What effect does a bearish economy have on the participation of citizens in politics?

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Introduction

Research question

For this data project I am going to look at the relationship between GDP growth and the turnout for elections. The idea of this project is to see if a change in GDP in the economy will lead to a higher or lower turnout at an election. In its simplest form, do people care about who is in power or representing their country when the economy is doing good, the idea that if things are going well in the economy then a majority of people will also be doing well and they will not care about who is in power. Or on the flip side, will citizens get more involved and use their voices when the economy is doing bad in order to change government and improve the GDP for the better so that they, as individuals will also do better. This is working from the idea that people do not tend to care about something until it starts to effect the individual negatively.

H0 – does GDP growth effect the level of turnout for an election

Data set

From the data set the three main variables which I will be using in order to hopefully explain my hypotheses are as follows.

gdp_growth ➔ a continuous variable measuring the local GDP growth rate for the constituency in a given election year.

Turnout ➔ a measure of turnout of conservative party voters in a given constituency in a given year.

Year ➔ the year of a UK parliamentary election

The research question will look at the variable gdp_growth and its relationship with the dependent variable which will be turnout. The model that I will be running and examining will be the difference in difference model (DID). This model allows you to compare what the turnout for an election was in a year where GDP did not change vs a year when GDP did

change. There are two areas which to look at (1) when GDP increases does the turnout stay the same or does it change and (2) if the GDP decreases in the economy and the turnout for elections increases what other variables could be effecting this change. The turnout variable measures turnout of conservatives voters but I do not want to look at what political parties vote, I want to see if society as a whole voting patterns changes when the economic growth starts to decrease.

Causal relationship between independent and dependent variable

Firstly, to establish if there is any connect between turnout and GDP in the first place a regression model will be run. Run a regression model between turnout and GDP growth to see if there is any relationship, and is this relationship statistical significant.

In table 1.1 we can see that there is a relationship between turnout and GDP Growth, the Coefficient shows a 28.2% relationship, this indicates that the is a positive correlation between the two variables being tested. We also observe a P value of at least < 0.0001, meaning that there is a very strong statistical significant between these two variables.

Causal relationship regression

[1.1]

Source	SS	df	MS	Number of obs	=	12,524
				F(1, 12522)	=	46.73
Model	1020.09476	1	1020.09476	Prob > F	=	0.0000
Residual	273334.545	12,522	21.8283457	R-squared	=	0.0037
				Adj R-squared	=	0.0036
Total	274354.64	12,523	21.9080604	Root MSE	=	4.6721

turnout	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
gdp_growth	.2818052	.041223	6.84	0.000	.2010019	.3626085
_cons	56.03989	.097694	573.63	0.000	55.84839	56.23138

Section 2

Casual identification approach

Difference in difference

The control variable for this is going to be a variable generated called gdp_mean which will take all the GDPs which are at the mean and log them into this variable. The treated variable will be the variable generated called gdp_treated which will be all the GDPs which are under 0, meaning that the economy will be beginning to slow and contract in comparison to the mean. When the economy is shrinking it could be the early signs of a recession occurring, so the prediction is that more citizens will be effect by this and will be more inclined to get involved in politics (by voting) in order to choose politicians with policies that will be best suited to recover from this. In order to see if this presumption is true or not, the two variables that will be compare to see if there was any difference in the treated variable then the control variable. DID is the most appropriate approach because if allows for a direct comparison to be drawn between the years where GDP decreases and the years it does not. Then compare that to how that change effects voter turnout. The theory is that as the economy begins to take a change for the worse, voters will start to demand better policy decisions from politicians. This in theory should lead to an increase in voter turnout because more people will be effected by economic turmoil and will be more likely to vote. The more people that are effected should cause more people to turnout and vote.

The variables

The variable which are to be used in order to make comparison and generate new variables are as follows. The snowstorm variable will be used in the analysis later on in the DAG.

