Result

Shadi

2023-07-06

Descriptive Analysis

Table 1: Baseline Characteristics for states

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Table 1: Baseline Comparison of States

Group	Variable	Non Expansion	Expansion	Difference
Pre-ACA	State's Political Liberalism	0.45 (0.17)	0.24 (0.09)	**0.22*** **
	Immigration Policy Climate	-1 (2)	-3 (1)	**2.1*** **
	State's Unemployment Rate	8.60 (1.64)	7.16 (2.02)	**1.4*** **
Post-ACA	State's Political Liberalism	0.47 (0.22)	0.23 (0.10)	**0.24*** **
	Immigration Policy Climate	0 (3)	-3 (1)	**2.8*** **
	State's Unemployment Rate	5.00 (1.14)	4.50 (1.15)	**0.50*** **

[1] Mean (SD)

[2] *p<0.05;* ***p<0.01;*** p<0.001

Table 2: Baseline Characteristics by Nativity

Table 2 provides a comprehensive summary of the demographic characteristics, insurance rates, and Medicaid coverage of the low-income adult sample prior to the implementation of the Affordable Care Act. It includes the pre-expansion means for age and proportions of various variables, specifically distinguishing between foreign-born and US-born individuals in states that expanded their Medicaid later and non-expansion states that did not expand their Medicaid until 2019.

Significant differences were observed across all demographic characteristics between foreign-born and US-born adults. However, while substantial disparities were found between native and foreign-born individuals in both expansion and non-expansion states, the discrepancies between native-born individuals in expansion and non-expansion states were relatively smaller in magnitude. The same trend was observed for foreign-born individuals.

For example, in the expansion state, the proportion of foreign-born individuals who identified as Hispanic was 68%, compared to 76% in non-expansion states. This reveals that the non-expansion states had approximately 6.7% more foreign-born Hispanics compared to the expansion state. Additionally, the proportion of US-born Hispanics in the expansion state was 11%, while this population was only 1% lower in non-expansion states. Notably, within both expansion and non-expansion states, the disparities between foreign-born andUS-born individuals were more pronounced. Specifically, approximately 66% of the foreign-born population in the expansion state identified as Hispanic, while only 9.7% of the US-born population shared this heritage, resulting in a significant difference of about 57%.

Table 2: Baseline Characteristics by Nativity

Characteristic	expansion			Non-expansion		
	Foregin-born, 11592215	**US-born**, 34946509	**p-value**	**Foregin-born**, 7113051	**US-born**, 26041282	**p-value**
Uninsured	6,473,288 (56%)	11,893,979 (34%)	<0.001***	4,995,253 (70%)	10,833,686 (42%)	<0.001***
Medicaid coverage	2,880,034 (25%)	13,241,734 (38%)	<0.001***	871,138 (12%)	7,688,863 (30%)	<0.001***
Age	41 (34, 50)	43 (33, 53)	<0.001***	40 (33, 49)	43 (33, 53)	<0.001***
Sex			<0.001***			<0.001***
Female	6,323,790 (55%)	19,813,110 (57%)		3,819,350 (54%)	15,057,504 (58%)	
Male	5,268,425 (45%)	15,133,399 (43%)		3,293,701 (46%)	10,983,778 (42%)	
Disability	1,136,618 (9.8%)	9,432,288 (27%)	<0.001***	663,792 (9.3%)	7,060,627 (27%)	<0.001***
Current employment status			<0.001***			<0.001***
Employed	6,188,727 (53%)	13,125,180 (38%)		4,037,034 (57%)	10,335,124 (40%)	
Not in labor force	4,083,199 (35%)	16,444,592 (47%)		2,376,172 (33%)	11,975,810 (46%)	
Unemployed	1,320,289 (11%)	5,376,737 (15%)		699,845 (9.8%)	3,730,348 (14%)	
Marital status	6,457,264 (56%)	9,635,900 (28%)	<0.001***	4,094,355 (58%)	8,063,391 (31%)	<0.001***
Education			<0.001***			<0.001***
College degree	797,858 (6.9%)	2,860,619 (8.2%)		470,230 (6.6%)	1,884,546 (7.2%)	
Graduate and beyond	319,853 (2.8%)	994,271 (2.8%)		172,679 (2.4%)	577,787 (2.2%)	
High school	2,822,810 (24%)	12,647,283 (36%)		1,833,018 (26%)	9,500,208 (36%)	
Less than high school	5,866,533 (51%)	6,839,940 (20%)		3,557,536 (50%)	5,819,385 (22%)	
Some college or Associate degree	1,785,161 (15%)	11,604,396 (33%)		1,079,588 (15%)	8,259,356 (32%)	
Race/ethnicity			<0.001***			<0.001***
Asian	1,704,788 (15%)	264,742 (0.8%)		518,213 (7.3%)	54,950 (0.2%)	
Black	501,427 (4.3%)	6,817,804 (20%)		563,959 (7.9%)	7,362,213 (28%)	
Hispanic	7,914,764 (68%)	3,998,364 (11%)		5,382,119 (76%)	2,731,265 (10%)	
Other	207,897 (1.8%)	1,512,924 (4.3%)		106,083 (1.5%)	838,658 (3.2%)	
White	1,263,339 (11%)	22,352,675 (64%)		542,677 (7.6%)	15,054,196 (58%)	
Federal poverty			<0.001***			<0.001***
Income 100 to 138% poverty	4,257,006 (37%)	10,820,459 (31%)		2,563,949 (36%)	8,447,926 (32%)	
Income below 100% poverty	7,335,209 (63%)	24,126,050 (69%)		4,549,102 (64%)	17,593,356 (68%)	
Citizenship status			<0.001***			<0.001***
Born in US states	0 (0%)	34,498,962 (99%)		0 (0%)	25,729,677 (99%)	
Born in US Territories	0 (0%)	447,547 (1.3%)		0 (0%)	311,605 (1.2%)	
Naturalized-citizen	3,527,306 (30%)	0 (0%)		1,870,512 (26%)	0 (0%)	
Non-citizen	7,709,364 (67%)	0 (0%)		4,975,148 (70%)	0 (0%)	
US-citizen Born abroad	355,545 (3.1%)	0 (0%)		267,391 (3.8%)	0 (0%)	
Lifetime in US			<0.001***			<0.001***
<25%	2,074,736 (18%)	104,908 (23%)		1,476,453 (21%)	108,020 (35%)	
>25%	9,517,479 (82%)	342,639 (77%)		5,636,598 (79%)	203,585 (65%)	
Self-rated English proficiency			<0.001***			<0.001***
Not at all	1,867,518 (16%)	67,420 (0.2%)		1,192,569 (17%)	64,202 (0.2%)	
Not well	3,749,138 (32%)	232,892 (0.7%)		2,211,497 (31%)	183,085 (0.7%)	
Only english	1,047,881 (9.0%)	31,537,870 (90%)		758,922 (11%)	23,561,819 (90%)	
Very well	2,307,127 (20%)	2,677,630 (7.7%)		1,436,201 (20%)	1,883,887 (7.2%)	
Well	2,620,551 (23%)	430,697 (1.2%)		1,513,862 (21%)	348,289 (1.3%)	
Cultural clusters			<0.001***			<0.001***
African-Islamic	881,988 (7.6%)	0 (0%)		354,779 (5.0%)	0 (0%)	
Catholic Europe	211,276 (1.8%)	0 (0%)		68,188 (1.0%)	0 (0%)	
Confucian	719,929 (6.2%)	0 (0%)		172,880 (2.4%)	0 (0%)	
English-speaking	228,492 (2.0%)	34,946,509 (100%)		118,375 (1.7%)	26,041,282 (100%)	
Latin America	8,399,447 (72%)	0 (0%)		5,924,207 (83%)	0 (0%)	
Orthodox	257,099 (2.2%)	0 (0%)		70,909 (1.0%)	0 (0%)	
Protestant Europe	150,035 (1.3%)	0 (0%)		129,210 (1.8%)	0 (0%)	
South Asian	743,949 (6.4%)	0 (0%)		274,503 (3.9%)	0 (0%)	
Country/Region of birth			<0.001***			<0.001***
Canada	87,977 (0.8%)	0 (0%)		50,896 (0.7%)	0 (0%)	

