HURJ

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HUMANITIES & SOCIAL SCIENCES

LETTER from the EDITORS

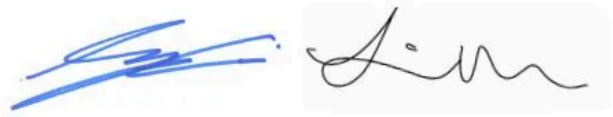
Hopkins Undergraduate Research Journal (HURJ) is the first undergraduate interdisciplinary research journal. Since its inception in 2001, every issue of HURJ evolved to better encompass and reflect the diverse interests of the students on the Homewood campus. In the following pages, you will encounter a sample of incredible research in the sciences, humanities, social sciences, and engineering which the undergraduates of the Johns Hopkins University engaged in.

For each issue of HURJ, the editorial staff select from numerous article submissions, highlighting the passion and dedication of the Hopkins undergraduate community. We are confident that this publication is a testament to the boundless academic and intellectual talents of our peers. As you read each article presented in this issue, it is our hope that you will partake in honoring their work with us.

Each issue of HURJ is only possible with the diligence, dedication, and cooperation of our staff and the contributing authors. We would like to extend a special thanks to them, which allowed for this issue the success it has become.

We welcome all thoughtful ideas, comments, and questions. We hope that this journal serves as an inspiration for you to partake in the contribution and celebration the intellectual growth of this community.

Sincerely,



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Computational Analysis on the Relationship Between State Political Party Dominance and Lack of Health Insurance

Daniel Habib

BACKGROUND

Healthcare in the United States has recently gained a greater foothold in the political sphere, especially with Obamacare on the verge of repeal since the election of Donald Trump. Although President Trump has not been successful in completely eradicating the Affordable Care Act, he has been chipping away at it. President Trump signed in 2017 and enacted in January 2019 the Tax Cuts and Jobs Act to repeal the Obamacare individual mandate that puts a punitive tax on citizens in certain socioeconomic groups if they do not have health insurance. According to *Reuters*, the Congressional Budget Office estimates that this repeal will increase the number of uninsured Americans by a staggering 13 million (1). With no financial incentive to continue paying for premiums, fewer young, and hence typically healthy, people feel inclined to pay for insurance. Health insurance providers with a greater proportion of sick people and surging costs would be forced to increase premiums, further widening the healthcare gap. As a result of unaffordable health insurance, utilizing preventative care may even more frequently take a back seat in favor of risking sporadic, expensive emergency room visits when preventable, progressively worsening health issues suddenly become urgent.

Knowledge of insurance disparities takes us one step closer to ensuring assistance for the uninsured. Current research initiatives, such as SToP Glaucoma of the Wilmer Eye Institute of Johns Hopkins Hospital, are aimed at determining optimal methods of providing health services to the uninsured and would benefit from insurance demographic research. Understanding which states fall above and below the national average rate of uninsured Americans is key in properly addressing the issue of healthcare in the United States on a case-by-case basis. A shift away from a one-size-fits-all mentality may be useful when supplementing public insurance with region-specific programs, which take into account both political party dominance as well as exceptional local disparities. For example, regions with lower rates of uninsured citizens may benefit more from small scale free clinics, while areas with higher uninsured rates may require a more comprehensive approach to keep pace with demand.

Matlab-generated analysis of raw data retrieved from the United States Census Bureau and *Gallup* compares the uninsured rate of each region to the national average in order to evaluate the relationship between uninsured rates and regional political party dominance in 2017, the year the Tax Cuts and Jobs Act was signed (2-3).

METHODS

Data of uninsured rates with error margins of each state, the District of Colombia, and the United States as a whole were obtained from the 2017 census conducted by the USCB (2). Data of political party dominance in 2017 were obtained from Gallup (3). Another raw data set from the USCB was used to compare the poverty rate in Democrat and Republican states (4). Analysis and computation were conducted using the MATLAB® 2017 version, MATLAB_R2017b (**Figure 1**). The bar graphs of uninsured population discrepancy with the national average were color coded according to which political party affiliation was dominant in each respective region in 2017. Solid regions had a ten or higher percentage point advantage, lean regions had only a five to nine-point advantage, and competitive regions had a dominant party discrepancy below five percentage points. In this paper, lean and solid democrat classifications were consolidated into just democrat regions, and lean and solid republican classifications were consolidated into republican

regions for an adequate number of regions in each category on which more accurate statistical analysis could be conducted. **Figure 1; Table 1**

RESULTS

Figure 2; Figure 3 No significant correlation was found between poverty rate and the rate of uninsured residents in each state. Hence, the policies in Republican-dominant states, rather than the poverty rates alone, are responsible for higher rates of uninsurance and do not adequately address the needs of the states' impoverished and uninsured residents.

