

Data Analysis of Campaign Contributions and Voting Behavior

LPM of all Representatives

The reason for using a LPM for this analysis despite popular opinion in academia that the model is not always accurate (see Ch.5 in my paper), is that the LPM is ideal for binary outcomes, i.e. pro environmental or anti environmental vote.

with control variables

This is the most basic model, which includes all representatives (who can be associated with the R or D party, not I or Libertarian) in panel and who participated in at least 2 votes (to be able to track changes in voting behaviour). This means the dataset encompasses 574 (?) Representatives.

```
# remove ID type columns
df_long <- df_long %>% select(-c(GovtrackID, opensecrets_id, first_name, last_name, name, Vo
view(df_long)
## with control variables & no contrib, only dummy
full_ols_dummy <- lm(Vote ~ . - state - BioID - Vote_change, data = df_long)
summary(full_ols_dummy)
```

Call:

```
lm(formula = Vote ~ . - state - BioID - Vote_change, data = df_long)
```

Residuals:

	Min	1Q	Median	3Q	Max
	-0.99060	-0.04051	-0.01116	0.02351	1.00095

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-4.159e-01	7.822e-01	-0.532	0.59495
district	7.882e-04	3.717e-04	2.120	0.03411 *
partyR	-9.010e-01	8.855e-03	-101.745	< 2e-16 ***
birthday	7.378e-04	3.982e-04	1.853	0.06409 .
genderM	-2.519e-02	9.241e-03	-2.726	0.00648 **
nominate_dim1	-1.407e-01	2.851e-02	-4.935	8.74e-07 ***
nominate_dim2	-6.994e-02	2.134e-02	-3.276	0.00107 **
GeographicalNE	7.307e-02	1.123e-02	6.507	9.82e-11 ***
GeographicalSO	8.803e-03	9.403e-03	0.936	0.34929
GeographicalWE	1.938e-02	1.124e-02	1.725	0.08475 .
Instance	4.826e-04	1.788e-04	2.698	0.00703 **
seniority	1.618e-03	1.038e-03	1.559	0.11921
Contribution_minus	-6.038e-07	1.476e-07	-4.090	4.49e-05 ***
Contribution_plus	7.214e-06	1.400e-06	5.152	2.85e-07 ***
Dmajority	2.406e-02	8.748e-03	2.750	0.00601 **
anti_env_dummy	-2.099e-02	1.317e-02	-1.593	0.11134
pro_env_dummy	-6.638e-03	9.169e-03	-0.724	0.46919

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1516 on 1884 degrees of freedom

(1417 observations deleted due to missingness)

Multiple R-squared: 0.9087, Adjusted R-squared: 0.908

F-statistic: 1172 on 16 and 1884 DF, p-value: < 2.2e-16

```
## with control variables and contribs
full_ols <- lm(Vote ~ . - state - BioID - Vote_change, data = df_long)
summary(full_ols)
```

Call:

```
lm(formula = Vote ~ . - state - BioID - Vote_change, data = df_long)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.99060	-0.04051	-0.01116	0.02351	1.00095

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-4.159e-01	7.822e-01	-0.532	0.59495

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partyR	-9.010e-01	8.855e-03	-101.745	< 2e-16	***
birthday	7.378e-04	3.982e-04	1.853	0.06409	.
genderM	-2.519e-02	9.241e-03	-2.726	0.00648	**
nominate_dim1	-1.407e-01	2.851e-02	-4.935	8.74e-07	***
nominate_dim2	-6.994e-02	2.134e-02	-3.276	0.00107	**
GeographicalNE	7.307e-02	1.123e-02	6.507	9.82e-11	***
GeographicalSO	8.803e-03	9.403e-03	0.936	0.34929	
GeographicalWE	1.938e-02	1.124e-02	1.725	0.08475	.
Instance	4.826e-04	1.788e-04	2.698	0.00703	**
seniority	1.618e-03	1.038e-03	1.559	0.11921	
Contribution_minus	-6.038e-07	1.476e-07	-4.090	4.49e-05	***
Contribution_plus	7.214e-06	1.400e-06	5.152	2.85e-07	***
Dmajority	2.406e-02	8.748e-03	2.750	0.00601	**
anti_env_dummy	-2.099e-02	1.317e-02	-1.593	0.11134	
pro_env_dummy	-6.638e-03	9.169e-03	-0.724	0.46919	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1516 on 1884 degrees of freedom

(1417 observations deleted due to missingness)

Multiple R-squared: 0.9087, Adjusted R-squared: 0.908

F-statistic: 1172 on 16 and 1884 DF, p-value: < 2.2e-16

```
# same thing again with log transformed contributions
```

```
df_long_log <- df_long_log %>% select(-c(GovtrackID, opensecrets_id, first_name, last_name,
full_ols_log <- lm(Vote ~ . - state - BioID - Vote_change, data = df_long_log)
summary(full_ols_log)
```

Call:

```
lm(formula = Vote ~ . - state - BioID - Vote_change, data = df_long_log)
```

Residuals:

Min	1Q	Median	3Q	Max
-1.09309	-0.03431	-0.00684	0.02394	0.97306

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	0.1951467	0.7671589	0.254	0.799233
district	0.0001180	0.0003708	0.318	0.750326
partyR	-0.9109252	0.0090809	-100.312	< 2e-16 ***

Vote_change_dummy	0.1760734	0.0173161	10.168	< 2e-16	***
birthday	0.0004227	0.0003906	1.082	0.279375	
genderM	-0.0266096	0.0090810	-2.930	0.003428	**
nominate_dim1	-0.0751775	0.0287092	-2.619	0.008900	**
nominate_dim2	-0.1057884	0.0211617	-4.999	6.30e-07	***
GeographicalNE	0.0605128	0.0110885	5.457	5.47e-08	***
GeographicalSO	-0.0008319	0.0092087	-0.090	0.928025	
GeographicalWE	0.0190261	0.0110184	1.727	0.084375	.
Instance	0.0005591	0.0001747	3.201	0.001394	**
seniority	0.0002570	0.0010177	0.252	0.800688	
Dmajority	0.0284876	0.0085833	3.319	0.000921	***
anti_env_dummy	0.0788661	0.0317912	2.481	0.013197	*
pro_env_dummy	-0.0696149	0.0340943	-2.042	0.041307	*
Contribution_plus_log	0.0113726	0.0046009	2.472	0.013530	*
Contribution_minus_log	-0.0120736	0.0033220	-3.634	0.000286	***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1484 on 1883 degrees of freedom

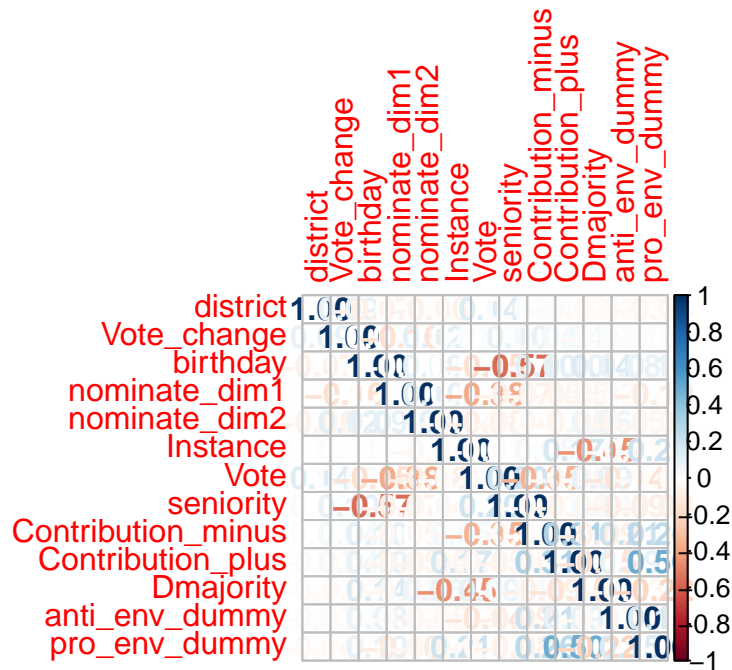
(1417 observations deleted due to missingness)

Multiple R-squared: 0.9126, Adjusted R-squared: 0.9118

F-statistic: 1157 on 17 and 1883 DF, p-value: < 2.2e-16

Why such high adjusted R-squared, use `corrtest` to see if multicollinearity is present.

```
# select only numeric variables
df_long_num <- df_long %>%
  select_if(is.numeric) %>%
  filter(complete.cases())
corrplot(cor(df_long_num), method = "number")
```



The ols regresses the pro and anti environmental contributions with the control variables used:

- party
- district
- birthday
- state (alt. to Geographical)
- Seniority (number of terms served prior to vote)
- DW-Nominate Scores from the 1st and second dimensions
- Geographical region (i.e. States categorised into regions (South, West, North-East and Midwest))
- majority party in the house at the time of the vote.

transforming the contribution variables logarithmically does not change the adjusted R-squared of the model by much. It also decreases the significance of the contribution coefficients, which is strange, given that the contribution variables are highly skewed and thus should be transformed logarithmically.

check for multicollinearity in model

```
vif(full_ols)
```

	GVIF	Df	$GVIF^{(1/(2*Df))}$
district	1.106005	1	1.051668
party	1.614196	1	1.270510
birthday	1.633170	1	1.277956
gender	1.173584	1	1.083321
nominate_dim1	1.286703	1	1.134329
nominate_dim2	1.044345	1	1.021932
Geographical	1.349322	3	1.051201
Instance	1.301281	1	1.140737
seniority	1.588564	1	1.260382
Contribution_minus	1.385466	1	1.177058
Contribution_plus	1.420459	1	1.191830
Dmajority	1.373583	1	1.171999
anti_env_dummy	1.081422	1	1.039914
pro_env_dummy	1.465752	1	1.210683

shows that multicollinearity is not of a real concern here, all VIF values are below 5, most of which between 1 and 1.25.

```
df_long <- df_long %>% filter(complete.cases(Contribution_plus))
skewness(df_long$Contribution_plus)
```

```
[1] 7.249464
```

```
df_long_log <- df_long_log %>% filter(complete.cases(Contribution_plus_log))
skewness(df_long_log$Contribution_plus_log)
```

```
[1] 0.9765213
```

The reason for transforming the contribution variables is to account for differences in contributions which representatives might receive, i.e. AOC vs. Kevin McCarthy.

checking differences in party

```
df_long_D <- df_long %>%
  filter(party == "D") %>%
  select(-c(state, party, BioID, Vote_change))

full_ols_D <- lm(Vote ~ ., data = df_long_D)
summary(full_ols_D)
```

Call:

```
lm(formula = Vote ~ ., data = df_long_D)
```

Residuals:

	Min	1Q	Median	3Q	Max
	-0.89386	-0.02095	0.00584	0.03769	0.22466

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	2.405e-01	8.120e-01	0.296	0.76716	
district	-1.681e-03	3.550e-04	-4.736	2.55e-06	***
birthday	3.645e-04	4.135e-04	0.882	0.37824	
genderM	-6.949e-03	7.936e-03	-0.876	0.38144	
nominate_dim1	2.450e-01	3.561e-02	6.881	1.14e-11	***
nominate_dim2	-1.905e-01	2.166e-02	-8.796	< 2e-16	***
GeographicalNE	5.931e-03	1.060e-02	0.559	0.57603	
GeographicalSO	-9.807e-03	1.092e-02	-0.898	0.36939	
GeographicalWE	2.952e-02	1.158e-02	2.548	0.01100	*
Instance	2.535e-04	1.876e-04	1.352	0.17687	
seniority	-2.062e-03	1.034e-03	-1.994	0.04650	*
Contribution_minus	-7.981e-07	2.657e-07	-3.004	0.00274	**
Contribution_plus	4.249e-06	1.947e-06	2.182	0.02936	*
Dmajority	3.633e-02	8.869e-03	4.096	4.59e-05	***
anti_env_dummy	-6.912e-03	1.145e-02	-0.604	0.54615	
pro_env_dummy	-5.442e-03	9.344e-03	-0.582	0.56048	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.106 on 870 degrees of freedom

(250 observations deleted due to missingness)

Multiple R-squared: 0.1741, Adjusted R-squared: 0.1599

F-statistic: 12.23 on 15 and 870 DF, p-value: < 2.2e-16

```
df_long_R <- df_long %>%  
  filter(party == "R") %>%  
  select(-c(state, party, BioID, Vote_change))  
  
full_ols_R <- lm(Vote ~ ., data = df_long_R)  
summary(full_ols_R)
```

```

Call:
lm(formula = Vote ~ ., data = df_long_R)

Residuals:
    Min       1Q   Median       3Q      Max
-0.38817 -0.05319 -0.01624  0.01787  0.97551

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)  -3.073e+00  1.228e+00  -2.502  0.012493 *
district      2.411e-03  6.669e-04   3.615  0.000315 ***
birthday      1.625e-03  6.244e-04   2.603  0.009377 **
genderM       -2.610e-02  1.989e-02  -1.312  0.189714
nominate_dim1 -2.366e-01  4.606e-02  -5.137  3.35e-07 ***
nominate_dim2  3.748e-02  3.445e-02   1.088  0.276918
GeographicalNE 1.663e-01  2.198e-02   7.568  8.60e-14 ***
GeographicalSO 3.280e-02  1.387e-02   2.365  0.018238 *
GeographicalWE 1.681e-02  1.813e-02   0.927  0.354258
Instance       6.549e-04  2.738e-04   2.392  0.016935 *
seniority      2.712e-03  1.773e-03   1.529  0.126486
Contribution_minus -5.609e-07  1.881e-07  -2.982  0.002931 **
Contribution_plus  9.480e-06  1.870e-06   5.069  4.76e-07 ***
Dmajority      2.589e-02  1.390e-02   1.863  0.062697 .
anti_env_dummy -2.739e-02  2.623e-02  -1.044  0.296549
pro_env_dummy  -9.943e-03  1.463e-02  -0.680  0.496788
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1713 on 999 degrees of freedom
(163 observations deleted due to missingness)
Multiple R-squared:  0.178, Adjusted R-squared:  0.1657
F-statistic: 14.43 on 15 and 999 DF,  p-value: < 2.2e-16

```

Not much difference in the coefficients between the two parties. Why NA in anti_env_dummy ? because all received contributions? lets see...

```
table(df_long_R$anti_env_dummy)
```

```

0      1
68 1110

```


Since only 96 instances of non-anti environmental contributions exist, this means that only $96/6 = 16$ representatives never received contributions from anti environmental groups. hence why there are probably NAs for this variable.

with party & year fixed effects

```
ols_party <- lm(Vote ~ district + birthday + nominate_dim1 + nominate_dim2 + Geographical + 
summary(ols_party)
```

Call:

```
lm(formula = Vote ~ district + birthday + nominate_dim1 + nominate_dim2 + 
    Geographical + as.factor(party) + as.factor(Instance) + seniority + 
    Contribution_minus + Contribution_plus + gender + pro_env_dummy + 
    anti_env_dummy, data = df_long)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.98664	-0.04059	-0.01140	0.02301	1.00436

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-4.263e-01	7.842e-01	-0.544	0.58680
district	7.851e-04	3.719e-04	2.111	0.03489 *
birthday	7.414e-04	3.994e-04	1.856	0.06355 .
nominate_dim1	-1.412e-01	2.852e-02	-4.950	8.10e-07 ***
nominate_dim2	-6.979e-02	2.135e-02	-3.269	0.00110 **
GeographicalNE	7.292e-02	1.123e-02	6.490	1.09e-10 ***
GeographicalSO	8.676e-03	9.407e-03	0.922	0.35645
GeographicalWE	1.943e-02	1.124e-02	1.729	0.08400 .
as.factor(party)R	-9.011e-01	8.864e-03	-101.662	< 2e-16 ***
as.factor(Instance)4	1.007e-02	1.206e-02	0.835	0.40400
as.factor(Instance)6	3.505e-02	1.237e-02	2.833	0.00465 **
as.factor(Instance)7	2.546e-02	1.309e-02	1.945	0.05196 .
as.factor(Instance)51	2.387e-02	1.223e-02	1.952	0.05107 .
as.factor(Instance)52	3.305e-02	1.232e-02	2.683	0.00737 **
seniority	1.643e-03	1.042e-03	1.578	0.11484
Contribution_minus	-6.107e-07	1.479e-07	-4.130	3.79e-05 ***
Contribution_plus	7.200e-06	1.402e-06	5.137	3.08e-07 ***
genderM	-2.513e-02	9.246e-03	-2.718	0.00663 **

```

pro_env_dummy      -6.747e-03  9.173e-03   -0.736  0.46206
anti_env_dummy     -2.101e-02  1.318e-02   -1.594  0.11119
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

```

Residual standard error: 0.1516 on 1881 degrees of freedom
(413 observations deleted due to missingness)
Multiple R-squared:  0.9088,    Adjusted R-squared:  0.9079
F-statistic: 986.8 on 19 and 1881 DF,  p-value: < 2.2e-16

```

with state & year fixed effects

once with geographical

```

ols_geo <- lm(Vote ~ district + party + birthday + nominate_dim1 + nominate_dim2 + as.factor
summary(ols_geo)

```

Call:

```

lm(formula = Vote ~ district + party + birthday + nominate_dim1 +
    nominate_dim2 + as.factor(Geographical) + as.factor(Instance) +
    seniority + Contribution_minus + Contribution_plus + gender +
    pro_env_dummy + anti_env_dummy, data = df_long)

```

Residuals:

Min	1Q	Median	3Q	Max
-0.98664	-0.04059	-0.01140	0.02301	1.00436

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
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district	7.851e-04	3.719e-04	2.111	0.03489 *
partyR	-9.011e-01	8.864e-03	-101.662	< 2e-16 ***
birthday	7.414e-04	3.994e-04	1.856	0.06355 .
nominate_dim1	-1.412e-01	2.852e-02	-4.950	8.10e-07 ***
nominate_dim2	-6.979e-02	2.135e-02	-3.269	0.00110 **
as.factor(Geographical)NE	7.292e-02	1.123e-02	6.490	1.09e-10 ***
as.factor(Geographical)SO	8.676e-03	9.407e-03	0.922	0.35645
as.factor(Geographical)WE	1.943e-02	1.124e-02	1.729	0.08400 .
as.factor(Instance)4	1.007e-02	1.206e-02	0.835	0.40400

as.factor(Instance)6	3.505e-02	1.237e-02	2.833	0.00465	**
as.factor(Instance)7	2.546e-02	1.309e-02	1.945	0.05196	.
as.factor(Instance)51	2.387e-02	1.223e-02	1.952	0.05107	.
as.factor(Instance)52	3.305e-02	1.232e-02	2.683	0.00737	**
seniority	1.643e-03	1.042e-03	1.578	0.11484	
Contribution_minus	-6.107e-07	1.479e-07	-4.130	3.79e-05	***
Contribution_plus	7.200e-06	1.402e-06	5.137	3.08e-07	***
genderM	-2.513e-02	9.246e-03	-2.718	0.00663	**
pro_env_dummy	-6.747e-03	9.173e-03	-0.736	0.46206	
anti_env_dummy	-2.101e-02	1.318e-02	-1.594	0.11119	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1516 on 1881 degrees of freedom

(413 observations deleted due to missingness)

Multiple R-squared: 0.9088, Adjusted R-squared: 0.9079

F-statistic: 986.8 on 19 and 1881 DF, p-value: < 2.2e-16

same thing with log

```
ols_geo_log <- lm(Vote ~ district + party + birthday + nominate_dim1 + nominate_dim2 + as.factor(Geographical) + seniority + Contribution_minus_log + Contribution_plus_log + gender + pro_env_dummy + anti_env_dummy, data = df_long_log)
summary(ols_geo_log)
```

Call:

```
lm(formula = Vote ~ district + party + birthday + nominate_dim1 +
    nominate_dim2 + as.factor(Geographical) + as.factor(Instance) +
    seniority + Contribution_minus_log + Contribution_plus_log +
    gender + pro_env_dummy + anti_env_dummy, data = df_long_log)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.96550	-0.04226	-0.01131	0.02241	1.00041

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-0.4591089	0.7869615	-0.583	0.559698
district	0.0008103	0.0003743	2.165	0.030541 *
partyR	-0.8996493	0.0092617	-97.137	< 2e-16 ***
birthday	0.0007581	0.0004008	1.892	0.058707 .
nominate_dim1	-0.1389326	0.0287939	-4.825	1.51e-06 ***
nominate_dim2	-0.0726271	0.0214780	-3.381	0.000736 ***
as.factor(Geographical)NE	0.0704985	0.0113434	6.215	6.31e-10 ***

```

as.factor(Geographical)SO 0.0056663 0.0094350 0.601 0.548207
as.factor(Geographical)WE 0.0177440 0.0113159 1.568 0.117036
as.factor(Instance)4      0.0111050 0.0121206 0.916 0.359673
as.factor(Instance)6      0.0350433 0.0124298 2.819 0.004863 **
as.factor(Instance)7      0.0253127 0.0131640 1.923 0.054646 .
as.factor(Instance)51     0.0263085 0.0122730 2.144 0.032192 *
as.factor(Instance)52     0.0364922 0.0123535 2.954 0.003176 **
seniority                 0.0014049 0.0010425 1.348 0.177926
Contribution_minus_log    -0.0119403 0.0034188 -3.492 0.000490 ***
Contribution_plus_log     0.0132229 0.0047233 2.799 0.005171 **
genderM                   -0.0226172 0.0093202 -2.427 0.015331 *
pro_env_dummy             -0.0826574 0.0350031 -2.361 0.018306 *
anti_env_dummy            0.0760222 0.0326888 2.326 0.020144 *
---

```

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1524 on 1881 degrees of freedom

(413 observations deleted due to missingness)

Multiple R-squared: 0.9079, Adjusted R-squared: 0.907

F-statistic: 976.3 on 19 and 1881 DF, p-value: < 2.2e-16

Explain the following in the paper:

- why bill fixed effects (environmental occurrences/perception may influence voting)
- why state fixed effects (D-CA != D-TX or so. avg. rep from states different)

for `ols_geo_1` since I am being stricter than in the model before, since I am using fixed effects for the geographical region and the (year). This means that the model is more robust, but also more specific.

once with state

```

ols_state_fe <- lm(Vote ~ party + birthday + nominate_dim1 + nominate_dim2 + as.factor(state)
summary(ols_state_fe)

```

Call:

```

lm(formula = Vote ~ party + birthday + nominate_dim1 + nominate_dim2 +
    as.factor(state) + as.factor(Instance) + seniority + Contribution_minus +
    Contribution_plus + gender + pro_env_dummy + anti_env_dummy,
    data = df_long)

```

Residuals:

	Min	1Q	Median	3Q	Max
	-0.98076	-0.04303	-0.00641	0.02722	0.93072

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	-1.288e+00	7.668e-01	-1.680	0.093152	.
partyR	-8.947e-01	9.179e-03	-97.476	< 2e-16	***
birthday	1.157e-03	3.915e-04	2.955	0.003165	**
nominate_dim1	-1.437e-01	2.930e-02	-4.904	1.01e-06	***
nominate_dim2	-5.672e-02	2.137e-02	-2.654	0.008013	**
as.factor(state)AL	4.188e-02	6.914e-02	0.606	0.544709	
as.factor(state)AR	3.049e-02	7.231e-02	0.422	0.673306	
as.factor(state)AZ	7.449e-02	7.018e-02	1.061	0.288595	
as.factor(state)CA	8.262e-02	6.501e-02	1.271	0.203947	
as.factor(state)CO	8.175e-02	6.890e-02	1.186	0.235584	
as.factor(state)CT	8.710e-02	7.054e-02	1.235	0.217075	
as.factor(state)DE	8.102e-02	9.042e-02	0.896	0.370333	
as.factor(state)FL	1.311e-01	6.564e-02	1.997	0.046000	*
as.factor(state)GA	4.124e-02	6.694e-02	0.616	0.537915	
as.factor(state)HI	5.695e-02	8.285e-02	0.687	0.491915	
as.factor(state)IA	3.441e-03	7.435e-02	0.046	0.963089	
as.factor(state>ID	4.323e-02	8.066e-02	0.536	0.592054	
as.factor(state)IL	7.013e-02	6.610e-02	1.061	0.288795	
as.factor(state)IN	2.196e-02	6.801e-02	0.323	0.746752	
as.factor(state)KS	1.766e-02	7.450e-02	0.237	0.812685	
as.factor(state)KY	4.369e-02	6.937e-02	0.630	0.528832	
as.factor(state)LA	5.868e-02	7.109e-02	0.825	0.409242	
as.factor(state)MA	9.440e-02	6.819e-02	1.384	0.166413	
as.factor(state)MD	1.031e-01	6.873e-02	1.501	0.133599	
as.factor(state)ME	6.580e-02	7.951e-02	0.828	0.408007	
as.factor(state)MI	1.000e-01	6.666e-02	1.500	0.133723	
as.factor(state)MN	-2.670e-03	6.878e-02	-0.039	0.969037	
as.factor(state)MO	2.866e-02	6.854e-02	0.418	0.675819	
as.factor(state)MS	7.021e-02	7.288e-02	0.963	0.335446	
as.factor(state)MT	7.421e-03	1.099e-01	0.068	0.946167	
as.factor(state)NC	5.635e-02	6.764e-02	0.833	0.404894	
as.factor(state)ND	7.392e-03	1.267e-01	0.058	0.953499	
as.factor(state)NE	-1.931e-02	7.458e-02	-0.259	0.795769	
as.factor(state)NH	5.945e-02	8.110e-02	0.733	0.463577	
as.factor(state)NJ	1.470e-01	6.685e-02	2.199	0.027964	*
as.factor(state)NM	5.074e-02	8.682e-02	0.584	0.558965	

```

as.factor(state)NV      5.768e-02  7.267e-02   0.794 0.427438
as.factor(state)NY      1.559e-01  6.543e-02   2.383 0.017253 *
as.factor(state)OH      4.687e-02  6.607e-02   0.709 0.478158
as.factor(state)OK      2.753e-02  7.404e-02   0.372 0.710113
as.factor(state)OR      9.039e-02  7.011e-02   1.289 0.197462
as.factor(state)PA      1.152e-01  6.606e-02   1.744 0.081288 .
as.factor(state)RI      1.000e-01  7.848e-02   1.274 0.202729
as.factor(state)SC      1.169e-01  6.915e-02   1.690 0.091091 .
as.factor(state)SD     -1.753e-02  9.455e-02  -0.185 0.852946
as.factor(state)TN      4.596e-02  6.804e-02   0.676 0.499384
as.factor(state)TX      2.807e-02  6.532e-02   0.430 0.667423
as.factor(state)UT      2.848e-02  7.381e-02   0.386 0.699616
as.factor(state)VA      5.810e-02  6.762e-02   0.859 0.390314
as.factor(state)WA      7.401e-02  6.759e-02   1.095 0.273649
as.factor(state)WI      6.681e-02  6.958e-02   0.960 0.337058
as.factor(state)WV      2.044e-02  7.475e-02   0.273 0.784540
as.factor(state)WY      3.338e-02  1.021e-01   0.327 0.743763
as.factor(Instance)4    1.212e-02  1.149e-02   1.055 0.291509
as.factor(Instance)6    3.526e-02  1.175e-02   3.001 0.002718 **
as.factor(Instance)7    2.842e-02  1.233e-02   2.306 0.021222 *
as.factor(Instance)51   2.468e-02  1.160e-02   2.127 0.033515 *
as.factor(Instance)52   3.328e-02  1.169e-02   2.847 0.004453 **
seniority               1.822e-03  1.033e-03   1.763 0.078062 .
Contribution_minus     -4.776e-07  1.351e-07  -3.536 0.000415 ***
Contribution_plus       6.984e-06  1.417e-06   4.930 8.87e-07 ***
genderM                -2.857e-02  9.030e-03  -3.164 0.001578 **
pro_env_dummy          -4.585e-04  8.815e-03  -0.052 0.958518
anti_env_dummy         -2.567e-02  1.292e-02  -1.987 0.047065 *
---

