The Contrast Between Random Control Trial

And Non Experimental Analysis

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4/27/2023

ABSTRACT

The fundamental distinction between a Randomized Clinical Trial and Non-Experimental results through Regression Correction on Observables is a notable distinction to highlight. Such differences are key in understanding the limitations and power of the two distinct research designs that are prominent throughout numerous studies. This paper will go in depth and highlight both research designs and the ways in which they contrast through the examination of data corresponding to a study that was conducted on the effect of an effort to increase voter turnout through encouraging phone calls. Where the results after analyzing the study in a Randomized Control Trial determined that assigning a person to get an encouraging phone call did not significantly change the probability of voting. This finding contrasts with the inability to get an estimate of the causal effect of getting a phone call encouraging you to vote on your probability of voting with non-experimental data by using regression to adjust for the differences between people who got a call and those who didn't. The inability to achieve the estimate is due to the non-randomized treatment and control group comparison that is conducted when the research design is Regression Correction on Observables. Clarity on the distinction between the two research designs will be implemented through the examination of the data associated with the study, the methods used to analyze the given data, and the interpretation of the results. Through the comparison of the two research designs it is concluded that Regression Correction on observables implemented the use of data in which the differences between the control group and treatment group had characteristics that were statistically different thus the potential outcomes between the two groups are different. The differences are presented through the inclusion of results that display the given balance tables and regression tables for both research designs. The underlying differences will become apparent through the analysis and results between the two research designs associated with the data presented by the study conducted on voter turnout.

Introduction

The importance of understanding the causal effects of interventions on outcomes is central to many fields including public policy, medicine, and econometrics. In the

objective for establishing causality, researchers rely on various study designs and methods each with their unique strengths and limitations. Among these designs the randomized controlled trial is often considered the gold standard for causal inference due to its ability to minimize confounding factors through the random assignment of treatments. However, in certain cases, conducting a randomized controlled trial becomes costly or unethical, leading researchers to explore alternative methods such as regression on observables which relies on non-experimental data. The choice of research design plays a significant role in determining the credibility and reliability of findings in any study. In this paper the differences between these two research designs, randomized controlled trial and regression on observables, will be investigated by using a study on the effect of encouraging phone calls on voter turnout as the data for examination. The results will be presented via both research designs, highlighting their distinct findings by presenting the given balance tables and regression tables when adding covariates to both research designs. The Randomized Control Trial analysis demonstrates that assigning a person to receive an encouraging phone call at random increased their probability of voting by a minimal amount. When specifically highlighting the RCT research design its balance table provided clear indication that the control group and treatment group are counterfactuals of each other. Thus, after analyzing the results, it is concluded that the treatment effect is the only dimension affecting the given outcome of voter turnout due to the random assignment between treatment and control that took place. After examining the regression table, it is determined that after adding covariates did not change the estimate of the treatment effect because the covariates are uncorrelated with the random assignment to treatment not because they are

uncorrelated with the outcome. The non-experimental approach based on regression on observables fails to provide a reliable causal estimate due to the inherent limitations of its design. When examining the design, it is illustrated through its balance table that there are underlying differences amongst other covariates present when determining the effect of answering the phone call on voter turnout. It is important to note that the random assignment to treatment and its effect on voter turnout is the contrasting regression table from the RCT. The effect of answering the phone call on voter turnout is performed for the Correction on observables research design. Furthermore, the regression table concludes that when covariates are added they are correlated with both the outcome and whether you got the call or not This is ultimately due to the characteristics being statistically different suggesting that the potential outcomes between the two groups are different. The primary aim is to provide clarity on the differences between Randomized control Trials and regression on observables by examining the data, methods, and results associated with each approach. Through this comparison emphasis on the importance of understanding the assumptions and limitations that are underlying within various research designs when interpreting causal estimates. In the following sections, the data used in the analysis will be described, with the inclusion of detailing the source and the variables collected. Additionally, presenting the methods employed for both the randomized control trial and non-experimental approaches by explaining their respective procedures and assumptions. Finally, the results and interpretations derived from each method will be discussed, highlighting the key differences and limitations in estimating causal effects using randomized control trials and regression on observables.

