

QRM Homework 1

Impact of Campaign Finance Laws on Party Competition

Paper Replication

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1 Content

Potter and Tavits hypothesise that fund parity or equality in party campaign finance laws affect party competition and the size of the party system in *The Impact of Campaign Finance Laws on Party Competition* published in July 2013. Since the dearth of cross-sectional data plagued an earlier generation of researchers, nowadays this gap is begins to be filled (Nassmacher 1993, Noppe 2006) creating opportunity to study the affects of campaign finance on cross-country party systems. The main objective behind this study is to demonstrate if inequality caused by the party finance laws within the party system effects effective number of parties (ENP). They introduce a new concept called *fundparity4* which contains additive values of four finance law restriction metrics gathered from the International Funding of Political Parties and Election Campaigns installment of Institute for Democracy and Electoral Assistance (International IDEA):

- 1.Limits on donation amount(1) or no limits (0)
- 2.Limits on party expenditures(1) or no limits(0)
- 3.Media access allocated based on previous performance (-1), allocated equally(1) or no media acess(0)
- 4.Direct public funding allocated based on previous performance(-1), allocated equally(1) or no direct funding(0)

The outcome variable, the effective number of parties(ENP) was calculated with the formula by Laakso and Taagepera (1979):

$$N = \frac{1}{\sum_{i=1}^n p_i^2}$$

To test the internal validity of these four features of the outcome, they performed Kuder-Richardson 20 test(Potter and Tavits, p.81.), the derivative of Crombach's α since the variables contained dichotomous outcomes.¹ The control variables used in this study were standard battery of factors such as democratisation year, district magnitude, ethno-linguistic fractionalization, federalism, etc. Due to voters' increasing familiarity with the strategic incentives provided by electoral institutions, the number of democratic years a country has experienced is included as the age of democracy (*demyears*)(Golder), which has been shown to have a reductive influence on ENP. Potter and Tavits also controlled whether a country is federal(*fed*) (which has been argued to have a positive impact on the number of parties) as well as presidential(*pres*)(which has been argued to have a negative impact on the effective number of parties, as parties coalesce or 'link' across districts in an effort to win elections). They followed the lead of many prior researchers and utilized the weighted average figure from the Database of Political Institutions as their measure of national-level district size. When a country has a mixed-member electoral system, this measure of average district magnitude(*avemag*) is weighted by district size, which conveniently offers an approximately right summary statistic. They combined district magnitude with

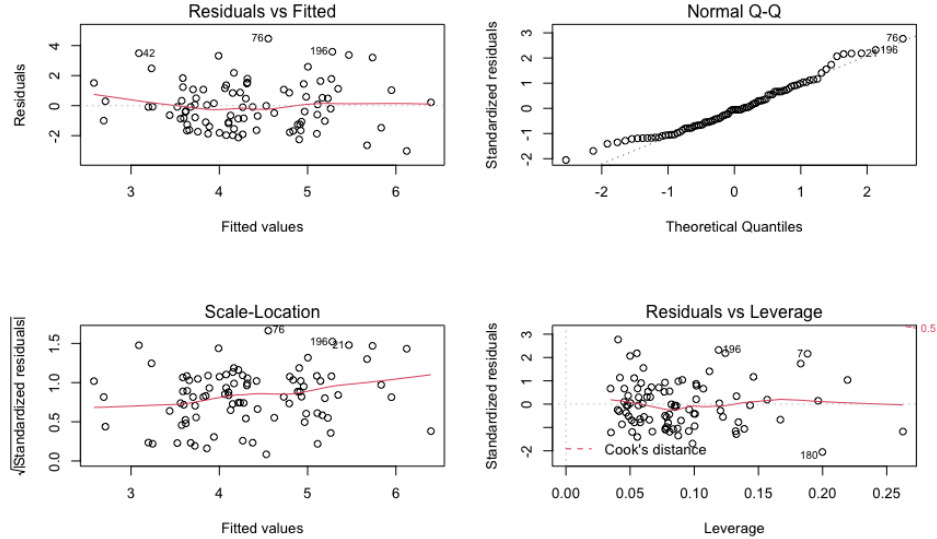
¹*Principal component analysis(PCA)* was not used for the explanatory variable since PCA performs dependably on dichotomous variables and useless unless the variables can assume at least five distinct variables.(Guertin and Baily, 1970)

