

**Examining the Impact of Undergraduate Berkeley Students and their
Inefficient Choices on Health Insurance Providers**

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ABSTRACT

This study examined the inefficiency of undergraduate Berkeley students on choosing health insurance providers when given an efficient health insurance, SHIP. The study also sought to contribute to the limited literature of take-up and how it affects individuals and their decisions to take up health insurance providers. I used the effect of age, ethnicity, gender, and use of health insurance per year to create linear regression models to estimate efficiency of students choosing the right health insurance and the knowledge of students on SHIP health insurance. I also used descriptive data to test the general healthiness, the efficiency level, the knowledge level, and the effect of take-up for Berkeley students. I found that Berkeley undergraduate students are generally healthy and that SHIP is efficient for them. However, most students are inefficient and unknowledgeable of the benefits and costs of SHIP, and this can be explained mostly by take-up, especially by default. Conversely, while using the regression models, only one variable came out to be significant and that was the use of health insurance 6-10 per year to estimate efficiency. Nevertheless, this variable did not account for a substantial share of the impact on efficiency, and thus further studies are needed to improve the regression models in support of the descriptive data.

INTRODUCTION

Health care in the United States, unlike many other developed nations, is not state-funded and isn't guaranteed by the government for its citizens. Instead, individuals must search for a health insurance provider or pay high up front fees. However, government programs do exist to provide the needy with adequate health care policies, but for the majority of the population, health insurance is not free and comes with a hefty price tag. Thus, many individuals, more than 15% of the US population is uninsured. What is even worse is that California, with one of the highest GDPs, is among the leading states with the most uninsured individuals, over 18.5%. Because of such, public colleges like UC Berkeley have identified the need to provide excellent health insurance (SHIP) for an affordable price to its students, hoping to at least guarantee that all of its students, those previously uninsured and those previously insured, will have health insurance throughout their college years. With such a guarantee of great health insurance for a minimum fee, students should naturally take-up this plan. However, preliminary studies have shown that students are not taking up the plan, instead they are taking up other insurance providers or they take up SHIP and another insurance provider.

Perhaps, it is the inefficiency of SHIP, because it is a private insurance care provider. Brandon RM, Podhorzer M, and Pollak TH (1991) said in their study that private insurances spent 14 times as much on administration, overhead, and marketing per dollar of claims paid as did the public insurances. "Had an efficient public program such as Medicare or the Canadian system provided the same amount of benefits, consumers and businesses served by commercial insurers would have saved \$13 billion." However, SHIP is efficient as it provides a comparable health insurance plan for an affordable price.¹

¹ Refer to background literature for further details.

Hence, the problem lies on the other side with the students. In a study of a similar problem, Currie (2003) proposed the “take-up effect” to explain the take up of social benefits in the UK and US. She found that take-up was enhanced by automatic or default enrollment and lowered by administrative barriers due to stigma, transaction costs, or a lack of information. This would explain why Berkeley students were not taking up SHIP and instead, taking up an insurance that was less efficient than SHIP.

Following up on this study, my approach is to examine the take up effect as it applies to Berkeley students and SHIP. This paper will contribute to the limited literature of take-up and how it affects individuals and their decisions to take up health insurance. Since most studies have examined the inefficiencies of the health care systems, my study will aim to examine the inefficiency of the individuals who have health insurance, specifically UC Berkeley undergraduate students. It will examine inefficiency caused by individuals when they are given an efficient health insurance.

My argument is that Berkeley students are generally healthy and only need a basic insurance. For a basic insurance, SHIP will provide the best benefits for the cheapest price. Secondly, I believe there is inefficiency, such that most students will either have another insurance provider or SHIP and another insurance. Thirdly, I also believe that the number of uses of health insurance per year, age, gender, and ethnicity will affect how inefficient an individual is. Finally, I hypothesize that the main reason why Berkeley students do not take up SHIP is because of the lack of information (not being knowledgeable of the benefits and costs of SHIP) as explained by Currie on the take-up effect.

To examine these hypotheses, this paper will analyze the relation between undergraduate UC Berkeley students and health insurance providers, especially SHIP. First, in Part I, I provide

a brief overview of relevant literature on health insurance in the US and California market, and the effects of take-up. Then, in Part II, I provide a detailed account of the data and how it was performed on undergraduate students of University of California, Berkeley. In Part III, I present the analytical models and their significant results. In Part IV, I summarize the evidence for health insurance on Berkeley students. Part V concludes the study, while focusing on future work in this area.

BACKGROUND LITERATURE

A. US Health Insurance

In the US in 2004, according to the US Census Bureau on the Income, Poverty, and Health Insurance Coverage in the United States (2005), 84.3% of Americans have health insurance. That is about 245.3 million people, non-elderly and elderly currently covered either through their place of employment, individually, or under various government agencies (Medicaid, Medicare, or military health care). Of that total, 59.8% obtain their coverage through an employer or by themselves (private health insurance), while 27.2% of the insured are covered through various government agencies (public health insurance).

Traditionally, there were only two types of private insurance plans that offered fee-for-service: Blue Cross/Blue Shield plans that charged either “community rated” or “experience rated” insurance premiums. However, over the past twenty years, there has been a radical change of private insurance towards managed care. This includes Health Maintenance Organizations (HMOs), Preferred Provider Organizations (PPOs), and Point of Service (POS) that restricts patient’s choices on providers and have strict co-payments and deductibles. Though, compared to

fee-for-service, these plans tend to be a lot cheaper; however, it doesn't mean there isn't a premium or inefficiency.

Rise of managed care in the U.S.				
Year	conventional plans	HMOs	PPOs	POS plans
1988	73%	16%	11%	NA
1993	46%	21%	26%	7%
1996	27%	31%	28%	14%
1998	14%	27%	35%	24%
1999	9%	28%	38%	25%
2000	8%	29%	41%	22%
2001	7%	23%	48%	22%

According to the US Consensus Bureau, by 2001 nearly 50% of the private health insurance was PPOs.

