Draft. Comments welcome.

# The Effect of Mandatory Employer-Sponsored Insurance (ESI) on Health Insurance Coverage and Employment in Hawaii: Evidence from the Current Population Survey (CPS) 1994-2003

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**Abstract**

The purpose of this study is to examine the impact of Hawaii's mandatory employer-provided health insurance on insurance coverage and employment structure in Hawaii. We hypothesize that mandated employer-sponsored health insurance has three effects on health insurance coverage and the labor market. First, it increases employer-provided health insurance coverage for full-time workers. That is, persons employed more that 20 hours per week. Second, it changes the distribution of equilibrium employment by hours worked as some employees seek and employers offer part-time employment to avoid the mandated benefit. Third, people who are not matched with full-time jobs with employer-provided health insurance will switch to other types of insurance, such as publicly provided health insurance or spousal military benefits, as an optimal response. Our empirical evidence generally supports all three hypotheses. First, private employment-based insurance coverage for full-time workers is more prevalent in Hawaii than the U.S. overall. Second, there is substantial avoidance of the employer-mandate in Hawaii by skirting the 20 hour rule. Third, switching to other types of insurance is significant compared to the other states and the U.S. overall.

Key words: health insurance, employer-sponsored insurance, working hours
JEL Classification: I18, J32

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## 1. Introduction

One of the most distinctive features of health insurance in the US is the strong link between health insurance and employment. With few pooling mechanisms available for insurance purchase outside of the workplace, most individuals and families rely on group coverage sponsored by their employers. Employer-sponsored insurance is attractive for at least three reasons. First, group coverage at work typically has lower administrative costs as employers process and maintain employee informational records as matter a general business practice for variety of purposes. This generates economies of scope and economies of scale in insurance pool formation, which in turn renders low marginal cost of coverage. Second, employment-based groups are less likely to be subject to adverse selection as the group is formed for a primary reason other than the purchase of health insurance. Finally, and perhaps most importantly, the favorable tax-treatment of employment-based health insurance, provides a substantial subsidy to the purchase of coverage at work (Gruber 2002, 2000; Gruber and Poterba 1994; Pauly 1986; Feldstein and Friedman 1977). Together these various phenomenon generate low effective premiums and provide a powerful incentive to obtain health insurance coverage at work. According to the Current Population Survey (CPS) Annual Social and Economic Supplement (i.e., March Demographic Supplement) in 2003, 70 percent of people in the United States have private-provided health insurance and 88 percent of those obtain their insurance through their own employment or the employment of a family member.

This link between health insurance purchase and employment has very important implication for the functioning of both health insurance system and labor market in the

US. Gruber (2000) and Currie and Madrian (1999) review dozens of studies that have addressed the effect of employer-provided health insurance on labor market outcomes. While this literature has convincingly addressed the effect of employer-provided heath insurance on wages, job turnover, and employment, there are several important holes in the literature that need to be filled. One largely ignored question is whether state-mandated employer-provided health insurance program is actually an effective tool to increase health insurance coverage. Most of all, no research to date has focused on how the state-mandated employer-provided health insurance program has affected the coverage of other types of insurance, such as publicly provided health insurance. Another largely ignored, yet still very important, question is the effect of state-mandated program on the use of part-time workers.

Empirical evidences on these issues are quite limited and also mixed. Gruber (1994a, 1994b) finds no significant effect of state-mandated program (such as maternity leave) on employer-provided health insurance coverage. Gruber offers evidence to support the view of full employee valuation; most firms voluntarily offer the benefits even in the absence of state mandates. Galloway (1995) and Scott et. al. (1989) find a positive relationship between the share of fringe benefits in compensation and the fraction of part-time workers, while Ehrenberg et. al. (1988) find no effect of variations in the eligibility of part-time workers for benefits on the use of part-time workers. While Buchmueller (1999) finds that increase in the fringe benefits for full-time employees increases the share of part-time workers employed, Montgomery and Cosgrove (1993) find that increases in benefits costs decrease the share of hours at their sample of childcare centers that are worked by part-time workers.

The Hawaii's employer-provided mandated health care system might be the best case-study to examine these issues. In 1974, the Hawaii state legislature passed the Prepaid Health Care Act of 1974 (PHCA) which requires all employers to provide health insurance for workers. However, the implementation of the law was delayed by a series of court challenges and the Employee Retirement Income Security Act of 1974 (ERISA) was enacted by the U.S. Congress. Initially, the courts ruled that ERISA preempted PHCA, but in 1983 Congress passed an exemption that allowed PHCA to take effect with limited future amendments to the act. Largely due to the preemption of ERISA, no other state has implemented mandatory employer-provided health insurance to date.[1] When the PHCA went into effect, some groups of workers, for example, employed for less than 20 hours were exempt.

Thurston (1997) shows, that Hawaii had significantly higher rates of insurance coverage than the rates for the rest of the country.[2] Thurston (1997) also shows that Hawaii's employment growth exceeded that of the country as a whole, but the percentage of Hawaiian part-time workers (employed less than 20 hours per week and thus exempt from the law) was significantly higher than the national average. Because Thurston focused on the effect of the PHCA on other issues such as wage and overall working hours, he paid less attention to the issues on coverage and the use of part-time workers. He simply compared the mean values of employer-provided health insurance coverage and working hours between Hawaii and U.S. The study does not consider the unique

[1] Currently Maryland is considering state-mandated program which is similar to Hawaii.

[2] There has also been a debate about the effect of the PHCA. While Lewin and Sybinsky (1993) and Neubauer (1993) claim that PHCA might be an effective tool in increasing insurance coverage rate, Dick (1994) argues that the PHCA has little impact on employer-provided health insurance coverage simply because it does not target a large portion of the uninsured.

demographic and industry structure of Hawaii that may have affected health insurance rates and part-time workers in the absence of state-mandated programs. Nor does it consider the effect of the state-mandated health program on other insurance program such as public-provided insurance. Little systematic effort has been made to assess his claims yet up to date.

