

# Aggregate and Idiosyncratic Political Risk: Measurement and Effects

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# Motivation

- ▶ Political decisions on regulation, taxation, government expenditure have a major impact on business environment.
- ▶ Outcomes of these decisions often hard to predict (Brexit, government shutdown, health care, immigration reforms).
- ▶ Effects of risk on behavior of households and firms might outweigh potential upside of well-meaning reforms.
- ▶ **How do firms react to political risk?**

Main issue:

- ▶ Lack of measurement of firm-level political risk.

This paper:

- ▶ Develop a novel, firm-level, measure of political risk based on textual analysis of conference call transcripts.
- ▶ Decompose political risk by topic.
- ▶ Study reactions to aggregate and idiosyncratic political risk

## Main Findings

1. Idiosyncratic political risk associated with retrenching of hiring and investment. Largest effects of risk associated w/ corporate regulation, health care, and government reform.
2. Firms that devote more time discussing risks associated with a particular political topic increase lobbying on that topic and not other topics (actively manage political risk).
3. Generally smaller associations of stock return volatility, investment (but not hiring) with idiosyncratic than aggregate political risk.
4. Nevertheless 2/3rds of variation in political risk is idiosyncratic, identity of firms most affected changes over time and within sector.
5. Dispersion of idiosyncratic political risk increases when aggregate political risk is high.

## Contribution

- ▶ Value of political connections. (Fisman, 2001; Leuz & Oberholzer-Gee 2006; Faccio, 2004; Tahoun 2014; Acemoglu, Hassan & Tahoun, 2015; Akey & Lewellen, 2016, ...)
- Show that firms manage political uncertainty by cultivating connections to politicians.
- ▶ Measurement of political uncertainty. (Baker, Bloom & Davis, 2016)
- Introduce a firm- and time-specific measure that can be decomposed by topic.
- ▶ Effect of political risk on asset prices, cost of capital, macroeconomic fluctuations. Kelly, Pastor & Veronesi (2015), Kojien, Philipson, and Uhlig (2016), Caldera & al. (2016)
- Document firm-level effects of political risk, including idiosyncratic political risk.
- ▶ Pattern-based sequence classification methods (Song & Wu, 2009; Manning & al. 2008)

# Outline

Measuring Political Risk at the Firm Level

Validation

Idiosyncratic Political Risk

Managing Political Risk

## Conference Call Transcripts

- ▶ Complete transcripts of 89,897 earnings conference calls of US listed firms 2002-10 from Thomson-Reuters.
- ▶ Typically four calls per year, after earnings releases.
- ▶ Management presentation followed by Q&A with firm's analysts (0-70 questions, average duration 45 min).
- ▶ Conversation typically centers around uncertainties that the firm is facing. (Hollander, 2010; Bowen, 2002, 2003; Matsumoto, 2011; Huang, 2015)

**What share of the conversation between management and participants centers on risks associated with political topics?**

## Measuring Overall Political Risk

1. Extract all two-word combinations (“bigrams”) from training libraries that are indicative of discussion of political topics,  $\mathbb{P}$ , and non-political topics  $\mathbb{N}$ .
2. Count the number of occurrences of (exclusively) political bigrams in conjunction with a synonym for risk or uncertainty and divide by the total number of bigrams in the transcript:

$$PRisk_{it} = \frac{\sum_b^{B_{it}} (1[b \in \mathbb{P} \setminus \mathbb{N}] \times 1[|b - r| < 10] \times f_{b,\mathbb{P}}/B_{\mathbb{P}})}{B_{it}},$$

where  $r$  is the position of the nearest synonym of risk or uncertainty and  $b = 0, 1, \dots, B_{it}$  are the bigrams contained in call of firm  $i$  at time  $t$ .

# Topic-based Measures

1. Extract all bigrams from a set of  $Z$  training libraries of political topics,  $\mathbb{Z} = \{\mathbb{P}_1, \dots, \mathbb{P}_Z\}$ .
2. Then again count the number of bigrams associated with  $T$  used in conjunction with a synonym for risk, but now weight also with inverse document frequency.

$$PRisk_{it}^T = \frac{\sum_b^{B_{it}} \left( 1[b \in \mathbb{P}_T \setminus \mathbb{N}] \times 1[|b - r| < 10] \times \frac{f_{b,\mathbb{P}}}{B_{\mathbb{P}}} \log(Z / f_{b,\mathbb{Z}}) \right)}{B_{it}}$$



# Training Libraries

## Non-Political Bigrams, $\mathbb{N}$

- ▶ Textbook on financial accounting (Libby, 2011)
- ▶ Santa Barbara Corpus of Spoken American English (non-political topics), Du Bois & al. (2000)

## Political Training Libraries $\mathbb{P}, \{\mathbb{P}_T\}$

### 1. Overall Political ( $PRisk_{it}$ )

- Textbook on American Politics (Bianco & Canon, 2013)
- Political vs non-political newspapers articles

### 2. Topic-Based ( $\{PRisk_{it}^T\}$ )

- Text contained in 24 topics from OnTheIssues.org.
- Contains snippets from newspapers, speeches, press releases, books, voting records, and bill sponsorships identifying where candidates for political office stand on each of 24 topics (health care, foreign policy, defense, ...)