Presently, there are about 45.8 million people in the US that are currently uninsured. This is actually an 800,000 person increase from the previous year. (Appendix 2) Of those that are uninsured, 8.77 million are in the range of 18-24 years old, which accounts for 19% of the uninsured and 31.4% of the total 18-24 year old range. This is the largest group of uninsured age ranges. Depending on ethnicity, the largest group of uninsured individuals would be 21.98 million Caucasians, while the smallest group would be 2.07 million Asians. However, according to percentage of total, 11.3% of Caucasians are uninsured while 16.8% of Asians are uninsured

(by largest total percentage, 32.7% of Hispanics are uninsured with a total equal to 13.68 million).

B. California Health Insurance

California has one of the highest rates of uninsured in the United States, with over 18.5% of the population uninsured. It has the third-highest rate of uninsured for the nonelderly population, accounting for over 24.4% percent compared to the national average of 18.4%. (Fronstin 2000) Of that statistic, only 57% of the nonelderly Hispanics in California were insured in 1998 according to the Employee Benefit Research Institute Special report in September 2000, compared to 86% of the nonelderly Caucasians and 79% of the nonelderly Asians.

C. Berkeley Demographics

<u>Fall 2004 Headcount</u>	<u>Undergrad</u>	<u>Grad</u>
	22,880	9,934
<u>California Resident</u>	89%	64%
<u>Gender</u>		
Male	46%	54%
Female	54%	46%
<u>Ethnicity</u>		
African-Am/Black	4%	3%
Amer Indian	1%	1%
Asian-Am/Pac Isl	43%	18%
Caucasian	31%	46%
Hispanic	11%	6%
International	3%	18%

According to the fall 2004 statistics from Cal Stats, there are approximately 23,000 undergraduates. The male to female ratio is 0.85. The undergraduate class is composed of 43% Asian, 31% Caucasian, 11% Hispanic, 4% African-American, and 4% others.

D. Berkeley Health Insurance

The Student Health Insurance Plan, denoted SHIP, was voted in by students and passed by the UC Regents as the default insurance plan for all students, undergraduates and graduates, of UC Berkeley. The University requires all students to have a major insurance provider and SHIP automatically meets that requirement by providing students with the basic coverage for an affordable price. SHIP is a Blue Cross PPO that provides primary care, hospitalization, traveling insurance (in case if you are sick abroad), full dental coverage, and other such benefits. “Students automatically are enrolled in SHIP, and there is a charge on the CARS bill [for \$573 dollars per 6 months for undergraduates]. Students can choose to keep SHIP, or they can waive enrollment if they have comparable coverage.” (Berkeley SHIP website) In order to waive out of SHIP, the minimum requirements for a comparable coverage would include (Berkeley SHIP website):

1. Enrolling in a medical health insurance plan through a recognized company that is owned, headquartered and operated in the United States. Foreign insurance plans with U.S. affiliates/representatives, travel insurance plans and reimbursement programs of any kind do not qualify, including reimbursement arrangements of vouchers for home governments or their U.S.-based consulates.
2. A private insurance plan that provides:
 - a minimum of \$250,000 in lifetime benefits
 - 90% coverage of hospitalization fees
 - 80% coverage of professional fees
 - at least 15 days of inpatient mental health services
 - worldwide coverage for all services
 - a network provider facility within 50 miles of the UCB campus.
3. An annual deductible through your private insurance plan that must be no more than \$500

SHIP is classified under managed care through a private insurance. It functions like a company because it provides its employees (students) with a managed care plan (SHIP). If you

cannot afford the cost of SHIP, financial aid will cover the expenses; so every student in Berkeley either has SHIP, another provider, or has SHIP and another plan (which would indicate they did not meet the comparable requirements and couldn't waive out).

E. Other Insurance Providers Compared to SHIP²

Kaiser Permanente is a comparable plan that also has a comparable price. Its plan covers all of the above minimum requirements. For an individual, you would pay up to \$1,250 per year (as compared to \$1146 for SHIP).

Blue Cross, which is the same provider for SHIP, offers outside of the University a plan that has a \$500 deductible with a 30% co-payment and a 30% co-payment for office visits for \$197 per month, which is more than twice what you would pay for SHIP. For a plan that costs almost the same (\$91 per month), it offers a \$5,000 deductible with a 20% co-payment and a \$30 office visit fee. With SHIP, one would get a better plan for a cheaper price with the same provider.

Blue Shield offers a plan for \$230 per month that has a \$500 deductible, a 25% co-payment and a \$30 office visit fee and it also offers a plan for \$92 per month that has a \$0 deductible, a 40% co-payment, and a \$25 office visit fee. SHIP has a better plan for a cheaper price.

Aetna offers a plan for \$248 per month that has a \$500 deductible, a 20% co-payment and a \$30 office visit fee and it also offers a plan for \$92 per month that has a \$2,750 deductible, a 20% co-payment, and a 20% co-payment for office visits. Again, SHIP would be a better plan for a cheaper price.

² When looking for insurance quotes, I assumed the average undergraduate is between the ages of 18-22.

PacificCare offers a plan for \$180 per month that has a \$500 deductible, a 30% co-payment and a 30% co-payment for office visits and it also offers a plan for \$83 per month that has a \$2,000 deductible, a 30% co-payment, and a 30% co-payment for office visits. For this, SHIP has a better plan for a better price.

HealthNet offers a plan for \$84 per month that has a \$1500 deductible, a 0% co-payment and a free office visits once the deductible is met. HealthNet doesn't provide a plan that is comparable to SHIP. Again, SHIP would be a better plan that offers more benefits for a comparable price.