[1.2]

Variable	Obs	Mean	Std. Dev.	Min	Max
turnout	12,524	56.64368	4.680605	40.56017	79.97507
gdp_growth	12,524	2.142603	1.012785	-2.077548	5.981653
snowstorm	12,524	.2801821	.449106	0	1

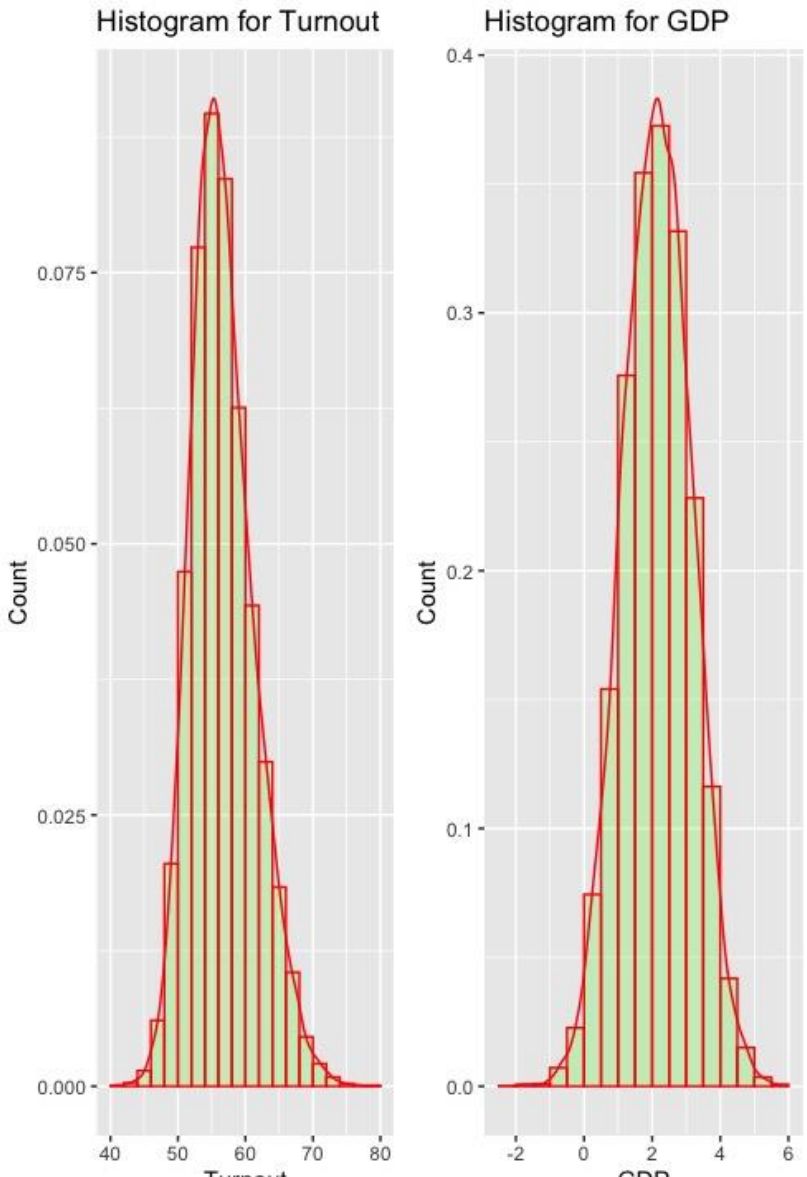
For the values that are to be used in generating the new variables in order to crease the DID model are: gdp_mean = 2 for the control and gdp_treated =< 0 for the treated variable which will be used as a comparison. The mean is set to 2 because that is what the economy will on average grow each year (see diagram 1.4), the treated variable is set to 0 because the economy need to be contracting in order to see if voter turnout increases because a majority of people will be negatively affected by this. The below histogram shows these means. The model labelled 1.3 shows this comparison.

