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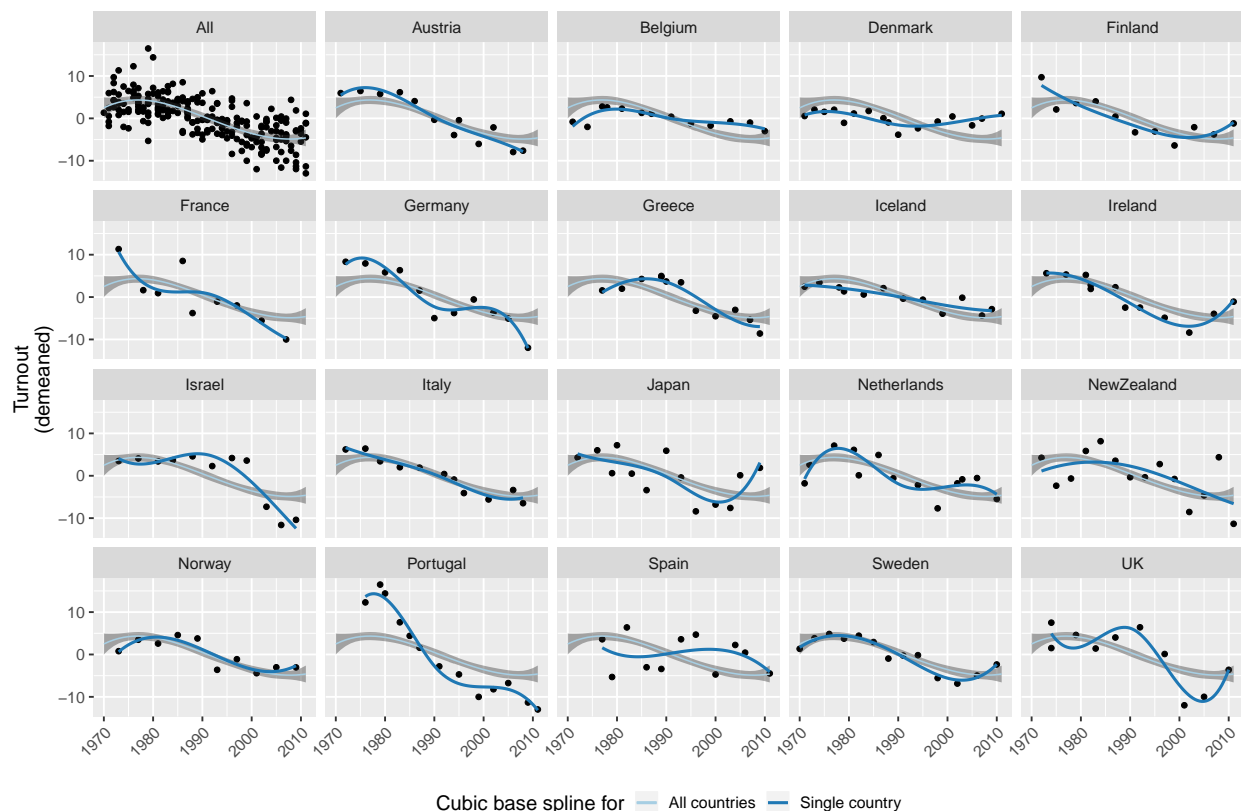
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Trends in the data

What's the grand picture?

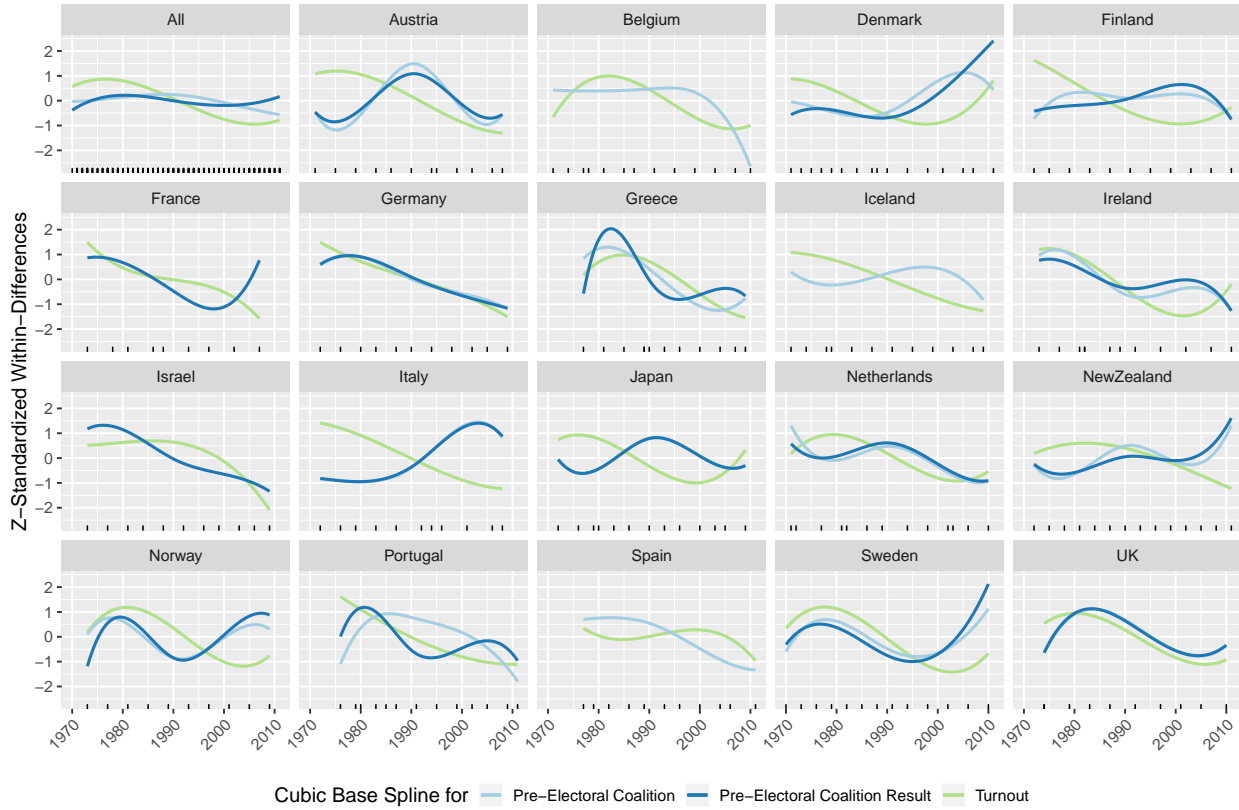
Turnout has been declining for decades. Starting in 1970, participation in general elections decreased from an average 8830.00 per cent to 7155.33 per cent in 2011. The figure above shows the development for all democracies in the data. With the exceptions of Belgium and Denmark turnout has declined across the board although differences in speed, magnitude, and monotonicity of the decline are apparent.

