main

Introduction

```
The dictionary meaning of "Democracy" defined by Encyclopedia Britannica is "literally ruled by the pe
Measuring democracy also has been contested that there still have ongoing debates on this subject. The
Following the introduction, this research paper will proceed by presenting previous studies to provide
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Prior studies and background about Democratization

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Democratization, according to "An Agenda for Democratization" by Boutros Boutros-Ghali, the formal Se
From his On Democracy, Robert Dahl suggests three conditions that are essential to attain democratic
Africa has also been the wave of political transitions from various types of dictatorships to more op
```

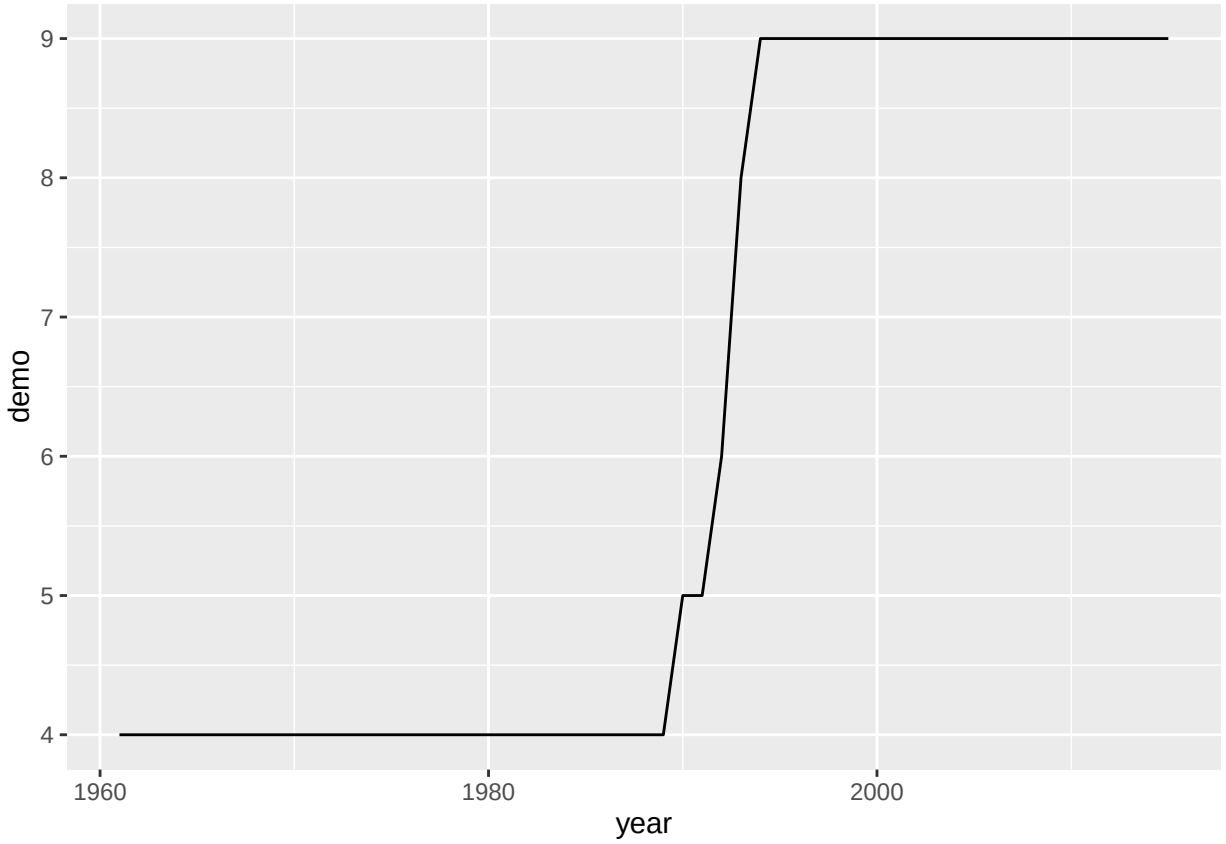
Research Question

test

Data Availability

1) Measurement of Democratization 1-1) Polity 4 ?? ??http://www.systemicpeace.org/inscr/p4manualv2015.pdf 1-2)
2) Gross National Income Level
3) primary enrollment
4) Income Inequality
5) Gender Inequality in labor force
6) mortality rate under 5

Democratization in South Africa



Explanetory variables

variable name	detail	source
gdppc	Gross National Production Per Capita	World Bank
pe	Primary enrollment in education	United Nations
mr	Infant Mortaliry Rate	United Nations
gi	gender inequality in labor market	United Nations

OLS results

% Table created by stargazer v.5.2 by Marek Hlavac, Harvard University. E-mail: hlavac at fas.harvard.edu
% Date and time: Fri, Dec 02, 2016 - 00:03:44