	Model 1
(Intercept)	3.07*** (0.76)
fundparity4	0.44** (0.15)
demyears	0.01 (0.01)
fed	-0.21 (0.48)
pres	-0.17 (0.21)
log(avemag)	0.60* (0.30)
fract	0.96 (1.29)
log(avemag):fract	-0.75 (0.64)
R ²	0.20
Adj. R ²	0.13
Num. obs.	90

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table 1: *OLS Model estimating the Effect of Fund Parity on ENP*

a national-level measure of ethno-linguistic fractionalization (*fract*), as reported by Fearon, following Clark and Golder. Larger values of district magnitude and ethnolinguistic fractionalization are projected to have a favorable influence on ENP.² The replicated regression results on R can be seen on Table 1. *fundparity4* exerted the strongest significance on ENP.



Plot 1: *Regression Plots of the Replication Formula*

²Please check the paper for further reference to data sources.

2 Assessing the Regression

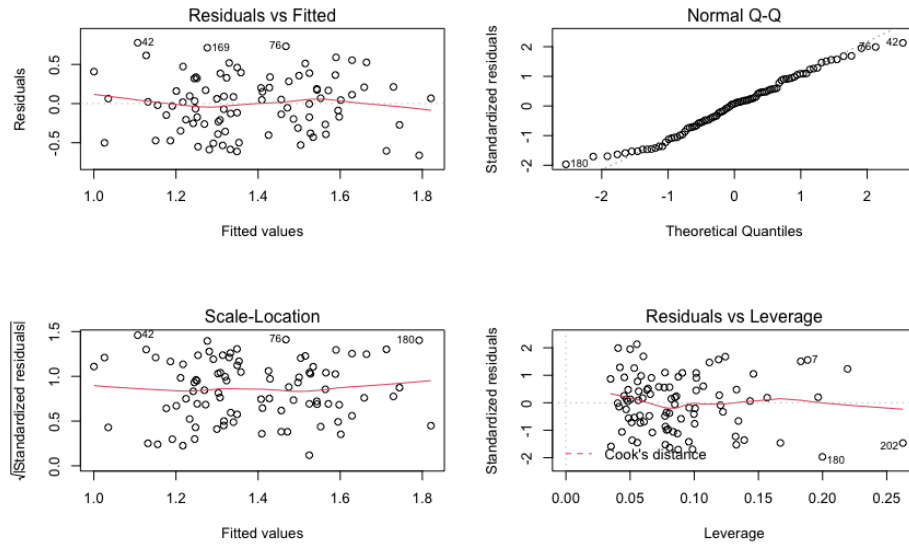
2.1 Outliers

Earlier regression diagnostics have identified three outliers and they omitted these outliers.³

2.2 Assumptions

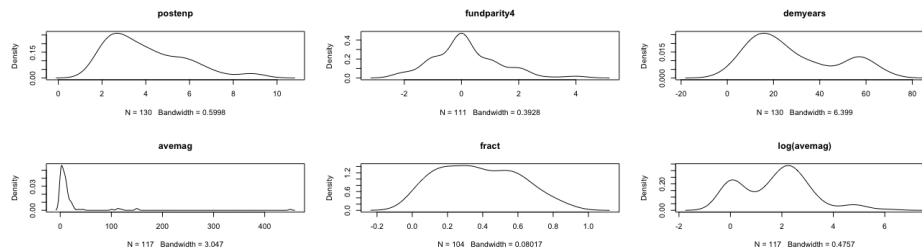
2.2.1. Linearity in it's parameters

Visually, we can see that the residuals vs. fitted plot follows a horizontal line which suggests that our model provides us with a linear relationship. Also, the Q-Q plot does not have an obvious S or U shape which might suggest linearity and normality. Although the researchers haven't applied Box-Cox, we applied it for a better conditional normality. Since the results are significant, we don't assume it will make much of a difference.