The study examines the impact of Hawaii's mandatory employer-provided health insurance on insurance coverage and employment structure in Hawaii. We hypothesize that the employer-provided mandated health insurance affects the health insurance coverage and employment structure in three ways. First, it may increase the health insurance coverage for full-time workers. Second, there may be changes in the distribution of health insurance by working hours due to employers' eligibility avoidance. Third, some people who are unable to find full-time jobs with health insurance will switch to other types of insurance, such as publicly provided health insurance.

Our model predicts that employer-based coverage is higher in Hawaii than in the rest of the U.S. *only* for workers who are working more than 20 hours a week. At the same time, there is a clear trend that the percentage of workers covered by employment based insurance is *lower* than the U.S. as a whole for those who work less than 20 hours, suggesting that there is substantial eligibility avoidance. However, those who are working less than 20 hours in Hawaii are much more likely to rely on publicly provided health insurance than in the rest of the U.S. This is why levels of the overall uninsured rate are lower in Hawaii than in the rest of the U.S, regardless of hours worked. Next section discusses our "PHCA notch" model and data used in the analysis. Section 3 presents evidence of the impact of the PHCA on the insurance coverage. Section 4 presents

evidence of the impact of the PHCA on the employment composition. Section 5 concludes the paper.

## 2. The Model and Data

Similar to Gruber and Krueger (1991), we assume that labor demand and supply of *full-time* workers are respectively given as:

$$(1) \qquad \begin{aligned} L_d &= f_d(W + C) \\ L_s &= f_s(W + \alpha C) \end{aligned}$$

where $W$ is wages, $C$ insurance costs, and $\alpha C$ is the monetary value that a worker place on employer-provided health insurance. From Equation (1), we get the following equation.

$$(2) \qquad \frac{dW}{dC} = -\frac{\eta^d - \alpha\eta^s}{\eta^d - \eta^s}$$

where $\eta^d$ and $\eta^s$ are the elasticities of demand of and supply for labor, respectively. The change in employment of full-time workers is then:

$$(3) \qquad \frac{\partial L}{L} = \frac{-(\Delta C + \Delta W)}{W^e} * \eta^d$$

where $W^e$ is original equilibrium wage for full-time workers. Thus, the change in wage and employment after the PHCA depends on $\alpha$ given $\eta^d$ and $\eta^s$. If $\alpha$=1, the wage will fall by exactly same amount as the fixed cost (health insurance) rise, with no effect on employment. If $\alpha$>1, then full-time employment could even rise. If $\alpha$<1, then the reduction in wages will be less than the increase in costs; i.e., employers cannot fully shift the insurance cost to wages. Thus, employers tend to replace full-time workers with their (uninsured) part-time counterpart. It results in a decrease in employment for full-time workers. In practice, employers may not be able to fully shift the insurance cost to wages due to other market imperfections such as minumum wage laws or union's resistence. Currie and Madrian (1999) note that the empirical validity of the shifting the insurance cost to wages had been difficult to establish. However, using husband's firm size, union status, and health coverage through his job as instruments for his wife's own employer health insurance, Olson (2002) found that wives with own employer provided health insurance accept a wage about 20 percent lower than what they would have received working in a job without benefits. This result suggests that employers are able to shift some insurance cost to wages.

In order to simplify our discussion we assume that there is neither other publicly provided welfare program nor tax. We further assume that the value of employer-provided health insurance is same as the value of public-provided health insurance and employers cannot fully shift the insurance cost to wages. Thus, after the state mandate there is an excess supply for full-time jobs and these people move to part-time labor markets. Workers face a choice between i) not working or working part-time receiving public-provided health insurance if they are eligible, ii) working full-time receiving

employer-provided health insurance, or iii) working part-time without publicly provided health insurance.

Figure 1 and 2 summarize our insurance coverage theory. We only consider the case in which employers cannot fully shift the insurance cost to wages. The publicly and the state-mandated employer-provided health insurance create two notches in the budget constraint for some workers. With less than $H_2$ hours of work, the worker receives publicly provided health insurance, which is a dominated part of the budget constraint. This is similar to what is called "Medicaid notch" by Yelowitz (1995). The worker will lose the public-provided benefit if the worker works more than $H_2$ hours and thereby the person's income is above the eiligible state poverty line. The worker is eligible for state-mandated employer-provided health insurance program if she/he works more than $H_1$ hours (the "PHCA notch"). If $\alpha$=1, then the "PHCA notch" disappears because the employer can fully shift the fixed cost to wages.

<Figures 1 and 2 about here>

There are three types of part-time workers. In Figure 1, the worker voluntarily chooses to be a part-time worker and relies on publicly provided health insurance if the person is eligible. The PHCA does not affect the percentage of people covered by public-provided health insurance, but it may increase the employer-based health insurance coverage. In Figure 2, however, the worker maximizes utility as a full-time worker. Because of a decrease in demand for full-time workers the worker ends up with a part-time job with lower utility ($I_P$). The PHCA increases the percentage of people covered by publicly provided health insurance for part-time workers. That is, those who are unable to find full-time jobs with employer-provided health insurance will switch to publicly-

provided health insurance. The third case is (not shown in figures), although it is less likely, that depending on the size of notch and shape of the indifference curve some part-time workers who are eligible for publicly provided health insurance choose along the segment DF, losing both publicly-provided and employer-provided health insurance.

