

Managing Political Risk

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Motivation

- ▶ Shocks emanating from the political system are a major determinant of long-term economic growth (North, 1981; Acemoglu, Johnson & Robinson, 2001).
- ▶ Mounting evidence that political uncertainty also affects economic performance in developed economies. (Kelly, Pastor & Veronesi, 2016; Baker, Bloom & Davis 2016)
- ▶ **How do firms react to political uncertainty?**

Main issue:

- ▶ Lack of a firm-level measure of political uncertainty.

This paper:

- ▶ Develop a novel, firm-level, measure of political uncertainty based on textual analysis of conference call transcripts.
- ▶ Decompose political uncertainty by topic.
- ▶ Study (heterogeneous) reactions to political risk.

Main Findings

1. Firms that are more affected by political uncertainty experience more volatile stock returns.
2. Increases in political uncertainty are associated with less hiring and lower investment.
 - ▶ Particularly strong effects of uncertainty about tax reform, corporate regulations, and criminal law.
3. Firms react to political uncertainty by donating to political parties and engaging lobbyists.
 - ▶ More discussion of uncertainty about a given political topic → increased lobbying on that same topic.
 - ▶ Strongest elasticity of lobbying with respect to discussion of uncertainty about health care, energy, environment, tax reform, and corporate regulation.
 - ▶ Elasticity also stronger for firms based in states that receive more transfers from the federal government and that are relatively more corrupt.

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), Koijen, Philipson, and Uhlig (2016), Caldera & al. (2016)
- Document firm-level effects of political risk, including idiosyncratic political risk.

Outline

Measuring Political Uncertainty at the Firm Level

Political Uncertainty

Managing Political Uncertainty

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, often after earnings releases.
- ▶ Management presentation followed by Q&A with firm's analysts (0-70 questions, average duration one hour).
- ▶ Conversation typically centers around uncertainties that the firm is facing. (Hollander, 2010; Bowen, 2002, 2003; Matsumoto, 2011; Huang, 2015)
- ▶ Over the sample period, share of listed firms holding earnings conference calls increases from 42-72%.

Measuring Political Uncertainty

What share of the conversation between analysts and firm management centers on political uncertainty?

1. Identify a set of two-word combinations (“bigrams”) that are indicative of a discussion of a political topic, \mathbb{P}_T .
2. Count the number of occurrences of these bigrams in conjunction with a synonym for risk or uncertainty and divide by the total number of bigrams in the transcript:

$$pu_{it}^T = \frac{\sum_b^{B_{it}} (1[b \in \mathbb{P}_T] \times 1[|b - r| < 10])}{B_{it}},$$

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 .

Synonyms for Risk

Single-word synonyms of 'risk', 'risky', 'uncertain', and 'uncertainty' from Oxford Dictionary:

ambivalence, ambivalenttorn, apprehension, bet, chance, chanciness, chancy, changeability, changeable, changeableness, changeful, chariness, danger, dangerous, debatable, defenceless, dicey, diffidence, diffident, dilemma, disquiet, disquietude, dodgy, doubt, doubtful, doubtfulness, dubiety, dubious, endager, equivocating, equivocation, erratic, exposed, faltering, fear, fickleness, fitful, fitfulness, fluctuant, fluctuating, gamble, gnarly, hairy, halting, hazard, hazardous, hazy, hesitancy, hesitant, hesitating, iffy, imperil, incalculable, incertitude, inconstancy, indecision, indecisive, insecure, insecurity, instability, irregular, irresolute, irresolution, jeopardize, jeopardy, likelihood, menace, misgiving, niggle, oscillating, parlous, pending, peril, perilous, perilousness, possibility, precarious, precariousness, probability, prospect, qualm, quandary, queries, query, reservation, risk, risked, riskier, riskiest, riskiness, risking, risks, risky, scepticism, scruple, speculative, sticky, suspicion, tentative, tentativeness, threat, treacherous, tricky, uncertain, uncertainties, uncertainty, unclear, unconfident, undecided, undependable, undetermined, unforeseeable, unknown, unpredictability, unpredictable, unreliability, unreliable, unresolved, unsafe, unsettled, unstable, unsure, unsureness, untrustworthy, vacillating, vacillation, vague, vagueness, variability, variable, varying, venture, wager, wariness, wavering,

Note that we excluded 'question' and 'questions' from the list

Identifying Political Bigrams

- ▶ Select a training library for each political topic (health care, defense, ...) $T = 1, \dots, C$, as well as a set of bigrams \mathbb{N} appearing in non-political text.
- ▶ From each library, drop all bigrams that also appear in \mathbb{N} .
- ▶ Assign a score to each remaining bigram

$$s(b, T) = \frac{f_{b,T}}{B_T} \log(C/f_{b,Z})$$

where $f_{b,T}$ is the frequency of bigram b in training library T , B_T is the total number of bigrams in library T , and $f_{b,Z}$ is the number of libraries that contain bigram b . (Song & Wu, 2009; Manning & al. 2008)

- ▶ \mathbb{P}_T = set of bigrams with a score in the highest decile for library T .

Training Libraries

Non-Political Bigrams

- ▶ All bigrams contained in newspaper articles during sample period from NYT, USA Today, WSJ, and WP on the subject of “performance”, “ownership changes”, or “corporate actions” (Factiva).

Political Training Libraries

1. Newspaper-Based (pu_{it})

- One single library containing all articles from the same newspapers on the subject of “domestic politics”.

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

- 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, ...)

Other Data

For each firm and quarter/year

- ▶ Employment, investment, basic balance sheet information (Compustat)
- ▶ Lobbying expenses by topic and donations from (Center for Responsive Politics), manually match each of 80 topics from disclosure forms to our 24 topics of our topic-based measures.
- ▶ Implied volatility from OptionMetrics, stock return data from CRSP
- ▶ State corruption conviction rate of public officials from DoJ

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Top Bigrams – Newspaper-based

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|---------------------|---------------------|------------------|------------------|---------------------|------------------|
| the cia | 5.690 | 1 | these statements | 0.051 | 8891 |
| the constitution | 4.749 | 8 | on form | 0.034 | 7012 |
| the partys | 4.261 | 1 | future events | 0.026 | 3745 |
| for governor | 4.022 | 2 | and assumptions | 0.026 | 3682 |
| general election | 3.337 | 4 | detailed in | 0.197 | 3094 |
| the convention | 3.277 | 6 | this conference | 0.034 | 3003 |
| senate and | 3.251 | 22 | factors and | 0.051 | 2921 |
| national committee | 3.183 | 1 | are described | 0.026 | 2609 |
| the epa | 2.986 | 54 | your next | 0.026 | 1860 |
| of delegates | 2.575 | 1 | events or | 0.051 | 1788 |
| the faa | 2.302 | 10 | are discussed | 0.034 | 1719 |
| public schools | 2.285 | 1 | statements such | 0.026 | 1372 |
| governor and | 2.233 | 9 | statements as | 0.060 | 1287 |
| the voters | 2.216 | 3 | assumptions that | 0.068 | 1269 |
| president has | 2.208 | 4 | please see | 0.026 | 1212 |
| this election | 2.079 | 8 | and q | 0.034 | 1198 |
| the ethics | 1.977 | 3 | the heading | 0.051 | 1085 |
| of elections | 1.968 | 3 | future financial | 0.086 | 985 |
| national convention | 1.942 | 1 | expressed in | 0.171 | 948 |

58,000 bigrams in total. Same [tables](#) for 24 topics. Same [table](#) for health care

An Example

Archipelago Learning Inc. Q3-2010 earnings conference call:

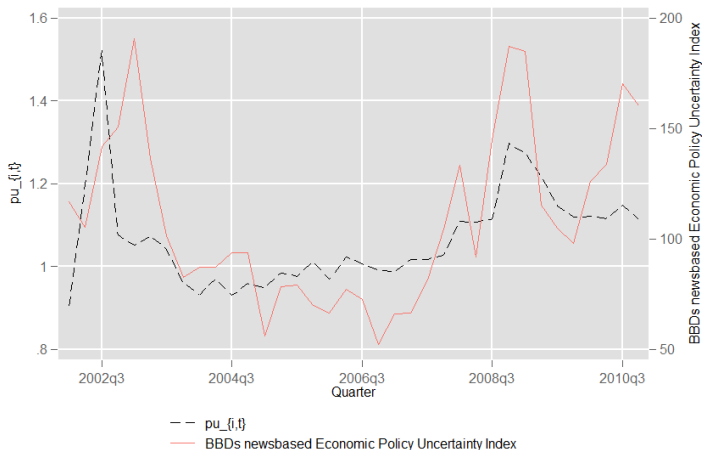
Learning for their Pre-K and math modules. Our high-impact and low-cost products continue to make a positive difference in teacher performance and student outcomes, and we continue to drive outstanding financial performance during difficult economic times. However, the K-12 budget environment continues to get tougher and the recent outcome of the elections only creates more uncertainty around near-term budgetary and education reform picture. Given that we have already experienced an extended sales cycle and delayed purchases in several key states this school year, we believe it's prudent to modestly lower our 2010 cash flow guidance for any potential softness in fourth-quarter invoice sales, which Jim will speak to in a few minutes. Looking ahead, we

