

The Global Impact of Brexit Uncertainty

Tarek A. Hassan

Boston University, NBER, and CEPR

Stephan Hollander

Tilburg University

Laurence van Lent

Frankfurt School of Finance and Management

Ahmed Tahoun

London Business School

Motivation

- The UK's decision to leave the EU (“Brexit” vote) exemplifies how political and economic shocks originating in one country can propagate to affect firms in other countries.
- Understanding and quantifying this propagation is often difficult: hard to measure how a given firm may be exposed to a specific policy measure, reform, or other shock.

This paper:

- Proposes a general, text-based, method for isolating firm-level exposure to costs, benefits, and risks relating to specific events.
- Illustrates this method with a comprehensive analysis of how UK, US, and international firms respond to the consequences of the 2016 Brexit referendum.

Main Findings

1. Widespread concern about Brexit-related risks among international (non-UK) firms.
 - Irish firms on average even more concerned than UK firms.
 - Impacts as far afield as United States, South Africa, and Singapore.
2. UK and non-UK firms overwhelmingly expect negative impacts from regulatory divergence, reduced labor mobility, trade access, etc.
 - No evidence of economic benefits touted by the 'Vote Leave' campaign, even among UK firms.
3. Brexit risk strongly associated with significant reductions in investment and employment growth among exposed non-UK firms.
4. First-moment shocks attributable to Brexit are priced by the stock market but have not realized in firm actions (yet).

Related Literature

- Measurement and effects of political uncertainty (Belo et al. 2013, Handley and Limao 2015, Kelly et al. 2016, Koijen et al. 2016, Baker et al. 2016)

This paper: general text-based method for isolating first- and second moment exposures to specific shocks.

- Effects of Brexit on UK firms, trade, asset prices (Bloom et al. 2019, Born et al. 2019, Breinlich et al. 2018, Sampson 2017, Van Reenen 2016, ...)

This paper: speaks to impacts outside the UK; evidence Brexit vote mostly acted as an as an uncertainty shock.

- International spillovers of uncertainty (Forbes and Warnock 2012, Rey 2015, Maggiori 2017)

This paper: provide direct, well-identified evidence of spillovers through risk.

- Text-based measurement in macro (Baker et al. 2016, Caldara and Iacoviello 2016, Hassan et al. 2019, Handley and Li 2020)

Outline

Measuring a Firm's Exposure to Brexit

Validation: Global Exposure to Brexit

Validation: Event Study

Validation: Regional Support for Brexit

The Firm-Level Effects of Brexit

Earnings Call Transcripts

- Refinitiv EIKON: complete set of 145,902 English-language earnings conference call transcripts of 7,733 firms headquartered in 71 countries, from 2011 through 2019.
- Typically four calls per year, associated with earnings releases.
- Management presentation followed by Q&A with firm's analysts (0-70 questions, average duration 45 minutes).
- In this “market place” of information, we intuit that managers and participants devote more time to events of greater importance to the firm.

What share of the conversation between management and participants centers on costs, benefits, and risks associated with Brexit?

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Coverage

Region	Number of Sample Firms	
	Headquarters	UK subsidiary
UK	428	NA
EU (non-UK)	1,035	432
US	3,948	1,634
Rest of the world	2,767	781

2,841 international firms in our sample have direct exposure to the UK through a subsidiary. Many more through suppliers, customers, competitors, or shareholders.

A Firm-Level Measure of Brexit Exposure

Count the number of times the unigram “Brexit” is used and divide by the total number of words in the transcript:

$$BrexitExposure_{it} = \frac{1}{B_{it}} \sum_{b=1}^{B_{it}} 1[b = Brexit],$$

where $b = 0, 1, \dots, B_{it}$ are the words contained in the earnings call of firm i at time t .

A Firm-Level Measure of Brexit Risk

Same procedure as for $BrexitExposure_{it}$, see previous sheet, but now we condition on proximity to a synonym for risk or uncertainty:

$$BrexitRisk_{it} = \frac{1}{B_{it}} \sum_{b=1}^{B_{it}} \{1[b = Brexit] \times 1[|b - r| < 10]\},$$

where r is the position of the nearest synonym of risk or uncertainty.

► List of synonyms

A Firm-Level Measure Brexit Sentiment

Same procedure, but now counting positive and negative tone words (Loughran and McDonald 2011) used in conjunction with “Brexit”:

$$BrexitSentiment_{it} = \frac{1}{B_{it}} \sum_{b=1}^{B_{it}} \left\{ \{1[b = Brexit] \times \left(\sum_{c=b-10}^{b+10} S(c) \right) \right\},$$

where S assigns sentiment to each c :

$$S(c) = \begin{cases} +1 & \text{if } c \in \mathbb{S}^+ \\ -1 & \text{if } c \in \mathbb{S}^- \\ 0 & \text{otherwise} \end{cases}$$

► [List of tone words](#)

Firm-Level Controls

For firm-level regressions, we also construct controls for firm i 's non-Brexit related risk at time t :

$$NonBrexitRisk_{it} = \frac{1}{B_{it}} \sum_b^{B_{it}} \{1[b \in \mathbb{R}]\} - BrexitRisk_{it}$$

and non-Brexit related sentiment:

$$NonBrexitSentiment_{it} = \frac{1}{B_{it}} \sum_b^{B_{it}} S(b) - BrexitSentiment_{it}.$$

as in Hassan, Hollander, van Lent, and Tahoun 2019.

