

Forecasting Political and Regulatory Risk Using Machine Learning



Tim Hwang

Founder & CEO
FiscalNote

“Advanced anomaly detection and NLP would have been game-changing for budget fraud work.”

FiscalNote

Real-Time Legal Analytics

The Dilemma

Vast majority of policy analysis and government is still manual or expensive (attorneys v. media organizations)

Information has fragmented

Policy analysis is restricted by human capital

Computational + Political Understanding Needed

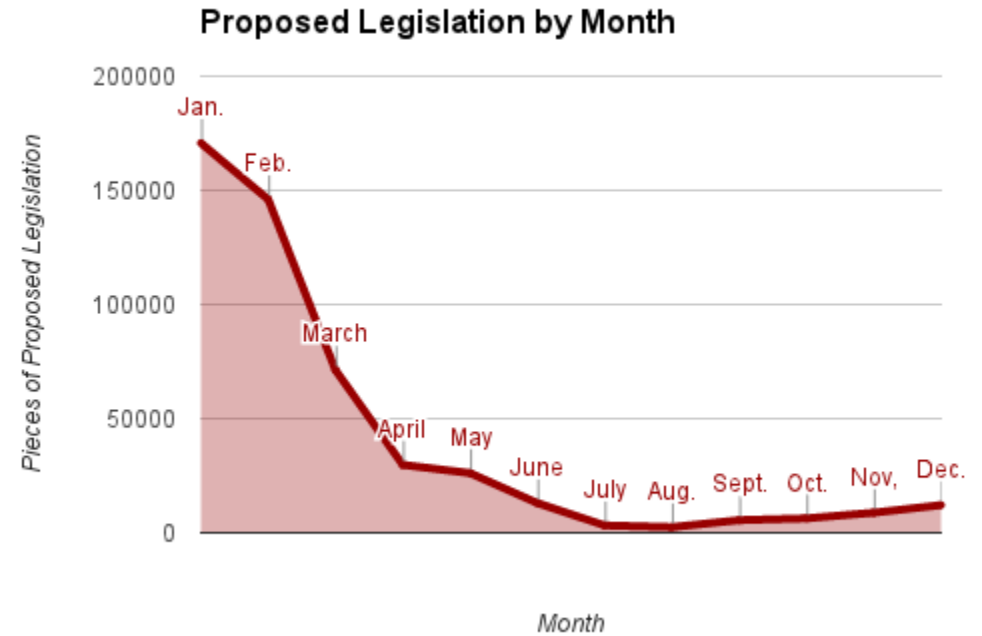
Limitations to Human Analysis

50 State Governments

3,144 County Governments

19,355 Municipal Governments

Education. Zoning. Property Law. \$4 Trillion in Spending.



International Concern

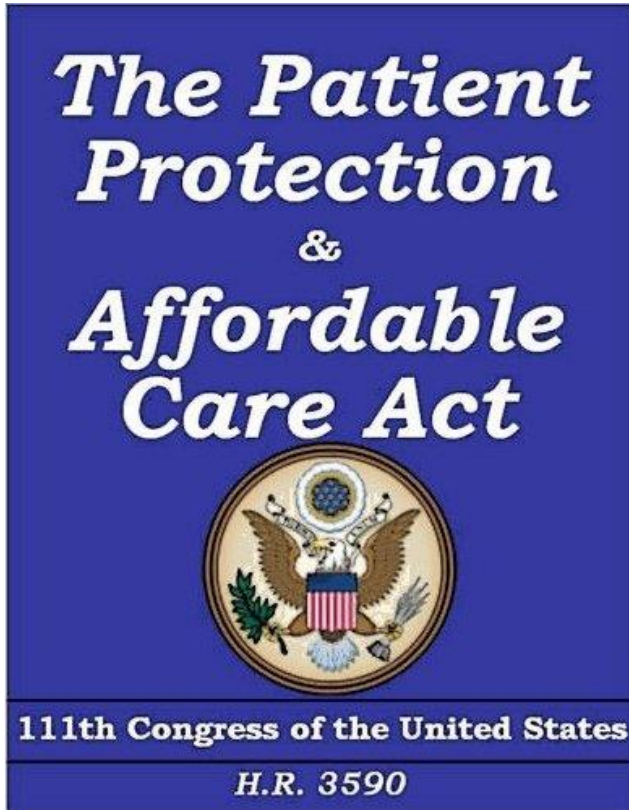
The German Example:

16 Länder (State) Governments

12,141 Gemeinden (Municipal) Governments

Tourism. Zoning. Property Law.

