

An Economic Analysis on Healthcare Affordability and Income Inequality, with Focus on the Affordable Care Act

Eco 481: Health and Economic Inequality

University of Toronto Department of Economics

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1 Introduction

In economics, healthcare emerges as a highly multifaceted subject, with countries globally implementing distinct policies that reflect their unique social and political ideologies and preferences. This complex allocation of healthcare to individuals is rooted in the need to balance the economic feasibility of making and providing medical innovations and the ethical considerations behind refusing certain groups to access these advancements. Countries such as Canada have embraced a publicly funded healthcare system, ensuring universal essential healthcare coverage for all residents. In contrast, the United States of America features a more predominantly private healthcare system with a combination of public and private providers. These variations in healthcare systems come with their own set of trade-offs and are primarily influenced by the choice between increasing accessibility of healthcare for lower-income individuals at the expense of efficiency, quality, and innovation.

Due to the controversial nature of this topic, many past studies have examined the relationship between income and healthcare consumption. In a study by Burkhauser et al. (2012), using census population survey data collected by the US Census Bureau and the Bureau of Labor Statistics on the incomes and expenditures of US adults from 1996 to 2008, the authors showed that the addition of government and employer-provided healthcare reduces the income inequality within all age groups but especially those who are above 63 and are under no insurance plan. In a more recent study conducted by Christopher et al. (2018), the authors used similar CPS data but on US adults from 2010 to 2014. They concluded that the then-current US healthcare system is designed to increase income inequality and deprive millions of Americans.

Both studies highlight the Affordable Care Act's (ACA) potential to enhance healthcare access for lower-income individuals. Buettgens et al. (2021) used the Urban Institute's model to show that the ACA significantly reduced income inequality in Medicaid-expanding states. Before the ACA (2010), roughly 17% of Americans were uninsured; this lowered to 8.8% in 2017 (Christopher et al., 2018). While the ACA expanded medicine

access, studies also indicate increased dental care use among low-income childless adults (Song, 2021). Meanwhile, for vision care, the ACA improved utilization for those newly insured but at rates lower than pre-existing insured individuals (Pang et al, 2020).

Despite the extensive research linking healthcare provision and income inequality, further investigation is crucial. This is because the effects of the ACA are still ongoing, and several amendments and policy changes have been made after its passing in 2010. So while existing studies provide conclusions, the nature of the relationship is not always straightforward and is always changing. This paper seeks to address these conflicts in knowledge by exploring the relationship between income and healthcare spending, and how this relationship has been affected by the introduction of the ACA.

2 The Context and Method

Repeated cross-sectional data was gathered from the IPUMS US Health Surveys which studied a sample of US citizens across all states from the years 2009 to 2018. The survey measures the overall income and healthcare expenditure of individuals each year.

Our primary outcome variable of interest is healthcare access. The survey assesses this across various aspects of health spending, with a particular emphasis on variables related to dental, vision, and prescription medication consumption. The health access of an individual was assessed based on whether or not they were able to afford treatment within the past 12 months. These variables, along with the level of household income per respondent will be central to our research. Additionally, other socioeconomic variables (such as gender, region, ethnicity, education, and household size) were collected to be analyzed.

All the responses in this survey were categorized for easy standardization and implementation. However, this approach to survey design limits data analysis since continuous methods are no longer applicable to categorical data. So while categorical visualizations, such as bar charts, offer valuable insights, they also lack the rigor of a regression model. A method to go around this issue is to aggregate individual responses to determine the proportion of respondents who were not able to access treatment in a given year. Line charts can then be created to measure the trend in the proportion of people who had access to healthcare over a given time period.

Another solution to dealing with categorical data would be to run a logistic regression model to measure the relationship between household income and healthcare access by partitioning the healthcare variable into two binary categories of whether or not an individual had access to healthcare. Socioeconomic factors such as gender, region, ethnicity, education, and household size can then be used to control for potential confounding variables, ensuring a more accurate assessment of the relationship. In doing so, multiple regression models can then be created for each cross-sectional period to observe the effect of income on healthcare affordability and determine whether or not that effect has

changed through the implementation of the Affordable Care Act.

For our analysis, we would like to assume that the Health survey conducted is representative of the United State's population for each year. This would help in extrapolating our results to that of the US population.