...

year. Now let me provide a brief K-12 market update. State budgetary pressures, along with declining property taxes, continue to pressure educational funding. In addition, the expiration of the federal stimulus and the EduJobs bailout programs in 2011 and 2012 are expected to further tighten the spending picture. On top of this, we now have additional uncertainty over educational

Time Series

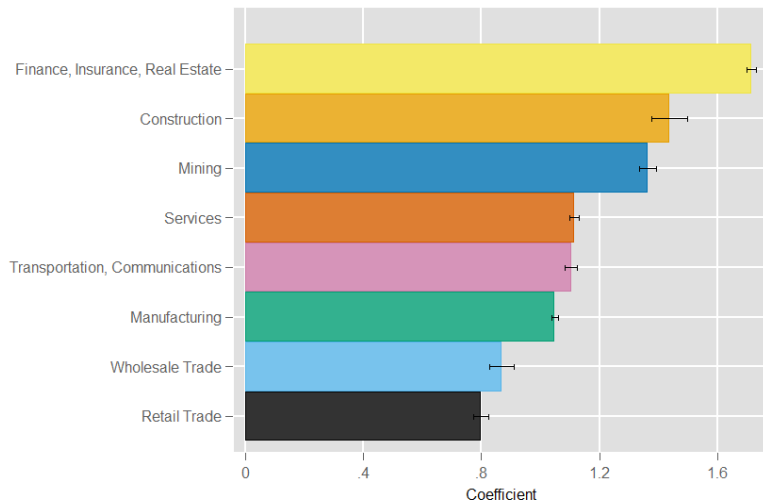
Firm average political uncertainty ($\sum_i pu_{it}$) vs Baker, Bloom & Davis (2016) news-based measure



Notes: Pearson corr=0.613 with p-value=0.000; small firms: Pearson corr=0.508 with p-value=0.002; large firms: Pearson corr=0.684 with p-value=0.000)

Cross Section

Regressing pu_{it} on SIC division effects:



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

Political Risk in the Political Cycle

| | $\rho u_{i,t}$ | | | |
|--|-----------------------|------------------------|-----------------------|-----------------------|
| | (1) | (2) | (3) | (4) |
| Presidential elections $_t$ | 0.0890*** (0.0126) | | | |
| Congressional elections $_{i,t}$ | 0.00997 (0.00751) | | | |
| State elections $_{i,t}$ | | 0.0273*** (0.00799) | 0.00548 (0.00999) | 0.0159* (0.00840) |
| $\mathbb{1}\{\text{close election result}\}_{s,t}$ | | | 0.0518*** (0.0166) | |
| $\mathbb{1}\{\text{ruling party changes}\}_{s,t}$ | | | | 0.0870*** (0.0239) |
| Year FE | no | no | no | no |
| Firm FE | yes | yes | yes | yes |
| Sector FE | no | no | no | no |
| Number of firms | 3,114 | 3,114 | 3,114 | 3,114 |
| Number of periods | 36 | 36 | 36 | 36 |
| R^2 | 0.351 | 0.351 | 0.351 | 0.351 |
| N | 72,189 | 72,189 | 72,189 | 72,189 |

Notes: All regressions control for the log of firm assets. Standard errors are clustered at the firm level.

Volatility of Stock Returns

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

| PANEL A: | | Realized volatility $_{i,t}$ (standardized) | | | |
|------------|------------------------|---|------------------------|------------------------|--|
| $pu_{i,t}$ | 0.0898*** (0.00719) | 0.0378*** (0.00625) | 0.0365*** (0.00574) | 0.0176*** (0.00447) | |
| R^2 | 0.108 | 0.466 | 0.491 | 0.640 | |
| N | 80,383 | 80,383 | 80,383 | 80,383 | |
| PANEL B: | | Implied volatility $_{i,t}$ (standardized) | | | |
| $pu_{i,t}$ | 0.106*** (0.00954) | 0.0514*** (0.00858) | 0.0404*** (0.00765) | 0.0170*** (0.00469) | |
| R^2 | 0.183 | 0.449 | 0.499 | 0.733 | |
| N | 56,249 | 56,249 | 56,249 | 56,249 | |
| Time FE | no | yes | yes | yes | |
| Firm FE | no | no | no | yes | |
| Sector FE | no | no | yes | no | |

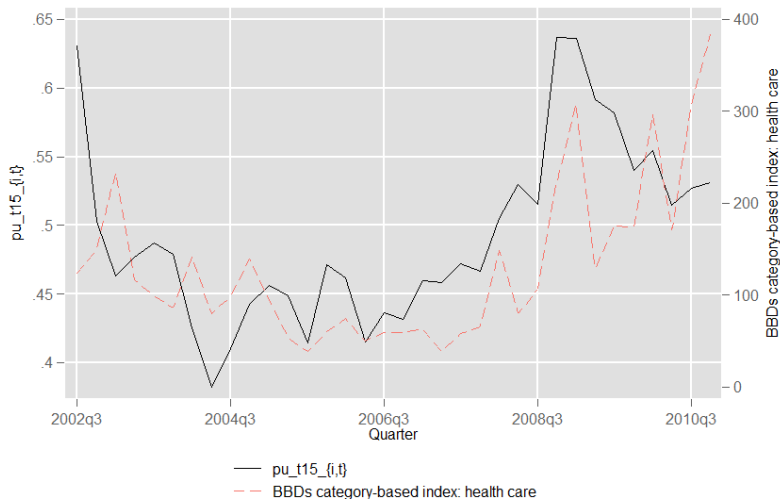
Notes: All regressions control for the log of firm assets. S.e. clustered at firm level.

Top Bigrams – Topic-based – Health care

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|-------------------|---------------------|------------------|----------------|---------------------|------------------|
| part d | 211.612 | 95 | the market | 21.083 | 5784 |
| prescription drug | 189.985 | 22 | information on | 15.112 | 2158 |
| medicare part | 174.580 | 22 | cost of | 10.925 | 1883 |
| health insurance | 169.624 | 116 | the cost | 21.650 | 1743 |
| care plan | 131.348 | 3 | costs and | 12.897 | 1523 |
| health care | 128.662 | 344 | about million | 10.794 | 1357 |
| of health | 125.470 | 63 | the fda | 21.161 | 942 |
| childrens health | 111.096 | 1 | plans and | 18.727 | 916 |
| have health | 108.428 | 4 | have got | 14.981 | 680 |
| generic drugs | 91.324 | 7 | is certainly | 10.581 | 627 |
| drugs from | 87.173 | 3 | year or | 10.581 | 593 |
| their health | 87.117 | 18 | what kind | 13.972 | 551 |
| for medicare | 84.333 | 20 | quality of | 16.200 | 545 |
| from canada | 80.148 | 14 | to buy | 37.397 | 524 |
| the uninsured | 78.309 | 10 | the program | 20.012 | 497 |
| drug benefit | 76.709 | 11 | the quality | 13.269 | 447 |
| private health | 74.720 | 1 | the costs | 12.063 | 427 |
| the medicare | 74.064 | 133 | research and | 10.747 | 383 |
| insurance program | 69.694 | 14 | quality and | 12.553 | 351 |

Time Series – Topic-based – Health Care

Firm average political uncertainty about health care ($\sum_i pu_{it}^{HC}$) vs BBD healthcare component (corr=0.529)



