

How does a relative economy affect voter turnout?

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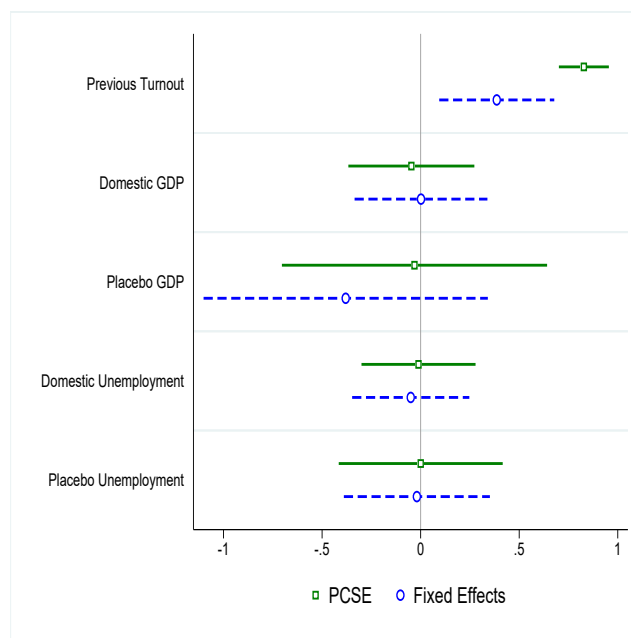
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1 Appendix (Supplementary Information)

1.1 Further Analyses

This paper assumes that voters arrive at a reasonable comparative assessment as they look to its most relevant reference country's economic conditions, rather than making an *ad hoc* comparison, when they make a decision to turn out on an election day. Thus it is important, as noted in the previous section, to employ the theory- and media-driven reference point(s) in turnout models to ensure empirical accuracy. In this regard, it would be useful to highlight the difference in results when one uses systematic benchmark(s) versus when one uses randomly selected set of benchmark(s), perhaps countries that were seldom reported in the domestic news. There should be no effect of a relative economy on turnout based on these random reference points. This placebo-like test would be useful to see if voters indeed make a reasonable evaluation about the relative economic performance, and thus make an informed decision whether they go to the polls or not.

Figure A1: The Effect of Domestic and Random Economy on Turnout (CI 95%)



Note: *Placebo* variables are based on the economic indicators from a randomly selected country using Stata programming, which presumably yield a reference point that is not similar, familiar and connected with the benchmarking country.

I select the economic indicators from a randomly assigned country using Stata programming. In doing so, I expand the scope of the sample countries from 29 to all available countries in the dataset (179 countries) to reduce a probability of assigning a country which is likely to be a reference point among the restricted sample (29 countries). This process will increase the likelihood that a random reference point is not similar, familiar, and connected with the benchmarking country.