Data

The data being used to demonstrate the contrasts between the two research designs is from the paper "Comparing Experimental and Matching Methods Using a Large-Scale Voter Mobilization Experiment." Political Analysis, 2006, 14, 37-62 written by Arceneaux, Kevin, Alan Gerber, and Donald Green. Where the paper includes a study that was intended to assess the effectiveness of get out the vote efforts where the authors attempted to deliver a get out the vote message that was meant to encourage individuals to vote. The dataset derived from the paper is a subset of all the observations included by the authors where variables included in the dataset are voting outcome in 2002, assignment to the treatment group, being a newly registered voter, age, gender, if voted in 1998, if voted in 2000, if the individual received a phone call and responded to the question "Can I count on you to vote next Tuesday?" regardless of answer, along with other variables such as state and their competitive district. Specifically, the subset of data observed included a total of 161,490 observations and 33 variables. The technical variable names used within the data set will be mentioned in order to properly distinguish the key variables. Where the data's key variables to highlight are the assignment to the treatment group which is variable "treat real", whether they received the phone call and responded regardless of answer is variable "contact", and the outcome of interest being the vote in 2002 which is variable "vote02". Thus, the data used in this analysis is derived from a randomized controlled trial conducted to study the impact of phone calls on voter turnout. The randomized control trial was carried out during a 2002 election campaign in the United States, where

individuals were randomly assigned to either a treatment group that received a phone call encouraging them to vote or a control group that did not receive any contact. It is vital to clarify the variables as the comparison between the research designs will be shown through emphasizing the differences in a randomized control trial design and a non-experimental design through the correction on observables. A randomized control trial is one in which there are two counterfactuals via randomization that establish an isolated treatment effect on a desired outcome. Where the treatment in this analysis refers to receiving a phone call encouraging the individual to vote in the upcoming election. The individuals who received this phone call were part of the treatment group. In contrast, contact refers to the actual act of responding to receiving a phone call or any communication from the campaign. The control group consists of individuals who did not receive any contact or communication from the campaign, allowing for a comparison between those who received the treatment which is the phone call and those who did not. Since the research design was a randomized control trial individuals were assigned at random in a group to receive the call and others were drawn at random in a group to not receive the call which is represented by “treat real”. These two groups therefore were counterfactuals of each other and properly randomized in order to draw a proper result of the treatment effect of receiving the call. To be more explicit the two research designs will use the data mentioned in the study via the analyzation of treat real, contact, vote in 2002, and other covariates where the empirical methods will be thoroughly examined subsequently along with the results.

Methods

In order to analyze the data, it is necessary to apply empirical methods such as regression analysis which is a statistical method used to examine the relationship between one dependent variable and one or more independent variables. In this study multiple regression models were calculated to understand the effect of receiving the random assignment to treatment of receiving the phone call on voter outcome for 2002 and the effect of answering the phone call on voter turnout. It is essential to mention the control of other covariates present when running regression analysis such as controlling for age, gender, and even previous voting behaviors. Regressions provide clear estimates of the treatment effect and help clarify how such estimates change when accounting for different control variables. When discussing the regression equation the outcome variable is voter turnout for 2002 and the associated components are. A regression equation typically takes the following form:

$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + ... + \beta_n * X_n + \varepsilon$