We test our theory using the Current Population Survey (CPS) March Demographic Supplement for the years 1994-2003, which is conducted by the U.S. Census Bureau. Ideally an analysis would include random samples of the Hawaiian population both before and after the PHCA, January 1975. Such data simply does not exist.[3] As an alternative, we analyze the performance of Hawaiian system after implementation of the PHCA relative to other states and US as a whole and conduct counter-factual analyses. If we view the provision of the state-mandated employer-provided health insurance in Hawaii as a constraint model relative to US nationwide, it follows that at least some of the deviations from the US coutcomes imply the effect of the PHCA. We not only compare Hawaii with US, but we compare it with other states. We select four other states (Nevada, Michigan, California, and Florida), ranging from one with very similar industrial structure with Hawaii (Nevada), and to the other with very different industrial structure (Michigan) to compare the results.

The estimates in this paper are based on About 48,000 housing units (450 in Hawaii). 130,000 individuals (1,300 in Hawaii) were covered each year. The number of households and individuals interviewed using the 2002 March supplement was

[3] The CPS does not include health insurance coverage information prior to 1980, nor was it identified Hawaii from other states in any of the pre-program years. To show how wage and health insurance coverage has changed before and after the PHCA, Thurston (1997) tries to use 1970 Census data and 1969 hospital enrollment data and compare it with 1990-93 CPS. However, any two numbers before and after the PHCA were not directly comparable. Unfortunately, there is a substantial difference in numbers between self-reported survey data and estimates based on hospital enrollment data which Thurston used. Furthermore, only bracketed working hours and weeks worked are reported in the 1970 Census, preventing us making any direct comparisons between CPS and the Census for our purpose.

substantially expanded. It covers about 1,000 household and about 3,200 individuals for Hawaii. In 2003 it is expanded to more, covering **** household and **** individuals for Hawaii. Among the sample, we select people aged 18 and over who are employed but not self-employed. The total number of observations used for Hawaii in our sample is 5,674. The total number of observation used for U.S. as a whole is 531,401.

We assume that the selection of workers into each type of insurance has the structure of a multinomial logit model. The probability that each alternative s will be chosen can be calculated by

$$(4) \qquad \Pr(I_i = s) = \frac{\exp(Z\beta_s)}{(1+\sum_{s\in S}\exp(Z\beta_s))}$$

where $I_i$ is an indicator of each worker's type of insurance, and Z is the set of variables in the multinomial logit equation. The dependent variable is essentially a categorical probability that a person with specific characteristic will end up in a particular category. The model predicted over three categories: uninsured, employment-based insurance, and other insurance.[4,5] The independent variables of baseline specification include age of an individual and its squared term, gender of the worker, ratio of household income to state poverty line, working hours, a dummy variable for non-white, 21 dummy variables for type of industry the worker belongs to, and whether or not the worker is covered under a collective bargaining agreement. All estimates in this paper were obtained using the

[4] Other insurance includes Medicaid, Medicare, other forms of public and private insurance.
[5] There are some people who are covered by two or even three different insurance. We tried to separate or drop this group, but it barely affected results. We also tried four categorical model, i.e., i) uninsured, ii) employer-provide, iii) publicly provided, iv) others (other private insurance). The results are qualitatively same, and the results are not reported here.

consistent variance-covariance matrix estimator of White (1980). The standard errors are thus robust to heteroscedasticity.

The March Supplement final weight, which is the product of several adjustments of the CPS, is used to produce population estimates for the various estimates. After estimation, we conduct counter-factual analysis: e.g. what would be the insurance coverage by type of insurance of Hawaii and other states if they have same socio-economic and demographic characteristics. We predict the effect of hours worked on the probability in coverage holding other variables constant.

Table 1 present the percentage of insured by type of insurance for five states and U.S. as a whole. Fifteen percent of people in the U.S. have no health insurance in 2003. Hawaii (10.0%) and Michigan (11.7%) have much less uninsured people than U.S. as a whole, while Nevada (19.7%), California (18.2%), and Florida (17.3%) are characterized by much higher percentage of uninsured people in year 2003. The 10-year average shows very similar pattern as well. The table also clearly indicates that the coverage of insurance by type of insurance is very different across states. For example, Hawaii is characterized by higher percentage of publicly provided health insurance, and this is largely due to the large share of military population who are covered by Champus (or Tricare). Thus, it is necessary to take this into consideration, for example by doing analysis, first with Champus and then without it. The table also shows a higher percentage of employment based health insurance for Hawaii and Michigan. However, we cannot draw any rigorous conclusions based on these summarized data. What our model predicts is an effect of "PHCA notch", but the insurance coverage depends on

several other factors such as age structure and income distribution within states. To gain better insight, therefore, we turn to our regression results discussed in the next section.

<Table 1 about here>

## 3. Evidence on the Use of Part-Time Workers

One way in which the PHCA may impact the labor market in the state of Hawaii is by causing a sectoral shift of labor from full-time to part-time labor. The benefit of such a shift to employers is that part-time employees are exempt from the PHCA, thus reducing the employers' insurance liability. One way to examine whether the PHCA has had an impact on full-time versus part-time labor markets in the economy is to compare the distribution of hours worked in Hawaii to those of the other states and the U.S. as a whole. Figure 3 presents a result for five states as well as the U.S. Using 5-hour ranges for hours worked, there appears to be a clear difference in the pattern of hours worked between Hawaii and other states.

