Preliminary Analysis - Research in Health Economics

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1 Introduction

The United States has one of the lowest life expectancy rates amongst OECD countries of 76.4 years as of 2021. According to the CDC, personal health care expenditure in 2019 was USD$2.937 billion. The cost of health care in USA is one of the highest in the world, leading to a large proportion of the population being unable to access adequate health care. Around 47% of the the adult population find it difficult to pay for medical costs, with adults in households with annual income below $40,000 being three times as likely as adults in households with annual income above $90,000 to find medical costs difficult to afford. These statistics show that health insurance could help ease the burden of medical costs and medical cost debt on people, allowing them to access necessary health care services to improve the quality of their health.

The Affordable Care Act (ACA) aimed to improve accessibility to healthcare by making affordable health insurance available to more people. As the groups with lower annual income levels are more prone to be unable to receive medical care, it is important to look at the impact of health insurance on the health of these groups to answer the question: "Can Health Insurance improve health?"

2 Data

This project is looking into the effect of health insurance on health outcomes to answer the question, "does health insurance improve health?" It is using annual survey data on general health trends in USA from the Behavioral Factor Surveillance System (BFRS). In particular, it is using the self-reported health status (GENHLTH) as an indicator of health with a rating of '1' corresponding to 'excellent health' and '5' to 'poor health' while a rating of '7' indicated people who were unsure of their health status. It is using data from 2011, 2012 and 2013 as years before Medicaid expansion and data on years 2014-2019 for years after expansion.

This is also using data for the state of Kentucky as the treatment variable as they have expanded Medicaid. The data has been lowered to only include people with annual income of $35,000 or less and people with no children to better study the impact of health insurance on low-income individuals.

For insurance data, it is using data from United States Census Bureau for the years 2012-2019 on the different types health-care coverage being used by the population. It is also using data from the Kaiser Family Foundation to determine the states which have expanded Medicaid and which have not to better compare the impact of Medicaid expansion on health.

3 Data Analysis

Table 1 above includes the summary statistics of the data on insurance distribution in the US. It shows that a majority of the population is covered under Employer-Provided Insurance with a mean of 2.1260121×10^6 and the second-most coverage is provided by Medicaid with a mean of 4.0564329×10^5 over the years and across all states.

Table 1: Insurance Plan Summary Statistics

	Observations	Mean	Standard Deviation	Minimum	Maximum
ins_employer	416	2,126,012.09	2,334,520.92	194,796	13,216,474
ins_direct	416	305,473.19	385,152.23	15,534	2,427,618
ins_medicaid	416	405,643.29	595,766.46	9,975	4,529,147
ins_medicare	416	47,351.12	46,960.78	1,532	235,939
uninsured	416	564,927.45	838,367.35	19,009	5,901,869

Table 2: Average Share of Insurance without Medicaid Expansion

State	Average Insured	Average Uninsured	Average Direct Purchase	Average Employer-Provided	Averag
Alabama	71.12101	16.53166	10.856767	76.27425	
Florida	68.96030	22.10937	16.783006	69.96166	
Georgia	69.18161	20.94417	11.156729	78.52341	
Kansas	75.61638	14.16747	11.687327	81.20986	
Mississippi	67.75585	20.55271	10.384451	73.53871	
North Carolina	71.22498	18.04868	13.172285	74.82512	
South Carolina	70.37783	18.25224	10.834609	75.43552	
South Dakota	74.56165	14.28065	15.283380	77.16848	
Tennessee	73.46484	16.13851	10.677323	73.92048	
Texas	66.50214	25.50396	10.985891	79.36726	
Wisconsin	82.71222	9.15619	9.270848	78.51481	
Wyoming	73.34406	16.92109	12.252321	80.90633	
Total Average	72.06857	17.71722	11.945411	76.63716	

Looking at the difference in average share of insured and uninsured in the population according to States can give a better understanding of insurance distribution and its impact on health. Table 2 includes a summary of the share of insurance of insurance distribution for States which have not expanded Medicaid and Table 3 shows a summary for the States that have expanded Medicaid since 2014. The share of insured people amongst Medicaid expanded states is higher at 78 compared to 72 for states which not expanded Medicaid. This corresponds to better health ratings given by people in states with Medicaid expansion as shown in Table 4.