[1.3]

Variable	Obs	Mean	Std. Dev.	Min	Max
turnout	12,524	56.64368	4.680605	40.56017	79.97507
gdp_growth	12,524	2.142603	1.012785	-2.077548	5.981653

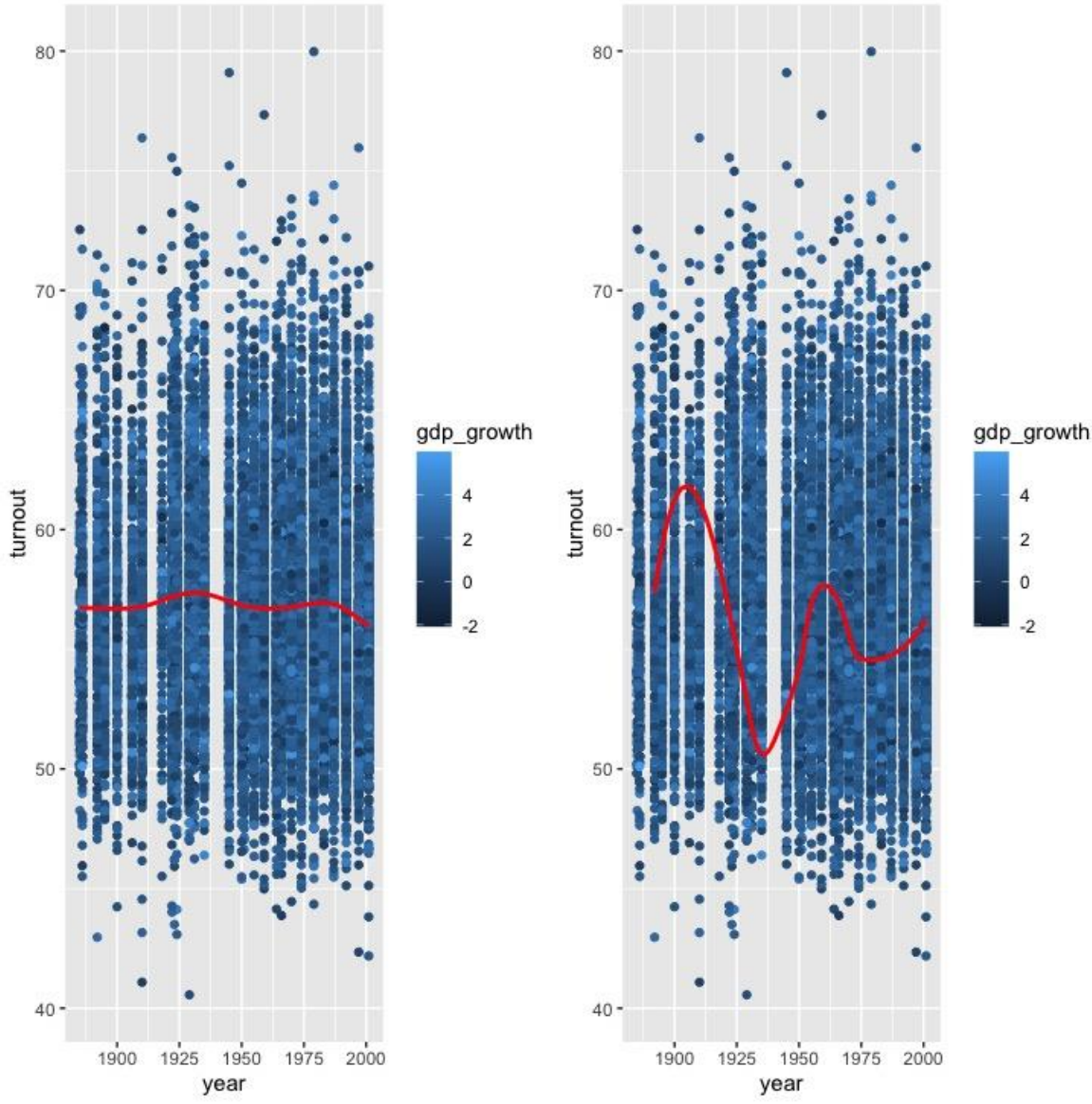
Graph

[1.4]



The model

[1.5]



