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' befiefs

Introduction

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

Introduction

Figure: Referendum in Catalonia on the independence from Spain

Introduction

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
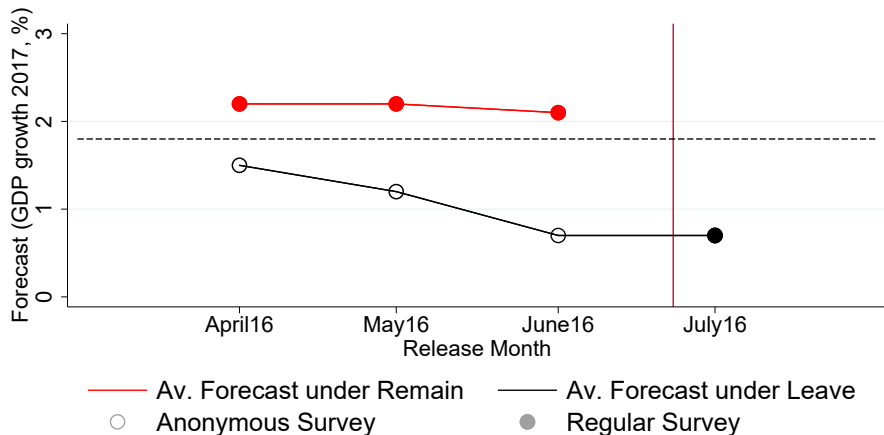
Figure: GDP Forecasts released around the referendum

Related literature

- Propaganda bias of special interest groups and media
  - Downs (1957) postulates that rational agents lack incentives in 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 asimmetry 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
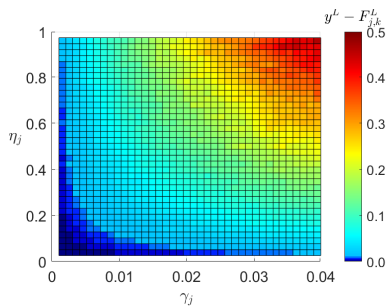
(b) State R
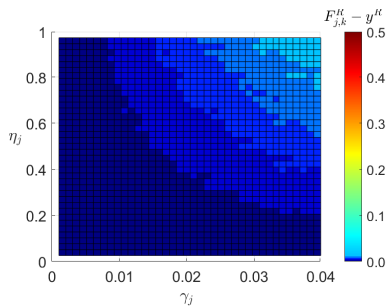
Figure: Propaganda Bias in period k

Theoretical Framework

Dynamic allocation of the bias
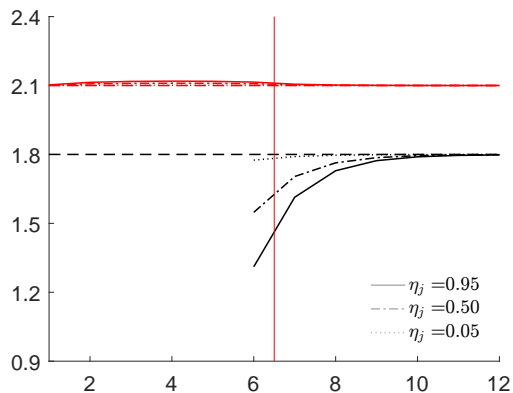
Figure: Evolution of propaganda bias over time

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
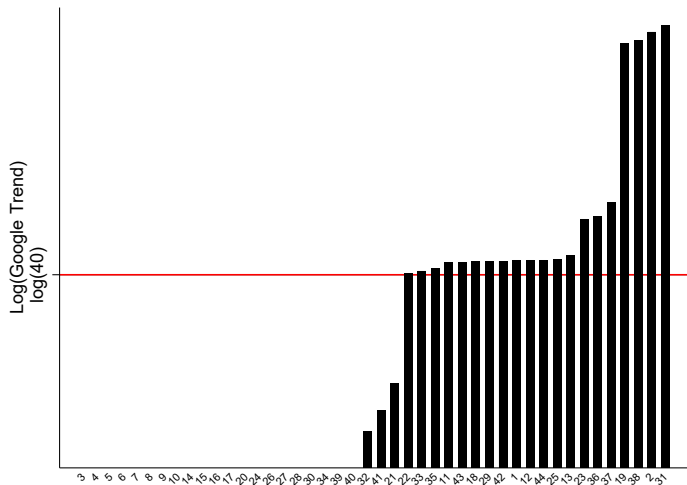
Taking the Model to Data