Pooled OLS

% Table created by stargazer v.5.2 by Marek Hlavac, Harvard University. E-mail: hlavac at fas.harvard.edu
% Date and time: Fri, Dec 02, 2016 - 00:03:45

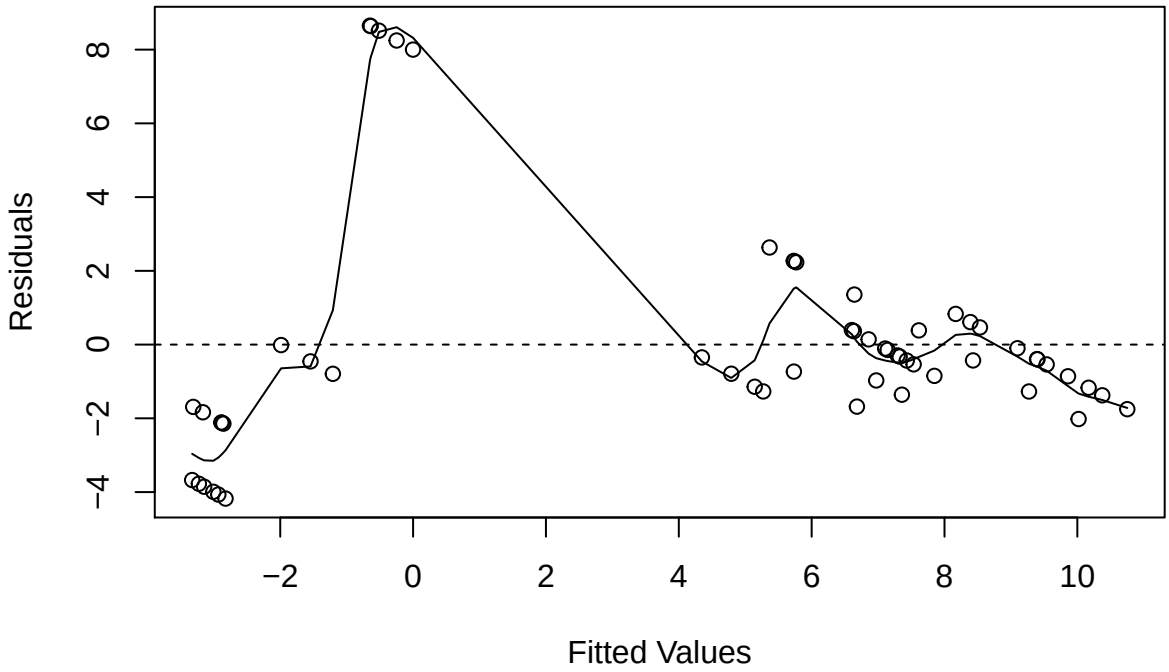
Table 2: Regression results for each country

	Dependent variable:		
	demo		
	(1)	(2)	(3)
log(gdppc)	-2.78^{*}	1.86^{***}	-6.37
	(1.43)	(0.56)	(3.79)
log(pe)	0.81	-3.29	9.05
	(2.83)	(2.31)	(8.68)
log(mr)	-11.16	2.84^{***}	-34.05^{***}
	(7.05)	(0.84)	(9.39)
log(gi)	-43.66^{***}	4.61	-147.18^{***}
	(13.70)	(2.85)	(38.41)
Constant	44.40	23.80	21.71
	(73.50)	(22.73)	(157.22)
Observations	17	21	19
R^2	0.93	0.85	0.92
Adjusted R^2	0.90	0.82	0.90
Residual Std. Error	0.72 (df = 12)	0.28 (df = 16)	1.94 (df = 14)
F Statistic	38.99^{***} (df = 4; 12)	23.04^{***} (df = 4; 16)	42.66^{***} (df = 4; 14)
Note:			*p<0.1; **p<0.05; ***p<0.01

Table 3: Pooled OLS

	Dependent variable:
	demo
log(gdppc)	−0.64
	(1.39)
log(pe)	−1.10**
	(0.46)
log(mr)	−6.89**
	(3.06)
log(gi)	−39.08***
	(10.91)
Constant	41.87*
	(21.14)
Observations	57
R^2	0.72
Adjusted R^2	0.70
Residual Std. Error	3.16 (df = 52)
F Statistic	33.01*** (df = 4; 52)
Note:	*p<0.1; **p<0.05; ***p<0.01

residual vs fitted value



Breusch-Pagan test

```
##
##  studentized Breusch-Pagan test
##
## data:  L4
## BP = 12.672, df = 4, p-value = 0.01299
```

Fixed-Effect model

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Table 4: pooled OLS and fixed effects OLS