From the above comparison, it is clear that SHIP is overall a better plan that offers a better price. However, it also depends on the healthiness of the individual. SHIP provides the basic benefits for an affordable price. If the individual is relatively unhealthy, they may pay a higher premium for a plan that provides better benefits. However, if they are quite healthy, then it would be inefficient for an individual to be on another plan if SHIP has the better benefits and the cheaper price for the basic coverage. Only if the individual has Kaiser, would they have a plan that is comparable in price and benefits, and would thus be considered as having an efficient plan.

International Plans such as Cigna and AIA are unqualified for the waiver. This would apply to less than 3% of the population in Berkeley, accounting for international students who have international health care providers. If a person does have an international provider, then they are also required to have SHIP. Having two insurance companies would be inefficient for the individual, especially if they are quite healthy and do not need the benefits of two insurance plans.

G. Take-up Effect

“The Take-Up of Social Benefits” is a paper written by Janet Currie that offers a recent account of the take up of social programs in the US and UK. She states that take-up is enhanced by automatic or default enrollment and lowered by administrative barriers. Secondly, a more comprehensive reason why there is low take up is either: 1) due to stigma, 2) transaction costs, or 3) a lack of information. The last explanation is less supported as a reason for low take-up.

Moffit (1983) emphasized that “stigma” was the main cost of participation in a means-tested program. In his model, utility is given by:

$$U = U(Y + aPB) - bP$$

Y is the income absence of the program, B is the benefit derived from the program, P is the indicator equal to 1 if person participates and 0 otherwise, “flat stigma” is b which is a fixed cost associated with participating in the program and “variable stigma” is a which is a function of the size of the benefits received.

Stigma, in this case, would increase the cost of participating, “so that some households who would participate in the absence of stigma choose not to participate” (Currie 2003) in the social program.

Currie proposes that it is more transaction costs that cause people not to take up social programs. For example, Brien and Swann (1999) show in cross-sectional data that requiring income documentation of WIC applicants reduced participation rates. However, two concerns were brought up in relation to transaction costs: 1) Are the non-financial barriers screening out the “right” people? and 2) To the extent that needy individuals are not being served, what can be done to increase their take up rates? The first question has to do with crowd-out. As Cutler and Gruber (1996) proposed, some of the take-up of public insurance were individuals who had private insurance; and that the national rate of uninsured has stayed almost the same throughout the years even though more and more individuals were publicly insured (direct substitute of

private insurance for public insurance). Then, in order to improve efficiency and to increase take up, Currie suggests increasing the number of people, decreasing the number of barriers, and increasing private institutions incentives to assist individuals in taking up their benefits.

A less supported reason would be the lack of information. In a study of current and former welfare recipients, Meyers and Heintze (1999) asked mothers eligible for employment-related child care subsidies why they were not receiving them. The majority replied that they were not aware of the program. However, when considering this reason, transaction costs must also be examined. There was not enough supporting information from Currie to assume that the lack of information would greatly cause low take-up.

In relation to this paper, the take up of SHIP health insurance or another provider can either be efficient or inefficient. For example, by default, we are required to take up SHIP health insurance. If we only use SHIP, then it would be efficient. In another case, if we do not take up SHIP and stick with another insurance provider because of transaction costs (i.e. filing a waiver), then it would be inefficient.

DATA DESCRIPTION

Setting

In a period of two months, undergraduate students were given a short survey to fill out. The surveys were conducted at different times (time of day, different location), but were strictly administered by myself. Each person was individually given a survey and had 10 minutes to complete it. In the meantime, there were no distractions in the surrounding and all of the surveys were administered in a quiet setting, either in their homes or in the Berkeley library.

At the time of study (March 2006-April 2006), the copayment for Berkeley health insurance (SHIP) and for office visits was 20% in the Blue Cross network. The annual deductible was \$500. The plan type was Blue Cross PPO. The cost per semester was \$573 or \$95.50 per month. Other plans were compared to this standard (20% copayment, \$500 deductible, and cost) and were evaluated as either being efficient (either better or comparable) or inefficient (worst off) than SHIP. Other benefits, such as coverage for prescription drugs or specialist fees, were not accounted for during the comparison.

Subjects

The target population for my study consisted of UC Berkeley undergraduate students. As long as they were currently enrolled in UC Berkeley and had either the default, SHIP, another insurance company, or both; then, they were qualified for the study. I used random sampling to capture a good representation of Berkeley demographics (major, ethnicity, age, gender). However, subjects were dependent on their willingness to take part in the survey, which was reliant on satisfying one of the three conditions: 1) The first group of subjects was obtained through close relations, which meant they were friends of mine or friends of acquaintances. 2) The second group of subjects was obtained through two specific organizations that allowed me to administer the survey to their members: Berkeley Model United Nations and Beta Alpha Psi, International Co-ed Business Fraternity (open to all majors). 3) The third group of subjects was chosen randomly on the Berkeley campus and had agreed to take the survey.

Survey

The survey is composed of demographic information on the person's age, year in school, major, ethnicity, and gender, followed by a series of 10 questions, split into three modules. (Appendix 1) The first module, consisting of question 1-6, contained categorical scales that helped to define what type of plan the person had and why they had chosen that specific plan. Module one was established to test for inefficiencies and the effects of take-up and crowd-out.

4. Why did you choose this insurance over SHIP/ SHIP over other insurance? (skip to question 7)

- My parents had this insurance
- It is cheaper than SHIP/other insurance
- The benefits are better than SHIP/ other insurance
- I have no idea
- Other, please specify _____

The second module consisted of questions 7-8, that assessed the person's knowledge of Berkeley Health Insurance (SHIP) benefits and costs. Using a categorical scale for benefits, the survey asked them a series of 4 questions with 2-5 choices each. If they were able to check all 4 boxes correctly, then they scored a 100%. If they checked only 3 out of 4 correct, then they obtained a 75% and so forth. For costs, another categorical scale was used with 6 choices. If they were able to check the correct box (1 out of 6 chances) then they knew the cost, but if they didn't (5 out of 6 chances), then they didn't know the cost. The correct answers were based on the benefits and costs for SHIP health insurance during the period of February 2006 to April 2006.

