Internet Appendix for "The Global Impact of Brexit Uncertainty"

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This internet appendix accompanies the article "The Global Impact of Brexit Uncertainty." It consists of three sections. Section I provides more details on the data and variable construction. Section II reports additional results briefly discussed in the main paper. Section III reports and discusses results from an additional application, the Fukushima incident.

Section I. Data and Variable Construction

A. Earnings Conference Call Transcripts

From Refinitiv EIKON, we collect the complete set of 176,149 English-language transcripts of earnings conference calls held from 2011 through 2019. We omit 1,509 transcripts because we could not reliably match them to a company name in Compustat. Of the matched transcripts, 162,380 belong to firms that hold an earnings call post-Brexit (2016 to 2019). We exclude (modify) the following bigrams from (in) transcripts:

- We remove "risk officer" and "risk credit officer" to avoid the synonym "risk" catching these persons/positions;
- We remove "unknown speaker," "unknown participant," "unknown speaker," "unknown participant," "unknown caller," "unknown operator," and "unknown firm analyst" to avoid the risk synonym "unknown" catching these persons or positions.

In addition, we remove 17,750 "safe harbor" snippets from transcripts. Specifically, if in a snippet from the first half of the transcript more than two words are safe harbor key words (see next sentence) or less than two words are safe harbor key words and the word "forward-looking" is in the snippet, we remove this snippet. Safe harbor key words used: "safe," "harbor," "forwardlooking," "forward," "looking," "actual," "statements," "statement," "risk,"

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"risks," "uncertainty," "uncertainties," "future," "events," "sec," and "results." Safe harbor statements use formulaic legal language to remind participants at the beginning of the call that forward-looking information disclosed in the call will not be considered fraudulent unless it is made in bad faith or without reasonable basis.

B. Other Data Sources

We obtain firms' headquarters locations from Refinitiv EIKON and subsidiary location information from Orbis. We measure firm-level pre-Brexit and post-Brexit share of sales in the UK from Compustat Historical Segments Data (summing all mentions of United Kingdom, UK, Great Britain, Northern Ireland, England, Wales, Scotland, and variations thereof). Compustat Historical Segments provides yearly sales data for a firm by country, and using this we calculate the share of sales in the UK before and after 2016. To measure a firm's investment rate, capital expenditures, change in sales, employment change, quarterly stock return, and earnings surprise, we use financial statement data from Standard & Poor's Compustat North America (U.S.) and Global (non-U.S.) files. Specifically, we obtain the following data from Compustat: earnings per share, capital expenditures, property, plant, and equipment, investment, sales, employment, and quarterly stock returns. We retrieve daily stock returns from Center for Research in Security Prices (CRSP) and Refinitiv Datastream. We obtain $PRiskTrade_{i,t}$ (std.) from Hassan et al. (2019) (Political Risk: Trade Policy Index), which we standardize by its own standard deviation. To measure income and share of people born in the UK, we obtain the following data from the Office of National Statistics (www.ons.gov.uk): total annual income by output area, and population by output area and country of origin. We then calculate income per capita as $\frac{\text{total annual income}_d}{\text{total population}_d}$ and share UK born$_d$ as $\frac{\text{UK born}_d}{\text{total population}_d}$, where d is output area.

C. Variable Construction

Our measure for capital expenditures, $I_{i,t}/K_{i,t-1}$, is calculated recursively using a perpetual-inventory method. Specifically, we calculate the investment rate as follows. For $t = 2$, $\frac{Capxy_2}{Ppent_1}$, and for $t > 2$, $\frac{Capxy_t}{Recursive\ K_{t-1}}$, where the denominator for $t > 2$ is calculated recursively as $Recursive\ K_{t-1} := \Delta p_K \times \delta \times Recursive\ K_{t-2} + Capxy_{t-1}$, where *Capxy* is Compustat's out-of-the-box capital expenditures, *Ppent* is Compustat's out-of-the-box property, plant, and equipment, Δp_K is the ratio of this period's to last period's Producer Price Index (obtained from FRED), and δ is depreciation (set at 10%). We winsorize the variable at the first and last percentiles. Change in sales, $\Delta sales_{i,t}/sales_{i,t-1}$, is the change in year-over-year sales relative to last year's value, winsorized at the first and last percentiles. Employment change, $\Delta emp_{i,t}/emp_{i,t-1}$, is the change in year-over-year employment relative to last year's value, winsorized at the first and last percentiles. $Earnings\ surprise_{i,t}$ is defined as $(EPS_{i,t} - EPS_{i,t-4})/price_{i,t}$, where $EPS_{i,t}$ is earnings per share (basic) of firm i at time t, and price$_{i,t}$ is the closing price of quarter t. We calculate $Average\ UK\ sales_i$ (pre-Brexit) as the average sales for a firm in the UK before 2016 (i.e., the year of the Brexit referendum). For firm i in year t, we calculate $Stock\ returns_{i,t}$: *Quarterly* as the firm's return in the quarter in which the conference call was held (as given in Compustat), averaged across all quarters in which

calls are held. Similarly, we calculate *Stock returns*$_{i,t}$: *Week before EC* as the firm's return seven days before the date of the earnings call, averaged across all weeks prior to earnings calls in year t.

Section II. Additional Results

The next few pages report additional results briefly discussed in the main paper.

Table IAI
Data Coverage

This table reports the number of firms in our sample that are headquartered in each country (left column) and the number of these with one or more subsidiaries in the UK (right column). Panel A (Panel B) splits the sample by region (country). Countries with fewer than five sample firms headquartered in that country are excluded.

	Number of sample firms	
	Headquarters country	With UK subsidiaries
Panel A: Split by region		
United Kingdom (UK)	428	n/a
EU non-UK	1,034	435
United States	3,948	1,634
Rest of the world	2,767	781
Panel B: Split by country		
Canada	583	155
Australia	356	105
India	279	66
China	208	24
Japan	159	95
Germany	164	79
Sweden	162	40
Brazil	144	17
France	133	77
Switzerland	101	52
Hong Kong	83	28
Netherlands	76	40
Italy	81	35
South Africa	81	36
Norway	77	23
Mexico	71	7
Bermuda	64	40
Israel	72	30
Spain	63	30
Ireland	57	33
Denmark	53	24
Finland	52	20
Singapore	42	12
Russia	42	2
New Zealand	48	5
S. Korea	37	14
Luxembourg	37	12
Taiwan	34	11
Belgium	32	9
Austria	32	15
Poland	28	6
Chile	26	3
Turkey	25	7
Thailand	22	5
Greece	23	1
Malaysia	18	5
Argentina	17	0
Philippines	15	4
Colombia	16	2
Indonesia	15	1
UK Channel Islands	22	6
Cyprus	16	4
United Arab Emirates	15	5
Nigeria	13	5
Cayman Islands	11	3
Peru	10	0
Monaco	10	1
Portugal	9	4
Czech Republic	6	2
Puerto Rico	5	0

Table IAII
Risk and Sentiment of Translated Transcripts

This table reports estimations results from regressions of $BrexitRisk_{i,t}$ (columns (1)-(3)) and $BrexitSentiment_{i,t}$ (columns (4)-(6)) on $Translated\ transcripts_{i,t}$, where $Translated\ transcripts_{i,t}$ is a dummy variable that equals one if any of firm i's earnings calls in year t are translated into English and zero otherwise. In columns (3) and (6), we interact the variable of interest with a dummy variable equal to one if firm i is headquartered in Japan (JP), China (CN), or Brazil (BR). All specifications control for *log(assets)*. Standard errors are clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	$\text{BrexitRisk}_{i,t}$			$\text{BrexitSentiment}_{i,t}$		
	(1)	(2)	(3)	(4)	(5)	(6)
$\text{Translated transcripts}_{i,t}$	–0.100***	0.009		0.076	–0.139	
	(0.016)	(0.018)		(0.059)	(0.094)	
$\text{Translated transcripts}_{i,t} * 1\{JP - HQ\}$			–0.007			0.135
			(0.033)			(0.095)
$\text{Translated transcripts}_{i,t} * 1\{CN - HQ\}$			0.025			0.009
			(0.025)			(0.051)
$\text{Translated transcripts}_{i,t} * 1\{BR - HQ\}$			0.025			–0.080
			(0.015)			(0.054)
R^2	0.038	0.094	0.094	0.015	0.050	0.050
N	33,975	33,870	33,870	33,975	33,870	33,870
Controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
Industry × Year FE	N	Y	Y	N	Y	Y
Country × Year FE	N	Y	Y	N	Y	Y

Table IAIII
Risk and Uncertainty Synonyms

This table shows the frequency across all 102,567 earnings call transcripts between 2016 and 2019 of all single-word synonyms of "risk," "risky," "uncertain," and "uncertainty" as given in the Oxford English Dictionary (excluding "question" and "questions") that appear within +/- 10 words of "Brexit."

Word	Frequency	Word	Frequency
uncertainty	1,562	variable	6
uncertainties	367	prospect	6
risk	279	unpredictability	5
uncertain	119	insecurity	5
risks	99	danger	4
unknown	38	faltering	3
possibility	34	unstable	3
pending	29	unsure	3
exposed	23	risky	3
threat	22	bet	3
instability	21	suspicion	2
fear	21	indecision	2
doubt	20	hesitant	2
unclear	17	hesitating	2
unresolved	17	dilemma	2
chance	16	indecisive	2
likelihood	14	apprehension	2
probability	8	fluctuating	1
unpredictable	8	speculative	1
unsettled	6	sticky	1

Table IAIV
Most Frequent Positive-Tone Words

This table shows the frequency across all 102,567 earnings call transcripts between 2016 and 2019 of all positive tone words from Loughran and McDonald (2011) (their list contains 354 positive-tone words) appearing within +/- 10 words of "Brexit."