DISCUSSION

Unified action in solving America's health insurance crisis seems further from reach as candidates at every level of government are pressured to the poles of the political spectrum. Many Republican states refuse to implement the federally sponsored Medicaid expansion offered by the Affordable Care Act of 2010, better known as Obamacare, due to its association with a Democratic president. On the other end of the spectrum, more radical Democrats want to overhaul Obamacare in favor of a single-payer healthcare system. Partisan participation in what should be a bipartisan approach cannot solve the healthcare problem.

Of the 15 states that opted against Medicaid expansion (Table 1), 14 have above-average rates of uninsurance and 10 are Republican (4-5). Competitive Wisconsin is the only exception to the trend, while the uninsurance rates of Republican-dominant Oklahoma, Wyoming, and Mississippi are notably higher than the national average (4-5). A potential confounding factor is that some Republican states that opt out of Medicaid expansion, such as Mississippi, are very poor (4). This may account for higher rates of uninsured residents. Hoever, the below-average poverty rates of Wyovming, Utah, and Missouri fail to corroborate this theory (4). Moreover, three more of the ten Republican states have poverty rates from the national average by less than one percent (4). The four remaining Republican states, which show more significant differences, may implicate poverty in higher uninsurance but fail to explain it entirely (4). For example, Alabama has the second highest poverty rate of the ten Republican states, which refuse to expand Medicaid, yet has one of the lowest rates of uninsurance of these states (4).

"People with little financial leeway are not so much making a choice as they are prioritizing basic necessities."

The possibility of an increase in the uninsurance rate, rapidly increasing premiums, and a shift away from preventative care raises the question of how to tackle the national crisis of uninsured Americans. Although a number of states prominently stood out from the trend, the majority of predominantly democrat areas have lower rates of people without insurance (**Figure 2**).

CONCLUSION

Considering political party allegiance is founded more times than not, though a shift away from the mentality of one size fits all is justifiable in supplementing public insurance with region-specific programs, which take into account both political party dominance as well as other underlying disparities. The trend demonstrated by the graphs highlights the failure of Republican states to implement more accessible and effective healthcare. People with little financial leeway are not so much making a choice as they are prioritizing basic necessities, such as housing and food, over investing without immediate payoff. Obviously, an individual voter's political affiliation does not directly affect that person's ability to get insurance. Nevertheless, the refusal of several Republican states to participate in the Obamacare expansion of Medicaid to adults living under 138% of the federal poverty line has profound consequences (5). Small-scale health clinics may be more feasible in Democrat dominant regions since the demands are likely to be lower proportional to those in republican areas, which would require more expansive political reforms to account for the greater percentage of uninsured people.

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FIGURES

A) Signed Discrepancy $= Percent_{Region} - Percent_{Nation}$

B) Error $= Error_{Region} + Error_{Nation}$

C) Mean Signed Discrepancy $= \frac{\Sigma \text{ Discrepancy}}{N}$

D) Mean Signed Discrepancy Error $= \frac{\sqrt{\Sigma\, Error^2}}{N}$

Figure 1. (A) Calculation of signed discrepancy between the national uninsured rate and the uninsured percentage of each region. (B) Error calculation of each region's discrepancy. (C) Calculation of average discrepancy by political party dominance. *N* represents the number of values. (D) Error propagation of average signed discrepancies.

State	Political Party Dominance	Uninsurance Rate Compared to National Average	Poverty Rate	Signed Poverty Rate Discrepancy
Alabama	Republican	Above	15.6	3.3
Florida	Competitive	Above	13.3	1
Georgia	Competitive	Above	14.3	2
Kansas	Republican	Average	12.9	0.6
Mississippi	Republican	Above	19.7	7.4
Missouri	Republican	Above	12	-0.3
North Carolina	Competitive	Above	14	1.7
Oklahoma	Republican	Above	13.6	1.3
South Carolina	Republican	Above	14.8	2.5
South Dakota	Republican	Above	12.4	0.1
Tennessee	Republican	Above	13.2	0.9
Texas	Competitive	Above	13.6	1.3
Utah	Republican	Above	8.6	-3.7
Wisconsin	Competitive	Below	10.1	-2.2
Wyoming	Republican	Above	11.6	-0.7

Table 1. Uninsurance and Poverty Rate Comparison of the 15 states that opted against Medicaid expansion (2-5).