Stock prices
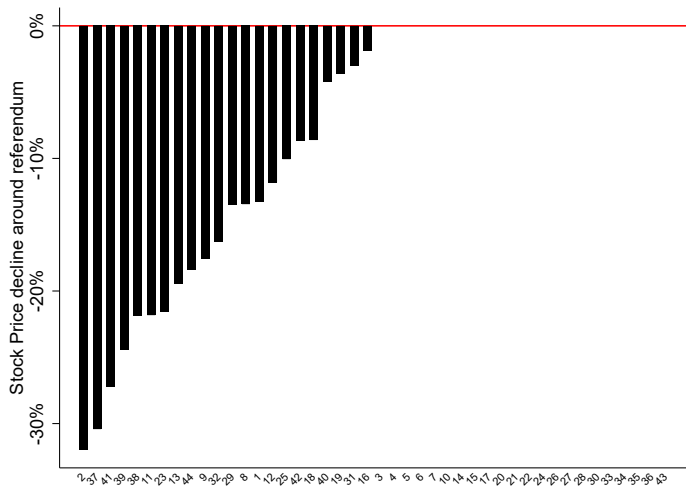
Empirical Strategy
Setup

- 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:

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

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

Taking the model to data
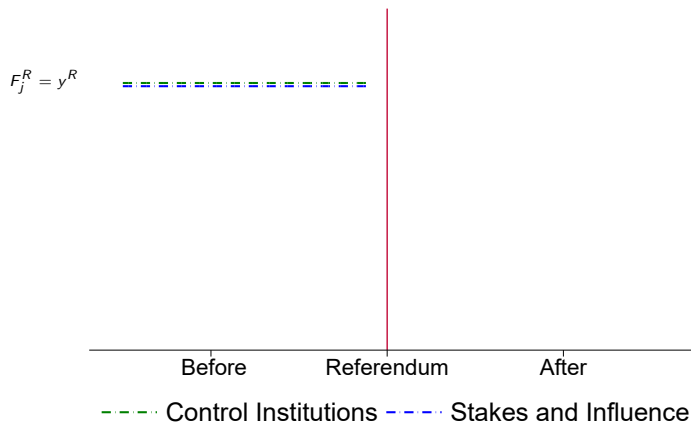
Predictions and Estimation

(a) Predictions

$F_j^R = y^R$

Before   Referendum   After

--- Control Institutions --- Stakes and Influence

Taking the model to data

Predictions and Estimation

(a) Predictions

$F_j^R = y^R$

$F_j^L = y^L$

$F_j^L < y^L$

Before   Referendum   After

······· Control Institutions ······· Stakes and Influence
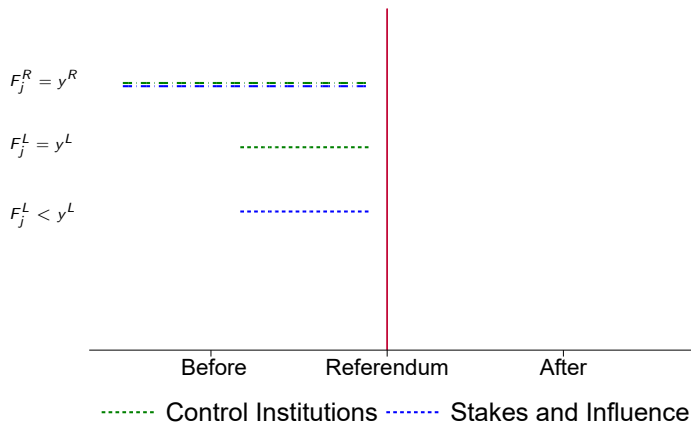
Taking the model to data