Uncertainty



FiscalNote Prophecy

Search. Monitor. **Predict.**

Notifications [Change Settings](#)

- PR 20-0526** from DC Introduced
Real Estate Commission Stephen W. Porter Confirmation...
Oct 24, 2013
- PR 20-0527** from DC Introduced
Commission On African-american Affairs Dr. Janette H...
Nov 05, 2013
- B 20-0542** from DC Introduced
Department Of Corrections Central Cellblock Manageme...
Nov 05, 2013
- B 20-0541** from DC Introduced
Department Of Corrections Central Cellblock Manageme...
Nov 05, 2013
- SJR 59** from WI Introduced
Early childhood brain development.
Nov 07, 2013

[See all](#)

Search Results

Enacts a tax exemption for capital gains on the sales of ne...
in New York.
Updated: May 08, 2013

A 7266	NY	2013-2014 General Assembly	May 08, 2013	60%
--------	----	----------------------------	--------------	-----

Relates to exempting conveyances of real property to 510(c)3 corporations and municipalities for preservation purposes from the real estate transfer tax and capital gains tax.
Updated: May 17, 2013

Analysis
The current chamber is controlled by Democrats, 107 to 43.
There are 1 Democrat sponsors and 0 Republican sponsors.
This bill does not enjoy bipartisan sponsorship support.

A 7448	NY	2013-2014 General Assembly	May 17, 2013	87%
--------	----	----------------------------	--------------	-----

A 7448 [Follow](#) Session State NY Probability 87% [Return to Bill](#)

Relates to exempting conveyances of real property ... **2013-2014 General Assembly**