Word	Frequency	Word	Frequency
despite	298	greater	29
good	277	strength	29
strong	210	profitability	27
positive	188	improving	24
great	116	benefited	24
opportunities	107	stability	23
opportunity	86	optimistic	23
better	84	improve	22
stable	77	advantage	20
able	72	favorable	18
benefit	58	tremendous	18
leading	52	rebound	15
pleased	41	stabilize	15
confident	40	strengthening	14
progress	38	excellent	13
improved	37	gain	13
improvement	35	leadership	12
stronger	32	smooth	11
gains	30	successfully	11
best	30	successful	11

Table IAV
Most Frequent Negative-Tone Words

This table shows the frequency across all 102,567 earnings call transcripts between 2016 and 2019 of all negative-tone words (with the exception of "question," "questions," and "ill") from Loughran and McDonald (2011) (their list contains 2,352 negative-tone words) appearing within +/- 10 words of "Brexit."

Word	Frequency	Word	Frequency
volatility	317	volatile	47
concerns	269	fallout	45
negative	210	adverse	45
slowdown	133	slower	44
challenges	133	slowed	44
difficult	124	crisis	40
concern	105	turmoil	40
decline	102	aftermath	38
concerned	97	challenge	38
against	96	unexpected	37
disruption	86	delays	35
weakness	81	fears	33
weak	77	delay	33
weaker	70	shutdown	32
challenging	63	delayed	32
slowing	61	weakened	28
slow	59	problems	28
weakening	56	caution	27
late	52	bad	27
negatively	50	disruptions	25

Table IAVI
BrexitRisk and Estimated Average Effects by Country

For each country indicated in the first column, this table reports the mean (standard error, s.e.) and max of *BrexitRisk*, the number of sample firms, and the average effect on $I_{i,t+1}/K_{i,t}$ (sample average: 29.66%) and $\Delta emp_{i,t}/emp_{i,t-1}$ (sample average: 10.67%). The mean and max of *BrexitRisk* are calculated over all firms headquartered in the country. N is the total number of sample firms from a specific country. The average effect (in percent. point) is calculated as $\hat{\beta}_y \times \overline{BrexitRisk_{i,t}}^c$, where $y \in \{I_{i,t+1}/K_{i,t} \cdot 100, \Delta emp_{i,t}/emp_{i,t-1} \cdot 100\}$ and $\hat{\beta}_y$ is the estimated coefficient from column (5) of Table V (Panel A for all countries and Panel B for the United States) and Table VII (Panel A, column (2) for all countries and Panel A, column (4) for the United States), respectively. The table excludes countries for which we have fewer than five sample firms headquartered in that country.

Country	Mean *BrexitRisk* (s.e.)	Max *BrexitRisk*	N	Average effect (percent. point) $I_{i,t+1}/K_{i,t}$	$\Delta emp_{i,t}/emp_{i,t-1}$
All firms	0.228 (0.011)	21.106	8,110	-0.18	-0.17
United States	0.128 (0.010)	21.106	3,948	-0.10	-0.10
Ireland	1.739 (0.443)	14.517	57	-0.75	-0.55
United Kingdom	1.000 (0.099)	15.301	428	-0.43	-0.32
Denmark	0.701 (0.279)	11.176	53	-0.30	-0.22
Netherlands	0.677 (0.202)	9.127	76	-0.29	-0.21
South Africa	0.672 (0.176)	7.883	81	-0.29	-0.21
Sweden	0.638 (0.198)	20.423	162	-0.28	-0.20
UK Channel Islands	0.491 (0.692)	5.893	11	-0.21	-0.15
France	0.460 (0.099)	6.377	132	-0.20	-0.14
Switzerland	0.422 (0.109)	7.102	101	-0.18	-0.13
Germany	0.377 (0.065)	3.917	164	-0.16	-0.12
Thailand	0.316 (0.316)	6.952	22	-0.14	-0.10
Spain	0.313 (0.099)	3.263	63	-0.14	-0.10
Belgium	0.294 (0.143)	4.071	32	-0.13	-0.09
Australia	0.292 (0.076)	18.217	356	-0.13	-0.09
Singapore	0.280 (0.118)	4.617	42	-0.12	-0.09
Peru	0.257 (0.257)	2.566	10	-0.11	-0.08
Hong Kong	0.244 (0.108)	6.599	83	-0.11	-0.08
Austria	0.185 (0.125)	3.879	32	-0.08	-0.06
Monaco	0.157 (0.157)	1.572	10	-0.07	-0.05
Italy	0.156 (0.061)	3.181	81	-0.07	-0.05
Japan	0.155 (0.045)	3.717	159	-0.07	-0.05
Norway	0.154 (0.078)	4.159	77	-0.07	-0.05
Turkey	0.150 (0.091)	1.686	25	-0.07	-0.05
Bermuda	0.150 (0.060)	3.068	64	-0.06	-0.05
Greece	0.138 (0.122)	2.799	23	-0.06	-0.04
India	0.133 (0.034)	4.591	279	-0.06	-0.04
Canada	0.127 (0.028)	7.479	583	-0.05	-0.04
S. Korea	0.124 (0.051)	1.270	37	-0.05	-0.04
New Zealand	0.120 (0.101)	4.784	48	-0.05	-0.04
Luxembourg	0.116 (0.065)	1.928	37	-0.05	-0.04
Finland	0.097 (0.061)	3.115	52	-0.04	-0.03
Mexico	0.089 (0.059)	4.074	71	-0.04	-0.03
Philippines	0.066 (0.066)	0.991	15	-0.03	-0.02
Chile	0.065 (0.049)	1.181	26	-0.03	-0.02
Cyprus	0.055 (0.055)	0.884	16	-0.02	-0.02
Russia	0.048 (0.048)	2.026	42	-0.02	-0.02
Israel	0.045 (0.035)	2.332	72	-0.02	-0.01
Malaysia	0.023 (0.023)	0.410	18	-0.01	-0.01
Poland	0.017 (0.017)	0.485	28	-0.01	-0.01
China	0.003 (0.003)	0.668	208	-0.00	-0.00
Brazil	0.003 (0.003)	0.420	144	-0.00	-0.00

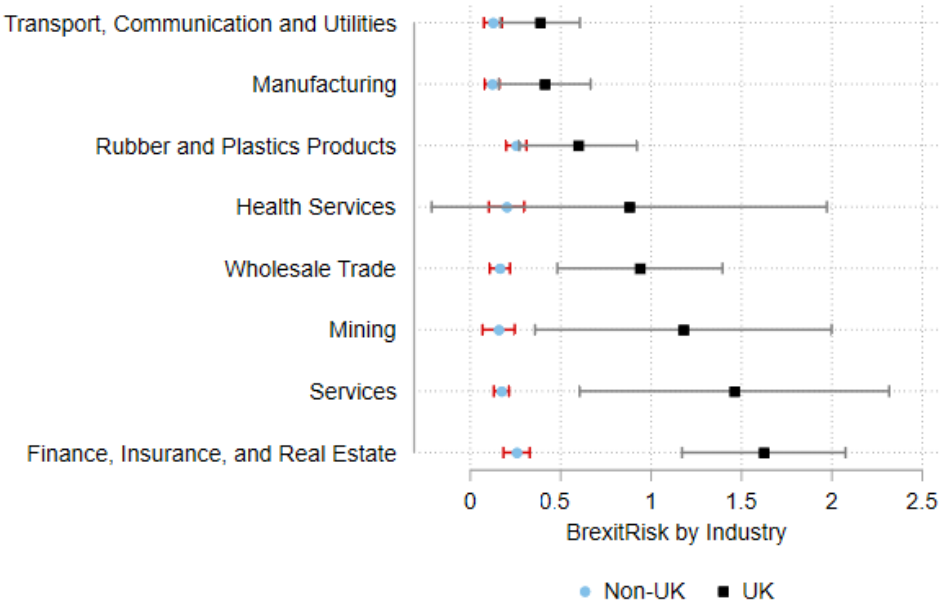


Figure IA1. *BrexitRisk* by industry. This figure shows the mean $BrexitRisk_{i,t}$ by one-digit SIC industry for UK and non-UK firms. Whiskers indicate 95% confidence intervals.

Table IAVII
BrexitSentiment by Country

For each country indicated in the first column, this table reports the mean (standard error, s.e.), min, and max of *BrexitSentiment* and the number of sample firms. The mean, min, and max of *BrexitSentiment* are calculated over all firms headquartered in a specific country. N is the total number of sample firms in a specific country. The table excludes countries for which we have fewer than five sample firms headquartered in that country.

Country	Mean (s.e.)	Min	Max	N
Ireland	-1.227 (0.948)	-40.497	13.741	57
United Kingdom	-1.000 (0.196)	-39.628	10.332	428
Germany	-0.985 (0.213)	-15.061	5.924	164
Peru	-0.851 (0.569)	-4.567	0.000	10
Austria	-0.746 (0.544)	-12.712	2.503	32
Sweden	-0.714 (0.448)	-43.267	25.500	162
Italy	-0.679 (0.295)	-18.289	3.250	81
France	-0.602 (0.269)	-22.928	9.399	132
Denmark	-0.601 (0.397)	-15.355	7.627	53
Norway	-0.467 (0.245)	-15.701	2.046	77
Switzerland	-0.432 (0.228)	-8.000	6.815	101
Spain	-0.389 (0.165)	-5.718	1.862	63
Turkey	-0.369 (0.232)	-4.531	0.689	25
Singapore	-0.357 (0.175)	-6.101	0.705	42
South Africa	-0.348 (0.325)	-12.915	14.030	81
Belgium	-0.332 (0.158)	-3.433	1.100	32
Hong Kong	-0.315 (0.263)	-15.700	8.333	83
Chile	-0.290 (0.256)	-6.633	0.000	26
Monaco	-0.280 (0.280)	-2.798	0.000	10
India	-0.276 (0.098)	-9.435	15.095	279
New Zealand	-0.267 (0.170)	-6.213	0.000	48
Malaysia	-0.260 (0.260)	-4.688	0.000	18
Mexico	-0.259 (0.146)	-8.170	0.871	71
Japan	-0.259 (0.188)	-23.712	8.194	159
United States	-0.237 (0.024)	-25.942	20.627	3,948
Australia	-0.224 (0.256)	-70.955	38.326	356
Thailand	-0.205 (0.300)	-3.210	4.203	22
Finland	-0.194 (0.110)	-3.712	2.165	52
Russia	-0.172 (0.172)	-7.212	0.000	42
Luxembourg	-0.153 (0.117)	-2.377	2.606	37
Canada	-0.146 (0.054)	-13.408	9.189	583
Brazil	-0.124 (0.089)	-12.330	0.993	144
Cyprus	-0.122 (0.122)	-1.946	0.000	16
Bermuda	-0.080 (0.152)	-4.679	3.761	64
China	-0.049 (0.038)	-7.665	0.000	208
Poland	-0.034 (0.093)	-2.218	1.265	28
S. Korea	-0.032 (0.092)	-2.716	1.130	37
Greece	-0.021 (0.285)	-3.861	4.982	23
Netherlands	-0.003 (0.267)	-6.045	14.768	76
Israel	0.016 (0.016)	0.000	1.154	72
Philippines	0.045 (0.111)	-0.753	1.434	15
UK Channel Islands	0.649 (0.789)	-1.932	7.736	11

