

Biased Forecasts to Affect Voting Decisions? The Brexit Case

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Introduction

- Referenda are used to address issues of great economic relevance
- Debates about the potential effects of the vote on the economy use figures published by forecasters
- Macroeconomic forecasts are taken as given, without considering that institutions publishing them often have stakes in the voting decisions and may try to influence voters' beliefs

The Telegraph

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Greece crisis live: 'no' vote in referendum would trigger economic meltdown, as it happened

Latest F

Figure: Referendum in Greece to solve the debt crisis

The screenshot shows the Financial Times website interface. At the top, the logo "FINANCIAL TIMES" is centered. Below it is a navigation bar with links: HOME, WORLD, UK, COMPANIES, TECH, MARKETS, GRAPHICS, OPINION, WORK & CAREERS, LIFE & ARTS, and HOW TO SPEND IT. A teal banner below the navigation bar features the text "Get a fresh start." on the left, an image of a coffee cup, a smartphone, and headphones in the center, and a black button with the text "Choose your FT trial" on the right. Below the banner, a section titled "Latest on Catalonia" contains three news items: 1. "Why Basques and Catalans see independence differently" with a small image of flags. 2. "Catalan leaders reject coup claim as trial nears end" with a small image of a crowd. 3. "Catalan independence bid was 'coup', Spanish court hears" with a small image of a crowd. Below these items, there is a "Brussels Briefing Catalonia" section with a "+ Add to myFT" button. The main article title is "The economics of Catalan secession" in a large serif font, with a sub-headline "Prospect of a breakaway conjures up visions of capital controls and legal uncertainties" below it.

FINANCIAL TIMES

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Catalan independence bid was 'coup', Spanish court hears

Brussels Briefing Catalonia + Add to myFT

The economics of Catalan secession

Prospect of a breakaway conjures up visions of capital controls and legal uncertainties

Figure: Referendum in Catalonia on the independence from Spain

Brexit runs risk of price rises and store closures

Economy Brands will compensate for a weak pound, says Robin Swithinbank

The prospect of Britain voting to leave the European Union on June 23 is unsettling the UK watch industry and may lead to a rise in prices, stores closing and difficulties in finding skilled workers, say industry executives.

Prices in the UK have remained static for several years; Rolex has not raised them since 2012, although it is rumoured to be scheduling an increase in June. But the pound's weakening over the past six months, due to the possibility of **Brexit**, has made watches cheaper to overseas consumers.

The pound has fallen against the euro from 1.42 in November to 1.31 at the end of May, a decline of 7.8 per cent. Retailers are therefore expecting manufacturers to increase prices to compensate.

"If you're from, say, China and you're buying tax-free [in Britain], you can pick up a great bargain at the moment," says Brian Duffy, chief executive of Aurum Group, parent company of luxury retailers Watches of Switzerland, Mappin & Webb and Goldsmiths.

"We are now seeing an across-the-board increase in tourist activity in luxury watches," says Mr Duffy. "Last year, we had real difficulty and we were losing customers to France, but now it's the other way round. It's logical to assume the disparity will be addressed by price changes."

The effect of the current imbalance appears to be reflected in data from research firm GfK's POS Tracking unit, which reports that the average sales price of a watch over £1,500 in the UK in the six months to April rose from £4,581 to £4,791. Industry analysts point to the rising number of tourist consumers buying expensive watches as part of the explanation.

Opinion on British membership of the EU among brands and retailers is divided. One UK-based executive for a Swiss watch company says he would welcome **Brexit** because a weaker

pound would be good in theory for watch sales to tourists. Yet if prices rise, this benefit would be negated.

But many feel **Brexit** poses a greater threat to the industry than staying. "What this business needs is growing individual wealth, a stable exchange rate and free movement of product," says David Coleridge, chairman of the Watch Gallery, which operates the Wonder Room in Selfridges and the Rolex boutique at One Hyde Park. "Staying in will deliver this, while leaving and pursuing isolationism is charging into the unknown."