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# Validation

1. Bigrams with highest scores intuitively linked to politics ('the constitution,' 'public opinion,' 'interest groups,' 'the FAA' ...) ▶
2. Transcripts with highest  $PRisk_{it}$  indeed center around discussions about ballot initiatives, legislation, regulation, government expenditure, ... ▶
3. Mean of  $PRisk_{it}$  across firms highly correlated with Baker, Bloom and Davis' EPU index (0.83). ▶
4.  $PRisk_{it}$  significantly higher around federal elections. ▶
5. Sectors with highest  $PRisk_{it}$  are finance, construction, ... ▶
6. Aggregate & idiosyncratic variation in  $PRisk_{it}$  significantly related to realized & implied stock return volatility.

# Transcript excerpts with highest $PRisk_{i,t}$

Firm Name	Call Date	$PRisk_{i,t}$ (standardized)	Text surrounding bigram with highest weight ( $f_{b,P} / B_P$ )
NEVADA GOLD CASINOS INC	10-Sep-08	37.36	gaming industry is currently <b>supporting a ballot</b> initiative to <b>amend the constitution to authorize an</b> increase in the — BET— limits allow additional
Axis Capital Holdings Limited	9-Feb-10	34.98	accident year ratios the combined ratios we have talked about <b>the political</b> —RISK— business particularly really shouldnt be looked at on a
Female Health	10-Feb-09	31.82	market acceptance the economic and business environment and the impact <b>of government pressures</b> currency — RISKS— capacity efficiency and supply <b>constraints and</b> other
Applied Energetics, Inc.	11-May-09	29.29	of products and the —UNCERTAINTY— of the timing and <b>magnitude of government funding and</b> customer orders <b>dependence on sales to government</b> customers
FPIC Insurance Group, Inc.	30-Oct-08	28.01	a —CHANCE— for national <b>tort reform and</b> i dont see <b>the constitution of congress changing in</b> such a way after <b>this election</b>
BANKFINANCIAL CORP	4-Nov-08	27.59	was <b>an accurate</b> metaphor and really given all the — UNCERTAINTIES— <b>of government involvement</b> in operations and business activities and given the capital
World Acceptance Corporation	25-Jul-06	26.46	management analyst i wanted to followup on the regulatory <b>front the states</b> that you had <b>mentioned the</b> —POSSIBILITY— of some positive <b>legislation</b>
Magellan Health Services	29-Jul-10	25.31	future so this is a time of quite —UNCERTAINTY— for <b>the states</b> they are not <b>sure what</b> the fmap will be if

# Transcript excerpts with highest PRisk<sub>i,t</sub>

Firm Name	Call Date	PRisk <sub>i,t</sub> (standardized)	Text surrounding bigram with highest weight ( $f_{b,P}/B_P$ )
Piedmont Natural Gas	9-Jun-09	24.76	your point as you will recall in all three of <b>the states</b> that we have serve jim we are —EXPOSED— only to
Platinum Underwriters Holdings Ltd	18-Feb-10	23.95	we have had historically had a very small participation in <b>the political</b> —RISK— market backing only a couple of players <b>parties that</b>
Mechanical Technology Inc.	12-May-08	21.78	measurement business on a <b>small number</b> customers an potential loss <b>of government funding</b> —RISK— related to developing mobion direct methanol <b>fuel cells</b>
Advanced Photonix	14-Aug-06	19.04	market due primarily to the —UNPREDICTABLE— nature of the timing <b>of government contracts</b> overall revenue growth met the companys expectations for the
TravelCenters of America	24-Feb-10	18.75	in the future whether due to speculation or the impact <b>of government policy such</b> an increase or the —
Metalink	25-Jul-02	18.36	POSSIBILITY— of one requires important to alcatel especially given the situation <b>economic situation in the states</b> ph and <b>the</b> —THREAT— <b>that</b> alcatel <b>is seeing</b> in china
GTSI Corp.	7-Aug-08	17.85	is somewhat —UNCERTAIN— <b>but</b> thank god we a whole bunch <b>of government</b> bureaucrats <b>that spend</b> the money that will still be in
TRC Companies	12-Aug-04	17.76	and this is where we are going to allocate it <b>the states</b> are —HESITANT— to move forward so until the tbbill <b>is</b>

# Association with stock return volatility

$$y_{it} = \delta_i + \delta_t + \beta PRisk_{it} + \gamma' X_{it} + \epsilon_{it}$$

	Realized volatility <sub>i,t</sub> (standardized)					
	(1)	(2)	(3)	(4)	(5)	(6)
PRisk <sub>i,t</sub> (standardized)	0.187*** (0.013)	0.076*** (0.012)	0.028*** (0.007)	0.021*** (0.007)	0.036*** (0.008)	0.025*** (0.007)
Mean of PRisk <sub>i,t</sub> (standardized)		0.441*** (0.006)				
Stock return 7 days prior <sub>i,t</sub>					4.233*** (0.664)	
Earnings announcement surprise <sub>i,t</sub>						-0.040 (0.029)
<i>N</i>	80,370	80,370	80,370	80,370	62,156	77,946
Time FE	no	no	yes	yes	yes	yes
Firm FE	no	no	yes	yes	yes	yes
Sector*time FE	no	no	no	yes	no	no