3 Analysis of Results

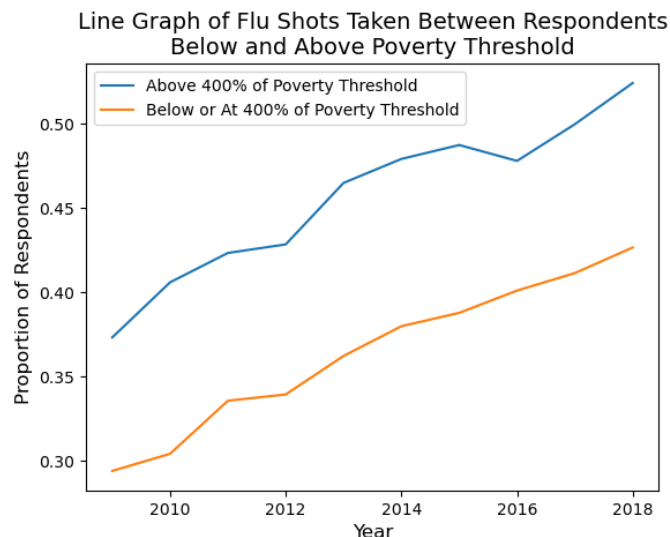
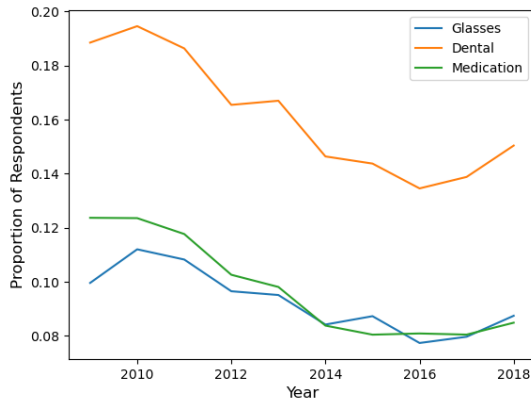


Figure 1: Line Chart of Flu Shots

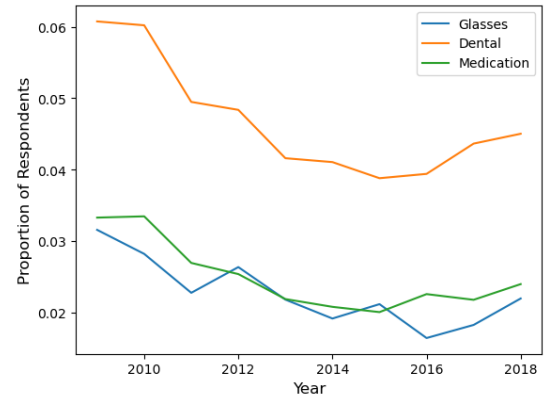
The ACA provided subsidies aimed at lowering the cost of healthcare spending for households at or below 400% of the poverty threshold. Figure 1 visualizes the relationship between these two income groups and the proportion of people who get flu shots yearly. The graph shows a yearly upward trend which indicates that since 2009, there has been a greater proportion of people taking the flu shot every year in both groups. The yearly trend does not show a noticeable causal shock factor from the implementation of the Affordable Care Act in 2010. However, the increase in the proportion of recipients may be partly due to lowered costs from the act's preventative disease mandates.

The graph highlights a persistent annual gap of approximately 10% between individuals living below or at and those living above the poverty threshold in terms of receiving a flu shot. This shows a sub-optimal performance of the ACA in addressing unequal access to healthcare due to income. What this may also suggest is that various other factors can exert an influence on healthcare spending, and notably, these factors remained unaffected by the implementation of the ACA. Accounting for these factors in our regression models would be beneficial.

Figure 2: Line Graph of Respondents Unable to Afford Healthcare



(a) At or Below 400% of Poverty Threshold



(b) Above 400% of Poverty Threshold

Figure 2 shows the difference in healthcare affordability throughout the years for both income groups discussed previously. Before the implementation of the ACA in 2010, we can see that there was roughly a higher proportion of individuals who were not able to afford medical care in the form of dental, vision, and medicine. Post-2010 is when there is an observed drop in the proportion of people who stated they were not able to afford healthcare for that year. The trends in both groups are similar; however, it is logical to see that there is a higher proportion of households that are unable to afford healthcare in the lower-income group. Consequently, the magnitude of the decrease for households at or below 400% of the poverty threshold surpasses that of households above that threshold. This suggests that the impact of the ACA was more significant for households below or at the 400% poverty threshold.

The trend reached a low in 2016 for both glasses and dental but began increasing from 2017 to 2018, potentially reflecting changes in healthcare policy following a presidential administration transition (Obama to Trump). While the proportion of individuals seemingly unable to afford healthcare may appear small (0.1 of respondents in 2016 stated they could not afford dental healthcare that year), extrapolating this survey's findings to the size of the American population in 2016 (approximately 323 million), reveals that roughly 32.3 million people were unable to afford dental care.

Table 1: Logistic Regression Analysis of Health Care Affordability for Years 2009-2018.