<Figure 3 about here>

One might argue that businesses affiliated with the tourism industry in Hawaii are very different from that in other states, which is conducive to employing part-time labor. The striking feature of the figure, however, is that Nevada and Michigan, which are respectively have the most similar and different industry structure as that of Hawaii, has very similar distribution of workers by working hours. Their pattern is not different from the U.S. as a whole, either. This implies that the distribution of working hours in an economy is not much different by industry structure. Especially, the percentage of people working 16-19 hours is almost identical across state and in the U.S., while it is in the

spike in Hawaii. In addition, Hawaii appears to have higher percentage of employees at exactly 20 hour categories as well. Considering there is often a substantial reporting error due to rounding-off (reporting 20 hours when it is slightly less than 20 hours) some people in this group could also belong to 16-19 working hours group. This is indicative of employers in Hawaii employ more part-time workers not because of industry structure but because of employer's effort to reduce cost by employing more part-time workers.

However, there could be other exogenous factors that contributed to the spike of part-time workers in Hawaii. For example, Hawaii's population is, on average, older than the U.S. average, so larger numbers of retirees who are covered by Medicare have little need for health insurance benefits. If elderly labor force is larger in Hawaii than in other states it would affect the distribution of working hours in Hawaii. To explore this issue, we redrew the Figure 3 using US population age structure as a weight (not shown). The results are not qualitatively different, implying that age structure in Hawaii is little to do with the pattern shown in Figure 3.

## 4. Evidence on Insurance Coverage

Since the goal of the PHCA was to reduce the number of uninsured in the state of Hawaii, it is necessary to analyze insurance rates to determine whether it has been an effective tool or not. Thurston (1997) finds that Hawaii had significantly higher rates of people covered by employer-provided insurance than U.S. Perhaps even more interesting, he finds a substantial coat-tail effect that implies a 1-to-1 spillover effect from full time workers (working at least 20 hours per week) to part-time workers (working less than 20 hours); he finds that even though part-time workers are excluded from the PHCA,

approximately 11% more part-time workers in Hawaii have employer-provided health insurance than in the U.S. as a whole. However, this simple comparison might be misleading in part because Hawaii's economy and demographic structure is very different from the other states in the U.S. Most of all, the simple comparison does not consider how people's behavior changes when they face different constraints.

Our multinomial logit results are presented in Table 2. The base category is the uninsured. Again, we run regressions using samples from Hawaii, Nevada, Michigan, California, Florida, and the U.S. and compare the results. The coefficients are presented as relative risk ratios. For example, the coefficient of male dummy in the employer-provided health insurance in Hawaii sample is 0.741 suggesting that the odd of having employer-provided health insurance over being uninsured (base category) is 0.741 for male workers relative to female workers. Most variables in all categories are significant at the 5% significant level. The regression coefficient of working hours is especially significant in all samples except for the employer-provided health insurance in Michigan sample where it is marginally significant. This suggests that working hours is a strong predictor of the type of insurance.

<Table 2 about here>

For every working-hours group, the model predicts that the insurance coverage of Hawaii is higher than that of the U.S. in general (Figure 4). This appears to support Thurston's contention that there are positive spillovers to workers employed for less than 20 hours per week. However, when we looked at the predicted percentage of workers covered only under employment-based insurance, we see very different pattern (Figure 5). There is a clear trend that the percentage of workers covered by employment-based

insurance in Hawaii is *lower* than the U.S. and other states for workers working less than 20 hours. At the same time, for all workers over 20 hours, the model predicts levels of employer-based coverage that are higher in Hawaii than in the U.S. If the positive spillovers that Thurston suggests exist, one would think that they would largely appear in the predictions of employment-based insurance. Since this is not the case, this casts doubt on the claim for positive spillovers to part-time employees.

<Figures 4 and 5 about here>

To see why this is the case, we predict the percentage of other insurance. The result is striking (Figure 6). Those who are working less than 20 hours in Hawaii are much more likely to rely on the other types of insurances, especially publicly provided health insurance than in the rest of the U.S. The results are robust even after considering the difference in industry structure across states. That is, our evidence suggests that the lower rate of uninsurance of part-time workers in Hawaii is not due to the spillover effect. It is in part because people who could not find a full-time job have switched to the other types of insurance.

<Figure 6 about here>

Our method for discerning the impact of the PHCA is to compare the probability of being covered by employer-sponsored health insurance in Hawaii with the probabilities of being covered in the U.S. and selected states. In making our comparison we control for characteristics of the workforce and labor market including age, sex, ethnicity, income, hours-worked, industrial structure and collective bargaining. The remaining difference we infer is due to the presence of the PHCA employer-mandate, as Hawaii is the only state in the Union to have such a mandate. Our method, therefore, is

essentially a residual method. That is, we infer the residual difference is due to the PHCA, assuming other things are held constant. If our maintained hypothesis, that other factors have been properly controlled, is false, our results may overstate or understate the impact of the PHCA.

One possible source of major structural difference between Hawaii and the U.S. overall is the presence of a disproportionately large military complex including all branches of the U.S. military services with combat units, support units & facilities, and command & control infrastructure. This has significant impacts on the Hawaii economy, labor market, health delivery system and insurance coverage. While 3-4% of the population nationwide is covered by military health insurance through CHAMPUS/TRICARE, 8-9% of the Hawaii population is so covered. Perhaps this explains the effects we observe, rather than PHCA.

To see if our results are possibly driven by this structural difference, we re-estimate our models for Hawaii, US, Michigan, Nevada, California and Florida omitting all observations relating to military health insurance. The results are essentially unchanged further strengthening our conclusion that the PHCA act is increasing coverage for full-time workers and decreasing ESI coverage for part-time workers. We believe, however, that the large presence of CHAMPUS/TRICARE in Hawaii is part of the PHCA labor market interactions and our preferred model includes these observations. For example, military spouses are more likely to accept part-time private-sector employment without health insurance, but with higher cash wages in the knowledge that they can draw upon family coverage through TRICARE. It is this type of equilibrium response we believe our model captures.

