Applied Econometrics II

Impact of NCLB on States in the US

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**Introduction/ Background:**

No Child Left Behind Act of 2001 was a U.S. Act of Congress that reauthorized the Elementary and Secondary Education Act. It was signed into law by President Bush on January 8th, 2022. The law applied to all K-12 public schools in the US and focused on the progress of disadvantaged students. It aimed at improving public primary and secondary schools which would increase student performance, accountability of schools, school districts, and states for students’ progress, and teachers were also required to meet higher standards for certification.

But some critics complained that the federal government was not providing enough funding to implement the law’s requirements and in 2015 Obama signed into law Every Student Succeeds Act (ESSA), which was a replacement of NCLB. The reader should care about this analysis because it would show if the policy was fruitful or not.

**Data and Methodology:**

For my data, I extracted the total number of high school students who were enrolled in grade 12 and total number of high school graduates from the year 1997 to 2007 from the National Center of Education Statistics (NCES). Then I calculated the graduation rate of high school students in all states for all those years. Once I had the graduation rate of all states, I divided the data into 2 parts – one was from year 1997 to 2001 and another one was from year 2003 to 2007. I took the average graduation rate of all states before and after the policy came into effect. Using the average graduation rate, I divided all the states into 3 categories – Low graduation rate which was less than 85%, Medium graduation rate which was between 85% and 90%, and High graduation rate which was anything higher than 90%. This bifurcation helped me figure out my treatment and control group. All the states with high graduation rates before the policy was introduced were in the control group as the policy couldn’t have impacted those states as much and the states within the low graduation rates were the treatment group as I was interested to see how much their graduation rate would have increased or decreased after the policy was introduced. The states in the treatment group were Oregon, Tennessee, Alaska, Nevada, and Washington. So, using the DID method, I would specifically be monitoring if the policy had a significant impact on those states or not.

**Equation that I used in the DID method:**

**The frequency of the data is as follows:**

**The FREQ Procedure**

| Number of Variable Levels | | |
| --- | --- | --- |
| Variable | Label | Levels |
| State | State | 50 |
| Year | Year | 11 |

**The MEANS Procedure**

| Variable | Label | N | Mean | Std Dev | Minimum | Maximum |
| --- | --- | --- | --- | --- | --- | --- |
| Year  Graduation Rate  Treatment  After  DID | Year  Graduation Rate  Treatment | 550  550  550  550  550 | 2002.00  0.9069549  0.1000000  0.5454545  0.0545455 | 3.1651564  0.0538976  0.3002731  0.4983829  0.2272976 | 1997.00  0.6613093  0  0  0 | 2007.00  1.0805479  1.0000000  1.0000000  1.0000000 |

For the DID method, first I imported the data into SAS which already had treatment group column, then I created an ‘after’ variable which was all the years after the NCLB was implemented. To create the DID variable I multiplied treatment with after. So, all the treatment group states after the year 2001 were considered ‘1’ under the DID variable. After that I ran the regression in which graduation rate was the main regressor of interest and whose value I expected to be positive and quite significant.

|  |  |
| --- | --- |
| Table 1: Impact of No Child Left Behind Act using DID Model | |
|  |  |
| Regressors | Model1 |
| Intercept | 0.87\*\*\* |
|  | (0.01) |
| DID | 0.01 |
|  | (0.01) |
| Number of Obs | 550 |
| Adjusted R-sq | 0.7647 |
| Overall Significance | 44.12\*\*\* |
|  |  |
| Note: robust standard errors are in parentheses. \*, \*\*, and \*\*\* indicate 10%, 5%, and 1% significance levels, respectively. | |

The DID model shows that the impact of No child left behind act on the states in the treatment group (who had graduation rate less than 85%). NCLB was implemented on a federal level so it was implemented to all the states at the same time so my guess was that the DID model would show a significant positive impact on the main regressor (Graduation Rate). The DID in the given figure is 0.01 which is not at all significant, so the NCLB act did not have any visible impact on the treatment group states.

In conclusion, it would mean that the graduation rate in treatment group states is 0.01% higher than what they would have been if the NCLB act wasn’t implemented.