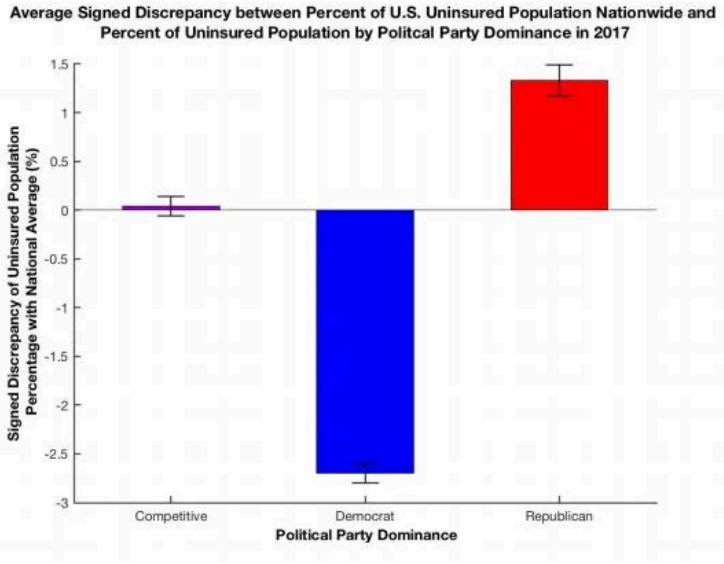
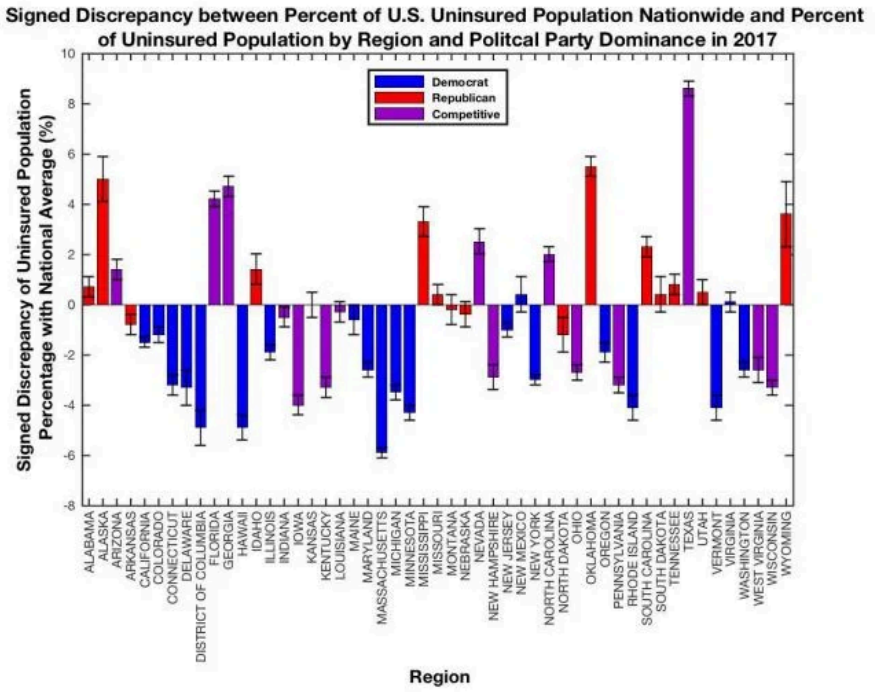


Figure 2. (Left) Average Signed Discrepancy between Percent of U.S. Uninsured Population Ntionwide and Percent of Uninsured Population by Political Party Dominance in 2017. Discrepancies of each region were compared, allowing for cross referencing with respect to each region's dominant political party affiliation (2-3). The line y = 0 represents the national uninsured rate, and the distance from this line to the end of each column represents the signed discrepancy between the uninsured rate of each region to the national uninsured rate.

Figure 3. (Bottom) Signed Discrepancy between Percent of U.S. Uninsured Population Ntionwide and Percent of Uninsured Population by Political Party Dominance in 2017. The discrepancies of each region were averaged according to political party dominance and plotted in a separate figure to make more conspicuous the correlation between political party dominance and rate of uninsured people (2-3). The average signed discrepancy between the national uninsured rate and that of competitive, democrat, and republican states were found to be 0.04%, -2.70%, and 1.33% respectively.



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