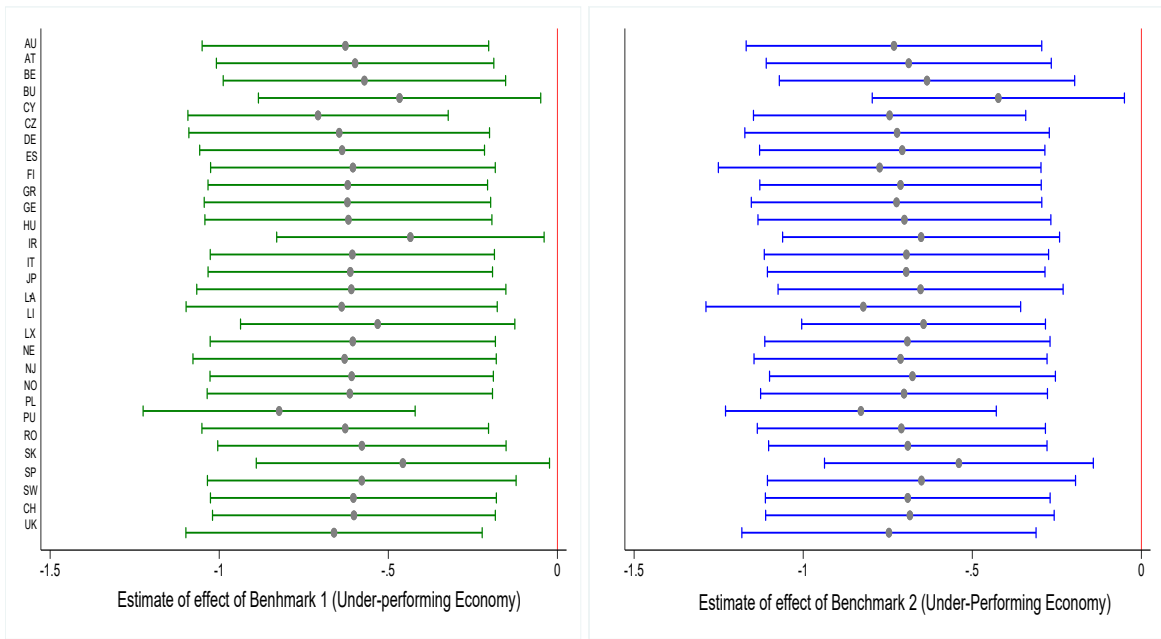
Figure A1 presents the results of the placebo test whose estimation are based on not the media-driven but *ad-hoc* reference point²¹. It is apparent that a relative economic performance compared to an irrelevant economy dose not affect voter turnout. In both models, the marginal effect of *Placebo Growth* and *Placebo Unemployment* are never distinguishable from zero. This result implies that voters benchmark in a systemic manner by looking to the relevant countries that have a great commonality in between. They do not benchmark any random and irrelevant countries when they make a comparative assessment regarding the economy. More to the point, the difference in results between media-guided and *ad hoc* reference points further validates the measurement of the relative economy variables of this paper, which consequently reduces a threat of biased estimations.

To guard against the possibility that the results are driven by the inclusion of any one particular country, I carry out jackknife analyses by replicating the two PCSE models in Table 2. From each iteration of the estimation, one country is excluded in turn. The result of these analyses, reported in Figure A2, shows that the effect of benchmark(s) GDP growth on turnout is stable, and hence not much driven by a single outlier country in the sample. Finally, I also apply a Prais-Winsten transformation to further correct for the serial correlation, and the results are presented in Table A2 in Appendix. The main results hold.

Finally, the current presentation implies that the average economic voter is sophisticated enough to simply use the media as the source of the economic information. This implication is inconsistent with survey research on the limits of voter sophistication in

²¹The estimation result is available in Table A1 in Appendix.

Figure A2: Jackknife Estimates of the Effect of Benchmark, Replication of Models with PCSE in Table 2