Table IAVIII

Pre-Specified Topics Related to Brexit: Description, Example Text Fragments, and Ex-Post Word Cloud

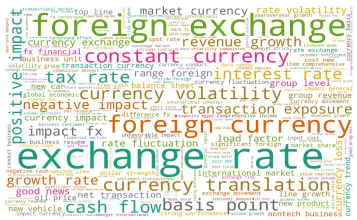
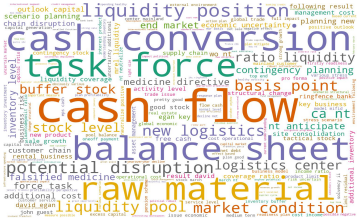
Topic	Description	Example text fragment	Word cloud
Asset prices	Asset or commodity price effects, other than currency (see *Currency or exchange rate*), of Brexit and their impact on credit or loan portfolios: for example, Brexit, directly or indirectly (e.g., through financial risk management), impacting interest rate, real estate, and credit and loan conditions/requirements.	Non-UK: "LME copper prices decreased from an average of $2.77 per pound in the third quarter of 2018 to $2.63 per pound, minus 5.1%. We see a fair physical market for copper, but we believe the fall in prices is now reflecting a slowdown of the world economy, strongly related with Brexit and the escalation of trade protectionism between the United States, Europe and China. We believe a clear path of solution to this event is necessary for a recovery in copper prices." (Grupo Mexico SAB de CV, Q4, 2019) UK: "Yes, on all of our items – on all of our projects, we break the Brexit risk down into the 3 components of currency, labor and materials. If for instance, you just take materials, which is probably the heightened risk of a potential hard Brexit at the end of October, we have arrangements in place with all of our contractors that we effectively have staging warehouses for components and materials to be stored upfront." (Derwent London PLC, Q3, 2019)	
Consumer confidence, demand	The impact of Brexit on consumer confidence or customer demand, e.g., Brexit increasing households' concerns about their finances or customers fearing the stability of the UK economy, resulting in lower consumer demand. Depending on the industry a firm is in, "consumers" or "customers" may be named differently: e.g., "students" for publishing companies (selling textbooks), "shoppers" for e-retailers, etc.	Non-UK: "Sales in the U.K. declined organically with 13.9% or around SEK 37 million versus Q3 2018. Brexit uncertainty continues and led to significantly less rental orders than expected in the quarter. As before, this is affecting the entire industry and we do not expect the situation to improve short term as long as we have this uncertainty present." (Arjo AB, Q4, 2019) UK: "And perhaps most importantly of all, consumer confidence remains low as it has been since last autumn, as the Brexit process continues to be prolonged and unresolved. Customers are concerned and uncertain, affecting the way they plan and the way they shop." (WM Morrison Supermarkets PLC, Q3, 2019)	
FX	The value of the British Pound or exchange rate of the U.S. Dollar (or any other currency) to the Pound.	Non-UK: "Finally, timing differences on FX derivatives. I think it is well-known that economic uncertainty in the U.K., our single most important European market caused by the protracted negotiations around Brexit, has led to an increased risk of exchange rate volatility, with sales in pounds and supply chain costs largely in other currencies. We have placed hedges in respect to the part of our exposure to the pound for up to approximately 24 months ahead." (Landis+Gyr Group AG, Q4, 2019) UK: "But as far as the wider outlook is concerned, I mean, it's all happening along the road here, isn't it? We will definitely be affected by Brexit one way or the other. There is no doubt that a hard Brexit will hit the currency and the currency will indirectly hit us through new car pricing and therefore volumes." (Lookers PLC, Q1, 2019)	
Government expenditures	The decision to leave to the EU potentially could affect government expenditure, for example, public sector spending, health programs, infrastructure investment, and subsidies.	Non-UK: "Well, let's wait and see what the consequences will be, to see if we continue the same policies for investment, or if we're going to change that. The big discussion is – going on in France, is what do you do with Brexit? And what are the attractiveness measures that the Government, or the region, could set up in order to make Brexit into an opportunity for the Greater Paris region?" (Icade SA, Q3, 2016) UK: "We also, right at the end of the year, lost Bahrain air traffic control, which was actually quite a valuable contract in terms of margin. The U.K. environment remains weak, and again, I'll talk more about that little slide on that coming up and also about Brexit, which is causing immense difficulty for the civil service. I mean, having – they already had a lot on in terms of the departments that were suffering significant cuts as a result of government trying to bear down or at least keep stable government expenditure whilst increasing it on the NHS." (Serco Group PLC, Q1, 2019)	

Table IAVIII-*Continued*

Topic	Description	Example text fragment	Word cloud
Labor market, employment	The potential impact of Brexit on jobs, wages, and/or availability of workers.	Non-UK: "And the policy is, which we've actually seen a bit, is that due to new immigration conditions in the U.K., some of the expats might return back to our region, which could alleviate a bit of wage pressures. So that's what we see as a potential positive outcome of Brexit for us." (Erste Group Bank AG, Q4, 2018) UK: "This is probably due to the big spike in visitor numbers that we saw after the steep fall in the value of the pound after the 2016 referendum. As you know, there is still uncertainty about British economy and Brexit. For example, we are seeing a rise in costs here because of European nationals leaving UK hospitality labor market, the shortage of people – everyone is going after the same pool of people and there's room to be cautious looking forward with the Brexit uncertainty." (Millennium & Copthorne Hotels PLC, Q1, 2018)	
Legal, regulatory	Due to Brexit, having to comply with multiple regulatory regimes, or the impact of Brexit on the legal system, for example, impacts on travel agreements, environmental policy, fishing quota, landing rights, and tax-related matters. Occasionally, the text fragment may refer to specific rules, regulations, laws, or acts.	Non-UK: "We remain very concerned about Brexit and the continuing uncertainty over the terms of the U.K.'s departure from the European Union in March 2019. We continue to campaign to persuade the U.K. to remain in the EU Open Skies agreement, but – and we caution, but if they leave the Open Skies agreement, we worry that there won't be sufficient time or goodwill on both sides to allow a bilateral to be put in place between the U.K. and the EU 27 in time for September or October 2018, which would allow us to roll out the summer ' 19 schedule." (Ryanair Holdings PLC, Q3, 2017) UK: "Which is great news. We love regulations, get Brexit done, get regulations. And so having our own proprietary technology, we're able to adapt to changes in the ESMA region." (CMC Markets PLC, Q4, 2019)	
Logistics, transition costs	Costs associated with adjusting to or preparing for Brexit. For example, due to Brexit, firms relocating headquarters (leaving the UK), moving business, investing in new systems (e.g., to make customs declarations), preparing supply chains, making changes to working capital (e.g., increasing inventory levels, improving liquidity). Note: firms moving workforce, because of Brexit, is classified as a *Labor market or employment* change.	Non-UK: "I mean, we – I don't know how Brexit's going to play out. There are some great opportunities associated with Brexit to get many of those systems prepare for Brexit. That's an opportunity." (DXC Technology Co, Q2, 2018) UK: "Under normal conditions, the board expects to operate at a ratio around the middle of the risk appetite range of 140% to 180%. The current political and economic uncertainty, including Brexit, feels anything but normal. We've, therefore, chosen to err on the side of caution for the time being, and maintain a more prudent solvency buffer." (Direct Line Insurance Group PLC, Q1, 2019)	
Trade deals	A firm's ability to sell goods and services across borders, accompanied by duties, rules, and/or tariffs.	Non-UK: "Then on the U.K., the Brexit, if I may. I think one of you have said for BNR radio that, actually, Brexit could be beneficial for ForFarmers. I can understand that it might have a positive impact on your position in the U.K." (ForFarmers NV, Q1, 2019) UK: "We thought we would – could predict with the trend effectively. However, in September, we recognized that there was increasing uncertainty, particularly in the downturn in automotive, particularly with the uncertainty in Brexit, and certainly, with the uncertainty on the ongoing tariff wars. This was making an impact on – continuing to weaken the end markets." (Trifast PLC, Q4, 2019)	