I had expected that NCLB would have a lot more impact on the graduation rates of high school students but as mentioned in the introduction there were some criticisms presented regarding the policy so it did not turn out as good as one would anticipate it to be.

Appendix

|  |  |
| --- | --- |
| **Table 2: Impact of No Child Left Behind Act on States** | |
|  |  |
| **Regressors** | **Model1** |
| Intercept | 0.87\*\*\* |
|  | (0.01) |
| DID | 0.01 |
|  | (0.01) |
| Alaska | -0.06\*\*\* |
|  | (0.01) |
| Arizona | -0.06\*\* |
|  | (0.03) |
| Arkansas | 0.07\*\*\* |
|  | (0.01) |
| California | 0.00 |
|  | (0.01) |
| Colorado | 0.03\*\* |
|  | (0.01) |
| State Connecticut | 0.08\*\*\* |
|  | (0.01) |
| Delaware | 0.09\*\*\* |
|  | (0.01) |
| Florida | 0.04\*\*\* |
|  | (0.01) |
| Georgia | -0.01 |
|  | (0.01) |
| Hawaii | 0.12\*\*\* |
|  | (0.02) |
| Idaho | 0.04\*\*\* |
|  | (0.01) |
| Illinois | 0.04\*\*\* |
|  | (0.01) |
| Indiana | 0.02\*\* |
|  | (0.01) |
| Iowa | 0.06\*\*\* |
|  | (0.01) |
| Kansas | 0.04\*\*\* |
|  | (0.01) |
| Kentucky | 0.10\*\*\* |
|  | (0.01) |
| Louisiana | 0.04\*\*\* |
|  | (0.01) |
| Maine | 0.06\*\*\* |
|  | (0.01) |
| Maryland | 0.09\*\*\* |
|  | (0.01) |
| Massachusetts | 0.07\*\*\* |
|  | (0.01) |
| Michigan | 0.08\*\*\* |
|  | (0.01) |
| Minnesota | -0.03\*\* |
|  | (0.01) |
| Mississippi | 0.05\*\*\* |
|  | (0.01) |
| Missouri | 0.08\*\*\* |
|  | (0.01) |
| Montana | 0.07\*\*\* |
|  | (0.01) |
| Nebraska | 0.07\*\*\* |
|  | (0.01) |
| Nevada | -0.06\*\*\* |
|  | (0.01) |
| New Hampshire | 0.07\*\*\* |
|  | (0.01) |
| New Jersey | 0.14\*\*\* |
|  | (0.01) |
| New Mexico | 0.06\*\*\* |
|  | (0.01) |
| New York | 0.07\*\*\* |
|  | (0.01) |
| North Carolina | 0.08\*\*\* |
|  | (0.01) |
| North Dakota | 0.07\*\*\* |
|  | (0.01) |
| Ohio | 0.06\*\*\* |
|  | (0.01) |
| Oklahoma | 0.09\*\*\* |
|  | (0.01) |
| Oregon | -0.06\*\*\* |
|  | (0.01) |
| Pennsylvania | 0.07\*\*\* |
|  | (0.01) |
| Rhode Island | 0.08\*\*\* |
|  | (0.01) |
| South Carolina | 0.01 |
|  | (0.01) |
| South Dakota | 0.08\*\*\* |
|  | (0.01) |
| Tennessee | -0.02 |
|  | (0.02) |
| Texas | 0.10\*\*\* |
|  | (0.01) |
| Utah | -0.02 |
|  | (0.02) |
| Vermont | 0.08\*\*\* |
|  | (0.01) |
| Virginia | 0.07\*\*\* |
|  | (0.01) |
| Washington | -0.04\*\*\* |
|  | (0.01) |
| West Virginia | 0.07\*\*\* |
|  | (0.01) |
| Wisconsin | 0.05\*\*\* |
|  | (0.01) |
| Wyoming | 0.03\*\*\* |
|  | (0.01) |
| 1998 | -0.00 |
|  | (0.00) |
| 1999 | 0.00 |
|  | (0.00) |
| 2000 | 0.00 |
|  | (0.00) |
| 2001 | 0.00 |
|  | (0.00) |
| 2002 | -0.00 |
|  | (0.00) |
| 2003 | -0.01 |
|  | (0.01) |
| 2004 | -0.01\*\* |
|  | (0.00) |
| 2005 | -0.02\*\*\* |
|  | (0.01) |
| 2006 | -0.02\*\*\* |
|  | (0.01) |
| 2007 | -0.01\*\* |
|  | (0.01) |
| Number of Obs | 550 |
| Adjusted R-sq | 0.7647 |
| Overall Significance | 44.12\*\*\* |
|  |  |
| Note: robust standard errors are in parentheses. \*, \*\*, and \*\*\* indicate 10%, 5%, and 1% significance levels, respectively. | |