Brands are not yet confirming what they would do to prices in the event of **Brexit**. "We haven't made any decisions," says Mark Hearn, Patek Philippe's UK managing director. "We will wait and see what happens in the **Brexit** vote and review it again then."

In Switzerland, there is nervousness about raising prices in the UK. "How much can the UK customers take before they stop buying watches because of high prices?" asks Jean-Claude Biver, TAG Heuer's chief executive and head of watches at LVMH.

Continued on page 2

'How much can UK customers take before they stop buying watches because of high prices?'



Rough love \$70m diamond may defy the market

Sotheby's will be hoping the 1,109-carat Lesedi la Rona rough diamond breaks a record when it is sold on June 29. But even if it does, the overall diamond market remains in the doldrums, with

too much supply and too few consumers. That is why the Diamond Producers Association is launching a new ad campaign to woo millennials. **Full diamond coverage on page 10**

Figure: Brexit referendum

This paper

- We introduce macroeconomic forecasters as a new political agent and investigate whether they use their forecasts to influence voting outcomes
- We combine predictions from a theoretical framework with empirical analysis using data at the forecaster level in the occasion of the Brexit referendum
- We estimate a large propaganda bias of forecasters with *stakes* and *influence* that explains up to 50% of the forecast error
 - ▶ Forecasters converge in their estimates at least five months after the vote
 - ▶ The propaganda bias decreased the probability of Brexit by 10 p.p.

Introduction

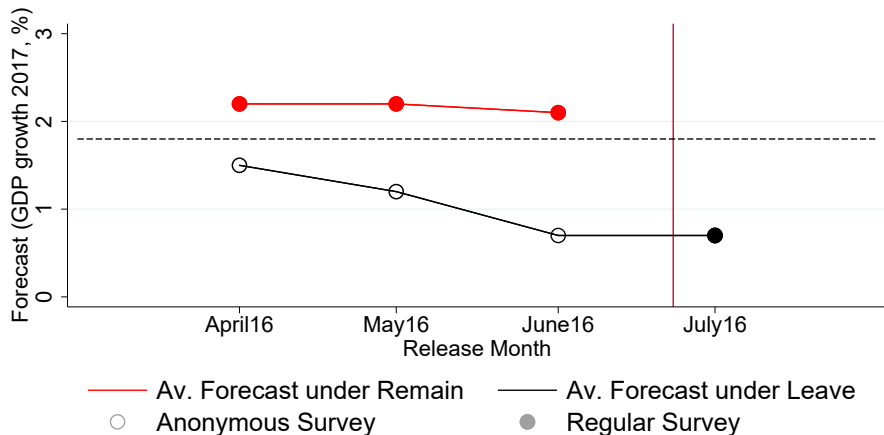


Figure: GDP Forecasts released around the referendum

Related literature

- Propaganda bias of special interest groups and media
 - ▶ Downs (1957) postulates that rational agents lack incentives to invest in collecting costly information before voting and rely on SIG and media
 - ▶ Baron (1994), Grossman and Helpman (1996), Besley and Coate (2001), Enikolopov et al. (2011), Della Vigna et al. (2014)
 - ▶ **We consider an additional player that takes advantage of the information asymmetry:** macroeconomic forecasters
- Strategic behavior of macroeconomic forecasters
 - ▶ Laster et al. (1999) develop a model in which forecasters face a trade-off between accuracy and publicity of forecasts, as efforts to attract publicity compromise accuracy
 - ▶ Ottaviani and Sørensen (2006), Marinovic et al. (2013), Deb et al. (2018)
 - ▶ **We consider an additional objective for forecasters:** a trade-off between accuracy and favoring the preferred outcome of the policy making process

Model summary

- Macroeconomic forecasters have a information advantage regarding the future state of the economy
 - ▶ Difficult and costly for individuals to develop forecasts...
 - ▶ ...but they can be easily communicated to the general public, who obtains a measure before casting a vote
- Some forecasters may exploit the asymmetry of information to influence voters' beliefs if their economic interests are threatened by the referendum result