In addition to our model variants with and without CHAMPUS/TRICARE beneficiaries, we conduct two other sensitivity checks to confirm the robustness of our results. First we utilize two questions from the CPS on the number of hours worked per week—usual hours worked per week at all jobs held last year and usual hours per week at main job held last week. The results are essentially invariant to the hours measured used. Second, we simulate the counterfactual estimates with the Hawaii means and overall U.S. means. Again the results are quite robust to choice of mean. These additional checks confirm our conclusions are based on real underlying phenomenon and not mere remnants of the specification or particular data values employed.

## 5. Discussion: Welfare and Macro-Economic Implication

The relationship between health insurance coverage and employment was the central concern of Clinton Administration's proposed universal employer-provided mandated program. The debate is still on-going especially at the state level and the debate will certainly reappear in the near future. This paper tries to shed a light on the debate by examining the case of Hawaii's state-mandated employer-provided health insurance.

The evidence in this paper suggests that levels of employer-based coverage are higher in Hawaii than in the rest of the U.S. for workers who are working more than 20 hours a week. At the same time, there is a clear trend that the percent of workers covered by employment-based insurance is *lower* than the U.S. for those who work less than or equal to 20 hours, suggesting that there is substantial eligibility avoidance. However, those who are working less than 20 hours in Hawaii are much more likely to rely on other insurance such as publicly provided health insurance than in the rest of the U.S. The

results are robust after controlling the difference in industry structure and demographic characteristics across states.

The implication of our evidence on social welfare and economy is complex. Some studies claim that the mandate will be an efficient and equitable policy if the mandate is simply a means of financing (Gruber, 2000). Thurston (1997) also argues that there is a coat-tail effect of the mandate on part-time workers. However, our evidence suggests that eligibility avoidance of employers might offset the beneficial effect of mandate on government budget financing. Nor it suggests that the lower percentage of uninsurance of part-time workers in Hawaii is not a coat-tail effect.

Is there any other employment-related implication of the state mandate? One of labor market characteristics of Hawaii is its low unemployment rate relative to the other states. Although no research has examined the issue to date, it might be interesting to ask whether a higher percentage of part-time workers are related with lower unemployment rate. This seems to be borne out by available data.[6] Although this is not the main focus of this paper, briefly examining the relationship between unemployment rate and the percentage of part-time workers yields some interesting results. The time-series evidence suggests that they are positively related with each other. The result is not surprising at all, because weak economy reduces demand for full-time or regular jobs. However, the cross-section evidence suggests that they are negatively related with each other; i.e. states with higher percentage of part-time workers are also more likely to have lower unemployment

[6] From 1980, just after the implementation of PHCA, until 1994, Hawaii's unemployment rate was lower than the overall U.S. unemployment rate. However, when the bottom fell out of the Japanese economy in the mid-1990s, unemployment in Hawaii jumped higher than the U.S. rate due to a strong reliance of the tourism industry in Hawaii on Japanese visitors. However, it appears that in the last couple of years, unemployment in Hawaii is again trending below that of the U.S.

rate. Using 1994-2003 CPS we regress the unemployment rate on the percentage of part-time workers and year-dummies. The result[7] suggests that higher percentage of part-time workers could be a reason for lower unemployment rate, and this "work-sharing" might help to reduce the social welfare loss of unemployment.

Another interesting research topic that we did not address here is to test so called "wife-lock" hypothesis. Because PHCA discourage double coverage and thereby dependent coverage, people have wondered that state-mandated health insurance such as PHCA may encourage spouse's labor force participation. This might be an interesting extension of this paper.

[7] Coefficients for year dummies are suppressed. standard error is in parenthesis.
Unemployment rate = -0.139*percentage of part-time workers.
(0.043) $R^2$=0.192, N=306

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Table 1. Insured and Uninsured by Types of Insurance: CPS 1994-2003

(%)