[← back](#)
Analysis

Bipartisan Support **No** Passage Prediction Score **87%**

Sponsorship Partisan Composition

1 Democrat **Republican 0**

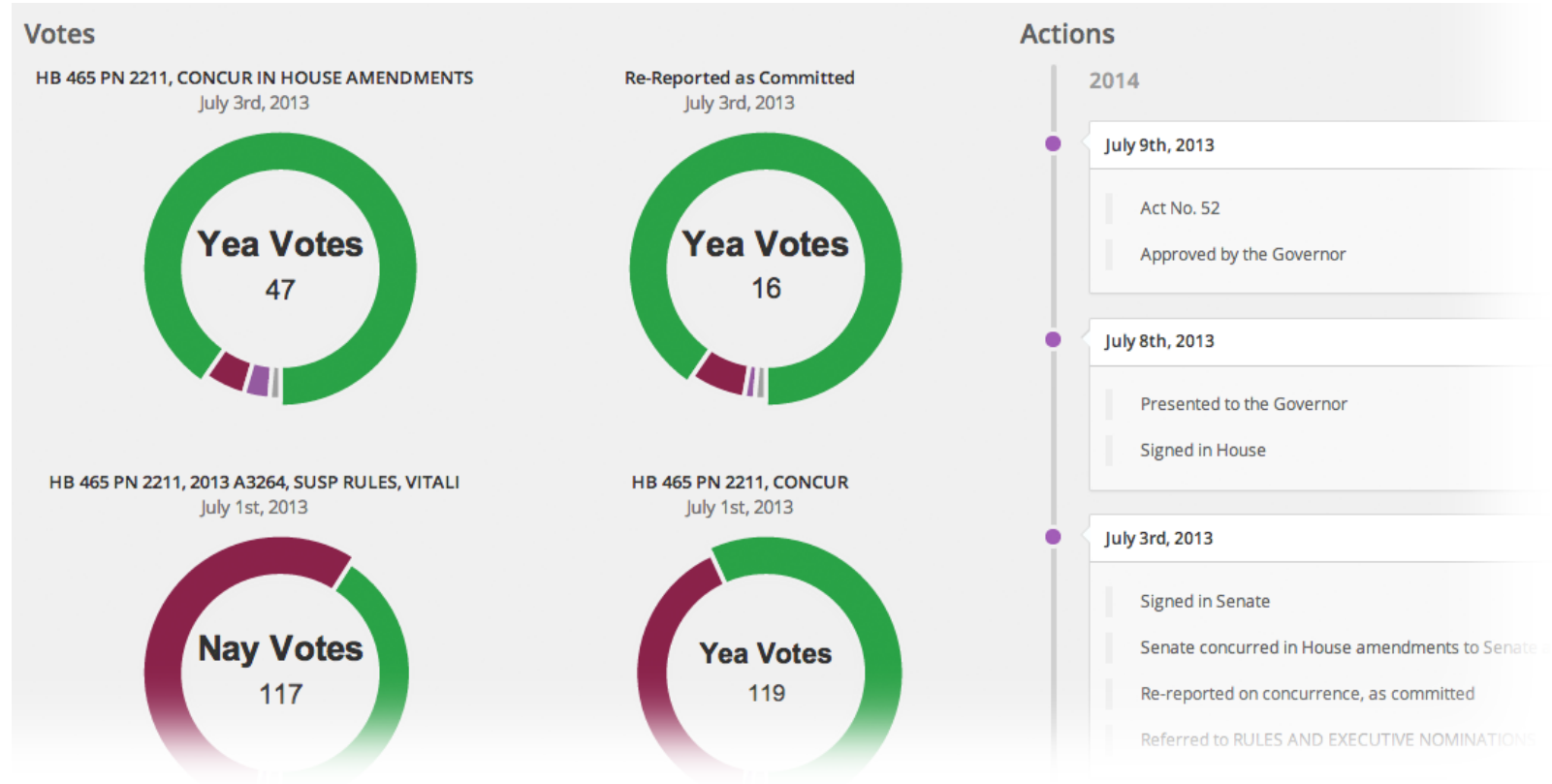
Chamber Partisan Composition

107 Democrat **Republican 43**

FiscalNote mines vast amounts of government data to analyze the **probability** of bill passage in each of the 50 state legislatures in **real-time**.

Portfolio Management

- **Problem:** As state legislatures become more active, portfolios may be over-exposed to government and under-exposed to legislative opportunity
- **Solution:** FiscalNote's tracking and prediction algorithms provide institutions with deep insights to optimize portfolio strategy
- **Example:** Monitor state tax legislation nationwide, stay ahead of capital gains tax changes



United States: Sweeping Changes To The Pennsylvania Tax Code - The Passage Of Pa. House Bill 465

Last Updated: September 10 2013

Article by [John C. Friskey](#) and [Steven Packer](#)

Figure 1. Breakdown of past actions on a tax code bill. Timeline provides summary of bill actions.

Equity & FI Research

- **Problem:** State legislation that affects over \$4 Tn in taxing & spending annually is under-analyzed
- **Solution:** FiscalNote's tracking and prediction capabilities empower Analysts to be proactive on legislation
- **Example:** Internet retailers may lose over \$23 Bn in 2014 due to state legislation on internet sales taxes (e.g. Marketplace Fairness Acts)

Memorializing the Congress of the United States to pass and the President of the United States to sign the Marketplace Fairness Act of 2013 or a similar act to provide uniform measures for the collection of states' sales and use taxes.				
A Resolution memorializing the Congress of the United States to pass and the President of the United States to sign the Marketplace Fairness Act of 2013 or a similar act to provide uniform measures for the collection of states' sales and use taxes.				
Updated: Dec 09, 2013				
Analysis				
The current chamber is controlled by Republicans, 27 to 23.				
There are 6 Democrat sponsors and 15 Republican sponsors.				
This bill enjoys bipartisan sponsorship support, improving its chance of passing.				
HR 571	PA	2013-2014 Regular Session	Dec 09, 2013	96%
An Act To Establish Tax Fairness				
Updated: Jun 07, 2013				
LD 1256	ME	126th Legislature	Jun 07, 2013	85%
Small Business Fairness Act				
Creates "Small Business Fairness Act"; revises certain tax rates imposed on sales price of communications services; revises definition of term "mail order sale" to specifically include sales of tangible personal property ordered via Internet; deletes certain provisions that specify dealer activities or other circumstances that subject mail order sales to this state's power to levy & collect sales & use tax; provides that certain persons who make mail order sales & who have substantial nexus with this state are subject to this state's power to levy & collect sales & use tax if they engage in certain activities; specifies that dealer who does not have physical presence in this state is required to collect & remit sales & use tax; provides an exception; creates rebuttable presumption that dealer is subject to state's power to levy & collect sales or use tax; specifies evidentiary proof that may be submitted to rebut presumption.				
Updated: May 03, 2013				
H 497	FL	2013 Regular Session	May 03, 2013	Failed

Figure 2. Search Results for bills pertaining to Marketplace Fairness Act. Note the probability of bill passage as well as the analysis. Probability is generated from our algorithms.