Table 2: Baseline Characteristics by Nativity *(continued)*

Characteristic	expansion			Non-expansion		
	Foregin-born, 11592215	**US-born**, 34946509	**p-value**	**Foregin-born**, 7113051	**US-born**, 26041282	**p-value**
Eastern Asia	586,211 (5.1%)	0 (0%)		145,699 (2.0%)	0 (0%)	
Eastern Europe	273,831 (2.4%)	0 (0%)		72,756 (1.0%)	0 (0%)	
Latin America	8,152,177 (70%)	0 (0%)		5,872,570 (83%)	0 (0%)	
Middle East	442,380 (3.8%)	0 (0%)		129,256 (1.8%)	0 (0%)	
Oceania and at Sea	67,785 (0.6%)	0 (0%)		16,732 (0.2%)	0 (0%)	
South & Centeral Asia	307,477 (2.7%)	0 (0%)		138,250 (1.9%)	0 (0%)	
South East Asia	954,859 (8.2%)	0 (0%)		279,316 (3.9%)	0 (0%)	
Sub-Saharan Africa	338,734 (2.9%)	0 (0%)		158,722 (2.2%)	0 (0%)	
United States	0 (0%)	34,946,509 (100%)		0 (0%)	26,041,282 (100%)	
Western Europe	380,784 (3.3%)	0 (0%)		248,854 (3.5%)	0 (0%)	

[1] n (%); Median (IQR)

[2] *p<0.05;* ***p<0.01;*** p<0.001

Table 3: Uninsured and Medicaid coverage rate before and after ACA for expansion and non-expansion state by characteristics