Model summary

Setup

- Probabilistic voting (Lindbeck and Weibull, 1984)
- Voters have to choose whether to remain (R) or leave (L) a status quo, exogenously given
- They do not observe the economic outcomes associated with the two states and rely on professional forecasters
- We assume that forecasters are heterogeneous in two dimensions: stakes (η_j) and influence (γ_j)
 - ▶ Stakes: economic cost associated with leaving from the status-quo
 - ▶ Influence: Weight that each individual forecaster has on the voters' posterior (Bayesian) belief

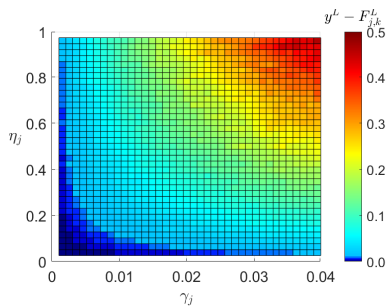
Model summary

- Forecasters release forecasts trading-off accuracy and consistency over time of their estimates with the attempt of influencing the referendum outcome
 - ▶ Costs for low accuracy/low consistency are paid ex-post only subject to the realized state
- Multiple time periods
 - ▶ Pre-campaign periods where forecasters release only $F_{j,t}^R$
 - ▶ A campaign period (k) in which forecasters release both $F_{j,k}^R$ and $F_{j,k}^L$
 - ▶ Post referendum periods where forecasters only release estimates subject to the realized state

Theoretical Framework

Intensive margin

(a) State L



(b) State R

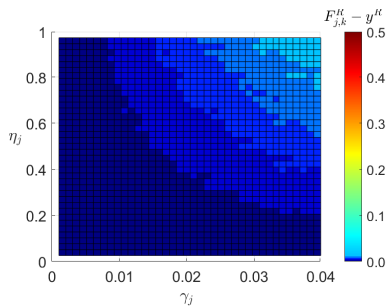


Figure: Propaganda Bias in period k

Theoretical Framework

Dynamic allocation of the bias

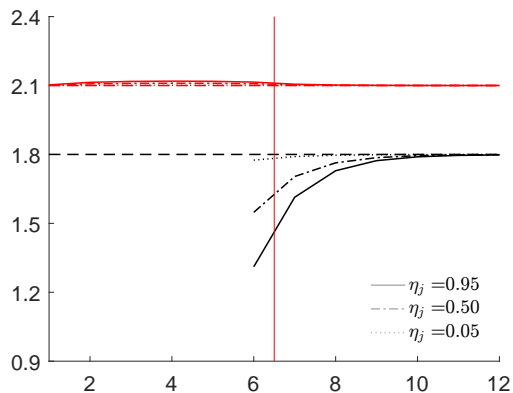


Figure: Evolution of propaganda bias over time

Taking the Model to Data

The Brexit Referendum

- We test the model in the occasion of the Brexit referendum held in the UK in June, 2016
 - ▶ The economy is a relevant dimension [▶ Trends](#)
 - ▶ Consequences are difficult to predict for voters [▶ Opinion Polls and Odds](#)
 - ▶ Some forecasters may face profit losses

Taking the Model to Data

Data from HM Treasury

- "Forecasts for the UK economy" from the HM Treasury
 - ▶ Monthly survey of 44 independent forecasters from 2012 up to April 2018
 - ★ Mainly Financial institutions and research companies
 - ▶ Central forecasts for next year ($t+1$) annual GDP (and its components) growth rate
 - ★ Around referendum, forecasts for growth in 2017
- Forecasters' characteristics from Google News, Google Trends and Thomson Reuters Eikon