```

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1538 on 2153 degrees of freedom

(97 observations deleted due to missingness)

Multiple R-squared: 0.9081, Adjusted R-squared: 0.9054

F-statistic: 337.6 on 63 and 2153 DF, p-value: < 2.2e-16

```
# same thing again with plm
```

```
ols_state_fe_plm <- plm(Vote ~ party + birthday + nominate_dim1 + nominate_dim2 + seniority -
```

Warning in pdata.frame(data, index): duplicate couples (id-time) in resulting pdata.frame
to find out which, use, e.g., table(index(your_pdataframe), useNA = "ifany")

```
summary(ols_state_fe_plm)
```

Oneway (individual) effect Within Model

Call:

```
plm(formula = Vote ~ party + birthday + nominate_dim1 + nominate_dim2 +  
      seniority + Contribution_minus + Contribution_plus + gender +  
      pro_env_dummy + anti_env_dummy, data = df_long, model = "within",  
      index = c("state", "Instance"))
```

Unbalanced Panel: n = 49, T = 2-283, N = 2217

Residuals:

	Min.	1st Qu.	Median	3rd Qu.	Max.
	-0.9675578	-0.0435903	-0.0052962	0.0257190	0.9332252

Coefficients:

	Estimate	Std. Error	t-value	Pr(> t)
partyR	-8.9567e-01	9.1785e-03	-97.5835	< 2.2e-16 ***
birthday	1.4407e-03	3.7839e-04	3.8074	0.0001444 ***
nominate_dim1	-1.4360e-01	2.9345e-02	-4.8935	1.064e-06 ***
nominate_dim2	-5.5328e-02	2.1378e-02	-2.5881	0.0097156 **
seniority	2.3691e-03	1.0148e-03	2.3345	0.0196632 *
Contribution_minus	-4.8760e-07	1.3502e-07	-3.6114	0.0003115 ***
Contribution_plus	7.1870e-06	1.4107e-06	5.0945	3.800e-07 ***
genderM	-2.9704e-02	9.0355e-03	-3.2875	0.0010271 **
pro_env_dummy	-1.6461e-03	8.6430e-03	-0.1905	0.8489679
anti_env_dummy	-2.6618e-02	1.2928e-02	-2.0590	0.0396185 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 394.57

Residual Sum of Squares: 51.254

R-Squared: 0.8701

Adj. R-Squared: 0.86661

F-statistic: 1445.5 on 10 and 2158 DF, p-value: < 2.22e-16

```
# same thing again with log
```

```
ols_state_fe_log <- lm(Vote ~ party + birthday + nominate_dim1 + nominate_dim2 + as.factor(s  
summary(ols_state_fe_log)
```

Call:

```
lm(formula = Vote ~ party + birthday + nominate_dim1 + nominate_dim2 +  
    as.factor(state) + as.factor(Instance) + seniority + Contribution_minus_log +  
    Contribution_plus_log + gender + pro_env_dummy + anti_env_dummy,  
    data = df_long_log)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.96950	-0.04431	-0.00684	0.02780	0.92596

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-1.4131558	0.7687040	-1.838	0.06615 .
partyR	-0.8934106	0.0094783	-94.258	< 2e-16 ***
birthday	0.0012239	0.0003926	3.118	0.00185 **
nominate_dim1	-0.1458261	0.0297420	-4.903	1.01e-06 ***
nominate_dim2	-0.0608293	0.0214780	-2.832	0.00467 **
as.factor(state)AL	0.0419216	0.0694180	0.604	0.54597
as.factor(state)AR	0.0282338	0.0726003	0.389	0.69739
as.factor(state)AZ	0.0728869	0.0704719	1.034	0.30113
as.factor(state)CA	0.0764943	0.0652153	1.173	0.24095
as.factor(state)CO	0.0835448	0.0691082	1.209	0.22683
as.factor(state)CT	0.0784138	0.0708326	1.107	0.26840
as.factor(state)DE	0.0773796	0.0907723	0.852	0.39405
as.factor(state)FL	0.1250684	0.0659216	1.897	0.05793 .
as.factor(state)GA	0.0365091	0.0671892	0.543	0.58693
as.factor(state)HI	0.0433561	0.0832550	0.521	0.60259
as.factor(state)IA	0.0256047	0.0744066	0.344	0.73079
as.factor(state>ID	0.0366105	0.0809088	0.452	0.65096
as.factor(state)IL	0.0659180	0.0663566	0.993	0.32063
as.factor(state)IN	0.0210719	0.0682979	0.309	0.75771
as.factor(state)KS	0.0182655	0.0747227	0.244	0.80691
as.factor(state)KY	0.0368347	0.0696307	0.529	0.59686
as.factor(state)LA	0.0477975	0.0711664	0.672	0.50189
as.factor(state)MA	0.0870165	0.0684438	1.271	0.20374
as.factor(state)MD	0.0933834	0.0689310	1.355	0.17564
as.factor(state)ME	0.0640444	0.0799157	0.801	0.42299
as.factor(state)MI	0.0971507	0.0668916	1.452	0.14655
as.factor(state)MN	-0.0054061	0.0690344	-0.078	0.93759
as.factor(state)MO	0.0243813	0.0688178	0.354	0.72316
as.factor(state)MS	0.0698431	0.0731654	0.955	0.33989
as.factor(state)MT	-0.0013241	0.1102809	-0.012	0.99042
as.factor(state)NC	0.0528712	0.0678787	0.779	0.43612

as.factor(state)ND	0.0054669	0.1272275	0.043	0.96573
as.factor(state)NE	-0.0202777	0.0749573	-0.271	0.78678
as.factor(state)NH	0.0494536	0.0814894	0.607	0.54400
as.factor(state)NJ	0.1478090	0.0670874	2.203	0.02768 *
as.factor(state)NM	0.0412632	0.0871305	0.474	0.63585
as.factor(state)NV	0.0516852	0.0728998	0.709	0.47841
as.factor(state)NY	0.1507442	0.0656891	2.295	0.02184 *
as.factor(state)OH	0.0429944	0.0662783	0.649	0.51661
as.factor(state)OK	0.0243711	0.0743343	0.328	0.74305
as.factor(state)OR	0.0821647	0.0703099	1.169	0.24269
as.factor(state)PA	0.1090435	0.0663100	1.644	0.10023
as.factor(state)RI	0.0799745	0.0790184	1.012	0.31160
as.factor(state)SC	0.1136158	0.0694321	1.636	0.10191
as.factor(state)SD	-0.0225157	0.0949221	-0.237	0.81252
as.factor(state)TN	0.0389729	0.0683393	0.570	0.56854
as.factor(state)TX	0.0242671	0.0654871	0.371	0.71100
as.factor(state)UT	0.0270868	0.0740842	0.366	0.71468
as.factor(state)VA	0.0530005	0.0678840	0.781	0.43503
as.factor(state)WA	0.0672618	0.0678498	0.991	0.32163
as.factor(state)WI	0.0630914	0.0698421	0.903	0.36644
as.factor(state)WV	0.0136554	0.0750156	0.182	0.85557
as.factor(state)WY	0.0275054	0.1024208	0.269	0.78830
as.factor(Instance)4	0.0128152	0.0115329	1.111	0.26661
as.factor(Instance)6	0.0346753	0.0117927	2.940	0.00331 **
as.factor(Instance)7	0.0271531	0.0124003	2.190	0.02865 *
as.factor(Instance)51	0.0266620	0.0116362	2.291	0.02204 *
as.factor(Instance)52	0.0364435	0.0117058	3.113	0.00187 **
seniority	0.0016735	0.0010332	1.620	0.10545
Contribution_minus_log	-0.0105324	0.0034430	-3.059	0.00225 **
Contribution_plus_log	0.0124879	0.0046028	2.713	0.00672 **
genderM	-0.0271517	0.0090819	-2.990	0.00282 **
pro_env_dummy	-0.0718579	0.0340709	-2.109	0.03505 *
anti_env_dummy	0.0602036	0.0326595	1.843	0.06541 .

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.1544 on 2153 degrees of freedom

(97 observations deleted due to missingness)

Multiple R-squared: 0.9074, Adjusted R-squared: 0.9047

F-statistic: 334.8 on 63 and 2153 DF, p-value: < 2.2e-16

using state instead of geographical region means that we can more accurately determine the differences in voting behavior between representatives from different states, not just regions.

this makes sense, when we look at the states which are significant in the model, i.e. NY, SC, NJ, NH, FL, CT, AZ, they are not all from the same region, manye from the north east and the south and west, but no real patterns...

```
kable(head(state_makeup), format = "html")
```

State	Number
Alabama	7
Alaska	1
Arizona	9
Arkansas	4
California	52
Colorado	8

```
# mean(state_makeup$Number)
# boxplot(state_makeup$Number)
```

Discuss... maybe makeup of states also important for the coefficient. If you have only

The average amount of representatives for each state is 8.7 , with the highest number of representatives from California (52) and the lowest from Wyoming, Vermont, Alaska, etc. (1).

here, the model is getting stricter than before, since I am not only fixing for state and year (instance) but also for party, also i cannot include the dummy variables for anti and pro environmental contributions

with individual & year fixed effects

```
ols_ind_fe <- lm(Vote ~ nominate_dim1 + nominate_dim2 + as.factor(Instance) + as.factor(BioID) +
summary(ols_ind_fe)
```

Call:

```
lm(formula = Vote ~ nominate_dim1 + nominate_dim2 + as.factor(Instance) +
    as.factor(BioID) + seniority + Contribution_minus + Contribution_plus,
    data = df_long)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.82265	-0.01015	-0.00226	0.01038	0.82707

Coefficients: (2 not defined because of singularities)

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	8.719e-01	1.311e+00	0.665	0.506071
nominate_dim1	-2.131e+00	2.957e+00	-0.721	0.471276
nominate_dim2	-3.873e-01	1.117e+00	-0.347	0.728785
as.factor(Instance)4	-5.540e-03	4.479e-02	-0.124	0.901582
as.factor(Instance)6	-1.454e-02	1.328e-01	-0.109	0.912847
as.factor(Instance)7	-3.294e-02	1.769e-01	-0.186	0.852292
as.factor(Instance)51	-8.354e-03	8.869e-02	-0.094	0.924968
as.factor(Instance)52	-8.445e-04	8.873e-02	-0.010	0.992407
as.factor(BioID)A000367	7.613e-01	1.287e+00	0.592	0.554205
as.factor(BioID)A000369	-2.420e-02	8.095e-02	-0.299	0.765037
as.factor(BioID)A000370	1.088e+00	1.197e-01	9.090	< 2e-16 ***
as.factor(BioID)A000371	8.186e-01	2.781e-01	2.943	0.003292 **
as.factor(BioID)A000372	6.875e-01	1.003e+00	0.685	0.493277
as.factor(BioID)A000374	3.555e-01	5.318e-01	0.668	0.503955
as.factor(BioID)A000375	4.779e-01	6.300e-01	0.759	0.448211
as.factor(BioID)A000376	1.322e+00	8.113e-01	1.630	0.103298
as.factor(BioID)A000377	1.322e-01	2.046e-01	0.646	0.518307
as.factor(BioID)A000378	8.595e-01	3.663e-01	2.346	0.019085 *
as.factor(BioID)B000213	4.482e-02	4.824e-01	0.093	0.925991
as.factor(BioID)B000287	1.135e+00	2.288e-01	4.960	7.77e-07 ***
as.factor(BioID)B000490	3.702e-01	4.451e-01	0.832	0.405708
as.factor(BioID)B000574	1.073e+00	2.134e-01	5.027	5.52e-07 ***
as.factor(BioID)B000755	1.638e-01	2.237e-01	0.732	0.464255
as.factor(BioID)B000911	9.293e-01	3.672e-01	2.531	0.011460 *
as.factor(BioID)B001227	1.077e+00	1.870e-01	5.758	1.01e-08 ***
as.factor(BioID)B001248	2.857e-01	3.538e-01	0.807	0.419552
as.factor(BioID)B001250	1.999e-01	2.492e-01	0.802	0.422573
as.factor(BioID)B001251	9.349e-01	1.984e-01	4.712	2.66e-06 ***
as.factor(BioID)B001255	1.725e-02	9.591e-02	0.180	0.857312
as.factor(BioID)B001257	-6.867e-02	2.605e-01	-0.264	0.792113
as.factor(BioID)B001260	-1.540e-01	3.161e-01	-0.487	0.626244
as.factor(BioID)B001269	-1.678e-01	2.613e-01	-0.642	0.520758
as.factor(BioID)B001270	1.355e+00	4.452e-01	3.044	0.002370 **
as.factor(BioID)B001271	2.002e-01	2.257e-01	0.887	0.375217
as.factor(BioID)B001273	4.149e-01	5.392e-01	0.770	0.441698
as.factor(BioID)B001274	6.221e-01	9.341e-01	0.666	0.505460
as.factor(BioID)B001275	3.440e-02	1.650e-01	0.209	0.834857
as.factor(BioID)B001278	1.074e+00	2.270e-01	4.729	2.45e-06 ***

as.factor(BioID)B001281	1.043e+00	8.982e-02	11.616	< 2e-16	***
as.factor(BioID)B001282	2.439e-01	3.677e-01	0.663	0.507275	
as.factor(BioID)B001283	6.375e-01	8.376e-01	0.761	0.446657	
as.factor(BioID)B001284	-8.780e-02	1.369e-01	-0.641	0.521345	
as.factor(BioID)B001285	7.332e-01	4.363e-01	1.680	0.093066	.
as.factor(BioID)B001286	6.132e-01	5.941e-01	1.032	0.302164	
as.factor(BioID)B001287	5.997e-01	6.272e-01	0.956	0.339183	
as.factor(BioID)B001289	4.760e-01	6.878e-01	0.692	0.488964	
as.factor(BioID)B001290	9.766e-01	1.402e+00	0.697	0.486088	
as.factor(BioID)B001291	6.467e-01	8.609e-01	0.751	0.452592	
as.factor(BioID)B001292	9.506e-01	1.074e-01	8.854	< 2e-16	***
as.factor(BioID)B001293	9.762e-02	1.306e-01	0.747	0.454885	
as.factor(BioID)B001294	3.979e-01	7.320e-01	0.544	0.586838	
as.factor(BioID)B001295	-7.761e-02	1.662e-01	-0.467	0.640633	
as.factor(BioID)B001296	9.878e-01	7.442e-02	13.273	< 2e-16	***
as.factor(BioID)B001297	6.566e-01	1.036e+00	0.634	0.526328	
as.factor(BioID)B001298	-2.137e-01	2.870e-01	-0.745	0.456654	
as.factor(BioID)B001299	5.247e-01	7.037e-01	0.746	0.455966	
as.factor(BioID)B001300	1.232e+00	3.219e-01	3.827	0.000135	***
as.factor(BioID)B001301	7.741e-02	1.093e-01	0.708	0.478809	
as.factor(BioID)B001302	1.096e+00	1.700e+00	0.645	0.519207	
as.factor(BioID)B001303	9.115e-01	1.495e-01	6.096	1.35e-09	***
as.factor(BioID)B001304	8.628e-01	2.151e-01	4.011	6.31e-05	***
as.factor(BioID)B001306	1.690e-01	2.924e-01	0.578	0.563454	
as.factor(BioID)B001307	3.194e-01	7.486e-01	0.427	0.669619	
as.factor(BioID)B001309	6.926e-01	1.090e+00	0.635	0.525381	
as.factor(BioID)C000059	-2.489e-01	4.859e-01	-0.512	0.608526	
as.factor(BioID)C000266	1.609e-01	2.671e-01	0.602	0.546992	
as.factor(BioID)C000537	1.018e+00	2.385e-01	4.268	2.08e-05	***
as.factor(BioID)C000714	1.478e+00	6.385e-01	2.315	0.020723	*
as.factor(BioID)C000754	2.983e-01	1.178e+00	0.253	0.800092	
as.factor(BioID)C000984	9.303e-01	3.409e-01	2.729	0.006414	**
as.factor(BioID)C001036	8.866e-01	3.224e-01	2.750	0.006017	**
as.factor(BioID)C001037	1.234e+00	3.282e-01	3.761	0.000175	***
as.factor(BioID)C001038	8.764e-01	3.928e-01	2.231	0.025813	*
as.factor(BioID)C001045	-1.558e-01	2.771e-01	-0.562	0.573994	
as.factor(BioID)C001048	2.141e-01	2.752e-01	0.778	0.436807	
as.factor(BioID)C001051	2.591e-01	4.503e-01	0.575	0.565127	
as.factor(BioID)C001053	-1.466e-01	2.099e-01	-0.698	0.484973	
as.factor(BioID)C001055	5.298e-01	6.905e-01	0.767	0.442984	
as.factor(BioID)C001059	2.236e-01	5.076e-01	0.440	0.659640	
as.factor(BioID)C001061	9.836e-01	2.488e-01	3.954	8.01e-05	***
as.factor(BioID)C001063	9.104e-02	3.411e-01	0.267	0.789600	

as.factor(BioID)C001066	9.899e-01	1.818e-01	5.444	5.97e-08	***
as.factor(BioID)C001067	1.431e+00	5.774e-01	2.479	0.013282	*
as.factor(BioID)C001068	9.979e-01	6.732e-02	14.824	< 2e-16	***
as.factor(BioID)C001069	7.738e-01	4.448e-01	1.739	0.082147	.
as.factor(BioID)C001072	9.694e-01	2.146e-01	4.517	6.72e-06	***
as.factor(BioID)C001076	5.610e-01	7.541e-01	0.744	0.457020	
as.factor(BioID)C001077	4.009e-01	2.396e-01	1.673	0.094546	.
as.factor(BioID)C001078	7.230e-01	4.880e-01	1.481	0.138691	
as.factor(BioID)C001080	1.242e+00	3.885e-01	3.197	0.001415	**
as.factor(BioID)C001083	6.894e-01	5.014e-01	1.375	0.169352	
as.factor(BioID)C001084	9.962e-01	7.725e-02	12.896	< 2e-16	***
as.factor(BioID)C001087	1.692e-01	2.789e-01	0.607	0.544104	
as.factor(BioID)C001090	8.328e-01	3.251e-01	2.562	0.010506	*
as.factor(BioID)C001091	9.797e-01	1.153e-01	8.498	< 2e-16	***
as.factor(BioID)C001092	-5.578e-02	1.187e-01	-0.470	0.638551	
as.factor(BioID)C001093	4.446e-01	5.825e-01	0.763	0.445383	
as.factor(BioID)C001094	-4.001e-02	9.621e-02	-0.416	0.677522	
as.factor(BioID)C001097	9.352e-01	2.056e-01	4.549	5.77e-06	***
as.factor(BioID)C001101	1.233e+00	3.845e-01	3.206	0.001370	**
as.factor(BioID)C001103	4.257e-01	6.520e-01	0.653	0.513888	
as.factor(BioID)C001105	-1.460e-01	2.606e-01	-0.560	0.575356	
as.factor(BioID)C001106	2.487e-01	6.243e-01	0.398	0.690415	
as.factor(BioID)C001107	6.283e-01	5.329e-01	1.179	0.238592	
as.factor(BioID)C001108	3.717e-01	4.907e-01	0.757	0.448877	
as.factor(BioID)C001109	3.068e-01	8.322e-01	0.369	0.712428	
as.factor(BioID)C001110	8.249e-01	2.542e-01	3.245	0.001199	**
as.factor(BioID)C001111	6.277e-01	5.398e-01	1.163	0.245025	
as.factor(BioID)C001112	8.138e-01	2.807e-01	2.900	0.003784	**
as.factor(BioID)C001114	1.272e-01	2.118e-01	0.600	0.548347	
as.factor(BioID)C001117	1.700e+00	1.173e+00	1.450	0.147377	
as.factor(BioID)C001118	7.408e-01	1.075e+00	0.689	0.490889	
as.factor(BioID)C001119	9.525e-01	4.589e-01	2.076	0.038083	*
as.factor(BioID)C001120	1.705e-01	3.315e-01	0.514	0.607062	
as.factor(BioID)C001121	8.885e-01	1.978e-01	4.493	7.51e-06	***
as.factor(BioID)D000096	1.085e+00	1.703e-01	6.373	2.39e-10	***
as.factor(BioID)D000191	7.777e-01	6.986e-01	1.113	0.265797	
as.factor(BioID)D000197	9.870e-01	1.502e-01	6.570	6.67e-11	***
as.factor(BioID)D000216	8.229e-01	5.138e-01	1.602	0.109430	
as.factor(BioID)D000399	9.146e-01	2.266e-01	4.036	5.69e-05	***
as.factor(BioID)D000482	6.789e-01	6.473e-01	1.049	0.294414	
as.factor(BioID)D000533	3.423e-01	4.608e-01	0.743	0.457670	
as.factor(BioID)D000598	7.580e-01	4.841e-01	1.566	0.117539	
as.factor(BioID)D000600	-3.345e-01	5.667e-01	-0.590	0.555155	

as.factor(BioID)D000604	-4.104e-01	6.996e-01	-0.587	0.557587	
as.factor(BioID)D000610	9.271e-01	1.925e-01	4.815	1.61e-06	***
as.factor(BioID)D000612	-1.840e-01	2.926e-01	-0.629	0.529413	
as.factor(BioID)D000614	2.085e-01	2.442e-01	0.854	0.393187	
as.factor(BioID)D000615	6.060e-01	7.892e-01	0.768	0.442632	
as.factor(BioID)D000616	3.292e-01	3.990e-01	0.825	0.409381	
as.factor(BioID)D000617	7.671e-01	3.495e-01	2.195	0.028324	*
as.factor(BioID)D000619	-2.580e-01	3.733e-01	-0.691	0.489573	
as.factor(BioID)D000620	6.975e-01	4.991e-01	1.398	0.162427	
as.factor(BioID)D000621	5.564e-01	7.148e-01	0.778	0.436453	
as.factor(BioID)D000623	1.357e+00	5.975e-01	2.270	0.023311	*
as.factor(BioID)D000624	1.024e+00	7.714e-02	13.277	< 2e-16	***
as.factor(BioID)D000625	-3.736e-01	5.592e-01	-0.668	0.504170	
as.factor(BioID)D000626	6.418e-01	9.693e-01	0.662	0.507972	
as.factor(BioID)D000627	8.015e-01	3.279e-01	2.445	0.014604	*
as.factor(BioID)D000628	3.289e-01	5.829e-01	0.564	0.572629	
as.factor(BioID)D000629	8.016e-01	2.885e-01	2.779	0.005514	**
as.factor(BioID)D000630	7.251e-01	3.700e-01	1.960	0.050210	.
as.factor(BioID)D000631	1.104e+00	1.543e-01	7.154	1.25e-12	***
as.factor(BioID)E000179	7.901e-01	5.958e-01	1.326	0.185036	
as.factor(BioID)E000215	8.663e-01	2.437e-01	3.554	0.000389	***
as.factor(BioID)E000288	1.411e+00	6.926e-01	2.037	0.041811	*
as.factor(BioID)E000290	1.364e+00	4.854e-01	2.809	0.005026	**
as.factor(BioID)E000291	8.557e-02	1.824e-01	0.469	0.638955	
as.factor(BioID)E000293	7.936e-01	3.510e-01	2.261	0.023898	*
as.factor(BioID)E000294	1.168e-01	1.672e-01	0.698	0.484990	
as.factor(BioID)E000296	1.150e+00	2.116e-01	5.434	6.33e-08	***
as.factor(BioID)E000297	1.436e+00	6.448e-01	2.228	0.026037	*
as.factor(BioID)E000298	4.970e-01	6.795e-01	0.731	0.464587	
as.factor(BioID)E000299	1.242e+00	4.701e-01	2.642	0.008318	**
as.factor(BioID)F000030	9.886e-01	2.867e-01	3.448	0.000578	***
as.factor(BioID)F000372	-3.319e-01	5.801e-01	-0.572	0.567219	
as.factor(BioID)F000448	6.514e-01	8.078e-01	0.806	0.420171	
as.factor(BioID)F000449	-3.093e-01	5.526e-01	-0.560	0.575795	
as.factor(BioID)F000450	4.186e-01	5.350e-01	0.782	0.434066	
as.factor(BioID)F000451	-4.286e-01	6.539e-01	-0.655	0.512265	
as.factor(BioID)F000454	6.277e-01	5.340e-01	1.175	0.239968	
as.factor(BioID)F000455	1.333e+00	4.124e-01	3.232	0.001252	**
as.factor(BioID)F000456	3.481e-01	3.911e-01	0.890	0.373537	
as.factor(BioID)F000458	2.807e-01	3.492e-01	0.804	0.421580	
as.factor(BioID)F000459	1.518e-01	3.104e-01	0.489	0.624869	
as.factor(BioID)F000460	2.601e-01	2.926e-01	0.889	0.374166	
as.factor(BioID)F000461	4.140e-01	5.811e-01	0.712	0.476303	