| | | Insured | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Public | | | | Private | | | | |
| | Year | Medicare | Medicaid | champ | Sub-total | Emp. based | Sub-total | Insured Total | Uninsured | Total |
| **US** | | | | | | | | | | |
| | 1994 | 12.7 | 12.2 | 3.7 | 26.4 | 57.1 | 70.2 | 84.7 | 15.3 | 100.0 |
| | 1995 | 12.9 | 12.1 | 4.3 | 26.8 | 60.9 | 70.3 | 84.8 | 15.2 | 100.0 |
| | 1996 | 13.1 | 12.1 | 3.5 | 26.4 | 61.1 | 70.3 | 84.6 | 15.4 | 100.0 |
| | 1997 | 13.2 | 11.8 | 3.3 | 25.9 | 61.2 | 70.2 | 84.4 | 15.6 | 100.0 |
| | 1998 | 13.2 | 10.8 | 3.2 | 24.8 | 61.4 | 70.1 | 83.9 | 16.1 | 100.0 |
| | 1999 | 13.2 | 10.3 | 3.2 | 24.3 | 62.0 | 70.2 | 83.7 | 16.3 | 100.0 |
| | 2000 | 13.2 | 10.3 | 3.1 | 24.3 | 63.5 | 72.1 | 85.7 | 14.3 | 100.0 |
| | 2001 | 13.4 | 10.3 | 3.0 | 24.2 | 64.1 | 72.4 | 86.0 | 14.0 | 100.0 |
| | 2002 | 13.5 | 11.2 | 3.4 | 25.3 | 62.6 | 70.9 | 85.4 | 14.6 | 100.0 |
| | 2003 | 13.4 | 11.6 | 3.5 | 25.7 | 61.3 | 69.6 | 84.8 | 15.2 | 100.0 |
| | Total | 13.2 | 11.3 | 3.4 | 25.4 | 61.6 | 70.6 | 84.8 | 15.2 | 100.0 |
| **Hawaii** | | | | | | | | | | |
| | 1994 | 12.4 | 7.7 | 14.4 | 33.2 | 60.4 | 72.4 | 88.9 | 11.1 | 100.0 |
| | 1995 | 14.3 | 9.5 | 13.8 | 34.2 | 67.4 | 74.8 | 90.9 | 9.1 | 100.0 |
| | 1996 | 11.6 | 14.6 | 13.2 | 36.1 | 62.2 | 71.8 | 91.1 | 8.9 | 100.0 |
| | 1997 | 12.3 | 14.3 | 12.4 | 36.1 | 60.5 | 69.1 | 91.4 | 8.6 | 100.0 |
| | 1998 | 13.9 | 10.9 | 11.1 | 33.7 | 64.2 | 72.4 | 92.5 | 7.5 | 100.0 |
| | 1999 | 13.4 | 10.4 | 9.2 | 31.5 | 69.3 | 74.6 | 90.0 | 10.0 | 100.0 |
| | 2000 | 11.4 | 10.2 | 6.5 | 27.1 | 71.3 | 76.8 | 89.7 | 10.3 | 100.0 |
| | 2001 | 13.2 | 10.5 | 5.6 | 26.5 | 68.4 | 77.7 | 89.9 | 10.1 | 100.0 |
| | 2002 | 14.4 | 11.5 | 10.0 | 32.9 | 66.1 | 73.2 | 90.4 | 9.6 | 100.0 |
| | 2003 | 14.1 | 10.5 | 8.5 | 30.2 | 67.6 | 73.5 | 90.0 | 10.0 | 100.0 |
| | Total | 13.1 | 11.0 | 10.4 | 32.1 | 65.8 | 73.6 | 90.5 | 9.5 | 100.0 |
| **Nevada** | | | | | | | | | | |
| | 1994 | 11.7 | 5.9 | 6.2 | 21.7 | 60.9 | 72.6 | 81.9 | 18.1 | 100.0 |
| | 1995 | 12.6 | 6.8 | 5.3 | 22.4 | 66.3 | 73.4 | 84.3 | 15.7 | 100.0 |
| | 1996 | 13.3 | 8.9 | 4.2 | 22.4 | 64.0 | 71.4 | 81.3 | 18.7 | 100.0 |
| | 1997 | 12.4 | 9.0 | 4.5 | 23.3 | 67.3 | 72.4 | 84.4 | 15.6 | 100.0 |
| | 1998 | 13.1 | 6.7 | 5.1 | 22.3 | 64.2 | 72.7 | 82.5 | 17.5 | 100.0 |
| | 1999 | 11.5 | 4.5 | 3.4 | 17.2 | 63.7 | 70.2 | 78.8 | 21.2 | 100.0 |
| | 2000 | 11.9 | 6.2 | 3.5 | 19.6 | 62.7 | 70.8 | 81.7 | 18.3 | 100.0 |
| | 2001 | 12.9 | 8.3 | 3.4 | 21.8 | 63.9 | 71.4 | 84.4 | 15.6 | 100.0 |
| | 2002 | 11.8 | 6.3 | 4.1 | 19.4 | 67.1 | 72.8 | 83.9 | 16.1 | 100.0 |
| | 2003 | 12.5 | 6.0 | 4.0 | 19.8 | 63.1 | 69.0 | 80.3 | 19.7 | 100.0 |
| | Total | 12.4 | 6.8 | 4.3 | 20.8 | 64.4 | 71.6 | 82.3 | 17.7 | 100.0 |
| **Michigan** | | | | | | | | | | |
| | 1994 | 12.2 | 14.8 | 1.7 | 26.9 | 64.1 | 74.6 | 88.8 | 11.2 | 100.0 |
| | 1995 | 13.1 | 13.7 | 3.2 | 28.0 | 68.4 | 76.2 | 89.2 | 10.8 | 100.0 |
| | 1996 | 13.6 | 11.2 | 1.4 | 24.9 | 71.4 | 77.9 | 90.3 | 9.7 | 100.0 |
| | 1997 | 13.8 | 12.6 | 1.1 | 25.2 | 71.3 | 78.6 | 91.1 | 8.9 | 100.0 |
| | 1998 | 13.9 | 12.8 | 1.3 | 25.7 | 68.3 | 75.7 | 88.4 | 11.6 | 100.0 |
| | 1999 | 12.7 | 11.3 | 0.9 | 23.2 | 69.6 | 74.9 | 86.8 | 13.2 | 100.0 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2000 | 12.3 | 10.3 | 1.0 | 21.8 | 71.5 | 78.6 | 89.9 | 10.1 | 100.0 |
| 2001 | 13.0 | 10.0 | 0.9 | 22.2 | 72.5 | 79.1 | 90.1 | 9.9 | 100.0 |
| 2002 | 14.0 | 10.1 | 1.2 | 23.5 | 72.3 | 78.2 | 89.6 | 10.4 | 100.0 |
| 2003 | 12.9 | 11.7 | 0.9 | 24.0 | 68.9 | 75.6 | 88.3 | 11.7 | 100.0 |
| Total | 13.2 | 11.8 | 1.3 | 24.5 | 69.9 | 76.9 | 89.2 | 10.8 | 100.0 |
| **California** | | | | | | | | | |
| 1994 | 10.7 | 16.5 | 3.3 | 27.8 | 50.9 | 62.2 | 80.3 | 19.7 | 100.0 |
| 1995 | 11.3 | 16.4 | 4.4 | 28.7 | 52.9 | 60.1 | 78.9 | 21.1 | 100.0 |
| 1996 | 11.1 | 15.9 | 3.0 | 27.5 | 53.3 | 61.0 | 79.4 | 20.6 | 100.0 |
| 1997 | 10.9 | 14.5 | 2.4 | 25.5 | 53.7 | 62.2 | 79.9 | 20.1 | 100.0 |
| 1998 | 11.0 | 13.5 | 2.7 | 24.6 | 54.1 | 61.5 | 78.5 | 21.5 | 100.0 |
| 1999 | 11.3 | 12.8 | 2.9 | 24.5 | 54.1 | 61.3 | 77.9 | 22.1 | 100.0 |
| 2000 | 10.8 | 13.3 | 2.8 | 24.4 | 57.3 | 64.9 | 81.0 | 19.0 | 100.0 |
| 2001 | 11.0 | 13.5 | 2.9 | 24.7 | 57.3 | 65.1 | 81.9 | 18.1 | 100.0 |
| 2002 | 10.2 | 13.9 | 2.9 | 24.1 | 55.9 | 63.6 | 80.5 | 19.5 | 100.0 |
| 2003 | 10.7 | 14.2 | 3.0 | 24.8 | 56.9 | 65.1 | 81.8 | 18.2 | 100.0 |
| Total | 10.9 | 14.4 | 3.0 | 25.6 | 54.7 | 62.8 | 80.0 | 20.0 | 100.0 |
| **Florida** | | | | | | | | | |
| 1994 | 16.4 | 12.2 | 5.0 | 31.1 | 49.1 | 64.2 | 80.4 | 19.6 | 100.0 |
| 1995 | 17.6 | 11.5 | 5.7 | 31.8 | 53.0 | 64.9 | 82.8 | 17.2 | 100.0 |
| 1996 | 17.4 | 11.2 | 5.3 | 31.0 | 52.8 | 64.8 | 81.7 | 18.3 | 100.0 |
| 1997 | 18.2 | 11.9 | 4.4 | 31.6 | 52.7 | 64.4 | 81.1 | 18.9 | 100.0 |
| 1998 | 19.0 | 9.0 | 3.9 | 28.9 | 53.1 | 64.2 | 80.4 | 19.6 | 100.0 |
| 1999 | 19.8 | 8.5 | 3.8 | 29.1 | 55.4 | 66.6 | 82.5 | 17.5 | 100.0 |
| 2000 | 18.1 | 9.2 | 3.6 | 27.8 | 55.7 | 65.9 | 82.0 | 18.0 | 100.0 |
| 2001 | 18.2 | 10.5 | 3.1 | 28.0 | 56.5 | 66.7 | 82.7 | 17.3 | 100.0 |
| 2002 | 17.7 | 10.9 | 4.0 | 29.1 | 55.9 | 65.7 | 82.5 | 17.5 | 100.0 |
| 2003 | 18.4 | 10.7 | 5.0 | 29.9 | 53.4 | 64.9 | 82.7 | 17.3 | 100.0 |
| Total | 18.1 | 10.5 | 4.4 | 29.8 | 53.8 | 65.2 | 81.9 | 18.1 | 100.0 |