Go to [t-statistic distribution](#) from placebo regressions

# Outline

Measuring Political Risk at the Firm Level

Validation

Idiosyncratic Political Risk

Managing Political Risk

# Idiosyncratic Political Risk

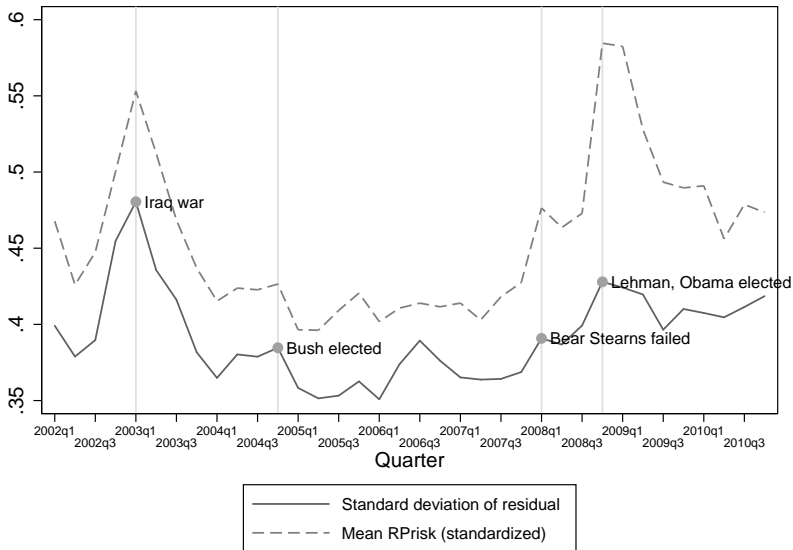
	Realized volatility $_{i,t}$ (standardized)				
	(1)	(2)	(3)	(4)	(5)
PRisk $_{i,t}$ (standardized)	0.029*** (0.007)	0.029*** (0.007)	0.048*** (0.016)	0.049*** (0.016)	0.046*** (0.016)
EPU beta $_{i,t}$ × mean of PRisk $_{i,t}$	71.313 (50.917)				
EPU beta $_{i,t}$ × EPU $_t$		41.349* (21.644)			
Log(1+\$ federal contracts $_{i,t}$ )				-0.001 (0.004)	0.093*** (0.015)
Log(1+\$ federal contracts $_{i,t}$ ) × mean of PRisk $_{i,t}$					-0.014*** (0.002)
<i>N</i>	78,248	78,248	9,099	9,099	9,099
Time FE	yes	yes	yes	yes	yes
Firm FE	yes	yes	yes	yes	yes
Sector*time FE	no	no	no	no	no

- ▶ ANOVA: Aggregate 0.7%, Idiosyncratic 67% of variation



# Dispersion of idiosyncratic PRisk<sub>i,t</sub> across firms

Idiosyncratic risk increases when aggregate risk is high.



# Outline

Measuring Political Risk at the Firm Level

Validation

Idiosyncratic Political Risk

Managing Political Risk

Lobbying by Topic

Donations, Hiring, and Investment

## Lobbying by political topic

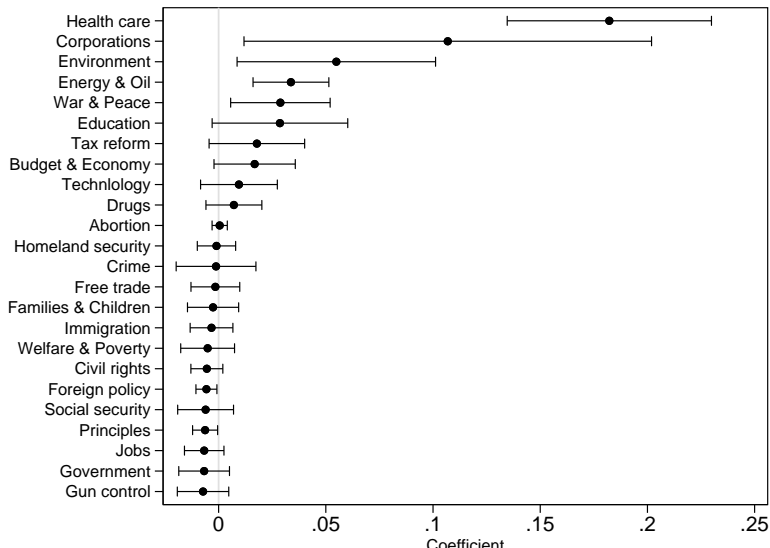
- ▶ Lobbying expenses by topic (Center for Responsive Politics), manually match each of 80 topics from disclosure forms to our 24 topic-based measures of  $PRisk_{it}^T$ .

$$Lobbying_{it}^T = \delta_i + \delta_t + \delta_T + \beta PRisk_{it}^T + \gamma' X_{it} + \epsilon_{it}$$

	Log(1+\$ lobby) $_{i,\tau,t}^T$				
	(1)	(2)	(3)	(4)	(5)
PRisk $_{i,t}^T$ (standardized)	0.051*** (0.006)	0.052*** (0.006)	0.044*** (0.006)	0.045*** (0.006)	0.004** (0.002)
Time FE	yes	yes	yes	implied	yes
Firm FE	no	yes	yes	yes	implied
Topic FE	no	no	yes	yes	implied
SIC2*time FE	no	no	no	yes	no
Firm*topic FE	no	no	no	no	yes
<i>N</i>	1,437,144	1,437,144	1,437,144	1,437,144	1,434,456

# Heterogeneity across topics

$$\text{Lobbying}_{it}^T = \delta_i + \delta_t + \delta_T + \zeta^T \delta_T \times \text{PRisk}_{it}^T + \gamma' X_{it} + \epsilon_{it}$$