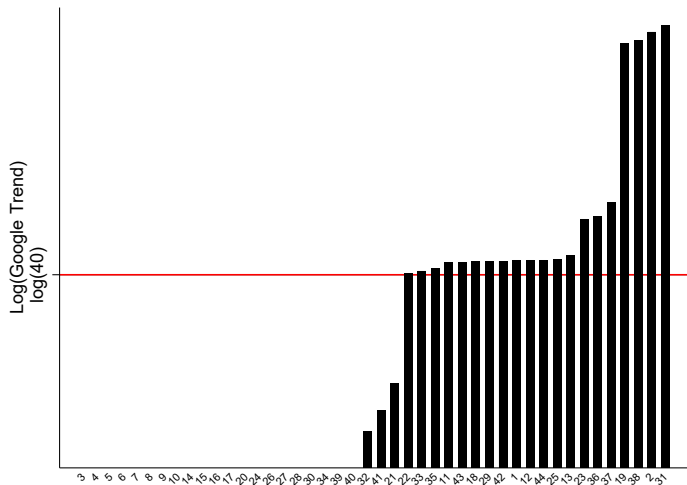
Taking the Model to Data

Measures of Stakes and Influence

- Measures of stakes (η_j)
 - ▶ Financial institutions (banks)
 - ▶ Institutions located in the financial district of London (city)
 - ★ Intensive margin: drop in the stock market price between the referendum date and two following working days
- Measures of influence (γ_j)
 - ▶ Google Trends – "is the general public searching for the forecaster?"
 - ▶ Google News – "is the forecaster mentioned in UK news?"
 - ★ Define threshold to divide forecasters in two groups
 - ★ Intensive Margin: log Google Trends (and log Google News)

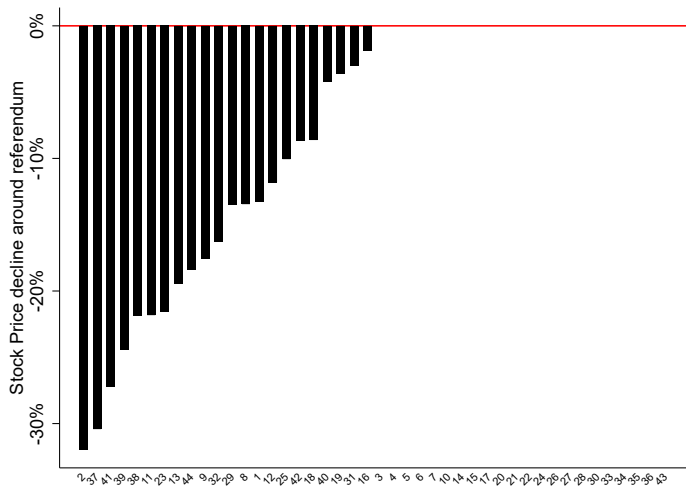
Taking the Model to Data

Google Trends



Taking the Model to Data

Stock prices



Empirical Strategy

Setup

- Idea: compare forecasts released by institutions with stakes and influence and forecasts released by institutions without
 - ▶ Forecasters without stakes and influence should release their best forecast given available information
- We estimate the following dynamic difference-in-differences model:

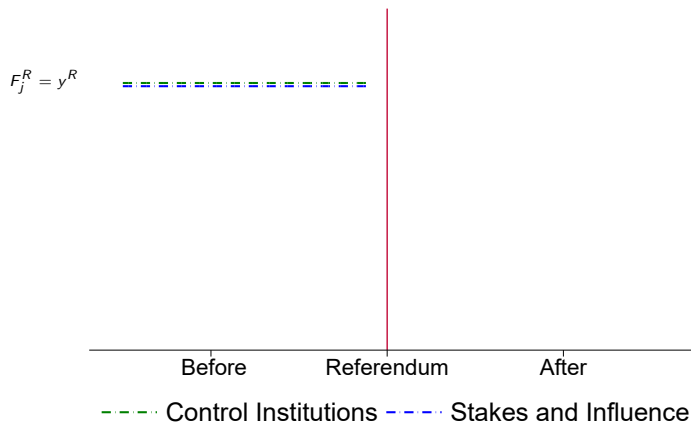
$$F_{j,m} = \theta_j + \delta_m + \mathbb{1}(\eta_j \gamma_j > 0) \sum_{k=-5}^4 \beta_k \mathbb{1}(m = k) + \varepsilon_{j,m} \quad (1)$$

where $k = -5, \dots, 4$ measures the distance in months from the first survey after the vote

