$ , an indicator variable if a welfare waiver was implemented in state  $s$  before March of year  $t$  and TANF had not been implemented, the maximum AFDC benefits for a family of three, the unemployment rate, and the employment growth rate in state  $s$  in year  $t$ . In parentheses: Heteroskedasticity-robust standard errors clustered at the state-level. Regressions weighted by state population age 65 and over. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Table 7: Impact of HCBS Waivers on Medicaid Expenditures, Adding State Linear Trends

	EXPENDCASE				
	HCBS	Institutional	Home Health	Pharmaceutical	Total
$WAIVERCASE_{s,t}$	<b>9,451***</b> (1,560)	<b>20,018***</b> (5,532)	1,121 (897.4)	<b>4,805**</b> (1,993)	<b>78,299***</b> (22,147)
Nursing Beds	151.10 (117.21)	-349.57 (629.60)	-79.27 (69.06)	-66.18 (179.41)	1,730.02 (2,185.83)
Women's LFP	-3.97 (3.18)	2.45 (13.23)	-0.68 (1.53)	0.48 (5.21)	-6.65 (39.91)
TANF	-34.29 (38.60)	-235.72 (214.30)	-16.18 (16.43)	1.91 (49.48)	-381.79 (523.38)
WELFARE	-13.27 (14.24)	-38.99 (105.29)	-21.76 (14.83)	(-22.71) 37.73	-101.71 (357.46)
AFDC Benefits	-6.82 (21.61)	-85.244 (98.15)	9.09 (13.65)	-30.74 (33.52)	-404.80 (319.57)
Unemployment Rate	21.50 (13.62)	-5.19 (65.96)	-2.48 (6.98)	3.79 (18.86)	41.63 (213.67)
Employment Growth Rate	-2.61 (8.83)	50.81 (42.68)	1.11 (4.49)	13.77 (7.98)	200.97* (119.36)
Constant	-172.71 (242.53)	1,674.43 (1,066.41)	124.64 (111.54)	441.48 (369.46)	7,025.71* (3,650.07)
Observations	432	432	432	432	432
R-squared	0.974	0.972	0.943	0.904	0.937

*Notes:*

Equation estimated:  $EXPENDCASE_{s,t} = \beta_0 + \beta_1 * WAIVERCASE_{s,t} + \beta_2 * X_{s,t} + \beta_3 * state_s + \beta_4 * year_t + \beta_5 * state_s * t + \varepsilon_{s,t}$   
The sample covers 1992-2000. Hawaii and Oklahoma are excluded because caseload data is not available for all periods. Arizona is excluded because it runs an 1115 waiver. WAIVERCASE represents the total number of waiver participants per state adult Medicaid caseload. EXPENDCASE represents Medicaid expenditures and is divided by state adult Medicaid caseload. All regressions include controls for Nursing beds as a percent of the state population, Women's LFP expressed as a percent of state population, an indicator variable if TANF was implemented in state  $s$  before March of year  $t$ , an indicator variable if a welfare waiver was implemented in state  $s$  before March of year  $t$  and TANF had not been implemented, the maximum AFDC benefits for a family of three, the unemployment rate, and the employment growth rate in state  $s$  in year  $t$ . In parentheses: Heteroskedasticity-robust standard errors clustered at the state-level. Regressions weighted by state population age 65 and over. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Table 8: Impact of HCBS Waivers on Medicaid Expenditures, Adding a Placebo Policy

	EXPENDCASE				
	HCBS	Institutional	Home Health	Pharmaceutical	Total
$WAIVERCASE_{s,t}$	<b>8,252**</b> (1,880)	<b>19,589***</b> (7,355)	1,593 (1,365)	3,924 (2,392)	<b>83,789***</b> (31,384)
$WAIVERCASE_{s,t+2}$	2,113 (1,305)	1,395 (4,622)	-257.7 (706.3)	-1,160 (1,194)	-10,583 (19,169)
Observations	336	336	336	336	336
R-squared	0.972	0.977	0.946	0.896	0.944