	Uninsured Rate				Medicaid Coverage			
	Expansion		Non-expansion		Expansion		Non-expansion	
Characteristic	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Citizenship status								
Born in US states	15%	33%	30%	40%	55%	38%	34%	30%
Born in US Territories	12%	23%	27%	36%	68%	57%	39%	37%
Naturalized-citizen	15%	35%	33%	50%	54%	35%	24%	21%
Non-citizen	45%	63%	67%	76%	36%	22%	11%	9.7%
US-citizen Born abroad	17%	36%	34%	45%	49%	31%	25%	23%
Lifetime in US								
<25%	31%	56%	49%	70%	45%	26%	19%	12%
>25%	32%	51%	53%	65%	44%	28%	17%	15%
Unknown	88,065	106,526	127,764	97,425	316,536	122,694	145,240	74,807
Race/ethnicity								
Asian	16%	37%	30%	51%	48%	31%	19%	14%
Black	15%	31%	27%	37%	60%	46%	40%	36%
Hispanic	31%	51%	52%	64%	47%	30%	20%	18%
Other	22%	37%	37%	45%	58%	43%	35%	32%
White	15%	33%	30%	40%	53%	35%	32%	27%
Sex								
Female	16%	34%	32%	42%	56%	40%	34%	30%
Male	22%	42%	37%	48%	48%	30%	27%	23%
Current employment status								
Employed	22%	43%	38%	50%	43%	23%	18%	14%
Not in labor force	15%	28%	28%	34%	60%	47%	43%	41%
Unemployed	26%	52%	50%	63%	58%	33%	29%	23%
Marital status	19%	37%	34%	45%	48%	31%	25%	22%
Education								
College degree	14%	32%	24%	37%	39%	21%	19%	15%
Graduate and beyond	13%	26%	20%	31%	32%	16%	16%	13%
High school	19%	38%	35%	45%	55%	36%	32%	28%
Less than high school	27%	44%	44%	52%	57%	41%	35%	32%
Some college or Associate degree	15%	33%	29%	40%	54%	36%	31%	26%
Federal poverty								
Income 100 to 138% poverty	19%	37%	30%	41%	45%	27%	24%	21%
Income below 100% poverty	19%	38%	36%	46%	57%	40%	34%	31%
Self-rated English proficiency								
Not at all	45%	62%	68%	77%	43%	28%	16%	14%
Not well	37%	56%	61%	73%	46%	29%	16%	14%
Only english	15%	33%	29%	39%	55%	37%	34%	30%
Very well	21%	40%	39%	51%	51%	34%	24%	22%
Well	30%	49%	49%	63%	46%	29%	19%	16%
Country/Region of birth								
Canada	18%	34%	31%	42%	39%	20%	19%	16%

(continued)

	Uninsured Rate				Medicaid Coverage			
	Expansion		Non-expansion		Expansion		Non-expansion	
Characteristic	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Eastern Asia	18%	45%	31%	52%	44%	23%	15%	12%
Eastern Europe	22%	42%	37%	50%	48%	31%	20%	16%
Latin America	42%	61%	60%	72%	39%	24%	15%	12%
Middle East	14%	33%	32%	50%	63%	44%	29%	26%
Oceania and at Sea	18%	31%	42%	49%	43%	35%	12%	9.6%
South & Centeral Asia	16%	36%	33%	57%	52%	35%	18%	13%
South East Asia	14%	33%	29%	48%	53%	38%	23%	18%
Sub-Saharan Africa	20%	37%	36%	51%	51%	35%	22%	16%
United States	15%	33%	30%	40%	55%	38%	34%	30%
Western Europe	17%	36%	30%	43%	44%	25%	24%	21%
Disability	8.6%	20%	20%	26%	71%	58%	53%	51%
Cultural clusters								
African-Islamic	16%	35%	35%	53%	59%	42%	25%	20%
Catholic Europe	22%	41%	30%	44%	41%	23%	19%	17%
Confucian	18%	43%	32%	51%	44%	24%	15%	12%
English-speaking	15%	33%	30%	40%	55%	38%	34%	30%
Latin America	41%	60%	60%	71%	40%	24%	15%	12%
Orthodox	17%	37%	36%	52%	55%	39%	23%	19%
Protestant Europe	15%	35%	29%	42%	47%	28%	27%	23%
South Asian	14%	33%	29%	52%	56%	41%	21%	17%

Table 4: Uninsured/Medicaid Coverage Rate by Socio-Demographic Factors, Across Citizenship Status

Table 4: Uninsured/Medicaid Rate by Socio-Demographic Factors, Across Citizenship Status

	Non-citizen		Naturalized-citizen		Citizen born abroad		Born in US states		Born in territories	
Characteristic	Uninsured	Medicaid	Uninsured	Medicaid	Uninsured	Medicaid	Uninsured	Medicaid	Uninsured	Medicaid
	59%	23%	28%	39%	30%	35%	27%	42%	22%	52%
Sex										
Female	57%	26%	27%	41%	28%	38%	24%	45%	20%	57%
Male	62%	19%	30%	37%	32%	32%	30%	37%	27%	45%
Disability	42%	43%	17%	59%	19%	55%	16%	61%	11%	71%
Current employment status										
Employed	61%	18%	29%	33%	32%	26%	30%	29%	28%	36%
Not in labor force	56%	29%	24%	47%	24%	45%	20%	52%	15%	65%
Unemployed	64%	25%	40%	39%	45%	33%	44%	39%	37%	49%
Married	59%	22%	27%	39%	27%	33%	24%	36%	21%	47%
Education										
College degree	48%	19%	25%	32%	24%	26%	21%	27%	22%	33%
Graduate and beyond	35%	15%	22%	27%	20%	21%	17%	22%	22%	28%
High school	59%	22%	30%	39%	33%	37%	29%	43%	24%	52%
Less than high school	63%	23%	30%	44%	38%	41%	30%	52%	20%	65%
Some college or Associate degree	51%	23%	26%	39%	27%	36%	25%	41%	23%	46%
Race/ethnicity										
Asian	35%	30%	22%	41%	25%	35%	22%	31%	21%	30%
Black	46%	25%	28%	37%	29%	36%	26%	47%	33%	35%
Hispanic	64%	21%	33%	37%	38%	32%	30%	43%	22%	54%
Other	43%	27%	25%	42%	27%	39%	31%	48%	21%	44%
White	41%	27%	23%	43%	27%	35%	26%	40%	27%	38%
Federal poverty										
Income 100 to 138% poverty	57%	20%	27%	34%	27%	29%	25%	34%	23%	40%
Income below 100% poverty	61%	24%	29%	42%	31%	38%	28%	46%	22%	58%
Lifetime in US										
<25%	58%	21%	28%	42%	33%	33%	NA%	NA%	24%	51%
>25%	60%	23%	28%	39%	29%	35%	NA%	NA%	22%	53%
Self-rated English proficiency										
Not at all	65%	25%	31%	50%	44%	37%	49%	35%	18%	69%
Not well	63%	23%	29%	47%	42%	34%	36%	41%	21%	63%
Only english	48%	23%	26%	32%	27%	36%	26%	42%	26%	42%