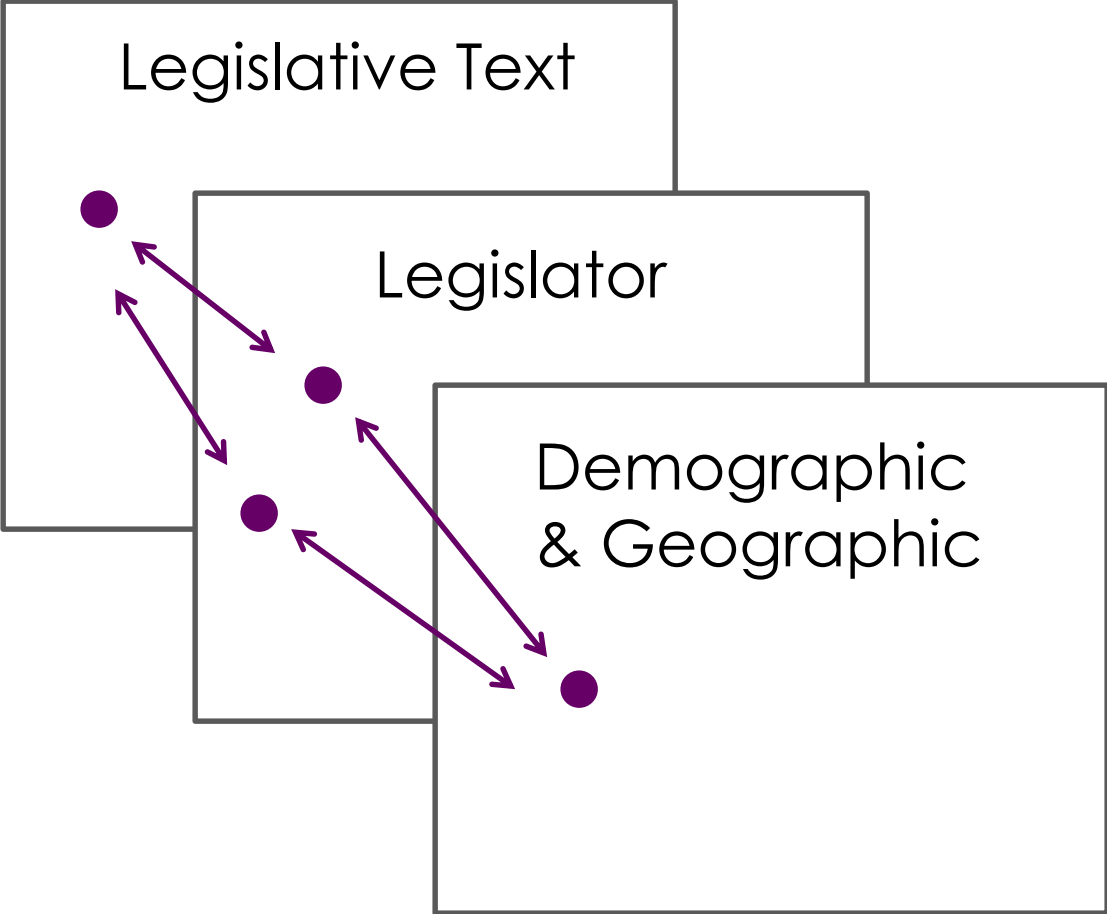
Regulatory Frontier

On FiscalNoteDB across 50 states and Federal:

- **6,500,000+** Pages of Legislation and Amendments
- **1,850,000+** Pages of Regulations and Enforcement Action
 - **1,950,000+** more coming from FCC, EPA, FDA, DoT in Winter 2014
- **1,500,000+** Statues
- **4,000,000+** Superior/District Court Opinions
- **2,500,000+** Appellate Court Opinions

Scraped. Normalized. Citable.