7. Do you know your benefits?

- My copayment/ coinsurance is: 0% 10% 20% 30% 40% or higher
- My deductible is: 0 500 1000 1500 2000 2500 or more
- My plan type is: PPO HMO
- My office visit copayment is: 0% 10% 20% 30% 40% or higher

(This corresponds to 0%)

The third module consisted of questions 9-10, that assessed the person's healthiness. This helped to determine if the person needed basic insurance (healthy person) or premium insurance/specialist (unhealthy person). For question 9, using a 4 choice categorical scale, I assessed how often the person used their insurance. For question 10, I used a 1-10 numerical scale, to test how each person perceived how healthy they were, with higher scores reflecting healthiness and lower scores reflecting unhealthiness.

The survey was conducted between February 2006 to April 2006. A total of 124 surveys were collected, but only 100 of them were fully completed. With the remaining (N=100) usable surveys, analysis was conducted.

Variables

In order to test whether or not a person needed basic health insurance vs premium insurance, I tested to see how healthy the person was. The variables for healthiness were the number of times they used their health insurance (denoted *use* = 0 for 0-2 times a year, = 1 for 3-5 times a year, = 2 for 6-10 times a year, and = 3 for more than 10 times a year) and how healthy they rated themselves on 1-10 scale (denoted *HL*). However, there is a difference between how healthy they believe themselves to be vs how healthy they really are. Though, because of time constraints, actual questions on healthiness (i.e. number of times they get sick, chronic illness, etc.) were excluded from the healthiness measurement in my survey.

After determining healthiness, I tested for inefficiencies in health insurance. As I mentioned before, if the average Berkeley student only required basic health insurance, then the most efficient health insurance would be SHIP or Kaiser Permanente. The variables in this calculation included questions 1 (denoted *SHIP* = 0 for yes (I have SHIP), = 1 for no, because I

waived out, = 2 for yes and I chose SHIP over my previous insurance company), 3 (denoted $HI = 0$ for Kaiser Permanente, = 1 for PacificCare, = 2 for Aetna, = 3 for Blue Cross, = 4 for Blue Shield, = 5 for other), and 5 (denoted $OHI = 0$ for Kaiser Permanente, = 1 for PacificCare, = 2 for Aetna, = 3 for Blue Cross, = 4 for Blue Shield, = 5 for other, = . for none). Efficiency was measured as $HI = 1$ or ($SHIP = 0$ & $OHI = \text{"."}$).

Then, after determining how inefficient health insurance was for Berkeley undergraduate students, I further investigated efficiency using variables that included age (denoted age), gender (denoted $mf = 0$ for male and = 1 for female), ethnicity (denoted $Ethnicity = 0$ for Caucasian, = 1 for Asian, = 2 for Black, = 3 for Latino, = 4 for Middle Eastern), and the previous variables for healthiness (use and HL).

I also, tested for the knowledge of benefits (denoted $BEN = 0$ for 0%, = 1 for 25%, = 2 for 50%, = 3 for 75%, = 4 for 100% on answering question 7 described above) and costs (denoted $COST = 0$ for not knowing the cost and = 1 for knowing the cost on question 8 described above) using previous variables age , mf , and $Ethnicity$. I combined the two variables, $COST$ and BEN , to form $know$. If $COST = 1$ & $BEN \geq 2$, then $know = 1$ meaning the person knows the costs and benefits of SHIP health insurance. Technically, if they don't know the benefits and costs of SHIP, then they have a lack of information of this better plan.

Finally, I tested to see how much inefficiency/ efficiency was caused by the take-up effect. Take-up was measured using the variables from question 4 (denoted $REASON$) and question 6 (denoted WHY). Take-up by default was measured as either $REASON = 0$ or $WHY = 0$. Take-up by stigma was measured as $REASON = 1, 2$. Take-up by transaction cost was measured using $WHY = 1$. Take-up by lack of information was measured using either $REASON = 3$ or $WHY = 2$.

Regression Analyses

To assess the effects of variables on efficiency and knowledge of benefits and costs, I conducted multivariate regression analyses on the categories mentioned above. For this, I estimated two regression models. For the first model, I estimated the effects of using health insurance (*use*), age, gender, and ethnicity on efficiency. Since efficiency = 0 and inefficiency = 1, I also conducted a probit model on this first set of variables. Ethnicity was also replaced by a set of dummy variables. For the second model, I estimated the effects of age, gender, and ethnicity on the knowledge of SHIP health insurance (*know*). Again, ethnicity was replaced by the same set of dummy variables. For all the regression models, I used a generalized linear model.

RESULTS

Descriptive Data

The total number of observations came out to be 100, with an average age of 19.96 years, average years in Berkeley being 2.41, and a male to female ratio being 0.52. Out of the observations, there was a good distribution of majors. For ethnicity, 71% were Asian, 18% were Caucasian, 4% were African-American, 5% were Latino, and 2% was other (Middle Eastern). 55% of the observations did not have SHIP and used another insurance provider: 29% used Kaiser, 11% used PacificCare, 5.5% used Aetna, 22% used Blue Cross, 5.5% used Blue Shield, and 27% used other. Out of the 45% that did have SHIP, 76% of them had another insurance provider as well and only 24% had SHIP alone.

use	percentage
0-2 times	59%
3-5 times	25%
6-10 times	5%
11+ times	11%

Testing for healthiness, in general 74% of observations used their insurance less than 5 times a year. The average health level of an individual was 7.79, with a standard deviation of 1.39.

efficiency	percentage
0	73%
1	27%

Testing for efficiency, this table denotes efficiency = 0 when it is inefficient and efficiency = 1 when it is efficient. Out of the total number of observations, 73% had inefficient health insurance, therefore they either had two insurance companies at once or had an insurance provider that was less efficient than SHIP.