Predictions and Estimation

(a) Estimation

$F_j^R = y^R$

$F_j^L = y^L$

$F_j^L < y^L$

Before   Referendum   After

······· Control Institutions ······· Stakes and Influence
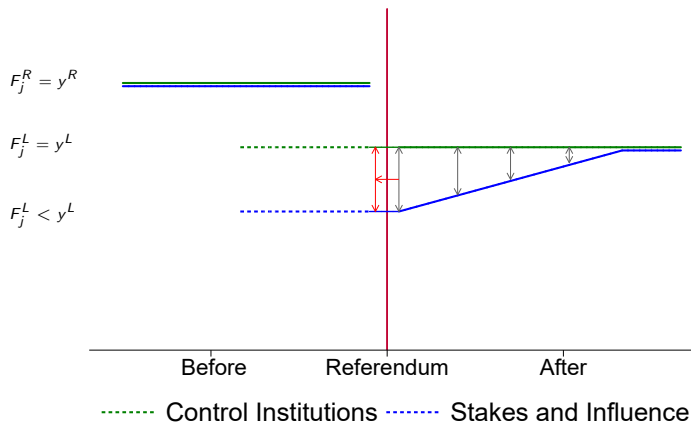
Validation of the assumption

- 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

Results

Table: Estimation of Propaganda Bias in GDP Growth Forecasts

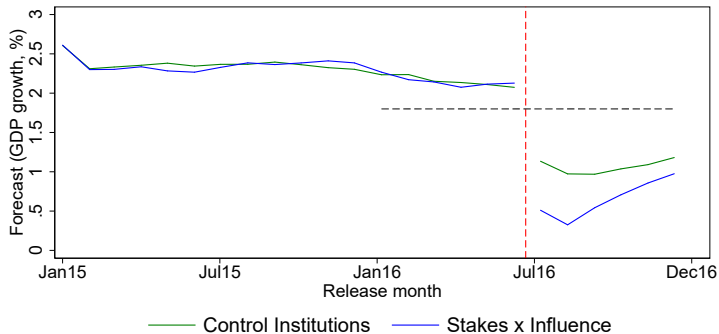|	Stakes × Influence				Stakes	Influence
	(1)	(2)	(3)	(4)	(5)	(6)
Group × Referendum	-0.526***	-0.638***	-0.745***	-0.601***	-0.755***	-0.766***
	(0.183)	(0.171)	(0.185)	(0.173)	(0.204)	(0.166)
Group × Ref. (+1)	-0.711***	-0.753***	-0.529***	-0.751***	-0.743***	-0.578***
	(0.140)	(0.172)	(0.177)	(0.171)	(0.146)	(0.170)
Group × Ref. (+2)	-0.456***	-0.445***	-0.471***	-0.484***	-0.536***	-0.488***
	(0.148)	(0.144)	(0.148)	(0.142)	(0.155)	(0.145)
Group × Ref. (+3)	-0.420***	-0.483***	-0.473***	-0.451***	-0.479***	-0.447***
	(0.158)	(0.150)	(0.154)	(0.150)	(0.151)	(0.152)
Group × Ref. (+4)	-0.121	-0.126	-0.157	-0.125	0.001	-0.377***
	(0.145)	(0.122)	(0.120)	(0.122)	(0.149)	(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 x Influence				Stakes	Influence
	(1)	(2)	(3)	(4)	(5)	(6)
Group x Ref. (-1)	0.089	0.041	0.005	0.042	-0.033	0.056
	(0.112)	(0.096)	(0.093)	(0.096)	(0.111)	(0.093)
Group x Ref. (-2)	-0.050	-0.077	-0.026	-0.074	-0.077	-0.051
	(0.115)	(0.096)	(0.098)	(0.094)	(0.113)	(0.091)
Group x Ref. (-3)	0.045	-0.066	-0.067	-0.064	-0.092	-0.032
	(0.115)	(0.088)	(0.090)	(0.088)	(0.097)	(0.089)
Group x Ref. (-4)	0.085	0.053	0.081	0.055	-0.004	0.050
	(0.147)	(0.101)	(0.097)	(0.099)	(0.127)	(0.099)
Group x Ref. (-5)	-0.065	-0.104	-0.168	-0.075	-0.116	-0.091
	(0.135)	(0.112)	(0.110)	(0.110)	(0.113)	(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 × Influence			Stakes	Influence	
	(1)	(2)	(3)	(4)	(5)	(6)
Group × Ref. × Stock Price	-0.361***		-0.316***	-0.330***		-0.246**
	(0.094)		(0.102)	(0.098)		(0.098)
Group × Ref. × log(Trend)		-0.252***	-0.067		-0.308***	-0.197**
		(0.093)	(0.084)		(0.092)	(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.
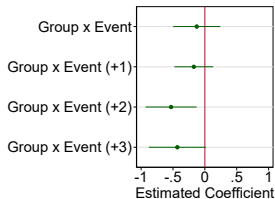
Robustness Checks