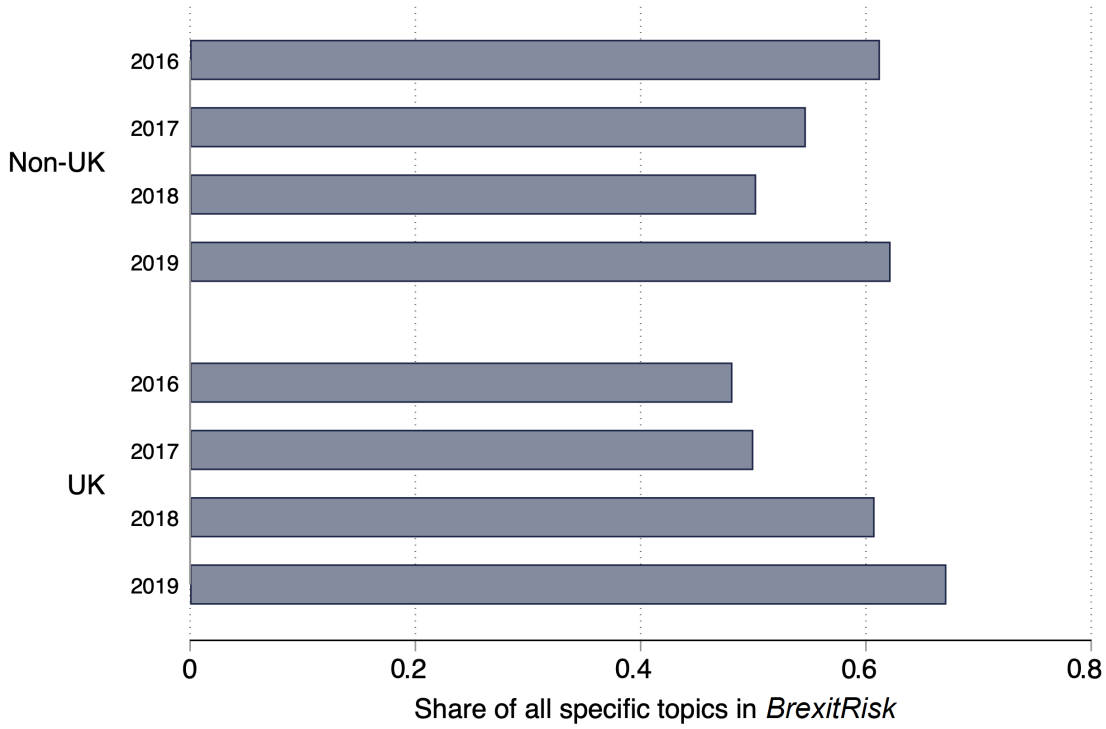
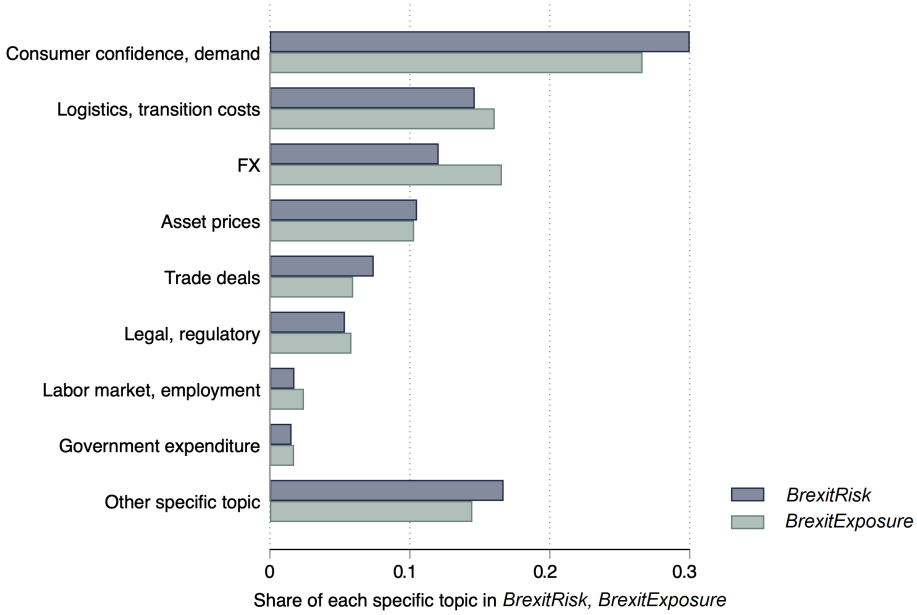


Figure IA2. Time-variation in *BrexitRisk* specificity. This figure shows the time-variation in share of all specific topic categories in *BrexitRisk* for non-UK (top) and UK (bottom) firms. Specific topics include: Asset prices; Consumer confidence, demand; FX; Government expenditure; Labor market, employment; Legal, regulatory; Logistics, transition costs; *Trade deals*; and Other specific topic (i.e., specific concerns related to Brexit is mentioned other than one of aforementioned pre-specified topics). The unspecific category includes fragments in which $BrexitRisk_{i,t}$ is discussed generically, without specifying a distinct concern. For a description of each topic category, see Table IAVIII in this Internet Appendix and the audit guide available at our website www.firmlevelrisk.com.

Panel A: Topic share in *BrexitRisk* and *BrexitExposure* fragments



Panel B: Time-variation topic share in *BrexitExposure* fragments

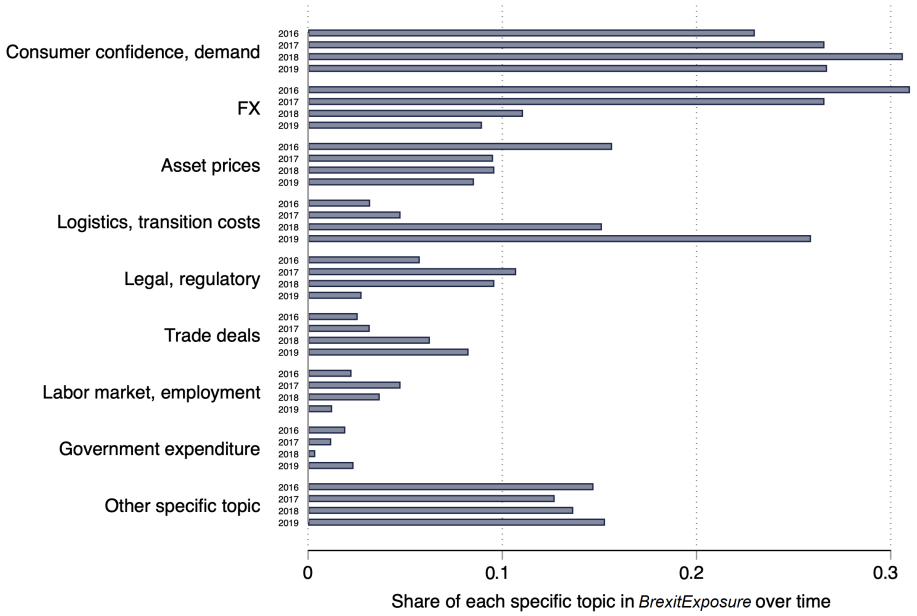


Figure IA3. Topic categories in *BrexitRisk* and *BrexitExposure* fragments. Panel A shows the share of each specific topic category in *BrexitRisk* and *BrexitExposure* fragments, that is, the proportion of text fragments that mention a specific topic. Panel B shows its time-variation for *BrexitExposure* fragments. For a description of each topic category, see Table IAVIII in this Internet Appendix and the audit guide available at our website www.firmlevelrisk.com.

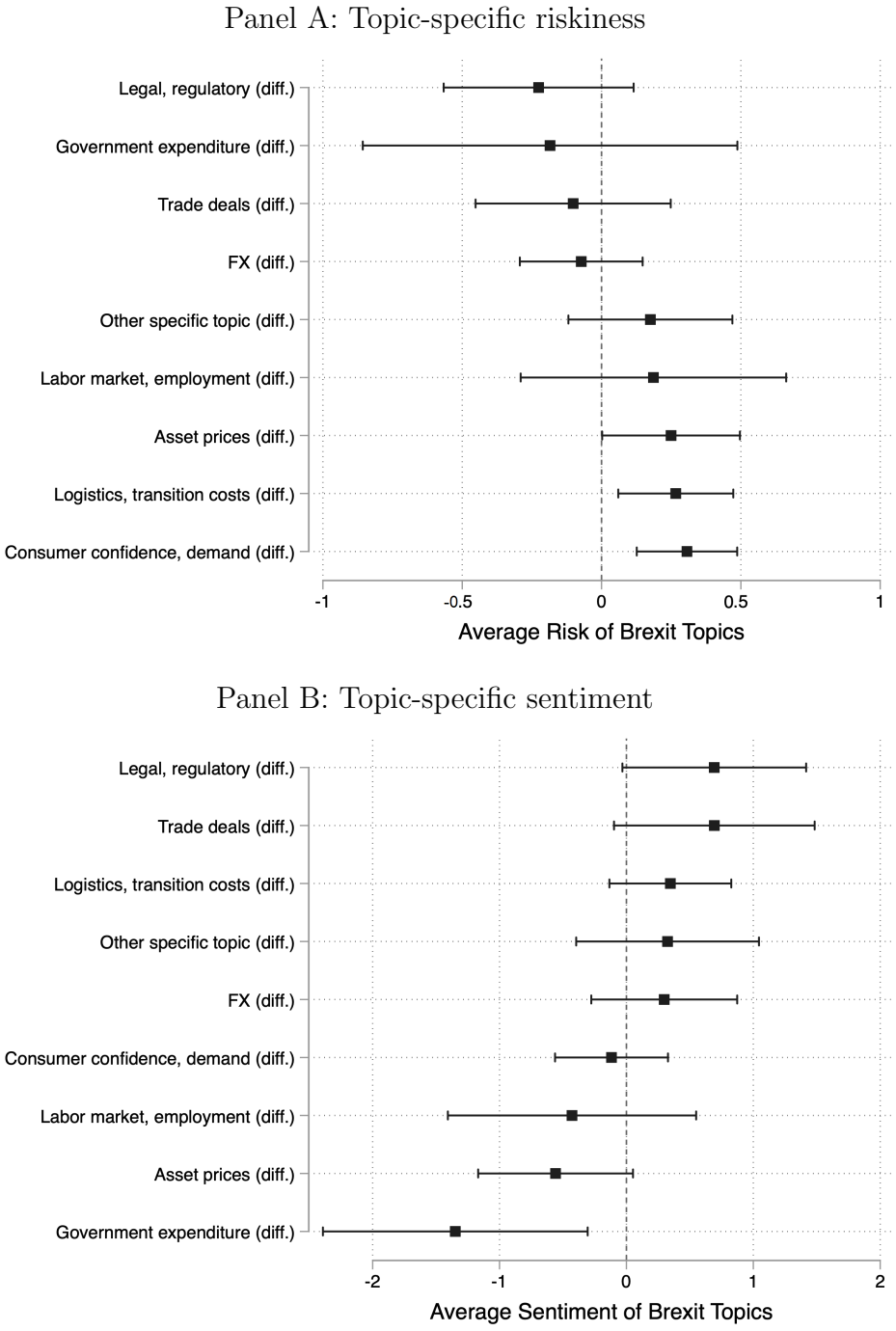
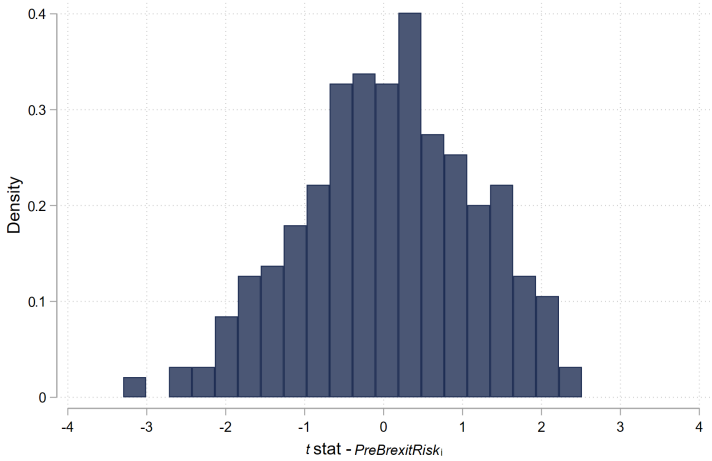