Table 4: Uninsured/Medicaid Rate by Socio-Demographic Factors, Across Citizenship Status *(continued)*

Characteristic	Non-citizen		Naturalized-citizen		Citizen born abroad		Born in US states		Born in territories	
	Uninsured	Medicaid	Uninsured	Medicaid	Uninsured	Medicaid	Uninsured	Medicaid	Uninsured	Medicaid
	59%	23%	28%	39%	30%	35%	27%	42%	22%	52%
Very well	50%	22%	27%	35%	31%	33%	31%	42%	23%	48%
Well	59%	21%	28%	40%	35%	35%	37%	40%	22%	53%
Cultural clusters										
African-Islamic	38%	35%	23%	50%	26%	40%	NA%	NA%	NA%	NA%
Catholic Europe	43%	25%	24%	32%	27%	32%	NA%	NA%	NA%	NA%
Confucian	37%	26%	24%	37%	25%	34%	NA%	NA%	NA%	NA%
English-speaking	34%	23%	22%	31%	28%	35%	27%	42%	22%	52%
Latin America	63%	21%	32%	36%	36%	32%	NA%	NA%	NA%	NA%
Orthodox	40%	35%	23%	47%	26%	35%	NA%	NA%	NA%	NA%
Protestant Europe	34%	23%	21%	32%	28%	37%	NA%	NA%	NA%	NA%
South Asian	33%	35%	22%	45%	23%	38%	NA%	NA%	NA%	NA%
Country/Region of birth										
Canada	31%	21%	24%	29%	30%	34%	NA%	NA%	NA%	NA%
Eastern Asia	37%	25%	24%	37%	25%	34%	NA%	NA%	NA%	NA%
Eastern Europe	46%	29%	25%	42%	29%	33%	NA%	NA%	NA%	NA%
Latin America	64%	21%	33%	36%	38%	31%	NA%	NA%	NA%	NA%
Middle East	35%	41%	21%	54%	23%	44%	NA%	NA%	NA%	NA%
Oceania and at Sea	32%	30%	17%	42%	32%	28%	NA%	NA%	NA%	NA%
South & Centeral Asia	37%	27%	23%	43%	23%	43%	NA%	NA%	NA%	NA%
South East Asia	33%	37%	21%	44%	25%	36%	NA%	NA%	NA%	NA%
Sub-Saharan Africa	41%	29%	24%	43%	28%	32%	NA%	NA%	NA%	NA%
United States	NA%	NA%	NA%	NA%	NA%	NA%	27%	42%	22%	52%
Western Europe	36%	24%	23%	32%	28%	36%	NA%	NA%	NA%	NA%

Finding Causal Diagram

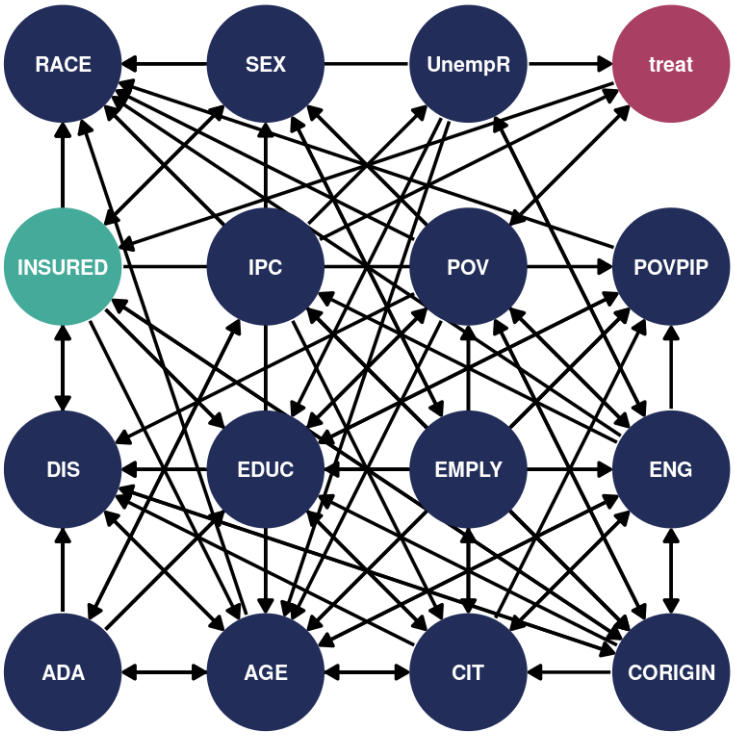
Causal Structure Discovery

I utilized causal structure discovery techniques to accurately represent the data generating process and unveil the underlying causal relationships among the variables. The causal structure discovery approach identifies potential causal relationships based on patterns and dependencies observed in the data. The resulting Directed Acyclic Graph (DAG) from the causal discovery is capturing the complex interplay between the variables, accounting for confounding factors and potential biases, and providing credible evidence for the causal effects of medicaid expansion on medicaid take-up and uninsured rate.

By utilizing the DAG obtained through the causal discovery approach, I can conduct backdoor and front door analyses, enabling the identification of the minimal adjustment set. The minimal adjustment set represents the smallest subset of variables that must be controled for to obtain unbiased estimates of causal effects.