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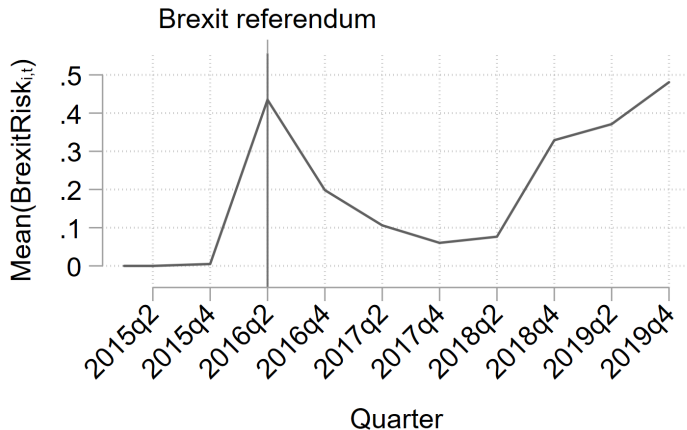
BrexitExposure and Firm Characteristics

	<i>BrexitExposure_i</i>			
	(1)	(2)	(3)	(4)
1{UK HQ}	0.860*** (0.074)	0.902*** (0.074)	0.110 (0.088)	0.145 (0.091)
1{UK subsidiary}	0.194*** (0.018)	0.207*** (0.018)	0.244*** (0.022)	0.244*** (0.021)
1{EU non-UK HQ}		0.295*** (0.034)	0.085 (0.086)	0.081 (0.082)
% of sales in UK (2010-2015)			1.838*** (0.398)	
% of sales in UK (2016-present)				1.751*** (0.394)
R^2	0.074	0.092	0.128	0.128
N	8,177	8,177	3,533	3,742

Standard errors are robust.

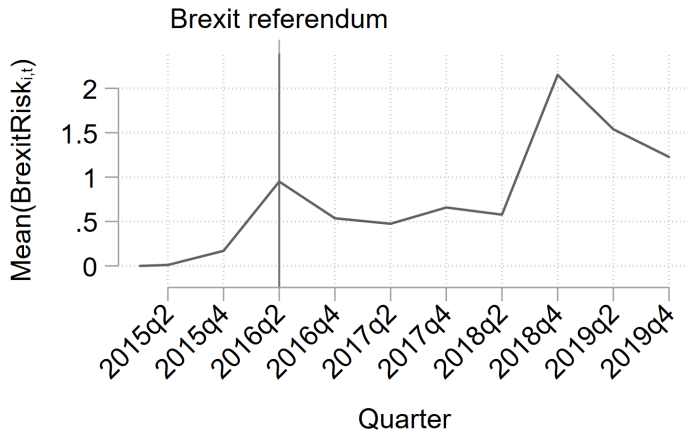
BrexitExposure is the firm-level mean Brexit exposure measured from 2016Q1-2019Q1. Geographical location of firms' operational headquarters and UK revenues (*before* and *after*) the Brexit vote: firms with closer commercial ties to the UK are more exposed to Brexit.

Time-Series *BrexitRisk*: Non-UK Firms



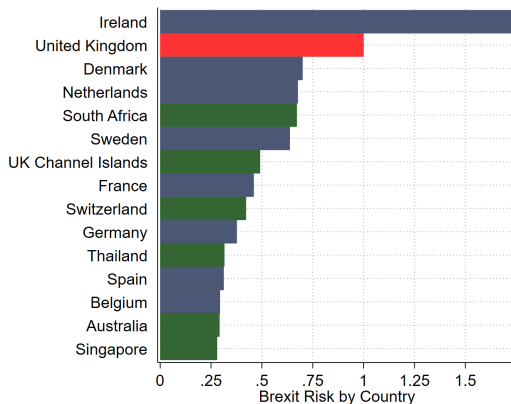
Immediately after referendum, Brexit risk for non-UK firms reaches level of average UK-firm Brexit risk during 2016-2019.

Time-Series *BrexitRisk*: UK Firms



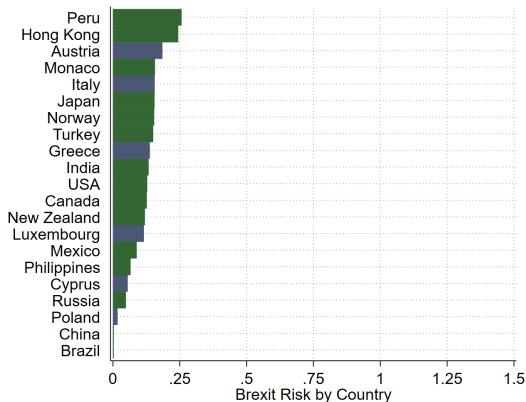
Closely mimics EU-UK negotiations process; e.g. end of 2018: Theresa May's deal and difficulties obtaining parliamentary approval for that deal.

BrexitRisk by Country (1/2)



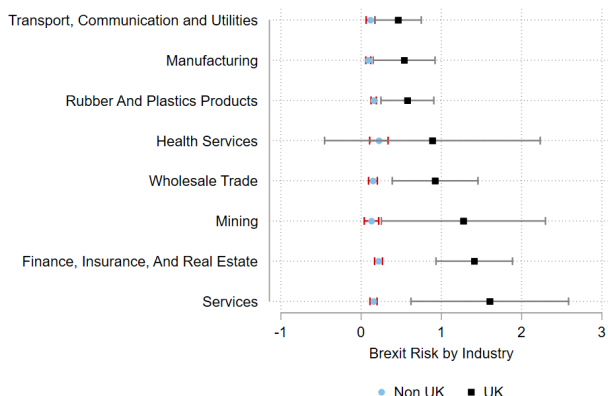
Average *BrexitRisk* significantly higher in Ireland than in UK (p-val 0.02): market and supplier access to neighboring countries most important for small economies. Mirrors result in Garetto et al 2019: Brexit shock most reduces purchasing power in Ireland.