Plot 2: *Regression Plots of the Replication Formula after Box-Cox*

Density plots have also highlighted the log transformation on the average magnitude (*avemag*). Other explanatory variables followed a somewhat normal pattern.



Plot 3: *Density Plots*

³Removed outliers discussed in the paper are 1,31 and 113 and can be found on the residuals vs. fitted plot of the raw dataset. These were Albania (2003), Brazil(2003) and Liberia(2012). Although, a similar significance was estimated with these outliers.

	Model 2
(Intercept)	4.38*** (1.22)
fundparity4	0.45* (0.21)
demyears	-0.01 (0.03)
fed	-0.23 (0.75)
pres	-0.03 (0.28)
log(avemag)	0.34 (0.45)
fract	-0.43 (1.91)
log(avemag):fract	-0.58 (0.89)
R ²	0.17
Adj. R ²	0.04
Num. obs.	54

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

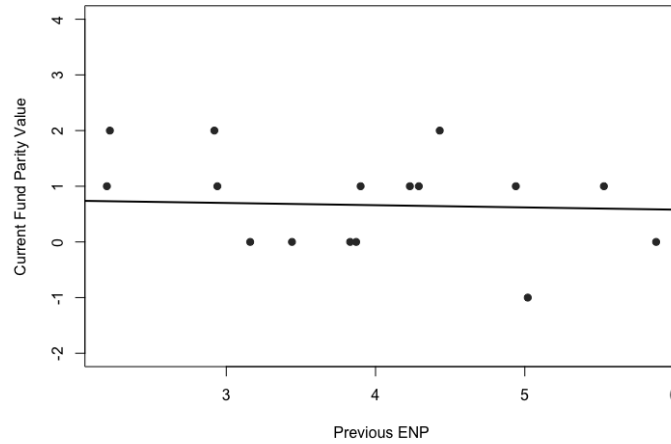
Table 2: *Post-1973 democracies endogeneity test regression*

To check for normality of the variables, Shapiro-Wilk, Lilliefors and Anderson Darling tests were applied although they were contradictory with the obvious normality of the variables.

2.2.2. No endogeneity

Researchers argued that there could be a simultaneity bias meaning that ENP could also effect fund parity. They argued that in recently democratized countries (after 1974) since the campaign finance laws have been adopted exogenously before the party system was established, they hypothesize that these countries had less or perhaps no incentive on deciding their campaign finance laws (Potter and Travis, p.86) The direction of the correlation was examined by subsetting the dataset by newer democrasized countries and seeking if there is in fact still positive significance of fund parity on ENP. Table 2 illustrates the second model which shows such significance. Since the fund parity measures were taken from 2003 and 2012, the researchers note that it would create enough time for the adoption of democratic rules.

Potter and Tavits also checked if in fact the previous ENP and the current fund parity measures were correlated to assess the direction of the correlation. The lack of trend in the scattering of the bivariate relationship plot and a non-significant regression line proved no linearity between previous ENP and current fund parity. (p. 86)



Plot 4: Plot of current fund parity (*fundparity4*) against "previous" ENP(*preenp*) ($r=-0.04$)

2.2.3. No heteroskedasticity

It is hypothesized that the model is homoscedastic if the residuals vs.fitted plot is the same width for all values of the predicted DV, meaning that the "spread" of the points across predicted values is expected to be almost the same. Heteroscedasticity is usually shown by a cluster of points that is wider as the values for the predicted DV get larger. We can assume that the Box-Cox transformation might have fixed the almost triangular shape of the residuals vs. fitted plot of the first model. Although, we have performed Breusch-Pagan and Goldfield-Quandt tests to diagnose possible homoskedasticity issues. Both Breusch-Pagan and Goldfield-Quandt tests showed no sign of heteroskedasticity in the model.⁴

2.2.4.No autocorrelation in the errors

Usually, one doesn't have to assess autocorrelation on cross-sectional data or survey data. We would be seeing a clustering of these residuals or a trend along the line of the residuals vs. fitted plot. We don't see that on our plot. Still, we performed Durbin-Watson and Breusch-Golfrey autocorrelation tests to see if the model violates the independence of error terms. Both of these tests also confirm the independence of error terms.⁵

2.2.5. No multicollinearity between variables

The variance inflation factor provides an index that measures how much the variance of an estimated regression coefficient is increased because of collinearity.

$$VIF = \frac{1}{1 - R_i^2}$$

A rule of thumb is that if $VIF > 10$, then multicollinearity is high and we have to either drop those variables or use PCA.(A cutoff of 5 is also commonly used). In our case, none of the variables showed higher than cut-off VIFs.