Cost	Percentage
0 (don't know)	88%
1 (know)	12%

Benefits	Percentage
0% right	73%
25% right	20%
50% right	4%
75% right	2%
100% right	1%

Knowledge	Percentage
0 (don't know)	98%
1 (know: $cost=1$ & $ben \geq 2$)	2%

Testing for knowledge of benefits and costs, 88% of the observations did not know the cost of SHIP, 93% of the observations did not know the benefits of SHIP, and 98% of the observations did not know the benefits and costs combined for SHIP.

Effect	Percentage
Take-up	
<i>default</i>	52%
<i>stigma</i>	6%
<i>transaction costs</i>	13%
<i>lack of information</i>	14%
Other	15%

Testing for effect, take-up explained 85% of the total observations. Take-up by default was 52% of the total observations, which means that over 50% of the individuals surveyed either, took up another insurance by default (ex. From a parent) or took up SHIP by default (ex. couldn't waive out).

Regression Analyses

Table 1: Estimates for Linear Regression on Efficiency

Efficiency	
use1	-0.012 (0.118)
use2	-0.338 (0.096)*
use3	0.169 (0.178)
age	0.004 (0.032)
m f	0.139 (0.093)
Dethnicity_1	0.068 (0.119)
Dethnicity_2	0.165 (0.248)
Dethnicity_3	-0.017 (0.208)
Dethnicity_4	0.209 (0.288)
Constant	0.060 (0.630)
Observations	100
R-squared	0.070
F(9,90)	2.77
Prob>F	0.007

Standard errors in parentheses, * significant at 5%.

$$\begin{aligned}
 \text{efficiency}_i = & \beta_0 + \beta_1 \text{use1}_i + \beta_2 \text{use2}_i + \beta_3 \text{use3}_i + \beta_4 \text{age}_i + \beta_5 \text{mf}_i + \beta_6 \text{Dethnicity}_1_i + \beta_7 \text{Dethnicity}_2_i \\
 & + \beta_8 \text{Dethnicity}_3_i + \beta_9 \text{Dethnicity}_4_i + \mu_i
 \end{aligned}$$

This table predicted efficiency by exploring the effects of use of health insurance, age, gender, and ethnicity. The variable *use2* is significant ($t = -3.51$) at a 5% significance level for the linear regression on efficiency, which means as you increase *use2* by 1 unit, efficiency will decrease by -0.34 (meaning it will become more inefficient). All other variables were not significant for the regression on efficiency.

Table 2: Estimates for dProbit Regression on Efficiency

Efficiency	
use1	-0.021 (0.116)
use3	0.176 (0.173)
age	0.006 (0.032)
mf	0.156 (0.093)
Dethnicity_1	0.074 (0.119)
Dethnicity_2	0.257 (0.332)
Dethnicity_3	-0.02 (0.229)
Dethnicity_4	-0.055 (0.321)
observed P	0.284
predicted P	0.274
Observations	95
R-squared	0.046
Wald chi2(8)	6.73
Prob>chi2	0.566

Standard errors in parentheses.

use2 dropped because it predicts failure completely, thus 5 observations were dropped from total

$$\begin{aligned}
 \text{efficiency}_i = \Phi (\beta_0 + \beta_1 \text{use1}_i + \beta_2 \text{use3}_i + \beta_3 \text{age}_i + \beta_4 \text{mf}_i + \beta_5 \text{Dethnicity}_1_i + \beta_6 \text{Dethnicity}_2_i + \\
 \beta_7 \text{Dethnicity}_3_i + \beta_8 \text{Dethnicity}_4_i + \mu_i)
 \end{aligned}$$

Since efficiency was based on categorical values 0 and 1, in order to create a better fit and to eliminate possible predicted efficiency values over 1 or less than 0, I used a dprobit regression on efficiency. Gender (*mf*) came close to being significant, which could mean that for every additional female, efficiency would increase by 0.156 (meaning that females are more efficient than males). However, all the values from this dprobit regression were insignificant.

Table 3: Estimate for Linear Regression on Knowledge

Knowledge	
age	0.001 (0.005)
mf	0.039 (0.028)
Dethnicity_1	-0.044 (0.055)
Dethnicity_2	-0.047 (0.050)
Dethnicity_3	-0.06 (0.057)
Dethnicity_4	-0.055 (0.058)
Constant	0.010 (0.122)
Observations	100
R-squared	0.035
F(6,93)	0.33
Prob>F	0.920

Standard errors in parentheses.

$$knowledge_i = \beta_0 + \beta_1 age_i + \beta_2 mf_i + \beta_3 Dethnicity_1_i + \beta_4 Dethnicity_2_i + \beta_5 Dethnicity_3_i + \beta_6 Dethnicity_4_i + \mu_i$$

This table predicted knowledge of the benefits and cost of SHIP health insurance by varying age, gender, and ethnicity. All variables were not significant for the regression on knowledge.

DISCUSSION

This study examined the role of individuals on their choices of health insurance providers, especially SHIP. My analyses found only one significant effect of use, age, gender, and ethnicity on efficiency. All other effects were insignificant; however, I did find some interesting results for the descriptive data.