BrexitRisk by Country (2/2)



Generally larger incidence among geographically proximate countries.
Mean *BrexitRisk* of US firms = 0.13.

BrexitRisk by Industry



In nearly all industries (Health Services in an exception) mean *BrexitRisk* is larger in UK than in non-UK countries.

High-*BrexitRisk* Transcripts: Non-UK

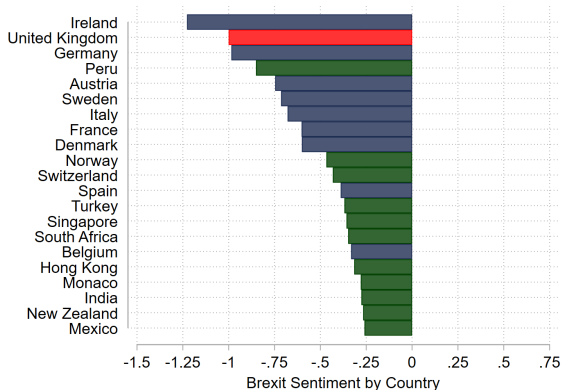
Company	Brexit Risk _i	Country	Month	Transcript excerpts
Northstar Realty Europe Corp	18.35	US	2016-07	give rise to greater uncertainty this uncertainty has been exasperated by brexit the prospect of brexit has resulted in a high degree of
Ryanair Holdings PLC	18.29	IE	2017	airlines the pricing environment has also been affected by the post brexit uncertainty which has seen weaker sterling and a switch of charter
Breedon Group PLC	17.58	JE	2019-01	quarter and the increased input costs but also an element of brexit uncertainty in ireland our performance was strong and benefited from the
Sweco AB	12.58	SE	2018-10	but still there is still an uncertainty when it comes to brexit and some weakness in the real estate market so once again
Stonegate Mortgage Corp	11.65	US	2016-07	markets primarily driven by economic concerns abroad in particular uncertainty around brexit played a major role related to the instability of interest rates

Top firms by average *BrexitRisk*

Text fragments confirm that discussion centers on Brexit-related uncertainty faced by the firm.

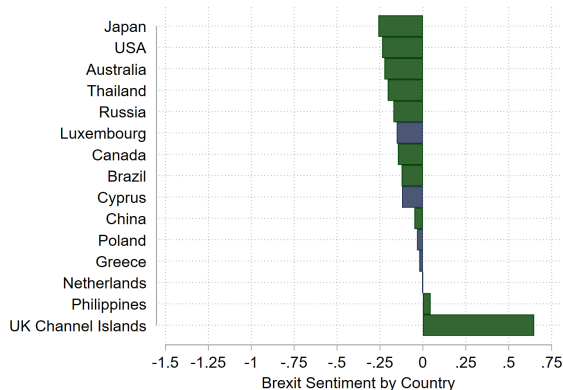
► UK firms

BrexitSentiment by Country (1/2)



Overwhelmingly, Brexit-related sentiment in the UK and elsewhere is negative.

BrexitSentiment by Country (2/2)



One anomalous area: UK Channel Islands, with *BrexitSentiment* of +.65.

Positive *BrexitSentiment*: Expected Benefits

Category	UK in %	Non-UK in %
Not exposed	78.95	79.55
Weak pound	14.03	16.67
Better trade access	5.26	1.52
Relocation opportunities	3.51	3.79
Higher government expenditures	0	1.52
Less regulation	0	0.76

- Manually read all 473 excerpts with positive *BrexitSentiment*; 189 convey sufficiently specific reasoning.
- Main upsides: firms are happy they are not exposed to Brexit or glad about the devalued pound.
- No evidence, even among UK firms, of economic benefits touted by ‘Vote Leave’ campaign. [▶ Time-series](#)

Positive *BrexitSentiment*: Example Snippets

Category	Transcript excerpt
Not exposed	despite whats going on with the brexit noise so thus far we havent seen a whole lot of softening and just to remind you our uk office portfolio we have no financial institution exposure (Kennedy-Wilson Holdings Inc, US, 2019 Q1)
Weak pound	saw a spike in leisure occupancy after the brexit referendum in june as tourists took advantage of the cheaper pound (Millennium & Copthorne Hotels PLC, UK, 2017 Q1)
Better trade access	brexit could be beneficial for forfarmers i can understand that it might have a positive impact on your position in the uk (ForFarmers, NL, 2019 Q1)
Relocation opportunities	potential opportunity coming from brexit and weve seen a number of firms announcing that frankfurt would ultimately be their european hub (Deutsche Boerse AG, DE, 2017 Q3)
Higher government expenditure	probably greater amount of private capital going into those assets simply because of the other pressures on government spending so i think brexit is neutral to who knows maybe mildly positive for us (International Public Partnerships Ltd, GG, 2016 Q3)

Negative *BrexitSentiment*

Category	UK in %	Non-UK in %
Weak pound	24.69	57.41
Worse trade access	24.69	22.84
Labor market frictions	18.52	9.26
Falling consumer confidence	18.52	2.47
Adjustment and transition costs	8.64	1.23
New, multiple regulatory regimes	6.17	9.88

- Manually read all 884 excerpts with negative *BrexitSentiment*; 243 convey sufficiently specific reasoning.
- Much more diffuse downsides: weak pound, worse trade access, multiple regulatory regime, labor market frictions.
- UK particularly concerned with adjustment costs.