Taking the model to data

Predictions and Estimation

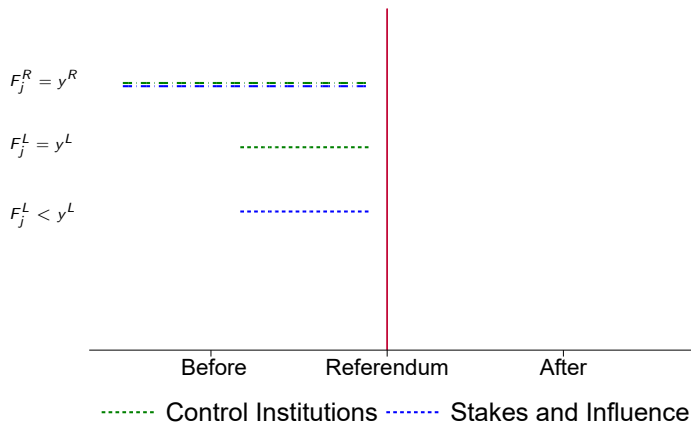
(a) Predictions



Taking the model to data

Predictions and Estimation

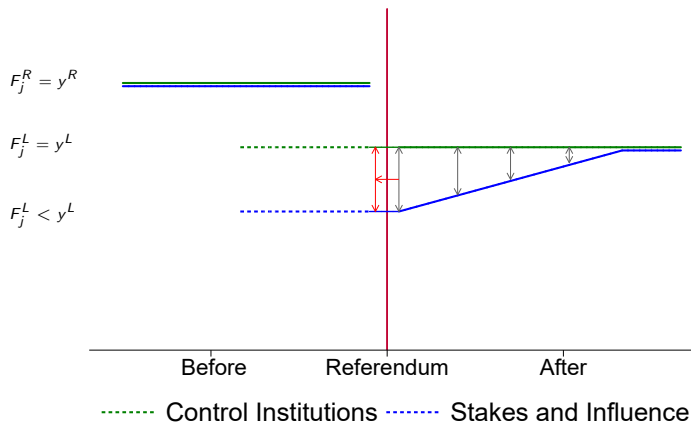
(a) Predictions



Taking the model to data

Predictions and Estimation

(a) Estimation



Validation of the assumption

- Average F^L does not vary around the referendum
- Only seven calendar days between the referendum and the survey
- Credibility: it is costly to revise a forecast subject to the same state in the short run

Results

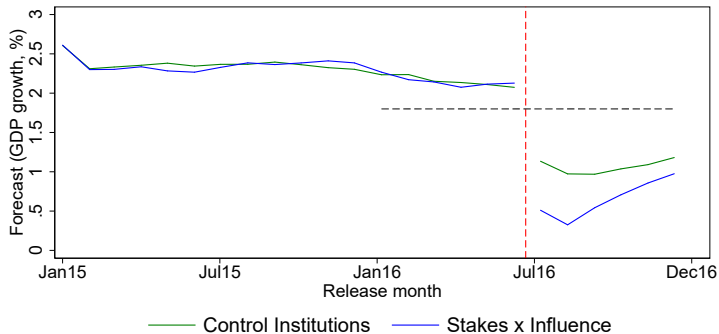


Table: Estimation of Propaganda Bias in GDP Growth Forecasts

	Stakes × Influence				Stakes	Influence
	(1)	(2)	(3)	(4)	(5)	(6)
Group × Referendum	-0.526*** (0.183)	-0.638*** (0.171)	-0.745*** (0.185)	-0.601*** (0.173)	-0.755*** (0.204)	-0.766*** (0.166)
Group × Ref. (+1)	-0.711*** (0.140)	-0.753*** (0.172)	-0.529*** (0.177)	-0.751*** (0.171)	-0.743*** (0.146)	-0.578*** (0.170)
Group × Ref. (+2)	-0.456*** (0.148)	-0.445*** (0.144)	-0.471*** (0.148)	-0.484*** (0.142)	-0.536*** (0.155)	-0.488*** (0.145)
Group × Ref. (+3)	-0.420*** (0.158)	-0.483*** (0.150)	-0.473*** (0.154)	-0.451*** (0.150)	-0.479*** (0.151)	-0.447*** (0.152)
Group × Ref. (+4)	-0.121 (0.145)	-0.126 (0.122)	-0.157 (0.120)	-0.125 (0.122)	0.001 (0.149)	-0.377*** (0.127)
Observations	1,643	1,643	1,643	1,643	1,643	1,643
R ²	0.679	0.776	0.776	0.776	0.778	0.777
Fixed Effects		✓	✓	✓	✓	✓
Survey Month Effects	✓	✓	✓	✓	✓	✓
Measure of Stakes	Banks	Banks	Banks	City	Banks	
Measure of Influence	GTrends	GTrends	GNews	GTrends		GTrends