I discovered that undergraduate Berkeley students were generally healthy as 74% of them used their health insurance 5 times or less per year. On a scale of 1 to 10, the average health level of undergraduate Berkeley students was 7.79. Therefore, the majority Berkeley students needed only a basic insurance plan to cover them. Thus, SHIP is the most efficient choice for these students. However, there is low reliability for the health level variable because it did not assess the true health level of the students; instead it assessed the students' own perception of their health level. Alternatively, I could have used variables that tested for certain diseases in the past or medications that they currently take, to assess the student's health level more accurately. A possible reason why students rated themselves so high on the scale is because of stigma, of not wanting to reveal to others that they are sick or less healthy, or because in general, they feel healthy at the moment.

Knowing that SHIP is efficient, I found that 73% of the students had inefficient health insurance. These students either had chosen to take up another insurance provider that wasn't Kaiser Permanente or had two insurance providers (SHIP and another insurance plan). A possible reason why someone would have another insurance provider would be if the person needed another insurance to provide premium coverage on benefits not covered by SHIP. However, this situation would not apply to 74% of the population. A possible caveat that wasn't accounted for in the study is the fact that most undergraduate students are covered by their family. Family insurance is cheaper per person than individual insurance. Thus, if this information was accounted for, it is possible that other insurance plans would be either cheaper or of equal price and benefits to SHIP. Also, if I included other benefits like dental, prescription drugs, and specialist fees, it is possible that other insurance plans are comparable to SHIP.

Nevertheless, in the case of the two insurance company individuals, it is inefficient for a person to have two insurance plans, unless one covers something the other doesn't and vice versa. In any sense, an individual could always pay a little more to get a better plan that covers all their needs. Thus, individuals who have two insurances in this study have a high validity as being inefficient. This will account for 34% of the observations. That is still a large portion of the observations that are inefficient and a majority of that can be explained with take-up.

As we look at the regression model for efficiency, only one variable was significant. Efficiency would thus be dependent on an individual using health insurance 6-10 times per year. The more individuals that only used health insurance 6-10 times per year, the more inefficient they were. However, this data isn't very reliable or valid as it does not include many variables. From what I tested, my variables only explain less than 7% of efficiency. Thus, I tried to improve the regression by using a dprobit regression, but this regression only reinforced the previous information on the linear regression and didn't provide any significant variables or new information. Thus, other possible variables that should be in the regression include knowledge of SHIP, knowledge of health insurance, and health level.

Though, looking at the insignificant data, *use3* (use more than 10 times) would predict the most efficient, females were more efficient than males, *ethnicity_4* (other = Middle Eastern) was the most efficient followed by *ethnicity_2* (African Americans) and the least efficient were *ethnicity_3* (Latino). Even though this data is invalid, some of the findings are quite interesting. Technically, if one is to use their insurance more than 10 times a year, they would most likely know which insurance provider gives them the best benefits for a cheaper cost. Thus, these people should be the most efficient. According to gender which was close to being significant, females could possibly be more efficient than males, but not much information has been

researched on health insurance in relation to males or females. It would be interesting to do a follow up study focused on gender differences.

The interesting part of this regression has to do with ethnicity. According to the California studies on health insurance, over 40% of the Latino American population in California is uninsured. With SHIP, Latino students would benefit the most if they were previously uninsured. Since there is a high percentage of Latino Americans uninsured in California, they would most likely benefit the most from SHIP and thus, only have SHIP. It is unlikely that they would be inefficient if they only had SHIP, but my finding seems to point out that Latino Americans are the most inefficient. Again, it is still insignificant data, but it would be interesting to do a follow-up study on this as well, focused on ethnicity and efficiency.

When looking at efficiency of taking up SHIP, another viable reason why individuals are not efficient is because they don't know the benefits or costs of SHIP (that SHIP is cheaper and has better benefits). When testing for the subjects' knowledge of SHIP, only 2% actually knew the benefits and costs, which means that nearly 100% of the participants had no clue what the benefits and costs were. This is startling information, knowing that Berkeley students are very well educated. This lack of information can either be because SHIP does not publicly provide this information or because students do not inform themselves or pay attention when the information is publicly given. A good follow up study would test to see how much money Berkeley was spending on publicity for SHIP and to see if it is publicly accessible either online, by phone, or by person in the Tang Center (Berkeley medical center) for the students. If this follow-up study proved that SHIP was providing the information, then it would suggest that students were not taking up the information and informing themselves of the benefits. Another interesting follow-up study would test the parent's knowledge of SHIP since many students

acquire knowledge from their parents and see if it is actually the students that are not informed or the parents, who are uninformed.

Next, I examined the regression on knowledge of SHIP using age, gender, and ethnicity. However, none of the information was significant and only accounted for less than 3.5% of the explained variables. Again, looking at the insignificant data, females were more knowledgeable than males. The most knowledgeable ethnicity was *constant* (Caucasian), but only by a small increment and the least knowledgeable ethnicity was *ethnicity_3* (Latino). Even though this data is invalid, it seems to coincide with the invalid data from efficiency. Females are more knowledgeable and Latino Americans are least knowledgeable. The same reasons would also apply likewise. What is interesting is that efficiency and knowledge of SHIP affect each other and should be related to each other in some way. The more knowledgeable they are of SHIP, the higher likelihood they would pick the more efficient SHIP as their health insurance provider. Of course, it would also be interesting to see the participants' knowledge of their own health insurance provider and possibly, their parent's knowledge of their health insurance providers.

Now that we know that individuals are not knowledgeable of the benefits and costs of SHIP, it would seem likely that the lack of information would be the biggest reason why individuals did not take up SHIP. However from the data, the lack of information only accounted for 14% of the observations while default took up more than half of the observations, which supports Currie's (2003) finding as well. In total, take-up explained 85% of the total observations.