		Dependent Variables		
Year		Glasses	Dental	Medicine
2009	Income 1k	0.017*** (0.001)	0.016*** (0.001)	0.018*** (0.001)
	Observations	32087	32087	32087
2010	Income 1k	0.020*** (0.001)	0.017*** (0.001)	0.020*** (0.001)
	Observations	31395	31395	31395
2011	Income 1k	0.022*** (0.001)	0.018*** (0.001)	0.020*** (0.001)
	Observations	37617	37617	37617
2012	Income 1k	0.019*** (0.001)	0.017*** (0.001)	0.020*** (0.001)
	Observations	39237	39237	39237
2013	Income 1k	0.021*** (0.001)	0.018*** (0.001)	0.020*** (0.001)
	Observations	39170	39170	39170
2014	Income 1k	0.020*** (0.001)	0.017*** (0.001)	0.019*** (0.001)
	Observations	42727	42727	42727
2015	Income 1k	0.020*** (0.001)	0.017*** (0.001)	0.018*** (0.001)
	Observations	39212	39212	39212
2016	Income 1k	0.019*** (0.001)	0.015*** (0.001)	0.016*** (0.001)
	Observations	37913	37913	37913
2017	Income 1k	0.018*** (0.001)	0.015*** (0.001)	0.015*** (0.001)
	Observations	30777	30777	30777
2018	Income 1k	0.016*** (0.001)	0.013*** (0.001)	0.015*** (0.001)
	Observations	29290	29290	29290

Note: The regression table shows the effect of income on healthcare affordability for each year 2009-2010. Each regression model contains socioeconomic controls to isolate the effects of income on healthcare. Region Dummy Variables are added to account for differences in policy implementation across regions in the US. *p<0.1; **p<0.05; ***p<0.01

Table 1 shows the logistic regression models generated for healthcare analysis on household income for each year. In 2009, we can see that for an increase in income by 1000 dollars, there is a statistically significant increase in the log-odds of being able to afford healthcare such as glasses, dental work, and medicine within the past 12 months.

Post-2009, the impact of income on the probability of affording healthcare varies, but there is an overall small decline in the influence of income on healthcare affordability by 2018. The regression results imply that the implementation of the ACA in 2010 has had a limited impact on narrowing the income inequality gap in access to healthcare.

Due to a Supreme Court ruling in 2012, the expansion of Medicaid was made optional for states. In this logistic regression analysis, it would be valuable to include the impact of states that did not implement Medicaid. However, a severe limitation arises due to the data collection method, where responses were categorized only by U.S. regions (North, South, etc.), to protect privacy. Therefore, by accounting for regions instead of individual states, the effects of Medicaid expansion in some states and not other is improperly accounted for.

4 Discussion

The results of this analysis echo familiar conclusions discussed in previous papers regarding the impact of income on healthcare affordability. From our analysis, we can see that income plays an important role in the determinants of healthcare access (the more money you have the more you can afford). This issue is indicative of the challenge America faces with its private healthcare system which primarily caters to individuals with higher incomes.

The implementation of the Affordable Care Act seems to attempt to pivot to a more public healthcare system, through the expansion of Medicaid. However as noted previously, the expansion of Medicaid is optional, with only 33 of 50 states choosing to expand Medicaid in 2018. This diminishes the potential effects of the ACA, which initially aimed to extend Medicaid expansion to all states, and could be the reason why the impacts did not seem so profound.

It is also important to acknowledge that the analysis presented in this study is susceptible to various other internal and external validity concerns, which should be acknowledged when interpreting the findings:

Externally, the use of categorical variables limits the amount of variation observed, making it hard to generalize to specific individuals. Some observations from the survey were excluded due to invalid or irrelevant responses, impacting our initial assumption that the survey data accurately represented the US population. Also, the assumption that the NHIS survey is representative of the United State's population is a very strong assumption to be made.

Internally, although socioeconomic factors like race were added to the regression model to reduce the problem of omitted variable bias, we know that other factors like improvements in the economy would affect the amount of healthcare spending. Leaving these variables out of the model means that confounding variables are still a problem affecting the accuracy of our results. Lastly, the assumptions for running a logistic regression were not formally tested if held thus affecting the validity of our estimates.

5 Conclusion

This study utilized both graph and regression analyses to investigate the impact of the Affordable Care Act on unequal access to healthcare tied to income. The graph findings revealed a notable decline in the proportion of individuals reporting inability to afford crucial medical services like vision, dental, and medicine since the ACA's enactment in 2010. Running a logistic regression model to further test these claims, the effect of income on healthcare has decreased after the implementation of the ACA, however, the magnitude of the decrease was small and the income effect still remains a large factor behind the accessibility or affordability of healthcare.

The Affordable Care Act marked a positive stride towards the establishment of a publicly funded healthcare system in the United States. While progress has been made, there remains a need for continued efforts in addressing and resolving the inequities in healthcare access associated with varying income levels.

6 References

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