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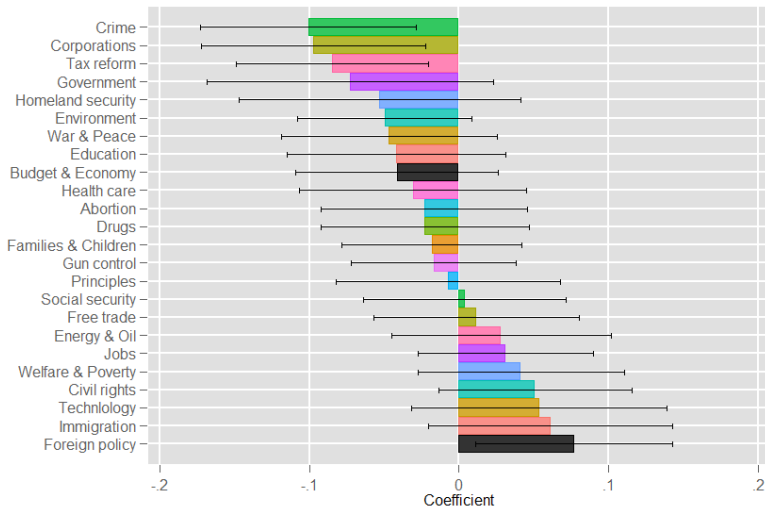
Hiring & Investment

| | $\Delta \text{emp}_{i,t} / \text{emp}_{i,t-1} * 100$ | | | $I_{i,t} / K_{i,t-1} * 100$ | | |
|---|--|----------------------|----------------------|-----------------------------|-----------------------|-----------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| $pu_{i,t}$ | -0.768*** (0.181) | -0.619*** (0.179) | -1.028*** (0.267) | -0.138*** (0.0405) | -0.0975** (0.0396) | -0.177*** (0.0535) |
| $pu_{i,t} \times \mathbb{1}\{\text{assets}_{i,t} > \text{p50 assets}\}$ | | | 0.641* (0.343) | | | 0.105 (0.0800) |
| $\mathbb{1}\{\text{assets}_{i,t} > \text{p50 assets}\}$ | | | 2.726*** (0.870) | | | 1.188*** (0.275) |
| Log of assets $_{i,t}$ | | 6.208*** (0.494) | | | 2.519*** (0.171) | |
| Time FE | yes | yes | yes | yes | yes | yes |
| Firm FE | yes | yes | yes | yes | yes | yes |
| Sector FE | no | no | no | no | no | no |
| Number of firms | 3,544 | 3,544 | 3,544 | 2,567 | 2,567 | 2,567 |
| Number of periods | 9 | 9 | 9 | 36 | 36 | 36 |
| R^2 | 0.332 | 0.342 | 0.334 | 0.295 | 0.309 | 0.296 |
| N | 22,199 | 22,199 | 22,199 | 55,270 | 55,265 | 55,265 |

Notes: Standard errors are clustered at the firm level.

Investment by Topic

$$I_{i,t}/K_{i,t-1} * 100 = \delta_i + \delta_t + \sum_T \beta^T pu_{it}^T + \gamma' X_{it} + \epsilon_{it}$$



Donations & Lobbying

| | Log(\$ donation) $_{i,t}$ | | # of recipients $_{i,t}$ | Hedge $_{i,t}$ | Log(\$ lobby) $_{i,t}$ | |
|-------------------|---------------------------|--------------------|--------------------------|------------------------|------------------------|---------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| $pu_{i,t}$ | 0.0814** (0.0414) | 0.0205 (0.0170) | 1.642*** (0.555) | 0.00527** (0.00262) | 0.0341 (0.0373) | 0.0198* (0.0110) |
| Time FE | yes | yes | yes | yes | yes | yes |
| Firm FE | no | yes | no | no | no | yes |
| Sector FE | yes | no | yes | yes | yes | no |
| Number of firms | 3,692 | 3,692 | 3,692 | 3,692 | 3,651 | 3,651 |
| Number of periods | 9 | 9 | 9 | 9 | 36 | 36 |
| R^2 | 0.324 | 0.917 | 0.204 | 0.180 | 0.294 | 0.841 |
| N | 23,840 | 23,840 | 23,840 | 23,840 | 82,553 | 82,553 |

Notes: All regressions control for the log of firm assets. Standard errors are clustered at the firm level. ***, **, and * denote statistical significance at the 1, 5, and 10% level, respectively.

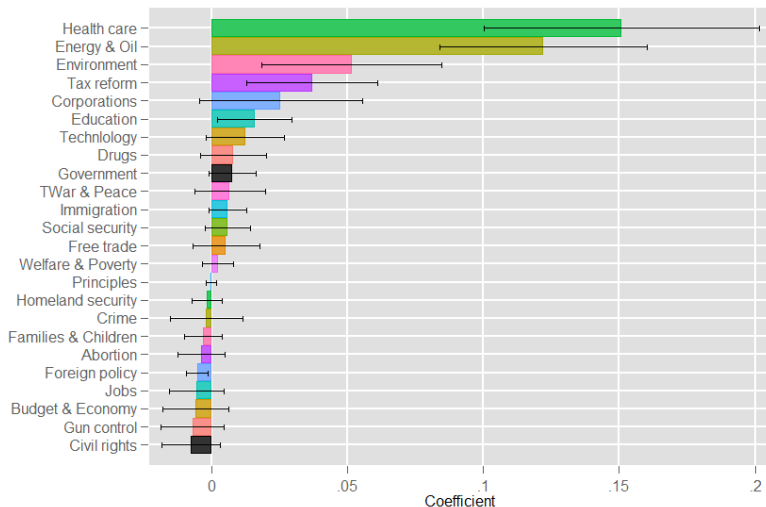
Lobbying by Topic

$$\text{Lobbying}_{it}^T = \delta_i + \delta_t + \delta_T + \beta pu_{it}^T + \gamma' X_{it} + \epsilon_{it}$$

| | Log of lobby expense $_{i,t}^T$ | | |
|------------------------|---------------------------------|------------------------|------------------------|
| | (1) | (2) | (3) |
| $pu_{i,t}^T$ | 0.0329*** (0.00236) | 0.0339*** (0.00223) | 0.0189*** (0.00216) |
| Log of assets $_{i,t}$ | 0.0604*** (0.00259) | 0.0230*** (0.00394) | 0.0225*** (0.00394) |
| Year-quarter FE | yes | yes | yes |
| Firm FE | no | yes | yes |
| Topic FE | no | no | yes |
| Sector FE | yes | no | no |
| Number of firms | 3,651 | 3,651 | 3,651 |
| Number of periods | 36 | 36 | 36 |
| R^2 | 0.013 | 0.037 | 0.056 |
| N | 1,981,272 | 1,981,272 | 1,981,272 |

Heterogeneity by Topic

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



Heterogeneity by State and Over Time

| | Log of lobby expense $\bar{e}_{i,t}^T$ | | | | | |
|---|--|------------------------|------------------------|------------------------|------------------------|------------------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| $\rho u_{i,t}^T$ | -0.000569 (0.00182) | 0.0200*** (0.00261) | 0.0171*** (0.00292) | 0.0230*** (0.00258) | 0.0227*** (0.00257) | 0.0221*** (0.00253) |
| $\rho u_{i,t}^T \times 1\{\text{av firm assets} > \text{p50}\}_i$ | 0.0388*** (0.00418) | | | | | |
| $\rho u_{i,t}^T \times 1\{\text{av dependence} > \text{p50}\}_{s,t}$ | | 0.0127* (0.00654) | | | | |
| $\rho u_{i,t}^T \times 1\{\text{av state corruption rate} > \text{p50}\}_{s,t}$ | | | 0.0108*** (0.00396) | | | |
| $\rho u_{i,t}^T \times 1\{\text{federal election quarter}\}_t$ | | | | -0.00267 (0.00234) | | |
| $\rho u_{i,t}^T \times 1\{\text{state election year}\}_{s,t}$ | | | | | -0.00108 (0.00231) | |
| $\rho u_{i,t}^T \times 1\{\text{incumbent not candidate}\}_{s,t}$ | | | | | | 0.00165 (0.00357) |
| Log assets $_{i,t}$ | | 0.0264*** (0.00436) | 0.0264*** (0.00436) | 0.0264*** (0.00436) | 0.0264*** (0.00436) | 0.0264*** (0.00436) |
| Year-quarter FE | yes | yes | yes | yes | yes | yes |
| Firm FE | yes | yes | yes | yes | yes | yes |
| Topic FE | yes | yes | yes | yes | yes | yes |
| Number of firms | 3,651 | 3,114 | 3,114 | 3,114 | 3,114 | 3,114 |
| Number of periods | 36 | 36 | 36 | 36 | 36 | 36 |
| R^2 | 0.057 | 0.057 | 0.057 | 0.057 | 0.057 | 0.057 |
| N | 1,981,272 | 1,732,536 | 1,732,536 | 1,732,536 | 1,732,536 | 1,732,536 |

Notes: Standard errors are clustered at the firm level.

Conclusion

- ▶ Introduced simple, firm-level measure of political risk.
- ▶ Firms that are more affected by political uncertainty experience more volatile stock returns.
- ▶ Increases in political uncertainty are associated with less hiring and lower investment.
 - ▶ Particularly strong effects of uncertainty about tax reform, corporate regulations, and criminal law.
- ▶ Firms react to political uncertainty by donating to political parties and engaging lobbyists.
 - ▶ More discussion of uncertainty about a given political topic → increased lobbying on that same topic.
 - ▶ Strongest elasticity of lobbying with respect to discussion of uncertainty about health care, energy, environment, tax reform, and corporate regulation.
 - ▶ Elasticity also stronger for firms based in states that receive more transfers from the federal government and that are relatively more corrupt.