as.factor(BioID)F000462	9.547e-01	1.467e-01	6.506	1.02e-10	***
as.factor(BioID)F000464	5.837e-01	5.859e-01	0.996	0.319259	
as.factor(BioID)F000465	4.739e-01	6.952e-01	0.682	0.495532	
as.factor(BioID)F000466	4.614e-01	7.534e-01	0.612	0.540311	
as.factor(BioID)F000468	1.456e+00	1.072e+00	1.358	0.174580	
as.factor(BioID)G000289	-1.572e-02	4.422e-01	-0.036	0.971640	
as.factor(BioID)G000377	-9.012e-02	2.725e-01	-0.331	0.740941	
as.factor(BioID)G000410	5.453e-01	3.361e-01	1.622	0.104903	
as.factor(BioID)G000535	1.062e+00	2.194e-01	4.839	1.42e-06	***
as.factor(BioID)G000546	4.766e-04	1.815e-01	0.003	0.997905	
as.factor(BioID)G000548	5.651e-01	7.468e-01	0.757	0.449280	
as.factor(BioID)G000551	1.391e+00	5.079e-01	2.739	0.006224	**
as.factor(BioID)G000552	5.511e-01	7.901e-01	0.698	0.485555	
as.factor(BioID)G000553	1.076e+00	1.050e-01	10.248	< 2e-16	***
as.factor(BioID)G000556	1.038e+00	2.292e-01	4.531	6.30e-06	***
as.factor(BioID)G000558	7.308e-02	1.122e-01	0.651	0.515021	
as.factor(BioID)G000559	7.477e-01	4.238e-01	1.764	0.077846	.
as.factor(BioID)G000560	5.860e-01	7.291e-01	0.804	0.421731	
as.factor(BioID)G000563	2.146e-01	3.175e-01	0.676	0.499276	
as.factor(BioID)G000565	7.561e-01	1.152e+00	0.657	0.511552	
as.factor(BioID)G000566	4.747e-01	5.806e-01	0.818	0.413715	
as.factor(BioID)G000568	3.276e-01	5.016e-01	0.653	0.513779	
as.factor(BioID)G000571	7.766e-01	3.066e-01	2.533	0.011401	*
as.factor(BioID)G000574	1.009e+00	6.694e-02	15.077	< 2e-16	***
as.factor(BioID)G000576	4.656e-01	6.682e-01	0.697	0.486050	
as.factor(BioID)G000577	3.445e-02	8.413e-02	0.409	0.682240	
as.factor(BioID)G000578	9.713e-01	1.137e+00	0.854	0.393001	
as.factor(BioID)G000579	5.276e-02	8.286e-02	0.637	0.524381	
as.factor(BioID)G000581	9.890e-01	7.218e-01	1.370	0.170834	
as.factor(BioID)G000583	5.296e-01	6.274e-01	0.844	0.398776	
as.factor(BioID)G000584	6.651e-02	1.076e-01	0.618	0.536398	
as.factor(BioID)G000585	1.386e+00	6.192e-01	2.238	0.025341	*
as.factor(BioID)G000586	1.389e+00	1.017e+00	1.366	0.172201	
as.factor(BioID)G000587	2.003e+00	1.545e+00	1.297	0.194968	
as.factor(BioID)G000588	-2.344e-01	3.407e-01	-0.688	0.491421	
as.factor(BioID)G000589	7.469e-01	1.026e+00	0.728	0.466672	
as.factor(BioID)G000590	5.633e-01	7.602e-01	0.741	0.458836	
as.factor(BioID)G000591	2.923e-01	4.204e-01	0.695	0.486986	
as.factor(BioID)G000592	5.063e-01	6.447e-01	0.785	0.432352	
as.factor(BioID)H000324	1.184e+00	3.170e-01	3.736	0.000193	***
as.factor(BioID)H000636	7.849e-01	4.386e-01	1.789	0.073728	.
as.factor(BioID)H000874	7.461e-01	6.716e-01	1.111	0.266815	
as.factor(BioID)H001034	1.317e+00	4.579e-01	2.875	0.004087	**

as.factor(BioID)H001036	5.246e-01	6.453e-01	0.813	0.416378	
as.factor(BioID)H001038	7.742e-01	4.627e-01	1.673	0.094488	.
as.factor(BioID)H001045	7.804e-02	2.405e-01	0.324	0.745618	
as.factor(BioID)H001047	6.531e-01	5.035e-01	1.297	0.194738	
as.factor(BioID)H001048	2.388e-01	2.831e-01	0.843	0.399103	
as.factor(BioID)H001050	8.691e-01	3.153e-01	2.756	0.005911	**
as.factor(BioID)H001051	1.030e-01	6.184e-01	0.167	0.867765	
as.factor(BioID)H001052	6.475e-01	9.477e-01	0.683	0.494545	
as.factor(BioID)H001053	1.790e-01	2.472e-01	0.724	0.468990	
as.factor(BioID)H001055	-1.892e-01	4.296e-01	-0.440	0.659706	
as.factor(BioID)H001056	-1.637e-01	2.786e-01	-0.588	0.556794	
as.factor(BioID)H001057	8.569e-01	1.252e+00	0.685	0.493715	
as.factor(BioID)H001058	2.273e-01	2.625e-01	0.866	0.386672	
as.factor(BioID)H001059	1.388e-01	1.594e-01	0.871	0.384025	
as.factor(BioID)H001063	1.065e+00	1.906e-01	5.590	2.65e-08	***
as.factor(BioID)H001064	8.047e-01	3.131e-01	2.570	0.010256	*
as.factor(BioID)H001066	8.925e-01	1.870e-01	4.774	1.96e-06	***
as.factor(BioID)H001067	2.873e-01	3.747e-01	0.767	0.443353	
as.factor(BioID)H001068	1.203e+00	4.719e-01	2.549	0.010885	*
as.factor(BioID)H001071	8.905e-01	1.265e+00	0.704	0.481657	
as.factor(BioID)H001072	1.400e-01	2.570e-01	0.545	0.586149	
as.factor(BioID)H001073	-1.773e-01	2.835e-01	-0.625	0.531817	
as.factor(BioID)H001074	8.323e-02	2.237e-01	0.372	0.709925	
as.factor(BioID)H001077	5.720e-01	8.706e-01	0.657	0.511281	
as.factor(BioID)H001078	2.935e-01	4.891e-01	0.600	0.548553	
as.factor(BioID)H001081	8.507e-01	2.269e-01	3.750	0.000183	***
as.factor(BioID)H001085	8.381e-01	2.718e-01	3.083	0.002082	**
as.factor(BioID)H001088	2.790e-01	5.299e-01	0.527	0.598593	
as.factor(BioID)H001090	1.093e+00	4.949e-01	2.208	0.027346	*
as.factor(BioID)I000056	2.941e-02	2.995e-01	0.098	0.921790	
as.factor(BioID)I000057	7.197e-01	5.673e-01	1.269	0.204693	
as.factor(BioID)J000032	9.635e-01	3.268e-01	2.949	0.003235	**
as.factor(BioID)J000126	1.030e+00	2.673e-01	3.854	0.000121	***
as.factor(BioID)J000174	3.139e-01	4.132e-01	0.760	0.447585	
as.factor(BioID)J000288	1.054e+00	1.767e-01	5.968	2.93e-09	***
as.factor(BioID)J000289	6.433e-01	8.549e-01	0.752	0.451908	
as.factor(BioID)J000290	1.827e-01	2.173e-01	0.841	0.400674	
as.factor(BioID)J000292	1.026e-01	1.373e-01	0.748	0.454823	
as.factor(BioID)J000294	1.151e+00	1.748e-01	6.584	6.11e-11	***
as.factor(BioID)J000295	-2.433e-01	3.438e-01	-0.708	0.479212	
as.factor(BioID)J000297	-1.003e-01	1.936e-01	-0.518	0.604664	
as.factor(BioID)J000298	1.668e+00	1.083e+00	1.540	0.123691	
as.factor(BioID)J000299	3.319e-01	4.155e-01	0.799	0.424557	

as.factor(BioID)J000301	1.705e-01	2.779e-01	0.614	0.539571	
as.factor(BioID)J000302	3.401e-01	4.495e-01	0.757	0.449329	
as.factor(BioID)K000009	6.540e-01	7.568e-01	0.864	0.387636	
as.factor(BioID)K000188	5.346e-01	8.185e-01	0.653	0.513730	
as.factor(BioID)K000210	-5.163e-01	9.576e-01	-0.539	0.589860	
as.factor(BioID)K000362	3.434e-01	4.724e-01	0.727	0.467448	
as.factor(BioID)K000363	1.252e-01	1.760e-01	0.712	0.476811	
as.factor(BioID)K000368	4.463e-01	8.659e-01	0.515	0.606331	
as.factor(BioID)K000375	8.183e-01	3.102e-01	2.638	0.008421	**
as.factor(BioID)K000376	2.703e-02	1.874e-01	0.144	0.885335	
as.factor(BioID)K000378	-2.805e-01	3.788e-01	-0.741	0.459072	
as.factor(BioID)K000379	1.061e+00	1.119e-01	9.480	< 2e-16	***
as.factor(BioID)K000380	9.394e-01	1.206e-01	7.790	1.17e-14	***
as.factor(BioID)K000381	7.569e-01	4.256e-01	1.778	0.075514	.
as.factor(BioID)K000382	6.727e-01	4.918e-01	1.368	0.171504	
as.factor(BioID)K000385	1.092e+00	1.161e-01	9.409	< 2e-16	***
as.factor(BioID)K000386	5.039e-01	7.555e-01	0.667	0.504817	
as.factor(BioID)K000387	3.545e-01	1.003e-01	3.533	0.000422	***
as.factor(BioID)K000388	5.664e-01	8.257e-01	0.686	0.492842	
as.factor(BioID)K000389	1.285e+00	4.640e-01	2.768	0.005696	**
as.factor(BioID)K000390	1.049e+00	1.745e-01	6.012	2.25e-09	***
as.factor(BioID)K000391	8.099e-01	2.892e-01	2.800	0.005162	**
as.factor(BioID)K000392	3.987e-01	6.722e-01	0.593	0.553193	
as.factor(BioID)K000394	9.987e-01	2.177e-01	4.587	4.83e-06	***
as.factor(BioID)K000395	2.566e-01	4.049e-01	0.634	0.526284	
as.factor(BioID)L000263	7.145e-01	7.100e-01	1.006	0.314364	
as.factor(BioID)L000287	1.210e+00	3.670e-01	3.296	0.001002	**
as.factor(BioID)L000397	9.338e-01	1.332e-01	7.009	3.47e-12	***
as.factor(BioID)L000480	7.741e-01	5.744e-01	1.348	0.177945	
as.factor(BioID)L000491	-1.364e-01	2.395e-01	-0.570	0.568956	
as.factor(BioID)L000551	1.614e+00	8.974e-01	1.799	0.072187	.
as.factor(BioID)L000554	-5.104e-01	8.502e-01	-0.600	0.548364	
as.factor(BioID)L000557	8.291e-01	4.541e-01	1.826	0.068055	.
as.factor(BioID)L000559	8.290e-01	3.883e-01	2.135	0.032894	*
as.factor(BioID)L000560	8.346e-01	3.446e-01	2.422	0.015544	*
as.factor(BioID)L000562	7.399e-01	5.420e-01	1.365	0.172440	
as.factor(BioID)L000563	5.759e-01	6.583e-01	0.875	0.381799	
as.factor(BioID)L000564	5.508e-01	7.363e-01	0.748	0.454480	
as.factor(BioID)L000565	6.245e-01	6.273e-01	0.996	0.319563	
as.factor(BioID)L000566	2.357e-01	3.163e-01	0.745	0.456359	
as.factor(BioID)L000567	1.073e-01	2.361e-01	0.454	0.649722	
as.factor(BioID)L000569	1.050e-01	1.404e-01	0.748	0.454654	
as.factor(BioID)L000573	8.644e-01	1.328e+00	0.651	0.515155	

as.factor(BioID)L000576	3.327e-01	4.531e-01	0.734	0.462905	
as.factor(BioID)L000578	2.466e-01	2.888e-01	0.854	0.393314	
as.factor(BioID)L000579	1.195e+00	3.676e-01	3.252	0.001168	**
as.factor(BioID)L000580	7.770e-01	3.864e-01	2.011	0.044523	*
as.factor(BioID)L000581	1.072e+00	9.077e-02	11.805	< 2e-16	***
as.factor(BioID)L000582	9.867e-01	1.083e-01	9.112	< 2e-16	***
as.factor(BioID)L000583	5.552e-01	7.167e-01	0.775	0.438642	
as.factor(BioID)L000584	2.868e-01	3.523e-01	0.814	0.415723	
as.factor(BioID)L000585	1.487e-01	2.565e-01	0.580	0.562201	
as.factor(BioID)L000586	6.942e-01	4.469e-01	1.553	0.120522	
as.factor(BioID)L000587	2.630e-01	4.141e-01	0.635	0.525455	
as.factor(BioID)L000588	4.858e-01	6.800e-01	0.714	0.475039	
as.factor(BioID)L000590	7.496e-01	3.534e-01	2.121	0.034079	*
as.factor(BioID)L000591	7.213e-01	3.944e-01	1.829	0.067622	.
as.factor(BioID)L000592	1.356e+00	7.593e-01	1.786	0.074342	.
as.factor(BioID)L000593	8.874e-01	1.705e-01	5.205	2.17e-07	***
as.factor(BioID)M000087	8.536e-01	3.450e-01	2.474	0.013442	*
as.factor(BioID)M000312	1.216e+00	2.922e-01	4.164	3.29e-05	***
as.factor(BioID)M000404	1.397e+00	5.144e-01	2.715	0.006700	**
as.factor(BioID)M000689	-4.311e-02	3.732e-01	-0.116	0.908041	
as.factor(BioID)M001137	8.611e-01	4.269e-01	2.017	0.043843	*
as.factor(BioID)M001143	9.512e-01	2.045e-01	4.651	3.56e-06	***
as.factor(BioID)M001144	4.198e-01	5.071e-01	0.828	0.407866	
as.factor(BioID)M001150	-2.466e-01	5.551e-01	-0.444	0.656872	
as.factor(BioID)M001151	-3.511e-01	5.854e-01	-0.600	0.548703	
as.factor(BioID)M001156	1.953e-01	2.433e-01	0.803	0.422255	
as.factor(BioID)M001157	-2.837e-02	1.728e-01	-0.164	0.869629	
as.factor(BioID)M001158	3.677e-01	4.508e-01	0.816	0.414871	
as.factor(BioID)M001159	-8.448e-03	1.785e-01	-0.047	0.962258	
as.factor(BioID)M001160	1.241e+00	3.132e-01	3.962	7.76e-05	***
as.factor(BioID)M001163	9.961e-01	1.380e-01	7.218	7.98e-13	***
as.factor(BioID)M001165	1.390e-01	1.248e-01	1.113	0.265704	
as.factor(BioID)M001166	6.524e-01	5.329e-01	1.224	0.221051	
as.factor(BioID)M001177	6.634e-01	9.690e-01	0.685	0.493647	
as.factor(BioID)M001180	-2.142e-01	3.366e-01	-0.636	0.524730	
as.factor(BioID)M001181	-9.695e-02	6.663e-01	-0.145	0.884340	
as.factor(BioID)M001182	9.187e-01	1.393e+00	0.659	0.509771	
as.factor(BioID)M001184	8.005e-01	1.331e+00	0.601	0.547683	
as.factor(BioID)M001187	4.582e-01	6.275e-01	0.730	0.465368	
as.factor(BioID)M001188	9.715e-01	8.646e-02	11.237	< 2e-16	***
as.factor(BioID)M001189	3.293e-01	4.054e-01	0.812	0.416688	
as.factor(BioID)M001191	4.900e-01	7.786e-01	0.629	0.529245	
as.factor(BioID)M001193	-3.456e-01	4.801e-01	-0.720	0.471761	

as.factor(BioID)M001194	1.276e-01	1.872e-01	0.681	0.495689	
as.factor(BioID)M001195	3.893e-01	5.633e-01	0.691	0.489653	
as.factor(BioID)M001196	7.175e-01	4.426e-01	1.621	0.105195	
as.factor(BioID)M001199	1.233e+00	4.605e-01	2.677	0.007499	**
as.factor(BioID)M001200	9.306e-01	1.572e-01	5.919	3.92e-09	***
as.factor(BioID)M001201	1.245e-01	3.101e-01	0.401	0.688144	
as.factor(BioID)M001202	5.035e-01	6.966e-01	0.723	0.469891	
as.factor(BioID)M001203	7.544e-01	3.516e-01	2.146	0.032049	*
as.factor(BioID)M001204	2.771e-01	4.727e-01	0.586	0.557871	
as.factor(BioID)M001205	2.741e-01	3.967e-01	0.691	0.489635	
as.factor(BioID)M001206	8.726e-01	1.991e-01	4.382	1.25e-05	***
as.factor(BioID)M001208	9.129e-01	1.996e-01	4.573	5.17e-06	***
as.factor(BioID)N000002	1.170e+00	2.444e-01	4.788	1.83e-06	***
as.factor(BioID)N000015	8.150e-01	5.623e-01	1.449	0.147410	
as.factor(BioID)N000127	1.032e+00	1.911e-01	5.398	7.71e-08	***
as.factor(BioID)N000179	1.020e+00	1.464e-01	6.970	4.54e-12	***
as.factor(BioID)N000181	5.610e-02	1.049e-01	0.535	0.592782	
as.factor(BioID)N000182	4.855e-01	6.370e-01	0.762	0.446055	
as.factor(BioID)N000184	4.694e-02	1.494e-01	0.314	0.753399	
as.factor(BioID)N000185	1.489e-01	1.641e-01	0.907	0.364447	
as.factor(BioID)N000188	1.113e+00	2.387e-01	4.663	3.37e-06	***
as.factor(BioID)N000189	-9.107e-02	1.943e-01	-0.469	0.639347	
as.factor(BioID)N000190	1.063e+00	1.570e+00	0.677	0.498514	
as.factor(BioID)N000191	1.053e+00	2.013e-01	5.234	1.87e-07	***
as.factor(BioID)O000168	3.666e-01	4.894e-01	0.749	0.453945	
as.factor(BioID)O000170	8.373e-01	2.147e-01	3.900	0.000100	***
as.factor(BioID)O000171	6.068e-01	5.431e-01	1.117	0.264046	
as.factor(BioID)O000172	1.133e+00	8.095e-01	1.400	0.161723	
as.factor(BioID)O000173	1.132e+00	8.088e-01	1.399	0.162007	
as.factor(BioID)P000034	7.725e-01	5.657e-01	1.366	0.172240	
as.factor(BioID)P000096	7.353e-01	6.113e-01	1.203	0.229167	
as.factor(BioID)P000197	9.905e-01	3.788e-01	2.615	0.009004	**
as.factor(BioID)P000258	-2.565e-01	6.557e-01	-0.391	0.695664	
as.factor(BioID)P000373	1.242e-01	3.313e-01	0.375	0.707856	
as.factor(BioID)P000523	6.263e-01	8.217e-01	0.762	0.446098	
as.factor(BioID)P000588	6.153e-02	1.841e-01	0.334	0.738239	
as.factor(BioID)P000591	4.422e-01	5.259e-01	0.841	0.400602	
as.factor(BioID)P000592	3.085e-01	3.718e-01	0.830	0.406880	
as.factor(BioID)P000593	6.648e-01	5.638e-01	1.179	0.238540	
as.factor(BioID)P000594	-7.451e-03	9.019e-02	-0.083	0.934169	
as.factor(BioID)P000597	1.089e+00	1.862e-01	5.850	5.90e-09	***
as.factor(BioID)P000598	9.198e-01	3.289e-01	2.796	0.005229	**
as.factor(BioID)P000599	3.227e-01	4.809e-01	0.671	0.502302	

as.factor(BioID)P000601	3.902e-01	6.314e-01	0.618	0.536690	
as.factor(BioID)P000602	5.661e-01	7.249e-01	0.781	0.434918	
as.factor(BioID)P000604	1.218e+00	2.604e-01	4.679	3.11e-06	***
as.factor(BioID)P000605	7.104e-01	1.088e+00	0.653	0.514000	
as.factor(BioID)P000606	4.213e-01	6.266e-01	0.672	0.501471	
as.factor(BioID)P000607	1.437e+00	7.783e-01	1.847	0.064912	.
as.factor(BioID)P000608	5.064e-01	7.643e-01	0.663	0.507682	
as.factor(BioID)P000609	5.876e-01	7.908e-01	0.743	0.457565	
as.factor(BioID)P000611	-5.958e-02	1.259e-01	-0.473	0.636071	
as.factor(BioID)P000613	7.746e-01	3.245e-01	2.387	0.017095	*
as.factor(BioID)P000614	7.642e-01	3.415e-01	2.238	0.025352	*
as.factor(BioID)P000615	2.663e-01	4.073e-01	0.654	0.513307	
as.factor(BioID)P000616	7.926e-01	2.939e-01	2.697	0.007075	**
as.factor(BioID)P000617	1.233e+00	8.861e-01	1.391	0.164307	
as.factor(BioID)P000618	7.112e-01	3.919e-01	1.815	0.069721	.
as.factor(BioID)Q000023	8.438e-01	2.309e-01	3.655	0.000265	***
as.factor(BioID)R000053	1.112e+00	2.616e-01	4.250	2.25e-05	***
as.factor(BioID)R000395	-3.627e-01	7.648e-01	-0.474	0.635360	
as.factor(BioID)R000409	3.855e-01	5.072e-01	0.760	0.447393	
as.factor(BioID)R000435	1.658e-01	8.756e-01	0.189	0.849822	
as.factor(BioID)R000486	9.836e-01	3.086e-01	3.187	0.001462	**
as.factor(BioID)R000487	4.672e-01	6.005e-01	0.778	0.436663	
as.factor(BioID)R000515	1.016e+00	2.678e-01	3.794	0.000153	***
as.factor(BioID)R000575	-4.176e-02	8.241e-02	-0.507	0.612454	
as.factor(BioID)R000576	6.842e-01	5.440e-01	1.258	0.208612	
as.factor(BioID)R000577	9.442e-01	1.784e-01	5.293	1.36e-07	***
as.factor(BioID)R000578	-1.100e-01	6.974e-01	-0.158	0.874714	
as.factor(BioID)R000580	2.158e-01	2.409e-01	0.896	0.370568	
as.factor(BioID)R000582	1.011e-01	1.583e-01	0.638	0.523269	
as.factor(BioID)R000583	5.437e-02	1.735e-01	0.313	0.754083	
as.factor(BioID)R000585	-1.624e-01	5.162e-01	-0.315	0.753124	
as.factor(BioID)R000586	-2.336e-02	1.268e-01	-0.184	0.853806	
as.factor(BioID)R000587	5.127e-01	7.169e-01	0.715	0.474619	
as.factor(BioID)R000588	1.248e+00	3.732e-01	3.343	0.000846	***
as.factor(BioID)R000591	1.039e-01	4.301e-01	0.242	0.809066	
as.factor(BioID)R000592	4.174e-01	5.488e-01	0.761	0.447051	
as.factor(BioID)R000593	2.504e-01	2.964e-01	0.845	0.398242	
as.factor(BioID)R000597	3.643e-01	5.042e-01	0.723	0.470083	
as.factor(BioID)R000598	1.871e-01	1.938e-01	0.966	0.334428	
as.factor(BioID)R000599	6.407e-01	5.607e-01	1.143	0.253266	
as.factor(BioID)R000601	6.249e-01	8.422e-01	0.742	0.458181	
as.factor(BioID)R000602	7.122e-01	4.538e-01	1.569	0.116750	
as.factor(BioID)R000603	3.983e-01	5.876e-01	0.678	0.498025	

as.factor(BioID)R000604	1.932e-01	2.674e-01	0.722	0.470225	
as.factor(BioID)R000606	1.318e+00	5.016e-01	2.627	0.008699	**
as.factor(BioID)R000607	1.367e+00	7.159e-01	1.910	0.056292	.
as.factor(BioID)R000609	4.731e-02	8.260e-02	0.573	0.566909	
as.factor(BioID)R000610	8.893e-02	1.425e-01	0.624	0.532643	
as.factor(BioID)R000612	5.890e-01	8.319e-01	0.708	0.479033	
as.factor(BioID)R000614	1.079e+00	1.700e+00	0.635	0.525632	
as.factor(BioID)S000018	6.015e-01	7.951e-01	0.757	0.449437	
as.factor(BioID)S000030	7.628e-01	5.958e-01	1.280	0.200617	
as.factor(BioID)S000051	1.280e+00	1.268e+00	1.010	0.312721	
as.factor(BioID)S000185	8.816e-01	5.081e-01	1.735	0.082937	.
as.factor(BioID)S000248	1.078e+00	2.038e-01	5.289	1.39e-07	***
as.factor(BioID)S000250	2.650e-01	3.511e-01	0.755	0.450517	
as.factor(BioID)S000344	7.372e-01	5.274e-01	1.398	0.162371	
as.factor(BioID)S000364	-1.831e-01	4.312e-01	-0.425	0.671116	
as.factor(BioID)S000480	9.062e-01	5.131e-01	1.766	0.077561	.
as.factor(BioID)S000510	6.266e-01	6.512e-01	0.962	0.336070	
as.factor(BioID)S000522	-8.859e-02	1.155e+00	-0.077	0.938857	
as.factor(BioID)S000583	-1.892e-01	6.391e-01	-0.296	0.767249	
as.factor(BioID)S001145	1.354e+00	4.665e-01	2.903	0.003744	**
as.factor(BioID)S001148	-2.664e-01	4.401e-01	-0.605	0.545070	
as.factor(BioID)S001150	7.808e-01	4.328e-01	1.804	0.071385	.
as.factor(BioID)S001154	-7.223e-02	1.807e-01	-0.400	0.689407	
as.factor(BioID)S001156	1.141e+00	1.950e-01	5.852	5.84e-09	***
as.factor(BioID)S001157	7.160e-01	4.820e-01	1.485	0.137636	
as.factor(BioID)S001165	9.160e-01	2.496e-01	3.670	0.000250	***
as.factor(BioID)S001168	1.055e+00	1.455e-01	7.248	6.42e-13	***
as.factor(BioID)S001170	7.947e-01	3.589e-01	2.214	0.026941	*
as.factor(BioID)S001172	2.096e-01	2.848e-01	0.736	0.461859	
as.factor(BioID)S001175	1.009e+00	1.225e-01	8.238	3.47e-16	***
as.factor(BioID)S001176	3.089e-01	3.570e-01	0.865	0.387140	
as.factor(BioID)S001180	4.694e-01	8.332e-01	0.563	0.573261	
as.factor(BioID)S001183	3.579e-01	5.090e-01	0.703	0.482107	
as.factor(BioID)S001185	1.077e+00	2.204e-01	4.888	1.12e-06	***
as.factor(BioID)S001187	-1.683e-01	2.653e-01	-0.634	0.525932	
as.factor(BioID)S001188	6.720e-01	8.953e-01	0.751	0.452983	
as.factor(BioID)S001189	3.510e-01	5.337e-01	0.658	0.510835	
as.factor(BioID)S001190	5.525e-01	6.430e-01	0.859	0.390263	
as.factor(BioID)S001192	2.195e-01	2.862e-01	0.767	0.443256	
as.factor(BioID)S001193	8.900e-01	2.175e-01	4.092	4.48e-05	***
as.factor(BioID)S001195	4.243e-01	6.062e-01	0.700	0.484130	
as.factor(BioID)S001196	5.684e-01	3.168e-01	1.794	0.073009	.
as.factor(BioID)S001199	1.118e-01	1.720e-01	0.650	0.515827	