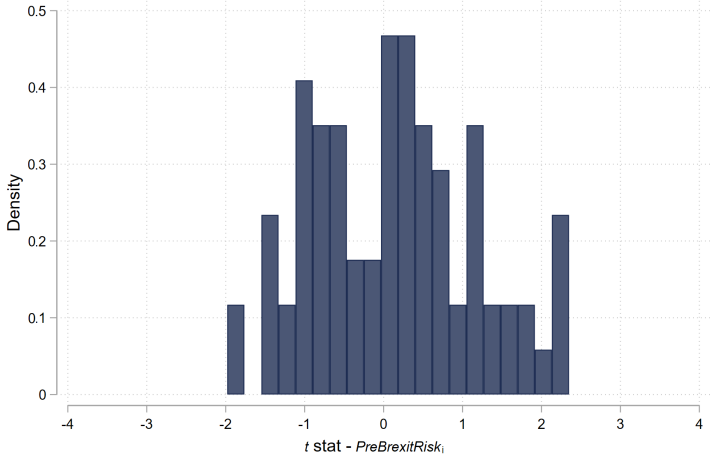
Figure IA4. Topic category riskiness and sentiment: UK vs. non-UK firms. This figure plots per topic category the difference between UK and non-UK firms in average risk (Panel A) and average sentiment (Panel B) of Brexit-related discussions. Positive differences in average risk suggest that UK firms' discussions of the topic contain more risk synonyms. Negative differences in average sentiment suggest UK firms have more negative discussions of the topic. Whiskers indicate 95% confidence intervals. For a description of each topic category, see Table IAVIII in this Internet Appendix and the audit guide available at our website www.firmlevelrisk.com.

Panel A: All windows



Rejection rate (< -1.96): 3.6%

Panel B: Extreme return windows



Rejection rate (< -1.96): 1.2%

Figure IA5. Placebo tests. As a placebo exercise, we repeat the regression specification of column (5) in Table IV, taking four consecutive trading days at a time from January 1, 2010 and December 31, 2014. The figures plot the distribution of the t-statistic for the coefficient estimate on $\overline{PreBrexitRisk_i}$ from each of those regressions. In Panel A, we use all windows, while in Panel B we restrict our sample to windows where the average firm gains or loses at least 1% in stock returns.

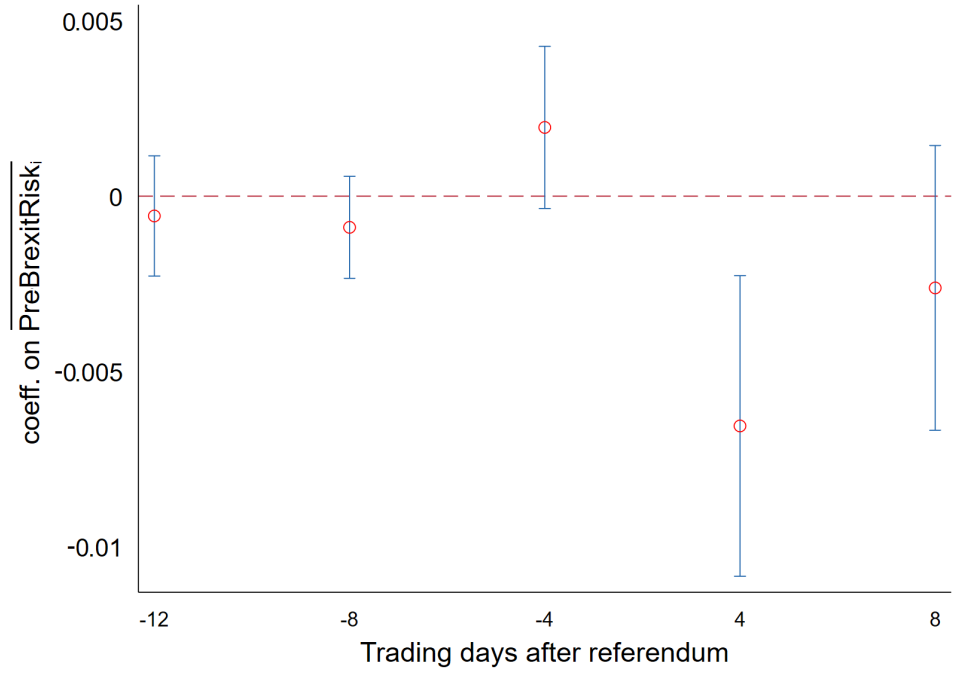


Figure IA6. Alternative stock return windows around the referendum. This figure shows coefficient estimates and 95% confidence intervals of $\overline{PreBrexitRisk_i}$ for consecutive stock return windows before and after the June 23, 2016 Brexit referendum using the specification of column (6) of Panel B in Table IV. Each stock return window consists of four consecutive trading days.

Table IAIX
Event-Study Estimates with Varying Text Windows

This table reports estimation results for the event-study regression in column (5) of Panel B, Table IV, for the sample of U.S.-headquartered firms, performed with varying text windows (i.e., number of words) around "Brexit." In our baseline analysis used throughout the paper, we use a 10-word window around "Brexit," which is column (2) in this table. Controls and standard error specifications are the same as in Table IV. In column (6), we use a text window of three sentences (or "triples"), where the middle sentence contains the word "Brexit."

	Stock Returns: June 24-29, 2016					
Text window (words)	5	10	15	20	25	triple
	(1)	(2)	(3)	(4)	(5)	(6)
$\overline{\text{BrexitRisk}_i}$	–0.009***	–0.008***	–0.009***	–0.010***	–0.011***	–0.012***
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)
$\overline{\text{BrexitSentiment}_i}$	0.004***	0.003***	0.002***	0.001***	0.000**	0.000
	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.000)
$\overline{\text{NonBrexitRisk}_i}$	–0.004	–0.004	–0.004	–0.004	–0.004	–0.003
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
$\overline{\text{NonBrexitSentiment}_i}$	0.005	0.004	0.004	0.004	0.004	0.005*
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Constant	0.013**	0.013**	0.013**	0.013*	0.013*	0.012*
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
R^2	0.125	0.126	0.125	0.125	0.125	0.124
N	2,785	2,785	2,785	2,785	2,785	2,785
Controls	Y	Y	Y	Y	Y	Y

Table IAX
Alternative Ways of Clustering Standard Errors

This table reports alternative standard errors (s.e.) and t-statistics for the coefficient estimate on *BrexitRisk* in the regression specification of column (5) in Panel A of Table V.

Clustering scheme	s.e.	t-statistic
Clustered by firm (standard)	.14	-3.14
Clustered by country	.18	-2.35
Clustered by industry	.18	-2.42
Two-way clustered by country and industry	.2	-2.13
Robust	.12	-3.48

Table IAXI
Implied Volatility, *BrexitRisk*, *BrexitSentiment*, and Firm Investment

This table reports estimation results from the specification of column (6) in Table V, in which we regress $I_{i,t+1}/K_{i,t} \cdot 100$ on *BrexitRisk* and *BrexitSentiment*, without (columns (1) and (3)) and with (columns (2) and (4)) *Implied volatility*$_{i,t}$ as additional control. Implied stock return volatility is measured using 90-day at-the-money options. Columns (1) and (2) report results for all firms and columns (3) and (4) report results for U.S.-headquartered firms. The sample is restricted to firm-year observations with nonmissing implied volatility data. All specifications control for *log(assets)* and for year and industry (two-digit SIC) fixed effects. The dependent variable is winsorized at the 1st and 99th percentiles. The regressions exclude non-UK firms with fewer than 10 transcripts in the 2015 to 2018 period and firms in the "Non Classifiable" sector. Standard errors are clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	All firms		U.S. firms	
	(1)	(2)	(3)	(4)
BrexitRisk$_{i,t}$	–0.514***	–0.508***	–0.468**	–0.464**
	(0.197)	(0.196)	(0.195)	(0.195)
BrexitSentiment$_{i,t}$	–0.063	–0.065	–0.051	–0.053
	(0.075)	(0.075)	(0.076)	(0.076)
NonBrexitRisk$_{i,t}$	–0.585	–0.627	–0.464	–0.506
	(0.393)	(0.398)	(0.400)	(0.405)
NonBrexitSentiment$_{i,t}$	0.960***	0.986***	0.922***	0.948***
	(0.283)	(0.284)	(0.286)	(0.286)
Implied volatility$_{i,t}$		3.373		3.712
		(2.235)		(2.298)
R^2	0.097	0.097	0.085	0.086
N	14,529	14,529	13,657	13,657
Controls	Y	Y	Y	Y
Year FE	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y
Industry × Year FE	Y	Y	Y	Y
Country x Year FE	Y	Y	n/a	n/a