Appendix

Table: Panel A; summary statistics: firm-year units

| | Mean | Median | St. dev. | Min | Max | <i>N</i> |
|--|----------|----------|----------|----------|----------|----------|
| $pu_{i,t}$ | .0006875 | .0005687 | .0005387 | 0 | .0157176 | 24,262 |
| Log of assets $_{i,t}$ | 7.021231 | 6.925641 | 2.079447 | .1646666 | 14.93574 | 23,840 |
| $\Delta emp_{i,t}/emp_{i,t-1}$ | .0553584 | .0265487 | .187514 | -.5 | 1 | 22,199 |
| $\Delta emp_{i,t}/(0.5 * (emp_{i,t} + emp_{i,t-1}))$ (as in BBD) | .0431014 | .0269227 | .2329655 | -2 | 2 | 22,732 |
| Log donation expense $_{i,t}$ | 2.145331 | 0 | 4.303383 | 0 | 14.94421 | 24,262 |
| Number of donations $_{i,t}$ | 13.31131 | 0 | 57.71738 | 0 | 1387 | 24,262 |
| Donation \$ Republicans / Donation \$ Democrats $_{i,t}$ | .0955816 | 0 | .2940226 | 0 | 1 | 24,262 |

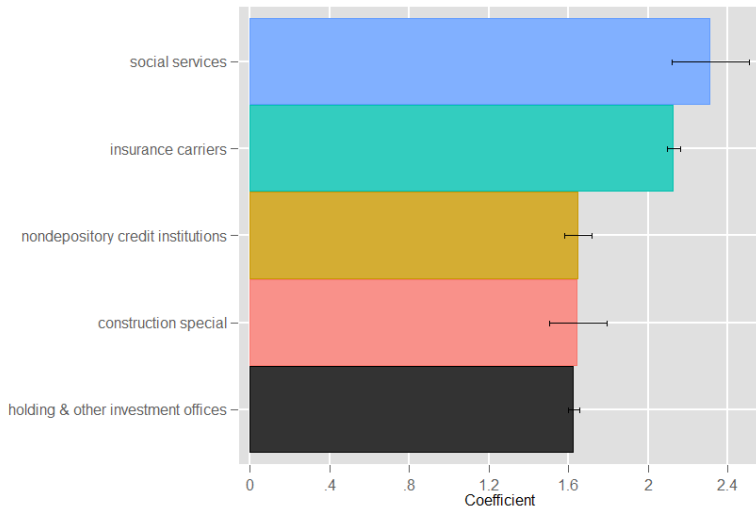
Table: Panel B; summary statistics: firm-quarter units

| | Mean | Median | St. dev. | Min | Max | <i>N</i> |
|---|----------|----------|----------|-----------|----------|----------|
| $pu_{i,t}$ | .0006788 | .0005298 | .0006315 | 0 | .0157176 | 85,165 |
| Realized volatility $_{i,t}$ | .0300982 | .0250032 | .0205403 | .000999 | 1.162727 | 81,323 |
| Implied volatility $_{i,t}$ | .444341 | .399025 | .2152438 | .011128 | 1.99572 | 56,519 |
| Log lobby expense $_{i,t}$ | 2.442493 | 0 | 4.879416 | 0 | 16.76468 | 85,165 |
| Log of assets $_{i,t}$ | 7.093859 | 6.991712 | 2.014259 | .6124793 | 15.10848 | 82,553 |
| $l_{i,t}/K_{i,t-1}$ | .0956922 | .0833773 | .0672292 | -.0997141 | .399977 | 55,270 |
| $\mathbb{1}\{\text{Presidential election}\}_t$ | .0591885 | 0 | .2359788 | 0 | 1 | 72,210 |
| $\mathbb{1}\{\text{House or Senate election}\}_{i,t}$ | .2036422 | 0 | .4027087 | 0 | 1 | 72,210 |
| $\mathbb{1}\{\text{Gubernatorial election}\}_{i,t}$ | .2948068 | 0 | .455959 | 0 | 1 | 72,210 |
| $\mathbb{1}\{\text{Close election result (< 5%)}\}_{i,t}$ | .1228362 | 0 | .3282513 | 0 | 1 | 72,210 |
| $\mathbb{1}\{\text{Ruling party changes}\}_{i,t}$ | .1461709 | 0 | .3532799 | 0 | 1 | 72,210 |

Table: Panel C; summary statistics: firm-topic-quarter units

| | Mean | Median | St. dev. | Min | Max | <i>N</i> |
|---|----------|----------|----------|----------|----------|-----------|
| $pu_{i,t}^T$ | .000059 | 0 | .0001417 | 0 | .0075173 | 2,043,960 |
| Log lobby expense $_{i,t}^T$ | .1061151 | 0 | 1.108566 | 0 | 16.76468 | 2,043,960 |
| Log assets $_{i,t}$ | 7.093859 | 6.991712 | 2.014247 | .6124793 | 15.10848 | 1,981,272 |
| $\mathbb{1}\{\text{assets} > \text{p50}(\text{assets})\}_{i,t}$ | .4999818 | 0 | .5000001 | 0 | 1 | 1,981,272 |
| $\mathbb{1}\{\text{average state dependence} > \text{p50}(\text{average state dependence})\}_s$ | .179712 | 0 | .3839475 | 0 | 1 | 1,733,040 |
| $\mathbb{1}\{\text{average corruption rate} > \text{p50}(\text{all average corruption rate})\}_s$ | .4842681 | 0 | .4997526 | 0 | 1 | 1,733,040 |
| $\mathbb{1}\{\text{election year}\}_{s,t}$ | .2948068 | 0 | .455956 | 0 | 1 | 1,733,040 |
| $\mathbb{1}\{\text{incumbent not candidate}\}_{s,t}$ | .1461709 | 0 | .3532776 | 0 | 1 | 1,733,040 |

Figure: Bar chart of top 5 two-digit SIC industries



Go back to original [▶ chart](#)

Top Bigrams: Topic 1 = Abortion

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|-------------------|--------------|-----------|------------------|--------------|-----------|
| stem cell | 429.162 | 20 | in china | 24.842 | 1005 |
| embryonic stem | 394.324 | 3 | the fda | 36.644 | 942 |
| a womans | 248.266 | 5 | the period | 31.409 | 541 |
| stem cells | 196.699 | 8 | in circumstances | 24.645 | 511 |
| planning services | 177.983 | 1 | services and | 33.230 | 474 |
| pregnant woman | 167.513 | 1 | there could | 24.645 | 470 |
| of unintended | 157.044 | 1 | that affect | 27.585 | 430 |
| litmus test | 157.044 | 1 | this area | 31.409 | 349 |
| cell lines | 115.166 | 2 | has changed | 23.261 | 190 |
| the pregnant | 94.226 | 2 | the life | 53.406 | 189 |
| this research | 90.366 | 4 | rates of | 23.261 | 175 |
| the stem | 83.757 | 5 | cover the | 27.851 | 162 |
| of roe | 83.757 | 7 | the court | 24.033 | 161 |
| womens health | 82.151 | 8 | right to | 21.425 | 156 |
| woman is | 73.936 | 5 | health of | 25.943 | 149 |
| of reproductive | 73.287 | 1 | life and | 28.647 | 147 |
| the fetus | 73.287 | 7 | and various | 24.645 | 140 |
| the roe | 73.287 | 28 | services that | 26.174 | 134 |
| exception for | 73.287 | 3 | the lines | 23.842 | 132 |

Top Bigrams: Topic 2 = Budget & Economy

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|------------------------|--------------|-----------|----------------|--------------|-----------|
| freddie mac | 70.817 | 23 | the market | 23.356 | 5784 |
| home values | 64.379 | 9 | the economy | 36.971 | 2847 |
| deficit in | 60.725 | 4 | interest rate | 21.618 | 2829 |
| fannie mae | 59.449 | 33 | and financial | 11.678 | 2262 |
| interest rates | 58.202 | 1524 | the economic | 13.651 | 2182 |
| the subprime | 57.941 | 86 | the financial | 24.321 | 1815 |
| debt by | 54.044 | 40 | fiscal year | 18.708 | 1762 |
| the deficit | 52.316 | 17 | the credit | 11.617 | 1560 |
| buy up | 51.503 | 2 | interest rates | 58.202 | 1524 |
| balanced budget | 49.374 | 2 | the biggest | 15.926 | 1477 |
| their homes | 49.374 | 18 | our financial | 27.022 | 1291 |
| and freddie | 48.640 | 28 | offset by | 12.307 | 1219 |
| subprime mortgages | 48.640 | 12 | identified in | 10.809 | 1211 |
| discretionary spending | 46.711 | 95 | economy and | 16.927 | 1141 |
| the housing | 45.426 | 230 | the growth | 26.041 | 991 |
| tax cuts | 44.236 | 5 | of credit | 16.213 | 852 |
| credit card | 42.181 | 254 | risk in | 12.876 | 847 |
| the fundamentals | 42.040 | 97 | understand the | 11.225 | 750 |
| wall street | 41.382 | 109 | or do | 10.913 | 693 |