Table 3: Average Share of Insurance with Medicaid Expansion

State	Average Insured	Average Uninsured	Average Direct Purchase	Average Employer-Provided	A
Alaska	64.88908	19.737403	7.342559	77.42218	
Arizona	73.84153	17.195369	10.427135	69.51594	
Arkansas	72.58593	15.996237	10.913030	69.92828	
California	78.10040	14.975812	11.584048	67.89583	
Colorado	77.85327	13.080262	12.542243	73.54077	
Connecticut	83.99151	9.235459	9.137904	74.30655	
Delaware	80.74897	9.631871	7.445467	75.29370	
District of Columbia	84.80560	5.782024	10.654911	68.46867	
Hawaii	78.80972	6.806435	7.712383	77.77957	
Idaho	71.61048	18.120769	16.433443	74.97993	
Illinois	80.84749	12.588118	9.478518	75.48566	
Indiana	77.85380	14.034386	8.629812	78.70017	
Iowa	82.75794	8.246481	10.553463	77.46123	
Kentucky	77.78188	11.506548	7.758085	70.34921	
Louisiana	72.20953	17.673565	10.597004	70.14047	
Maine	75.73247	12.877699	10.830420	73.93077	
Maryland	80.17140	10.203761	8.860426	77.64631	
Massachusetts	87.22155	4.325749	8.335397	72.90346	
Michigan	80.49999	10.556783	8.970479	73.62708	
Minnesota	85.22976	7.410168	9.578297	76.54313	
Missouri	75.65402	15.084333	10.847696	78.90834	
Montana	72.86429	16.392922	16.193685	70.95750	
Nebraska	77.28603	12.999598	13.509889	80.09910	
Nevada	71.83013	19.174256	9.428004	76.34488	
New Hampshire	81.64325	10.805673	8.878346	81.71014	
New Jersey	80.61552	13.498627	8.151021	79.47496	
New Mexico	70.57850	18.151253	9.083114	62.97473	
New York	81.60798	10.557116	8.227737	70.23727	
North Dakota	79.77499	10.108728	14.238836	78.55987	
Ohio	81.30759	10.759509	7.354188	75.33277	
Oklahoma	68.29876	21.625969	11.296636	77.10640	
Oregon	77.77973	13.198703	11.193810	70.72288	
Pennsylvania	81.98652	9.733213	9.639582	76.37605	
Rhode Island	81.46153	9.269425	9.784324	73.20024	
Utah	78.41707	14.380731	12.424029	81.41890	
Vermont	83.45266	7.102627	9.544701	69.68684	
Virginia	73.36243	13.694997	11.041771	80.63708	
Washington	77.72001	12.208760	10.134353	75.39590	
West Virginia	76.13574	12.629879	5.575239	70.26242	
Total Average	77.93126	12.599006	10.111077	74.49552	

Table 4 below is showing the average health status rating for a state with Medicaid expansion and without. The average self-reported health status rating is 3.335 with Medicaid expansion and 3.371 without Medicaid expansion. As the mean rating is lower by 0.036 for states with Medicaid expansion, it can be understood that Medicaid expansion corresponds to better self-reported health status.

Table 4: Average Health Status Ratings

Medicaid Expansion	Observations	Average Health Status	Standard Deviation	Lower Interval	Upper Interval
Yes	7,406	3.335269	1.177124	3.308457	3.36208
No	6,484	3.371067	1.179496	3.308457	3.36208

The Figures 1 and 2 show the share of uninsured population and insured population respectively. As can be seen in Figure 1, the share of uninsured population has fallen significantly from around 18.6% in 2012 to 11% in 2016, before increasing slightly to almost 12% in 2019. Figure 2 shows share of insured population, on the other hand, has continued to increase from around 71% of the population in 2012 to around 78% in 2019, remaining fairly constant since 2016.