*Notes:*

Equation estimated:  $EXPENDCASE_{s,t} = \beta_0 + \beta_1 * WAIVERCASE_{s,t} + \beta_2 * WAIVERCASE_{s,t+2} + \beta_3 * X_{s,t} + \beta_4 * state_s + \beta_5 * year_t + \beta_6 * state_s * t + \varepsilon_{s,t}$   
The sample covers 1992-2000. Hawaii and Oklahoma are excluded because caseload data is not available for all periods. Arizona is excluded because it runs an 1115 waiver. WAIVERCASE represents the total number of waiver participants per state adult Medicaid caseload. EXPENDCASE represents Medicaid expenditures and is divided by state adult Medicaid caseload. All regressions include controls for Nursing beds as a percent of the state population, Women's LFP expressed as a percent of state population, an indicator variable if TANF was implemented in state  $s$  before March of year  $t$ , an indicator variable if a welfare waiver was implemented in state  $s$  before March of year  $t$  and TANF had not been implemented, the maximum AFDC benefits for a family of three, the unemployment rate, and the employment growth rate in state  $s$  in year  $t$ . In parentheses: Heteroskedasticity-robust standard errors clustered at the state-level. Regressions weighted by state population age 65 and over. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Table 9: Specification Check

	<u>EXPENDCASE</u>			
	Sterilizations		Abortions	
$WAIVERCASE_{s,t}$	26.19 (38.64)	-23.18 (51.48)	-0.121 (0.267)	-0.445 (0.471)
$WAIVERCASE_{s,t+2}$	-	42.55 (61.6)	-	-0.0278 (0.406)
Observations	432	336	432	336
R-squared	0.876	0.75	0.443	0.34

*Notes:*

Equation estimated:  $EXPENDCASE_{s,t} = \beta_0 + \beta_1 * WAIVERCASE_{s,t} + \beta_2 * X_{s,t} + \beta_3 * state_s + \beta_4 * year_t + \varepsilon_{s,t}$  The sample covers 1992-2000. Hawaii and Oklahoma are excluded because caseload data is not available for all periods. Arizona is excluded because it runs an 1115 waiver. WAIVERCASE represents the total number of waiver participants per state adult Medicaid caseload. EXPENDCASE represents Medicaid expenditures and is divided by state adult Medicaid caseload. All regressions include controls for Nursing beds as a percent of the state population, Women's LFP expressed as a percent of state population, an indicator variable if TANF was implemented in state  $s$  before March of year  $t$ , an indicator variable if a welfare waiver was implemented in state  $s$  before March of year  $t$  and TANF had not been implemented, the maximum AFDC benefits for a family of three, the unemployment rate, and the employment growth rate in state  $s$  in year  $t$ . In parentheses: Heteroskedasticity-robust standard errors clustered at the state-level. Regressions weighted by state population age 65 and over. \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