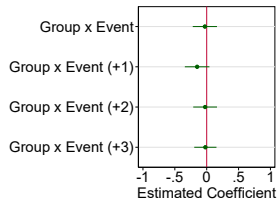Ruling out alternative mechanisms
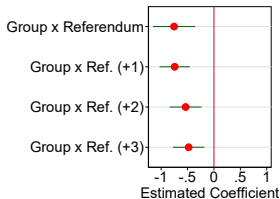
(a) Referendum (b) Financial Crisis (c) 9/11 attack

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 suggesta that the bias reduced the probability of Brexit by approx. 10 p.p.

Thank you!
davide.cipullo@nek.uu.se
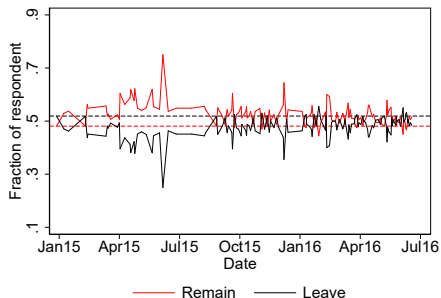
Extra

Motivation

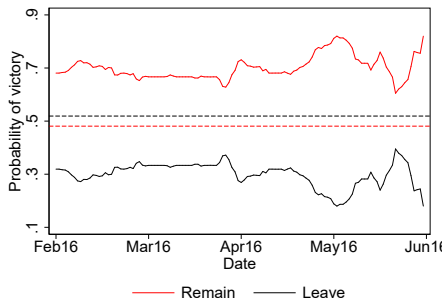

(a) Google Trends
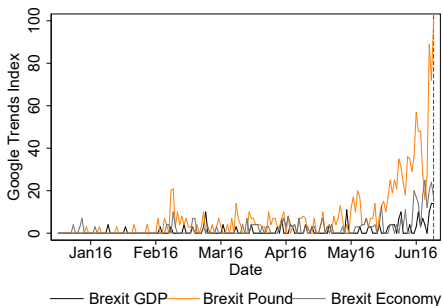
Taking the Model to Data

Opinion polls and Bookmakers' odds
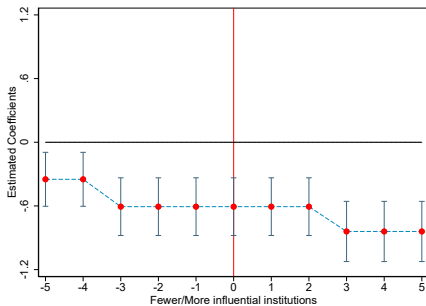

(a) Opinion polls

(b) Bookmakers' odds

‣ Back

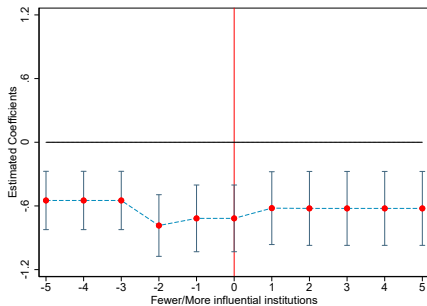# Robustness

Group assignment, Google

(a) Google Trend
(b) Google News

▸ Back
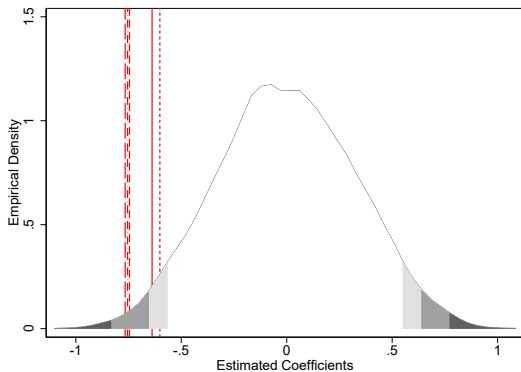
Robustness

Montecarlo simulation of group assignment