By default, it would mean that the students either took up another insurance provider by default or they took up SHIP by default. This could explain why individuals were inefficient in the first place. If a student's parent had another insurance provider, by default these students would also get this insurance. Sometimes this insurance would be cheaper because of the family

plan. The second reason is that SHIP is given to individuals by default. If you cannot waive out of SHIP, then you have SHIP by default. A possible reason that many students cannot waive out of SHIP is because they did not meet one of the criteria to waive out. I found that many of those that had the second insurance provider had an international insurance provider. Even though the benefits were equivalent to SHIP, they were unqualified to waive out because the second insurance provider was not located in the United States. This unfortunately creates inefficiency not because of the individual, but because of the guidelines of SHIP.

Even though, the lack of information only accounted for a small percentage of take-up, it could be very much intertwined with default take-up. There was no way to differentiate if a person had both of the take-up effects affecting them. Thus, it is possible for an individual to have a lack of information and also have default insurance. A logical explanation would say that since the person had to get their insurance by default, there was no need for them to be informed of SHIP afterwards. The question then would be if the person had informed themselves of SHIP, would they cancel their parent's health insurance and choose SHIP? It is hard to determine which effect came first and affected the other, and thus the lack of information could have had a larger effect than what was in the results.

A lot of the information in the results was insignificant and even though some did have interesting results, there were not enough observations to come to a valid assessment. The major caveat of this experiment was the number of observations. If there were more observations, the variables in the regressions might prove to be significant, especially the gender variable. Also, it would have been more valid if I also included time as a component of the study. Since the study was done in a short period of time, it was not possible to get information on the individuals for different time periods. Another problem was the bias of the data towards a specific ethnicity

group. Majority of the students tested were Asian American, and even though it was done randomly, I would have hoped for a better representation of other ethnicities. For example, Middle Eastern Americans were the most efficient, but since there were only two observations, it doesn't make sense to say that they are the most efficient. Finally, the aim of the survey was to be short; however, this took away from the reliability of the findings. Many of the variables were not specific enough to test exactly what it was suppose to test.

CONCLUSION

Despite these limitations, this study takes a first step towards our understanding of the impact of individuals and their inefficiency on health care insurance, especially as it pertains to Berkeley undergraduate students and SHIP. In particular, my results show that Berkeley undergraduate students are generally healthy and that SHIP is efficient for them. However, most students are inefficient and unknowledgeable of the benefits and costs of SHIP, and this can be explained mostly by take-up, especially by default. If my findings are generalizable to other colleges, this would provide some preliminary evidence that undergraduate students are not reaping the benefits of their school's better health insurance plan. Also if it can be generalized to other insurance plans, it would provide some startling evidence that students and possibly adults are very unknowledgeable of the benefits and cost of health insurance plans and providers.

However, my study also suggests that further research is needed to explore the inefficiency of individuals on health insurance. In this respect, more individuals need to be surveyed, more comprehensive measures of health insurance and individual information, separating the effects of take-up, possibly flushing out other effects (ex. Crowd-out), more information of other health insurances (family plans and knowledge of benefits and costs), better

ways to assess health levels, focuses on gender and ethnicity differences, causes of lack of information, and including more variables into the regressions. With this, further studies can be done on other colleges to test if this is valid in other institutions as well.

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APPENDIX 1: SURVEY

Age:
Year:
Major:
Ethnicity:
Male or Female:

1. Do you have SHIP?

- Yes (proceed to question 5)
 No, because I waived out (proceed to next question)
 Yes and I chose SHIP over my previous insurance company (proceed to question 4)

2. How did you waive out?

- I met all the criteria
 I did not meet all the criteria, but got out anyway
 Other, please specify _____

3. What health insurance company do you use?

- Kaiser Permanente
 PacificCare
 Aetna
 Blue Cross
 Blue Shield
 Other, please specify _____

4. Why did you choose this insurance over SHIP/ SHIP over other insurance? (skip to question 7)

- My parents had this insurance
 It is cheaper than SHIP/other insurance
 The benefits are better than SHIP/ other insurance
 I have no idea
 Other, please specify _____

5. Do you have another health insurance?

- Kaiser Permanente
 PacificCare
 Aetna
 Blue Cross
 Blue Shield
 Other, please specify _____

6. Why?

- Couldn't waive out
 Too Lazy
 Didn't know I could waive out
 Other, please explain _____

7. Do you know your benefits?

My copayment/ coinsurance is: 0% 10% 20% 30% 40% or higher

My deductible is: 0 500 1000 1500 2000 2500 or more

My plan type is: PPO HMO

My office visit copayment is: 0% 10% 20% 30% 40% or higher

8. Do you know the cost of your health insurance?

- less than \$50 per month or around \$300 for 6 months
 less than \$75 per month or around \$450 for 6 months
 less than \$100 per month or around \$600 for 6 months
 less than \$125 per month or around \$750 for 6 months
 less than \$150 per month or around \$900 for 6 months
 more than \$150 per month or more than \$900 for 6 months

9. How often do you use your health insurance?

- 0 – 2 times a year
 3 – 5 times a year
 6 – 10 times a year
 more than 10 times a year

10. How healthy are you, in general? (1 being very sick and 10 being extremely healthy)

APPENDIX 2: US CENSUS BUREAU ON HEALTH INSURANCE COVERAGE

Table 7.
People With or Without Health Insurance Coverage by Selected Characteristics: 2003 and 2004
 (Numbers in thousands, confidence intervals (C.I.) in thousands or percentage points as appropriate. People as of March of the following year)