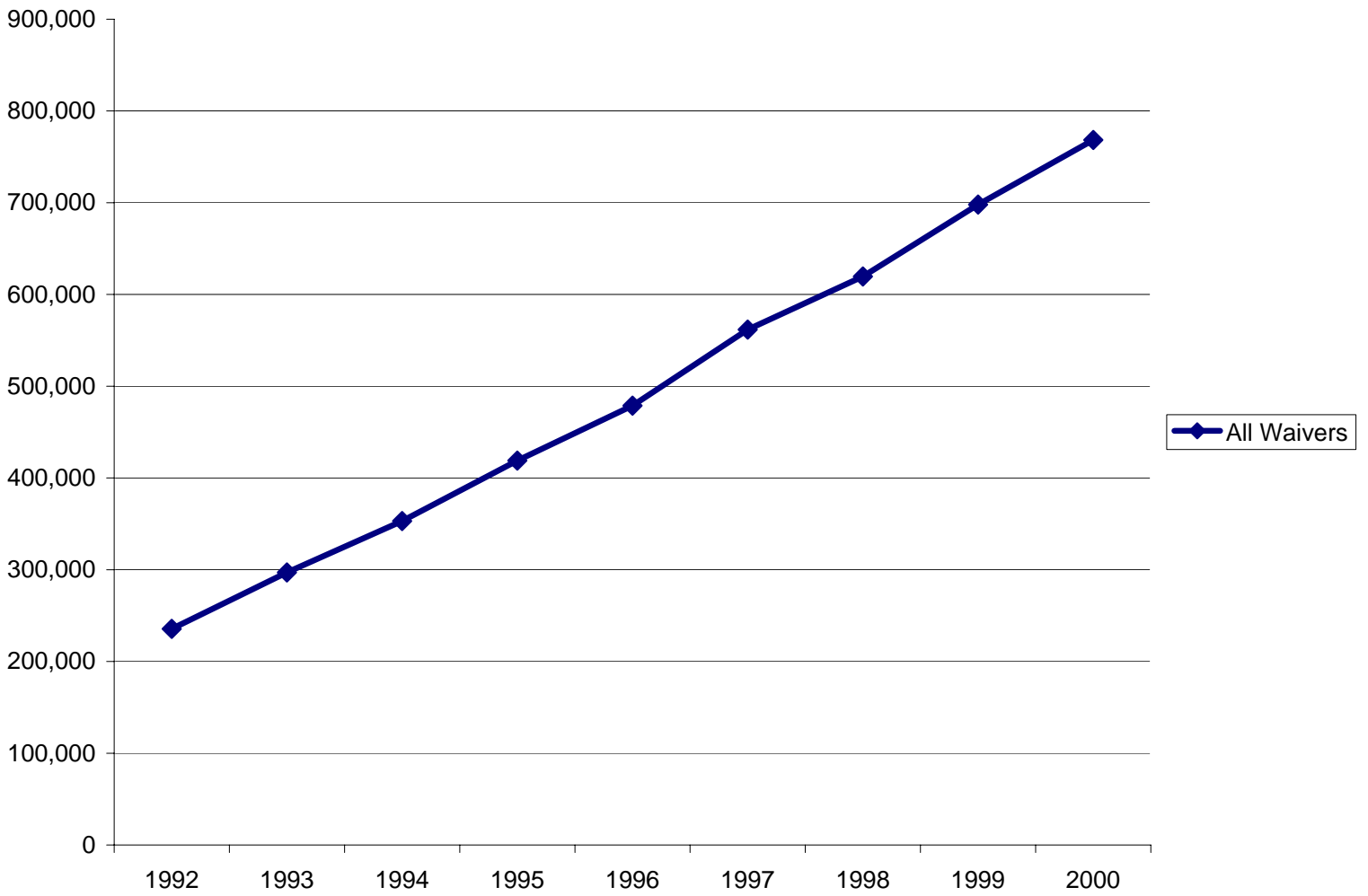


Figure 1: Growth in Medicaid HCBS Waiver Participants

*Notes:*

Participants measured as number of unduplicated individuals participating in HCBS waivers. Waiver participant data come from Kitchener et al. (2003).