SAS Codes

/\*First upload data, then import it in SAS\*/

proc import datafile = "/home/u60659161/MySAS/NCLB.xlsx"

out = work.NCLB

dbms = xlsx

replace;

getnames = yes;

run;

/\*Sorting the data\*/

proc sort data=NCLB;

by state year;

run;

/\*Looking at the frequency of the data\*/

proc freq data=NCLB nlevels;

Table state year;

run;

/\*Creating the after variable\*/

data After;

set NCLB;

if year > 2001 then after = 1;

else after = 0;

run;

/\*Creating the DID Variable\*/

data DID;

set after;

did=treatment\*after;

run;

/\*Regression\*/

ods output ParameterEstimates=PEforModel1 DataSummary=ObsModel1 FitStatistics=AdjRsqModel1 Effects=OverallSigModel1;

Proc Surveyreg data=DID;

class State Year / ref=first;

Model GraduationRate = did state year/ Solution Adjrsq ;

run;

/\* Step 1: Cleaning up the output of the regression analysis \*/

Data Table\_Long\_Project;

length Model $10;

length Parameter $30;

set PEforModel1 indsname=M;

keep Model Parameter EditedResults;

if M="WORK.PEFORMODEL1" then Model="Model1";

Where Estimate ne 0;

if Probt le 0.01 then Star="\*\*\*";

else if Probt le 0.05 then Star="\*\*";

else if Probt le 0.1 then Star="\*";

Results=Estimate;

EditedResults=Cats(put(Results,comma16.2),Star);

output;

Results=stderr;

EditedResults=Cats("(",put(Results,comma16.2),")");

output;

run;

/\* Sorting table \*/

proc sort data=Table\_Long\_Project out=Table\_Long\_Sorted;

by Model Parameter;

run;

/\* Step 2: Creating separate results columns corresponding to each model \*/

data Model1Results(rename=(EditedREsults=Model1));

set Table\_Long\_Sorted;

if Model="Model1" then output Model1Results;

drop Model;

run;

/\* Step 3: Creating the final results table that would include all models side-by-side\*/

data Table\_Wide;

merge Model1Results ;

by Parameter;

if mod(\_n\_,2)=1 then Regressors=Parameter;

length Order 3;

if Parameter="Intercept" then Order=1;

else if substr(Parameter,1,10)= "treatment " then Order =2;

else if substr(Parameter,1,6)= "after " then Order =3;

else if substr(Parameter,1,4)="did " then Order=5;

else Order=100;

run;

/\* Ordering the variables in the results table \*/

proc sort data=Table\_Wide out=Table\_Wide\_Sorted(drop=Order Parameter);

by Order;

run;

/\*Step 4: Create the rows for other statistics\*/

/\* The row for Number of Obs \*/

data NumofObs(keep=Label1 Model1);

merge ObsModel1(rename=(nvalue1=NVMoel1));

by Label1;

where Label1="Number of Observations";

Model1=put(NVMoel1,comma16.0);

run;

/\* The row for Adj R-sq \*/

Data AdjRsq;

merge AdjRsqModel1(rename=(cvalue1=Model1)) ;

by Label1;

Where Label1="Adjusted R-Square";

drop nvalue1;

run;