# Lobbying by political topic: heterogeneity across firms

	Log(1+\$ lobby) <sub>i,τ,t</sub>			
	(1)	(2)	(3)	(4)
PRisk <sub>i,t</sub> <sup>T</sup>	0.015*** (0.004)	0.047*** (0.007)	0.038*** (0.008)	0.051*** (0.007)
PRisk <sub>i,t</sub> <sup>T</sup> × 1{av firm assets > median} <sub>i</sub>	0.063*** (0.012)			
PRisk <sub>i,t</sub> <sup>T</sup> × 1{av dependence on federal gov > median} <sub>s,t</sub>		0.012 (0.015)		
PRisk <sub>i,t</sub> <sup>T</sup> × 1{av state corruption rate > median} <sub>s,t</sub>			0.025** (0.011)	
PRisk <sub>i,t</sub> <sup>T</sup> × 1{federal election quarter} <sub>t</sub>				-0.003 (0.006)
Log(assets) <sub>i,t</sub>		0.030*** (0.005)	0.030*** (0.005)	0.031*** (0.005)
Year-quarter FE	yes	yes	yes	yes
Firm FE	yes	yes	yes	yes
Topic FE	yes	yes	yes	yes
N	1,437,144	1,253,952	1,253,952	1,253,952

# Lobbying by political topic: Causality

	$\text{Log}(1+\$ \text{ lobby})_{i,t}^T$	$\text{PRisk}_{i,t}^T$ (standardized)	
	(1)	(2)	(3)
$\text{PRisk}_{i,t}^T$ (standardized)	0.004** (0.002)	0.032*** (0.010)	
$\text{PRisk}_{i,t-1}^T$ (standardized)	0.000 (0.005)		
$\text{PRisk}_{i,t+1}^T$ (standardized)	0.004 (0.005)		
$\text{PRisk}_{a,t}^T$ (industry average, standardized)			0.343*** (0.024)
IV specification	no	IV	first stage
Time FE	yes	yes	yes
Firm FE	implied	implied	implied
Topic FE	implied	implied	implied
Firm*topic FE	yes	yes	yes
<i>N</i>	1,350,288	1,434,456	1,434,456

# Idiosyncratic PRisk<sub>*i,t*</sub>, investment, and hiring

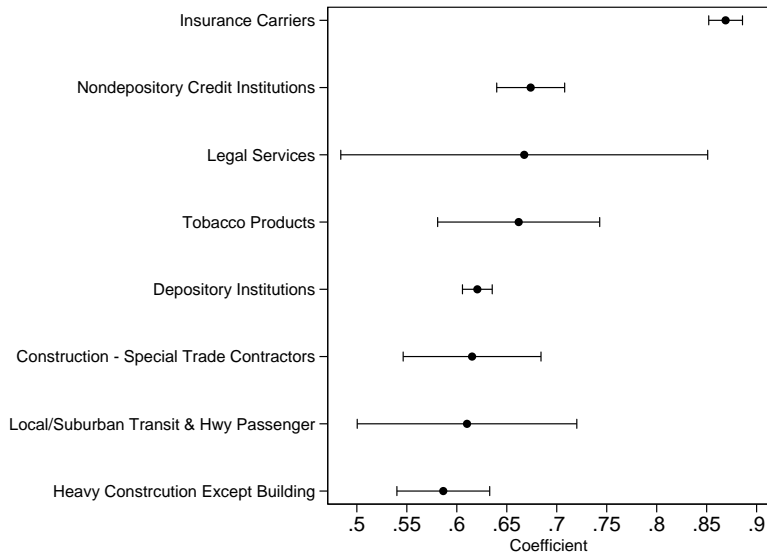
	$I_{i,t}/K_{i,t-1} * 100$			$\Delta emp_{i,t}/emp_{i,t-1} * 100$		
	(1)	(2)	(3)	(4)	(5)	(6)
PRisk <sub><i>i,t</i></sub> (standardized)	-0.191*** (0.070)	-0.165** (0.071)	-0.180* (0.103)	-1.169*** (0.326)	-1.128*** (0.329)	-2.001*** (0.506)
PRisk <sub><i>i,t</i></sub> × $\mathbb{1}\{\text{assets}_{i,t} > \text{median assets}\}$			-0.024 (0.140)			1.614*** (0.624)
$\mathbb{1}\{\text{assets}_{i,t} > \text{median assets}\}$			-0.368 (0.281)			-1.334 (0.873)
Time FE	yes	yes	yes	yes	yes	yes
Firm FE	yes	yes	yes	yes	yes	yes
SIC2*time FE	no	yes	no	no	yes	no
<i>N</i>	55,261	55,261	55,261	22,198	22,198	22,198

## Conclusion

- ▶ Introduced simple, firm-level measure of political risk.
- ▶ Firms that are more affected by idiosyncratic political risk experience more volatile stock returns, retrench hiring, and investment.
- ▶ Firms that devote more time discussing risks associated with a particular political topic increase lobbying on that topic and not other topics (actively manage political risk).
- ▶ 2/3rds of variation in political risk is idiosyncratic, identity of firms most affected changes over time and within sector.
- ▶ Dispersion of idiosyncratic political risk increases when aggregate political risk is high.