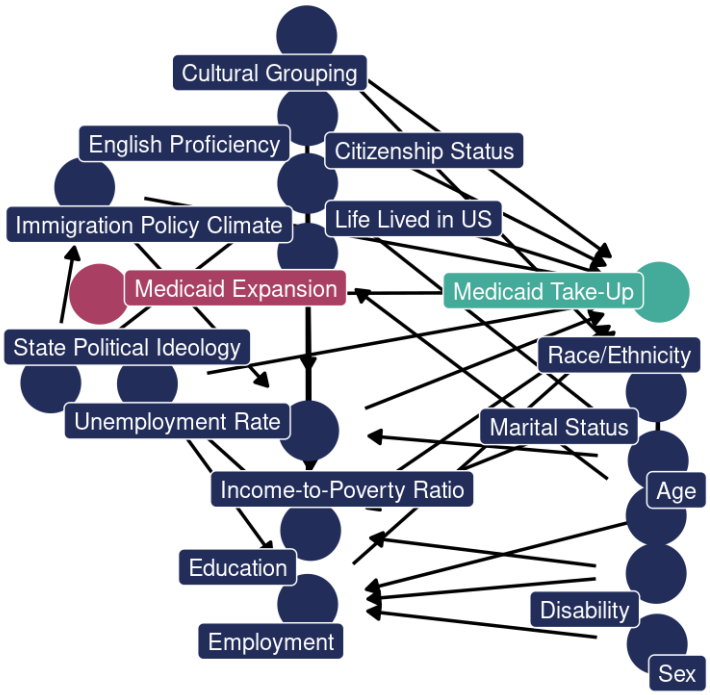
In the initial phase of our analysis, a DAG , as shown in Graph 1, was generated using multiple constraint-based and score-based algorithms including GDS algorithms, Greedy Equivalence Search (GES), Peter-Clark (PC) algorithm, and Fast Causal Inferences (FCI). To integrate the information obtained from these algorithms, following Joe et al.(2023) I employed a majority voting approach. This involved considering each edge and determining its presence in the final graph based on whether it appeared in more than 50% of the cases, indicating agreement among the majority of the algorithms.

```
## Warning: The `<scale>` argument of `guides()` cannot be `FALSE`. Use "none" instead as
## of ggplot2 3.3.4.
## This warning is displayed once every 8 hours.
## Call `lifecycle::last_lifecycle_warnings()` to see where this warning was
## generated.
```



Revised casual graph

To enhance the accuracy of the causal relationships represented in the DAG, I carefully reviewed and manually edited the graph by removing paths that contradicted my domain knowledge or appeared implausible within the context. By applying these revisions, the resulting DAG, illustrated in graph 2, aligns more closely with my expertise in the field and provides a more trustworthy representation of the underlying causal structure in my analysis.



Minimal adjustment set

The identified causal relationship between Medicaid expansion and Medicaid take-up in the revised DAG provides compelling evidence that changes in the treatment variable directly influence changes in the outcome variable. This finding suggests that interventions targeting the treatment variable, such as expanding Medicaid coverage, can potentially have a substantial impact on improving the rate of Medicaid take-up.

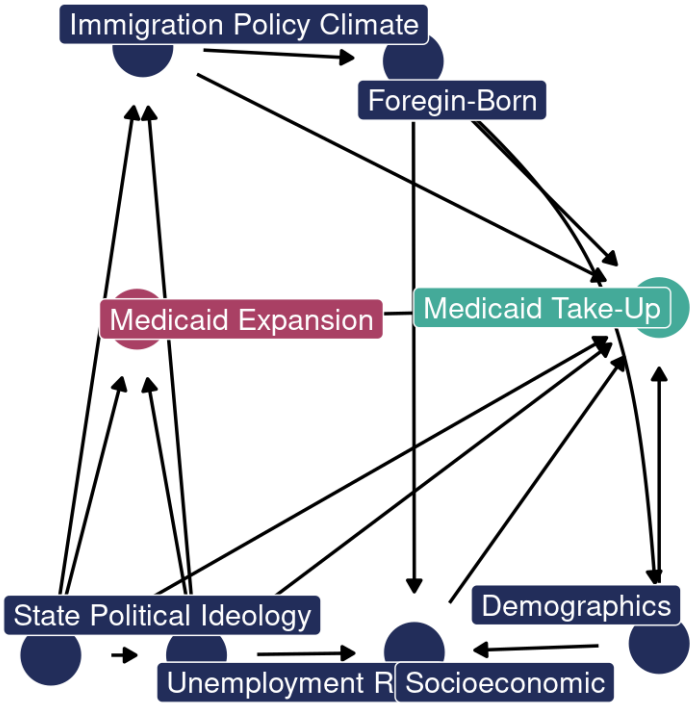
by conducting backdoor analysis I identified the necessary adjustment set, revealing that variables Citizenship Status, Immigration Policy Climate, Unemployment Rate need to be controlled for to accurately estimate the causal effect between Medicaid expansion and Medicaid take-up.

```
adjustmentSets(findag)
```

```
## { Citizenship Status, Immigration Policy Climate, Unemployment Rate }
## { State Political Ideology, Unemployment Rate }
```

Simplified causal graph

To enhance the clarity and interpretability of the graph, I employed a strategy to simplify its complexity. This involved grouping related variables into single nodes, such as combining 'education,' 'income,' and 'employment' into a unified node labeled 'Socioeconomic.' The streamlined representation of the underlying relationships can be observed in Graph 3.



Although utilizing causal discovery algorithms has limitations, such as assuming the adequacy of observed variables and relying on the absence of unobserved confounders, efforts were made to include relevant variables in the analysis. However, it is possible that unmeasured confounders may exist, potentially introducing biases into the identified causal relationships. Therefore, the obtained graph may not precisely represent the true underlying causal structure..