Where in this equation Y is the dependent variable, or the outcome that the model is trying to predict or explain. β_0 is the predicted value of Y when all independent variables any X are equal to 0 or graphically it is the y-intercept. β1, β2, ..., βn are the regression coefficients. Each coefficient represents the expected change in the dependent variable Y for a one-unit change in the corresponding independent variable while holding all other variables constant X_1, X_2, ..., Xn are the independent variables, predictors, or known covariates which are believed to influence the outcome Y. Furthermore, ε is the error term, or the difference between the observed and predicted values of Y. It captures the other existing possible covariates in Y that cannot be explained by the independent variables in the model. In the context of the study, the regression equation has Voter

turnout for 2002 as the outcome variable Y. Some of the included covariates are age, gender, if they voted in 2001, and others that are the known independent variables. The coefficients for these variables would indicate the change in the likelihood of voting in 2002 associated with a one-unit change in the respective variable, while controlling for the other variables in the model. For instance, if the coefficient for being a voter in 2001 is positive, it suggests that being a previous voter in 2001 is associated with a higher likelihood of voting in 2002. Similarly, if the coefficient for age is positive, it indicates that older individuals are more likely to vote in 2002 while all else being equal.

It's also important to note the presence of asterisks next to certain coefficients in the regression tables. These denote the statistical significance of the corresponding coefficients, which provides evidence against the null hypothesis that these coefficients are zero to determine that the corresponding variables have no effect on the outcome. In the tables, '***' indicates a significance level of less than 0.01, meaning that there is strong evidence against the null hypothesis for these variables. The p-value is the probability of obtaining the observed data if the null hypothesis is true. If the p-value is less than the determined significance level then we reject the null hypothesis, stating that the evidence in our data is sufficient to suggest that the null hypothesis is unlikely to be true. Thus, concluding that the variable being targeted has a statistically significant association with the dependent variable at the 1% significance level. If other variables aside from the treatment effect are not controlled for then the results will be faulty with inherit bias. To ensure a randomized control trial is indeed properly randomized, applying statistical methods to derive a balance table will provide such a solution. Balance analysis is a technique used to assess the comparability of treatment and

control groups in an experimental study. In a randomized controlled trial, balance is expected because random assignment ensures that the treatment and control groups are similar in their observed and unobserved characteristics. Balance analysis involves comparing the distribution of observed characteristics across the treatment and control groups to determine whether there are any significant differences between the groups that might bias the treatment effect estimates. A balance table will properly display the average characteristics of both the control and treatment group and provide the differences amongst them. The two groups must be equal in corresponding characteristics that are accounted for by the included variables for every listed observation. Therefore, the treatment group should on average be equal to the control group on average across the noted confounding factors that attribute the outcome of voting in 2002. Balance analysis is used to assess the comparability of treatment and control groups to verify any potential underlying differences. Regressions are used to estimate the relationship between the dependent variable being voter turnout for 2002 and the independent variables which are treatment and control groups, along with other covariates. By running regressions, one can isolate the effect of the treatment on the dependent variable while accounting for the influence of other variables. A non-experimental study does not involve random assignment of participants to treatment and control groups. This can result in selection bias and the presence of confounding factors. This will result in the inability to establish a causal relationship between the treatment and the outcome of interest. In this case, regression analysis and other statistical techniques are employed to attempt to control potential confounding factors and estimate the treatment effect. However, such a method might not eliminate bias and

the results may be less reliable than those from a randomized control trial since they draw comparisons from two groups that have underlying differences at the start. Since a randomized control trial randomly assigns observations to either treatment or control groups this implementation of random assignment ensures that the two groups are on average comparable in all aspects except for the treatment allowing researchers to estimate the causal effect of the treatment. In contrast, a non-experiment is an observational study in which participants are not randomly assigned to groups, and thus, the comparability of the treatment and control groups cannot be ensured. This may result in biased estimates of the treatment effect due to unobserved differences between the groups, which is a concern in causal inference. In this analysis comparison between the results from the two research designs will be drawn to better understand the impact of phone call interventions on voter turnout and the implications of using different research designs.

Results

The data that is used is a subset from the paper "Comparing Experimental and Matching Methods Using a Large-Scale Voter Mobilization Experiment." Political Analysis, 2006, 14, 37-62 written by Arceneaux, Kevin, Alan Gerber, and Donald Green. Included below, there is an included balance table that displays the means of the covariates across the control group and the treatment group when done via a randomized control trial followed by a balance table for the comparison of the two means for regression on observables.