## Average $PRisk_{i,t}$ by SIC-2 division



## Summary statistics: Firm-year data

	Mean	Median	St. dev.	Min	Max	<i>N</i>
$PRisk_{i,t}$ (not standardized)	121.40	74.68	188.38	0.00	5,009.33	24,261
$\text{Log}(1+\$ \text{ federal contracts}_{i,t})$	10.23	12.52	7.63	0.00	24.31	2,428
$\text{Log}(\text{assets}_{i,t})$	7.02	6.93	2.08	0.16	14.94	23,839
$\Delta \text{emp}_{i,t} / \text{emp}_{i,t-1}$	0.06	0.03	0.19	-0.50	1.00	22,198
$\text{Log}(1+\$ \text{ donation expense}_{i,t})$	2.15	0.00	4.30	0.00	14.94	24,261
Number of donations $_{i,t}$	13.31	0.00	57.72	0.00	1,387.00	24,261
Hedge $_{i,t}$	0.10	0.00	0.29	0.00	1.00	24,261

# Summary statistics: Firm-quarter data

	Mean	Median	St. dev.	Min	Max	N
PRisk <sub><i>i,t</i></sub> (not standardized)	120.02	58.19	235.58	0.00	8,268.97	85,152
Unrestricted PRisk <sub><i>i,t</i></sub> (not standardized)	4,717.94	4,612.01	768.75	1,980.20	10,296.14	85,152
Unweighted PRisk <sub><i>i,t</i></sub> (not standardized)	69.37	49.48	75.14	0.00	1,933.51	85,152
Textbook-based PRisk <sub><i>i,t</i></sub> (not standardized)	90.44	35.33	209.33	0.00	7,793.15	85,152
Realized volatility <sub><i>i,t</i></sub>	0.03	0.03	0.02	0.00	1.16	81,310
Implied volatility <sub><i>i,t</i></sub>	0.44	0.40	0.21	0.01	2.00	55,152
Log(1+\$ lobby expense <sub><i>i,t</i></sub> )	2.43	0.00	4.85	0.00	16.76	61,584
$\Delta$ sales <sub><i>i,t</i></sub> /sales <sub><i>i,t-1</i></sub>	0.16	0.02	14.90	-28.20	3,964.00	81,581
$l_{i,t}/K_{i,t-1}$	0.10	0.08	0.07	-0.10	0.40	55,266
(EPS <sub><i>i,t</i></sub> - EPS <sub><i>i,t-4</i></sub> )/price <sub><i>i,t</i></sub>	-0.00	0.00	0.59	-66.19	51.08	80,114
Log(1+\$ federal contracts <sub><i>i,t</i></sub> )	10.25	12.59	7.64	0.00	24.31	9,431
Average stock return 7 days prior to earnings call <sub><i>i,t</i></sub>	0.00	0.00	0.01	-0.15	0.31	63,345
Average stock return 30 days prior to earnings call <sub><i>i,t</i></sub>	0.00	0.00	0.01	-0.06	0.11	63,179
Average stock return 90 days prior to earnings call <sub><i>i,t</i></sub>	0.00	0.00	0.00	-0.03	0.08	62,730
$1\{\text{Presidential elections}\}_t$	0.06	0.00	0.24	0.00	1.00	72,368
$1\{\text{Congressional elections}\}_{i,t}$	0.20	0.00	0.40	0.00	1.00	72,368
$1\{\text{State election}\}_{i,t}$	0.30	0.00	0.46	0.00	1.00	72,368
Log(assets <sub><i>i,t</i></sub> )	7.09	6.99	2.02	-0.17	15.11	82,540
$1\{\text{assets}_{i,t} > p50\}$	0.50	0.50	0.50	0.00	1.00	82,540

# Summary statistics: Firm-topic-quarter data

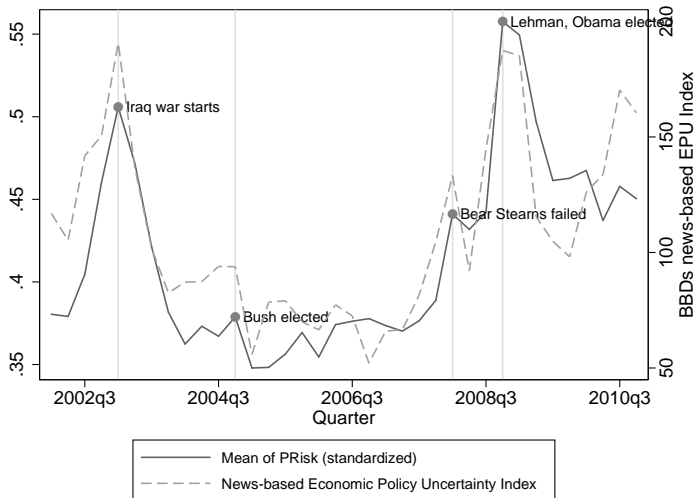
	Mean	Median	St. dev.	Min	Max	<i>N</i>
$\text{PRisk}_{i,t}^T$ (not standardized)	9.07	0.00	23.98	0.00	2,841.26	2,043,648
$\text{Log}(\text{assets}_{i,t})$	7.09	6.99	2.01	0.61	15.11	1,980,960
$\mathbb{1}\{\text{average assets} > \text{p50}\}_{i,t}$	0.50	0.50	0.50	0.00	1.00	1,980,960
$\mathbb{1}\{\text{average dependence on federal gov} > \text{p50}\}_s$	0.18	0.00	0.38	0.00	1.00	1,736,832
$\mathbb{1}\{\text{average state corruption rate} > \text{p50}\}_s$	0.48	0.00	0.50	0.00	1.00	1,736,832
$\mathbb{1}\{\text{federal election quarter}\}_t$	0.23	0.00	0.42	0.00	1.00	1,736,832
$\mathbb{1}\{\text{state election year}\}_{s,t}$	0.30	0.00	0.46	0.00	1.00	1,736,832
$\mathbb{1}\{\text{incumbent not candidate}\}_{s,t}$	0.15	0.00	0.35	0.00	1.00	1,736,832