Legal Aggregation



HB 01

John Smith

Jane Doe

NY-08

NY-15

30% GM

26% GM

62K MI

58K MI

Legal Categorization

Multiple top-level categories for each legal document

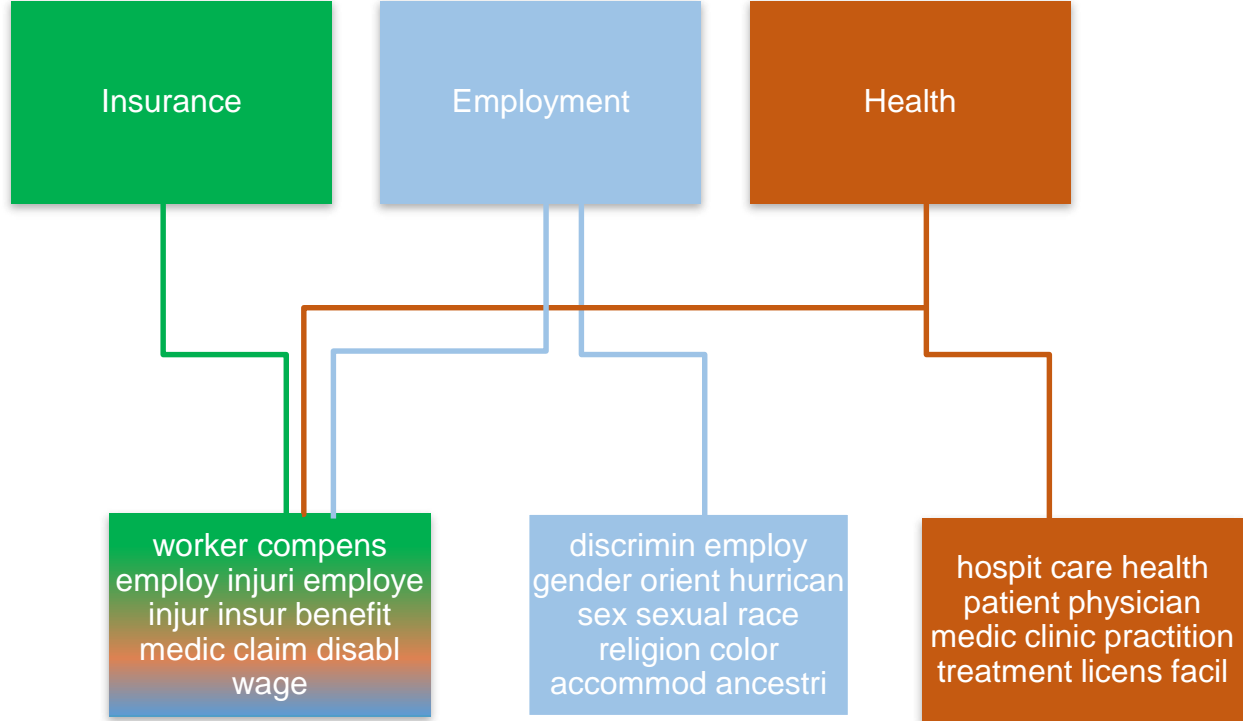
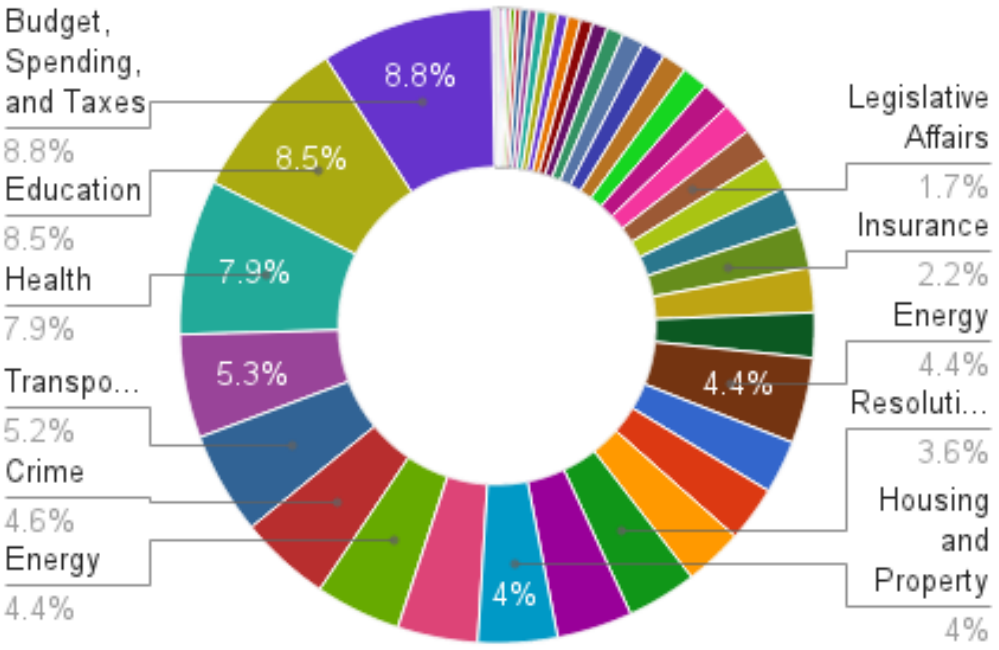
- Different number of sub-categories