Negative *BrexitSentiment*: Example Snippets

Category	Transcript excerpt
Weak pound	on the cost side weve had some cost headwinds fx particularly as sterling has still been weaker this year than last after brexit has impacted us (Flybe Group PLC, UK, 2018 Q2)
Worse trade access	if the uk is unable to negotiate access to the single market or open skies it may have implications for our three uk domestic routes (Ryan Air Holdings, IE, 2016 Q3)
Labor market frictions	labor market is getting tighter brexit will bring additional challenges with regard to particularly experienced people within all over banking organizations in ireland (Permanent TSB Group Holdings PLC, IE, 2018 Q3)
Falling consumer confidence	brexit has been and will continue to be a significant focus for the industry over the coming months we will be affected by the outcomes to the extent that there is significant changes in consumer confidence (Auto Trader Group PLC, UK, 2018 Q4)
Adjustment and transition costs	gbp million related to our investment in our operating platform regulatory developments and brexit preparations (Jupiter Fund Management PLC, UK, 2019 Q1)
New, multiple regulatory regimes	i sincerely hope that for the implementation of the brexit reasonable solutions will be found that will preserve to a large extent the rules of the single market for energy (Yunipro PAO, RU, 2016 Q3)

Outline

Measuring a Firm's Exposure to Brexit

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The Firm-Level Effects of Brexit

Validation: Event Study

- Referendum result on June 23, 2016 was a surprise.
 - Prediction markets and polls persistently suggested a “Remain” victory.
 - Famously, Boris Johnson himself went to bed resigned to losing the vote (ITV report, June 24, 2016).
 - Surprise should be reflected in asset returns.
- Use event study methodology to further validate measures of *BrexitRisk* and *BrexitSentiment*:

$$r_i = \alpha + \gamma \overline{BrexitRisk}_i + \delta \overline{BrexitSentiment}_i + X_i' \nu + \epsilon_i$$

where X_i controls for size, CAPM beta (S&P500, FTSE100 index), country, and sector FEs.

- If our measures indeed pick up the mean and variance of firm-level exposures to Brexit, would expect $\gamma < 0$ and $\delta > 0$ in a narrow stock return window around the referendum date.

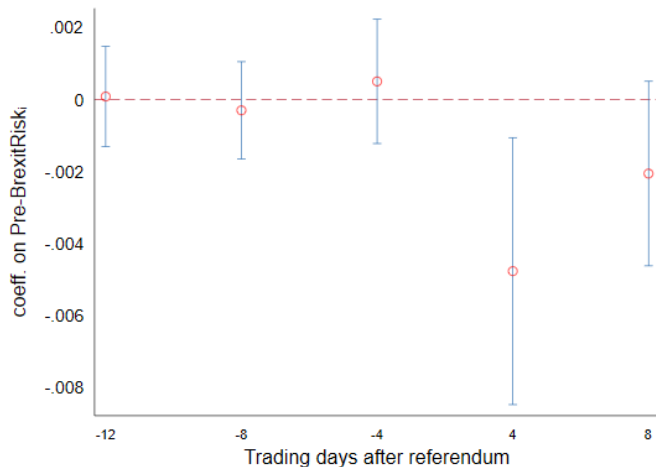
Validation: Event Study

	All firms				US firms
$\overline{\text{BrexitExposure}}_i$	-0.023*** (0.002)				
$\overline{\text{BrexitRisk}}_i$		-0.011*** (0.002)	-0.011*** (0.002)		
$\overline{\text{BrexitSentiment}}_i$		0.002** (0.001)	0.002** (0.001)		
Pre-BrexitRisk_i				-0.005** (0.002)	-0.005** (0.002)
$\text{Pre-BrexitSentiment}_i$				0.001** (0.000)	0.002** (0.001)
Constant	0.006 (0.004)	-0.006 (0.004)	0.006 (0.004)	0.009* (0.005)	0.007 (0.005)
R^2	0.205	0.155	0.190	0.171	0.115
N	4,528	4,572	4,528	3,811	2,534
Beta controls	Y	N	Y	Y	Y

Control for log(assets), industry fixed effects, headquarter country fixed effects.
Brexit variables averaged from 2016-19. SE clustered by firm.

Columns 3 and 4: using only information available at time of the referendum. Overall, exposure to both *BrexitRisk* and *BrexitSentiment* priced by stock market.

Event Study: Timing



Sequence of four-day return windows *prior* and *following* June 23, 2016 Brexit vote. Only document significant coefficient on *PreBrexitRisk* during treatment window—not before or after.

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Validation: Regional Support for Brexit

- We propose that voters' referendum choice will be guided by their assessment of how Brexit will affect local economic and employment conditions.
- Map 421 UK firms' area code of their operational headquarters into electoral districts.
- Compute district-level *BrexitRisk* and *BrexitSentiment* by averaging across firms in the district.
- Relate to referendum results: district-level vote in support of Leave ($\%leave_d$):

$$\%leave_d = \alpha + \beta \overline{BrexitRisk}_d + \gamma \overline{BrexitSentiment}_d + X'_d \zeta + \epsilon_d,$$

where all specifications control for regional income per capita and % UK born.

