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
Introduction

The Telegraph

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

Figure: Referendum in Greece to solve the debt crisis
Introduction

Figure: Referendum in Catalonia on the independence from Spain
**Introduction**

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 customers.

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 Colderidge, 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.

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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.
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 investing in collecting costly information before voting and rely on SIG and media
  - **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
Macroeconomic forecasters have an 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 ($\eta_j$) and influence ($\gamma_j$)
  - 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
  - Consequences are difficult to predict for voters
  - 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

- Forecaster’s characteristics from Google News, Google Trends and Thomson Reuters Eikon
Taking the Model to Data
Measures of Stakes and Influence

- Measures of stakes ($\eta_j$)
  - 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 ($\gamma_j$)
  - 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

Cipullo & Reslow (Uppsala)

January 5, 2020

AEA Congress 2020 18 / 30
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:

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

(1)

where \( k = -5, \ldots, 4 \) 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

Before Referendum

After

Control Institutions
Stakes and Influence

$F^R_j = y^R$

$F^L_j = y^L$

$F^L_j < y^L$
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

![Graph showing forecast of GDP growth](image)

- **Control Institutions**
- **Stakes x Influence**

### Forecast (GDP growth, %)
- Jan 15
- Jul 15
- Jan 16
- Jul 16
- Dec 16

### Release month:
- January 5, 2020
## Table: Estimation of Propaganda Bias in GDP Growth Forecasts

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

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

<table>
<thead>
<tr>
<th></th>
<th>Stakes x Influence</th>
<th>Stakes</th>
<th>Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group x Ref. (-1)</td>
<td>(1) 0.089</td>
<td>(4) 0.042</td>
<td>(6) 0.056</td>
</tr>
<tr>
<td></td>
<td>(0.112)</td>
<td>(0.096)</td>
<td>(0.093)</td>
</tr>
<tr>
<td>Group x Ref. (-2)</td>
<td>-0.050</td>
<td>-0.074</td>
<td>-0.077</td>
</tr>
<tr>
<td></td>
<td>(0.115)</td>
<td>(0.096)</td>
<td>(0.094)</td>
</tr>
<tr>
<td>Group x Ref. (-3)</td>
<td>0.045</td>
<td>-0.064</td>
<td>-0.092</td>
</tr>
<tr>
<td></td>
<td>(0.115)</td>
<td>(0.088)</td>
<td>(0.088)</td>
</tr>
<tr>
<td>Group x Ref. (-4)</td>
<td>0.085</td>
<td>0.055</td>
<td>0.050</td>
</tr>
<tr>
<td></td>
<td>(0.147)</td>
<td>(0.101)</td>
<td>(0.099)</td>
</tr>
<tr>
<td>Group x Ref. (-5)</td>
<td>-0.065</td>
<td>-0.168</td>
<td>-0.116</td>
</tr>
<tr>
<td></td>
<td>(0.135)</td>
<td>(0.112)</td>
<td>(0.113)</td>
</tr>
</tbody>
</table>

| Observations            | 1,643              |
| Fixed Effects           | ✓                   |
| Survey Month Effects    | ✓                   |
| Measure of Stakes       | Banks               |
| Measure of Influence    | 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

<table>
<thead>
<tr>
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<th>Stakes x Influence</th>
<th>Stakes</th>
<th>Influence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Group x Ref. x Stock Price</td>
<td>-0.361***</td>
<td>-0.316***</td>
<td>-0.330***</td>
</tr>
<tr>
<td></td>
<td>(0.094)</td>
<td>(0.102)</td>
<td>(0.098)</td>
</tr>
<tr>
<td>Group x Ref. x log(Trend)</td>
<td>-0.252***</td>
<td>-0.067</td>
<td>-0.308***</td>
</tr>
<tr>
<td></td>
<td>(0.093)</td>
<td>(0.084)</td>
<td>(0.092)</td>
</tr>
</tbody>
</table>

| 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!
davide.cipullo@nek.uu.se
Extra
Motivation

(a) Google Trends

![Google Trends Index over time for Brexit GDP, Pound, and Economy](image-url)

- Brexit GDP
- Brexit Pound
- Brexit Economy

Back
Taking the Model to Data
Opinion polls and Bookmakers' odds

(a) Opinion polls

(b) Bookmakers' odds
Robustness

Group assignment, Google

(a) Google Trend

(b) Google News
Robustness

Montecarlo simulation of group assignment