/\* The row for Overall Significance \*/

data OSM1(rename=(EditedValue=Model1)) ;

set OverallSigModel1 indsname=M;

Where Effect="Model";

Label1="Overall Significance";

if ProbF le 0.01 then Star="\*\*\*";

else if ProbF le 0.05 then Star="\*\*";

else if ProbF le 0.1 then Star="\*";

EditedValue=Cats(Put(FValue,comma16.2),Star);

if M="WORK.OVERALLSIGMODEL1" then output OSM1;

keep Label1 EditedValue;

run;

Data OverallSig;

merge OSM1 ;

by Label1;

run;

/\* Combining all rows for other statistics \*/

Data OtherStat;

set NumofObs AdjRsq OverallSig;

rename Label1=Regressors;

Run;

/\* Step 5: Adding other statistics to the results table \*/

Data Table\_Wide\_Sorted\_WithStat;

set Table\_Wide\_Sorted OtherStat;

run;

/\* creating new name for variables in the regression results table through defining a new format\*/

proc format;

value $VariableName(default=50) "did"="DID"

"wkswork"="Number of Weeks Worked LAst Year"

"Number of Observations"="Number of Obs"

"Adjusted R-Square"="Adjusted R-sq"

"State Alaska"="Alaska"

"State Arizona"="Arizona"

"State Arkansas"="Arkansas"

"State California"="California"

"State Colorado"="Colorado "

"STate Connecticut"="Connecticut"

"State Delaware"="Delaware"

"State Florida"="Florida"

"State Georgia"="Georgia"

"State Hawaii"="Hawaii"

"State Idaho"="Idaho"

"State Illinois"="Illinois"

"State Indiana"="Indiana"

"State Iowa"="Iowa"

"State Kansas"="Kansas"

"State Kentucky"="Kentucky"

"State Louisiana"="Louisiana"

"State Maine"="Maine"

"State Maryland"="Maryland"

"State Massachusetts"="Massachusetts"

"State Michigan"="Michigan"

"State Minnesota"="Minnesota"

"State Mississippi"="Mississippi"

"State Missouri"="Missouri"

"State Montana"="Montana"

"State Nebraska"="Nebraska"

"State Nevada"="Nevada"

"State New Hampshire"="New Hampshire"

"State New Jersey"="New Jersey"

"State New Mexico"="New Mexico"

"State New York"="New York"

"State North Carolina"="North Carolina"

"State North Dakota"="North Dakota"

"State Ohio"="Ohio"

"State Oklahoma"="Oklahoma"

"State Oregon"="Oregon"

"State Pennsylvania"="Pennsylvania"

"State Rhode Island"="Rhode Island"

"State South Carolina"="South Carolina"

"State South Dakota"="South Dakota"

"State Tennessee"="Tennessee"

"State Texas"="Texas"

"State Utah"="Utah"

"State Vermont"="Vermont"

"State Virginia"="Virginia"

"State Washington"="Washington"

"State West Virginia"="West Virginia"

"State Wisconsin"="Wisconsin"

"State Wyoming"="Wyoming"

"Year 1998"="1998"

"Year 1999"="1999"

"Year 2000"="2000"

"Year 2001"="2001"

"Year 2002"="2002"

"Year 2003"="2003"

"Year 2004"="2004"

"Year 2005"="2005"

"Year 2006"="2006"

"Year 2007"="2007";

Run;

/\* Printing the clean results table \*/

ods excel file="/home/u60659161/MySAS/Project3.xlsx" options(Embedded\_Titles="ON" Embedded\_Footnotes="ON"); /\*Use the path to your MySAS folder \*/

Title "Table 1: Impact of No Child Left Behind Act on States";

footnote justify=left "Note: robust standard errors are in parentheses. \*, \*\*, and \*\*\* indicate

10%, 5%, and 1% significance levels, respectively.";

proc print data=Table\_Wide\_Sorted\_withstat noobs;

var Regressors;

var Model1 /style(header)={just=center} style(data)={just=center tagattr="type:String"};

format Regressors $VariableName.;

run;

ods excel close;