as.factor(BioID)S001200	9.480e-01	1.191e-01	7.962	3.10e-15	***
as.factor(BioID)S001201	6.134e-01	5.564e-01	1.102	0.270430	
as.factor(BioID)S001205	1.153e+00	2.199e-01	5.244	1.77e-07	***
as.factor(BioID)S001207	7.107e-01	3.961e-01	1.794	0.072931	.
as.factor(BioID)S001208	1.097e+00	6.173e-01	1.777	0.075715	.
as.factor(BioID)S001209	6.544e-01	4.577e-01	1.430	0.152952	
as.factor(BioID)S001211	8.294e-01	2.605e-01	3.183	0.001482	**
as.factor(BioID)S001212	-6.100e-03	1.125e-01	-0.054	0.956763	
as.factor(BioID)S001213	3.872e-02	1.059e-01	0.366	0.714596	
as.factor(BioID)S001214	7.047e-01	1.064e+00	0.662	0.507827	
as.factor(BioID)S001215	1.045e+00	2.399e-01	4.357	1.40e-05	***
as.factor(BioID)S001216	9.073e-01	3.117e-01	2.911	0.003649	**
as.factor(BioID)T000193	1.175e+00	2.403e-01	4.891	1.10e-06	***
as.factor(BioID)T000238	1.774e-01	2.422e-01	0.733	0.463889	
as.factor(BioID)T000460	8.339e-01	4.379e-01	1.904	0.057056	.
as.factor(BioID)T000462	-1.526e-01	4.616e-01	-0.330	0.741070	
as.factor(BioID)T000463	-3.271e-01	5.063e-01	-0.646	0.518318	
as.factor(BioID)T000465	9.633e-01	1.237e-01	7.789	1.17e-14	***
as.factor(BioID)T000467	-9.625e-02	1.572e-01	-0.612	0.540522	
as.factor(BioID)T000468	7.791e-01	3.267e-01	2.385	0.017203	*
as.factor(BioID)T000469	1.038e+00	8.135e-02	12.757	< 2e-16	***
as.factor(BioID)T000470	4.819e-02	1.270e-01	0.379	0.704496	
as.factor(BioID)T000472	1.192e+00	3.133e-01	3.805	0.000147	***
as.factor(BioID)T000474	8.917e-01	2.084e-01	4.279	1.98e-05	***
as.factor(BioID)T000475	-8.933e-03	1.311e-01	-0.068	0.945680	
as.factor(BioID)T000477	9.166e-02	1.293e-01	0.709	0.478391	
as.factor(BioID)T000478	9.932e-02	1.359e-01	0.731	0.465047	
as.factor(BioID)T000479	4.537e-01	6.918e-01	0.656	0.512022	
as.factor(BioID)T000480	4.692e-01	6.768e-01	0.693	0.488280	
as.factor(BioID)T000481	1.118e+00	7.989e-01	1.400	0.161819	
as.factor(BioID)T000482	1.090e+00	2.096e-01	5.202	2.21e-07	***
as.factor(BioID)U000031	2.040e-01	5.703e-01	0.358	0.720521	
as.factor(BioID)U000040	1.535e+00	9.207e-01	1.667	0.095608	.
as.factor(BioID)V000081	1.219e+00	2.968e-01	4.107	4.20e-05	***
as.factor(BioID)V000108	8.202e-01	4.870e-01	1.684	0.092328	.
as.factor(BioID)V000130	9.673e-01	1.362e-01	7.102	1.81e-12	***
as.factor(BioID)V000131	9.198e-01	2.113e-01	4.354	1.42e-05	***
as.factor(BioID)V000132	7.432e-01	2.022e-01	3.675	0.000245	***
as.factor(BioID)V000133	6.904e-01	5.099e-01	1.354	0.175945	
as.factor(BioID)W000187	1.329e+00	4.744e-01	2.802	0.005139	**
as.factor(BioID)W000413	-3.119e-01	6.407e-01	-0.487	0.626414	
as.factor(BioID)W000791	-2.921e-01	6.525e-01	-0.448	0.654441	
as.factor(BioID)W000795	1.735e-01	2.374e-01	0.731	0.465099	

```

as.factor(BioID)W000796 5.428e-01 6.878e-01 0.789 0.430156
as.factor(BioID)W000797 9.343e-01 2.338e-01 3.997 6.71e-05 ***
as.factor(BioID)W000798 1.882e-01 2.127e-01 0.885 0.376511
as.factor(BioID)W000799 6.816e-01 5.268e-01 1.294 0.195950
as.factor(BioID)W000804 7.051e-04 2.193e-01 0.003 0.997435
as.factor(BioID)W000806 2.262e-01 2.724e-01 0.831 0.406374
as.factor(BioID)W000808 1.092e+00 1.385e-01 7.884 5.66e-15 ***
as.factor(BioID)W000809 5.523e-02 3.655e-01 0.151 0.879913
as.factor(BioID)W000810 4.058e-01 5.332e-01 0.761 0.446783
as.factor(BioID)W000812 4.084e-02 1.326e-01 0.308 0.758174
as.factor(BioID)W000813 1.375e-01 2.596e-01 0.530 0.596341
as.factor(BioID)W000814 6.554e-01 8.378e-01 0.782 0.434143
as.factor(BioID)W000815 3.186e-01 4.660e-01 0.684 0.494340
as.factor(BioID)W000816 3.880e-01 4.792e-01 0.810 0.418187
as.factor(BioID)W000820 1.024e-01 1.562e-01 0.656 0.512042
as.factor(BioID)W000821 3.950e-01 6.051e-01 0.653 0.514003
as.factor(BioID)W000822 1.469e+00 6.647e-01 2.210 0.027265 *
as.factor(BioID)W000823 6.152e-01 2.022e-01 3.042 0.002387 **
as.factor(BioID)W000825 1.034e+00 2.549e-01 4.058 5.18e-05 ***
as.factor(BioID)W000826 7.930e-01 2.969e-01 2.671 0.007644 **
as.factor(BioID)Y000033 -5.183e-01 1.029e+00 -0.504 0.614502
as.factor(BioID)Y000062 9.470e-01 9.880e-02 9.585 < 2e-16 ***
as.factor(BioID)Y000063 2.520e-01 3.235e-01 0.779 0.435998
as.factor(BioID)Y000065 7.320e-01 1.073e+00 0.682 0.495104
as.factor(BioID)Y000066 NA NA NA NA
as.factor(BioID)Z000017 NA NA NA NA
seniority 1.702e-02 4.440e-02 0.383 0.701600
Contribution_minus -2.363e-07 1.713e-07 -1.380 0.167819
Contribution_plus 3.608e-06 1.128e-06 3.199 0.001407 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Residual standard error: 0.1089 on 1679 degrees of freedom

(97 observations deleted due to missingness)

Multiple R-squared: 0.9641, Adjusted R-squared: 0.9526

F-statistic: 83.85 on 537 and 1679 DF, p-value: < 2.2e-16

```

# same thing again with plm
ols_ind_fe_plm <- plm(Vote ~ nominate_dim1 + nominate_dim2 + seniority + Contribution_minus -
summary(ols_ind_fe_plm)

```

Oneway (individual) effect Within Model

Call:

```
plm(formula = Vote ~ nominate_dim1 + nominate_dim2 + seniority +  
      Contribution_minus + Contribution_plus + Dmajority, data = df_long,  
      model = "within", index = c("BioID", "Instance"))
```

Unbalanced Panel: n = 530, T = 1-6, N = 2217

Residuals:

Min.	1st Qu.	Median	3rd Qu.	Max.
-0.8253608	-0.0074503	-0.0018293	0.0085984	0.8217370

Coefficients:

	Estimate	Std. Error	t-value	Pr(> t)
seniority	1.2188e-02	3.4223e-03	3.5614	0.0003792 ***
Contribution_minus	-2.0478e-07	1.7051e-07	-1.2010	0.2299331
Contribution_plus	3.7709e-06	1.1229e-06	3.3581	0.0008022 ***
Dmajority	-8.7401e-03	9.1687e-03	-0.9533	0.3405986

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 20.367

Residual Sum of Squares: 19.975

R-Squared: 0.019211

Adj. R-Squared: -0.2914

F-statistic: 8.24141 on 4 and 1683 DF, p-value: 1.3979e-06

```
# same thing again with log
```

```
ols_ind_fe_log <- lm(Vote ~ district + party + birthday + nominate_dim1 + nominate_dim2 + as  
summary(ols_ind_fe_log)
```

Call:

```
lm(formula = Vote ~ district + party + birthday + nominate_dim1 +  
      nominate_dim2 + as.factor(Instance) + as.factor(BioID) +  
      seniority + Contribution_minus_log + Contribution_plus_log +  
      Dmajority, data = df_long_log)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.81706	-0.01092	-0.00389	0.01325	0.82121

Coefficients: (6 not defined because of singularities)

	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	14.4416138	35.5235913	0.407	0.684410	
district	-0.0565309	0.1488284	-0.380	0.704121	
partyR	-0.8613168	0.3922392	-2.196	0.028260	*
birthday	-0.0068359	0.0180078	-0.380	0.704294	
nominate_dim1	0.0785876	0.3534751	0.222	0.824090	
nominate_dim2	-0.4218651	0.9584230	-0.440	0.659884	
as.factor(Instance)4	-0.0147396	0.0569280	-0.259	0.795737	
as.factor(Instance)6	-0.0343328	0.1696859	-0.202	0.839686	
as.factor(Instance)7	-0.0621551	0.2263281	-0.275	0.783645	
as.factor(Instance)51	-0.0155064	0.1131406	-0.137	0.891007	
as.factor(Instance)52	-0.0098209	0.1132238	-0.087	0.930891	
as.factor(BioID)A000367	0.3182258	0.7679453	0.414	0.678654	
as.factor(BioID)A000369	-0.1092827	0.3032725	-0.360	0.718642	
as.factor(BioID)A000370	0.4504502	1.2490541	0.361	0.718427	
as.factor(BioID)A000372	0.4695025	1.2597357	0.373	0.709428	
as.factor(BioID)A000374	0.0923041	0.2674560	0.345	0.730056	
as.factor(BioID)A000375	0.9134540	2.4558526	0.372	0.709985	
as.factor(BioID)A000376	2.1948037	5.6625435	0.388	0.698370	
as.factor(BioID)A000377	-0.0585667	0.1714106	-0.342	0.732646	
as.factor(BioID)A000378	0.3774894	0.9068673	0.416	0.677285	
as.factor(BioID)B000213	-0.2893319	0.6989965	-0.414	0.678991	
as.factor(BioID)B000287	1.6717329	4.4114512	0.379	0.704779	
as.factor(BioID)B000490	-0.4803467	0.3745537	-1.282	0.199892	
as.factor(BioID)B000574	0.0151667	0.1185292	0.128	0.898200	
as.factor(BioID)B000755	0.0475954	0.2346333	0.203	0.839281	
as.factor(BioID)B000911	-0.0758141	0.2485361	-0.305	0.760378	
as.factor(BioID)B001227	-0.2728361	0.6735992	-0.405	0.685507	
as.factor(BioID)B001248	1.0771235	2.9090449	0.370	0.711238	
as.factor(BioID)B001250	-0.3544054	0.8813000	-0.402	0.687642	
as.factor(BioID)B001251	-0.2032592	0.5003164	-0.406	0.684611	
as.factor(BioID)B001255	-0.0689870	0.2618565	-0.263	0.792239	
as.factor(BioID)B001257	0.3662366	1.0227301	0.358	0.720324	
as.factor(BioID)B001260	0.5464708	1.4929604	0.366	0.714396	
as.factor(BioID)B001269	0.4855297	1.2212817	0.398	0.691016	
as.factor(BioID)B001270	1.9221550	5.0947384	0.377	0.706020	
as.factor(BioID)B001271	-0.2113750	0.6006881	-0.352	0.724974	
as.factor(BioID)B001273	0.0843363	0.2322517	0.363	0.716565	
as.factor(BioID)B001274	0.1076984	0.2819797	0.382	0.702565	
as.factor(BioID)B001275	0.3351353	0.8455164	0.396	0.691893	
as.factor(BioID)B001278	0.0360729	0.1226477	0.294	0.768711	
as.factor(BioID)B001281	-0.0135390	0.0759772	-0.178	0.858593	

as.factor(BioID)B001282	0.2815925	0.7091598	0.397	0.691368
as.factor(BioID)B001283	-0.0444410	0.1882905	-0.236	0.813448
as.factor(BioID)B001284	0.1164403	0.2995694	0.389	0.697562
as.factor(BioID)B001285	1.3198170	3.4793691	0.379	0.704502
as.factor(BioID)B001286	0.8796855	2.3012741	0.382	0.702325
as.factor(BioID)B001289	-0.1572668	0.4052790	-0.388	0.698040
as.factor(BioID)B001290	0.2636999	0.7076674	0.373	0.709477
as.factor(BioID)B001291	1.7132340	4.5805552	0.374	0.708443
as.factor(BioID)B001292	0.3216807	0.8557718	0.376	0.707050
as.factor(BioID)B001293	0.2979280	0.7827714	0.381	0.703552
as.factor(BioID)B001294	-0.0196591	0.1611520	-0.122	0.902923
as.factor(BioID)B001295	0.4467094	1.2092599	0.369	0.711879
as.factor(BioID)B001297	0.1367762	0.3441118	0.397	0.691076
as.factor(BioID)B001298	-0.0168745	0.1457429	-0.116	0.907841
as.factor(BioID)B001299	0.0743241	0.2610902	0.285	0.775940
as.factor(BioID)B001300	2.5440503	6.7095477	0.379	0.704619
as.factor(BioID)B001301	-0.2320094	0.5913217	-0.392	0.694853
as.factor(BioID)B001302	0.2424928	0.6399403	0.379	0.704796
as.factor(BioID)B001303	-0.0070642	0.1071653	-0.066	0.947452
as.factor(BioID)B001304	0.1779650	0.4830318	0.368	0.712605
as.factor(BioID)B001306	0.5472189	1.4553405	0.376	0.706967
as.factor(BioID)B001307	0.1736901	0.4267619	0.407	0.684072
as.factor(BioID)B001309	0.0750906	0.2216177	0.339	0.734788
as.factor(BioID)C000266	-0.4047039	0.9837040	-0.411	0.680835
as.factor(BioID)C000537	-0.0669642	0.1568981	-0.427	0.669589
as.factor(BioID)C000714	0.2877756	0.8317747	0.346	0.729410
as.factor(BioID)C000754	-0.0730629	0.1787379	-0.409	0.682769
as.factor(BioID)C000984	0.0480583	0.2450262	0.196	0.844532
as.factor(BioID)C001036	1.0031589	2.6538441	0.378	0.705485
as.factor(BioID)C001037	0.0730022	0.3028628	0.241	0.809558
as.factor(BioID)C001038	0.5454544	1.4870116	0.367	0.713813
as.factor(BioID)C001045	-0.1276885	0.4128479	-0.309	0.757148
as.factor(BioID)C001048	0.1124511	0.3075252	0.366	0.714670
as.factor(BioID)C001051	1.4658016	3.8518813	0.381	0.703600
as.factor(BioID)C001053	-0.0604891	0.2211587	-0.274	0.784501
as.factor(BioID)C001055	-0.0865223	0.2349478	-0.368	0.712733
as.factor(BioID)C001061	-0.0485767	0.1307277	-0.372	0.710256
as.factor(BioID)C001063	0.9326016	4.1330955	0.226	0.821512
as.factor(BioID)C001066	0.6564826	1.7640854	0.372	0.709846
as.factor(BioID)C001067	0.4223743	1.1484103	0.368	0.713084
as.factor(BioID)C001068	0.3726524	0.9747448	0.382	0.702290
as.factor(BioID)C001069	-0.1189733	0.2796194	-0.425	0.670549
as.factor(BioID)C001072	0.3113858	0.8507770	0.366	0.714418

as.factor(BioID)C001076	0.0197496	0.0970843	0.203	0.838830
as.factor(BioID)C001077	0.3324316	0.2378954	1.397	0.162515
as.factor(BioID)C001078	0.4004394	1.0917025	0.367	0.713820
as.factor(BioID)C001083	-0.0861672	0.3078103	-0.280	0.779567
as.factor(BioID)C001084	0.0258522	0.1148694	0.225	0.821967
as.factor(BioID)C001087	-0.0628475	0.1976302	-0.318	0.750527
as.factor(BioID)C001091	1.1310579	2.9721405	0.381	0.703591
as.factor(BioID)C001092	1.2990744	3.4012982	0.382	0.702566
as.factor(BioID)C001093	0.3236641	0.8778498	0.369	0.712405
as.factor(BioID)C001094	0.1650710	0.4670777	0.353	0.723832
as.factor(BioID)C001097	1.5349468	4.0605866	0.378	0.705478
as.factor(BioID)C001101	0.2969655	0.7790395	0.381	0.703116
as.factor(BioID)C001103	-0.0894824	0.2555579	-0.350	0.726281
as.factor(BioID)C001105	0.4882856	1.2315392	0.396	0.691807
as.factor(BioID)C001106	0.9143173	0.6290381	1.454	0.146300
as.factor(BioID)C001107	2.4634145	3.7838961	0.651	0.515134
as.factor(BioID)C001108	-0.1090874	0.2530743	-0.431	0.666498
as.factor(BioID)C001109	0.1559838	0.3582958	0.435	0.663375
as.factor(BioID)C001110	2.6027129	6.8356419	0.381	0.703441
as.factor(BioID)C001111	0.6650261	1.7567086	0.379	0.705068
as.factor(BioID)C001112	1.3448347	3.5414340	0.380	0.704193
as.factor(BioID)C001114	0.0045547	0.1124000	0.041	0.967682
as.factor(BioID)C001117	0.5427849	1.3950874	0.389	0.697283
as.factor(BioID)C001118	0.2753148	0.7586307	0.363	0.716726
as.factor(BioID)C001119	0.4123744	0.9947410	0.415	0.678530
as.factor(BioID)C001120	0.1864862	0.4662381	0.400	0.689231
as.factor(BioID)C001121	0.4965071	1.2853494	0.386	0.699345
as.factor(BioID)D000096	0.0480378	0.2193666	0.219	0.826694
as.factor(BioID)D000191	-0.3069450	0.6880912	-0.446	0.655606
as.factor(BioID)D000197	-0.1595279	0.4008408	-0.398	0.690702
as.factor(BioID)D000216	-0.2987886	0.6790547	-0.440	0.659999
as.factor(BioID)D000533	-0.3646365	0.9102452	-0.401	0.688781
as.factor(BioID)D000598	2.6645211	7.0716934	0.377	0.706388
as.factor(BioID)D000604	0.5438759	1.4431894	0.377	0.706336
as.factor(BioID)D000612	0.4279666	1.0889334	0.393	0.694367
as.factor(BioID)D000614	0.2175457	0.5969749	0.364	0.715603
as.factor(BioID)D000615	-0.0611535	0.1388668	-0.440	0.659732
as.factor(BioID)D000616	-0.0295268	0.0937222	-0.315	0.752773
as.factor(BioID)D000617	0.0067079	0.0878593	0.076	0.939153
as.factor(BioID)D000619	0.6209672	1.6045353	0.387	0.698808
as.factor(BioID)D000620	0.2659032	0.6872044	0.387	0.698862
as.factor(BioID)D000621	0.2295494	0.6121203	0.375	0.707711
as.factor(BioID)D000625	0.4073248	1.0747234	0.379	0.704741

as.factor(BioID)D000626	0.4026392	1.0517570	0.383	0.701906
as.factor(BioID)D000627	0.4640522	1.2524365	0.371	0.711050
as.factor(BioID)D000628	-0.0157829	0.1225757	-0.129	0.897565
as.factor(BioID)D000629	0.3657427	0.9223224	0.397	0.691762
as.factor(BioID)D000630	1.2578740	3.2458337	0.388	0.698418
as.factor(BioID)D000631	0.1618315	0.4700161	0.344	0.730663
as.factor(BioID)E000179	0.4398041	1.2784282	0.344	0.730882
as.factor(BioID)E000288	0.3450627	0.8604445	0.401	0.688459
as.factor(BioID)E000290	0.1472380	0.3694856	0.398	0.690325
as.factor(BioID)E000291	0.0144539	0.1124490	0.129	0.897742
as.factor(BioID)E000293	0.1938387	0.5015652	0.386	0.699208
as.factor(BioID)E000294	0.1358291	0.3856211	0.352	0.724714
as.factor(BioID)E000297	0.6794342	1.8108682	0.375	0.707569
as.factor(BioID)E000298	-0.0224221	0.1009039	-0.222	0.824180
as.factor(BioID)E000299	1.0277712	2.6788447	0.384	0.701286
as.factor(BioID)F000030	0.7434262	1.9873955	0.374	0.708407
as.factor(BioID)F000372	0.1666501	0.5205687	0.320	0.748916
as.factor(BioID)F000448	0.0730880	0.2829915	0.258	0.796236
as.factor(BioID)F000449	-0.2726820	0.6950036	-0.392	0.694861
as.factor(BioID)F000450	-0.1361977	0.3313252	-0.411	0.681083
as.factor(BioID)F000451	0.2769284	0.6677129	0.415	0.678393
as.factor(BioID)F000454	0.5194698	1.3429400	0.387	0.698951
as.factor(BioID)F000455	0.4120097	1.1400731	0.361	0.717862
as.factor(BioID)F000456	-0.1344636	0.3723267	-0.361	0.718045
as.factor(BioID)F000458	0.3386100	0.8456142	0.400	0.688899
as.factor(BioID)F000459	0.0608740	0.1455214	0.418	0.675779
as.factor(BioID)F000460	1.2488933	3.3142267	0.377	0.706357
as.factor(BioID)F000461	0.7414724	1.9559669	0.379	0.704683
as.factor(BioID)F000462	1.0568091	2.8095282	0.376	0.706860
as.factor(BioID)F000464	1.8137957	2.1676909	0.837	0.402878
as.factor(BioID)F000465	0.0578178	0.1864798	0.310	0.756569
as.factor(BioID)F000468	0.8040487	1.9942127	0.403	0.686868
as.factor(BioID)G000289	-0.2251434	0.5220372	-0.431	0.666331
as.factor(BioID)G000377	0.1996919	0.6286947	0.318	0.750813
as.factor(BioID)G000410	1.1348613	3.6493676	0.311	0.755865
as.factor(BioID)G000535	-0.0817002	0.2111751	-0.387	0.698900
as.factor(BioID)G000546	0.0195771	0.1355705	0.144	0.885201
as.factor(BioID)G000548	-0.0085571	0.1143138	-0.075	0.940340
as.factor(BioID)G000552	-0.2033889	0.5186153	-0.392	0.694986
as.factor(BioID)G000553	0.3159474	0.8483063	0.372	0.709617
as.factor(BioID)G000556	0.5655615	1.3667235	0.414	0.679077
as.factor(BioID)G000558	-0.0623675	0.1793929	-0.348	0.728148
as.factor(BioID)G000560	0.5210424	1.4514877	0.359	0.719670

as.factor(BioID)G000563	0.1801057	0.4756147	0.379	0.704982
as.factor(BioID)G000566	-0.0521619	0.1304244	-0.400	0.689261
as.factor(BioID)G000568	0.3480850	0.9046188	0.385	0.700453
as.factor(BioID)G000571	0.2651096	0.6440962	0.412	0.680695
as.factor(BioID)G000576	0.1386351	0.3894125	0.356	0.721885
as.factor(BioID)G000577	0.1879166	0.5130618	0.366	0.714222
as.factor(BioID)G000578	0.5686873	0.5836051	0.974	0.330004
as.factor(BioID)G000579	0.3875854	1.0442129	0.371	0.710562
as.factor(BioID)G000583	0.4105817	1.0364991	0.396	0.692073
as.factor(BioID)G000584	-0.1858563	0.4811223	-0.386	0.699334
as.factor(BioID)G000585	2.0431401	5.3652077	0.381	0.703399
as.factor(BioID)G000586	0.5069466	1.2270444	0.413	0.679563
as.factor(BioID)G000587	1.6640163	4.3828789	0.380	0.704252
as.factor(BioID)G000588	1.0075880	2.5927983	0.389	0.697622
as.factor(BioID)G000589	0.2273225	0.6613500	0.344	0.731104
as.factor(BioID)G000590	0.2024682	0.6042407	0.335	0.737615
as.factor(BioID)G000591	0.0661487	0.2133245	0.310	0.756542
as.factor(BioID)G000592	0.3794776	0.9248104	0.410	0.681625
as.factor(BioID)H000324	0.6508716	1.8382098	0.354	0.723332
as.factor(BioID)H000636	0.5155225	1.3628682	0.378	0.705291
as.factor(BioID)H000874	-0.2488378	0.5651104	-0.440	0.659761
as.factor(BioID)H001034	0.7759259	1.9928576	0.389	0.697073
as.factor(BioID)H001036	-0.1264390	0.2837556	-0.446	0.655960
as.factor(BioID)H001038	1.2548996	3.3549773	0.374	0.708429
as.factor(BioID)H001045	0.0409118	0.1182131	0.346	0.729330
as.factor(BioID)H001047	0.1982201	0.5060994	0.392	0.695366
as.factor(BioID)H001048	2.6468714	6.9992147	0.378	0.705363
as.factor(BioID)H001050	-0.1396389	0.3792567	-0.368	0.712785
as.factor(BioID)H001051	1.4892421	2.5545969	0.583	0.560008
as.factor(BioID)H001052	-0.1191725	0.3176235	-0.375	0.707567
as.factor(BioID)H001053	0.0256192	0.1054932	0.243	0.808155
as.factor(BioID)H001055	-0.0836087	0.2897293	-0.289	0.772948
as.factor(BioID)H001056	0.0567186	0.1676280	0.338	0.735142
as.factor(BioID)H001057	0.0121846	0.1506641	0.081	0.935555
as.factor(BioID)H001059	0.5538842	1.4870416	0.372	0.709595
as.factor(BioID)H001063	2.4621216	6.3901906	0.385	0.700075
as.factor(BioID)H001064	0.4466513	1.1680771	0.382	0.702235
as.factor(BioID)H001066	0.2846833	0.7233562	0.394	0.693965
as.factor(BioID)H001068	0.2352661	0.5666537	0.415	0.678069
as.factor(BioID)H001071	0.3912334	1.0620827	0.368	0.712656
as.factor(BioID)H001072	-0.0511713	0.1788555	-0.286	0.774840
as.factor(BioID)H001073	1.2791939	3.3179371	0.386	0.699896
as.factor(BioID)H001074	0.5411342	1.3968277	0.387	0.698516