Table IAXII
Timing of the Effect of *BrexitRisk*: Investment and Employment

This table reports estimation results from regressions of $I_{i,t+1}/K_{i,t} \cdot 100$ (columns (1) to (3)) and $\Delta emp_{i,t}/emp_{i,t-1} \cdot 100$ (columns (4) to (6)) on $BrexitRisk_{i,t}$ and $BrexitSentiment_{i,t}$ using yearly data for the full sample. All variables are defined in Table III. All specifications control for *log(assets)* and for year and industry (two-digit SIC) fixed effects. The dependent variable is winsorized at the 1st and 99th percentiles. The regressions exclude non-UK firms with fewer than 10 transcripts in the 2015 to 2018 period and firms in the "Non Classifiable" sector. Standard errors are clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	$I_{i,t+1}/K_{i,t} \cdot 100$			$\Delta emp_{i,t}/emp_{i,t-1} \cdot 100$		
	(1)	(2)	(3)	(4)	(5)	(6)
2016*BrexitRisk$_{i,t}$	–0.667***	–0.603***	–0.602***	–0.633**	–0.580**	–0.654**
	(0.174)	(0.174)	(0.188)	(0.298)	(0.288)	(0.304)
2017*BrexitRisk$_{i,t}$	–0.532**	–0.483**	–0.448**	–0.455	–0.413	–0.318
	(0.216)	(0.212)	(0.214)	(0.295)	(0.300)	(0.304)
2018*BrexitRisk$_{i,t}$	–0.169	–0.125	–0.104	–0.165	–0.107	–0.114
	(0.156)	(0.155)	(0.160)	(0.124)	(0.122)	(0.141)
2019*BrexitRisk$_{i,t}$				–0.212	–0.191	–0.191
				(0.135)	(0.142)	(0.147)
BrexitSentiment$_{i,t}$	–0.093	–0.094	–0.085	–0.015	–0.027	–0.020
	(0.072)	(0.071)	(0.072)	(0.052)	(0.053)	(0.053)
NonBrexitRisk$_{i,t}$		–1.173***	–1.179***		–0.970***	–1.007***
		(0.364)	(0.370)		(0.303)	(0.303)
NonBrexitSentiment$_{i,t}$		0.724**	0.712**		1.535***	1.452***
		(0.282)	(0.285)		(0.247)	(0.250)
R^2	0.072	0.075	0.081	0.034	0.039	0.051
N	10,149	10,149	10,145	14,763	14,763	14,756
Controls	Y	Y	Y	Y	Y	Y
Year FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
Industry × Year FE	N	N	Y	N	N	Y
Country x Year FE	N	N	Y	N	N	Y

Table IAXIII

Robustness: $BrexitRisk_{i,t}$, $BrexitSentiment_{i,t}$, and Employment Growth

This table reports results from regressions of $\Delta emp_{i,t}/emp_{i,t-1} \cdot 100$ on $BrexitRisk_{i,t}$ and $BrexitSentiment_{i,t}$ using yearly data. Panel A uses the sample of all firms, while Panel B restricts the analysis to firms headquartered in the United States with the same specification as in Panel A. The dependent variable is winsorized at the 1st and 99th percentiles. All right-hand-side variables are defined as in Tables V and VI. We control for *log(assets)* in all regressions. Industry fixed effects are based on two-digit SIC codes. The regressions exclude non-UK firms with fewer than 10 transcripts in the 2015 to 2018 period and firms in the "Non Classifiable" sector. Standard errors are clustered by firm. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	$\Delta emp_{i,t}/emp_{i,t-1} \cdot 100$					
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A: All firms					
$\text{BrexitRisk}_{i,t}$	–0.413***	–0.402***	–0.356***	–0.346**	–0.471**	–0.476***
	(0.118)	(0.119)	(0.131)	(0.136)	(0.185)	(0.144)
$\text{BrexitSentiment}_{i,t}$	–0.009	–0.026	–0.032	–0.041	0.032	–0.018
	(0.067)	(0.068)	(0.069)	(0.070)	(0.086)	(0.068)
$\text{NonBrexitRisk}_{i,t}$		–0.725***	–0.774***	–0.791***	–0.916***	–0.775***
		(0.214)	(0.222)	(0.226)	(0.287)	(0.221)
$\text{NonBrexitSentiment}_{i,t}$		1.369***	1.398***	1.413***	1.568***	1.400***
		(0.176)	(0.196)	(0.198)	(0.237)	(0.196)
$\text{PRiskTrade}_{i,t}$ (std.)				–0.042		
				(0.103)		
Average UK sales_i (pre-Brexit)					–2.793	
					(3.739)	
$\overline{\text{BrexitExposure}_i}$						0.917**
						(0.389)
$\text{Realized volatility}_{i,t}$	–0.132***	–0.101***	–0.108***	–0.096***	–0.093***	–0.107***
	(0.027)	(0.027)	(0.029)	(0.029)	(0.034)	(0.029)
R^2	0.023	0.027	0.065	0.067	0.075	0.065
N	27,621	27,621	27,526	26,553	18,295	27,526
Year FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
Industry x Year FE	N	N	Y	Y	Y	Y
Country x Year FE	N	N	Y	Y	Y	Y
	Panel B: U.S. firms					
$\text{BrexitRisk}_{i,t}$	–0.736***	–0.737***	–0.767***	–0.761***	–0.600***	–0.899***
	(0.238)	(0.235)	(0.254)	(0.257)	(0.176)	(0.277)
R^2	0.024	0.028	0.058	0.060	0.059	0.058
N	18,283	18,283	18,263	17,988	14,896	18,263
Year FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
Industry x Year FE	N	N	Y	Y	Y	Y

Table IAXIV
Robustness: $BrexitRisk_{i,t}$, $BrexitSentiment_{i,t}$, and Sales Growth

This table reports results from regressions of $\Delta sales_{i,t}/sales_{i,t-1} \cdot 100$ on $BrexitRisk_{i,t}$ and $BrexitSentiment_{i,t}$ using yearly data. The dependent variable is winsorized at the 1st and 99th percentiles. All right-hand-side variables are defined as in Tables V and VI. We control for *log(assets)* in all regressions. Industry fixed effects are based on two-digit SIC codes. The regressions exclude non-UK firms with fewer than 10 transcripts in the 2015 to 2018 period and firms in the "Non Classifiable" sector. Standard errors are clustered by firm. *, **, *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	$\Delta sales_{i,t}/sales_{i,t-1} \cdot 100$					
	(1)	(2)	(3)	(4)	(5)	(6)
	Panel A : All firms					
$\text{BrexitRisk}_{i,t}$	–0.233	–0.233	–0.077	–0.070	–0.618**	–0.139
	(0.195)	(0.198)	(0.209)	(0.216)	(0.280)	(0.222)
$\text{BrexitSentiment}_{i,t}$	0.139	0.115	0.120	0.107	0.113	0.129
	(0.090)	(0.092)	(0.105)	(0.110)	(0.113)	(0.105)
$\text{NonBrexitRisk}_{i,t}$		–0.174	–0.207	–0.259	–0.304	–0.208
		(0.507)	(0.528)	(0.550)	(0.763)	(0.528)
$\text{NonBrexitSentiment}_{i,t}$		1.965***	2.023***	2.118***	2.410***	2.024***
		(0.320)	(0.350)	(0.365)	(0.425)	(0.350)
$\text{PRiskTrade}_{i,t}$ (std.)				–0.241		
				(0.210)		
Average UK sales_i (pre-Brexit)					6.408	
					(8.775)	
$\overline{\text{BrexitExposure}_i}$						0.461
						(0.536)
$\text{Realized volatility}_{i,t}$	0.193***	0.227***	0.239***	0.251***	0.166**	0.239***
	(0.058)	(0.058)	(0.062)	(0.064)	(0.071)	(0.062)
R^2	0.027	0.028	0.067	0.067	0.079	0.067
N	29,586	29,586	29,483	28,333	18,914	29,483
Year FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
Industry x Year FE	N	N	Y	Y	Y	Y
Country x Year FE	N	N	Y	Y	Y	Y
	Panel B: U.S. firms					
$\text{BrexitSentiment}_{i,t}$	0.184	0.152	0.201	0.200	0.235**	0.207
	(0.202)	(0.207)	(0.223)	(0.223)	(0.099)	(0.221)
R^2	0.038	0.039	0.060	0.061	0.060	0.060
N	18,977	18,977	18,957	18,675	15,376	18,957
Year FE	Y	Y	Y	Y	Y	Y
Industry FE	Y	Y	Y	Y	Y	Y
Industry x Year FE	N	N	Y	Y	Y	Y

Table IAXV
Timing of the Effect of *BrexitRisk*$_{i,t}$

This table reports estimates from panel regressions using yearly data. In all specifications, we control for *log(assets)*, industry (two-digit SIC) × year, and country fixed effects. The regressions exclude non-UK firms with fewer than 10 transcripts in the 2015 to 2018 period and firms in the "Non Classifiable" sector. Standard errors are clustered by firm. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% level, respectively.

	$I_{i,t}/K_{i,t-1} \cdot 100$	$\Delta emp_{i,t}/emp_{i,t-1} \cdot 100$
	(1)	(2)
$\text{BrexitRisk}_{i,t}$	–0.119	–0.310***
	(0.081)	(0.117)
$\text{BrexitRisk}_{i,t-1}$	–0.283**	–0.006
	(0.111)	(0.155)
R^2	0.070	0.045
N	24,992	26,403

Table IAXVI
Distribution of Sample Firms across Districts in UK

This table shows the number of UK districts (left column) and the number of UK firms in our sample headquartered in that district (right column).