Due to these limitations, I do not solely rely on this graph and its suggested adjustment set for estimating causal effects in my analysis. Nonetheless, the DAG derived from the causal discovery approach serves as a valuable tool for generating hypotheses and guiding the modeling process, as well as informing the selection of control variables in my DID approach analysis.

Event Study and Parallel Trend Assumption

Result for event Study and Parallel trend

The main assumption of the Difference-in-Differences (DiD) methodology relies on the presence of parallel trends before the policy implementation.We examine the event-study estimates for uninsured rates and Medicaid take-up to assess the impact of Medicaid expansion on low-income individuals aged 26-64 and assess the validity of parallel trend assumption.

Event studies for Uninsured rate. Low-income aged 26-64

Figure 1 displays the event-study estimates for both unconditional and conditional parallel trends in uninsured rates. In Panel (a), the focus is on the effects of the expansion on uninsured rates for US-born individuals, while Panel (b) examines the effects for foreign-born individuals. The green line with circles in both panels represents the conditional models, while the orange line with triangle represents the unconditional models. For the corresponding estimation coefficients, please refer to Table 1.

As shown in Figure 1, there are no significant pre-trend differences for US-born individuals living in expansion states compared to non-expansion states, as the coefficients are not significantly different from zero. Similarly, for foreign-born individuals, the coefficients for the interaction terms between year and the indicator for

the pre-treatment period are also small and not statistically significant, indicating no significant pre-trend differences in the uninsured rates between foreign-born individuals in expansion states and non-expansion states. Moreover, when controlling for characteristics, the coefficients exhibit minimal changes and remain small, further supporting the parallel trend assumption. Additionally, these coefficients do not attain statistical significance, indicating that the characteristics accounted for do not significantly impact the parallel trends assumption.

Transitioning to the post-expansion years, we observe notable and statistically significant declines in the overall uninsured rates for both foreign-born and US-born individuals. The coefficients associated with the indicator variables representing the post-expansion years are negative and demonstrate statistical significance for both groups. These results indicate a clear reduction in uninsured rates following the implementation of Medicaid expansion.

Upon analyzing the results presented in Table 1, it becomes evident that the significance levels of the lag year coefficients tend to be higher for foreign-born individuals compared to US-born individuals. Specifically, in Model 3, the coefficient for the lag year achieves statistical significance at the 5 level for the foreign-born group. In Model 4, it reaches statistical significance at the 0.1 level. In contrast, for the US-born group, the coefficient remains statistically insignificant in both models. These findings suggest stronger evidence of a pre-trend difference in uninsured rates for foreign-born individuals in expansion states compared to non-expansion states, even after accounting for foreign-born specific characteristics. Conversely, the evidence for a pre-trend difference in uninsured rates among US-born individuals is comparatively weaker. The differences in significance levels indicate a potential violation of the parallel trend assumption to a greater extent for foreign-born individuals, implying possible disparities in uninsured rates between expansion and non-expansion states even prior to the implementation of Medicaid expansion.

The event study presented in Figure 1 indicates significant improvements in insurance coverage within the expansion states compared to the non-expansion states following the implementation of Medicaid expansion. However, the observed divergence in uninsured trends and the relatively smaller reduction in the uninsured rate for foreign-born individuals highlight potential disparities in healthcare access. Nevertheless, it is important to note that the gap between the insured rates of foreign-born and US-born individuals started to close after 2018.

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## The variables 'CITNaturalized-citizen', 'CITNon-citizen' and 'CITUS-citizen Born abroad ' have been
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## The variables 'CITBorn in US Territories', 'CITUS-citizen Born abroad ' and 'CORIGINUnited States' ha
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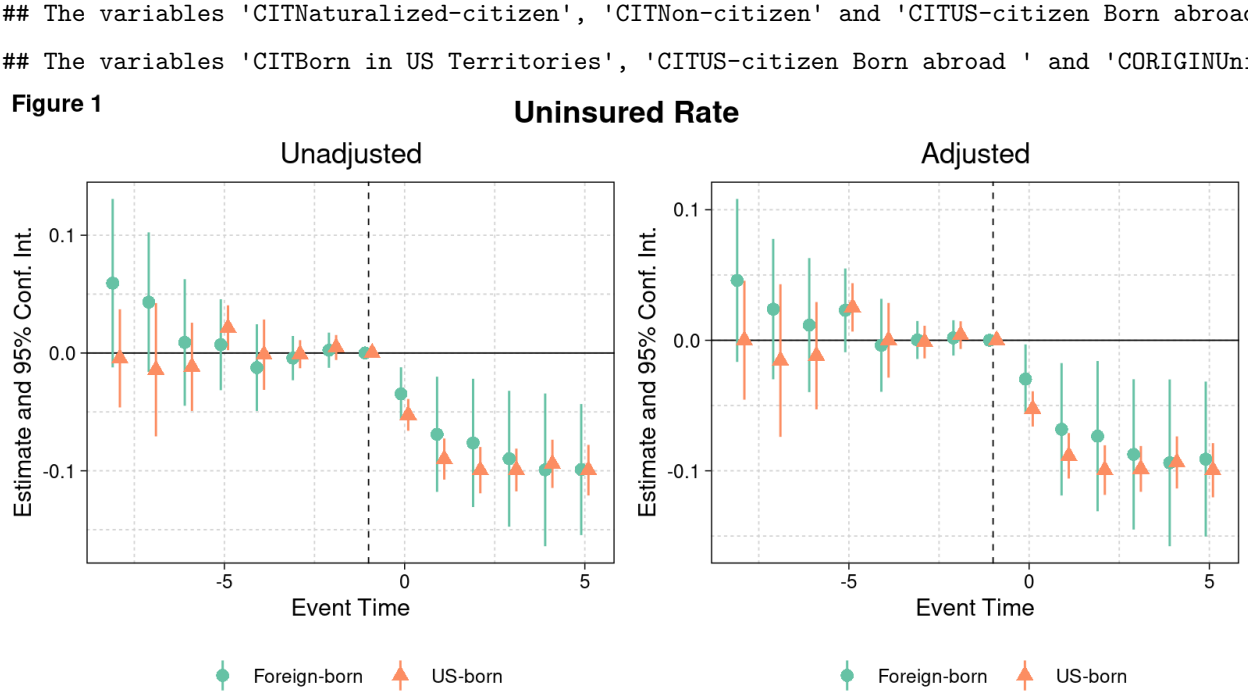
Figure 1