Approximate soft hierarchical clustering

- Top-level as semi-supervised classification
- Automatically create sub-categories based on several criteria (e.g. likelihood)
- Focus on scalable memory-efficient learning

Legal Categorization

Proposed Legislation by Industry



Legislative Prediction

Several stages to bill passage



2 stages x 50 states x 2 chambers x 2 types

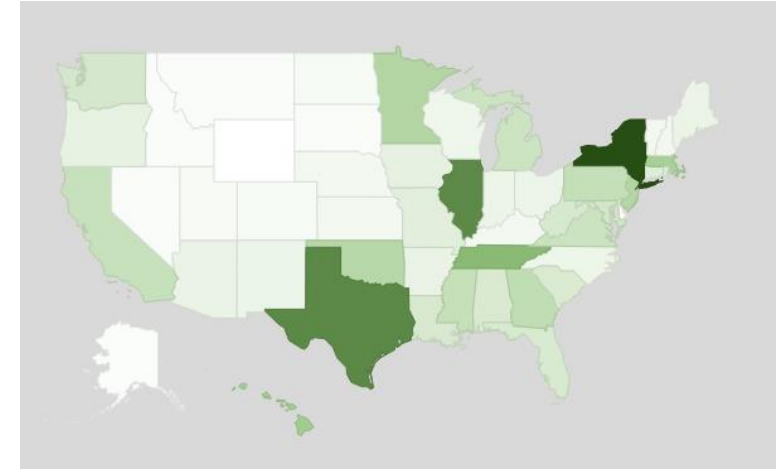
(2) Models based on stage

- 1) How likely is a bill to **get out of committee**
- 2) How likely is a bill to **pass a floor vote**

Legislative Prediction

(50) Models for each state

- Utilize bill, legislator, and legislature information



- Trained offline and updated as necessary

- Exploring different features and modeling strategies

 - Graph-based and instance-based classification

Legislative Prediction

S 06175 [Follow](#)

Relates to passenger registration of pickup trucks...

Session
2013-2014 General Assembly

State
NY

Probability
79%

Return to
[← Bill](#)

[← back](#)

Analysis

Bipartisan Support **No**

Passage Prediction Score **79%**

Sponsorship Partisan Composition



Chamber Partisan Composition



Legislators **likely** to vote to pass this bill (in no specific order)

Legislator	Party
Catharine Young	Republican
Joseph E Robach	Republican

NLP Legislative Analysis

Session

111TH CONGRESS
2D SESSION

H. R.

Bill ID

To amend title 10, United States Code, to provide for performance management of the defense acquisition system, and for other purposes.

Summary

IN THE HOUSE OF REPRESENTATIVES

Mr. ANDREWS (for himself, Mr. CONAWAY, Mr. SKELTON, Mr. McKEON, Mr. ELLSWORTH, Mr. COPPMAN of Colorado, and Mr. HUNTER) introduced the following bill; which was referred to the Committee on