Number of districts	Number of firms
54	1
26	2
14	3
7	4
5	5
3	6
3	7
1	8
1	10
1	54
1	90

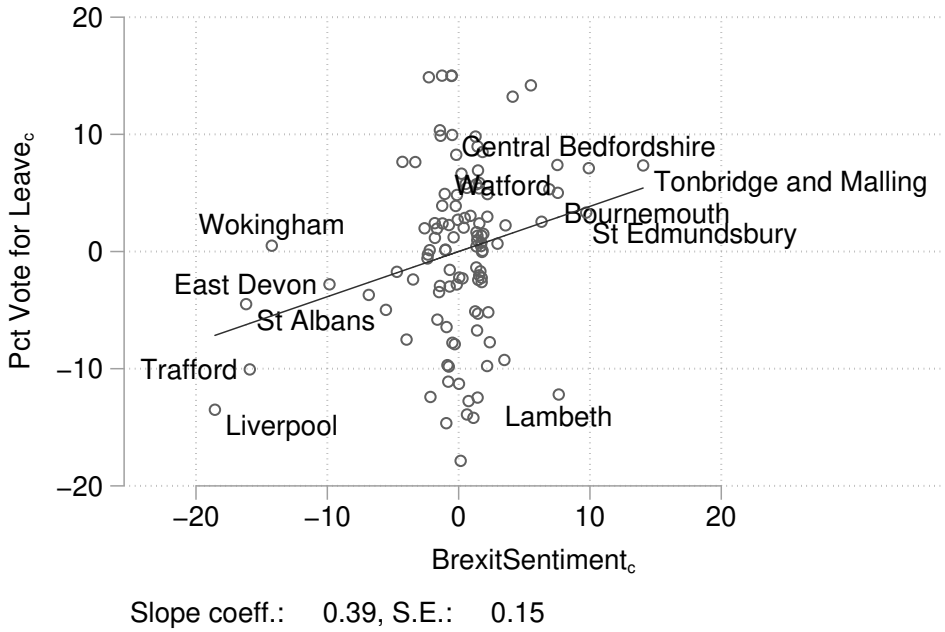


Figure IA7. Voting in Brexit referendum: Column (3) of Table VIII. This figure presents an added variable plot for the specification of column (3) in Table VIII. We label the observations with a residual value larger than 1.6 standard deviations from the sample mean.

Section III. Additional Application: The Fukushima Incident

While Brexit is a momentous economic and historical event, with consequences for firms around the globe that are worthwhile to examine in their own right, international transmission of any number of other small and large *shocks* is likely quite common in a globalized economy. A versatile method to quantify and analyze the exposure of firms to such shocks is thus an important addition to the tool kit of (financial) economists and policy makers. We therefore briefly consider how to generalize our measure of firm-level exposure to a variety of other specific shocks, using the Fukushima incident as an illustration.

On Friday, March 11, 2011, an earthquake and tsunami hit the Fukushima Daiichi Nuclear Power Plant in Okuma, Japan. The tsunami produced waves that swept over the power plant's protective seawalls, disabling the emergency generators that were designed to continue circulating coolants to the reactors' cores, which were automatically shut down upon detection of the earthquake. The loss of coolant led to a nuclear meltdown and a release of radioactive contamination. Ultimately, the fallout made Fukushima the most severe nuclear accident since the 1986 Chernobyl catastrophe.

To quantify the impact of this disaster on Japanese and international firms, we construct a measure of Fukushima-incident exposure analogously to our text-based approach to measuring Brexit exposure. Unlike Brexit, however, for the Fukushima incident there is no obvious single term around which conversations in earnings conference calls converge. To generalize our method, we thus add a step to our procedure that uses training data to generate a list of appropriate search terms. While this use of training data can be fully automated without any human intervention (as demonstrated in Hassan et al. (2019)), here we choose a hybrid approach where we first use training libraries to generate a list of possible search terms and then manually select the most appropriate of these terms.

We begin by generating lists of the top-100 one-, two-, and three-word combinations (n-grams) that were commonly used to discuss the disaster in newspaper articles at the time. Specifically, we use Factiva to search for "fukushima AND nuclear AND (disaster OR accident)" in the source "Newspapers: All" with language "English." We download the first 300 newspaper articles by date of publication and count all n-grams. We then filter out word combinations that also appear in a random selection of 300 newspaper articles on generic economic news published before 2011, and sort the remaining word combinations by their frequency of usage. Table IAXVII below shows the results of this exercise for two-word combinations (bigrams).

Since we consider the occurrence of these n-grams in earnings conference calls, ideally, the n-grams would be uniquely used to describe the Fukushima disaster and nothing else. One way to verify this requirement is to examine the use of these n-grams over time and identify those that are widely used immediately after the incident but not before. Therefore, in this instance we exclude all n-grams from consideration that are used more than twice across all earnings calls prior to the date of the Fukushima incident.

From the remaining list of n-grams, we choose the following set $\mathbb{F}$ to construct our count-based measure $FukushimaExposure$: "japan earthquake," "japanese earthquake," "japanese nuclear," "earthquake in japan," "fukushima," "earthquake and tsunami,"

"tsunami in japan," "japanese tsunami," "japan disaster," "nuclear crisis," "damaged nuclear," "japan tsunami," "worst nuclear," "nuclear accidents," "earthquake and tsunami," and finally, "daiichi power." Following equation (1), our firm-quarter-level measure of Fukushima exposure is then simply the number of mentions of n-grams in $\mathbb{F}$ in the transcript of firm i's quarter t earnings call divided by the total number of words in the transcript.

Having scored all transcripts in our sample this way, we can trace the exposure of international and Japanese firms to the event. Figure IA8 shows the results. For both groups of firms, we observe no exposure prior to the second quarter of 2011 and a large spike just after the event. Reassuringly, Japanese firms have higher exposure throughout the post-event sample period and their exposure appears to be more subject to change over time.

After validating the measure in this fashion, we can use it to consider regional patterns, for example, as before, by averaging the firm-level exposure of all firms headquartered in a given country and comparing these country-level averages. We can also leverage our micro data to offer further insights to better understand these patterns, for instance, by reading the underlying text fragments from the conference call transcripts.

Figure IA9 shows the average Fukushima exposure by country. As one would expect, Japan's exposure to the event is high (instead, we normalize scores by setting Japan equal to unity), as is the exposure of nearby Taiwan and Hong Kong. Aside from this straightforward geographic pattern, several interesting observations emerge. For example, insurance companies, heavily represented in the sectoral mix of faraway Cayman Islands, Bermuda, and Luxembourg, appear highly exposed. Our analysis of snippets confirms that these firms faced probing questions from financial analysts about their exposure to the event. Other global impacts are transmitted through a fear related to the future acceptance of nuclear technology (particularly in France and other European countries), the future of uranium mining (particularly in Canada and Australia), and the disruption of supply chains.

Table IAXVIII reports examples of text fragments underlying our Fukushima exposure measure, taken from Japanese and international firms' call transcripts, using the same sampling rules as for Table II. The following observations seem pertinent: while Japanese firms struggle with power outages, the inaccessibility of plants and properties, and production disruptions, the international impacts of the Fukushima disaster are transmitted through more subtle links. For instance, insurance companies (such as Global Indemnity, with headquarters in the Cayman Islands) discuss losses due to clients' policies taken out to protect against natural disasters. Similarly, (uranium) suppliers to the nuclear industry fear increased regulatory scrutiny to their own operations as an energy company, while suppliers of different power sources consider how to benefit from a crackdown on nuclear energy.

Though brief, this additional application demonstrates the versatility and, more generally, the potential of our approach to trace out and understand at the microeconomic level the impacts of a wide range of specific shocks on the fortunes and actions of publicly listed firms around the world.

Table IAXVII
Top-100 Fukushima Disaster Bigrams from Newspaper Articles

This table shows the top-100 Fukushima disaster bigrams by frequency in newspaper articles published after the Fukushima accident in March 2011. To construct this list, we proceed as follows. In Factiva, we search for "fukushima AND nuclear AND (disaster OR accident)" in the source "Newspapers: All" with language "English" and date within three months after the accident. We downloaded the first 300 newspaper articles by date of publication, remove nonletters, force words to be lower case, and count all adjacent two-word combinations (bigrams). Finally, we remove bigrams that are also in the set of bigrams formed from 300 randomly selected newspaper articles about economic news before 2011.