Model analyst

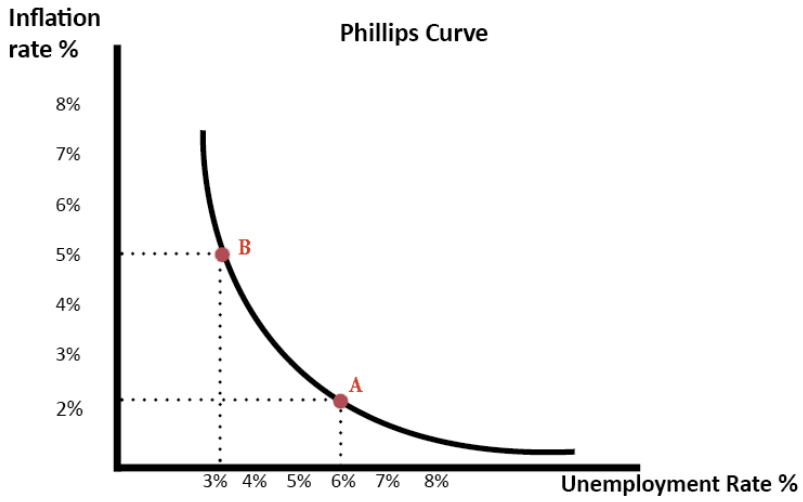
From the above model we can see that there is a clear difference between the turnout for an election on a given year when GDP is affected. The plot of the left shows a relatively flat line meaning that there really is not any effect on turnout when GDP is at the mean. However the plot of the right shows a clear difference between turnout and when the economy is shrinking and entering a recession. Moving to a turnout rate as high as 62%, but there is also a very steep drop off in turnout between 1910 and 1945 when the turnout drops as low as 50%. Something that can account for this is World War I and World War II.

What leads to high turnout

The education level is one of the main indicators which predict if someone votes or not, the younger that the person is will also indicate whether they will vote or not. Young adults have lower turnout rates (Franklin, P16). The reason for using GDP as an indicator in this research project is because it might do a better job of capturing more of society. If the economy is underperforming then nearly everyone in that economy will be effected by it, so the theory is that the more people who are effected by a underperforming economy the more people who will feel that they need to vote in order for things to change. This supports the idea that if the economy goes into a recession or GDP starts to decrease then more citizens are going to want to have a change in leadership.

What this could mean for policy

We see from the model above (1.5) that the better an economy is doing the less voter turnout there is, this can be seen as people being happy with the current government. A problem could occur between this link when it comes to the central banks. If a government has control of the central banks then they could be tempted to increase the GDP in the economy in the short run in order to be re-elected. This could be done by manipulating the Philips curve.

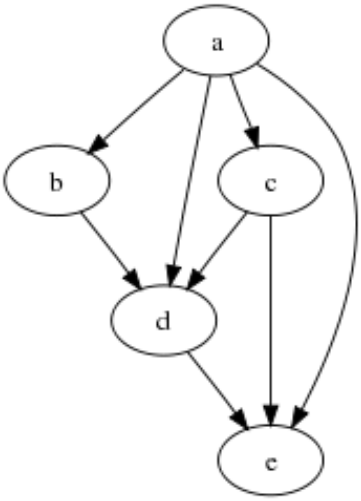


The Philips curve shows the relationship between unemployment and the inflation rate. If the government are up for re-election they could reduce unemployment in order to make the economy look better in the SR. This tactic in dangerous because it can lead to uncontrollable inflation. (Mankiw, 2013)

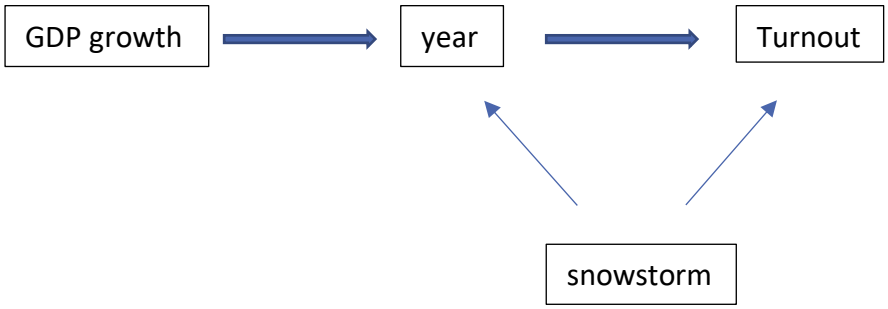
[1.6]