# Top 30 political bigrams used in $PRisk_{i,t}$

Bigram	$(f_{b,\mathbb{P}}/B_{\mathbb{P}})^*$ within-transcript frequency	Bigram	$(f_{b,\mathbb{P}}/B_{\mathbb{P}})^*$ within-transcript frequency
the constitution	84.45	of civil	13.79
the states	61.08	court has	13.79
public opinion	49.98	ruled that	13.68
interest groups	49.74	groups and	13.54
of government	49.50	the presidential	13.34
in congress	33.21	civil war	13.30
national government	28.56	shall have	13.30
the civil	25.61	the congress	13.30
elected officials	25.36	new deal	12.56
the political	24.89	the constitutional	12.56
politics is	22.65	governor and	12.48
office of	22.16	of representatives	12.06
the bureaucracy	20.19	a yes	12.01
for governor	19.65	yes no	11.88
and senate	19.45	african americans	11.82
care reform	19.31	economic policy	11.82
government and	18.91	a political	11.82
support for	17.03	of social	11.82
the epa	16.44	and political	11.78
in government	16.25	government policy	11.57
congress to	15.51	federal courts	11.57
the legislative	15.34	argued that	11.33
political process	15.27	the democratic	11.33
and social	15.03	the faa	11.30
government in	14.77	government the	11.08
due process	14.77	president has	10.83
president obama	14.53	white house	10.83
congress the	14.28	the politics	10.83
tea party	14.03	policy is	10.81
the republican	14.03	general election	10.59

50,422 unique bigrams in total. [▶ back](#)

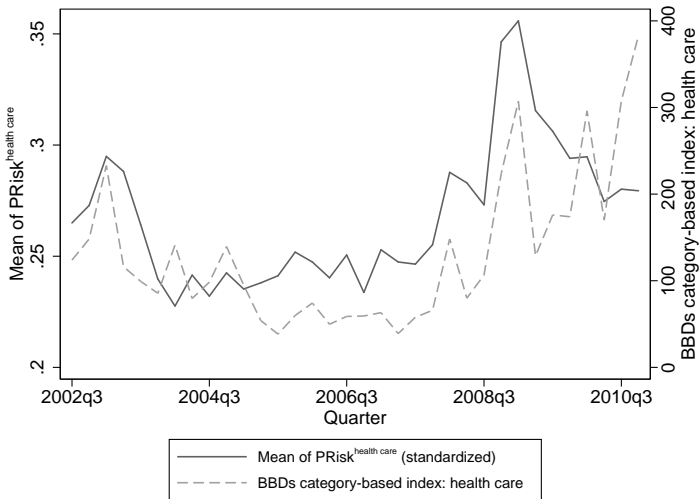
# Mean of $PRisk_{i,t}$ across firms



Correlation with BBD newspaper-based measure=0.83.

[▶ back](#)

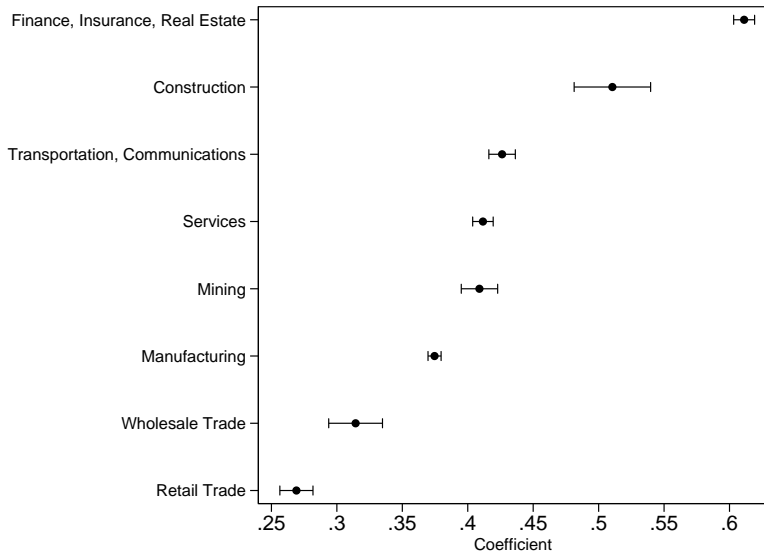
# Mean of $\text{PRisk}_{i,t}^{\text{HealthCare}}$



Correlation with BBD health care measure 0.63.