	Dependent variable:	
	demo	
	(1)	(2)
log(gdppc)	−0.644	−1.496
	(1.393)	(1.424)
log(pe)	−1.103**	15.793***
	(0.456)	(4.012)
log(mr)	−6.886**	−12.087***
	(3.062)	(3.176)
log(gi)	−39.075***	−28.940**
	(10.914)	(11.221)
Constant	41.873*	
	(21.138)	
Observations	57	57
R^2	0.717	0.610
Adjusted R^2	0.696	0.563
F Statistic	33.013*** (df = 4; 52)	19.532*** (df = 4; 50)
Note:		*p<0.1; **p<0.05; ***p<0.01

constants:

```
fixef(fixed)
```

```
##     Botswana        Kenya South Africa
##    -139.0599    -186.3148    -191.4030
```

Do panel specific effects exist?

```
pFtest(fixed,pooled)
```

```
##
##  F test for individual effects
##
## data:  demo ~ log(gdppc) + log(pe) + log(mr) + log(gi)
## F = 17.075, df1 = 2, df2 = 50, p-value = 2.228e-06
## alternative hypothesis: significant effects
```

Breush-Pagan test

```
##
##  Lagrange Multiplier Test - (Breusch-Pagan) for unbalanced panels
##
## data:  demo ~ log(gdppc) + log(pe) + log(mr) + log(gi)
## chisq = 0.67568, df = 1, p-value = 0.4111
## alternative hypothesis: significant effects
```

we cannot reject the null hypothesis. (residuals doesn't correlated with independent variables)

Random-Effects OLS

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Hausman test

```
Hausman Test
```

data: demo ~ log(gdppc) + log(pe) + log(mr) + log(gi) chisq = 4.6666e-19, df = 4, p-value = 1 alternative hypothesis: one model is inconsistent

results

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Oneway (individual) effect Within Model

Call: plm(formula = demo ~ log(gdppc) + log(pe) + log(mr) + log(gi), data = dfpanel, model = "within", index = c("country", "year"))

Unbalanced Panel: n=3, T=17-21, N=57

Residuals : Min. -3.160 1st Qu. -1.560 Median -0.584 3rd Qu. 0.730 Max. 8.200

Coefficients : Estimate log(gdppc) -1.4964 log(pe) 15.7935 log(mr) -12.0870 log(gi) -28.9397 Std. Error log(gdppc) 1.4239 log(pe) 4.0120 log(mr) 3.1755 log(gi) 11.2214 t-value log(gdppc) -1.0509 log(pe) 3.9366

Table 5: random effects OLS

	Dependent variable:		
	demo		
	(1)	(2)	(3)
log(gdppc)	−0.644	−1.496	−1.496
	(1.393)	(1.424)	(1.396)
log(pe)	−1.103**	15.793***	15.793***
	(0.456)	(4.012)	(3.934)
log(mr)	−6.886**	−12.087***	−12.087***
	(3.062)	(3.176)	(3.114)
log(gi)	−39.075***	−28.940**	−28.940**
	(10.914)	(11.221)	(11.003)
Constant	41.873*		−172.259
	(21.138)		(997,305.100)
Observations	57	57	57
R^2	0.717	0.610	0.610
Adjusted R^2	0.696	0.563	0.580
F Statistic	33.013*** (df = 4; 52)	19.532*** (df = 4; 50)	20.314*** (df = 4; 52)
Note:			*p<0.1; **p<0.05; ***p<0.01

Table 6: Regression results

	Dependent variable:		
	demo		
	(1)	(2)	(3)
log(gdppc)	−0.644	−1.496	−1.496
	(1.393)	(1.424)	(1.396)
log(pe)	−1.103**	15.793***	15.793***
	(0.456)	(4.012)	(3.934)
log(mr)	−6.886**	−12.087***	−12.087***
	(3.062)	(3.176)	(3.114)
log(gi)	−39.075***	−28.940**	−28.940**
	(10.914)	(11.221)	(11.003)
Constant	41.873*		−172.259
	(21.138)		(997,305.100)
Observations	57	57	57
R^2	0.717	0.610	0.610
Adjusted R^2	0.696	0.563	0.580
F Statistic	33.013*** (df = 4; 52)	19.532*** (df = 4; 50)	20.314*** (df = 4; 52)
Note:			*p<0.1; **p<0.05; ***p<0.01

log(mr) -3.8063 log(gi) -2.5790 Pr(>|t|) log(gdppc) 0.2983644 log(pe) 0.0002560 log(mr) 0.0003859 log(gi) 0.0128989

log(gdppc)
log(pe) ***log(mr)*** log(gi) *
— Signif. codes:
0 ‘***’ ***0.001*** ’’ *0.01* ’’ 0.05 ‘.’ 0.1 ‘’ 1

Total Sum of Squares: 788.23 Residual Sum of Squares: 307.59 R-Squared: 0.60977 Adj. R-Squared: 0.56294 F-statistic: 19.5324 on 4 and 50 DF, p-value: 9.8562e-10

$$democratization = -1.496log(gdppc) + 15.793log(pe) - 12.087log(mr) - 28.940log(gi) + \alpha_i$$

where a_i represents panel specific effects

Conclusion