DAG

[1.7]



[1.8]



In the model (1.5) we observed that as the economy stayed at stable levels, for example the economy mean growth per year staying at 2 or above, the level of voter turnout also stayed stable. The turnout rate was at around 50%. However when the GDP began to decline, GDP < 0 and the economy began to go into a recession the level of voter turnout went up to 62%. This supports the theory that as GDP begins to decline, turnout increases. However in the model 1.5 we also showed a steep drop off in the rate of turnout, this could be due heavy snowstorms which prevented people from voting. From the chart below there is a correlation and a statistical significance between these two variables.

[1.9]

Source	SS	df	MS	Number of obs	=	12,524
				F(1, 12522)	=	2039.74
Model	353.808215	1	353.808215	Prob > F	=	0.0000
Residual	2172.03297	12,522	.173457353	R-squared	=	0.1401
				Adj R-squared	=	0.1400
Total	2525.84118	12,523	.201696174	Root MSE	=	.41648

snowstorm	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
turnout	.035911	.0007951	45.16	0.000	.0343524	.0374696
_cons	-1.753951	.0451928	-38.81	0.000	-1.842535	-1.665366

Section 3

Results

[2.0]

DIFFERENCE-IN-DIFFERENCES ESTIMATION RESULTS

Number of observations in the DIFF-IN-DIFF: **12524**

	Before	After	
Control:	**5377**	**6949**	12326
Treated:	**198**	**0**	198
	5575	6949	

Outcome var.	**turnout**	S. Err.	|t|	P>|t|
Before				
Control	**56.428**			
Treated	**55.966**			
Diff (T-C)	**-0.462**	**0.306**	**-1.51**	**0.131**
After				
Control	**56.830**			
Treated	**56.368**			
Diff (T-C)	**-0.462**	**0.306**	**1.51**	**0.131**
Diff-in-Diff	**0.000**	.	.	.

R-square: **0.00**

* Means and Standard Errors are estimated by linear regre

**Robust Std. Errors

**Inference: *** p<0.01; ** p<0.05; * p<0.1

Analysis

Although there was a correlation between the two variables (turnout and gdp_growth) which was seen in the model 1.5, the difference in difference table shows that there is very little relationship between the two variables which could further support that there are other variable which are having an impact on the model that were not taken into account.

Effects

After running the DIFF test it showed that there was a very slight decrease in voter turnout in the treated group relative to the control group. This however is not statistical significant because the P-value, according to the DIFF model is greater then 5%. The P-value is 13.1% which indicates that the is no statistical significance in this model.

What could be done different

I feel that there still could be statistical significance within this model but the computer that this was programmed on is not able to process so many variables. It was not able to run through all of the variables in Stata, that code that couldn't run is below as well. The reason that I feel that there still could be a relationship here is because the model (1.5) was made in RStudio (which code is also below) and that model showed a relationship between turnout and GDP growth when GDP was filtered through the years.

A variable which could be effecting the model is the financial_subsidy variable. This for instance could show that there is a lack of funding for education during the years 1910 – 1945 and as stated above education is one of the main indicators to whether someone is going to vote or not. As well as that, the variable snowstorm could be having an impact on the model but it would not be as significant due to the fact that there was not snowstorms every year. This can be seen in the graph 2.1 below.