Go to top bigrams by [▶ topic](#) [▶ back](#)

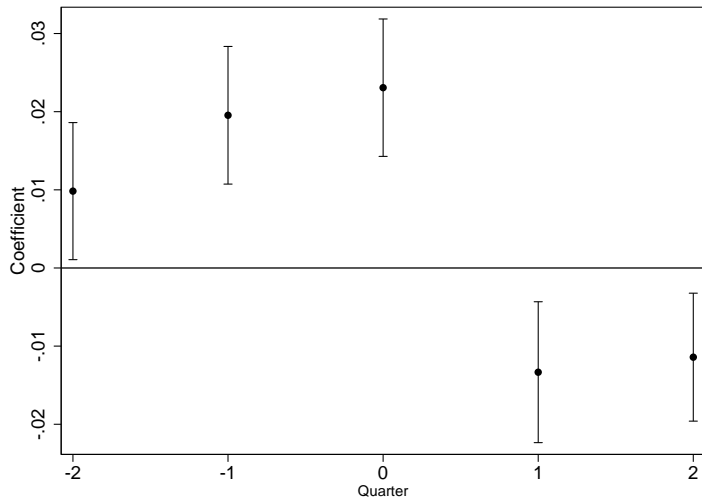
# Mean of $PRisk_{i,t}$ by SIC division



Same [▶ chart](#) for top 5 two-digit SIC industries [▶ back](#)



# PRisk<sub>*i,t*</sub> higher around federal elections



# Top 10 political bigrams per topic ( $T = 24$ )

Topic	Top ten bigrams
Abortion	"embryonic stem", "stem cell", "stem cells", "the fetus", "pregnant woman", "litmus test", "of unintended", "cell lines", "taken across", "womens health"
Budget & Economy	"free markets", "home values", "the subprime", "home mortgages", "the deficit", "buy up", "subprime mortgages", "and fred-die", "spending freeze", "mortgage industry"
Civil Rights	"the flag", "domestic partners", "the patriot", "the civil", "union of", "el paso", "the institution", "the constitution", "the aclu", "their spouses"
Corporations	"of commerce", "bain capital", "filing for", "community banks", "timber company", "on corporations", "which move", "subsidy for", "free markets", "auto industry"
Crime	"three strikes", "justice system", "the ranger", "local law", "law enforcement", "second chance", "the byrd", "criminal justice", "dna testing", "all capital"
Drugs	"in colombia", "illegal drugs", "of drug", "on drugs", "for drug", "drug testing", "the combat", "disparity between", "of drugs", "drug treatment"
Education	"private school", "pell grants", "public schools", "teachers and", "math and", "schools to", "and math", "schools that", "education reform", "in reading"
Energy & Oil	"global warming", "nuclear power", "climate change", "greenhouse gas", "clean energy", "the arctic", "energy independence", "gas emissions", "dependence on", "the kyoto"

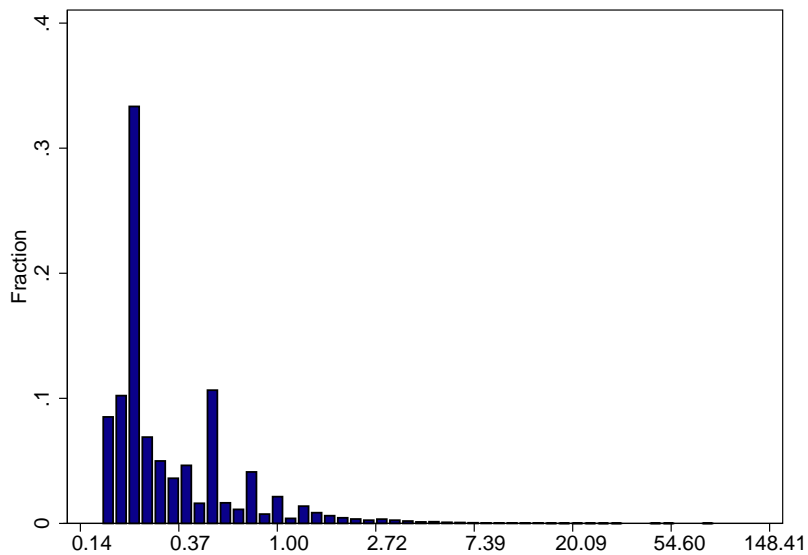
## Table continued

Topic	Top ten bigrams
Environment	"clean air", "in mercury", "great lakes", "for clunkers", "air act", "environmental health", "environmental protection", "mercury emissions", "the clean", "air and"
Families & Children	"child welfare", "entertainment media", "children from", "foster care", "sexually transmitted", "entertainment products", "conference on", "video games", "for adoption", "flexible work"
Foreign Policy	"nuclear weapons", "the nuclear", "government of", "with russia", "georgia and", "a nuclear", "of nuclear", "free markets", "and ukraine", "the taiwan"
Free Trade	"trade agreement", "the wto", "trade barriers", "of cape", "trade with", "duties on", "open markets", "in jordan", "fast track", "on trade"
Government Reform	"general elections", "the lineitem", "voter registration", "of dc", "the polls", "from federal", "for representation", "on rules", "suppress the", "representation in"
Gun Control	"the nra", "gun control", "second amendment", "the gun", "gun laws", "waiting period", "guns in", "checked baggage", "of gun", "day waiting"
Health Care	"part d", "prescription drug", "medicare part", "generic drugs", "care plan", "drugs from", "have health", "community health", "their health", "childrens health"
Homeland Security	"nuclear weapons", "missile defense", "the patriot", "the intelligence", "our troops", "in afghanistan", "of military", "on terror", "of war", "armed forces"