Figure 2 also shows the distribution of insurance coverage used by people. Employer-Provided Insurance makes up the largest share of insured population while Direct Purchase make up the smallest share from 2012 to 2019. However, the share of Medicaid has increased since 2014 while the share of Employer-Provided Insurance has started to reduce since 2013, before increase slightly till 2019.

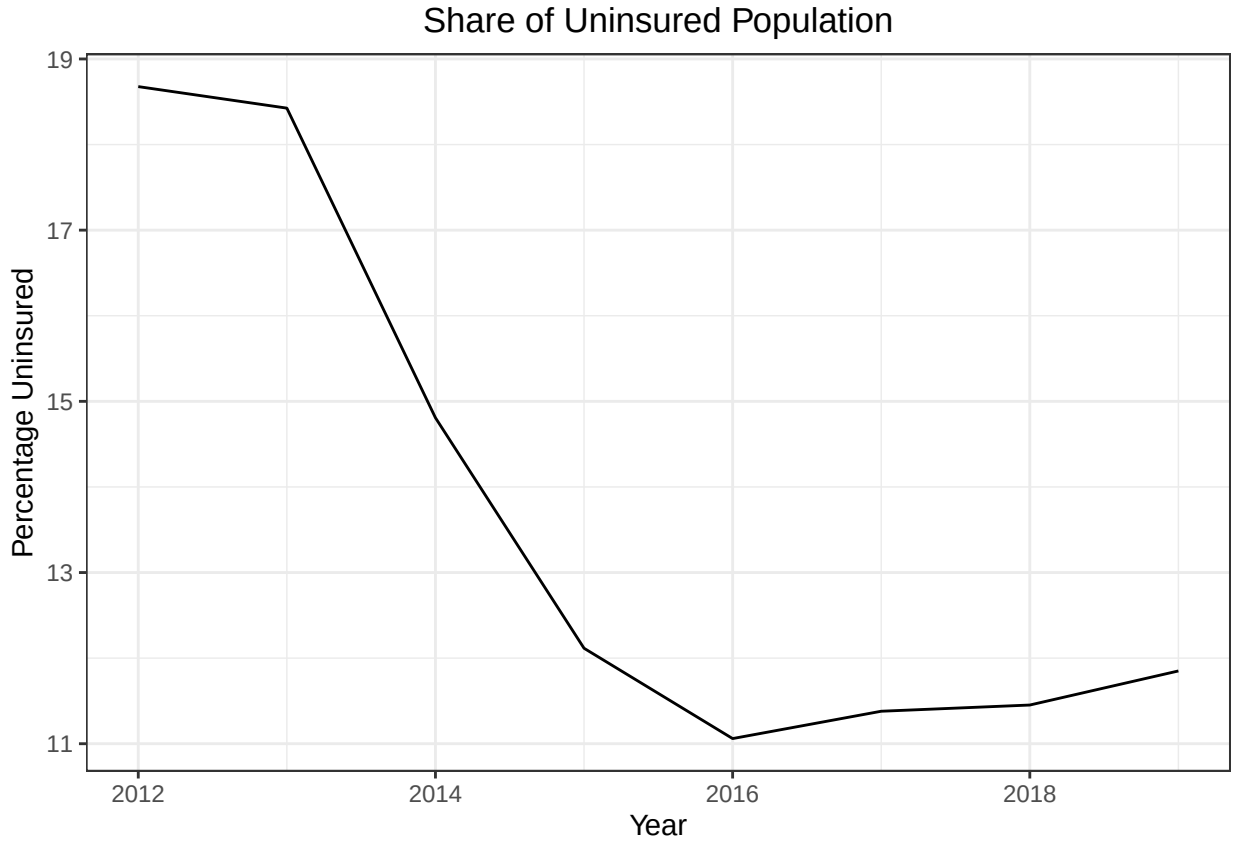

Figure 1: Share of Uninsured Population