[2.1]

Snowstorm During Election (Yes=1)

Percentiles		Smallest		
1%	**0**	**0**		
5%	**0**	**0**		
10%	**0**	**0**	Obs	**12,524**
25%	**0**	**0**	Sum of Wgt.	**12,524**
50%	**0**		Mean	**.2801821**
		Largest	Std. Dev.	**.449106**
75%	**1**	**1**		
90%	**1**	**1**	Variance	**.2016962**
95%	**1**	**1**	Skewness	**.9789526**
99%	**1**	**1**	Kurtosis	**1.958348**

Code

R code for the visuals

Libraries

```
{
 library("tidyverse")
 library("ggplot2")
 library("gridExtra")
 library("dplyr")
}
```

Regression comparison

```
{
 gdp_mean1 <- ggplot(data = data_project, mapping = aes(x = year, y = turnout))+
  geom_point(data = data_project, mapping = aes(colour = gdp_growth)) +
  geom_smooth(
   data = filter(data_project, gdp_growth >= 2), col= "red",
   se = FALSE
  )

 gdp_mean2 <- ggplot(data = data_project, mapping = aes(x = year, y = turnout))+
  geom_point(data = data_project, mapping = aes(colour = gdp_growth)) +
  geom_smooth(
   data = filter(data_project, gdp_growth < -1), col = "red",
   se = FALSE
  )

 grid.arrange(gdp_mean1, gdp_mean2, ncol = 2)
}
```

Histograms

```
{
 ggp1 <- ggplot(data=data_project, aes(data_project$turnout)) +
  geom_histogram(aes(y =..density..),
                 breaks=seq(40, 80, by = 2),
                 col="red",
                 fill="green",
                 alpha = .2) +
  geom_density(col=2) +
  labs(title="Histogram for Turnout") +
  labs(x="Turnout", y="Count")

 ggp2 <-  ggplot(data=data_project, aes(gdp_growth)) +
  geom_histogram(aes(y =..density..),
                 breaks=seq(-2.5, 6.0, by = 0.5),
                 col="red",
```

```
            fill="green",
            alpha = .2) +
  geom_density(col=2) +
  labs(title="Histogram for GDP_growth") +
  labs(x="GDP", y="Count")


 grid.arrange(ggp1, ggp2, ncol = 2)
}
```

Stata code

```
global data = "/Users/jasonmcgrh/Documents/University/2020-2021/political research/Data project/Data project_1"

cd "$data"

set more off

use "$data/data_project.dta"

log using Data_project_19503629, replace

clear all

****************************************

sum, detail
```

regression

```
regress turnout gdp_growth

sum turnout gdp_growth snowstorm
```

DIFF

```
gen gdp_mean = 0

gen gdp_treated = 0

gen gdp_mean = 1 if gdp_growth > 2
```

```
gen gdp_treated = 1 if gdp_growth < -0.5

regress gdp_mean gdp_treated

ssc install diff, replace

diff turnout, t(gdp_treated) p(gdp_mean) robust

log close
```

Data that would have been used but my Mac couldn't run it due to too many variables

```
* Set object "data" to my data directory location
global data="/Users/jasonmcgrh/Documents/University/2020-2021/political research/Data
project/Data project_1"

cd "$data"

* Set more off
set more off

* Turn on log file
log using data_project, replace

* Clear any existing data
clear all

* load data
use "$data/data_project.dta", replace

* Take a look at the data
summarize, detail
```

```
* Look at the data using tabulate
*by turnout
tabulate turnout gdp_growth
*by year
tabulate tunrout year
*by turnout and treated
tabulate turnout gdp_growth if gdp_growth=="treated"


generate x=0
replace x=1 if gdp_growth > 2

generate treated=0
replace treated=1 if gdp_growth=="treated"

*Generate interaction variable "DiD"
generate DiD=x*treated

*Run regression using DiD
reg turnout x treated DiD, robust

*Run regression using "##" operator
reg turnout x treated x##treated, robust

*Use margins and margins plot to visualize the result
margins x##treated
marginsplot


*Install "diff" if not already installed
ssc install diff, replace
```

*Use diff to estimate the diff in diff

diff turnout, t(treated) p(x) robust

log close

References

Franklin, MN 2004, Voter Turnout and the Dynamics of Electoral Competition in Established Democracies since 1945, Cambridge University Press, Cambridge.

Mankiw, G., 2013. *Macroeconomics*. 8th ed. Houndmills: Palgrave Macmillan.