Validation: Regional Support for Brexit (C'd)

	%leave _d		
BrexitRisk _d	-0.838* (0.456)		-0.929** (0.378)
BrexitSentiment _d		0.358*** (0.133)	0.386*** (0.114)
Share UK born _d	50.481*** (7.296)	51.592*** (7.484)	52.395*** (7.380)
Income per capita _d	-0.024*** (0.004)	-0.022*** (0.003)	-0.023*** (0.004)
R ²	0.580	0.586	0.604
N	110	110	110

Counties more exposed to Brexit risk, with negative Brexit sentiment less likely to vote 'Leave.' A one s.d. increase (decrease) in a county's *BrexitRisk* (*Sentiment*) associated with a 1.4 (1.7) pp decrease in support for 'Leave.' [▶ Scatter plot](#)

Validation Exercises: Summary

Measures of *BrexitRisk* and *BrexitSentiment*:

- Vary intuitively with firm-level exposures to the UK and EU.
- Correspond to valid conversations about firm-level risks, costs, and opportunities induced by the Brexit vote.
- Stock markets reacted intuitively to these exposures in response to the referendum result.
- *BrexitRisk* and *BrexitSentiment* of local firms appears to be reflected in local political support for Brexit.

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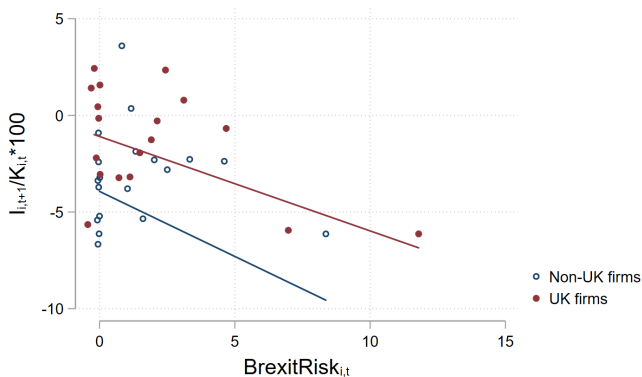
The Firm-Level Effects of Brexit

Regress firm-year-level outcome variables (investments, hiring, sales) on *BrexitRisk* and *BrexitSentiment*, from 2011 to 2018,

$$y_{i,t+1} = \delta_j + \delta_t + \delta_c + \beta \text{BrexitRisk}_{it} + \gamma \text{BrexitSentiment}_{it} + X'_{it}\zeta + \epsilon_{it},$$

where δ_j , δ_t , and δ_c are industry, year, and headquarters-country FEs. Finally, X controls for log of firm assets, *NonBrexitRisk*, and *NonBrexitSentiment*.

BrexitRisk and Capital Investment, $I_{i,t+1}/K_{i,t}$



Slope coeff.: -0.583 (UK) -0.614 (non-UK)
S.E.: 0.249(UK) 0.150(non-UK)

Binned-added variable plot: among UK and non-UK firms, negative association between *BrexitRisk* and investment rates, controlling for *BrexitSentiment*, firm size, sector and time FEs.

Capital Investment: Regression Analysis

	$I_{i,t+1}/K_{i,t} \cdot 100$				
	All firms				US firms
BrexitRisk _{<i>i,t</i>}	−0.528*** (0.134)	−0.464*** (0.138)	−0.430*** (0.135)	−0.434*** (0.138)	−0.794*** (0.258)
BrexitSentiment _{<i>i,t</i>}	−0.083 (0.069)	−0.084 (0.073)	−0.080 (0.072)	−0.089 (0.073)	−0.219 (0.178)
Non-BrexitRisk _{<i>i,t</i>}			−0.818*** (0.285)	−0.694** (0.286)	−0.660* (0.356)
Non-BrexitSentiment _{<i>i,t</i>}				0.833*** (0.232)	0.854*** (0.318)
R^2	0.033	0.079	0.080	0.080	0.069
N	25,835	25,743	25,743	25,743	16,368
Year FE	Y	Y	Y	Y	Y
SIC FE	Y	Y	Y	Y	Y
SIC x year FE	N	Y	Y	Y	Y
Country x year FE	N	Y	Y	Y	Y

Note: Controls for log(assets). Standard errors clustered by firm.

Estimated impact of *BrexitRisk* for each country (Appendix Table 8): average Irish firm −0.75 pct. point, average UK firm −0.43 pct. point, average US firm −0.10 pct. point—against average full sample −0.18 pct point.

Capital Investment: Robustness

	$I_{i,t+1}/K_{i,t} \cdot 100$						
BrexitRisk $_{i,t}$	-0.434*** (0.138)	-0.545** (0.231)	-0.369*** (0.137)	-0.430*** (0.139)	-0.440*** (0.144)	-0.455** (0.224)	-0.530*** (0.172)
Earnings surprise $_{i,t}$		-0.017 (0.051)					
Stock returns $_{i,t}$: Quarterly			0.254*** (0.026)				
Stock returns $_{i,t}$: Week before EC				0.128** (0.057)			
PRiskTrade $_{i,t}$ (std.)					-0.562** (0.229)		
Average UK sales $_i$ (pre-Brexit)						1.273 (4.118)	
BrexitExposure $_i$							0.614 (0.661)
R^2	0.080	0.095	0.095	0.081	0.085	0.110	0.080
N	25,743	18,303	24,595	24,829	24,651	17,500	25,743
Controls	Y	Y	Y	Y	Y	Y	Y
Industry x Year FE	Y	Y	Y	Y	Y	Y	Y
Country x Year FE	Y	Y	Y	Y	Y	Y	Y

Note: Include covariates as in column 4. Standard errors clustered by firm.