Top Bigrams: Topic 3 = Civil rights

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|--------------------|--------------|-----------|-------------------|--------------|-----------|
| affirmative action | 350.570 | 1 | today will | 20.707 | 559 |
| man and | 110.179 | 5 | statement and | 20.707 | 295 |
| the flag | 95.155 | 2 | a contract | 17.593 | 249 |
| a woman | 83.013 | 12 | benefited from | 23.400 | 242 |
| the patriot | 75.122 | 5 | el paso | 20.707 | 183 |
| a man | 71.305 | 11 | a factor | 17.593 | 177 |
| domestic partners | 69.024 | 2 | the south | 19.544 | 176 |
| the civil | 65.106 | 17 | of businesses | 20.033 | 160 |
| dont tell | 63.738 | 6 | the protection | 17.593 | 158 |
| is between | 60.098 | 51 | the legal | 20.192 | 152 |
| to marry | 55.219 | 8 | employees and | 24.911 | 150 |
| constitution of | 55.219 | 1 | ownership of | 21.992 | 145 |
| union of | 55.090 | 2 | understanding the | 23.177 | 115 |
| their spouses | 52.780 | 3 | wondering how | 20.707 | 112 |
| of equal | 52.780 | 9 | still feel | 17.593 | 105 |
| the aclu | 52.780 | 1 | definition of | 25.019 | 104 |
| a constitutional | 52.586 | 1 | the resolution | 31.309 | 103 |
| south carolina | 52.182 | 60 | state your | 17.593 | 102 |
| the equal | 50.701 | 3 | the defense | 31.139 | 98 |

Top Bigrams: Topic 4 = Corporations

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|--------------------|--------------|-----------|----------------|--------------|-----------|
| bain capital | 157.334 | 3 | the company | 35.250 | 9827 |
| timber company | 148.079 | 3 | the sec | 29.048 | 6854 |
| filing for | 130.716 | 96 | the business | 23.500 | 4433 |
| a timber | 129.569 | 2 | business and | 42.489 | 4084 |
| small businesses | 116.571 | 44 | the economy | 19.248 | 2847 |
| small business | 110.029 | 133 | in todays | 21.076 | 2244 |
| subsidy for | 109.732 | 1 | business is | 27.765 | 1626 |
| wall street | 93.358 | 109 | operations and | 36.577 | 1432 |
| on corporations | 92.550 | 1 | our financial | 24.385 | 1291 |
| companies which | 87.144 | 40 | that business | 37.020 | 1191 |
| which move | 87.144 | 3 | the sales | 21.076 | 939 |
| bankruptcy to | 87.144 | 1 | natural gas | 27.765 | 917 |
| auto industry | 83.295 | 31 | tax rate | 58.561 | 911 |
| for bankruptcy | 73.155 | 24 | a small | 26.613 | 691 |
| domestic companies | 73.155 | 3 | business the | 24.620 | 651 |
| counted as | 72.620 | 4 | and operating | 29.048 | 602 |
| corporate tax | 72.075 | 10 | go up | 29.280 | 601 |
| of corporate | 65.652 | 195 | the tax | 24.395 | 566 |
| for companies | 65.522 | 89 | and services | 21.076 | 503 |

Top Bigrams: Topic 5 = Crime

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|-------------------|--------------|-----------|-------------------|--------------|-----------|
| the death | 258.351 | 8 | release for | 35.325 | 574 |
| three strikes | 157.567 | 2 | remind everyone | 45.019 | 231 |
| local law | 140.968 | 3 | in product | 35.325 | 224 |
| justice system | 123.803 | 1 | services to | 44.853 | 171 |
| to death | 118.616 | 20 | distribution and | 35.325 | 145 |
| all capital | 112.548 | 7 | our books | 45.019 | 130 |
| on death | 112.548 | 1 | in capital | 52.987 | 126 |
| law enforcement | 105.422 | 37 | a current | 59.308 | 104 |
| criminal justice | 97.920 | 3 | or has | 35.325 | 78 |
| the byrd | 90.038 | 1 | product liability | 70.650 | 70 |
| second chance | 79.839 | 3 | proceedings and | 35.325 | 69 |
| the beat | 76.892 | 1 | put to | 45.019 | 56 |
| the criminal | 76.892 | 3 | ago or | 35.325 | 46 |
| the fbi | 71.215 | 2 | law enforcement | 105.422 | 37 |
| product liability | 70.650 | 70 | the person | 44.853 | 37 |
| for criminals | 70.650 | 1 | terms for | 59.308 | 36 |
| crime and | 70.484 | 8 | the hiring | 51.261 | 35 |
| who commit | 69.859 | 1 | is pending | 35.325 | 35 |
| for adult | 67.529 | 2 | continues on | 35.325 | 32 |

Top Bigrams: Topic 6 = Drugs

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|-------------------|--------------|-----------|--------------------------|--------------|-----------|
| illegal drugs | 248.295 | 1 | demand for | 47.750 | 1381 |
| in colombia | 211.270 | 15 | identified in | 35.471 | 1211 |
| on drugs | 183.948 | 1 | okay so | 26.925 | 714 |
| for drug | 175.012 | 7 | million from | 38.124 | 442 |
| drug testing | 169.016 | 8 | and cash | 42.254 | 439 |
| of drug | 168.619 | 28 | other thing | 26.925 | 373 |
| drug treatment | 124.148 | 2 | exposed to | 26.925 | 370 |
| to grams | 107.700 | 2 | implementation of | 27.469 | 343 |
| certify against | 107.700 | 1 | the implementation | 38.124 | 279 |
| resellers to | 107.700 | 1 | demand in | 42.254 | 269 |
| all retailers | 107.700 | 5 | is down | 35.812 | 262 |
| minimum threshold | 107.700 | 1 | as discussed | 26.925 | 249 |
| on drug | 107.303 | 6 | has increased | 26.925 | 235 |
| the combat | 106.412 | 1 | answer that | 30.658 | 229 |
| retailers who | 106.412 | 11 | these products | 30.658 | 223 |
| license number | 105.635 | 1 | most likely | 40.387 | 220 |
| clarify that | 105.635 | 58 | international operations | 42.254 | 211 |
| possession of | 95.832 | 6 | the drug | 95.310 | 207 |
| the drug | 95.310 | 207 | production in | 35.471 | 204 |

Top Bigrams: Topic 7 = Education

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|---------------------|--------------|-----------|-----------------|--------------|-----------|
| charter schools | 332.383 | 7 | quarter of | 12.886 | 3510 |
| pell grants | 236.503 | 1 | results and | 32.465 | 3128 |
| public schools | 198.970 | 1 | this conference | 16.292 | 3003 |
| private school | 162.923 | 6 | line of | 20.185 | 1957 |
| math and | 148.410 | 10 | a high | 16.622 | 1801 |
| teachers and | 126.266 | 2 | million for | 13.002 | 971 |
| and math | 121.448 | 1 | the top | 20.496 | 647 |
| schools to | 112.683 | 6 | the performance | 16.098 | 638 |
| private schools | 108.664 | 1 | to read | 27.010 | 611 |
| public school | 103.810 | 2 | starting to | 13.913 | 597 |
| of education | 103.090 | 17 | performance in | 21.463 | 544 |
| education funding | 102.272 | 2 | by million | 18.099 | 514 |
| public education | 102.032 | 15 | our public | 48.877 | 513 |
| student achievement | 97.754 | 1 | number one | 13.239 | 471 |
| on education | 97.754 | 5 | and competitive | 16.098 | 470 |
| charter school | 97.754 | 6 | global economy | 25.772 | 452 |
| schools that | 93.903 | 5 | improve our | 18.551 | 450 |
| teachers who | 89.608 | 1 | competition and | 16.108 | 448 |
| elementary and | 89.608 | 1 | areas that | 14.447 | 304 |