Weighted. Total is a 10-year average.

Table 2. Multinomial Logit Results (Base=Uninsured), CPS 1994-2003

| Status | | US | Hawaii | Nevada | Michigan | California | Florida |
|---|---|---|---|---|---|---|---|
| Empbased | Age | 1.103 | 1.066 | 1.120 | 1.103 | 1.103 | 1.099 |
| | | (34.54) | (2.03) | (5.63) | (5.97) | (11.49) | (8.64) |
| | Age^2 | 0.999 | 0.999 | 0.999 | 0.999 | 0.999 | 0.999 |
| | | (26.07) | (1.51) | (4.45) | (4.37) | (8.87) | (6.77) |
| | Male | 0.741 | 0.631 | 0.735 | 0.761 | 0.695 | 0.758 |
| | | (29.19) | (4.37) | (4.36) | (4.51) | (12.49) | (6.96) |
| | FPL | 1.505 | 1.317 | 1.355 | 1.547 | 1.524 | 1.431 |
| | | (62.92) | (5.66) | (5.44) | (13.95) | (23.43) | (13.14) |
| | Non-white | 0.704 | 1.158 | 0.997 | 0.580 | 0.976 | 0.856 |
| | | (24.83) | (1.06) | (0.02) | (7.10) | (0.59) | (2.73) |
| | Working hours | 1.013 | 1.042 | 1.019 | 1.007 | 1.017 | 1.020 |
| | | (23.71) | (6.12) | (3.63) | (2.56) | (9.48) | (8.43) |
| | Union | 2.449 | 3.499 | 2.589 | 2.020 | 2.356 | 1.980 |
| | | (22.5) | (3.02) | (3.64) | (4.17) | (7.46) | (3.14) |
| Others | Age | 0.928 | 0.995 | 0.897 | 0.907 | 0.964 | 0.933 |
| | | (17.39) | (0.11) | (2.77) | (4.27) | (2.82) | (4.28) |
| | Age^2 | 1.001 | 1.000 | 1.001 | 1.001 | 1.001 | 1.001 |
| | | (17.61) | (0.14) | (2.80) | (4.15) | (3.01) | (4.60) |
| | Male | 0.632 | 0.534 | 0.706 | 0.582 | 0.573 | 0.647 |
| | | (27.16) | (3.98) | (2.36) | (5.91) | (11.47) | (6.82) |
| | FPL | 1.075 | 0.965 | 1.142 | 0.895 | 1.126 | 1.122 |
| | | (7.87) | (0.46) | (1.77) | (2.15) | (4.76) | (3.29) |
| | Non-white | 0.826 | 0.866 | 1.294 | 1.092 | 0.946 | 0.807 |
| | | (8.9) | (0.76) | (1.18) | (0.84) | (0.85) | (2.45) |
| | Working hours | 0.974 | 0.976 | 0.979 | 0.965 | 0.972 | 0.978 |
| | | (31.01) | (2.79) | (1.82) | (8.41) | (10.78) | (6.21) |
| | Union | 0.928 | 0.839 | 1.401 | 0.840 | 0.880 | 0.839 |
| | | (1.04) | (0.27) | (0.59) | (0.66) | (0.62) | (0.43) |

Relative risk ratio form. t-values are in parenthesis.