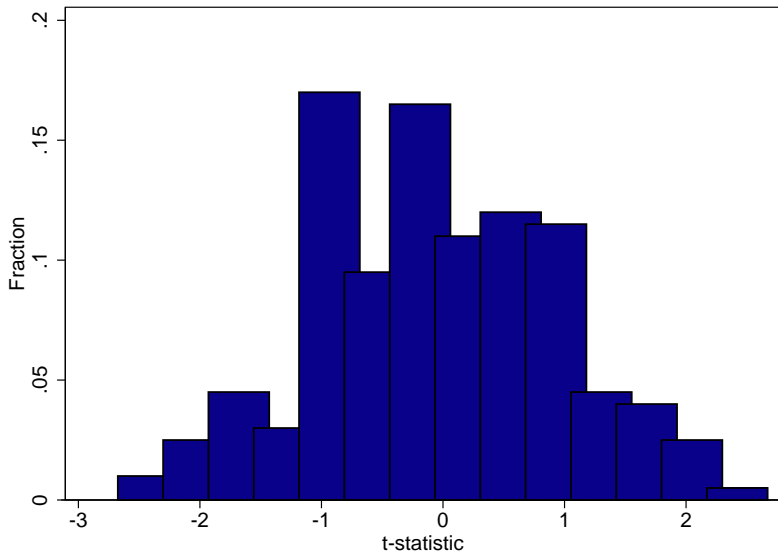
## Table continued

Topic	Top ten bigrams
Immigration	"illegal immigrants", "illegal immigration", "the border", "illegal aliens", "temporary worker", "operational control", "the borders", "the shadows", "the immigration", "secure our"
Jobs	"pay raises", "overtime pay", "air traffic", "job growth", "wage to", "unemployment benefits", "million jobs", "the faa", "higher when", "jobs lost"
Principles & Values	"of hawaii", "third way", "john f", "on principles", "run for", "justice of", "democratic leadership", "leadership council", "of church", "of hope"
Social Security	"younger workers", "private accounts", "retirement age", "of social", "their retirement", "personal retirement", "trust fund", "interest saved", "security system", "their social"
Tax Reform	"estate tax", "the estate", "the amt", "tax cuts", "bush tax", "tax relief", "alternative minimum", "tax cut", "minimum tax", "tax plan"
Technology	"the fcc", "on internet", "space program", "fairness doctrine", "internet a", "top markets", "privacy is", "internet is", "on technology", "internet to"
War & Peace	"our troops", "nuclear weapons", "from iraq", "to war", "in afghanistan", "of iraq", "a nuclear", "osama bin", "the surge", "mass destruction"
Welfare & Poverty	"home ownership", "block grants", "the proportion", "reducing by", "on less", "extreme global", "service by", "of extreme", "drug treatment", "south side"

## Distribution of bigram scores



## t-statistics from placebo regressions



Go back to [risk validation](#) table

# The contribution of the different components of $PRisk_{it}$

QUARTER DATA	$PRisk_t$	Unweighted $PRisk_t$	Unrestricted $PRisk_t$	Textbook-based $PRisk_t$	BBD news-based $_t$
$PRisk_{i,t}$	1.000	0.957	0.841	0.997	0.833
Unweighted $PRisk_t$	0.957	1.000	0.844	0.939	0.788
Unrestricted $PRisk_t$	0.841	0.844	1.000	0.835	0.626
Textbook-based $PRisk_t$	0.997	0.939	0.835	1.000	0.836
BBD news-based $_t$	0.833	0.788	0.626	0.836	1.000

# Frequency of all synonyms

Synonym	Frequency	Synonym	Frequency	Synonym	Frequency	Synonym	Frequency
risk	155645	dangerous	1692	hesitating	216	tentativeness	36
risks	45650	instability	1381	risked	205	qualm	30
uncertainty	33278	sticky	1371	unsafe	193	vagueness	26
variable	30566	tricky	1368	wager	171	equivocation	26
chance	25354	hazardous	1318	debatable	170	menace	20
pending	23947	queries	1020	dacey	169	scepticism	19
possibility	22695	danger	1002	undecided	161	indecisive	17
uncertainties	21623	vague	987	undetermined	160	vacillating	13
uncertain	16883	fluctuating	971	precarious	153	imperil	13
doubt	13983	unstable	841	apprehension	137	dodgy	12
bet	10708	query	791	indecision	136	gnarly	12
likelihood	8403	erratic	782	wavering	128	disquiet	9
variability	8152	unsettled	754	faltering	114	vacillation	9
exposed	6931	dilemma	729	iffy	111	equivocating	9
threat	6797	jeopardize	722	quandary	87	incalculable	8
probability	6760	unpredictability	685	hazy	84	unconfident	7
varying	3995	hesitancy	663	treacherous	76	ambivalence	6
unpredictable	3872	jeopardy	565	changeable	74	parlous	6
unclear	3766	unsure	509	hairy	68	diffident	5
speculative	3707	unresolved	462	insecurity	61	untrustworthy	5
fear	3516	suspicion	452	perilous	55	changeability	4
gamble	3137	riskier	443	riskiest	55	misgiving	4
hesitant	2849	irregular	374	dubious	51	undependable	3
reservation	2393	risking	305	wariness	43	fickleness	3
hazard	1937	chancy	279	oscillating	41	fitful	2
risky	1883	peril	266	unreliability	39	doubtfulness	1
tentative	1881	unreliable	265	riskiness	38	fluctuant	1
doubtful	1867	halting	224	insecure	37		

Single-word synonyms of 'risk', 'risky', 'uncertain', and 'uncertainty' from Oxford Dictionary, excluding 'question', 'unknown', 'venture,' and 'prospect'. Go [▶ back](#)