Randomized Control Trial
Balance Table

	Control Group mean	Treatment Group mean	difference b	p-value p
Newly Reg. Voter	0.048	0.048	-0.001	0.6683
Age	55.827	55.628	0.199	0.2304
Female	0.562	0.566	-0.004	0.3582
Voted 2001	0.733	0.728	0.005	0.2107
Voted 1998	0.572	0.567	0.005	0.2235
Observations	85988	15083	101071	

COO Balance Table

	Control mean	Treat mean	Difference b	p-value
Newly Registered V~r	0.048	0.042	0.006*	0.0123
Busy	0.005	0.000	0.005***	0.0000
Age	55.589	58.626	-3.037***	0.0000
Female	0.561	0.581	-0.021***	0.0009
Voted in 2000	0.729	0.769	-0.040***	0.0000
Voted in 1998	0.569	0.604	-0.035***	0.0000
Observations	94144	6927	101071	

The balance table for the randomized control trial shows that the treatment and control groups are generally balanced across the observed covariates. Where the covariates added also display no statistical significance. The remaining variables, such as age, gender, and past voting behavior, do not show statistically significant differences between the treatment and control groups, suggesting that the random assignment in the RCT has effectively balanced the groups. Highlighting the difference column, the values in the randomized control trial display results near 0 which indicate little to know difference between the control and treatment group when examining their covariates. For correction on observables the balance table for the non-experimental study reveals significant differences between the treatment and control groups for several covariates. Newly registered voters, age, gender, and past voting behavior all show statistically

significant differences indicated by the p-value being less than the significance level suggesting that the treatment and control groups are not balanced in the non-experimental setting. Specifically observing the covariate of age when examining the differences between the control and treatment group for the COO design there is on average a 3-year difference in age which is significantly greater than the difference in the RCT design. Including p-values in the results section is crucial because they provide a measure of the strength of the evidence supporting the study's conclusions. By reporting p-values, researchers can better communicate the uncertainty associated with their findings, and readers can make more informed judgments about the validity of the results. The balance analysis results indicate that the randomized control trial has effectively balanced the treatment and control groups, allowing for causal inferences about the effect of phone call interventions on voter turnout for 2002. In contrast, the non-experimental study shows significant differences between the groups, indicating potential issues with selection bias and limiting the ability to make causal claims. Since the treatment group and control group are inherently different due to their underlying differences the results in the non-experimental study will be contaminated with bias.

One important observation to note is that the covariates when examining the RCT Balance Table there are no other covariates that are statistically significant while when examining COO the added covariates display statistical significance. This further adds to the contrasting differences between the two designs.

Now below the inclusion of running regressions and accounting for covariate addition on both research designs.

Correction on Observables

Regression Table

VARIABLES	(1) Voted in 2002	(2) Voted in 2002	(3) Voted in 2002	(4) Voted in 2002	(5) Voted in 2002
Received Phone Call	0.067***	0.065***	0.050***	0.043***	0.036***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)
Newly Registered Voter		-0.315***	-0.224***	-0.221***	0.160***
		(0.007)	(0.007)	(0.007)	(0.007)
Busy		0.017	0.037	0.033	0.003
		(0.024)	(0.023)	(0.023)	(0.020)
Age			0.005***	0.006***	0.002***
			(0.000)	(0.000)	(0.000)
Female				-0.033***	-0.024***
				(0.003)	(0.003)
Voted in 2000					0.400***
					(0.004)
Voted in 1998					0.275***
					(0.003)
Constant	0.590***	0.605***	0.315***	0.322***	0.070***
	(0.002)	(0.002)	(0.005)	(0.005)	(0.005)
Observations	101,071	101,071	101,071	98,367	98,367
R-squared	0.001	0.020	0.057	0.065	0.304