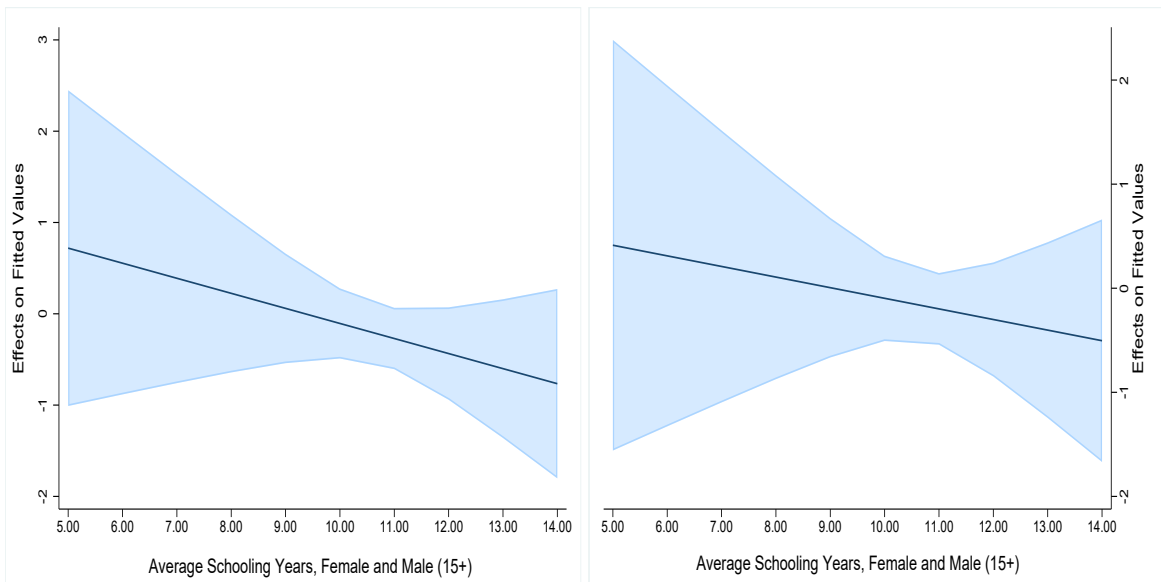


(a) Benchmark 1

(b) Benchmark 2

Note: Estimates from 29 different regression models, replicating Model 2 & 4 in Table 2 while excluding one country at a time. The excluded country is indicated on the y-axis.

Figure A3: Marginal Effects of Benchmark on Turnout conditioned by Education



(a) Benchmark 1

(b) Benchmark 2

Note: The value of Average Schooling Years ranges from 5 to 14(max), which contains 97% of the sample.

general and how political knowledge conditions economic voting (Gomez and Wilson 2001)²².

To test if only voters who have a certain level of political sophistication can be expected to use comparative information, I employ separate models including an interaction term between *Education* and the benchmark economy (noted as *Benchmark*). I use average years of schooling based on Aytac (2018) for the *Education* variable. I adopt an identification strategy that Arel-Bundock, Blais and Dassonneville (2021) propose, especially in the section of "How to Test Conditional Theories of Benchmarking." Figure A3 presents the marginal effect of *Benchmark* on voter turnout conditioned by *Education*. It is clear that the slopes are heading downward, suggesting that the negative effect of a poor relative economy on turnout becomes stronger with more educated citizens. However, the effects are statistically indistinguishable from zero across the entire range of *Education*. That said, the effect of a poor relative economy on turnout is homogeneous, and thus, people do not need to be highly sophisticated to comprehend the relative information when they make an informed political decision on whether to turn out or not.

²²Gomez, B.T. and Wilson, J.M., 2001. Political sophistication and economic voting in the American electorate: A theory of heterogeneous attribution. *American Journal of Political Science*, pp.899-914.

Table A1: Effect of Domestic and Placebo Economy on Voter Turnout

DV: Turnout	PCSE (1)	Fixed Effects (2)
Previous Turnout	0.828*** (0.065)	0.386*** (0.149)
Domestic GDP	-0.048 (0.163)	0.002 (0.172)
Placebo GDP	-0.009 (0.3437)	-0.380 (0.368)
Domestic Unemployment	-0.034 (0.145)	-0.050 (0.152)
Placebo Unemployment	-0.012 (0.209)	-0.019 (0.189)
Effective N. of Party	-0.352 (0.378)	-0.735 (0.811)
Electoral Competition	-0.034 (0.032)	-0.012 (0.038)
Presidential Election	-1.825 (3.181)	2.073 (2.808)
Population	-0.305 (0.289)	-2.501 (9.439)
Urbanization	0.164*** (0.044)	-0.129 (0.213)
Compulsory Voting	3.068** (1.528)	
Constant	3.876 (6907)	97.63 (86.90)
R^2	0.850	0.898
Election	139	138
Countries	29	29

Panel corrected standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A2: Alternative Specification: Prais-Winsten Regression with First-Order Correlation Specified

