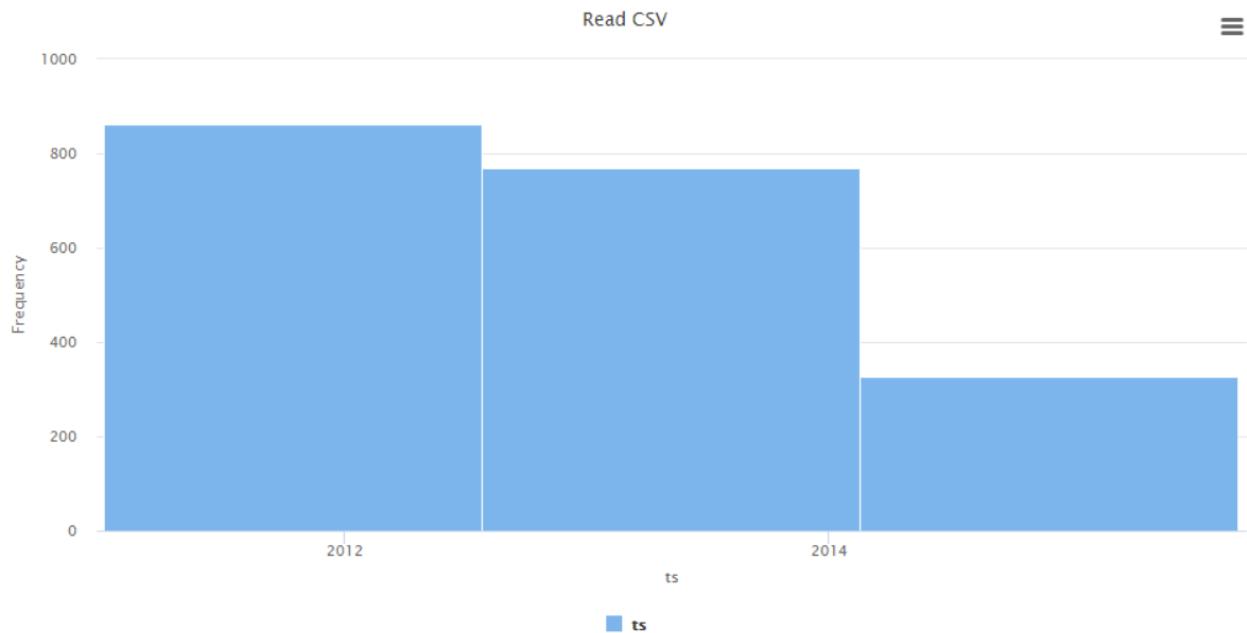
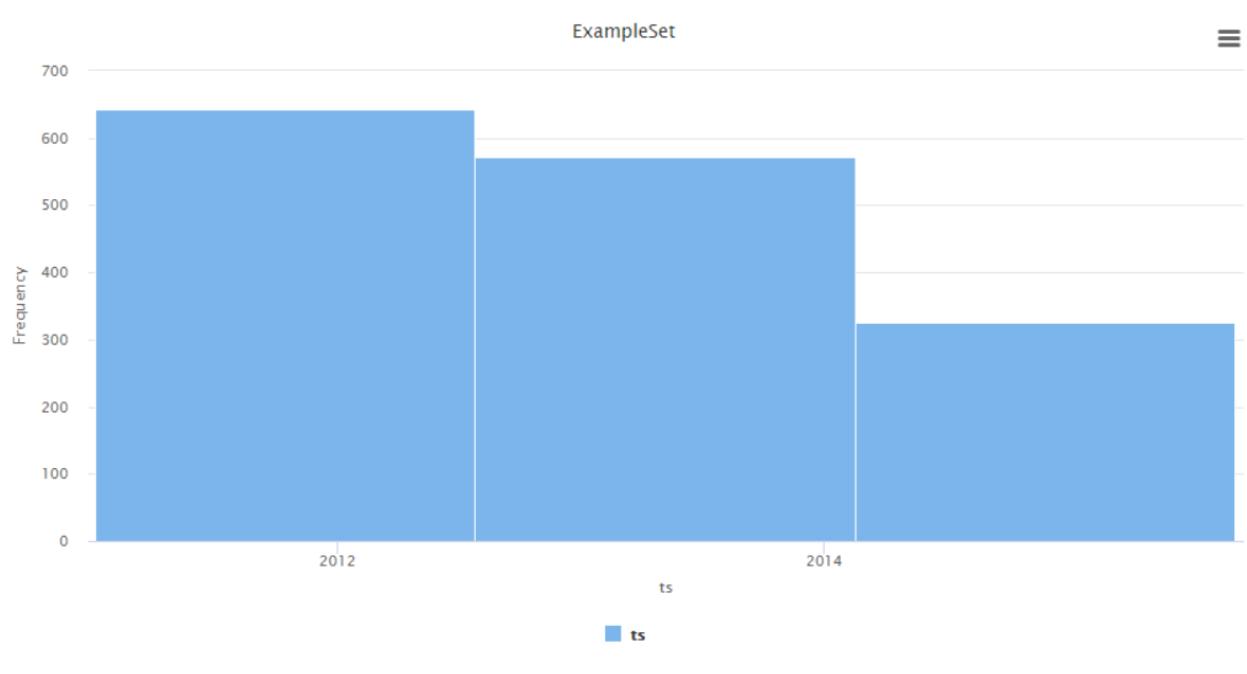