Characteristic	Uninsured								Change (2004 less 2003) ¹					
	2003				2004				Uninsured				Insured	
	Number	90-percent C.I. ² (±)	Percentage	90-percent C.I. ² (±)	Number	90-percent C.I. ² (±)	Percentage	90-percent C.I. ² (±)	Number	90-percent C.I. ² (±)	Percentage	90-percent C.I. ² (±)	Number	90-percent C.I. ² (±)
PEOPLE														
Total	44,961	523	15.6	0.2	45,820	527	15.7	0.2	*860	621	0.1	0.2	*2,015	648
Family Status														
In families	35,199	520	14.7	0.2	35,698	523	14.8	0.2	500	617	0.1	0.3	*1,750	668
Householder	10,511	270	13.8	0.3	10,634	271	13.8	0.3	123	308	-	0.4	663	691
Related children under 18	7,915	285	11.0	0.3	7,908	293	10.8	0.3	-112	277	-0.2	0.4	369	710
Related children under 6	2,369	190	10.1	0.5	2,325	129	9.8	0.5	-44	153	-0.3	0.6	399	445
In unrelated subfamilies	398	49	28.1	3.5	348	50	27.8	3.4	10	59	-0.4	4.1	43	94
Unrelated individual	9,424	256	19.6	0.5	9,774	260	20.1	0.5	*350	294	0.5	0.6	223	561
Race³ and Hispanic Origin														
White	33,983	464	14.6	0.2	34,788	469	14.9	0.2	*804	552	0.2	0.2	*1,019	806
White, not Hispanic	21,582	379	11.1	0.2	21,983	382	11.3	0.2	401	450	0.2	0.2	24	847
Black	7,090	252	19.6	0.7	7,186	254	19.7	0.7	107	300	0.1	0.8	319	451
Asian	2,229	143	18.8	1.2	2,070	138	16.8	1.1	-158	166	*-2.0	1.3	*600	269
Hispanic origin (any race)	13,237	303	32.7	0.7	13,678	308	32.7	0.7	*442	321	-0.1	0.8	*972	321
Age														
Under 18 years	8,373	242	11.4	0.3	8,269	240	11.2	0.3	-105	285	-0.2	0.4	346	715
18 to 24 years	8,414	242	30.2	0.7	8,772	247	31.4	0.7	*358	290	*1.1	0.9	-209	426
25 to 34 years	10,345	268	26.4	0.6	10,177	266	25.9	0.6	-168	315	-0.5	0.7	274	512
35 to 44 years	7,885	235	18.1	0.5	8,110	238	18.7	0.5	226	280	*0.6	0.6	-449	590
45 to 64 years	9,657	259	13.9	0.4	10,196	266	14.3	0.4	*539	310	0.4	0.4	*1,510	685
65 years and older	286	45	0.8	0.1	297	46	0.8	0.1	11	54	-	0.2	543	554
Nativity														
Native	33,146	459	13.0	0.2	33,962	464	13.3	0.2	*816	547	*0.2	0.2	*1,146	743
Foreign born	11,815	325	34.5	0.8	11,858	326	33.7	0.8	44	385	-0.8	0.9	*969	524
Naturalized citizen	2,243	144	17.1	1.0	2,317	146	17.2	1.0	73	172	0.1	1.2	297	372
Not a citizen	9,571	294	45.3	1.0	9,542	293	44.1	1.0	-29	347	*-1.3	1.2	*573	385
Region														
Northeast	6,919	196	12.9	0.4	7,106	216	13.2	0.4	187	244	0.3	0.5	128	240
Midwest	7,748	211	12.0	0.3	7,737	224	11.9	0.3	-11	258	-	0.4	94	262
South	18,621	354	18.0	0.3	19,262	350	18.3	0.3	*641	416	0.4	0.4	*874	423
West	11,674	292	17.6	0.4	11,715	276	17.4	0.4	41	396	-0.2	0.5	*919	333
Household Income														
Less than \$25,000	15,331	323	24.2	0.5	15,102	321	24.3	0.5	-229	381	0.1	0.5	*-896	633
\$25,000 to \$49,999	14,823	318	19.9	0.4	14,784	317	20.0	0.4	-39	376	0.1	0.5	-673	691
\$50,000 to \$74,999	7,226	225	12.5	0.4	7,842	234	13.3	0.4	*616	272	*0.7	0.4	*782	650
\$75,000 or more	7,580	230	8.2	0.2	8,092	238	8.4	0.2	*512	277	0.3	0.3	*2,902	783
Work Experience														
Total, 18 to 64 years old	36,301	478	20.2	0.3	37,255	499	20.5	0.3	*954	578	0.3	0.3	*1,126	765
Worked during year	26,581	417	18.6	0.3	27,353	441	19.0	0.3	*772	508	*0.4	0.3	352	799
Worked full-time	20,636	371	17.5	0.3	21,092	385	17.8	0.3	*456	454	0.2	0.4	673	779
Worked part-time	5,945	204	23.8	0.7	6,261	224	25.0	0.8	*316	254	*1.3	0.9	-320	434
Did not work	9,720	260	26.0	0.6	9,902	279	25.8	0.6	182	319	-0.2	0.7	*774	516

- Represents zero or rounds to zero.
 * Statistically different from zero at the 90-percent confidence level.

¹ Details may not sum to totals because of rounding.

² A 90-percent confidence interval is a measure of an estimate's variability. The larger the confidence interval in relation to the size of the estimate, the less reliable the estimate. For more information, see "Standard Errors and Their Use" at <www.census.gov/hhes/www/p60_229sa.pdf>.

³ Federal surveys now give respondents the option of reporting more than one race. Therefore, two basic ways of defining a race group are possible. A group such as Asian may be defined as those who reported Asian and no other race (the race-alone or single-race concept) or as those who reported Asian regardless of whether they also reported another race (the race-alone-or-in-combination concept). This table shows data using the first approach (race alone). The use of the single-race population does not imply that it is the preferred method of presenting or analyzing data. The Census Bureau uses a variety of approaches. Information on people who reported more than one race, such as White and American Indian and Alaska Native or Asian and Black or African American, is available from Census 2000 through American FactFinder. About 2.6 percent of people reported more than one race in Census 2000.

Source: U.S. Census Bureau, Current Population Survey, 2004 and 2005 Annual Social and Economic Supplements.