Potential concerns: Brexit **as excuse** (Cols 1-2); Brexit-exposed firms also exposed to **other risks** (Col 3); UK-exposed international firms generally **invest less** (Cols 4-5). Coefficient estimates stable.

Capital Investment: Placebo Test



Erroneously assign each firm's *BrexitRisk* to a three-year period prior to the referendum: (a) 2011-13; (b) 2013-15. No statistically significant effect of Brexit risk prior to 2016.

Employment: Regression Analysis

PANEL A	$\Delta emp_{i,t} / emp_{i,t-1} \cdot 100$			
	All firms		US firms	
BrexitRisk _{<i>i,t</i>}	−0.339*** (0.106)	−0.315*** (0.115)	−0.721*** (0.228)	−0.762*** (0.242)
BrexitSentiment _{<i>i,t</i>}	−0.009 (0.053)	−0.019 (0.053)	−0.116 (0.118)	−0.094 (0.122)
R^2	0.026	0.061	0.027	0.057
N	31,031	30,940	20,513	20,493
Controls	Y	Y	Y	Y
Industry × Year FE	N	Y	N	Y
Country × FE	N	Y	n/a	n/a

Estimated impact of *BrexitRisk* for each country (Appendix Table 6): average Irish firm −.55 pct point, average UK firm 0.32 pct point, average US firm −0.10 pct point—against average full sample −0.17 pct point.

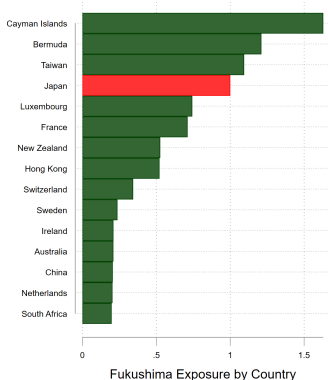
Sales: Regression Analysis

PANEL B	$\Delta sales_{i,t} / sales_{i,t-1} \cdot 100$			
	All firms		US firms	
BrexitRisk _{<i>i,t</i>}	-0.334*	-0.161	-0.317	-0.297
	(0.175)	(0.187)	(0.309)	(0.308)
BrexitSentiment _{<i>i,t</i>}	0.095	0.098	0.153	0.229
	(0.075)	(0.084)	(0.198)	(0.217)
R^2	0.026	0.064	0.037	0.059
N	33,274	33,169	21,333	21,313
Controls	Y	Y	Y	Y
Industry \times Year FE	N	Y	N	Y
Country FE	N	Y	n/a	n/a

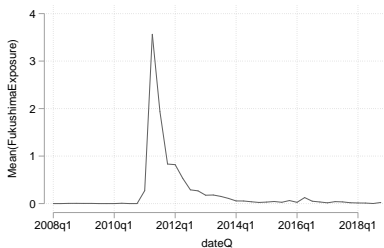
Real options literature postulates larger effect on hard-to-reverse investments (physical and human capital) than on short-run sales growth (e.g., Baker et al. 2016). Consistent with this prediction, *BrexitRisk* is no longer statistically significant.

Second Application: 2011 Fukushima Incident

- Shocks to a firm's market and non-market environment are part and parcel of the corporate world.
- This calls for a versatile method to quantify and analyze firm exposure to these shocks.
- Library-based method to measure exposure to specific events w.o. a synonymous unique made-up word like “Brexite.”



- Japan's exposure is high—same for nearby Taiwan and Hong Kong
- Insurance companies, heavily represented in Cayman



Conclusion

Introduce a general text-based method for isolating firm-level exposure to costs, benefits, and risks related to specific events.

1. Widespread concern about Brexit-related risks among non-UK firms.
2. UK and non-UK firms overwhelmingly expect negative impact from regulatory divergence, reduced labor mobility, trade access, etc.
3. No evidence of economic benefits touted by 'Vote Leave' campaign, even among UK firms.
4. Brexit risk significantly reduces in investment and employment growth among exposed non-UK firms.
5. First-moment shocks attributable to Brexit are priced by the stock market but have not (yet) been realized in firm actions.

Appendix

Synonyms for “Risk” or “Uncertainty”

Synonym	Frequency	Synonym	Frequency
uncertainty	1,157	prospect	4
uncertainties	260	unsure	3
risk	205	bet	3
uncertain	96	insecurity	3
risks	77	risky	3
unknown	33	danger	3
possibility	26	faltering	2
exposed	23	dilemma	2
instability	20	probability	2
threat	17	indecision	2
pending	17	suspicion	2
doubt	16	hesitant	2
fear	16	unpredictability	2
unclear	14	unstable	2
unresolved	13	sticky	1
chance	12	venture	1
likelihood	7	fluctuating	1
unsettled	6	hesitating	1
unpredictable	6	reservation	1
variable	5	speculative	1

Single-word synonyms of ‘risk’, ‘risky’, ‘uncertain’, and ‘uncertainty’ from Oxford Dictionary, excluding ‘question’, ‘questions’, and ‘venture’.