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## Variance contained negative values in the diagonal and was 'fixed' (a la Cameron, Gelbach & Miller 2
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Table 5: The Impact of Medicaid Expansion on Uninsured Rate

	US-born		Foreign-Born	
Variables	(1)	(2)	(3)	(4)
expansion year = -8	-0.005	3.95×10^{-5}	0.059*	0.046
	(0.021)	(0.023)	(0.030)	(0.028)
expansion year = -7	-0.014	-0.015	0.043	0.024
	(0.025)	(0.026)	(0.028)	(0.025)
expansion year = -6	-0.012	-0.012	0.009	0.012
	(0.019)	(0.021)	(0.026)	(0.026)
expansion year = -5	0.021*	0.025**	0.007	0.023
	(0.011)	(0.011)	(0.018)	(0.016)
expansion year = -4	-0.001	-2.61×10^{-5}	-0.012	-0.004
	(0.017)	(0.017)	(0.016)	(0.017)
expansion year = -3	-0.001	-0.001	-0.004	0.0002
	(0.004)	(0.005)	(0.010)	(0.009)
expansion year = -2	0.005	0.004	0.002	0.002
	(0.003)	(0.004)	(0.008)	(0.007)
expansion year = 0	-0.052***	-0.053***	-0.035***	-0.030**
	(0.005)	(0.005)	(0.008)	(0.011)
expansion year = 1	-0.090***	-0.088***	-0.069**	-0.068**
	(0.008)	(0.008)	(0.024)	(0.024)
expansion year = 2	-0.100***	-0.100***	-0.076**	-0.073**
	(0.009)	(0.009)	(0.026)	(0.027)
expansion year = 3	-0.099***	-0.099***	-0.090**	-0.087**
	(0.008)	(0.008)	(0.028)	(0.028)
expansion year = 4	-0.094***	-0.094***	-0.099**	-0.094**
	(0.009)	(0.009)	(0.030)	(0.030)
expansion year = 5	-0.100***	-0.100***	-0.099***	-0.091**
	(0.009)	(0.009)	(0.026)	(0.027)
State FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Controls		yes		yes
Observations	1,585,639	1,585,639	389,955	389,955
R^2	0.05930	0.11985	0.08577	0.21524
Within R^2	0.00286	0.06704	0.00172	0.14309

Clustered (State & Year) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

Event Study for medicaid-take up

Figure 2 and Table 2 present the event-study estimates for the unconditional and conditional parallel trends concerning Medicaid take-up. According to the data presented in Figure 2,prior to the implementation of Medicaid expansion, there is no significant pre-trend difference in Medicaid take-up between expansion and non-expansion states for both low-income US-born and foreign-born individuals aged 26-64.

For the US-born sub-sample, Model 2 includes control variables, while Model 1 serves as a baseline model. The coefficients for the interaction terms between year and the indicator for the pre-treatment period were generally small and statistically insignificant in both models. This suggests that there is no significant pre-trend difference in uninsured rates between expansion and non-expansion states for US-born individuals.

Similarly, for the foreign-born sub-sample, Model 4 includes control variables, while Model 3 serves as a baseline model. The coefficients for the interaction terms were also small and statistically insignificant in both models, suggesting no significant pre-trend difference in uninsured rates between expansion and non-expansion states for foreign-born individuals.

Furthermore, the coefficients for the interaction terms representing the post-treatment periods (years 0 to 5 after the implementation of Medicaid expansion) were positive and statistically significant in all models, indicating an increase in uninsured rates for both US-born and foreign-born individuals in expansion states compared to non-expansion states during those years.

Analyzing the results presented in Table 2, a notable pattern emerges regarding the Medicaid take-up rates between foreign-born and US-born individuals following the expansion. Initially, during the first three years after the expansion, the Medicaid take-up rate for foreign-born individuals was lower compared to that of US-born individuals. However, a reversal in this observation occurred from year 4 onwards, as the rate of take-up among foreign-born individuals increased.This suggests that over time, foreign-born individuals were able to overcome some of the barriers and obstacles they initially encountered, leading to a higher participation in Medicaid. It is likely that various factors contributed to this trend. Changes in immigration policies, targeted outreach efforts aimed at foreign-born populations, or the implementation of programs specifically designed to enhance healthcare access for immigrants could have played a role in facilitating the increased participation among foreign-born individuals. Further investigation into the specific policies and initiatives implemented during this period would provide a deeper understanding of the factors influencing the changing Medicaid take-up rates among foreign-born individuals. however, it is surprising to see a higher Medicaid take-up rate for foreign-born individuals during the fourth and fifth years after expansion, which align with the years 2018 and 2019 when stricter immigration policies were implemented under the Trump administration

These findings demonstrate the effectiveness of Medicaid expansion in improving access to healthcare, especially among foreign-born individuals. The absence of significant pre-trend differences and the subsequent increase in Medicaid take-up rates following the expansion highlight the positive impact of the expansion in reducing the uninsured population and promoting healthcare coverage for both US-born and foreign-born individuals in expansion states compared to non-expansion states.