2.3 Models on the Effect of Fund Parity Metrics

The researchers have also examined a model to ensure that all fund parity metric components are exerting similarly-signed influences on ENP.(Model 4) (Potter and Tavits, p.82.)

⁴Breusch-Pagan: BP = 7.449, df = 7, p-value = 0.3837, (H_0): Homoscedasticity is present.), Goldfield-Quant: GQ = 1.1946, df1 = 28, df2 = 28, p-value = 0.3206. (H_0): Homoscedasticity is present.)

⁵Durbin-Watson: lag=1, autocorrelation=0.09, D-W statistic=1.75, p=0.13 (H_0):Linear regression residuals are uncorrelated.), Breusch-Godfrey= LM test = 0.92467, df = 1, p= 0.3363 (H_0): There is no autocorrelation)

	Model 3
(Intercept)	2.92*** (0.80)
directelig	0.48 (0.31)
partyspend	0.17 (0.43)
donorlimit	1.15** (0.41)
eligmedia	0.22 (0.23)
demyears	0.01 (0.01)
fed	-0.36 (0.49)
pres	-0.18 (0.22)
log(avemag)	0.64* (0.30)
fract	1.20 (1.30)
log(avemag):fract	-0.85 (0.64)
R ²	0.24
Adj. R ²	0.14
Num. obs.	90

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table 3: *Effect of all parity components on ENP*

	Model 4
(Intercept)	3.11*** (0.75)
fundparity4	0.57*** (0.16)
rulelaw	0.42 (0.27)
demyears	0.00 (0.01)
fed	-0.57 (0.49)
pres	-0.08 (0.23)
log(avemag)	0.46 (0.30)
fract	1.00 (1.26)
fundparity4:rulelaw	-0.28 (0.15)
log(avemag):fract	-0.53 (0.63)
R ²	0.25
Adj. R ²	0.17
Num. obs.	90

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table 4: *Effect of differences between legal rules and actual empirical practice on ENP(p.82)*

	Model 5
(Intercept)	2.65* (1.04)
fundparity4	0.48** (0.17)
thresh	0.08 (0.09)
demyears	0.01 (0.01)
fed	-0.54 (0.56)
pres	-0.33 (0.26)
log(avemag)	0.76* (0.35)
fract	2.97 (1.72)
log(avemag):fract	-1.51* (0.74)
R ²	0.26
Adj. R ²	0.16
Num. obs.	69

*** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$

Table 5: *Includes the legal threshold (which eliminates a large number of our observations due to data availability) on ENP*

2.4 Conclusion

This research establishes itself as a first study that uses cross-sectional data to examine the correlation between fund parity and party system and the effective number of parties. The explanatory variables were almost completely normally distributed (except average magnitude) and it showed a linear relationship of fund parity and ENP. We have if there was any violations of the Gauss-Markov theory and found no assumptions were violated. The biggest issue was the suspected simultaneity bias for which Potter and Tavits found two solutions. First they ran the regression on the newly democratized countries, given that the direction of the correlation between fund parity and ENP might be inverse. In these countries, since the campaign finance laws were adopted when the party systems were weak. Therefore, we can argue that these regulations were in place before the party systems. The subset of newer democracies regression proved almost the same statistical significance on ENP. Secondly, they checked if there is in fact a linear relationship between current fund parity and earlier effective number of parties. They found no correlation which creates evidence that earlier effective number of parties has no effect on current fund parity. Therefore the simultaneity bias was somewhat proven non-existent.

2.5 References

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