[▶ Back](#)

Top-50 Tone Words

Word	Frequency
despite	250
good	231
strong	170
positive	162
opportunities	99
great	98
opportunity	70
better	67
stable	65
able	55
benefit	49
leading	48
confident	37
progress	35
pleased	33
improved	31
gains	29
stronger	28
strength	26
best	24

Word	Frequency
improvement	23
greater	23
profitability	23
benefited	23
improving	23
stability	20
improve	19
optimistic	19
advantage	16
favorable	14
stabilize	13
rebound	13
strengthening	12
gain	11
successful	11
tremendous	11
excellent	11
successfully	9
achieve	9
stabilized	9

Word	Frequency
volatility	297
concerns	220
negative	182
difficult	102
challenges	99
slowdown	99
decline	85
concerned	85
concern	84
against	74
weakness	74
disruption	72
weak	63
weaker	63
slow	50
late	49
weakening	47
challenging	43
volatile	43
fallout	42

Word	Frequency
negatively	40
slowing	39
adverse	38
aftermath	37
unexpected	37
turmoil	35
slower	35
slowed	32
shutdown	31
challenge	31
crisis	30
fears	29
delays	26
weakened	25
problems	25
delay	24
caution	23
delayed	23
exposed	23
recall	22

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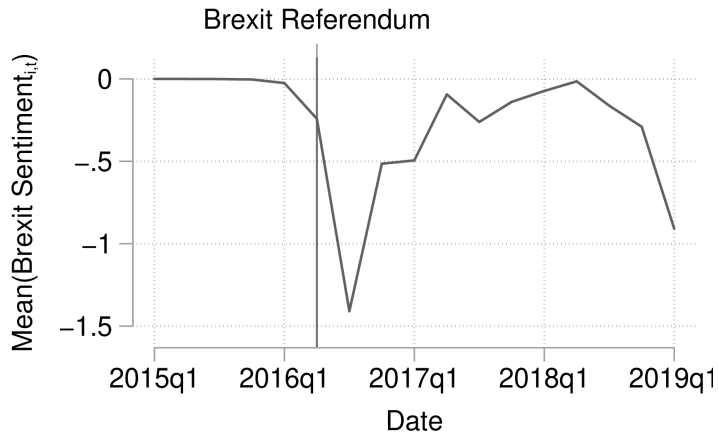
Excerpts Top *BrexitRisk* Transcripts: UK

Company	Brexit Risk _i	Country	Month	Transcript excerpts
Bellway PLC	18.89	GB	2018-10	deliver completions in fy we are mindful of the uncertainty surrounding brexit and we will wait to see whether customer sentiment is affected
Berendsen Ltd	14.14	GB	2016-07	and we have i think a pretty proven resilient business however brexit raises any number of uncertainties for every single business so were
SThree PLC	13.64	GB	2019-01	year theres also a lot of uncertainty around the uk and brexit and that will affect most markets but i think again the
Endava PLC	12.9	GB	2019-01	plans with us as a result of the uncertainties caused by brexit mark will talk about how weve mitigated fx risk in his
Millennium & Copthorne Hotels PLC	10.48	GB	2018-01	as you know there is still uncertainty about british economy and brexit for example we are seeing a rise in costs here because

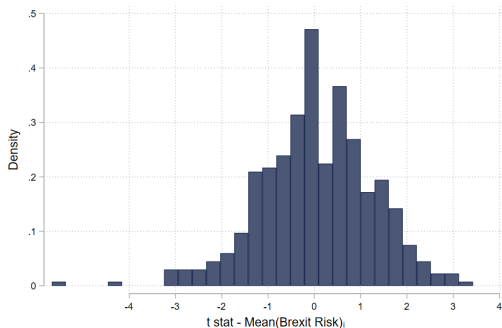
Top firms by average Brexit risk.

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Time-Series *BrexitSentiment*

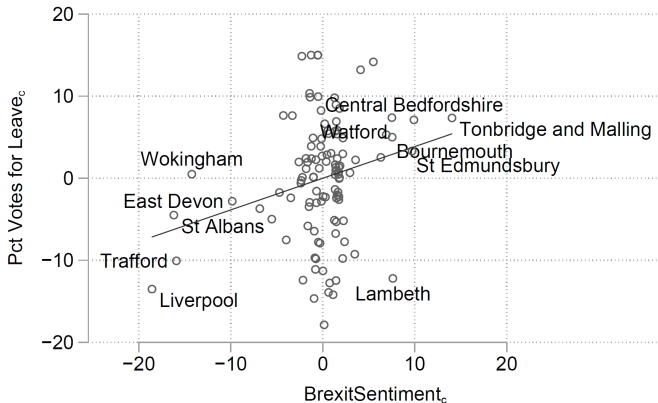


Brexit Risk



Rejection rate (< -1.96): 3.06%

We repeat the regression specification in column 5 of Table 5, taking four consecutive trading days at a time from January 1, 2012 and December 31, 2015. Figure plots distribution of t -statistic for the coefficient on *PreBrexitRisk* from each of those regression specifications. [▶ Back](#)



Slope coeff.: 0.39, S.E.: 0.15

Wealthier districts and districts with a larger immigrant population have lower support for Leave.