DV: Turnout	Domestic	Benchmark 1		Benchmark 2	
	(1)	(2)	(3)	(4)	(5)
Previous Turnout	0.829*** (0.063)	0.830*** (0.061)	0.408*** (0.138)	0.825*** (0.059)	0.459*** (0.135)
Domestic GDP	-0.042 (0.155)	0.280 (0.213)	0.241 (0.239)	0.232 (0.228)	0.116 (0.224)
Domestic Unemployment	-0.046 (0.141)	-0.047 (0.144)	0.003 (0.170)	-0.018 (0.134)	0.046 (0.156)
Benchmark GDP		-0.608*** (0.221)	-0.469*** (0.187)	-0.694*** (0.259)	-0.418*** (0.165)
Benchmark Unemployment		-0.149 (0.158)	-0.148 (0.218)	-0.361* (0.206)	-0.394 (0.279)
Effective N. of Party	-0.329 (0.374)	-0.344 (0.327)	-0.711 (0.735)	-0.353 (0.276)	-1.039 (0.692)
Electoral Competition	-0.037 (0.033)	-0.021 (0.028)	-0.005 (0.035)	-0.022 (0.026)	0.006 (0.038)
Presidential Election	-1.791 (3.181)	-1.848 (3.148)	1.323 (2.986)	-1.614 (3.071)	2.128 (2.883)
Population	-0.298 (0.271)	-0.284 (0.317)	-0.171 (10.094)	-0.361 (0.303)	-5.920 (8.830)
Urbanization	0.166*** (0.046)	0.172*** (0.047)	-0.117 (0.217)	0.141*** (0.042)	-0.037 (0.197)
Compulsory Voting	2.968** (1.463)	2.378 (1.654)		2.417 (1.491)	
Constant	3.592 (7.025)	4.694 (7.907)	71.61 (92.96)	10.042 (7.424)	118.34 (84.79)
R^2	0.858	0.875	0.914	0.875	0.921
Elections	139	139	139	138	138
Countries	29	29	29	29	29
Fixed Effects	—	—	√	—	√

Panel corrected standard errors in parentheses

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table A3: List of Countries and Elections

Country	Year
Australia	1987, 1990, 1993, 1996, 1998, 2001, 2004, 2007, 2010
Austria	1999, 2002, 2006, 2008
Belgium	1995, 1999, 2003, 2007, 2010
Bulgaria	1997, 2001, 2005, 2009
Cyprus	2001, 2006, 2011
Czech Republic	1996, 1998, 2002, 2006, 2010
Denmark	1998, 2001, 2005, 2007, 2011
Estonia	1999, 2003, 2007, 2011
Finland	2003, 2007, 2011
Germany	2002, 2005, 2009
Greece	2004, 2007, 2009
Hungary	1998, 2002, 2006, 2010
Ireland	1992, 1997, 2002, 2007, 2011
Italy	1992, 1994, 1996, 2001, 2006, 2008
Japan	1983, 1986, 1990, 1993, 1996, 2000, 2003, 2005, 2009, 2012
Latvia	1998, 2002, 2006, 2010, 2011
Lithuania	2000, 2004, 2008
Luxembourg	1999, 2004, 2009
Netherlands	1994, 1998, 2002, 2003, 2006, 2010, 2012
New Zealand	1996, 1999, 2002, 2005, 2008, 2011
Norway	2001, 2005, 2009
Poland	1997, 2001, 2005, 2007, 2011
Portugal	1999, 2002, 2005, 2009, 2011
Romania	2000, 2004, 2008
Slovakia	1998, 2002, 2006, 2010, 2012
Spain	1996, 2000, 2004, 2008, 2011
Sweden	1998, 2002, 2006, 2010
Switzerland	1995, 1999, 2003, 2007, 2011
United Kingdom	1983, 1987, 1992, 1997, 2001, 2005, 2010