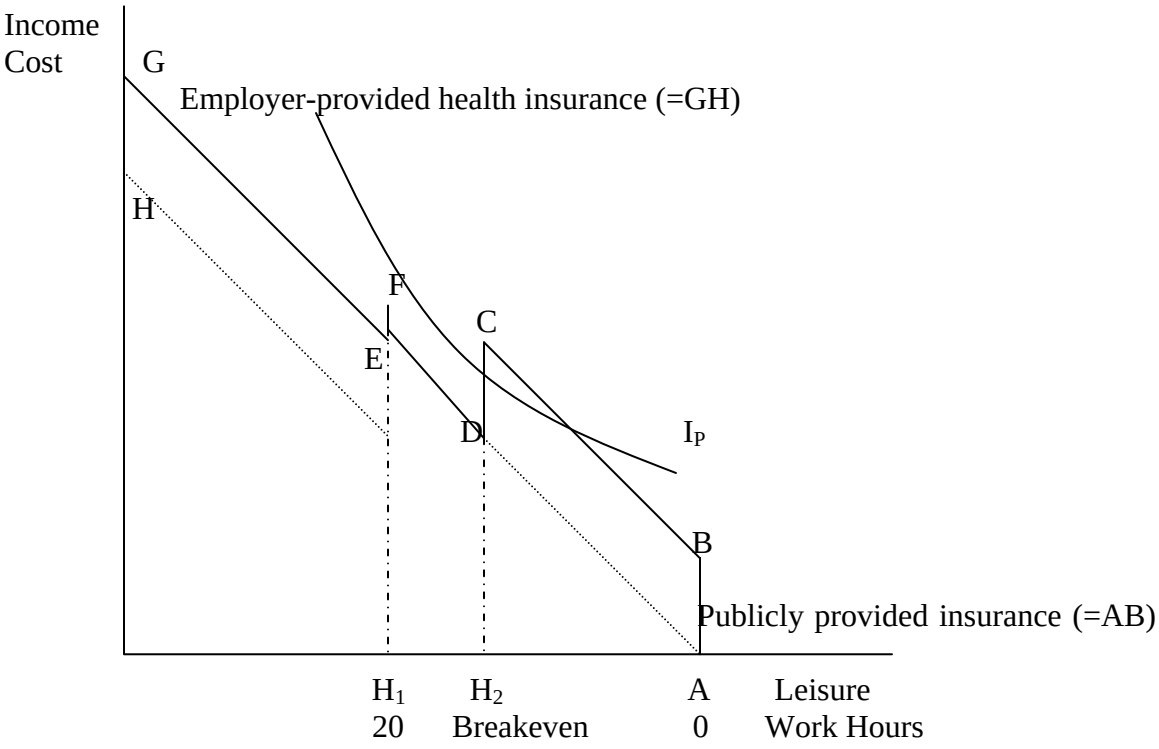


Figure 1. A Two-Notch Budget Constraint for Hawaii Workers after PHCA:
Voluntary Part-Time Workers with Public-Provided Health Insurance

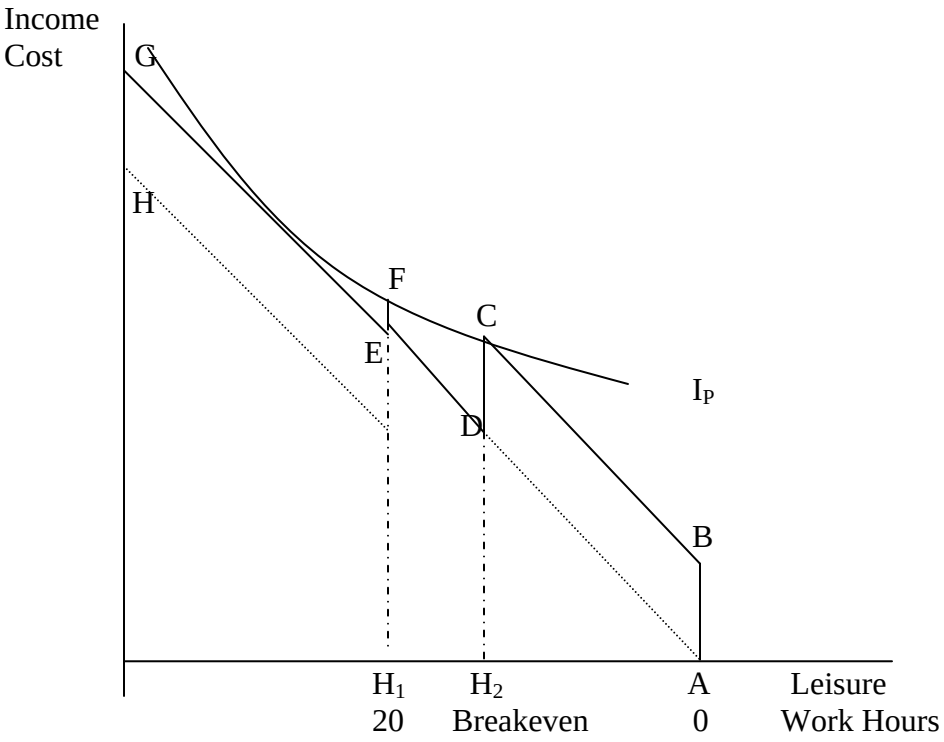


Figure 2. A Two Notch Budget Constraint for Hawaii Workers after PHCA: Full-Time Workers