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Randomized Control Trial

Regression Table

VARIABLES	(1) Voted in 2002	(2) Voted in 2002	(3) Voted in 2002
Assigned to Treatment	0.006	0.010***	0.010***
	(0.004)	(0.004)	(0.004)
Newly Registered Voter	-0.224***	0.135***	0.160***
	(0.007)	(0.007)	(0.007)
Busy	0.028	-0.004	-0.008
	(0.023)	(0.021)	(0.020)
Age	0.005***	0.003***	0.002***
	(0.000)	(0.000)	(0.000)
Female		-0.028***	-0.024***
		(0.003)	(0.003)
Voted in 2000		0.532***	0.400***
		(0.003)	(0.004)
Voted in 1998			0.275***
			(0.003)
Constant	0.316***	0.028***	0.070***
	(0.005)	(0.005)	(0.005)
Observations	101,071	98,367	98,367
R-squared	0.057	0.250	0.303

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

For the Correction on Observables research design, the regression results show the contact variable has a positive and statistically significant effect on voter turnout for 2002 across all models, with p-values less than 0.01. The effect size varies from the lowest value of 0.036 to the highest value 0.067, indicating that the selection of picking up the phone call increased voter turnout by 5.1 to 10.2 percentage points. The control variables or covariates that were added included Newly Registered Voter, age, Female, and prior voting behavior displayed varying effects on voter turnout. The added covariates are significant across different models suggesting that they do have an effect on the outcome. For the Randomized Control Trial research design, the regression results show the treat real variable also has a positive and statistically significant effect

on voter turnout in 2002 across all models, with p-values less than 0.01. The control variables added are the same as the COO design. The covariates show varying minimal effects on the outcome in contrast to the Correction on Observables research design. When comparing both research designs, the effect of adding covariates is more evident in the non-experimental design, as evidenced by the change in effect sizes and R-squared values across models. The R-squared values increase as more covariates are added, indicating that the model's explanatory power improves. The randomized control trial is considered more valid as it effectively controls confounding variables through random assignment, reducing the risk of selection bias as demonstrated through the balance tables. Also, in the non-experimental research design selection bias could still be present, and it is challenging to eliminate all bias even with the inclusion of covariates due to the base comparison between the two groups being different. As shown through the balance table difference values for covariates such as age were drastically larger than the differences apparent for the balance table when doing randomized control trial. The results from both research designs suggest that phone calls had a positive and statistically significant effect on voter turnout although not a significantly large one. It is important to understand that we cannot eliminate all bias by merely adding covariates in a Correction on Observables design. Although adding covariates can help control observable differences between the treatment and control groups, unobservable differences may still exist. These unobservable factors which cannot be controlled can introduce bias into the estimates. This is a fundamental limitation of non-experimental designs and it's one reason why randomized control trials contrast due to the randomization when done properly, ensures both observable and

unobservable characteristics are on average balanced across treatment and control groups. The results from the Randomized Control Trial and the Correction on Observables design ultimately answer different questions. The analysis of the RCTs provide the average effect of the assignment to treatment on voter turnout for 2002, not the effect of the treatment itself. This is because not everyone assigned to treatment will receive the treatment, they may not answer the phone, and not everyone assigned to control will be free of the treatment since they might receive a call anyway due to some possible mistake. The analysis from COO provides an estimate of the effect of the treatment listening to the call, but this estimate is likely to be biased if there are any systematic differences between those who listen to the call and those who do not.

The Instrumental Variable IV estimation allows us to address this issue by using assignment to treatment as an instrument for actual receiving of treatment. This approach can provide a consistent estimate of the Local Average Treatment Effect, which is the effect of the treatment on the compliers who listen to the call if and only if they are assigned to do so. This Local Average Treatment Effect estimate will implement the results from the analysis of both the RCT and COO. Performing the IV estimation using the data from the RCT will allow for the consistent estimate of the Local Average Treatment Effect. In summary, while the RCT estimates the effect of the treatment for a random assignment to treatment, the COO design estimates the effect of the treatment for a person with specific observable characteristics. Therefore, the two estimates answer different questions and are not directly comparable.