Table A4: Summary Statistics

Variable	Mean	Std. Dev.	Min.	Max.	N
Turnout	71.057	13.983	32.4	98.2	174
Previous Turnout	72.638	13.599	40.2	98.2	166
Domestic GDP	2.259	3.523	-17.73	10.28	174
Domestic Unemployment	8.359	4.545	2.2	26.5	170
Benchmark 1 GDP	2.012	3.4	-16	10.7	174
Benchmark 1 Unemployment	8.087	3.324	2.1	24.4	172
Benchmark 2 GDP	1.944	2.927	-14.829	9.132	173
Benchmark 2 Unemployment	8.061	2.392	4.028	17.949	169
Placebo GDP	1.871	1.305	-0.484	4	174
Placebo Unemployment	6.547	2.015	3.027	9.955	174
Effective Number of Parties	4.91	1.667	2.66	10.28	174
Electoral Competition	16.959	15.969	0	100	159
Presidential Election	0.06	0.237	0	1	168
Population (log)	9.398	1.326	6.053	11.748	152
Urbanization	74.497	10.786	53.004	97.818	160
Compulsory Voting	0.138	0.346	0	1	174

1.2 Information about Benchmark(s)

The data of benchmark is obtained from Park (2019), and below is the information about the data presented in the *Data Collection* section (Park 2019: 4-5). Find the full dataset at <https://doi.org/10.1016/j.electstud.2019.102085> including the full list of the benchmark countries.

"For each election in a country, the frequency of economic news reports is obtained and then ranked according to the quantity of media reports. Based on this ranking, the top three countries (Rank 1, 2 and 3) are selected for the source of constructing spatial reference points. Only three are used because it is likely more realistic that voters will only use a small number of references. More specifically, the reference points function as a heuristic short cut for voters to make comparisons, and thus it is reasonable to assume that they tend to make a small number of comparisons rather than many. In addition, it is also cognitively demanding for voters to make such a large number of comparisons because multiple comparisons require more information.

Once the ranks are constructed based on the amount of foreign news coverage, the proportion for each county in each rank is also calculated. For instance, if Spain, Germany, and the UK are ranked as the top three reference points of Italy in a given year, the relative percentage of news volume per country is obtained in order to construct a weighted average of country performance. Table A5 and A6²³ present the list of countries and the relative proportion that appeared in each country's domestic news media regarding the economy. It also shows how the distribution has changed over time and if it responds in sensible ways to secular changes, like the increasing importance of a particular country." (Park 2019: 4-5).

²³I only include a part of the list as a simple demonstration. The full list can be found at <https://doi.org/10.1016/j.electstud.2019.102085>

Table A5: Media-guided List of Benchmark(s)

Country	Election	Rank 1	Rank 2	Rank 3
Australia	1987	New Zealand (.68/.58)	Japan (.32/.27)	Germany (.14)
	1990	New Zealand (.70/.61)	Japan (.30/.25)	Germany (.14)
	1993	New Zealand (.56/.46)	Japan (.46/.36)	Germany (.18)
	1996	New Zealand (.69/.61)	Japan (.31/.28)	Germany (.11)
	1998	New Zealand (.53/.49)	Japan (.47/.42)	Germany (.08)
	2001	New Zealand (.73/.68)	Japan (.27/.26)	UK (.07)
	2004	New Zealand (.80/.75)	Japan (.20/.28)	UK (.07)
	2007	New Zealand (.81/.74)	Japan (.19/.16)	UK (.09)
	2010	New Zealand (.71/.59)	Japan (.29/.25)	UK (.17)
2013	New Zealand (.72/.61)	Japan (.28/.24)	Germany (.15)	
Austria	1999	Germany (.70/.57)	France (.30/.24)	UK (.19)
	2002	Italy (.67/.64)	Germany (.33/.26)	France (.21)
	2006	France (.64/.49)	UK (.36/.28)	Italy (.23)
	2008	France (.78/.72)	UK (.22/.20)	Italy (.08)
	2013	France (.76/.64)	UK (.24/.19)	Italy (.16)
Belgium	1995	Germany (.53/.44)	Netherlands (.47/.38)	France (.18)
	1999	Netherlands (.61/.50)	Germany (.39/.30)	France (.20)
	2003	Netherlands (.62/.50)	Germany (.38/.30)	France (.20)
	2007	Netherlands (.63/.51)	Germany (.37/.29)	France (.18)
	2010	Netherlands (.61/.51)	Germany (.39/.33)	France (.15)
	2014	Netherlands (.63/.52)	Germany (.37/.29)	France (.18)
Bulgaria	1994	Hungary (.60/.50)	Romania (.40/.33)	Greece (.17)
	1997	Romania (.68/.65)	Hungary (.32/.31)	Greece (.04)
	2001	Romania (.63/.56)	Hungary (.37/.33)	Greece (.16)
	2005	Romania (.52/.50)	Hungary (.48/.46)	Greece (.04)
	2009	Romania (.59/.47)	Greece (.41/.32)	Hungary (.21)
	2013	Romania (.62/.50)	Hungary (.38/.30)	Greece (.19)
Cyprus	2001	Greece (.67/.61)	Germany (.33/.29)	France (.09)
	2006	Greece (.70/.67)	Germany (.29/.22)	France (.07)
	2011	Greece (.68/.55)	Germany (.32/.25)	France (.19)