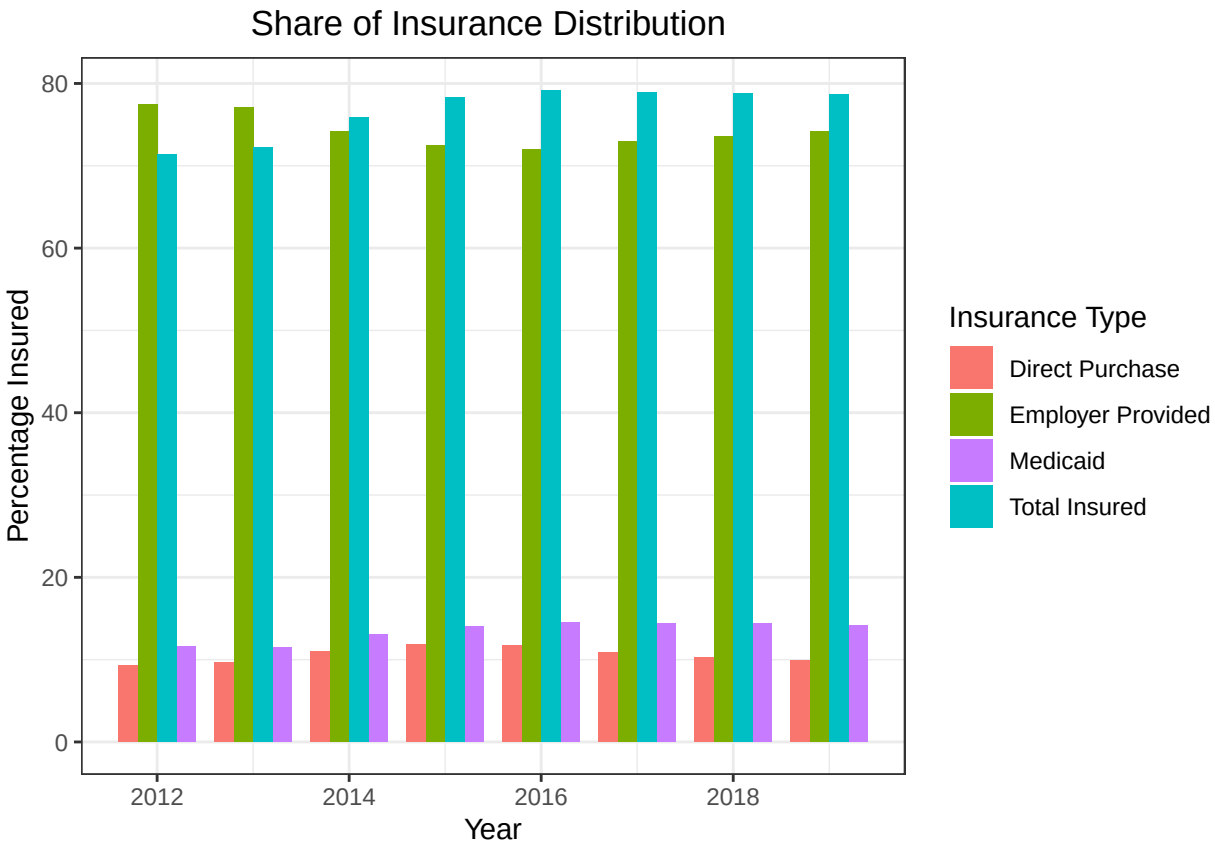

Figure 2: Share of Insurance Distribution

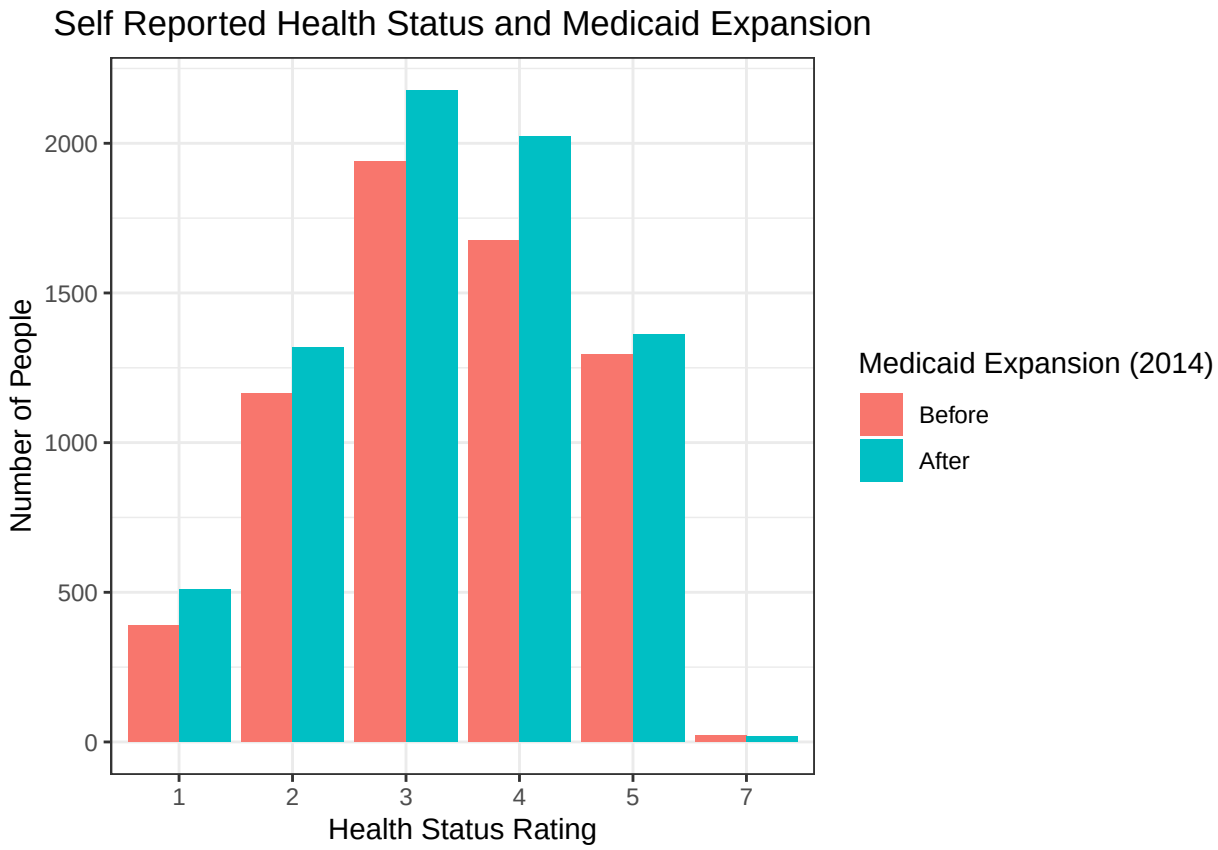

Figure 3: Self Reported Health Status with(out) Medicaid Expansion

As shown in Figure 3, more people (amongst lower income groups) reported a better rating for their health status after Medicaid expansion, compared to before. Approximately 100 more people rated their health status '1' which corresponds to 'excellent health' after 2014 while 150 more rated '2' corresponding to 'very good health' while around 200 more rated their health as '3', corresponding to 'good health' and around 400 more people rated their health as '4' or 'fair'. The figure also shows that around 50 more people have rated their health status as 'poor' after the Medicaid expansion. This could be due to the larger number of observations used for after Medicaid expansion compared to before. However, this increase is small compared to the increase in positive ratings.