Top Bigrams: Topic 8 = Energy & Oil

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|---------------------|--------------|-----------|-----------------|--------------|-----------|
| global warming | 280.911 | 12 | a million | 13.759 | 1392 |
| nuclear power | 250.104 | 31 | demand for | 17.742 | 1381 |
| climate change | 211.684 | 37 | sale of | 13.339 | 1254 |
| natural gas | 183.410 | 917 | reliance on | 23.343 | 1184 |
| clean energy | 182.260 | 34 | environment and | 33.869 | 1153 |
| greenhouse gas | 182.260 | 18 | economy and | 15.876 | 1141 |
| energy independence | 150.805 | 3 | natural gas | 183.410 | 917 |
| oil imports | 133.389 | 1 | the development | 15.618 | 856 |
| dependence on | 129.849 | 389 | the price | 15.208 | 838 |
| our dependence | 127.401 | 55 | from such | 26.359 | 800 |
| greenhouse gases | 124.192 | 3 | reduce our | 26.376 | 787 |
| renewable energy | 113.381 | 30 | the environment | 48.665 | 753 |
| power plants | 110.115 | 44 | prices and | 17.742 | 722 |
| gas emissions | 109.829 | 3 | oil and | 86.684 | 683 |
| of energy | 106.240 | 103 | investments in | 17.614 | 574 |
| clean coal | 101.042 | 17 | to develop | 17.993 | 569 |
| of greenhouse | 99.432 | 1 | gas prices | 30.013 | 546 |
| carbon emissions | 99.432 | 3 | of market | 14.785 | 528 |
| on foreign | 97.375 | 36 | by million | 14.818 | 514 |

Top Bigrams: Topic 9 = Environment

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|----------------------|--------------|-----------|------------------|--------------|-----------|
| clean air | 201.331 | 14 | environment and | 76.681 | 1153 |
| the animal | 136.913 | 18 | industry and | 21.300 | 789 |
| air act | 126.381 | 4 | the environment | 113.239 | 753 |
| great lakes | 126.381 | 61 | the cash | 30.566 | 667 |
| the environment | 113.239 | 753 | discussion and | 26.844 | 590 |
| acres of | 106.093 | 60 | environment is | 26.844 | 453 |
| cash for | 105.318 | 93 | a market | 23.803 | 428 |
| the clean | 99.339 | 29 | environment that | 21.064 | 368 |
| water pollution | 94.786 | 1 | last couple | 21.064 | 359 |
| environmental health | 94.786 | 1 | quality and | 21.232 | 351 |
| mercury rule | 93.954 | 3 | and management | 31.595 | 283 |
| mercury emissions | 93.954 | 1 | the health | 29.013 | 237 |
| the epa | 93.954 | 54 | this program | 30.566 | 233 |
| in mercury | 93.954 | 2 | the settlement | 21.064 | 215 |
| clean water | 91.698 | 2 | the commission | 21.300 | 214 |
| air and | 88.411 | 27 | the land | 30.566 | 206 |
| trade in | 88.411 | 18 | sources of | 24.484 | 191 |
| for clunkers | 84.254 | 7 | some new | 35.364 | 168 |
| the conservation | 84.254 | 3 | protection of | 22.924 | 154 |

Top Bigrams: Topic 10 = Families & Children

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|------------------------|--------------|-----------|-------------------|--------------|-----------|
| child welfare | 207.185 | 1 | the industry | 49.319 | 1873 |
| welfare system | 162.570 | 1 | the fda | 25.898 | 942 |
| children from | 122.903 | 2 | opportunities and | 29.489 | 677 |
| foster care | 121.928 | 1 | year there | 40.643 | 304 |
| for adoption | 103.592 | 3 | signs of | 29.489 | 280 |
| entertainment products | 103.592 | 3 | to balance | 32.880 | 244 |
| entertainment media | 101.606 | 2 | the internet | 35.432 | 237 |
| child support | 91.857 | 1 | most likely | 38.847 | 220 |
| head start | 91.857 | 6 | part to | 25.898 | 202 |
| conference on | 91.857 | 5 | the distribution | 34.118 | 201 |
| the christian | 88.466 | 1 | evaluation of | 25.898 | 169 |
| the entertainment | 85.295 | 14 | and strong | 27.503 | 160 |
| pregnancy and | 85.295 | 4 | technologies and | 34.446 | 154 |
| their children | 84.181 | 2 | call a | 25.898 | 132 |
| whats coming | 81.285 | 8 | to watch | 29.489 | 129 |
| video games | 81.285 | 8 | represent the | 30.726 | 129 |
| two parents | 77.694 | 1 | these programs | 25.898 | 123 |
| on families | 77.694 | 3 | be with | 34.446 | 115 |
| on family | 73.722 | 4 | recent report | 29.489 | 111 |

Top Bigrams: Topic 11 = Foreign policy

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|-----------------|--------------|-----------|-------------------|--------------|-----------|
| nuclear weapons | 119.610 | 1 | second half | 10.990 | 1570 |
| north korea | 111.775 | 11 | the global | 12.622 | 1105 |
| human rights | 101.638 | 1 | be very | 11.178 | 1086 |
| government of | 71.412 | 36 | in china | 24.925 | 1005 |
| the russian | 59.967 | 44 | its very | 12.775 | 714 |
| with russia | 59.805 | 5 | and development | 15.650 | 682 |
| of freedom | 59.526 | 5 | president of | 11.651 | 550 |
| and ukraine | 56.024 | 4 | in north | 32.290 | 547 |
| of israel | 50.742 | 1 | working with | 15.535 | 510 |
| georgia and | 50.742 | 27 | agreement with | 22.156 | 416 |
| south africa | 47.844 | 76 | my mind | 12.395 | 412 |
| cold war | 47.081 | 3 | activity in | 13.839 | 376 |
| of nuclear | 45.520 | 23 | the international | 35.130 | 373 |
| our troops | 45.520 | 5 | so to | 15.948 | 369 |
| the taiwan | 43.960 | 12 | and political | 15.948 | 351 |
| republic of | 43.857 | 62 | relationship with | 15.948 | 333 |
| in africa | 43.468 | 20 | the north | 37.185 | 328 |
| with china | 43.468 | 34 | in asia | 13.839 | 326 |
| the region | 42.018 | 208 | china and | 39.664 | 324 |

Top Bigrams: Topic 12 = Free trade

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|--------------------|--------------|-----------|-----------------------|--------------|-----------|
| trade agreement | 605.692 | 1 | our products | 54.454 | 817 |
| free trade | 565.019 | 1 | intellectual property | 69.398 | 635 |
| a trade | 223.071 | 21 | entered into | 69.143 | 516 |
| trade barriers | 208.195 | 1 | global economy | 41.167 | 452 |
| labor and | 182.850 | 128 | north american | 49.388 | 444 |
| the wto | 171.422 | 2 | agreement with | 82.335 | 416 |
| trade with | 164.821 | 13 | our markets | 30.768 | 387 |
| the trade | 164.821 | 69 | our competitors | 40.841 | 381 |
| open markets | 159.994 | 1 | of canada | 34.284 | 375 |
| duties on | 136.136 | 5 | china and | 73.698 | 324 |
| fast track | 128.408 | 16 | the chinese | 29.633 | 257 |
| central america | 114.281 | 13 | markets for | 86.748 | 250 |
| our trade | 108.653 | 25 | latin america | 30.768 | 243 |
| trade restrictions | 104.098 | 6 | to open | 31.722 | 217 |
| each participating | 104.098 | 1 | new markets | 68.612 | 191 |
| in jordan | 104.098 | 2 | the agreement | 64.204 | 184 |
| global trading | 104.098 | 5 | patents and | 29.633 | 173 |
| on trade | 102.853 | 10 | to different | 29.633 | 170 |
| tariffs on | 95.295 | 1 | our trading | 34.699 | 156 |

Top Bigrams: Topic 13 = Government

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|--------------------|--------------|-----------|------------------|--------------|-----------|
| public financing | 114.331 | 1 | statements are | 15.758 | 16258 |
| the lineitem | 100.410 | 1 | these statements | 13.388 | 8889 |
| voter registration | 68.283 | 1 | reform act | 16.735 | 5400 |
| for representation | 53.552 | 2 | section of | 13.388 | 2223 |
| financing of | 53.421 | 42 | that theres | 12.748 | 1533 |
| the polls | 53.421 | 2 | be considered | 33.994 | 1404 |
| the ethics | 52.525 | 3 | statements as | 13.388 | 1287 |
| of columbia | 50.205 | 19 | to these | 12.748 | 1014 |
| from federal | 48.502 | 3 | types of | 11.848 | 841 |
| spending limits | 46.858 | 4 | the general | 11.951 | 722 |
| term limits | 46.858 | 1 | ceo and | 13.228 | 666 |
| of representation | 46.858 | 1 | potential for | 13.388 | 625 |
| general elections | 46.858 | 2 | coming from | 10.589 | 621 |
| suppress the | 44.093 | 1 | size of | 13.599 | 573 |
| representation in | 44.093 | 6 | the size | 16.790 | 564 |
| voting rights | 43.511 | 4 | company in | 13.228 | 538 |
| district of | 42.356 | 39 | statements to | 11.433 | 490 |
| on rules | 42.020 | 1 | call that | 19.055 | 469 |
| and administration | 42.020 | 71 | can give | 10.623 | 465 |