Figure 1: Trends in Turnout



Importantly, trends that parallel turnout plague Tillman's two key predictors: the formation of pre-electoral coalitions and their voting percentage. The figure below shows Z-standardized versions of the fixed-effect transformed response and its two key predictors. Although developments may not always align to 100 percent, e.g., Italy, cases like Germany, the Netherlands, Greece or Denmark highlight the potential for confounding trends in Tillman's analysis clear.

Figure 2: Shared Trends in Treatments and Response



Note: Rug plots indicate election years.

What do the detrended results look like?

Several options to detrend panel data are on the table.

1. Indicator variables for observations can account for all apparent trends in the data. However, they reduce statistical power quite a bit.
2. Reduced form trend models of observation time, e.g., polynomials or splines, are easily implemented, but quickly overfit the data
3. Sophisticated error structures, e.g., AR(1), correct standard errors and p-values. Unfortunately, they ignore the biased effect estimate.
4. A set of lagged responses removes any trend up to the cardinality of the set, but it will bias results if the trend is more complex than that.
5. Substantive models of the trend in the outcome. However, if those models are to reduce confoundedness then they should yield leverage on the treatment(s) as well.

Keeping in mind our paper's purpose – a replication and data feature –, options one and two strike as most promising. Table 1 replicates Tillman's entire analysis using cubic base splines with three knots.¹ The table reports panel robust standard errors, clustered by country. There are three take-away messages.

1. As before, the *formation* of pre-electoral coalitions does not boost turnout once trends are taken into account. The estimated effect on PEC approaches zero and more sophisticated trend formulations will

¹ The last report already presented the dummy variable approach.

Table 1: Detrended Regression Results

	Model 1	Model 2	Model 3	Model 4
PEC	0.187 (0.606)			
PEC > 20%		1.616* (0.702)		
Vote PEC			0.027* (0.013)	
Small PEC				-1.372 (0.802)
Large PEC				1.172 (0.649)
Parties	-0.102 (0.300)	-0.098 (0.294)	-0.102 (0.305)	0.012 (0.323)
Disproportionality	0.021 (0.137)	0.059 (0.131)	0.077 (0.136)	0.047 (0.141)
PR	5.337* (2.259)	5.957** (2.101)	6.640** (2.249)	5.778** (2.187)
Plurality	-1.091 (3.144)	-1.519 (2.912)	-1.556 (2.722)	-1.545 (2.940)
Closeness	-0.092 (0.055)	-0.081 (0.052)	-0.082 (0.053)	-0.077 (0.052)
Economic Growth	0.056 (0.118)	0.040 (0.113)	0.023 (0.105)	0.044 (0.110)
log(Income)	0.450*** (0.068)	0.499*** (0.086)	0.529*** (0.132)	0.543*** (0.054)
Spline 1	3.478 (3.190)	2.948 (3.198)	2.141 (3.273)	2.053 (2.853)
Spline 2	-2.076 (1.671)	-2.106 (1.623)	-2.278 (1.821)	-1.553 (1.767)
Spline 3	-9.912*** (2.759)	-10.144*** (2.910)	-10.770*** (2.853)	-11.067*** (2.639)
Spline 4	-6.573*** (1.744)	-6.627*** (1.746)	-7.751*** (1.923)	-7.622*** (1.639)
PR \times Disproprtionality	-0.853** (0.310)	-0.884** (0.306)	-0.922** (0.309)	-0.924** (0.316)
Plurality \times Closeness	0.042 (0.161)	0.030 (0.157)	0.030 (0.138)	0.077 (0.156)
R ²	0.562	0.578	0.586	0.584
Adj. R ²	0.490	0.509	0.516	0.513
Num. obs.	226	226	222	226

*** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$

not substantively change this outcome: Tillman's pivotal analysis is spurious.

2. Interestingly, Models 2 through 4 imply that strong pre-electoral coalitions still boost turnout. According to Model 3, every additional vote percentage point which goes to PECS increases turnout by 0.027 percentage points. Moreover, Models 2 and 4 strongly suggest that this effect turns strong pre-electoral coalitions, i.e. PECs that account for at least 20 percent of the vote. However, voting results for PECs are downstream from turnout. Therefore, it is very likely that something else but time confounds these effects.
3. Many of the remaining regressors tend towards zero once the analysis has been detrended. At least, most of them do not flip signs. Consequently, not everything about Tillman's analysis is confounded by trends.

Rethinking institutional controls

Bringing polarization back in