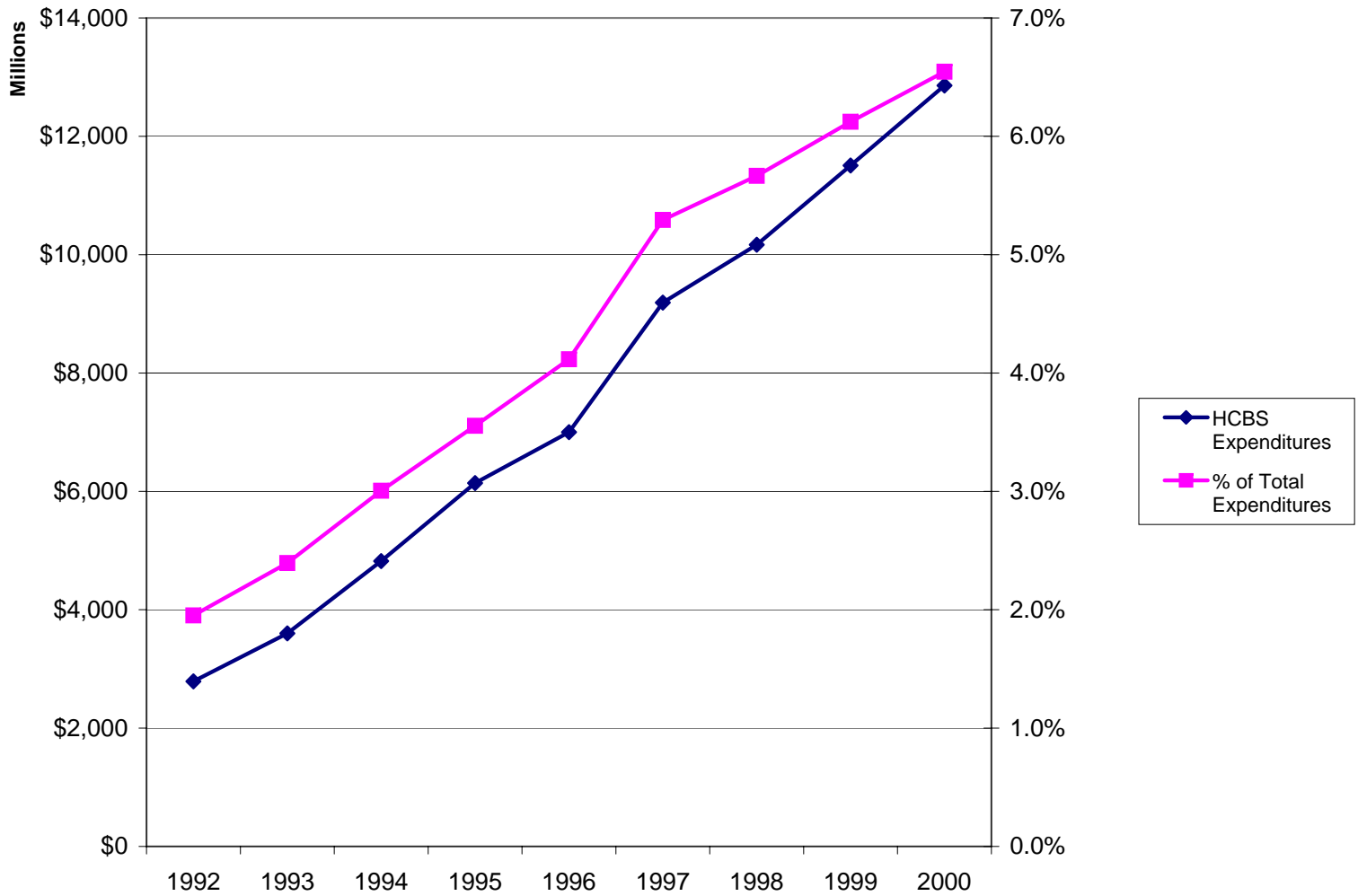


Figure 2: Growth in Medicaid HCBS Waiver Expenditures

*Notes:*

HCBS waiver expenditures measured in millions of dollars and as a percent of total Medicaid expenditures. Total Medicaid expenditure and HCBS waiver expenditure data come from Centers for Medicare and Medicaid Services and are expressed in 2000 dollars. All calculations made by author.