Top Bigrams: Topic 14 = Gun control

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|-------------------|--------------|-----------|-------------------|--------------|-----------|
| gun control | 386.050 | 1 | the sale | 45.206 | 1076 |
| background checks | 372.947 | 1 | testing and | 45.206 | 96 |
| the nra | 372.448 | 4 | sale or | 70.942 | 92 |
| a gun | 327.742 | 5 | sales at | 88.678 | 84 |
| second amendment | 283.770 | 2 | to own | 60.127 | 80 |
| gun laws | 248.299 | 1 | period for | 64.342 | 64 |
| the gun | 238.215 | 4 | the carrying | 53.207 | 63 |
| waiting period | 218.762 | 5 | per month | 45.206 | 54 |
| lawsuits against | 193.550 | 6 | manufacturers and | 56.507 | 49 |
| of gun | 180.823 | 2 | line up | 51.473 | 40 |
| guns in | 163.773 | 2 | buyers and | 53.207 | 38 |
| day waiting | 158.220 | 1 | licensing and | 53.207 | 36 |
| checked baggage | 141.885 | 3 | any effect | 45.206 | 28 |
| liability actions | 135.617 | 1 | carrying of | 53.207 | 27 |
| licensing of | 124.149 | 10 | show and | 53.207 | 23 |
| ban on | 115.298 | 4 | changed over | 45.206 | 19 |
| registration of | 113.014 | 7 | of background | 45.206 | 18 |
| age for | 106.414 | 8 | pending on | 67.809 | 17 |
| and ammunition | 90.412 | 1 | the manufacture | 70.942 | 16 |

Top Bigrams: Topic 15 = Health care

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|-------------------|--------------|-----------|----------------|--------------|-----------|
| part d | 211.612 | 95 | the market | 21.083 | 5784 |
| prescription drug | 189.985 | 22 | information on | 15.112 | 2158 |
| medicare part | 174.580 | 22 | cost of | 10.925 | 1883 |
| health insurance | 169.624 | 116 | the cost | 21.650 | 1743 |
| care plan | 131.348 | 3 | costs and | 12.897 | 1523 |
| health care | 128.662 | 344 | about million | 10.794 | 1357 |
| of health | 125.470 | 63 | the fda | 21.161 | 942 |
| childrens health | 111.096 | 1 | plans and | 18.727 | 916 |
| have health | 108.428 | 4 | have got | 14.981 | 680 |
| generic drugs | 91.324 | 7 | is certainly | 10.581 | 627 |
| drugs from | 87.173 | 3 | year or | 10.581 | 593 |
| their health | 87.117 | 18 | what kind | 13.972 | 551 |
| for medicare | 84.333 | 20 | quality of | 16.200 | 545 |
| from canada | 80.148 | 14 | to buy | 37.397 | 524 |
| the uninsured | 78.309 | 10 | the program | 20.012 | 497 |
| drug benefit | 76.709 | 11 | the quality | 13.269 | 447 |
| private health | 74.720 | 1 | the costs | 12.063 | 427 |
| the medicare | 74.064 | 133 | research and | 10.747 | 383 |
| insurance program | 69.694 | 14 | quality and | 12.553 | 351 |

Top Bigrams: Topic 16 = Homeland security

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|--------------------|--------------|-----------|-----------------|--------------|-----------|
| nuclear weapons | 177.428 | 1 | the joint | 7.825 | 7546 |
| the patriot | 123.918 | 5 | description of | 8.449 | 2406 |
| missile defense | 87.306 | 5 | fiscal year | 7.896 | 1762 |
| our troops | 74.202 | 5 | are still | 8.020 | 1686 |
| homeland security | 71.816 | 46 | driven by | 7.825 | 1309 |
| our military | 70.408 | 13 | by our | 8.832 | 1272 |
| armed forces | 63.367 | 3 | a question | 7.825 | 1118 |
| on terror | 62.602 | 4 | of certain | 10.966 | 1084 |
| the intelligence | 61.410 | 6 | expected to | 8.449 | 1033 |
| bin laden | 59.216 | 1 | reports on | 8.449 | 942 |
| the peace | 54.415 | 3 | are no | 7.850 | 811 |
| of military | 51.941 | 12 | a description | 8.449 | 810 |
| in afghanistan | 50.444 | 21 | the information | 8.449 | 762 |
| the military | 49.900 | 79 | commission for | 11.645 | 762 |
| defense spending | 48.908 | 17 | are currently | 8.449 | 707 |
| war on | 47.375 | 32 | and development | 9.045 | 682 |
| of war | 44.995 | 92 | time of | 8.911 | 646 |
| foreign business | 44.521 | 17 | to close | 7.850 | 597 |
| their subsidiaries | 44.521 | 1 | management of | 9.894 | 591 |

Top Bigrams: Topic 17 = Immigration

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|---------------------------|--------------|-----------|------------------|--------------|-----------|
| illegal immigrants | 314.846 | 2 | reform act | 61.447 | 5400 |
| the border | 163.134 | 22 | the line | 22.886 | 1987 |
| illegal aliens | 161.899 | 1 | other than | 22.718 | 970 |
| illegal immigration | 154.376 | 1 | in line | 55.390 | 709 |
| operational control | 153.616 | 9 | report and | 32.143 | 498 |
| our borders | 133.651 | 1 | here and | 32.692 | 494 |
| temporary worker | 133.134 | 1 | who have | 23.298 | 463 |
| come here | 129.601 | 7 | and look | 23.322 | 308 |
| the shadows | 107.932 | 1 | provided in | 30.723 | 289 |
| the immigration | 104.949 | 1 | appears to | 30.723 | 259 |
| comprehensive legislation | 92.170 | 1 | to learn | 22.886 | 222 |
| been here | 87.695 | 20 | future but | 20.482 | 141 |
| immigration laws | 87.695 | 2 | personnel and | 27.243 | 134 |
| secure our | 87.457 | 5 | here to | 26.237 | 134 |
| the magnet | 81.929 | 1 | services in | 20.482 | 125 |
| came here | 80.358 | 4 | to secure | 73.136 | 125 |
| path to | 78.360 | 52 | today than | 36.324 | 121 |
| are here | 76.808 | 27 | those people | 20.896 | 109 |
| the borders | 75.796 | 5 | our organization | 30.723 | 104 |

Top Bigrams: Topic 18 = Jobs

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|-----------------|--------------|-----------|----------------|--------------|-----------|
| minimum wage | 260.646 | 21 | natural gas | 26.070 | 917 |
| an hour | 156.421 | 36 | prices and | 23.117 | 722 |
| wage to | 128.792 | 1 | those things | 20.686 | 419 |
| the aflcio | 122.737 | 4 | the companies | 25.775 | 374 |
| overtime pay | 112.509 | 1 | a net | 23.071 | 361 |
| the faa | 104.280 | 10 | give no | 26.070 | 329 |
| price supports | 104.280 | 1 | prices are | 51.948 | 297 |
| federal minimum | 104.280 | 3 | and conditions | 25.758 | 285 |
| job growth | 104.280 | 57 | reduces the | 22.263 | 283 |
| air traffic | 102.281 | 4 | next two | 20.686 | 230 |
| per hour | 92.053 | 15 | loss in | 34.345 | 220 |
| th day | 92.053 | 3 | coming back | 39.105 | 208 |
| are higher | 89.054 | 117 | to per | 24.823 | 200 |
| million jobs | 87.670 | 2 | to speak | 26.481 | 196 |
| the minimum | 87.388 | 67 | good for | 20.686 | 188 |
| choice act | 81.825 | 1 | growth was | 30.684 | 170 |
| lost under | 78.210 | 1 | to form | 23.117 | 165 |
| many employers | 78.210 | 2 | open up | 23.071 | 155 |
| employees in | 77.275 | 40 | a benefit | 29.685 | 152 |