as.factor(BioID)H001077	0.0617384	0.1838281	0.336	0.737035
as.factor(BioID)H001078	0.2465130	0.6463012	0.381	0.702947
as.factor(BioID)H001081	0.3709467	0.9617472	0.386	0.699776
as.factor(BioID)H001085	0.4657753	1.1843059	0.393	0.694164
as.factor(BioID)H001088	0.0038046	0.1185575	0.032	0.974404
as.factor(BioID)I000057	-0.0666369	0.2148843	-0.310	0.756526
as.factor(BioID)J000032	0.6503887	1.8117910	0.359	0.719666
as.factor(BioID)J000126	1.2342818	3.3495342	0.368	0.712560
as.factor(BioID)J000174	-0.4605803	1.1365280	-0.405	0.685353
as.factor(BioID)J000288	-0.0105928	0.1029131	-0.103	0.918033
as.factor(BioID)J000289	-0.0277259	0.0897260	-0.309	0.757361
as.factor(BioID)J000290	-0.1818875	0.4526743	-0.402	0.687886
as.factor(BioID)J000292	0.1050170	0.2994529	0.351	0.725868
as.factor(BioID)J000294	0.4174903	1.1172378	0.374	0.708697
as.factor(BioID)J000295	0.6435990	1.6569332	0.388	0.697757
as.factor(BioID)J000297	0.0651006	0.1792046	0.363	0.716453
as.factor(BioID)J000298	0.5228965	1.3497857	0.387	0.698524
as.factor(BioID)J000299	0.0683929	0.2479840	0.276	0.782745
as.factor(BioID)J000301	-0.0419190	0.1448250	-0.289	0.772282
as.factor(BioID)J000302	0.4957951	1.3716288	0.361	0.717806
as.factor(BioID)K000009	0.0257165	0.2470134	0.104	0.917097
as.factor(BioID)K000188	-0.0842157	0.2030696	-0.415	0.678414
as.factor(BioID)K000210	-0.4796339	1.1920895	-0.402	0.687489
as.factor(BioID)K000362	-0.1743835	0.4248599	-0.410	0.681538
as.factor(BioID)K000363	-0.2854780	0.7590858	-0.376	0.706912
as.factor(BioID)K000375	0.3543725	0.9477718	0.374	0.708534
as.factor(BioID)K000378	0.9146776	2.3283735	0.393	0.694496
as.factor(BioID)K000379	0.3238480	0.8363012	0.387	0.698637
as.factor(BioID)K000381	0.3175905	0.8451270	0.376	0.707129
as.factor(BioID)K000382	0.0138067	0.0780076	0.177	0.859540
as.factor(BioID)K000385	-0.0376955	0.1066268	-0.354	0.723745
as.factor(BioID)K000386	2.1459014	3.0290166	0.708	0.478783
as.factor(BioID)K000387	1.6265667	3.3818269	0.481	0.630609
as.factor(BioID)K000388	-0.0536044	0.1551144	-0.346	0.729709
as.factor(BioID)K000389	1.0842685	2.8335463	0.383	0.702033
as.factor(BioID)K000390	0.3721016	0.9670536	0.385	0.700459
as.factor(BioID)K000391	0.4734938	1.2522418	0.378	0.705400
as.factor(BioID)K000392	0.4100067	1.0648448	0.385	0.700266
as.factor(BioID)K000394	0.3829962	0.9726612	0.394	0.693816
as.factor(BioID)K000395	0.5712004	1.5181325	0.376	0.706785
as.factor(BioID)L000263	-0.0830967	0.2439353	-0.341	0.733417
as.factor(BioID)L000287	-0.2159205	0.4791951	-0.451	0.652353
as.factor(BioID)L000480	0.4517397	1.3130584	0.344	0.730870

as.factor(BioID)L000491	-0.1485414	0.3759971	-0.395	0.692858
as.factor(BioID)L000554	-0.3357378	0.9192052	-0.365	0.714980
as.factor(BioID)L000557	-0.2999837	0.7220870	-0.415	0.677882
as.factor(BioID)L000559	-0.0833231	0.2059234	-0.405	0.685809
as.factor(BioID)L000560	-0.0495901	0.1500796	-0.330	0.741127
as.factor(BioID)L000562	0.1670109	0.5112445	0.327	0.743961
as.factor(BioID)L000563	0.0753077	0.2130540	0.353	0.723790
as.factor(BioID)L000564	-0.0221168	0.0870824	-0.254	0.799551
as.factor(BioID)L000565	-0.1146118	0.2954406	-0.388	0.698122
as.factor(BioID)L000566	0.0259166	0.1184950	0.219	0.826904
as.factor(BioID)L000567	0.3854015	0.3811406	1.011	0.312102
as.factor(BioID)L000569	-0.1052360	0.2918101	-0.361	0.718428
as.factor(BioID)L000573	0.0346572	0.1518581	0.228	0.819507
as.factor(BioID)L000576	0.1636483	0.4495500	0.364	0.715892
as.factor(BioID)L000578	-0.2084113	0.5194010	-0.401	0.688294
as.factor(BioID)L000579	2.5560054	6.7058095	0.381	0.703139
as.factor(BioID)L000580	-0.0433657	0.1512023	-0.287	0.774302
as.factor(BioID)L000581	0.6531043	1.7588280	0.371	0.710447
as.factor(BioID)L000583	0.3743259	1.0557795	0.355	0.722980
as.factor(BioID)L000584	0.0991192	0.2854122	0.347	0.728429
as.factor(BioID)L000586	0.1521175	0.4358757	0.349	0.727146
as.factor(BioID)L000587	-0.0690198	0.2144674	-0.322	0.747637
as.factor(BioID)L000590	0.2917932	0.7200887	0.405	0.685378
as.factor(BioID)L000591	0.3474272	0.8442443	0.412	0.680750
as.factor(BioID)L000592	0.6734346	1.7144873	0.393	0.694533
as.factor(BioID)L000593	2.9040906	7.6043386	0.382	0.702593
as.factor(BioID)M000087	0.3339672	0.9484753	0.352	0.724808
as.factor(BioID)M000312	-0.0865372	0.2459814	-0.352	0.725037
as.factor(BioID)M000404	-0.1026072	0.2727724	-0.376	0.706851
as.factor(BioID)M000689	-0.1563145	0.4223486	-0.370	0.711357
as.factor(BioID)M001137	-0.0566084	0.1408189	-0.402	0.687749
as.factor(BioID)M001143	-0.0040986	0.0976577	-0.042	0.966529
as.factor(BioID)M001144	-0.2907950	0.7648884	-0.380	0.703869
as.factor(BioID)M001150	0.1631838	0.4913740	0.332	0.739865
as.factor(BioID)M001151	0.6829391	1.7990922	0.380	0.704297
as.factor(BioID)M001156	0.3502618	0.9634470	0.364	0.716247
as.factor(BioID)M001157	0.2755191	0.7677466	0.359	0.719747
as.factor(BioID)M001158	0.9808722	2.6528081	0.370	0.711625
as.factor(BioID)M001159	0.0270884	0.1307653	0.207	0.835920
as.factor(BioID)M001160	0.0380577	0.1642732	0.232	0.816825
as.factor(BioID)M001166	0.3286464	0.8692343	0.378	0.705422
as.factor(BioID)M001180	-0.2396781	0.6566684	-0.365	0.715172
as.factor(BioID)M001181	0.4654345	0.3753673	1.240	0.215200

as.factor(BioID)M001182	0.2814825	0.6669574	0.422	0.673060
as.factor(BioID)M001184	0.2991416	0.7282608	0.411	0.681309
as.factor(BioID)M001187	0.4189428	1.1174961	0.375	0.707795
as.factor(BioID)M001188	0.4113301	1.0510545	0.391	0.695597
as.factor(BioID)M001189	0.1643312	0.4460494	0.368	0.712619
as.factor(BioID)M001191	1.0987847	2.8076685	0.391	0.695596
as.factor(BioID)M001193	0.0551889	0.1925301	0.287	0.774421
as.factor(BioID)M001195	0.0236209	0.0895132	0.264	0.791909
as.factor(BioID)M001196	0.3842347	1.0046868	0.382	0.702190
as.factor(BioID)M001200	0.1529889	0.4396905	0.348	0.727931
as.factor(BioID)M001201	0.4737992	1.2327868	0.384	0.700790
as.factor(BioID)M001202	0.5028753	1.2904810	0.390	0.696831
as.factor(BioID)M001203	0.4265471	1.1110325	0.384	0.701095
as.factor(BioID)M001204	0.4274911	1.1266073	0.379	0.704410
as.factor(BioID)M001206	1.3732454	3.6203377	0.379	0.704511
as.factor(BioID)N000015	-0.3912020	0.9349344	-0.418	0.675698
as.factor(BioID)N000127	0.3727991	0.9357680	0.398	0.690403
as.factor(BioID)N000181	1.0388731	2.7483162	0.378	0.705484
as.factor(BioID)N000182	0.7507325	1.9701989	0.381	0.703227
as.factor(BioID)N000184	-0.0770839	0.2547637	-0.303	0.762261
as.factor(BioID)N000185	0.3173052	0.8382733	0.379	0.705099
as.factor(BioID)N000188	0.0483379	0.1576092	0.307	0.759120
as.factor(BioID)N000189	0.1007199	0.2627300	0.383	0.701511
as.factor(BioID)N000190	0.1261599	0.3724473	0.339	0.734861
as.factor(BioID)N000191	0.3036041	0.7950733	0.382	0.702624
as.factor(BioID)O000168	1.0600119	2.7957369	0.379	0.704631
as.factor(BioID)O000170	1.0148839	2.5903615	0.392	0.695270
as.factor(BioID)O000171	-0.0360592	0.1637357	-0.220	0.825725
as.factor(BioID)O000172	1.3337426	3.3392713	0.399	0.689650
as.factor(BioID)O000173	0.7722700	1.8792109	0.411	0.681168
as.factor(BioID)P000034	-0.0905193	0.2104545	-0.430	0.667178
as.factor(BioID)P000096	0.0359246	0.2686754	0.134	0.893651
as.factor(BioID)P000258	-0.5321022	0.5295722	-1.005	0.315174
as.factor(BioID)P000373	0.3162134	0.9467817	0.334	0.738438
as.factor(BioID)P000523	-0.3114197	0.7167238	-0.435	0.663988
as.factor(BioID)P000588	-0.3173850	0.7867496	-0.403	0.686705
as.factor(BioID)P000591	-0.0343788	0.1572282	-0.219	0.826950
as.factor(BioID)P000592	-0.3285720	0.8099999	-0.406	0.685065
as.factor(BioID)P000593	0.1879678	0.5278549	0.356	0.721820
as.factor(BioID)P000594	-0.0167995	0.1166085	-0.144	0.885468
as.factor(BioID)P000597	-0.0021381	0.1074367	-0.020	0.984125
as.factor(BioID)P000598	0.3486321	0.8159395	0.427	0.669242
as.factor(BioID)P000599	0.1865766	0.5092439	0.366	0.714136

as.factor(BioID)P000601	0.1812026	0.4483347	0.404	0.686150
as.factor(BioID)P000602	0.0273035	0.1052010	0.260	0.795259
as.factor(BioID)P000604	0.4296998	1.1699426	0.367	0.713462
as.factor(BioID)P000606	0.2933997	0.7622790	0.385	0.700370
as.factor(BioID)P000607	0.2388593	0.5963032	0.401	0.688799
as.factor(BioID)P000609	0.0717459	0.2630413	0.273	0.785081
as.factor(BioID)P000611	-0.0935752	0.3094394	-0.302	0.762389
as.factor(BioID)P000614	0.2862957	0.7094190	0.404	0.686594
as.factor(BioID)P000615	0.1611376	0.4668385	0.345	0.730019
as.factor(BioID)P000616	0.2551374	0.6480056	0.394	0.693841
as.factor(BioID)P000617	0.8262365	2.0271027	0.408	0.683632
as.factor(BioID)Q000023	0.2090157	0.5374131	0.389	0.697386
as.factor(BioID)R000053	0.2437950	0.7131753	0.342	0.732518
as.factor(BioID)R000395	-0.3926181	0.9484111	-0.414	0.678955
as.factor(BioID)R000409	2.2337696	5.9484701	0.376	0.707329
as.factor(BioID)R000435	1.6995818	2.7746211	0.613	0.540274
as.factor(BioID)R000486	1.8269486	4.9155027	0.372	0.710193
as.factor(BioID)R000487	1.7752223	4.7272795	0.376	0.707324
as.factor(BioID)R000515	-0.3356647	0.7888965	-0.425	0.670546
as.factor(BioID)R000575	-0.0696211	0.2030241	-0.343	0.731709
as.factor(BioID)R000576	-0.1699685	0.4157917	-0.409	0.682760
as.factor(BioID)R000577	0.6645616	1.7647378	0.377	0.706543
as.factor(BioID)R000578	0.4455338	0.3510278	1.269	0.204567
as.factor(BioID)R000580	0.2691457	0.1604224	1.678	0.093618
as.factor(BioID)R000582	-0.3563307	0.8947729	-0.398	0.690516
as.factor(BioID)R000583	0.7350190	1.9303579	0.381	0.703432
as.factor(BioID)R000585	1.2895152	2.9530099	0.437	0.662411
as.factor(BioID)R000586	0.6707320	1.7584536	0.381	0.702939
as.factor(BioID)R000587	0.2827110	0.6937220	0.408	0.683681
as.factor(BioID)R000588	0.1867628	0.4925463	0.379	0.704612
as.factor(BioID)R000591	0.2136179	0.4775363	0.447	0.654702
as.factor(BioID)R000592	0.0642672	0.1826107	0.352	0.724939
as.factor(BioID)R000593	0.5904697	1.5728781	0.375	0.707413
as.factor(BioID)R000597	0.1872538	0.5105961	0.367	0.713871
as.factor(BioID)R000598	0.4426261	1.1865242	0.373	0.709171
as.factor(BioID)R000601	0.0370951	0.1622184	0.229	0.819155
as.factor(BioID)R000602	0.1814260	0.4800838	0.378	0.705557
as.factor(BioID)R000603	0.3227833	0.8455929	0.382	0.702723
as.factor(BioID)R000604	0.1290106	0.3527087	0.366	0.714590
as.factor(BioID)R000606	0.4713825	1.2453723	0.379	0.705110
as.factor(BioID)R000607	1.9991189	2.5950329	0.770	0.441212
as.factor(BioID)R000610	0.7663606	2.0289892	0.378	0.705705
as.factor(BioID)R000612	0.1943535	0.5540939	0.351	0.725821

as.factor(BioID)R000614	1.2839329	3.3434781	0.384	0.701027
as.factor(BioID)S000018	0.0528758	0.1587130	0.333	0.739067
as.factor(BioID)S000030	2.3134422	6.1194265	0.378	0.705450
as.factor(BioID)S000051	0.5099643	0.1489931	3.423	0.000637 ***
as.factor(BioID)S000185	-0.2891891	0.6555925	-0.441	0.659199
as.factor(BioID)S000248	0.4690702	1.3077133	0.359	0.719876
as.factor(BioID)S000364	0.4463546	1.2368687	0.361	0.718246
as.factor(BioID)S000480	0.8101749	2.2610560	0.358	0.720159
as.factor(BioID)S000510	0.2997453	0.8378307	0.358	0.720573
as.factor(BioID)S000522	0.2834465	0.7721490	0.367	0.713608
as.factor(BioID)S000583	0.5496402	1.5884520	0.346	0.729377
as.factor(BioID)S001145	0.2080694	0.6118176	0.340	0.733843
as.factor(BioID)S001148	-0.2551203	0.6618887	-0.385	0.699967
as.factor(BioID)S001154	0.2447240	0.6597408	0.371	0.710738
as.factor(BioID)S001156	2.0109114	5.3363565	0.377	0.706354
as.factor(BioID)S001157	0.4615985	1.2561258	0.367	0.713317
as.factor(BioID)S001165	0.2032871	0.5999332	0.339	0.734773
as.factor(BioID)S001168	0.0096331	0.1277232	0.075	0.939890
as.factor(BioID)S001170	-0.0895680	0.2716887	-0.330	0.741697
as.factor(BioID)S001172	-0.0083798	0.0577225	-0.145	0.884594
as.factor(BioID)S001175	0.7014044	1.8128710	0.387	0.698886
as.factor(BioID)S001176	-0.1948263	0.4851080	-0.402	0.688028
as.factor(BioID)S001180	0.0839071	0.2598231	0.323	0.746788
as.factor(BioID)S001185	0.4451559	1.1358750	0.392	0.695186
as.factor(BioID)S001187	0.7123076	1.8496980	0.385	0.700225
as.factor(BioID)S001188	0.0140561	0.1390465	0.101	0.919494
as.factor(BioID)S001189	0.3625597	0.9320705	0.389	0.697347
as.factor(BioID)S001190	0.5352646	1.3886778	0.385	0.699962
as.factor(BioID)S001192	-0.0922254	0.2427344	-0.380	0.704044
as.factor(BioID)S001195	0.4170557	1.0822082	0.385	0.700017
as.factor(BioID)S001196	1.9703842	3.0442801	0.647	0.517580
as.factor(BioID)S001200	0.6144273	1.6117628	0.381	0.703101
as.factor(BioID)S001201	0.1437608	0.3882418	0.370	0.711224
as.factor(BioID)S001205	0.2156629	0.6058033	0.356	0.721897
as.factor(BioID)S001207	0.7612429	1.9597379	0.388	0.697747
as.factor(BioID)S001209	0.6211598	1.5628287	0.397	0.691089
as.factor(BioID)S001212	0.3352708	0.9012753	0.372	0.709951
as.factor(BioID)S001213	0.0214589	0.1174015	0.183	0.854995
as.factor(BioID)S001214	0.9776517	2.5704293	0.380	0.703745
as.factor(BioID)S001215	0.8378754	2.1588427	0.388	0.697990
as.factor(BioID)S001216	0.6452515	1.6142486	0.400	0.689421
as.factor(BioID)T000193	-0.1833608	0.4406911	-0.416	0.677417
as.factor(BioID)T000238	0.3634183	1.0114427	0.359	0.719419

as.factor(BioID)T000462	0.3109654	0.8587884	0.362	0.717332	
as.factor(BioID)T000463	0.2899196	0.7870467	0.368	0.712656	
as.factor(BioID)T000465	-0.0347343	0.1170513	-0.297	0.766705	
as.factor(BioID)T000468	-0.0724956	0.2154880	-0.336	0.736600	
as.factor(BioID)T000469	0.9962714	2.6107254	0.382	0.702810	
as.factor(BioID)T000470	-0.1401698	0.3596609	-0.390	0.696796	
as.factor(BioID)T000474	1.9256603	5.0848440	0.379	0.704963	
as.factor(BioID)T000475	0.4907626	1.2657195	0.388	0.698271	
as.factor(BioID)T000477	0.0245891	0.1180975	0.208	0.835095	
as.factor(BioID)T000479	0.1318588	0.3502679	0.376	0.706637	
as.factor(BioID)T000480	0.2268988	0.6239791	0.364	0.716187	
as.factor(BioID)T000482	0.2663434	0.7034035	0.379	0.705004	
as.factor(BioID)U000031	0.3643643	0.3289475	1.108	0.268192	
as.factor(BioID)U000040	1.0826289	2.7948893	0.387	0.698547	
as.factor(BioID)V000081	0.1147830	0.3912750	0.293	0.769292	
as.factor(BioID)V000108	-0.3549190	0.8608482	-0.412	0.680189	
as.factor(BioID)V000131	1.7875819	5.1000189	0.351	0.726011	
as.factor(BioID)V000132	1.8273031	5.1807402	0.353	0.724357	
as.factor(BioID)V000133	1.1490421	0.3791110	3.031	0.002482	**
as.factor(BioID)W000187	1.8995695	5.1565713	0.368	0.712646	
as.factor(BioID)W000413	-0.4293044	1.1625098	-0.369	0.711966	
as.factor(BioID)W000791	-0.3317672	0.8170437	-0.406	0.684761	
as.factor(BioID)W000795	-0.3351678	0.8208191	-0.408	0.683090	
as.factor(BioID)W000796	-0.1818638	0.4860233	-0.374	0.708320	
as.factor(BioID)W000799	-0.0355199	0.1613577	-0.220	0.825800	
as.factor(BioID)W000804	-0.2935574	0.7211576	-0.407	0.684022	
as.factor(BioID)W000808	1.0806557	2.9048136	0.372	0.709931	
as.factor(BioID)W000809	0.1229967	0.2741722	0.449	0.653780	
as.factor(BioID)W000810	0.2316614	0.6308765	0.367	0.713520	
as.factor(BioID)W000812	-0.0194654	0.1189486	-0.164	0.870034	
as.factor(BioID)W000813	-0.0001427	0.0853835	-0.002	0.998667	
as.factor(BioID)W000814	0.4585303	1.2865273	0.356	0.721587	
as.factor(BioID)W000815	-0.0632676	0.1882847	-0.336	0.736905	
as.factor(BioID)W000816	1.0809367	2.9073264	0.372	0.710099	
as.factor(BioID)W000820	2.3863115	6.2765059	0.380	0.703855	
as.factor(BioID)W000821	0.1440592	0.3716232	0.388	0.698334	
as.factor(BioID)W000822	0.5335239	1.4346103	0.372	0.710026	
as.factor(BioID)W000823	0.7750664	0.7374075	1.051	0.293404	
as.factor(BioID)W000825	0.6877688	1.7766880	0.387	0.698734	
as.factor(BioID)W000826	0.4356259	1.1061989	0.394	0.693784	
as.factor(BioID)Y000033	-0.7466633	1.8530727	-0.403	0.687058	
as.factor(BioID)Y000062	NA	NA	NA	NA	
as.factor(BioID)Y000063	NA	NA	NA	NA	

```

as.factor(BioID)Y000065      NA      NA      NA      NA
as.factor(BioID)Y000066      NA      NA      NA      NA
as.factor(BioID)Z000017      NA      NA      NA      NA
seniority                    0.0242505  0.0567309  0.427 0.669105
Contribution_minus_log      0.0004834  0.0014424  0.335 0.737574
Contribution_plus_log      -0.0008799  0.0011041 -0.797 0.425597
Dmajority                    NA      NA      NA      NA
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

```

Residual standard error: 0.1125 on 1429 degrees of freedom
(413 observations deleted due to missingness)
Multiple R-squared:  0.9619,    Adjusted R-squared:  0.9494
F-statistic: 76.61 on 471 and 1429 DF,  p-value: < 2.2e-16

```

Using actual contributions instead of pro_env and anti_env dummy makes the coefficients more significant!

The difference between the ols before and this ols is the individual fixed effects instead of state effects. so we are fixing for individuals so we dont include person specific changes in the analysis and for the same person can see how their voting changes.

this is very useful since this way we account for changes that previously we could not account for, since they are either immesurable or just endogenous in this analysis that change the amount of contributions representatives receive, such as:

- difference in eloquence between representatives
- difference in connections to special interest groups
- difference in the amount of time spent on the campaign trail
- difference in the amount of time spent in office
- professional history with contributions (i.e. previous profession, previous income, etc. before history in office)
- high explanation of the model (multiple $R^2 = 0.96$)

Downsides of this model are however that the model is incredibly strict, so:

- cannot include 2 FEs that are strict, i.e. state (50 states) and individuals (about 570 individuals)
- cannot include time fixed effects, since the model is already too strict
- not much significance

Interpretation:

We are fixing for individuals to determine whether changes in contributions can be associated with changes in voting behavior for each representative. Only few representatives are significant, i.e. V000133, S000051, P00025, G000578... out of these 4 representatives with significant coefficients, two changed their voting behavior once.

- Marshall (Mark) Sanford from anti -> pro environment (which means that when you hold constant for this representative, then a change in from anti to pro env means 0.49 units more likely to change their vote?)
- Mark Gaetz from anti to pro environmental vote. (for Gaetz, this is 0.2880450 units more likely to change their vote from anti to pro environmental vote)

LPM per Vote

This LPM is more specific since it only includes the each separate vote, but all contributions of the votes leading up to it. E.g. In `ols_4_2` I include not only the vote 4, but also the contributions of the vote 3 which is on the same topic. this way it is easier to analyse whether the contributions from the previous relevant votes have an effect on the voting behavior of the representatives. -> **remove recency bias** attached to the 6mo prior vote

Does this change the coefficients? Since in the previous model we were fixing for instances, this shouldn't change anything, we could not see how the coefficients change over time. Why use this format - if we could fix year in model before ?

We do this because we want to see how prior contributions in similar votes could affect the voting. `###` vote and all contributions leading up to the vote with state FEs

can fix for states here, but not for instances, since this is already just that, and not for year and individuals, since these are all the same too.