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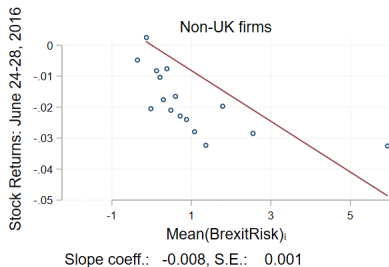
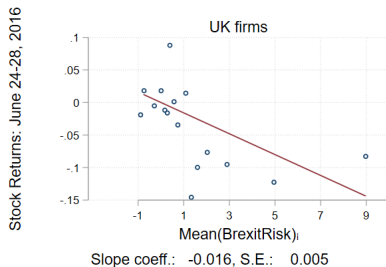
Summary Statistics

Table: Summary Statistics

	All Firms			UK Firms		Non-UK Firms		Total
	Mean	Median	SD	Mean	SD	Mean	SD	Count
Firm level risk and sentiment (2016 onward):								
BrexitExposure _i	0.211	0.000	0.674	1.000	1.496	0.169	0.568	7,733
BrexitRisk _i	0.195	0.000	0.931	1.000	2.287	0.152	0.771	7,733
BrexitSentiment _i	-0.255	0.000	2.104	-1.000	4.196	-0.215	1.920	7,733
Event study variables:								
Pre-BrexitExposure _i	0.043	0.000	0.366	0.261	0.744	0.034	0.340	4,399
Pre-BrexitRisk _i	0.040	0.000	0.511	0.250	1.312	0.032	0.449	4,399
Pre-BrexitSentiment _i	-0.083	0.000	2.014	-0.344	3.148	-0.073	1.955	4,399
Stock Returns _i ; June 24-28, 2016	-0.033	-0.027	0.065	-0.085	0.100	-0.030	0.062	6,077
Area level variables:								
Pct Votes for Leave _c	48.816	50.769	11.334	NA	NA	NA	NA	116
Brexit Risk _c	1.000	0.375	1.585	NA	NA	NA	NA	116
Brexit Sentiment _c	-1.000	-0.065	4.442	NA	NA	NA	NA	116
Firm yearly outcomes (2011-2018):								
BrexitExposure _{i,t}	0.083	0.000	0.502	0.414	1.216	0.067	0.433	44,665
BrexitRisk _{i,t}	0.060	0.000	0.619	0.300	1.620	0.049	0.522	44,665
BrexitSentiment _{i,t}	-0.088	0.000	1.822	-0.351	4.215	-0.075	1.618	44,665
Non-BrexitRisk _{i,t}	1.596	1.364	1.000	1.317	0.778	1.610	1.008	44,665
Non-BrexitSentiment _{i,t}	1.267	1.287	1.000	1.650	0.925	1.249	1.000	44,665
$I_{i,t+1} / K_{i,t} \cdot 100$	24.208	14.250	40.367	19.568	31.431	24.449	40.763	43,868
$\Delta emp_{i,t} / emp_{i,t-1} \cdot 100$	8.168	2.941	29.492	6.853	27.155	8.240	29.613	47,713
$\Delta sales_{i,t} / sales_{i,t-1} \cdot 100$	17.452	6.538	70.393	11.069	47.544	17.766	71.314	55,402

BrexitRisk_i and BrexitSentiment_i at the firm level for cross-sectional regressions are calculated starting January 1, 2016 to December 31, 2018, and are normalized by average Brexit risk and Brexit sentiment for UK headquartered firms post January 1, 2016. BrexitRisk_c and BrexitSentiment_c for area level variables are constructed by taking a mean for every firm, and then averaging over all firms headquartered in an area code. Both are normalized by the average Brexit risk and Brexit sentiment for all areas in the UK. For firm outcomes, t is at yearly frequency. The sample period for yearly outcomes is 2011-2018.

Validation: Event Study



Note: Controls as in Column (4).

Binned added-variable plots, separately for UK and non-UK firms, of four-trading day returns over BrexitRisk, controlling for BrexitSentiment, log assets, and sector and time FEs.

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Timing *BrexitRisk* Effect

	$I_{i,t}/K_{i,t-1} \cdot 100$	$\Delta emp_{i,t}/emp_{i,t-1} \cdot 100$
	(1)	(2)
Brexit Risk $_{i,t}$	-0.251 (0.156)	-0.509** (0.210)
Brexit Risk $_{i,t-1}$	-0.471*** (0.150)	-0.172 (0.238)
R^2	0.072	0.047
N	21,449	22,698

Employment responds more quickly than investment to changes in Brexit risk. Firm hiring responds more to concurrent than to lagged Brexit risk, while opposite is true for investment rate.

Excerpts Top *FukushimaExposure* Transcripts

Company	Country	Month	Transcript excerpts	Exposure Description
Lightbridge Corp	US	2013-10	be while they are still slowly reopening their reactors after fukushima our relationship with areva has been primarily based on thorium fuel	Nuclear fuel provider
Areva SA	FR	2011-07	japan with the earthquake and tsunami and the accident in fukushima nuclear power plant as of today reactors out of have been	Nuclear power supplier
Uranium One Inc.	CA	2012-10	options and pressure from business interests we believe that the japanese nuclear industry is probably on more of a longterm recovery plan	Uranium mining
Momentive Performance Materials Inc	US	2011-07	specialty products offset by raw material headwinds the effects of japanese earthquake foreign exchange and the onetime yearoveryear inventory change continued pricing	Nearby production plant disrupted
Global Indemnity plc	KY	2011-07	significantly impacted by million of catastropherelated losses resulting from the earthquake and tsunami in japan the earthquake in new zealand the floods	Insurance claims

Top firms by average Fukushima exposure.