Top Bigrams: Topic 19 = Principles

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|-----------------------|--------------|-----------|---------------|--------------|-----------|
| my father | 33.921 | 2 | sort of | 5.071 | 4512 |
| third way | 29.913 | 3 | president and | 4.215 | 4069 |
| on principles | 28.591 | 1 | a more | 5.722 | 3712 |
| of faith | 28.114 | 1 | the third | 5.163 | 3706 |
| justice of | 27.420 | 2 | from time | 4.225 | 3389 |
| a christian | 27.420 | 2 | the call | 4.765 | 2836 |
| was born | 26.383 | 1 | how much | 5.163 | 2732 |
| democratic leadership | 25.415 | 2 | would say | 5.163 | 2453 |
| church and | 25.321 | 1 | a bit | 4.498 | 2355 |
| run for | 25.321 | 21 | real estate | 4.765 | 2017 |
| of church | 25.111 | 1 | to those | 4.567 | 1626 |
| the church | 23.944 | 1 | the time | 4.416 | 1446 |
| party of | 23.870 | 3 | period of | 6.482 | 1435 |
| father and | 22.238 | 1 | turn the | 5.672 | 1425 |
| of hope | 21.358 | 8 | comment on | 4.225 | 1332 |
| the games | 20.926 | 17 | may not | 6.050 | 1319 |
| leadership council | 19.942 | 1 | is always | 4.225 | 1296 |
| of votes | 19.895 | 1 | to your | 4.346 | 1264 |
| born in | 19.719 | 1 | last quarter | 6.278 | 1255 |

Top Bigrams: Topic 20 = Social security

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|---------------------|--------------|-----------|-----------------|--------------|-----------|
| social security | 525.913 | 9 | of future | 54.588 | 3405 |
| younger workers | 382.116 | 1 | portion of | 49.165 | 1617 |
| retirement age | 215.742 | 3 | the earnings | 23.971 | 1039 |
| payroll tax | 208.683 | 3 | the interest | 25.899 | 699 |
| stock market | 186.470 | 138 | expectations of | 28.555 | 698 |
| the social | 167.073 | 14 | return on | 31.078 | 680 |
| of social | 165.751 | 6 | year or | 27.294 | 593 |
| personal retirement | 155.814 | 3 | to invest | 43.315 | 579 |
| the payroll | 154.666 | 30 | year so | 31.078 | 559 |
| trust fund | 139.852 | 12 | debt and | 25.899 | 526 |
| payroll taxes | 129.527 | 13 | the debt | 28.877 | 484 |
| the stock | 127.372 | 469 | the benefits | 40.662 | 482 |
| security system | 118.274 | 4 | the stock | 127.372 | 469 |
| security is | 115.506 | 16 | a portion | 37.127 | 453 |
| their retirement | 114.222 | 7 | benefits of | 25.876 | 442 |
| of return | 113.954 | 270 | the costs | 24.894 | 427 |
| the retirement | 109.176 | 29 | take some | 32.206 | 423 |
| their social | 109.176 | 1 | the table | 31.764 | 408 |
| interest saved | 109.176 | 6 | of return | 113.954 | 270 |

Top Bigrams: Topic 21 = Tax reform

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|---------------------|--------------|-----------|----------------|--------------|-----------|
| estate tax | 336.504 | 17 | to million | 25.898 | 2328 |
| the estate | 241.009 | 13 | a million | 16.478 | 1392 |
| tax cuts | 224.890 | 5 | offset by | 27.955 | 1219 |
| the amt | 213.089 | 3 | the capital | 25.446 | 1124 |
| bush tax | 198.309 | 4 | share of | 16.226 | 942 |
| taxes for | 163.705 | 18 | tax rate | 126.349 | 911 |
| tax relief | 142.602 | 3 | rates and | 16.964 | 906 |
| capital gains | 134.361 | 62 | the effect | 28.429 | 799 |
| tax rate | 126.349 | 911 | the top | 33.494 | 647 |
| tax rates | 126.349 | 151 | the middle | 18.603 | 619 |
| the tax | 121.536 | 566 | year or | 19.968 | 593 |
| tax cut | 117.381 | 3 | the tax | 121.536 | 566 |
| the death | 112.044 | 8 | credit and | 25.010 | 497 |
| and dividends | 106.544 | 44 | billion of | 29.558 | 479 |
| alternative minimum | 100.042 | 8 | businesses and | 23.020 | 474 |
| income tax | 91.063 | 247 | the stock | 19.968 | 469 |
| on capital | 90.947 | 253 | reducing the | 16.226 | 463 |
| for tax | 87.860 | 27 | billion in | 16.269 | 424 |
| taxes on | 85.561 | 19 | and capital | 24.789 | 408 |

Top Bigrams: Topic 22 = Technology

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|-------------------|--------------|-----------|-----------------------|--------------|-----------|
| the internet | 296.866 | 237 | results and | 30.884 | 3128 |
| the fcc | 170.262 | 100 | information on | 21.522 | 2158 |
| internet access | 142.929 | 9 | more detailed | 21.283 | 2148 |
| the digital | 117.055 | 61 | information about | 25.826 | 1710 |
| fairness doctrine | 108.494 | 1 | growth and | 19.303 | 1464 |
| highspeed rail | 106.414 | 2 | driven by | 26.816 | 1309 |
| of internet | 98.264 | 9 | investment in | 23.674 | 1053 |
| on internet | 92.652 | 2 | the section | 63.848 | 908 |
| space program | 85.131 | 4 | that number | 17.866 | 872 |
| privacy is | 81.370 | 1 | the customer | 17.866 | 829 |
| public agencies | 81.370 | 1 | information and | 48.269 | 801 |
| the space | 74.589 | 113 | nature of | 19.303 | 797 |
| the moon | 66.140 | 2 | the information | 19.303 | 762 |
| top markets | 63.848 | 7 | and development | 38.572 | 682 |
| the section | 63.848 | 908 | intellectual property | 47.466 | 635 |
| internet is | 63.848 | 5 | in future | 21.283 | 614 |
| internet a | 62.531 | 11 | business with | 26.816 | 555 |
| internet to | 61.028 | 6 | quality of | 24.429 | 545 |
| research and | 55.102 | 383 | information is | 30.884 | 510 |

Top Bigrams: Topic 23 = War & Peace

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|------------------|--------------|-----------|----------------|--------------|-----------|
| in iraq | 241.666 | 181 | this point | 7.366 | 4093 |
| bin laden | 137.195 | 1 | have some | 6.138 | 1851 |
| our troops | 131.514 | 5 | be found | 6.607 | 1665 |
| nuclear weapons | 127.726 | 1 | there and | 9.430 | 1574 |
| from iraq | 112.311 | 4 | operations and | 12.739 | 1432 |
| to war | 104.019 | 7 | there will | 7.980 | 1294 |
| of iraq | 93.311 | 9 | those are | 7.056 | 1164 |
| osama bin | 92.491 | 1 | a question | 7.648 | 1118 |
| the war | 83.662 | 270 | be very | 6.174 | 1086 |
| in afghanistan | 78.887 | 21 | relates to | 6.607 | 1083 |
| the region | 75.427 | 208 | continuing to | 9.670 | 1053 |
| the iraqi | 74.874 | 19 | does that | 12.323 | 1016 |
| war in | 70.045 | 104 | is on | 6.752 | 954 |
| a nuclear | 69.625 | 24 | the safe | 6.607 | 943 |
| the surge | 68.267 | 6 | is now | 7.879 | 852 |
| iraq is | 68.267 | 12 | this joint | 6.070 | 847 |
| war was | 66.065 | 7 | to date | 8.575 | 818 |
| troops in | 65.167 | 15 | and now | 6.436 | 798 |
| mass destruction | 65.167 | 4 | a risk | 7.736 | 786 |

Top Bigrams: Topic 24 = Welfare & Poverty

Table: Topic-based: Top 20 bigrams score and frequency

| bigram | score*100000 | frequency | bigram | score*100000 | frequency |
|--------------------|--------------|-----------|-----------------|--------------|-----------|
| home ownership | 161.162 | 4 | the business | 32.595 | 4433 |
| block grants | 140.320 | 1 | k for | 20.539 | 3907 |
| national service | 123.234 | 1 | interest rates | 36.425 | 1524 |
| minimum wage | 117.341 | 21 | the lower | 20.539 | 734 |
| another a | 102.695 | 3 | assets and | 23.387 | 674 |
| tax credits | 83.816 | 80 | if theres | 24.368 | 523 |
| reducing by | 82.156 | 4 | the competitive | 23.387 | 522 |
| volunteers and | 82.156 | 3 | our strong | 23.387 | 423 |
| on less | 81.174 | 16 | business of | 41.078 | 366 |
| down payment | 81.174 | 22 | increasing the | 29.233 | 326 |
| extreme global | 80.581 | 1 | move into | 20.539 | 253 |
| affordable housing | 67.645 | 15 | and continued | 20.539 | 248 |
| drug treatment | 67.645 | 2 | income tax | 37.467 | 247 |
| the millennium | 64.465 | 4 | rate in | 32.490 | 240 |
| recipients who | 64.465 | 1 | per day | 61.617 | 215 |
| people worldwide | 64.465 | 3 | job of | 20.954 | 209 |
| the minimum | 62.589 | 67 | more likely | 29.233 | 206 |
| the rolls | 61.617 | 4 | income in | 27.058 | 194 |
| grande valley | 61.617 | 3 | of was | 20.539 | 153 |