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## The variables 'CITNaturalized-citizen', 'CITNon-citizen' and 'CITUS-citizen Born abroad ' have been i

## The variables 'CITBorn in US Territories', 'CITUS-citizen Born abroad ' and 'CORIGINUnited States' ha
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Figure 2

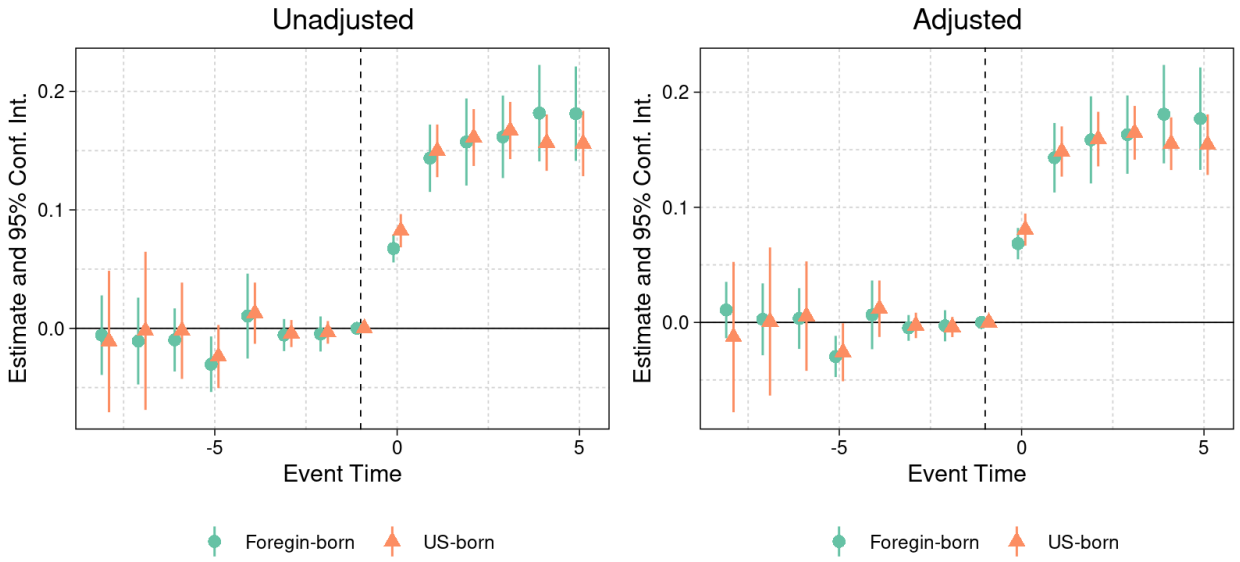


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Table 6: The Impact of Medicaid Expansion on Medicaid Coverage

	US-born		Foreign-Born	
Variables	(1)	(2)	(3)	(4)
expansion year = -8	-0.011	-0.013	-0.006	0.011
	(0.029)	(0.031)	(0.009)	(0.008)
expansion year = -7	-0.002	0.0008	-0.011	0.003
	(0.031)	(0.031)	(0.013)	(0.011)
expansion year = -6	-0.002	0.005	-0.010	0.003
	(0.021)	(0.024)	(0.011)	(0.011)
expansion year = -5	-0.024	-0.026*	-0.030***	-0.030***
	(0.014)	(0.013)	(0.008)	(0.007)
expansion year = -4	0.013	0.012	0.010	0.007
	(0.015)	(0.015)	(0.017)	(0.015)
expansion year = -3	-0.004	-0.003	-0.006	-0.005
	(0.003)	(0.003)	(0.006)	(0.006)
expansion year = -2	-0.003	-0.004	-0.005	-0.003
	(0.004)	(0.004)	(0.007)	(0.007)
expansion year = 0	0.082***	0.081***	0.067***	0.068***
	(0.004)	(0.005)	(0.002)	(0.004)
expansion year = 1	0.150***	0.148***	0.144***	0.143***
	(0.011)	(0.011)	(0.013)	(0.014)
expansion year = 2	0.161***	0.159***	0.157***	0.159***
	(0.011)	(0.012)	(0.017)	(0.018)
expansion year = 3	0.167***	0.165***	0.162***	0.163***
	(0.011)	(0.012)	(0.017)	(0.016)
expansion year = 4	0.157***	0.155***	0.182***	0.181***
	(0.010)	(0.010)	(0.018)	(0.020)
expansion year = 5	0.156***	0.154***	0.181***	0.177***
	(0.011)	(0.011)	(0.017)	(0.020)
State FE	yes	yes	yes	yes
Year FE	yes	yes	yes	yes
Controls		yes		yes
Observations	1,585,639	1,585,639	389,955	389,955
R^2	0.06514	0.18789	0.10655	0.18046
Within R^2	0.00628	0.13676	0.00837	0.09041

Clustered (State & Year) standard-errors in parentheses
*Signif. Codes: ***: 0.01, **: 0.05, *: 0.1*

The fixed-effects models accounted for state and year fixed-effects, controlling for unobserved heterogeneity and time-specific factors that could affect uninsured rates. The fit statistics indicate that the models explain a modest proportion of the variation in medicaid take-up, with R-squared values ranging from 0.06514 to 0.18770.

Difference-in-Differences Model Results