Below are the included results of performing the Instrumental Variables Estimate.

First Stage (regression D on Z)

VARIABLES	(1) Received Phone Call
Assigned to Treatment	0.459***
	(0.002)
Constant	-0.000
	(0.001)
Observations	101,071
R-squared	0.419

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

IV Regression

VARIABLES	(1) Received Phone Call	(2) Voted in 2002	(3) Voted in 2002
Assigned to Treatment	0.459***	0.006	
	(0.002)	(0.004)	
Received Phone Call			0.013
			(0.009)
Constant	-0.000	0.593***	0.593***
	(0.001)	(0.002)	(0.002)
Observations	101,071	101,071	101,071
R-squared	0.419	0.000	0.000

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

IV Regression with Covariates

VARIABLES	(1) Voted in 2002	(2) Voted in 2002	(3) Voted in 2002	(4) Voted in 2002	(5) Voted in 2002	(6) Voted in 2002	(7) Voted in 2002	(8) Voted in 2002
Received Phone Call	0.013	0.014	0.013	0.014	0.015*	0.021***	0.022***	0.014
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.008)	(0.008)	(0.009)
Newly Registered Voter		-0.315***	-0.315***	-0.224***	-0.221***	0.135***	0.160***	-0.315***
		(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
Busy			0.014	0.034	0.031	0.006	0.002	
			(0.024)	(0.023)	(0.023)	(0.021)	(0.020)	
Age				0.005***	0.006***	0.003***	0.002***	
				(0.000)	(0.000)	(0.000)	(0.000)	
Female					-0.033***	-0.028***	-0.024***	
					(0.003)	(0.003)	(0.003)	
Voted in 2000						0.532***	0.400***	
						(0.003)	(0.004)	
Voted in 1998							0.275***	
							(0.003)	
Constant	0.593***	0.608***	0.608***	0.317***	0.323***	0.029***	0.071***	0.608***
	(0.002)	(0.002)	(0.002)	(0.005)	(0.005)	(0.005)	(0.005)	(0.002)
Observations	101,071	101,071	101,071	101,071	98,367	98,367	98,367	101,071
R-squared	0.000	0.019	0.019	0.057	0.065	0.250	0.304	0.019

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

After conducting the analysis using the two research designs RCT and COO with the given obtained balance tables and regressions the objective is to take into account the Instrumental Variable (IV) estimates. This is where the Two-Stage Least Squares approach comes in. Where in the first stage, the treatment variable D_i whether the individual listened to the call using the instrument variable Zi whether the individual was assigned to receive a call. This allows for the isolation in the variation in treatment that is due to the random assignment. Then using these predicted values of the treatment variable to estimate its effect on the outcome variable Yi which is voting in 2002. This way a consistent estimate of the Local Average Treatment Effect is obtained, which is the causal effect of the treatment on the compliers those who listened to the call if and only if they were assigned to do so. The IV estimation provides an estimate of the causal effect of the treatment itself, but only for a specific subpopulation defined by the instrument. context of a randomized control trial, this translates to having an instrument that behaves as if it were randomly assigned. Consistency of the first stage and reduced form estimates ensures that our instrumental variable is not systematically related to any unobservable factors that could potentially bias the treatment effect estimates. In our study, the instrument - assignment to the treatment group - is randomly assigned, which satisfies this assumption. The second assumption for a valid IV estimate is that the instrument genuinely affects the treatment variable. In other words, the first stage estimate should not be zero. This assumption ensures that the instrument has a strong enough relationship with the treatment variable. It is crucial because a weak instrument could lead to imprecise and biased IV estimates. In the study, assignment to the treatment group directly affects whether an individual received a phone call, which