Sponsors

A BILL

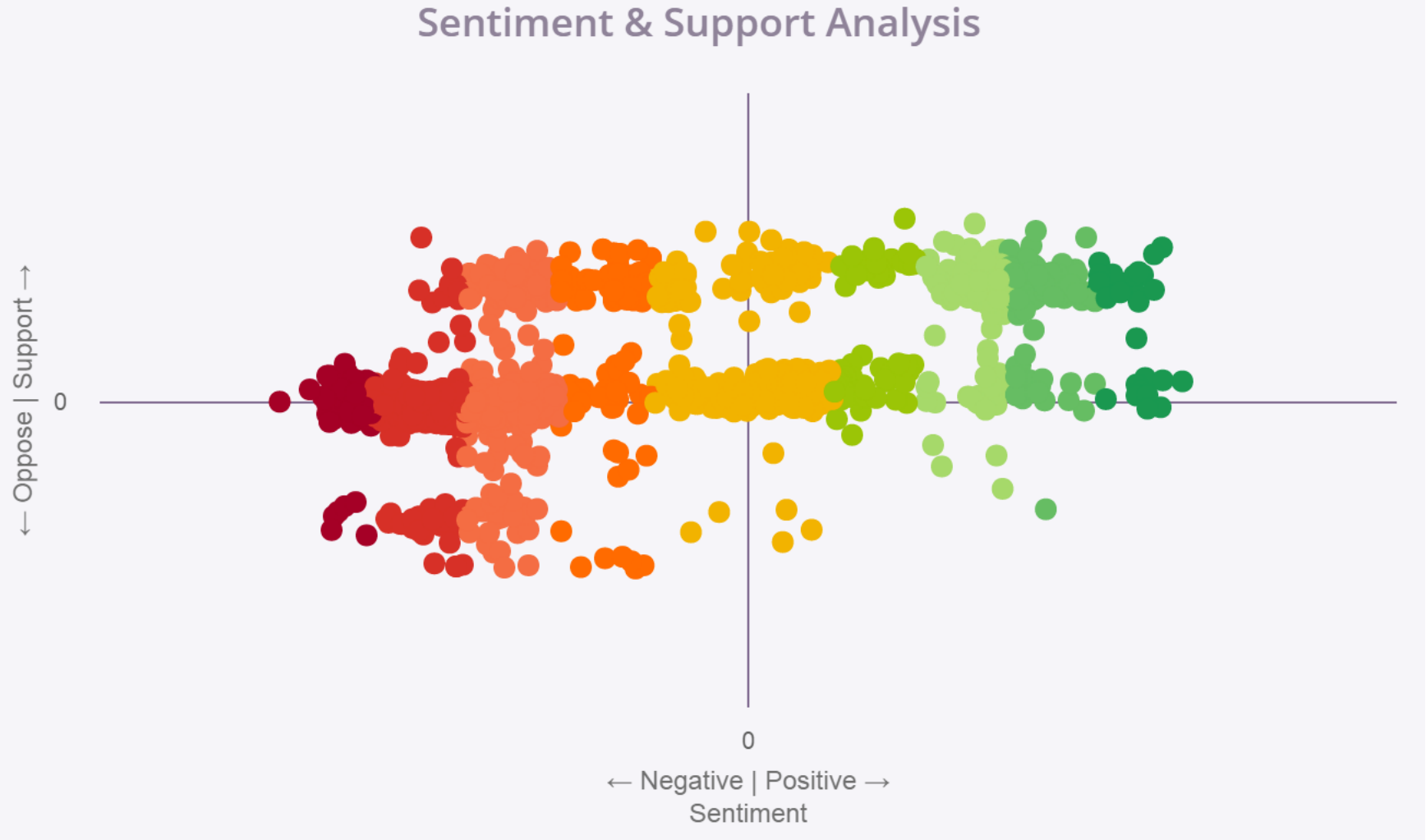
To amend title 10, United States Code, to provide for performance management of the defense acquisition system, and for other purposes.

Legislative Text

1 *Be it enacted by the Senate and House of Representa-*
2 *tives of the United States of America in Congress assembled,*
3 **SECTION 1. SHORT TITLE.**
4 This Act may be cited as the “Implementing Manage-
5 ment for Performance and Related Reforms to Obtain
6 Value in Every Acquisition Act of 2010”.

[Simple Sentence]. [Simple Sentence].
[Simple Sentence], [Simple Sentence].

Regulatory Comment Analysis



Conclusion

Three Relationships:

Legislation + Regulation (Efficiency)

Information + Decision-Maker (Strategic)

Citizen + Government (Certainty)