Ngram	Count
nuclear power	544
the nuclear	382
the fukushima	371
the plant	320
fukushima daiichi	285
the reactor	282
nuclear plant	218
the reactors	215
power plant	199
a nuclear	182
of radiation	179
fuel rods	167
earthquake and	158
of nuclear	157
the earthquake	154
and tsunami	140
nuclear plants	136
tokyo electric	134
power plants	131
three mile	125
mile island	123
the plants	123
radiation levels	115
the disaster	114
nuclear energy	112
at fukushima	112
daiichi nuclear	111
nuclear reactors	101
the quake	98
disaster in	97
atomic energy	95
the tsunami	93
reactors at	93

Ngram	Count
japans nuclear	89
per cent	87
no reactor	87
nuclear disaster	86
of radioactive	86
the chernobyl	85
nuclear safety	85
nuclear crisis	82
cooling systems	82
a meltdown	81
nuclear industry	80
daiichi plant	79
explosion at	79
the cooling	77
the accident	76
fukushima nuclear	76
nuclear accident	71
japanese government	71
fukushima plant	70
international atomic	70
edano said	69
prime minister	68
cooling system	67
plant and	66
energy agency	65
spent fuel	65
reactor no	64
yukio edano	63
nuclear regulatory	62
the radiation	61
in fukushima	60
an earthquake	60
radioactive material	58

Ngram	Count
the containment	57
power co	57
from japan	57
cool the	56
us nuclear	55
nuclear fuel	55
safety agency	53
the stricken	52
magnitude earthquake	51
reactors in	51
reactors and	50
sea water	49
cabinet secretary	49
reactor core	49
japanese authorities	49
accident in	49
to japan	49
plants are	49
the site	49
japanese nuclear	48
plant the	48
nuclear reactor	47
at japans	46
of water	46
the pacific	46
fukushima no	44
containment vessel	44
a tsunami	44
the radioactive	44
reactors are	43
knocked out	42
natural disaster	42
reactor and	41
chief cabinet	41

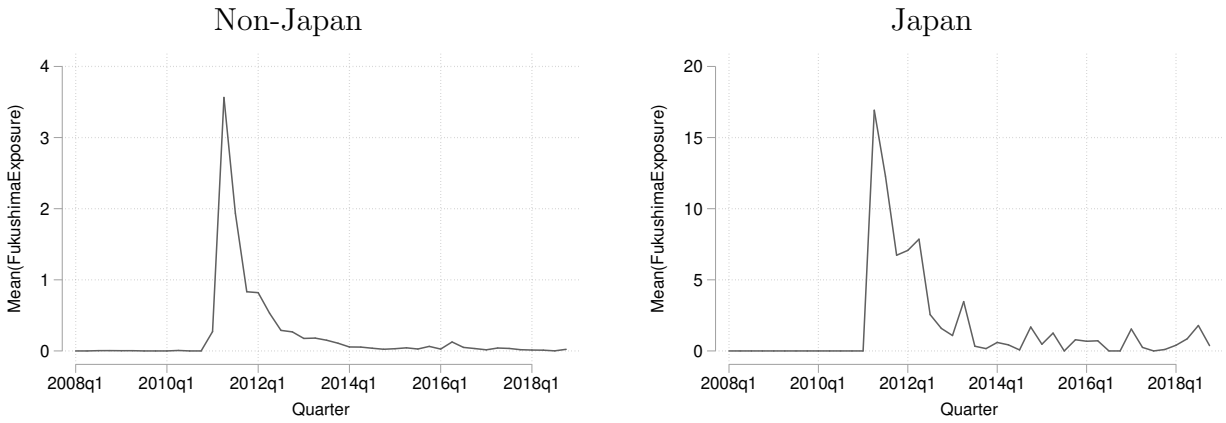


Figure IA8. Time-series of *FukushimaExposure*. This figure plots the quarterly mean of non-Japan-headquartered (left panel) and Japan-headquartered (right panel) firms' $FukushimaExposure_{i,t}$. $\overline{FukushimaExposure_t}$ is normalized using Japan-headquartered firms' average $FukushimaExposure_{i,t}$.

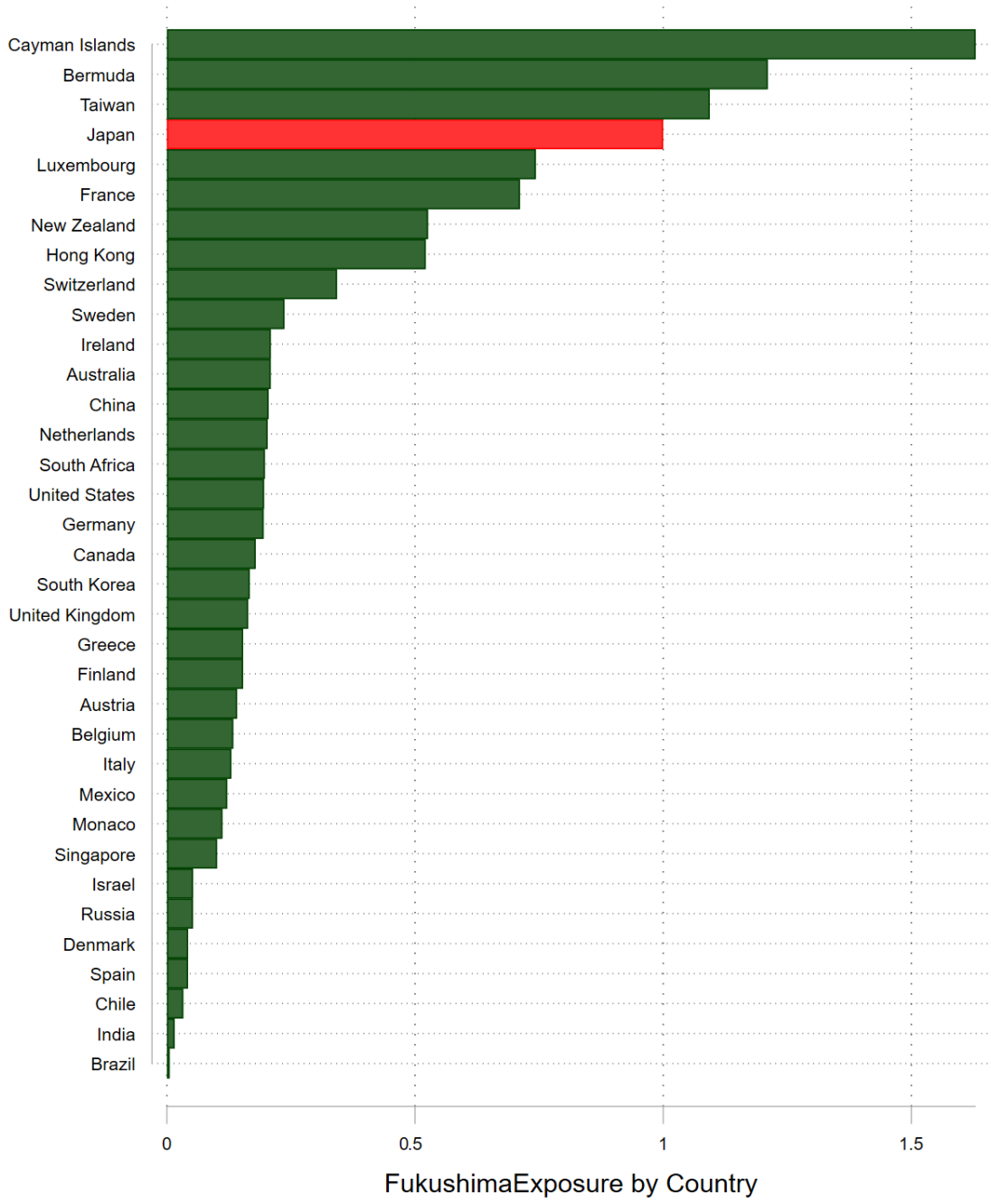


Figure IA9. Mean *FukushimaExposure* by country. This figure shows the country-level mean $FukushimaExposure_{i,t}$ across all firms headquartered in a specific country. Countries with zero $\overline{FukushimaExposure}_c$ or countries for which we have fewer than five headquartered firms are excluded. Zero $\overline{FukushimaExposure}_c$ countries are Argentina, Egypt, Indonesia, United Arab Emirates, Portugal, Colombia, Turkey, Norway, Poland, Cyprus, and Malaysia.

Table IAXVIII
Top *FukushimaExposure* Firms' Transcript Excerpts

This table shows transcript excerpts for the top-5 Japanese (Panel A) and the top-10 non-Japanese (Panel B) firms ranked by $\overline{FukushimaExposure}_i$. $\overline{FukushimaExposure}_i$ is calculated as the mean across all of a firm's available transcripts of earnings calls held between 2011 to 2013. Mentions of Fukushima-related words are in bold.

Panel A: Japanese firms

Company	$\overline{\text{Fukushima Exposure}}_i$	Country	Month	Transcript excerpts	Exposure description
East Japan Railway Co	20.97	JP	2013-04	in the materials at hand last year the great east **japan earthquake** occurred and i feel that was the biggest crisis in	Disruption of operations
Toyota Motor Corp	14.64	JP	2012-07	from the lack of supply caused by the great eastern **japan earthquake** last year especially in japan a market stimulated by ecocar	Supply chain disruption
Aeon Mall Co Ltd	8.38	JP	2012-04	of a loss on disaster related to the great east **japan earthquake** as well as provisions for asset retirement obligations for previous	Exposed properties (shopping malls)
Osaka Gas Co Ltd	7.44	JP	2013-04	far this plan was created before the great east of **japan earthquake** despite the earthquake we believe the planned activities have progressed	Power shortages
Showa Denko KK	7.07	JP	2011-10	year but profit of heat exchangers affected by great east **japan earthquake** declined overall profit decreased jpy billion year on year to	Production disruption
MCubs MidCity Investment Corp	6.78	JP	2012-07	recovery in the market deteriorated due to the great east **japan earthquake** in the first quarter of but the downward trend had	Exposed properties

Panel B: Non-Japanese firms

Company	$\overline{\text{Fukushima Exposure}}_i$	Country	Month	Transcript excerpts	Exposure description
Lightbridge Corp	30.83	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	30.05	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.	20.47	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	19.73	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
GSE Systems Inc	16.34	US	2012-04	safety control has been submitted to the state council previous **nuclear accidents** have resulted in new regulations requiring additional operator training higher	Supplier to nuclear industry
EnergySolutions, Inc.	15.85	US	2012-07	low cost of natural gas and the continuing reverberations from **fukushima** will increasingly drive the decommissioning of more nuclear power plants around	Nuclear waste disposal
Lite-On Technology Corporation	15.53	TW	2011-01	and i have another question given the supply disruption after **japanese earthquake** and the nokia transition whats your outlook in the second	Supplier to nuclear industry
Paladin Energy Ltd	14.46	AU	2011-04	kick in the teeth in its early days the damage **fukushima** sustained appeared very negative for nuclear but as cool heads start	Nuclear production
Cameco Corp	14.2	CA	2011-04	discuss the financial results and our latest assessments following the **fukushima** accident thanks for joining us with us are of camecos senior	Uranium producer
Global Indemnity plc	13.4	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

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