fulfills this assumption. The third and final assumption is that the instrument affects the outcome only through the treatment variable. This assumption establishes that there should not be any alternative channels, other than through the treatment variable, through which the instrument could influence the outcome. In other words, the instrument should not be correlated with the error term in the outcome equation. This means that assignment to the treatment group should not impact any other factors that could affect voter turnout in 2002.This assumption is less directly testable but is plausible given the design of the study. The random assignment to the treatment group should not impact voter turnout in 2002, except through receiving a phone call. However, it's important to note that violation of this assumption could lead to biased IV estimates. In summary, these assumptions are crucial to ensure the validity of our IV estimates. They provide the basis for the causal interpretation of the IV estimates. By confirming these assumptions, we can confidently interpret our IV estimates as the causal effect of phone call interventions on voter turnout for 2002.This IV estimation will incorporate the results from both the RCT and the COO design, providing an understanding of the effect of phone call interventions on voter turnout. It will help to bridge the gap between the two designs, showcasing the strengths of each and combining them to provide a more comprehensive view of the causal effects.

In summary, through careful selection and application of research designs, and the incorporation of Instrumental Variable estimation, there is a deeper understanding of the effect of phone call interventions on voter turnout. These findings can be used to inform future efforts to increase voter participation, improving the efficacy of such interventions and contributing to the understanding of voter behavior. The randomized control trial

provides causal evidence due to its random assignment design, while the Correction on Observables research design is subject to potential biases. The findings contribute to the understanding of the effectiveness of phone call interventions in increasing voter turnout and offer valuable insights for future election campaigns and the impact of calls that promote voter turnout. Adding covariates to the regression models improves the model's explanatory power, as evidenced by the increase in R-squared values in both research designs. This indicates that including additional control variables helps to account for more variation in voter turnout. In the non-experimental research design selection bias could still be present, and it is challenging to eliminate all bias even with the inclusion of covariates. The balance table results for this design show that several variables are significantly different between the control and treatment groups, indicating potential biases. The results from both research designs suggest that phone calls had a positive and statistically significant effect on voter turnout. The randomized control trial provides stronger evidence with no bias contamination due to its random assignment design, while the Correction on Observables research design is subject to potential biases.The comparison between the research designs highlights the importance of considering research design validity and the potential biases when evaluating the impact of interventions.

Conclusion

This paper aimed to evaluate the effectiveness of phone call interventions in increasing voter turnout and to compare the results obtained through two different research designs. By conducting this comparison, the paper aimed to shed light on the

importance of research design in evaluating the impact of interventions and to contribute valuable insights to the literature on voter mobilization strategies.

The randomized control trial which is known as a gold standard in research design, demonstrated the approach by randomly assigning participants to control and treatment groups, effectively controlling for confounding variables or covariates and reducing the risk of selection bias. In contrast, the Correction on Observables design, although informative, was subject to potential biases due to significant differences between control and treatment groups in some variables. This inherent limitation prevented the non-experimental design from eliminating all possible biases, making its results less reliable when compared to the randomized control trial. Results from both research designs showed that phone call interventions had a positive and statistically significant effect on voter turnout. The randomized control trial provided more reliable evidence of this effect, strengthening the case for phone call interventions as an effective tool to increase voter participation by a minimal amount. These findings have crucial implications for understanding the role of phone call interventions in election campaigns and for informing the development of evidence-based strategies to enhance democratic processes. By examining the differences between the research designs, it demonstrates the potential pitfalls of relying solely on non-experimental designs and highlights the need for continued research on voter turnout strategies using proper research designs. Ultimately, a deeper understanding of these issues will help to inform more effective implementation of the power of randomized control trials and the limitations of non-experimental data. As correction on observables using data is frequently more evident throughout most nonexperimental studies with the knowledge of its limitations

proceeding such studies should be done with caution. As the results are potentially not properly estimating a true treatment effect due to bias contamination.