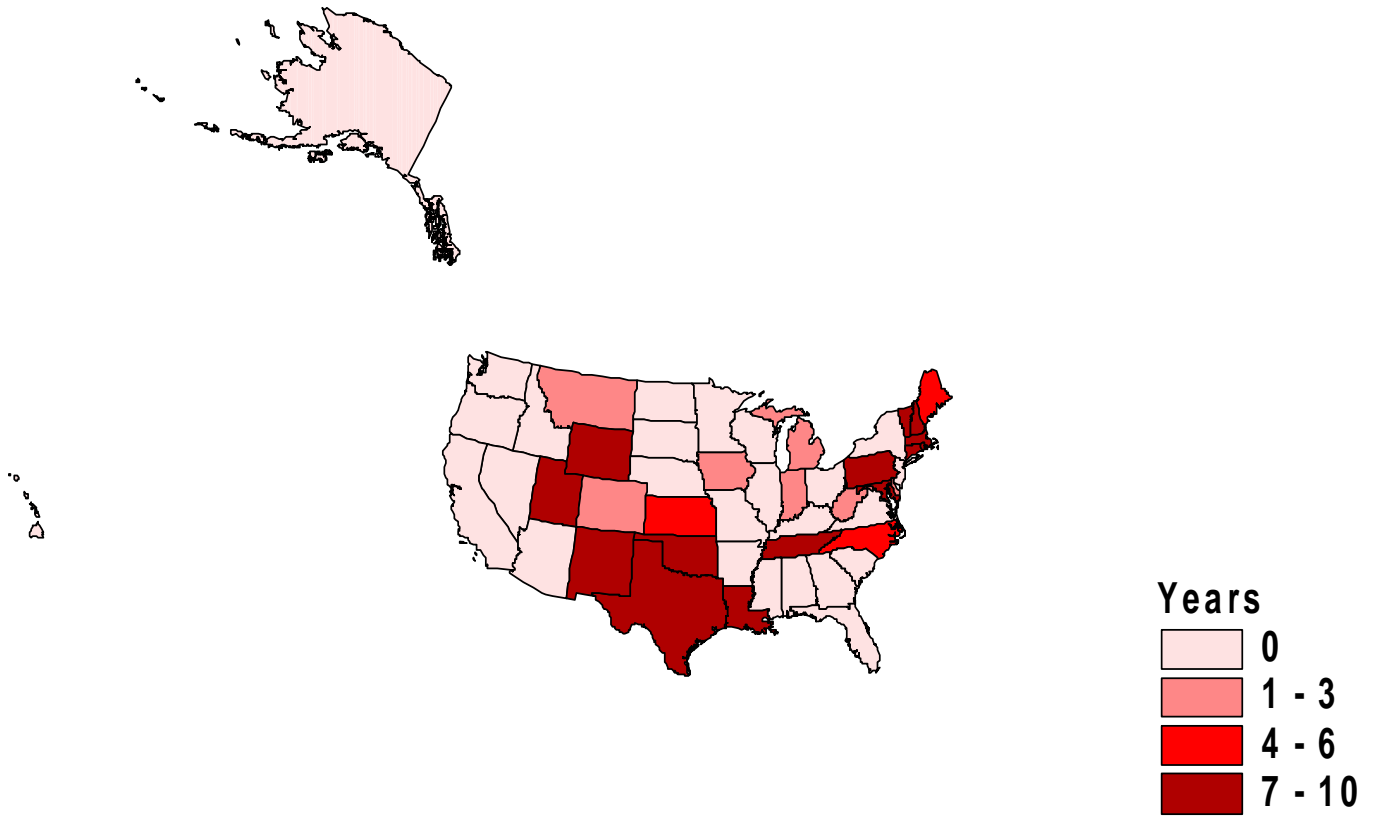


Figure 3: Number of Years Average Waiver Expenditures Are Larger than Average Nursing Facility Expenditures: 1992-2001

Notes:

Average HCBS Expenditures =  $\frac{HCBSexpenditures}{HCBSparticipants}$ , Average Nursing Facility Expenditures =  $\frac{nursingfacilityexpenditures}{nursingfacilitybeneficiaries}$ . All calculations by author. Source of nursing facility beneficiaries: Information on nursing facility beneficiaries come from Centers for Medicare and Medicaid Services (1992-2001b). Information on HCBS waiver participants from Kitchener et al. (2003). Data on HCBS waiver and nursing facility expenditures from Centers for Medicare and Medicaid Services. All calculations by author.