The first value in the parentheses is based on the Rank 1 and 2 only, and the second value is based on all ranks.

Table A6: Media-guided List of Benchmark(s)

Country	Election	Rank 1	Rank 2	Rank 3
Czech Republic	1992	Hungary (.59/.44)	Germany (.41/.30)	Poland (.26)
	1996	France (.70/.56)	Germany (.30/.24)	Poland (.19)
	1998	France (.61/.49)	Poland (.39/.31)	Germany (.20)
	2002	France (.51/.40)	Poland (.49/.38)	Hungary (.22)
	2006	Poland (.53/.47)	Hungary (.47/.40)	Germany (.13)
	2010	Poland (.51/.43)	Hungary (.49/.41)	Romania (.14)
	2013	Poland (.53/.51)	Hungary (.47/.45)	Germany (.05)
Denmark	1998	Germany (.65/.60)	France (.35/.30)	Norway (.08)
	2001	Germany (.62/.55)	France (.38/.34)	Finland (.11)
	2005	Sweden (.59/.44)	UK (.41/.29)	Norway (.23)
	2007	Sweden (.51/.38)	UK (.49/.37)	Norway (.24)
	2011	Sweden (.56/.54)	Norway (.44/.42)	Finland (.03)
	2015	Sweden (.73/.59)	Finland (.27/.22)	UK (.20)
Estonia	1995	Latvia (.68/.64)	Lithuania (.32/.30)	Poland (.05)
	1999	Lithuania (.51/.48)	Latvia (.49/.46)	Poland (.03)
	2003	Lithuania (.53/.49)	Latvia (.47/.39)	Poland (.03)
	2007	Lithuania (.51/.38)	Latvia (.49/.27)	Poland (.11)
	2011	Latvia (.51/.49)	Lithuania (.49/.45)	Poland (.04)
	2015	Latvia (.55/.53)	Lithuania (.45/.43)	Poland (.03)
Finland	2003	Norway (.55/.50)	Sweden (.45/.40)	UK (.10)
	2007	Sweden (.74/.61)	Norway (.26/.21)	Germany (.18)
	2011	Sweden (.76/.65)	Norway (.24/.19)	UK (.16)
	2015	Sweden (.75/.62)	UK (.25/.20)	Norway (.18)
Germany	2002	France (.51/.46)	UK (.49/.45)	Italy (.08)
	2005	UK (.51/.49)	France (.49/.48)	Italy (.02)
	2009	France (.65/.64)	UK (.35/.33)	Italy (.03)
	2013	France (.52/.45)	UK (.48/.40)	Italy (.16)
Greece	2004	UK (.56/.40)	Germany (.44/.32)	Italy (.28)
	2007	UK (.68/.53)	Germany (.32/.24)	France (.23)
	2009	UK (.61/.53)	France (.39/.29)	Germany (.27)
	2012	UK (.91/.75)	France (.09/.19)	Germany (.06)
	2015	France (.87/.80)	Germany (.13/.15)	UK (.09)