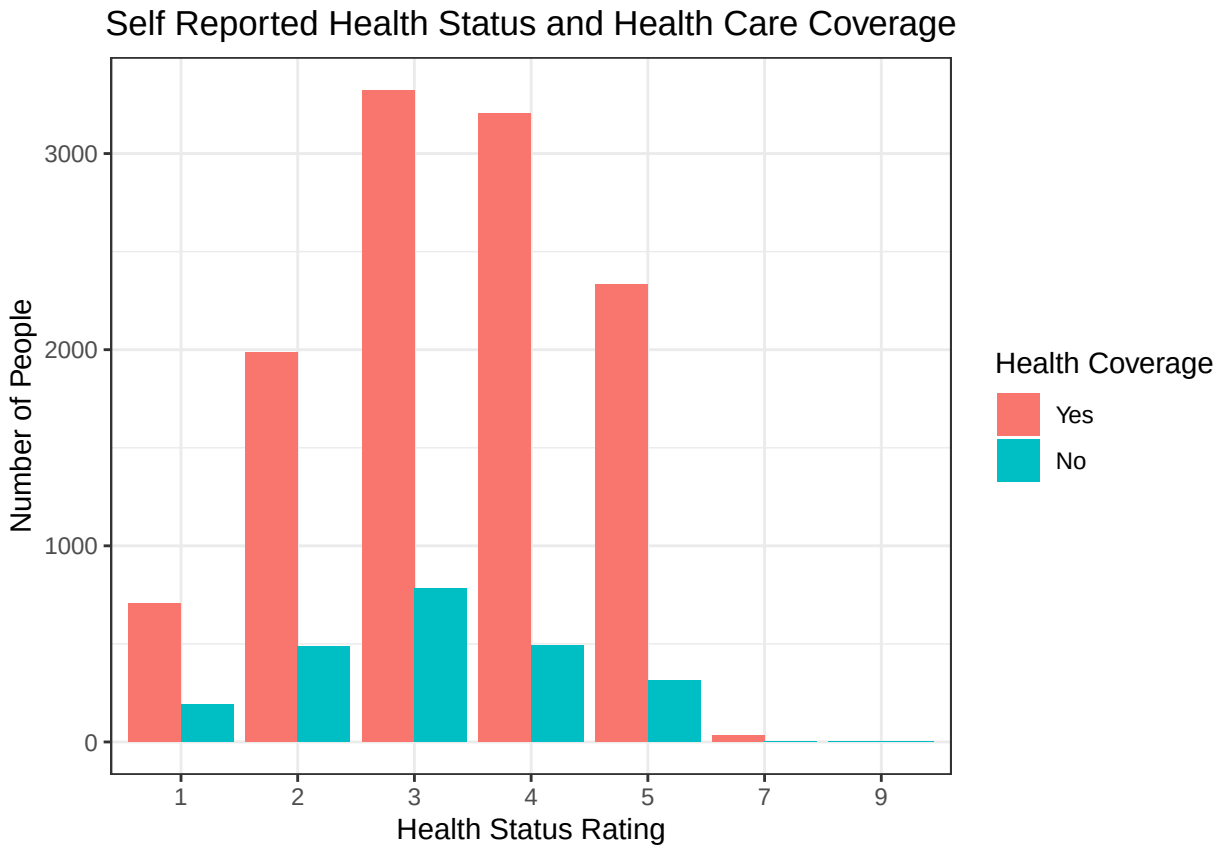

Figure 4: Self Reported Health Status and Health Care Coverage

Figure 4 shows self-reported health status of the population based on whether they have any kind of health coverage, including health insurance, prepaid plans such as HMOs, or government plans such as Medicare, or Indian Health Service. The graph shows that people with some form of health coverage tend to report a better health status compared to those without health coverage, indicating that health insurance could improve the quality of health. While the graph also shows more people with health coverage reporting their health as '5' meaning 'poor', it could due to more people with pre-existing health conditions or poor health enrolling in health coverage plans compared to healthy people.