```
# Vote 4_2
view(df_vote_4_2)
ols_4_2 <- plm(Vote4_minus ~ Contribution_3_minus + Contribution_3_plus + Contribution_4_min
```

Warning in `pdata.frame(data, index)`: duplicate couples (id-time) in resulting `pdata.frame` to find out which, use, e.g., `table(index(your_pdataframe), useNA = "ifany")`

```
summary(ols_4_2)
```

Oneway (individual) effect Within Model

Call:

```
plm(formula = Vote4_minus ~ Contribution_3_minus + Contribution_3_plus +
```

```
Contribution_4_minus + Contribution_4_plus + seniority_114 +
nominate_dim1 + nominate_dim2 + gender + pro_env_dummy +
anti_env_dummy, data = df_vote_4_2, model = "within", index = c("state",
"party"))
```

Unbalanced Panel: n = 46, T = 1-45, N = 332

Residuals:

Min.	1st Qu.	Median	3rd Qu.	Max.
-0.79396	-0.21720	0.00000	0.21463	1.06153

Coefficients:

	Estimate	Std. Error	t-value	Pr(> t)	
Contribution_3_minus	4.3495e-06	1.2592e-06	3.4543	0.0006384	***
Contribution_3_plus	-1.5177e-05	1.0816e-05	-1.4033	0.1616474	
Contribution_4_minus	2.8648e-06	1.0955e-06	2.6150	0.0094128	**
Contribution_4_plus	2.7911e-06	1.2965e-05	0.2153	0.8297018	
seniority_114	-1.8833e-02	5.5709e-03	-3.3806	0.0008277	***
nominate_dim1	1.0195e+00	1.7938e-01	5.6832	3.356e-08	***
nominate_dim2	1.1693e-01	1.4339e-01	0.8155	0.4154812	
genderM	2.1898e-01	5.7297e-02	3.8218	0.0001638	***
pro_env_dummy	1.1338e-02	6.2500e-02	0.1814	0.8561815	
anti_env_dummy	3.1421e-02	8.2448e-02	0.3811	0.7034204	

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 57.118

Residual Sum of Squares: 38.594

R-Squared: 0.32431

Adj. R-Squared: 0.18966

F-statistic: 13.2471 on 10 and 276 DF, p-value: < 2.22e-16

```
# Vote 51_2
```

```
ols_51_2 <- plm(Vote51_minus ~ Contribution_3_minus + Contribution_3_plus + Contribution_4_m
summary(ols_51_2)
```

Oneway (individual) effect Within Model

Call:

```
plm(formula = Vote51_minus ~ Contribution_3_minus + Contribution_3_plus +
Contribution_4_minus + Contribution_4_plus + Contribution_51_minus +
Contribution_51_plus + seniority_1151 + party + nominate_dim1 +
```

```
nominate_dim2 + gender + pro_env_dummy + anti_env_dummy,
data = df_vote_51_2, model = "within", index = c("state"))
```

Unbalanced Panel: n = 45, T = 1-39, N = 281

Residuals:

Min.	1st Qu.	Median	3rd Qu.	Max.
-0.848277	-0.026441	0.000000	0.030687	0.808670

Coefficients:

	Estimate	Std. Error	t-value	Pr(> t)
Contribution_3_minus	9.2140e-07	5.9396e-07	1.5513	0.122250
Contribution_3_plus	-8.1021e-06	5.0527e-06	-1.6035	0.110234
Contribution_4_minus	-1.1362e-07	5.4758e-07	-0.2075	0.835809
Contribution_4_plus	-1.2166e-05	4.5386e-06	-2.6806	0.007898 **
Contribution_51_minus	3.8857e-07	4.4354e-07	0.8761	0.381926
Contribution_51_plus	-9.3277e-07	3.4160e-06	-0.2731	0.785062
seniority_1151	1.0673e-03	2.2859e-03	0.4669	0.641023
partyR	9.4772e-01	2.4208e-02	39.1493	< 2.2e-16 ***
nominate_dim1	-4.4587e-02	7.9063e-02	-0.5639	0.573361
nominate_dim2	9.4747e-02	5.7819e-02	1.6387	0.102692
genderM	3.2406e-03	2.3106e-02	0.1402	0.888592
pro_env_dummy	2.6298e-02	2.2236e-02	1.1827	0.238197
anti_env_dummy	4.1973e-02	3.1590e-02	1.3286	0.185321

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 50.56

Residual Sum of Squares: 3.9051

R-Squared: 0.92276

Adj. R-Squared: 0.90302

F-statistic: 204.936 on 13 and 223 DF, p-value: < 2.22e-16

```
# Vote 52_2
```

```
ols_52_2 <- plm(Vote52_minus ~ Contribution_3_minus + Contribution_3_plus + Contribution_4_m.
summary(ols_52_2)
```

Oneway (individual) effect Within Model

Call:

```
plm(formula = Vote52_minus ~ Contribution_3_minus + Contribution_3_plus +
      Contribution_4_minus + Contribution_4_plus + Contribution_51_minus +
```

```

Contribution_51_plus + Contribution_52_minus + Contribution_52_plus +
seniority_1152 + party + nominate_dim1 + nominate_dim2 +
gender + pro_env_dummy + anti_env_dummy, data = df_vote_52_2,
model = "within", index = c("state"))

```

Unbalanced Panel: n = 45, T = 1-34, N = 268

Residuals:

	Min.	1st Qu.	Median	3rd Qu.	Max.
	-0.89843798	-0.03361441	0.00096878	0.04373188	0.84351121

Coefficients:

	Estimate	Std. Error	t-value	Pr(> t)
Contribution_3_minus	-2.4067e-07	8.3605e-07	-0.2879	0.77373
Contribution_3_plus	-4.3165e-06	6.4806e-06	-0.6661	0.50611
Contribution_4_minus	-1.0036e-07	7.3751e-07	-0.1361	0.89189
Contribution_4_plus	6.6762e-06	5.9969e-06	1.1133	0.26687
Contribution_51_minus	4.0724e-06	1.7775e-06	2.2910	0.02296 *
Contribution_51_plus	8.5020e-06	5.0695e-06	1.6771	0.09502 .
Contribution_52_minus	-2.7300e-06	1.4941e-06	-1.8272	0.06910 .
Contribution_52_plus	-1.4157e-05	3.0291e-06	-4.6736	5.314e-06 ***
seniority_1152	-2.1121e-03	2.8913e-03	-0.7305	0.46592
partyR	8.8526e-01	3.0613e-02	28.9177	< 2.2e-16 ***
nominate_dim1	3.9892e-02	1.0256e-01	0.3889	0.69771
nominate_dim2	3.9675e-02	7.7107e-02	0.5145	0.60741
genderM	4.1150e-02	2.8994e-02	1.4193	0.15731
pro_env_dummy	1.7033e-02	2.7304e-02	0.6238	0.53342
anti_env_dummy	5.0035e-02	4.3327e-02	1.1548	0.24949

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 46.843

Residual Sum of Squares: 5.6483

R-Squared: 0.87942

Adj. R-Squared: 0.84522

F-statistic: 101.134 on 15 and 208 DF, p-value: < 2.22e-16

```
# Vote 6_2
```

```
ols_6_2 <- plm(Vote6_minus ~ Contribution_3_minus + Contribution_3_plus + Contribution_4_minus,
summary(ols_6_2)
```

Oneway (individual) effect Within Model

Call:

```
plm(formula = Vote6_minus ~ Contribution_3_minus + Contribution_3_plus +  
      Contribution_4_minus + Contribution_4_plus + Contribution_51_minus +  
      Contribution_51_plus + Contribution_52_minus + Contribution_52_plus +  
      Contribution_6_minus + Contribution_6_plus + seniority_116 +  
      party + nominate_dim1 + nominate_dim2 + gender + pro_env_dummy +  
      anti_env_dummy, data = df_vote_6_2, model = "within", index = c("state"))
```

Unbalanced Panel: n = 42, T = 1-34, N = 224

Residuals:

Min.	1st Qu.	Median	3rd Qu.	Max.
-0.4727858	-0.0214771	-0.0027863	0.0124646	0.9372705

Coefficients:

	Estimate	Std. Error	t-value	Pr(> t)
Contribution_3_minus	-2.0502e-06	5.7393e-07	-3.5722	0.0004642 ***
Contribution_3_plus	-2.5997e-06	4.3407e-06	-0.5989	0.5500497
Contribution_4_minus	3.7107e-09	4.7783e-07	0.0078	0.9938133
Contribution_4_plus	6.1685e-06	3.7126e-06	1.6615	0.0985140 .
Contribution_51_minus	3.6897e-06	1.2149e-06	3.0370	0.0027778 **
Contribution_51_plus	-3.8942e-07	5.2048e-06	-0.0748	0.9404492
Contribution_52_minus	-1.7538e-06	1.0518e-06	-1.6674	0.0973291 .
Contribution_52_plus	-1.4213e-06	4.8284e-06	-0.2944	0.7688473
Contribution_6_minus	1.2000e-08	4.5678e-07	0.0263	0.9790728
Contribution_6_plus	-2.2133e-06	9.8655e-06	-0.2244	0.8227606
seniority_116	-2.1524e-03	1.8804e-03	-1.1446	0.2540154
partyR	9.7702e-01	2.0573e-02	47.4904	< 2.2e-16 ***
nominate_dim1	-3.7533e-02	6.6732e-02	-0.5625	0.5745727
nominate_dim2	7.0570e-02	5.0176e-02	1.4064	0.1614755
genderM	2.3008e-02	1.8072e-02	1.2731	0.2047665
pro_env_dummy	5.5802e-03	2.9821e-02	0.1871	0.8517931
anti_env_dummy	1.2590e-02	2.6285e-02	0.4790	0.6325723

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares: 38.836

Residual Sum of Squares: 1.4101

R-Squared: 0.96369

Adj. R-Squared: 0.95093

F-statistic: 257.614 on 17 and 165 DF, p-value: < 2.22e-16

```
# Vote 7_2
view(df_vote_7_2)
ols_7_2 <- plm(Vote7_minus ~ Contribution_3_minus + Contribution_3_plus + Contribution_4_minus + Contribution_4_plus, data = df_vote_7_2)
summary(ols_7_2)
```

Oneway (individual) effect Within Model

Call:

```
plm(formula = Vote7_minus ~ Contribution_3_minus + Contribution_3_plus + Contribution_4_minus + Contribution_4_plus + Contribution_51_minus + Contribution_51_plus + Contribution_52_minus + Contribution_52_plus + Contribution_6_minus + Contribution_6_plus + Contribution_7_minus + Contribution_7_plus + seniority_117 + party + gender + pro_env_dummy + anti_env_dummy + nominate_dim1 + nominate_dim2, data = df_vote_7_2, model = "within", index = c("state"))
```

Unbalanced Panel: n = 38, T = 1-30, N = 179

Residuals:

	Min.	1st Qu.	Median	3rd Qu.	Max.
	-4.3224e-01	-2.5864e-02	-2.4144e-15	2.6120e-02	2.6912e-01

Coefficients:

	Estimate	Std. Error	t-value	Pr(> t)
Contribution_3_minus	-1.9145e-06	5.9773e-07	-3.2030	0.001735 **
Contribution_3_plus	-2.4562e-06	4.2255e-06	-0.5813	0.562121
Contribution_4_minus	-2.4510e-06	5.5125e-07	-4.4463	1.939e-05 ***
Contribution_4_plus	-1.7205e-05	3.5986e-06	-4.7811	4.921e-06 ***
Contribution_51_minus	5.8359e-06	1.1615e-06	5.0244	1.749e-06 ***
Contribution_51_plus	-1.5560e-06	5.0671e-06	-0.3071	0.759302
Contribution_52_minus	-2.2717e-06	1.0841e-06	-2.0954	0.038201 *
Contribution_52_plus	2.7410e-06	4.2222e-06	0.6492	0.517443
Contribution_6_minus	1.3637e-06	5.4545e-07	2.5001	0.013743 *
Contribution_6_plus	-9.6421e-06	7.2868e-06	-1.3232	0.188235
Contribution_7_minus	-5.6068e-07	4.9777e-07	-1.1264	0.262216
Contribution_7_plus	9.9513e-06	8.0779e-06	1.2319	0.220349
seniority_117	3.4662e-04	1.7875e-03	0.1939	0.846565
partyR	9.5806e-01	2.0127e-02	47.6016	< 2.2e-16 ***
genderM	5.0855e-03	1.6847e-02	0.3019	0.763267
pro_env_dummy	-9.6070e-03	2.8221e-02	-0.3404	0.734126
anti_env_dummy	1.3249e-02	2.1717e-02	0.6101	0.542951
nominate_dim1	7.6090e-02	6.5826e-02	1.1559	0.249972

```

nominate_dim2      8.4126e-02  4.7185e-02  1.7829  0.077088 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Total Sum of Squares:    26.033
Residual Sum of Squares: 0.68962
R-Squared:              0.97351
Adj. R-Squared: 0.96135
F-statistic: 235.968 on 19 and 122 DF, p-value: < 2.22e-16

```

Why dont the anti_env_dummy coefficients show up? Are they singularities?

LPM with consistent Representatives

with control variables

```

df_long_no_change <- df_long %>%
  filter(Vote_change == 0) %>%
  select(-Vote_change)

ols_no_change <- lm(Vote ~ . - state - BioID, data = df_long_no_change)
summary(ols_no_change)

```

Call:

```
lm(formula = Vote ~ . - state - BioID, data = df_long_no_change)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.97173	-0.01672	-0.00456	0.00837	0.96082

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)	
(Intercept)	1.373e+00	4.488e-01	3.060	0.002244	**
district	1.056e-03	2.204e-04	4.791	1.80e-06	***
partyR	-9.684e-01	5.293e-03	-182.978	< 2e-16	***
birthday	-1.799e-04	2.285e-04	-0.787	0.431120	
genderM	1.008e-03	5.298e-03	0.190	0.849178	
nominate_dim1	-7.613e-02	1.676e-02	-4.542	5.94e-06	***

```

nominate_dim2      -3.746e-02  1.251e-02  -2.995  0.002783 **
GeographicalNE      3.872e-02  6.527e-03   5.932  3.57e-09 ***
GeographicalSO      1.341e-02  5.381e-03   2.492  0.012790 *
GeographicalWE      6.452e-03  6.438e-03   1.002  0.316359
Instance           1.112e-04  1.030e-04   1.079  0.280516
seniority          -2.143e-03  6.046e-04  -3.545  0.000403 ***
Contribution_minus -8.040e-08  8.633e-08  -0.931  0.351790
Contribution_plus   1.334e-06  9.545e-07   1.398  0.162324
Dmajority           1.133e-02  5.001e-03   2.266  0.023577 *
anti_env_dummy      -1.096e-02  7.555e-03  -1.451  0.146880
pro_env_dummy       4.386e-03  5.389e-03   0.814  0.415847
---

```

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.08503 on 1796 degrees of freedom

(401 observations deleted due to missingness)

Multiple R-squared: 0.9713, Adjusted R-squared: 0.971

F-statistic: 3798 on 16 and 1796 DF, p-value: < 2.2e-16

with state & year FE

```

ols_no_change_2 <- lm(Vote ~ as.factor(Geographical) + as.factor(Instance) + district + party
summary(ols_no_change_2)

```

Call:

```

lm(formula = Vote ~ as.factor(Geographical) + as.factor(Instance) +
    district + party + birthday + nominate_dim1 + nominate_dim2 +
    seniority + Contribution_minus + Contribution_plus + gender +
    pro_env_dummy + anti_env_dummy, data = df_long_no_change)

```

Residuals:

Min	1Q	Median	3Q	Max
-0.96882	-0.01703	-0.00472	0.00885	0.95921

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	1.374e+00	4.499e-01	3.053	0.002301 **
as.factor(Geographical)NE	3.864e-02	6.530e-03	5.918	3.91e-09 ***
as.factor(Geographical)SO	1.333e-02	5.383e-03	2.477	0.013352 *

```

as.factor(Geographical)WE 6.489e-03 6.440e-03 1.008 0.313821
as.factor(Instance)4      5.668e-03 6.954e-03 0.815 0.415118
as.factor(Instance)6      1.619e-02 7.084e-03 2.286 0.022398 *
as.factor(Instance)7      1.267e-02 7.499e-03 1.690 0.091241 .
as.factor(Instance)51     5.138e-03 7.049e-03 0.729 0.466117
as.factor(Instance)52     1.146e-02 7.086e-03 1.617 0.106064
district                  1.055e-03 2.205e-04 4.784 1.86e-06 ***
partyR                    -9.685e-01 5.298e-03 -182.794 < 2e-16 ***
birthday                  -1.812e-04 2.292e-04 -0.791 0.429233
nominate_dim1             -7.634e-02 1.677e-02 -4.553 5.65e-06 ***
nominate_dim2             -3.739e-02 1.251e-02 -2.988 0.002849 **
seniority                 -2.140e-03 6.070e-04 -3.526 0.000433 ***
Contribution_minus        -8.368e-08 8.647e-08 -0.968 0.333321
Contribution_plus         1.341e-06 9.551e-07 1.405 0.160324
genderM                   1.039e-03 5.301e-03 0.196 0.844713
pro_env_dummy             4.250e-03 5.392e-03 0.788 0.430654
anti_env_dummy            -1.093e-02 7.562e-03 -1.445 0.148700
---

```

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.08506 on 1793 degrees of freedom

(401 observations deleted due to missingness)

Multiple R-squared: 0.9713, Adjusted R-squared: 0.971

F-statistic: 3196 on 19 and 1793 DF, p-value: < 2.2e-16

Here, using geographical regions instead of state fixed effects creates more significant results.
Also, need to remove Majority because too specific?

with individual FEs

```

ols_no_change_3 <- lm(Vote ~ district + party + birthday + nominate_dim1 + nominate_dim2 + Instance +
summary(ols_no_change_3)

```

Call:

```

lm(formula = Vote ~ district + party + birthday + nominate_dim1 +
    nominate_dim2 + Instance + as.factor(BioID) + seniority +
    Contribution_minus + Contribution_plus + Dmajority, data = df_long_no_change)

```

Residuals:

Min	1Q	Median	3Q	Max
-0.24998	-0.00067	0.00030	0.00070	0.74730

Coefficients: (5 not defined because of singularities)

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	7.709e-01	2.866e+00	0.269	0.788
district	3.905e-03	7.520e-03	0.519	0.604
partyR	-1.000e+00	3.817e-02	-26.208	< 2e-16 ***
birthday	1.158e-04	1.451e-03	0.080	0.936
nominate_dim1	-1.167e-02	7.069e-02	-0.165	0.869
nominate_dim2	5.472e-04	5.465e-02	0.010	0.992
Instance	5.149e-05	5.302e-05	0.971	0.332
as.factor(BioID)A000367	-2.631e-03	5.220e-02	-0.050	0.960
as.factor(BioID)A000369	8.192e-04	2.870e-02	0.029	0.977
as.factor(BioID)A000370	-3.743e-02	7.066e-02	-0.530	0.596
as.factor(BioID)A000372	-3.620e-02	6.408e-02	-0.565	0.572
as.factor(BioID)A000374	-1.077e-02	2.214e-02	-0.486	0.627
as.factor(BioID)A000375	-6.725e-02	1.282e-01	-0.524	0.600
as.factor(BioID)A000376	-1.254e-01	2.625e-01	-0.478	0.633
as.factor(BioID)A000377	1.295e-03	2.319e-02	0.056	0.955
as.factor(BioID)A000378	-1.161e-02	4.089e-02	-0.284	0.776
as.factor(BioID)B000213	2.336e-03	4.136e-02	0.056	0.955
as.factor(BioID)B000287	-1.118e-01	2.403e-01	-0.465	0.642
as.factor(BioID)B000574	8.280e-03	2.604e-02	0.318	0.751
as.factor(BioID)B000755	-1.283e-02	3.356e-02	-0.382	0.702
as.factor(BioID)B000911	1.235e-03	2.941e-02	0.042	0.967
as.factor(BioID)B001227	1.549e-02	2.604e-02	0.595	0.552
as.factor(BioID)B001248	-8.541e-02	1.616e-01	-0.528	0.597
as.factor(BioID)B001250	1.254e-02	4.183e-02	0.300	0.764
as.factor(BioID)B001251	1.033e-02	2.234e-02	0.462	0.644
as.factor(BioID)B001255	1.615e-03	2.848e-02	0.057	0.955
as.factor(BioID)B001257	-3.538e-02	6.623e-02	-0.534	0.593
as.factor(BioID)B001260	-5.081e-02	9.098e-02	-0.558	0.577
as.factor(BioID)B001269	-3.466e-02	5.824e-02	-0.595	0.552
as.factor(BioID)B001270	-1.333e-01	2.640e-01	-0.505	0.614
as.factor(BioID)B001271	7.806e-03	4.007e-02	0.195	0.846
as.factor(BioID)B001273	-1.059e-02	2.893e-02	-0.366	0.714
as.factor(BioID)B001274	-7.386e-03	1.704e-02	-0.434	0.665
as.factor(BioID)B001275	-2.311e-02	3.797e-02	-0.609	0.543
as.factor(BioID)B001278	4.788e-03	2.267e-02	0.211	0.833
as.factor(BioID)B001281	-2.998e-03	1.595e-02	-0.188	0.851
as.factor(BioID)B001282	-1.574e-02	3.215e-02	-0.490	0.625
as.factor(BioID)B001283	6.381e-03	2.480e-02	0.257	0.797

as.factor(BioID)B001284	-1.135e-02	2.549e-02	-0.445	0.656
as.factor(BioID)B001285	-9.458e-02	1.764e-01	-0.536	0.592
as.factor(BioID)B001286	-6.064e-02	1.147e-01	-0.529	0.597
as.factor(BioID)B001289	7.308e-03	2.656e-02	0.275	0.783
as.factor(BioID)B001290	-1.415e-02	4.320e-02	-0.328	0.743
as.factor(BioID)B001291	-1.292e-01	2.401e-01	-0.538	0.591
as.factor(BioID)B001292	-2.376e-02	4.384e-02	-0.542	0.588
as.factor(BioID)B001293	-2.311e-02	4.212e-02	-0.549	0.583
as.factor(BioID)B001294	7.017e-03	2.667e-02	0.263	0.792
as.factor(BioID)B001295	-3.960e-02	6.790e-02	-0.583	0.560
as.factor(BioID)B001297	-5.649e-03	1.735e-02	-0.326	0.745
as.factor(BioID)B001298	-3.381e-03	2.911e-02	-0.116	0.908
as.factor(BioID)B001299	-6.254e-03	2.409e-02	-0.260	0.795
as.factor(BioID)B001300	-1.681e-01	3.358e-01	-0.501	0.617
as.factor(BioID)B001301	2.715e-03	4.909e-02	0.055	0.956
as.factor(BioID)B001302	-9.865e-03	3.342e-02	-0.295	0.768
as.factor(BioID)B001303	3.561e-03	2.247e-02	0.158	0.874
as.factor(BioID)B001304	-1.143e-02	2.602e-02	-0.439	0.660
as.factor(BioID)B001306	-4.280e-02	6.971e-02	-0.614	0.539
as.factor(BioID)B001307	-1.092e-02	2.958e-02	-0.369	0.712
as.factor(BioID)B001309	-2.705e-03	2.196e-02	-0.123	0.902
as.factor(BioID)C000266	1.497e-02	3.970e-02	0.377	0.706
as.factor(BioID)C000537	-2.366e-03	2.356e-02	-0.100	0.920
as.factor(BioID)C000714	-2.195e-02	6.599e-02	-0.333	0.739
as.factor(BioID)C000754	-4.469e-03	2.586e-02	-0.173	0.863
as.factor(BioID)C000984	-8.607e-03	3.426e-02	-0.251	0.802
as.factor(BioID)C001036	-7.421e-02	1.498e-01	-0.496	0.620
as.factor(BioID)C001037	-7.956e-03	3.994e-02	-0.199	0.842
as.factor(BioID)C001038	-3.846e-02	9.234e-02	-0.416	0.677
as.factor(BioID)C001045	6.818e-04	4.283e-02	0.016	0.987
as.factor(BioID)C001048	-1.025e-02	2.693e-02	-0.381	0.703
as.factor(BioID)C001051	-1.050e-01	1.941e-01	-0.541	0.589
as.factor(BioID)C001053	-2.009e-03	3.206e-02	-0.063	0.950
as.factor(BioID)C001055	2.401e-04	2.763e-02	0.009	0.993
as.factor(BioID)C001061	-5.104e-03	2.345e-02	-0.218	0.828
as.factor(BioID)C001066	-4.442e-02	9.873e-02	-0.450	0.653
as.factor(BioID)C001067	-2.283e-02	7.093e-02	-0.322	0.748
as.factor(BioID)C001068	-2.365e-02	4.942e-02	-0.479	0.632
as.factor(BioID)C001069	2.766e-03	1.741e-02	0.159	0.874
as.factor(BioID)C001072	-1.784e-02	5.798e-02	-0.308	0.758
as.factor(BioID)C001076	1.159e-03	2.001e-02	0.058	0.954
as.factor(BioID)C001078	-3.349e-02	6.285e-02	-0.533	0.594
as.factor(BioID)C001083	8.148e-03	2.669e-02	0.305	0.760

as.factor(BioID)C001084	4.312e-03	2.275e-02	0.190	0.850
as.factor(BioID)C001087	4.619e-03	1.882e-02	0.245	0.806
as.factor(BioID)C001091	-7.214e-02	1.514e-01	-0.476	0.634
as.factor(BioID)C001092	-9.703e-02	1.713e-01	-0.567	0.571
as.factor(BioID)C001093	-2.570e-02	4.889e-02	-0.526	0.599
as.factor(BioID)C001094	-2.150e-02	4.682e-02	-0.459	0.646
as.factor(BioID)C001097	-1.066e-01	2.082e-01	-0.512	0.609
as.factor(BioID)C001101	-1.206e-02	4.381e-02	-0.275	0.783
as.factor(BioID)C001103	4.806e-03	2.418e-02	0.199	0.842
as.factor(BioID)C001105	-3.338e-02	5.415e-02	-0.616	0.538
as.factor(BioID)C001107	9.018e-01	1.812e-01	4.976	7.32e-07 ***
as.factor(BioID)C001108	3.471e-03	1.733e-02	0.200	0.841
as.factor(BioID)C001109	3.572e-03	3.583e-02	0.100	0.921
as.factor(BioID)C001110	-1.765e-01	3.337e-01	-0.529	0.597
as.factor(BioID)C001111	-4.800e-02	8.343e-02	-0.575	0.565
as.factor(BioID)C001112	-9.093e-02	1.724e-01	-0.527	0.598
as.factor(BioID)C001114	-6.577e-03	2.311e-02	-0.285	0.776
as.factor(BioID)C001117	-1.901e-02	7.791e-02	-0.244	0.807
as.factor(BioID)C001118	-1.849e-02	4.112e-02	-0.450	0.653
as.factor(BioID)C001119	-8.772e-03	5.241e-02	-0.167	0.867
as.factor(BioID)C001120	-7.521e-03	2.691e-02	-0.280	0.780
as.factor(BioID)C001121	-2.440e-02	6.300e-02	-0.387	0.699
as.factor(BioID)D000096	-7.992e-03	2.901e-02	-0.276	0.783
as.factor(BioID)D000191	7.798e-03	2.610e-02	0.299	0.765
as.factor(BioID)D000197	1.272e-02	2.447e-02	0.520	0.603
as.factor(BioID)D000216	9.454e-03	2.516e-02	0.376	0.707
as.factor(BioID)D000533	1.872e-02	3.392e-02	0.552	0.581
as.factor(BioID)D000598	-1.918e-01	3.706e-01	-0.517	0.605
as.factor(BioID)D000604	-4.755e-02	8.710e-02	-0.546	0.585
as.factor(BioID)D000612	-3.063e-02	5.440e-02	-0.563	0.573
as.factor(BioID)D000614	-1.851e-02	3.558e-02	-0.520	0.603
as.factor(BioID)D000615	-1.690e-04	1.533e-02	-0.011	0.991
as.factor(BioID)D000616	-5.097e-03	1.811e-02	-0.281	0.778
as.factor(BioID)D000617	2.783e-03	1.847e-02	0.151	0.880
as.factor(BioID)D000619	-4.482e-02	7.758e-02	-0.578	0.564
as.factor(BioID)D000620	-1.726e-02	3.729e-02	-0.463	0.644
as.factor(BioID)D000621	-1.404e-02	4.046e-02	-0.347	0.729
as.factor(BioID)D000625	-3.698e-02	6.427e-02	-0.575	0.565
as.factor(BioID)D000626	-2.322e-02	4.993e-02	-0.465	0.642
as.factor(BioID)D000627	-3.523e-02	6.277e-02	-0.561	0.575
as.factor(BioID)D000628	-1.222e-03	2.438e-02	-0.050	0.960
as.factor(BioID)D000629	-1.328e-02	4.930e-02	-0.269	0.788
as.factor(BioID)D000630	-7.559e-02	1.488e-01	-0.508	0.612