Two-way clustered standard errors at the forecaster and at the survey month levels are in parentheses.

Results

Differences in $F_{j,t}^R$?

Table: Estimation of Propaganda Bias in GDP Growth Forecasts

	Stakes × Influence				Stakes	Influence
	(1)	(2)	(3)	(4)	(5)	(6)
Group × Ref. (-1)	0.089 (0.112)	0.041 (0.096)	0.005 (0.093)	0.042 (0.096)	-0.033 (0.111)	0.056 (0.093)
Group × Ref. (-2)	-0.050 (0.115)	-0.077 (0.096)	-0.026 (0.098)	-0.074 (0.094)	-0.077 (0.113)	-0.051 (0.091)
Group × Ref. (-3)	0.045 (0.115)	-0.066 (0.088)	-0.067 (0.090)	-0.064 (0.088)	-0.092 (0.097)	-0.032 (0.089)
Group × Ref. (-4)	0.085 (0.147)	0.053 (0.101)	0.081 (0.097)	0.055 (0.099)	-0.004 (0.127)	0.050 (0.099)
Group × Ref. (-5)	-0.065 (0.135)	-0.104 (0.112)	-0.168 (0.110)	-0.075 (0.110)	-0.116 (0.113)	-0.091 (0.111)
Observations	1,643	1,643	1,643	1,643	1,643	1,643
R ²	0.679	0.776	0.776	0.776	0.778	0.777
Fixed Effects		✓	✓	✓	✓	✓
Survey Month Effects	✓	✓	✓	✓	✓	✓
Measure of Stakes	Banks	Banks	Banks	City	Banks	
Measure of Influence	GTrends	GTrends	GNews	GTrends		GTrends

Two-way clustered standard errors at the forecaster and at the survey month levels are in parentheses.

▶ Alternative measures of influence

▶ Montecarlo

Intensive Margin

Estimated "Propaganda Bias" in Forecast for GDP growth

Table: Estimation of Propaganda Bias at the Intensive Margin in GDP Growth Forecasts

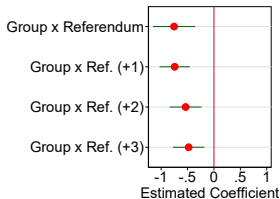
	Stakes x Influence			Stakes	Influence	
	(1)	(2)	(3)	(4)	(5)	(6)
Group x Ref. x Stock Price	-0.361*** (0.094)		-0.316*** (0.102)	-0.330*** (0.098)		-0.246** (0.098)
Group x Ref. x log(Trend)		-0.252*** (0.093)	-0.067 (0.084)		-0.308*** (0.092)	-0.197** (0.087)
Observations	1,643	1,643	1,643	1,643	1,643	1,643
R ²	0.770	0.769	0.770	0.770	0.769	0.770
Fixed Effects	✓	✓	✓	✓	✓	✓
Survey Month Effects	✓	✓	✓	✓	✓	✓
Measure of Stakes	Banks	Banks	Banks	Banks		Banks
Measure of Influence	GTrends	GTrends	GTrends		GTrends	GTrends

Two-way clustered standard errors at the forecaster and at the survey month levels are in parentheses.

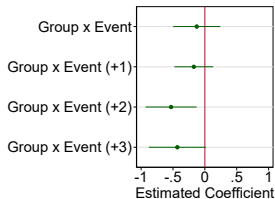
Robustness Checks

Ruling out alternative mechanisms

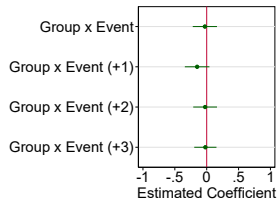
(a) Referendum



(b) Financial Crisis



(c) 9/11 attack



Summary

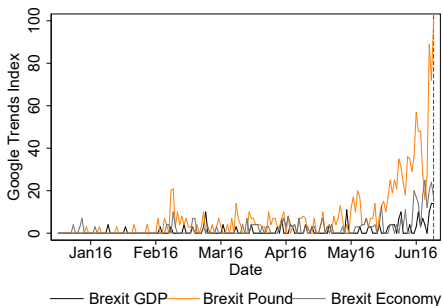
- We have introduced macroeconomic forecasters as political agents and explored whether they may release strategically pieces of information in order to affect voters' beliefs
- It is optimal for forecasters with stakes and influence to publish, prior to a referendum, forecasts that differ from their best estimates
- We tested our theory using micro-data at the forecaster level in the occasion of the Brexit referendum
- Empirical Results confirm the prediction of a propaganda bias around the Brexit referendum
 - ▶ The bias explains up to 50% of the forecast error
 - ▶ Our calibration suggests that the bias reduced the probability of Brexit by approx. 10 p.p.

Thank you!
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Extra

Motivation

(a) Google Trends

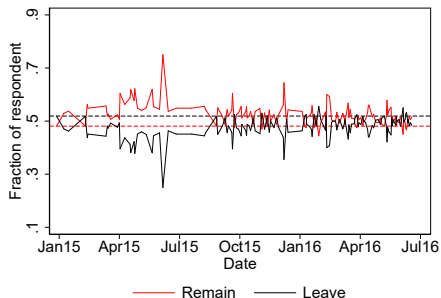


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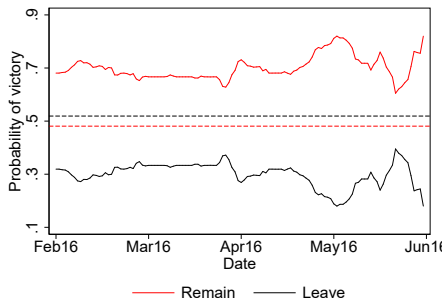
Taking the Model to Data

Opinion polls and Bookmakers' odds

(a) Opinion polls



(b) Bookmakers' odds

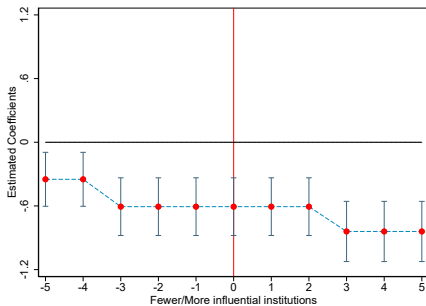


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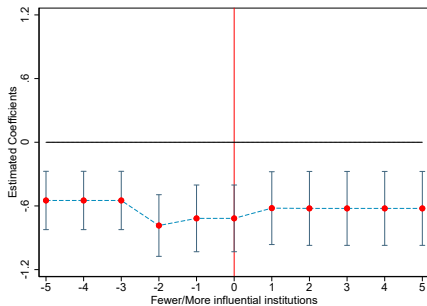
Robustness

Group assignment, Google

(a) Google Trend



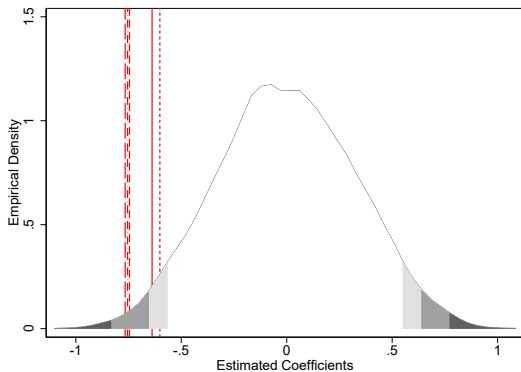
(b) Google News



▶ Back

Robustness

Montecarlo simulation of group assignment



▶ Back