as.factor(BioID)D000631	-1.261e-02	2.984e-02	-0.422	0.673
as.factor(BioID)E000179	-4.002e-02	9.333e-02	-0.429	0.668
as.factor(BioID)E000288	-7.268e-03	5.532e-02	-0.131	0.896
as.factor(BioID)E000290	-1.836e-03	3.700e-02	-0.050	0.960
as.factor(BioID)E000291	1.697e-03	2.170e-02	0.078	0.938
as.factor(BioID)E000293	-1.235e-02	2.864e-02	-0.431	0.666
as.factor(BioID)E000294	-1.460e-02	2.866e-02	-0.509	0.611
as.factor(BioID)E000297	-4.369e-02	8.975e-02	-0.487	0.626
as.factor(BioID)E000298	-6.322e-03	2.172e-02	-0.291	0.771
as.factor(BioID)E000299	-6.063e-02	1.260e-01	-0.481	0.631
as.factor(BioID)F000030	-5.582e-02	1.216e-01	-0.459	0.646
as.factor(BioID)F000372	-2.439e-02	5.668e-02	-0.430	0.667
as.factor(BioID)F000448	-1.257e-02	3.979e-02	-0.316	0.752
as.factor(BioID)F000449	7.045e-03	4.133e-02	0.170	0.865
as.factor(BioID)F000450	-2.949e-03	3.140e-02	-0.094	0.925
as.factor(BioID)F000451	-2.266e-02	4.483e-02	-0.505	0.613
as.factor(BioID)F000454	-3.452e-02	6.565e-02	-0.526	0.599
as.factor(BioID)F000455	-2.932e-02	6.919e-02	-0.424	0.672
as.factor(BioID)F000456	-1.437e-03	3.350e-02	-0.043	0.966
as.factor(BioID)F000458	-2.151e-02	4.663e-02	-0.461	0.645
as.factor(BioID)F000459	-2.818e-03	1.409e-02	-0.200	0.842
as.factor(BioID)F000460	-9.425e-02	1.778e-01	-0.530	0.596
as.factor(BioID)F000461	-5.455e-02	9.990e-02	-0.546	0.585
as.factor(BioID)F000462	-7.742e-02	1.452e-01	-0.533	0.594
as.factor(BioID)F000464	9.337e-01	1.170e-01	7.982	3.04e-15 ***
as.factor(BioID)F000465	-5.482e-03	1.422e-02	-0.385	0.700
as.factor(BioID)F000468	-2.677e-02	9.452e-02	-0.283	0.777
as.factor(BioID)G000289	-1.958e-03	3.821e-02	-0.051	0.959
as.factor(BioID)G000377	-2.853e-02	6.043e-02	-0.472	0.637
as.factor(BioID)G000535	5.091e-03	2.424e-02	0.210	0.834
as.factor(BioID)G000546	-8.685e-03	2.452e-02	-0.354	0.723
as.factor(BioID)G000548	-5.783e-04	2.256e-02	-0.026	0.980
as.factor(BioID)G000552	1.154e-02	2.661e-02	0.434	0.665
as.factor(BioID)G000553	-2.169e-02	4.779e-02	-0.454	0.650
as.factor(BioID)G000556	-2.610e-02	6.300e-02	-0.414	0.679
as.factor(BioID)G000558	1.640e-03	1.739e-02	0.094	0.925
as.factor(BioID)G000560	-4.216e-02	8.871e-02	-0.475	0.635
as.factor(BioID)G000563	-1.703e-02	3.003e-02	-0.567	0.571
as.factor(BioID)G000566	-3.652e-03	1.991e-02	-0.183	0.854
as.factor(BioID)G000568	-2.501e-02	4.316e-02	-0.579	0.562
as.factor(BioID)G000571	-4.003e-03	4.460e-02	-0.090	0.928
as.factor(BioID)G000576	-1.424e-02	2.484e-02	-0.573	0.566
as.factor(BioID)G000577	-1.711e-02	3.063e-02	-0.559	0.577

as.factor(BioID)G000579	-2.875e-02	5.273e-02	-0.545	0.586
as.factor(BioID)G000583	-1.906e-02	4.551e-02	-0.419	0.675
as.factor(BioID)G000584	5.976e-03	3.614e-02	0.165	0.869
as.factor(BioID)G000585	-1.285e-01	2.631e-01	-0.489	0.625
as.factor(BioID)G000586	-1.300e-02	5.670e-02	-0.229	0.819
as.factor(BioID)G000587	-1.054e-01	2.139e-01	-0.493	0.622
as.factor(BioID)G000588	-6.462e-02	1.134e-01	-0.570	0.569
as.factor(BioID)G000589	-1.540e-02	4.455e-02	-0.346	0.730
as.factor(BioID)G000590	-2.193e-02	3.861e-02	-0.568	0.570
as.factor(BioID)G000591	-8.728e-03	1.902e-02	-0.459	0.646
as.factor(BioID)G000592	-1.164e-02	4.680e-02	-0.249	0.804
as.factor(BioID)H000324	-5.477e-02	1.197e-01	-0.458	0.647
as.factor(BioID)H000636	-3.987e-02	8.435e-02	-0.473	0.636
as.factor(BioID)H000874	4.165e-03	2.784e-02	0.150	0.881
as.factor(BioID)H001034	-4.778e-02	1.053e-01	-0.454	0.650
as.factor(BioID)H001036	-1.778e-03	2.458e-02	-0.072	0.942
as.factor(BioID)H001038	-9.044e-02	1.794e-01	-0.504	0.614
as.factor(BioID)H001045	-1.064e-03	2.267e-02	-0.047	0.963
as.factor(BioID)H001047	-8.928e-03	2.845e-02	-0.314	0.754
as.factor(BioID)H001048	-1.855e-01	3.601e-01	-0.515	0.607
as.factor(BioID)H001050	5.873e-03	2.521e-02	0.233	0.816
as.factor(BioID)H001052	8.079e-03	2.193e-02	0.368	0.713
as.factor(BioID)H001053	-6.053e-03	1.687e-02	-0.359	0.720
as.factor(BioID)H001055	-3.102e-03	3.605e-02	-0.086	0.931
as.factor(BioID)H001056	-5.583e-03	1.584e-02	-0.352	0.725
as.factor(BioID)H001057	8.833e-03	3.108e-02	0.284	0.776
as.factor(BioID)H001059	-4.489e-02	8.357e-02	-0.537	0.591
as.factor(BioID)H001063	-1.618e-01	3.152e-01	-0.513	0.608
as.factor(BioID)H001064	-3.183e-02	5.836e-02	-0.545	0.586
as.factor(BioID)H001066	-1.291e-02	4.127e-02	-0.313	0.755
as.factor(BioID)H001068	-9.325e-04	4.006e-02	-0.023	0.981
as.factor(BioID)H001071	-2.807e-02	5.721e-02	-0.491	0.624
as.factor(BioID)H001072	-6.844e-04	2.604e-02	-0.026	0.979
as.factor(BioID)H001073	-8.607e-02	1.575e-01	-0.546	0.585
as.factor(BioID)H001074	-3.190e-02	6.192e-02	-0.515	0.606
as.factor(BioID)H001077	-4.568e-03	1.443e-02	-0.317	0.752
as.factor(BioID)H001078	-1.706e-02	2.970e-02	-0.574	0.566
as.factor(BioID)H001081	-1.978e-02	4.764e-02	-0.415	0.678
as.factor(BioID)H001085	-2.359e-02	5.064e-02	-0.466	0.641
as.factor(BioID)H001088	-7.266e-04	2.463e-02	-0.029	0.976
as.factor(BioID)I000057	3.841e-03	2.170e-02	0.177	0.860
as.factor(BioID)J000032	-5.135e-02	1.125e-01	-0.457	0.648
as.factor(BioID)J000126	-9.491e-02	1.920e-01	-0.494	0.621

as.factor(BioID)J000174	1.467e-02	5.491e-02	0.267	0.789
as.factor(BioID)J000288	-3.595e-03	2.110e-02	-0.170	0.865
as.factor(BioID)J000289	-1.582e-03	1.757e-02	-0.090	0.928
as.factor(BioID)J000290	3.913e-03	2.502e-02	0.156	0.876
as.factor(BioID)J000292	-1.316e-02	2.811e-02	-0.468	0.640
as.factor(BioID)J000294	-2.416e-02	6.409e-02	-0.377	0.706
as.factor(BioID)J000295	-4.853e-02	7.990e-02	-0.607	0.544
as.factor(BioID)J000297	-5.330e-03	2.583e-02	-0.206	0.837
as.factor(BioID)J000298	-2.081e-02	7.195e-02	-0.289	0.772
as.factor(BioID)J000299	-1.023e-02	2.128e-02	-0.481	0.631
as.factor(BioID)J000301	1.473e-03	2.296e-02	0.064	0.949
as.factor(BioID)J000302	-4.573e-02	7.631e-02	-0.599	0.549
as.factor(BioID)K000009	-1.245e-02	4.258e-02	-0.292	0.770
as.factor(BioID)K000188	2.588e-03	1.861e-02	0.139	0.889
as.factor(BioID)K000210	1.135e-02	6.636e-02	0.171	0.864
as.factor(BioID)K000362	3.785e-03	2.620e-02	0.144	0.885
as.factor(BioID)K000363	8.963e-03	4.399e-02	0.204	0.839
as.factor(BioID)K000375	-2.683e-02	5.033e-02	-0.533	0.594
as.factor(BioID)K000378	-5.723e-02	1.053e-01	-0.543	0.587
as.factor(BioID)K000379	-9.880e-03	5.511e-02	-0.179	0.858
as.factor(BioID)K000381	-1.889e-02	4.800e-02	-0.394	0.694
as.factor(BioID)K000382	-1.323e-03	1.548e-02	-0.085	0.932
as.factor(BioID)K000385	6.172e-04	1.687e-02	0.037	0.971
as.factor(BioID)K000386	9.101e-01	1.552e-01	5.863	5.68e-09 ***
as.factor(BioID)K000388	4.574e-03	1.863e-02	0.246	0.806
as.factor(BioID)K000389	-6.273e-02	1.392e-01	-0.451	0.652
as.factor(BioID)K000390	-1.278e-02	5.710e-02	-0.224	0.823
as.factor(BioID)K000391	-2.802e-02	6.277e-02	-0.446	0.655
as.factor(BioID)K000392	-2.579e-02	4.438e-02	-0.581	0.561
as.factor(BioID)K000394	-1.257e-02	5.659e-02	-0.222	0.824
as.factor(BioID)K000395	-4.369e-02	7.217e-02	-0.605	0.545
as.factor(BioID)L000263	-9.553e-03	4.423e-02	-0.216	0.829
as.factor(BioID)L000287	6.680e-03	2.434e-02	0.274	0.784
as.factor(BioID)L000480	-4.326e-02	9.496e-02	-0.456	0.649
as.factor(BioID)L000491	6.209e-03	2.030e-02	0.306	0.760
as.factor(BioID)L000554	1.025e-02	5.912e-02	0.173	0.862
as.factor(BioID)L000557	1.254e-02	2.686e-02	0.467	0.641
as.factor(BioID)L000559	5.191e-03	2.124e-02	0.244	0.807
as.factor(BioID)L000560	4.903e-03	2.311e-02	0.212	0.832
as.factor(BioID)L000562	-1.735e-02	4.258e-02	-0.408	0.684
as.factor(BioID)L000563	-2.698e-03	2.184e-02	-0.124	0.902
as.factor(BioID)L000564	-4.951e-03	1.843e-02	-0.269	0.788
as.factor(BioID)L000565	3.351e-03	2.028e-02	0.165	0.869

as.factor(BioID)L000566	-6.574e-03	1.891e-02	-0.348	0.728
as.factor(BioID)L000569	-3.610e-04	2.865e-02	-0.013	0.990
as.factor(BioID)L000573	8.348e-03	3.157e-02	0.264	0.792
as.factor(BioID)L000576	-1.628e-02	2.987e-02	-0.545	0.586
as.factor(BioID)L000578	5.290e-03	2.934e-02	0.180	0.857
as.factor(BioID)L000579	-1.738e-01	3.309e-01	-0.525	0.599
as.factor(BioID)L000580	3.286e-03	1.807e-02	0.182	0.856
as.factor(BioID)L000581	-4.753e-02	9.115e-02	-0.521	0.602
as.factor(BioID)L000583	-3.380e-02	6.327e-02	-0.534	0.593
as.factor(BioID)L000584	-8.399e-03	2.169e-02	-0.387	0.699
as.factor(BioID)L000586	-1.578e-02	2.774e-02	-0.569	0.570
as.factor(BioID)L000587	8.699e-04	2.877e-02	0.030	0.976
as.factor(BioID)L000590	-1.217e-02	3.298e-02	-0.369	0.712
as.factor(BioID)L000591	-9.045e-03	4.391e-02	-0.206	0.837
as.factor(BioID)L000592	-3.230e-02	7.495e-02	-0.431	0.667
as.factor(BioID)L000593	-1.904e-01	3.727e-01	-0.511	0.609
as.factor(BioID)M000087	-2.729e-02	6.439e-02	-0.424	0.672
as.factor(BioID)M000312	1.025e-02	3.064e-02	0.335	0.738
as.factor(BioID)M000404	9.311e-05	3.459e-02	0.003	0.998
as.factor(BioID)M000689	-4.994e-03	4.533e-02	-0.110	0.912
as.factor(BioID)M001137	-2.258e-03	2.352e-02	-0.096	0.924
as.factor(BioID)M001143	-5.741e-04	2.015e-02	-0.028	0.977
as.factor(BioID)M001144	1.372e-02	3.492e-02	0.393	0.694
as.factor(BioID)M001150	-2.472e-02	5.656e-02	-0.437	0.662
as.factor(BioID)M001151	-5.708e-02	1.043e-01	-0.547	0.584
as.factor(BioID)M001156	-2.674e-02	5.849e-02	-0.457	0.648
as.factor(BioID)M001157	-2.718e-02	5.059e-02	-0.537	0.591
as.factor(BioID)M001158	-7.826e-02	1.484e-01	-0.528	0.598
as.factor(BioID)M001159	-7.621e-03	2.036e-02	-0.374	0.708
as.factor(BioID)M001160	-1.650e-03	2.286e-02	-0.072	0.942
as.factor(BioID)M001166	-2.455e-02	4.790e-02	-0.513	0.608
as.factor(BioID)M001180	5.278e-03	5.353e-02	0.099	0.921
as.factor(BioID)M001182	-6.727e-03	4.120e-02	-0.163	0.870
as.factor(BioID)M001184	-5.355e-03	4.292e-02	-0.125	0.901
as.factor(BioID)M001187	-3.275e-02	5.939e-02	-0.551	0.581
as.factor(BioID)M001188	-1.831e-02	5.696e-02	-0.321	0.748
as.factor(BioID)M001189	-1.422e-02	2.923e-02	-0.487	0.627
as.factor(BioID)M001191	-6.548e-02	1.399e-01	-0.468	0.640
as.factor(BioID)M001193	-6.878e-03	3.326e-02	-0.207	0.836
as.factor(BioID)M001195	-7.992e-04	1.348e-02	-0.059	0.953
as.factor(BioID)M001196	-2.097e-02	5.313e-02	-0.395	0.693
as.factor(BioID)M001200	-1.175e-02	2.723e-02	-0.431	0.666
as.factor(BioID)M001201	-3.333e-02	5.449e-02	-0.612	0.541

as.factor(BioID)M001202	-2.773e-02	5.885e-02	-0.471	0.638
as.factor(BioID)M001203	-2.708e-02	5.025e-02	-0.539	0.590
as.factor(BioID)M001204	-3.194e-02	5.054e-02	-0.632	0.528
as.factor(BioID)M001206	-9.479e-02	1.757e-01	-0.540	0.590
as.factor(BioID)N000015	1.820e-02	2.954e-02	0.616	0.538
as.factor(BioID)N000127	-2.188e-02	4.092e-02	-0.535	0.593
as.factor(BioID)N000181	-7.359e-02	1.451e-01	-0.507	0.612
as.factor(BioID)N000182	-5.614e-02	1.108e-01	-0.507	0.612
as.factor(BioID)N000184	8.093e-03	2.508e-02	0.323	0.747
as.factor(BioID)N000185	-3.112e-02	5.954e-02	-0.523	0.601
as.factor(BioID)N000188	3.633e-03	2.464e-02	0.147	0.883
as.factor(BioID)N000189	-9.627e-03	2.773e-02	-0.347	0.729
as.factor(BioID)N000190	-8.854e-03	2.431e-02	-0.364	0.716
as.factor(BioID)N000191	-8.455e-03	5.472e-02	-0.155	0.877
as.factor(BioID)O000168	-7.479e-02	1.415e-01	-0.529	0.597
as.factor(BioID)O000170	-5.372e-02	1.219e-01	-0.441	0.660
as.factor(BioID)O000171	-3.611e-04	2.834e-02	-0.013	0.990
as.factor(BioID)O000172	-5.743e-02	1.483e-01	-0.387	0.699
as.factor(BioID)O000173	-2.137e-02	8.985e-02	-0.238	0.812
as.factor(BioID)P000034	1.037e-03	2.712e-02	0.038	0.970
as.factor(BioID)P000096	-1.654e-02	4.482e-02	-0.369	0.712
as.factor(BioID)P000258	-7.588e-01	3.136e-02	-24.198	< 2e-16 ***
as.factor(BioID)P000373	-4.084e-02	8.844e-02	-0.462	0.644
as.factor(BioID)P000523	6.506e-03	3.121e-02	0.208	0.835
as.factor(BioID)P000588	6.918e-03	4.693e-02	0.147	0.883
as.factor(BioID)P000591	-6.764e-03	3.033e-02	-0.223	0.824
as.factor(BioID)P000592	8.302e-03	4.265e-02	0.195	0.846
as.factor(BioID)P000593	-1.733e-02	3.544e-02	-0.489	0.625
as.factor(BioID)P000594	-1.006e-03	1.931e-02	-0.052	0.958
as.factor(BioID)P000597	6.148e-03	2.244e-02	0.274	0.784
as.factor(BioID)P000598	-1.195e-03	5.467e-02	-0.022	0.983
as.factor(BioID)P000599	-1.868e-02	3.464e-02	-0.539	0.590
as.factor(BioID)P000601	-6.798e-03	2.213e-02	-0.307	0.759
as.factor(BioID)P000602	-1.858e-03	2.072e-02	-0.090	0.929
as.factor(BioID)P000604	-2.922e-02	6.623e-02	-0.441	0.659
as.factor(BioID)P000606	-2.367e-02	4.174e-02	-0.567	0.571
as.factor(BioID)P000607	1.202e-04	4.696e-02	0.003	0.998
as.factor(BioID)P000609	-1.315e-02	2.677e-02	-0.491	0.623
as.factor(BioID)P000611	2.377e-04	3.805e-02	0.006	0.995
as.factor(BioID)P000614	-6.013e-03	4.507e-02	-0.133	0.894
as.factor(BioID)P000615	-1.912e-02	3.172e-02	-0.603	0.547
as.factor(BioID)P000616	-1.193e-02	3.330e-02	-0.358	0.720
as.factor(BioID)P000617	-2.776e-02	9.081e-02	-0.306	0.760

as.factor(BioID)Q000023	-1.090e-02	2.855e-02	-0.382	0.703
as.factor(BioID)R000053	-2.339e-02	6.440e-02	-0.363	0.717
as.factor(BioID)R000395	4.264e-03	5.927e-02	0.072	0.943
as.factor(BioID)R000409	-1.617e-01	3.215e-01	-0.503	0.615
as.factor(BioID)R000486	-1.350e-01	2.704e-01	-0.499	0.618
as.factor(BioID)R000487	-1.288e-01	2.581e-01	-0.499	0.618
as.factor(BioID)R000515	1.666e-02	2.746e-02	0.607	0.544
as.factor(BioID)R000575	1.142e-03	2.089e-02	0.055	0.956
as.factor(BioID)R000576	5.356e-03	2.266e-02	0.236	0.813
as.factor(BioID)R000577	-3.907e-02	9.861e-02	-0.396	0.692
as.factor(BioID)R000582	8.831e-03	5.305e-02	0.166	0.868
as.factor(BioID)R000583	-5.590e-02	1.077e-01	-0.519	0.604
as.factor(BioID)R000586	-5.284e-02	9.390e-02	-0.563	0.574
as.factor(BioID)R000587	-1.929e-02	4.184e-02	-0.461	0.645
as.factor(BioID)R000588	-1.245e-04	4.636e-02	-0.003	0.998
as.factor(BioID)R000591	-1.579e-03	2.844e-02	-0.056	0.956
as.factor(BioID)R000592	-4.509e-03	1.845e-02	-0.244	0.807
as.factor(BioID)R000593	-4.740e-02	8.785e-02	-0.540	0.590
as.factor(BioID)R000597	-1.763e-02	3.031e-02	-0.582	0.561
as.factor(BioID)R000598	-3.763e-02	6.791e-02	-0.554	0.580
as.factor(BioID)R000601	-6.295e-03	1.884e-02	-0.334	0.738
as.factor(BioID)R000602	-1.172e-02	2.721e-02	-0.431	0.667
as.factor(BioID)R000603	-2.042e-02	3.987e-02	-0.512	0.609
as.factor(BioID)R000604	-1.192e-02	2.298e-02	-0.519	0.604
as.factor(BioID)R000606	-2.583e-02	6.186e-02	-0.418	0.676
as.factor(BioID)R000607	9.308e-01	1.191e-01	7.819	1.06e-14 ***
as.factor(BioID)R000610	-5.427e-02	9.785e-02	-0.555	0.579
as.factor(BioID)R000612	-1.809e-02	3.260e-02	-0.555	0.579
as.factor(BioID)R000614	-7.648e-02	1.562e-01	-0.490	0.624
as.factor(BioID)S000018	-4.545e-03	2.770e-02	-0.164	0.870
as.factor(BioID)S000030	-1.628e-01	3.281e-01	-0.496	0.620
as.factor(BioID)S000185	8.619e-03	2.375e-02	0.363	0.717
as.factor(BioID)S000248	-3.507e-02	8.591e-02	-0.408	0.683
as.factor(BioID)S000364	-4.056e-02	8.213e-02	-0.494	0.622
as.factor(BioID)S000480	-7.062e-02	1.498e-01	-0.472	0.637
as.factor(BioID)S000510	-2.084e-02	5.630e-02	-0.370	0.711
as.factor(BioID)S000583	-5.739e-02	1.201e-01	-0.478	0.633
as.factor(BioID)S001145	-1.573e-02	4.796e-02	-0.328	0.743
as.factor(BioID)S001148	7.245e-03	4.320e-02	0.168	0.867
as.factor(BioID)S001154	-2.059e-02	4.339e-02	-0.474	0.635
as.factor(BioID)S001156	-1.353e-01	2.807e-01	-0.482	0.630
as.factor(BioID)S001157	-3.753e-02	7.278e-02	-0.516	0.606
as.factor(BioID)S001165	-1.894e-02	4.202e-02	-0.451	0.652

as.factor(BioID)S001168	-7.321e-04	2.430e-02	-0.030	0.976
as.factor(BioID)S001170	5.305e-03	2.338e-02	0.227	0.821
as.factor(BioID)S001172	1.241e-04	1.129e-02	0.011	0.991
as.factor(BioID)S001175	-4.353e-02	8.782e-02	-0.496	0.620
as.factor(BioID)S001176	8.317e-03	2.234e-02	0.372	0.710
as.factor(BioID)S001180	-1.170e-02	2.635e-02	-0.444	0.657
as.factor(BioID)S001185	-1.992e-02	5.618e-02	-0.354	0.723
as.factor(BioID)S001187	-5.171e-02	8.957e-02	-0.577	0.564
as.factor(BioID)S001188	3.751e-03	2.920e-02	0.128	0.898
as.factor(BioID)S001189	-2.201e-02	4.403e-02	-0.500	0.617
as.factor(BioID)S001190	-3.580e-02	6.397e-02	-0.560	0.576
as.factor(BioID)S001192	8.085e-04	2.117e-02	0.038	0.970
as.factor(BioID)S001195	-2.363e-02	5.486e-02	-0.431	0.667
as.factor(BioID)S001200	-3.343e-02	7.929e-02	-0.422	0.673
as.factor(BioID)S001201	-9.751e-03	2.086e-02	-0.467	0.640
as.factor(BioID)S001205	-1.517e-02	3.608e-02	-0.420	0.674
as.factor(BioID)S001207	-4.426e-02	8.616e-02	-0.514	0.608
as.factor(BioID)S001209	-2.954e-02	6.844e-02	-0.432	0.666
as.factor(BioID)S001212	-2.954e-02	4.496e-02	-0.657	0.511
as.factor(BioID)S001213	-3.522e-03	1.950e-02	-0.181	0.857
as.factor(BioID)S001214	-6.252e-02	1.242e-01	-0.504	0.615
as.factor(BioID)S001215	-4.371e-02	1.035e-01	-0.422	0.673
as.factor(BioID)S001216	-3.093e-02	6.824e-02	-0.453	0.650
as.factor(BioID)T000193	1.296e-02	2.342e-02	0.553	0.580
as.factor(BioID)T000238	-3.104e-02	6.734e-02	-0.461	0.645
as.factor(BioID)T000462	-3.195e-02	6.623e-02	-0.482	0.630
as.factor(BioID)T000463	-2.759e-02	5.052e-02	-0.546	0.585
as.factor(BioID)T000465	1.014e-03	1.582e-02	0.064	0.949
as.factor(BioID)T000468	4.512e-03	1.984e-02	0.227	0.820
as.factor(BioID)T000469	-6.664e-02	1.311e-01	-0.508	0.611
as.factor(BioID)T000470	-1.560e-03	3.220e-02	-0.048	0.961
as.factor(BioID)T000474	-1.318e-01	2.551e-01	-0.516	0.606
as.factor(BioID)T000475	-3.617e-02	6.051e-02	-0.598	0.550
as.factor(BioID)T000477	-2.428e-03	1.864e-02	-0.130	0.896
as.factor(BioID)T000479	-7.206e-03	2.184e-02	-0.330	0.741
as.factor(BioID)T000480	-1.339e-02	3.698e-02	-0.362	0.717
as.factor(BioID)T000482	-1.071e-02	4.343e-02	-0.247	0.805
as.factor(BioID)U000040	-5.346e-02	1.391e-01	-0.384	0.701
as.factor(BioID)V000081	-6.742e-03	4.218e-02	-0.160	0.873
as.factor(BioID)V000108	1.922e-02	2.823e-02	0.681	0.496
as.factor(BioID)V000133	9.919e-01	4.477e-02	22.153	< 2e-16 ***
as.factor(BioID)W000187	-1.431e-01	2.926e-01	-0.489	0.625
as.factor(BioID)W000413	1.624e-02	6.635e-02	0.245	0.807

as.factor(BioID)W000791	7.264e-03	4.404e-02	0.165	0.869
as.factor(BioID)W000795	9.593e-03	4.092e-02	0.234	0.815
as.factor(BioID)W000796	5.715e-03	2.806e-02	0.204	0.839
as.factor(BioID)W000799	5.828e-03	2.075e-02	0.281	0.779
as.factor(BioID)W000804	7.735e-03	3.721e-02	0.208	0.835
as.factor(BioID)W000808	-8.247e-02	1.565e-01	-0.527	0.598
as.factor(BioID)W000809	-3.638e-03	2.132e-02	-0.171	0.865
as.factor(BioID)W000810	-1.745e-02	3.674e-02	-0.475	0.635
as.factor(BioID)W000812	-7.130e-04	2.054e-02	-0.035	0.972
as.factor(BioID)W000813	1.178e-04	1.682e-02	0.007	0.994
as.factor(BioID)W000814	-4.244e-02	7.968e-02	-0.533	0.594
as.factor(BioID)W000815	1.359e-03	1.927e-02	0.071	0.944
as.factor(BioID)W000816	-8.659e-02	1.571e-01	-0.551	0.582
as.factor(BioID)W000820	-1.683e-01	3.138e-01	-0.536	0.592
as.factor(BioID)W000821	-8.452e-03	1.709e-02	-0.494	0.621
as.factor(BioID)W000822	-3.691e-02	7.422e-02	-0.497	0.619
as.factor(BioID)W000825	-3.821e-02	8.010e-02	-0.477	0.633
as.factor(BioID)W000826	-2.537e-02	4.580e-02	-0.554	0.580
as.factor(BioID)Y000033	2.382e-02	9.158e-02	0.260	0.795
as.factor(BioID)Y000062	NA	NA	NA	NA
as.factor(BioID)Y000063	NA	NA	NA	NA
as.factor(BioID)Y000065	NA	NA	NA	NA
as.factor(BioID)Y000066	NA	NA	NA	NA
as.factor(BioID)Z000017	NA	NA	NA	NA
seniority	-1.109e-03	1.426e-03	-0.778	0.437
Contribution_minus	2.244e-09	4.203e-08	0.053	0.957
Contribution_plus	-2.542e-07	3.247e-07	-0.783	0.434
Dmajority	5.886e-03	4.277e-03	1.376	0.169

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.0234 on 1365 degrees of freedom

(401 observations deleted due to missingness)

Multiple R-squared: 0.9983, Adjusted R-squared: 0.9978

F-statistic: 1845 on 447 and 1365 DF, p-value: < 2.2e-16

For this, since fixing individuals is so specific, we need to remove the anti and pro env. dummy, since they are already included in the individual fixed effects. (if a rep receives contribution once, this is automatically 1, i.e. never changes for an individual).

LPM with vote changing Representatives

Here is what this dataframe looks like

```
kable(df_vote_change[1:10, ], format = "html")
```

BioID	GovtrackID	opensecrets_id	first_name	last_name	state	district	party	name	Vote
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	
C001059	400618	N00026341	Jim	Costa	CA	NA	D	costa jim	

with control variables

Using the same model as above with the same specifications (control variables, then generous FE (state, year), then strict FE (individuals)) but using only those representatives that changed their voting behavior over time.

```
df_vote_change <- df_vote_change %>% select(-c(GovtrackID, opensecrets_id, Vote_change_dummy)
view(df_vote_change)
ols_change <- lm(Vote ~ . - state - anti_env_dummy - BioID, data = df_vote_change)
summary(ols_change)
```

Call:

```
lm(formula = Vote ~ . - state - anti_env_dummy - BioID, data = df_vote_change)
```

Residuals:

Min	1Q	Median	3Q	Max
-1.00649	-0.30235	0.07587	0.29972	0.75138

Coefficients:

Estimate	Std. Error	t value	Pr(> t)
----------	------------	---------	----------

```

(Intercept)      7.682e+00  1.559e+01   0.493 0.623178
district         5.401e-03  5.001e-03   1.080 0.282589
partyR          -3.183e-01  2.029e-01  -1.568 0.119814
birthday        -3.649e-03  7.935e-03  -0.460 0.646620
genderM         -2.670e-01  2.155e-01  -1.239 0.218139
nominate_dim1    6.525e-01  7.308e-01   0.893 0.374008
nominate_dim2   -3.408e-01  4.406e-01  -0.773 0.441032
GeographicalNE   -1.227e-03  2.135e-01  -0.006 0.995424
GeographicalSO   -7.972e-02  2.828e-01  -0.282 0.778609
GeographicalWE   -1.248e-01  2.223e-01  -0.561 0.575740
Instance         8.193e-03  2.148e-03   3.814 0.000232 ***
seniority        9.759e-03  1.703e-02   0.573 0.567804
Contribution_minus -2.458e-06  2.092e-06  -1.175 0.242836
Contribution_plus  8.536e-06  7.756e-06   1.101 0.273638
Dmajority        4.639e-01  1.275e-01   3.637 0.000430 ***
pro_env_dummy    -1.551e-02  1.276e-01  -0.122 0.903513
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Residual standard error: 0.4378 on 104 degrees of freedom

(66 observations deleted due to missingness)

Multiple R-squared: 0.3288, Adjusted R-squared: 0.232

F-statistic: 3.397 on 15 and 104 DF, p-value: 0.0001125

Compared to before we see multiple things, on the one hand the Adjusted R^2 is lower than in the other models where it averages to about 0.91, here only 0.25. This is because the model is more specific, i.e. only includes those representatives who changed their voting behavior, which are only 23 in total out of 574 (?), whereas there are 31 changes in votes to be seen in total.

So, we need to take all these results with caution, since 23 out of 547 (?) is not an incredibly small sample size, and thus makes the model less robust.

Here, we need to remove the anti_env_dummy and district because of singularities, because all have received anti_env contributions, so the coefficient is not defined. -> remove district too, too few obs.

with geography & year FEs

```

ols_change_fe <- lm(Vote ~ as.factor(Geographical) + as.factor(Instance) + party + birthday +
summary(ols_change_fe)

```

Call:

```
lm(formula = Vote ~ as.factor(Geographical) + as.factor(Instance) +  
    party + birthday + district + nominate_dim1 + nominate_dim2 +  
    seniority + Contribution_minus + Contribution_plus + gender +  
    pro_env_dummy, data = df_vote_change)
```

Residuals:

Min	1Q	Median	3Q	Max
-0.93366	-0.27796	0.04251	0.32263	0.80871

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	6.041e+00	1.573e+01	0.384	0.70181
as.factor(Geographical)NE	5.853e-04	2.140e-01	0.003	0.99782
as.factor(Geographical)SO	-7.255e-02	2.840e-01	-0.255	0.79887
as.factor(Geographical)WE	-1.184e-01	2.233e-01	-0.530	0.59708
as.factor(Instance)4	-7.420e-02	1.340e-01	-0.554	0.58112
as.factor(Instance)6	5.216e-01	1.678e-01	3.109	0.00244 **
as.factor(Instance)7	3.545e-01	1.764e-01	2.009	0.04717 *
as.factor(Instance)51	4.107e-01	1.419e-01	2.894	0.00466 **
as.factor(Instance)52	2.803e-01	1.454e-01	1.928	0.05669 .
partyR	-3.201e-01	2.036e-01	-1.572	0.11898
birthday	-2.798e-03	8.011e-03	-0.349	0.72760
district	5.972e-03	5.025e-03	1.189	0.23742
nominate_dim1	6.893e-01	7.326e-01	0.941	0.34904
nominate_dim2	-3.607e-01	4.421e-01	-0.816	0.41652
seniority	1.310e-02	1.722e-02	0.761	0.44847
Contribution_minus	-2.526e-06	2.114e-06	-1.195	0.23498
Contribution_plus	1.036e-05	7.892e-06	1.313	0.19214
genderM	-2.629e-01	2.163e-01	-1.216	0.22696
pro_env_dummy	-1.741e-02	1.282e-01	-0.136	0.89229

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.4386 on 101 degrees of freedom

(66 observations deleted due to missingness)

Multiple R-squared: 0.3457, Adjusted R-squared: 0.2291

F-statistic: 2.965 on 18 and 101 DF, p-value: 0.0002896

Here remove majority because it is a singularity...

checking differences in party

```
ols_change_D <- lm(Vote ~ . - party - Geographical - anti_env_dummy - BioID, data = df_vote_
summary(ols_change_D)
```

Call:

```
lm(formula = Vote ~ . - party - Geographical - anti_env_dummy -
    BioID, data = df_vote_change)
```

Residuals:

Min	1Q	Median	3Q	Max
-1.0164	-0.3278	0.0429	0.2995	0.8962

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	1.072e+01	1.949e+01	0.550	0.583673
stateCO	-2.034e-01	5.308e-01	-0.383	0.702346
stateFL	-7.737e-02	3.869e-01	-0.200	0.841917
stateGA	3.749e-01	5.107e-01	0.734	0.464620
stateIL	-2.830e-01	5.646e-01	-0.501	0.617421
stateMI	2.293e-01	4.951e-01	0.463	0.644365
stateNJ	2.613e-02	5.379e-01	0.049	0.961360
stateNY	-3.661e-02	3.053e-01	-0.120	0.904795
statePA	2.047e-01	5.702e-01	0.359	0.720457
stateSC	3.698e-01	6.041e-01	0.612	0.541840
stateTX	5.822e-01	3.472e-01	1.677	0.096807 .
stateWA	5.284e-02	5.589e-01	0.095	0.924865
district	-1.193e-03	2.060e-02	-0.058	0.953920
birthday	-5.217e-03	9.841e-03	-0.530	0.597221
genderM	-4.623e-01	2.729e-01	-1.694	0.093453 .
nominate_dim1	8.089e-01	1.223e+00	0.661	0.509949
nominate_dim2	-9.481e-01	6.998e-01	-1.355	0.178647
Instance	8.516e-03	2.192e-03	3.885	0.000187 ***
seniority	5.952e-03	2.124e-02	0.280	0.779924
Contribution_minus	-1.686e-06	2.394e-06	-0.704	0.483012
Contribution_plus	9.598e-06	8.021e-06	1.197	0.234354
Dmajority	4.976e-01	1.311e-01	3.794	0.000258 ***
pro_env_dummy	-7.757e-02	1.451e-01	-0.534	0.594236

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.44 on 97 degrees of freedom
 (66 observations deleted due to missingness)
 Multiple R-squared: 0.3678, Adjusted R-squared: 0.2244
 F-statistic: 2.565 on 22 and 97 DF, p-value: 0.0008507

```
ols_change_R <- lm(Vote ~ . - party - Geographical - anti_env_dummy - BioID, data = df_vote_change)
summary(ols_change_R)
```

Call:

```
lm(formula = Vote ~ . - party - Geographical - anti_env_dummy - BioID, data = df_vote_change)
```

Residuals:

Min	1Q	Median	3Q	Max
-1.0164	-0.3278	0.0429	0.2995	0.8962

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	1.072e+01	1.949e+01	0.550	0.583673
stateCO	-2.034e-01	5.308e-01	-0.383	0.702346
stateFL	-7.737e-02	3.869e-01	-0.200	0.841917
stateGA	3.749e-01	5.107e-01	0.734	0.464620
stateIL	-2.830e-01	5.646e-01	-0.501	0.617421
stateMI	2.293e-01	4.951e-01	0.463	0.644365
stateNJ	2.613e-02	5.379e-01	0.049	0.961360
stateNY	-3.661e-02	3.053e-01	-0.120	0.904795
statePA	2.047e-01	5.702e-01	0.359	0.720457
stateSC	3.698e-01	6.041e-01	0.612	0.541840
stateTX	5.822e-01	3.472e-01	1.677	0.096807
stateWA	5.284e-02	5.589e-01	0.095	0.924865
district	-1.193e-03	2.060e-02	-0.058	0.953920
birthday	-5.217e-03	9.841e-03	-0.530	0.597221
genderM	-4.623e-01	2.729e-01	-1.694	0.093453
nominate_dim1	8.089e-01	1.223e+00	0.661	0.509949
nominate_dim2	-9.481e-01	6.998e-01	-1.355	0.178647
Instance	8.516e-03	2.192e-03	3.885	0.000187 ***
seniority	5.952e-03	2.124e-02	0.280	0.779924
Contribution_minus	-1.686e-06	2.394e-06	-0.704	0.483012
Contribution_plus	9.598e-06	8.021e-06	1.197	0.234354
Dmajority	4.976e-01	1.311e-01	3.794	0.000258 ***

```

pro_env_dummy      -7.757e-02  1.451e-01  -0.534  0.594236
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.44 on 97 degrees of freedom
(66 observations deleted due to missingness)
Multiple R-squared:  0.3678,    Adjusted R-squared:  0.2244
F-statistic: 2.565 on 22 and 97 DF,  p-value: 0.0008507

```

We remove anti_env_dummy because of singularities, since all representatives have received contributions from anti environmental groups.

Already here we can see that the coefficients are less significant on average with only instance being significant, with 0.01 units more likely to change their vote from anti to pro environmental vote, further during the years. Moreover, we see that for a change in vote from anti-environmental to pro-environmental

with individual & year FEs

```

view(df_vote_change)
ols_change_ind_fe <- lm(Vote ~ as.factor(BioID) + as.factor(Instance) + Contribution_minus +
summary(ols_change_ind_fe)

```

```

Call:
lm(formula = Vote ~ as.factor(BioID) + as.factor(Instance) +
    Contribution_minus + Contribution_plus, data = df_vote_change)

```

```

Residuals:
    Min       1Q   Median       3Q      Max
-0.90323 -0.30274  0.06274  0.27000  0.75892

```

```

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)      2.751e-01  1.336e-01   2.058 0.041963 *
as.factor(BioID)C001059 -1.358e-01  1.646e-01  -0.825 0.411406
as.factor(BioID)C001063 -4.842e-01  2.340e-01  -2.069 0.040874 *
as.factor(BioID)C001077 -6.688e-01  3.062e-01  -2.184 0.031087 *
as.factor(BioID)C001106 -2.758e-02  2.787e-01  -0.099 0.921354
as.factor(BioID)G000410  1.068e-01  2.494e-01   0.428 0.669141

```

```

as.factor(BioID)G000578 -4.918e-01  2.782e-01  -1.768  0.079934 .
as.factor(BioID)G000581 -1.371e-01  2.491e-01  -0.550  0.583112
as.factor(BioID)H001051  1.978e-01  3.378e-01   0.585  0.559502
as.factor(BioID)K000387 -4.493e-01  2.220e-01  -2.024  0.045428 *
as.factor(BioID)L000567 -3.397e-01  2.448e-01  -1.388  0.168003
as.factor(BioID)M001181 -2.214e-01  2.802e-01  -0.790  0.431080
as.factor(BioID)R000435  2.320e-01  2.811e-01   0.825  0.411023
as.factor(BioID)R000578 -1.671e-01  2.803e-01  -0.596  0.552302
as.factor(BioID)R000580 -3.985e-01  2.488e-01  -1.601  0.112174
as.factor(BioID)R000585 -6.527e-01  2.236e-01  -2.919  0.004268 **
as.factor(BioID)S000051 -6.307e-02  2.459e-01  -0.256  0.798101
as.factor(BioID)S000522 -1.018e-01  1.704e-01  -0.597  0.551533
as.factor(BioID)S001196 -3.576e-02  2.294e-01  -0.156  0.876430
as.factor(BioID)U000031 -3.879e-01  2.634e-01  -1.473  0.143671
as.factor(BioID)V000131  1.206e-01  1.624e-01   0.743  0.459131
as.factor(BioID)V000132  1.662e-01  2.048e-01   0.812  0.418825
as.factor(BioID)W000823 -3.516e-01  3.363e-01  -1.045  0.298112
as.factor(Instance)4      4.377e-02  1.296e-01   0.338  0.736141
as.factor(Instance)6      5.264e-01  1.464e-01   3.594  0.000490 ***
as.factor(Instance)7      5.754e-01  1.465e-01   3.928  0.000151 ***
as.factor(Instance)51     5.083e-01  1.344e-01   3.782  0.000254 ***
as.factor(Instance)52     4.302e-01  1.328e-01   3.240  0.001583 **
Contribution_minus        3.259e-06  2.460e-06   1.325  0.187973
Contribution_plus         9.693e-06  8.174e-06   1.186  0.238275
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

Residual standard error: 0.4486 on 109 degrees of freedom

(47 observations deleted due to missingness)

Multiple R-squared: 0.3591, Adjusted R-squared: 0.1885

F-statistic: 2.106 on 29 and 109 DF, p-value: 0.003118

To make this work, we have to remove the control variables from before, i.e. party, district, Geographical and state, gender, nominate_dim1&2, and pro- and anti_env_dummy and birth-day since these are already included in the individual fixed effects, i.e. these dont change over time in an individual. Also, seniority and Dmajority are just NAs since this sample size is too small.

What is interesting to see here, is the fact that instances are highly significant. Meaning that for a change in vote, the instance of change is most likely with 0.74 units for vote7 and then 0.72 units for vote 6, and then 53. This is interesting since it shows that the instance of change is more likely to happen in the later votes.

Logit of all Representatives

all representatives

with control variables

```
full_logit <- glm(Vote ~ . - state - BioID, family = binomial(link = "logit"), data = df_long)
summary(full_logit)
```

Call:

```
glm(formula = Vote ~ . - state - BioID, family = binomial(link = "logit"),
    data = df_long)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-3.2281	-0.1457	-0.0417	0.0833	3.3671

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-2.869e+01	3.666e+01	-0.783	0.433789
district	7.340e-03	1.823e-02	0.403	0.687230
partyR	-8.436e+00	5.262e-01	-16.031	< 2e-16 ***
Vote_change	4.008e-01	3.916e-01	1.024	0.306011
birthday	1.799e-02	1.863e-02	0.966	0.334286
genderM	-1.208e+00	4.968e-01	-2.431	0.015065 *
nominate_dim1	-2.705e+00	1.496e+00	-1.808	0.070639 .
nominate_dim2	-3.449e+00	1.102e+00	-3.131	0.001744 **
GeographicalNE	2.351e+00	5.597e-01	4.201	2.65e-05 ***
GeographicalSO	6.326e-02	4.891e-01	0.129	0.897089
GeographicalWE	6.749e-01	5.613e-01	1.202	0.229175
Instance	2.821e-02	9.371e-03	3.011	0.002607 **
seniority	2.866e-02	5.020e-02	0.571	0.568110
Contribution_minus	-2.135e-05	8.481e-06	-2.517	0.011824 *
Contribution_plus	9.944e-05	3.621e-05	2.746	0.006026 **
Dmajority	1.622e+00	4.796e-01	3.381	0.000722 ***
anti_env_dummy	-7.252e-01	6.113e-01	-1.186	0.235503
pro_env_dummy	2.651e-01	4.345e-01	0.610	0.541753

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

(Dispersion parameter for binomial family taken to be 1)

Null deviance: 2632.06 on 1900 degrees of freedom
Residual deviance: 311.58 on 1883 degrees of freedom
(413 observations deleted due to missingness)
AIC: 347.58

Number of Fisher Scoring iterations: 8

with log transformed contributions

```
cols <- c("Contribution_plus", "Contribution_minus")
df_long[cols] <- lapply(df_long[cols], function(x) log(x + 1))

full_logit_log <- glm(Vote ~ . - state - BioID, family = binomial(link = "logit"), data = df_long)
summary(full_logit_log)
```

Call:

```
glm(formula = Vote ~ . - state - BioID, family = binomial(link = "logit"),
     data = df_long)
```

Deviance Residuals:

Min	1Q	Median	3Q	Max
-3.2909	-0.1428	-0.0420	0.0828	3.1929

Coefficients:

	Estimate	Std. Error	z value	Pr(> z)
(Intercept)	-24.147741	36.062100	-0.670	0.503103
district	0.003638	0.017619	0.206	0.836419
partyR	-8.470502	0.538712	-15.724	< 2e-16 ***
Vote_change	0.515223	0.378765	1.360	0.173745
birthday	0.015688	0.018340	0.855	0.392354
genderM	-1.135114	0.494849	-2.294	0.021799 *
nominate_dim1	-2.680033	1.509152	-1.776	0.075757 .
nominate_dim2	-3.378781	1.124512	-3.005	0.002659 **
GeographicalNE	2.306056	0.560957	4.111	3.94e-05 ***
GeographicalSO	-0.020477	0.480132	-0.043	0.965981
GeographicalWE	0.753004	0.552919	1.362	0.173239
Instance	0.030388	0.009379	3.240	0.001196 **

```

seniority          0.016360    0.049416    0.331 0.740601
Contribution_minus -0.425574    0.158521   -2.685 0.007261 **
Contribution_plus  0.467132    0.207103    2.256 0.024099 *
Dmajority          1.638044    0.485525    3.374 0.000741 ***
anti_env_dummy     2.776675    1.577183    1.761 0.078318 .
pro_env_dummy      -2.840655    1.576006   -1.802 0.071476 .
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

(Dispersion parameter for binomial family taken to be 1)

```

Null deviance: 2632.06  on 1900  degrees of freedom
Residual deviance: 313.57  on 1883  degrees of freedom
(413 observations deleted due to missingness)
AIC: 349.57

```

Number of Fisher Scoring iterations: 8

with geographical & year FEs

use the package `{bife}` to use fixed effects in a logit model, since the `glm` function does not allow for fixed effects in a logit model, it is only for linear models.

```

full_logit_geo <- bife(Vote ~ district + party + birthday + nominate_dim1 + nominate_dim2 +
  data = df_long,
  model = "logit"
)
summary(full_logit_geo)

```

binomial - logit link

```

Vote ~ district + party + birthday + nominate_dim1 + nominate_dim2 +
  seniority + Contribution_minus + Contribution_plus + gender +
  pro_env_dummy + anti_env_dummy + as.factor(Instance) | Geographical

```

Estimates:

	Estimate	Std. error	z value	Pr(> z)
district	0.006154	0.016764	0.367	0.713534
partyR	-8.542809	0.552073	-15.474	< 2e-16 ***
birthday	0.023251	0.017743	1.310	0.190042
nominate_dim1	-3.326268	1.458830	-2.280	0.022602 *

```

nominate_dim2      -3.151010    1.114133   -2.828    0.004681 **
seniority           0.040313    0.046539    0.866    0.386373
Contribution_minus -0.481313    0.160668   -2.996    0.002738 **
Contribution_plus   0.499922    0.210771    2.372    0.017698 *
genderM            -1.104824    0.494948   -2.232    0.025602 *
pro_env_dummy       -3.057877    1.604364   -1.906    0.056654 .
anti_env_dummy       3.290619    1.592082    2.067    0.038747 *
as.factor(Instance)4 0.666081    0.596310    1.117    0.263992
as.factor(Instance)6 2.366722    0.666295    3.552    0.000382 ***
as.factor(Instance)7 1.619147    0.692177    2.339    0.019325 *
as.factor(Instance)51 1.558957    0.628168    2.482    0.013074 *
as.factor(Instance)52 2.074271    0.630273    3.291    0.000998 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

```

```

residual deviance= 312.02,
null deviance= 2632.06,
n= 1901, N= 4

```

(413 observation(s) deleted due to missingness)

Number of Fisher Scoring Iterations: 8

Average individual fixed effect= -38.264

with state & year fixed effects

```

full_logit_state <- bife(Vote ~ district + party + birthday + nominate_dim1 + nominate_dim2 +
  data = df_long,
  model = "logit"
)
summary(full_logit_state)

```

binomial - logit link

```

Vote ~ district + party + birthday + nominate_dim1 + nominate_dim2 +
  seniority + Contribution_minus + Contribution_plus + gender +
  pro_env_dummy + anti_env_dummy + factor(Instance) | state

```

Estimates:

	Estimate	Std. error	z value	Pr(> z)
district	1.483e-02	2.530e-02	0.586	0.557815
partyR	-3.967e+01	1.568e+03	-0.025	0.979809
birthday	2.995e-02	1.958e-02	1.529	0.126211
nominate_dim1	-4.280e+00	1.899e+00	-2.254	0.024190 *
nominate_dim2	-1.988e+00	1.233e+00	-1.613	0.106776
seniority	3.920e-05	5.387e-02	0.001	0.999419
Contribution_minus	-4.726e-01	2.088e-01	-2.263	0.023652 *
Contribution_plus	5.025e-01	2.569e-01	1.956	0.050431 .
genderM	-1.340e+00	6.775e-01	-1.978	0.047973 *
pro_env_dummy	-2.926e+00	1.956e+00	-1.496	0.134734
anti_env_dummy	3.246e+00	2.040e+00	1.592	0.111494
factor(Instance)4	7.365e-01	6.433e-01	1.145	0.252267
factor(Instance)6	2.731e+00	7.430e-01	3.676	0.000237 ***
factor(Instance)7	2.006e+00	7.769e-01	2.582	0.009824 **
factor(Instance)51	1.978e+00	6.942e-01	2.850	0.004375 **
factor(Instance)52	2.243e+00	6.849e-01	3.275	0.001057 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

residual deviance= 222.37,
null deviance= 2308.69,
n= 1668, N= 32

(413 observation(s) deleted due to missingness)
(233 observation(s) deleted due to perfect classification)

Number of Fisher Scoring Iterations: 21

Average individual fixed effect= -32.671

Logit per Vote

doesnt work yet, why?

```
# # Vote 4_2
# view(df_vote_4_2)
# logit_4_2 <- bife(gender ~ Contribution_3_minus + Contribution_4_minus + Contribution_4_plus,
#   data = df_vote_4_2,
#   model = "logit"
# )
```

```
# summary(logit_4_2)
# # + seniority_114 + gender + pro_env_dummy
# # Vote4_minus ~ Contribution_3_minus + Contribution_3_plus + Contribution_4_minus + Contril
# # nominate_dim1 + nominate_dim2

# # Vote 51_2
# logit_51_2 <- bife(Vote51_minus ~ Contribution_3_minus + Contribution_3_plus + Contribution
#   data = df_vote_51_2,
#   model = "logit"
# )
```

need to remove dw-nominate scores, since they create a glm.fit error - too accurate 0 or 1 values.

need to remove anti_env_dummy and district because of singularities, since all have received anti_env contributions, so the coefficient is not defined.

individual and year fixed effects

```
logit_ind_fe <- bife(Vote ~ Contribution_minus + Contribution_plus + Dmajority | BioID, data
summary(logit_ind_fe)
```

binomial - logit link

Vote ~ Contribution_minus + Contribution_plus + Dmajority | BioID

Estimates:

	Estimate	Std. error	z value	Pr(> z)
Contribution_minus	-0.02834	0.13244	-0.214	0.83055
Contribution_plus	0.01612	0.09468	0.170	0.86481
Dmajority	2.13029	0.79417	2.682	0.00731 **

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

residual deviance= 109.61,

null deviance= 139.93,

n= 101, N= 24

(97 observation(s) deleted due to missingness)

(2116 observation(s) deleted due to perfect classification)

Number of Fisher Scoring Iterations: 5

Average individual fixed effect= -0.241

all representatives who did not change their opinion

```
# missmap(df_no_change, main = "Missing values vs observed")
# # all_votes_minus ~ . - all_votes_plus, data = df_no_change)

# logit <- glm(all_votes_minus ~ . - all_votes_plus, family = binomial(link = "logit"), data = df_no_change)
# summary(logit)

# probit <- glm(all_votes_minus ~ . - all_votes_plus, family = binomial(link = "probit"), data = df_no_change)
# summary(probit)
```

Here Probit better than Logit, Akaike lower, so Probit is more parsimonious.

Sessionized Models:

Sessionizing not useful, as the p values are super high. ->