## PHASE 1: DATA SET EXPLORATION

Encoding UTF-8 to remove unknown symbols. The data are displayed along three-time intervals



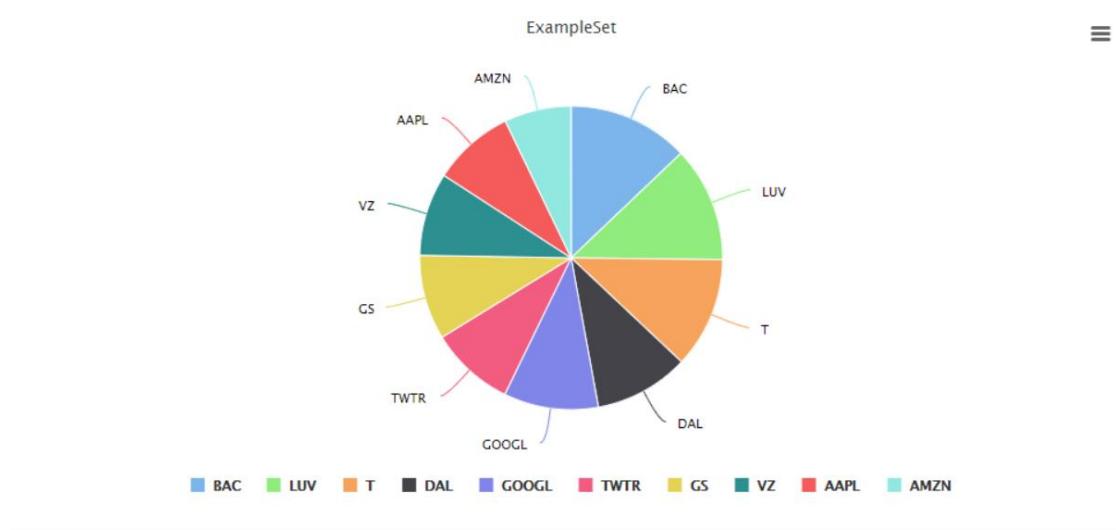
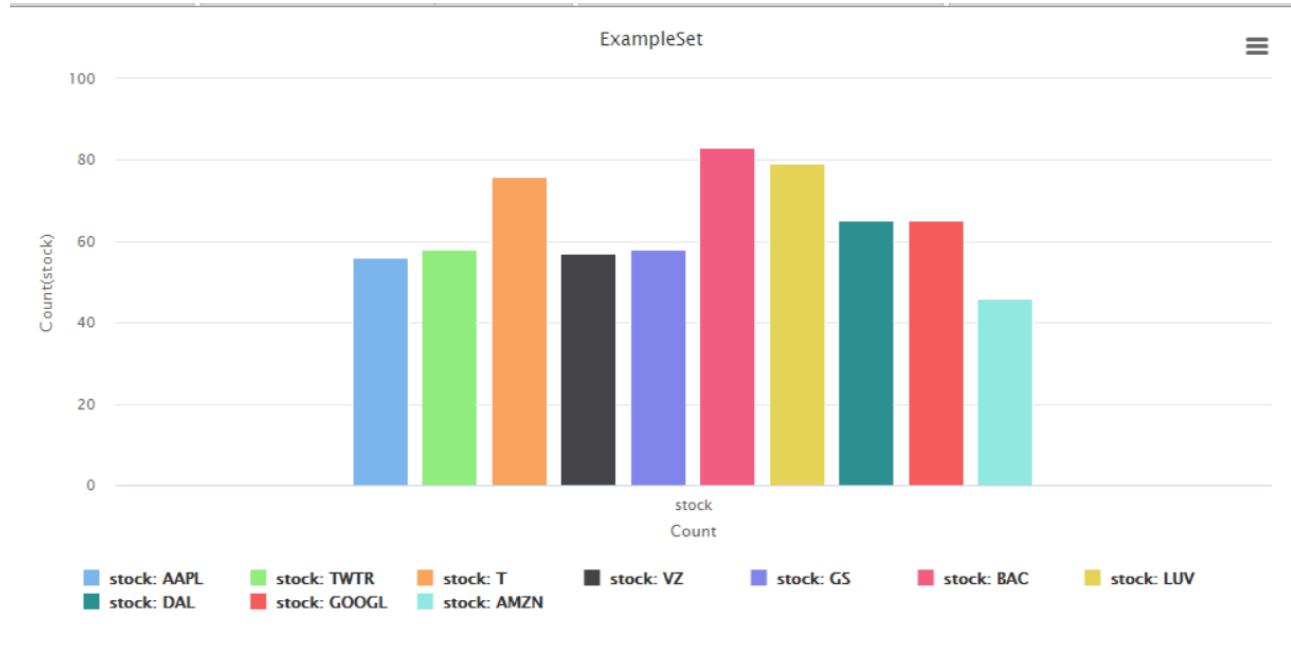
For this reason, we removed the data for October, November, and December from the years 2011 and 2013, and we made our dataset more consistent from a quantitative perspective.



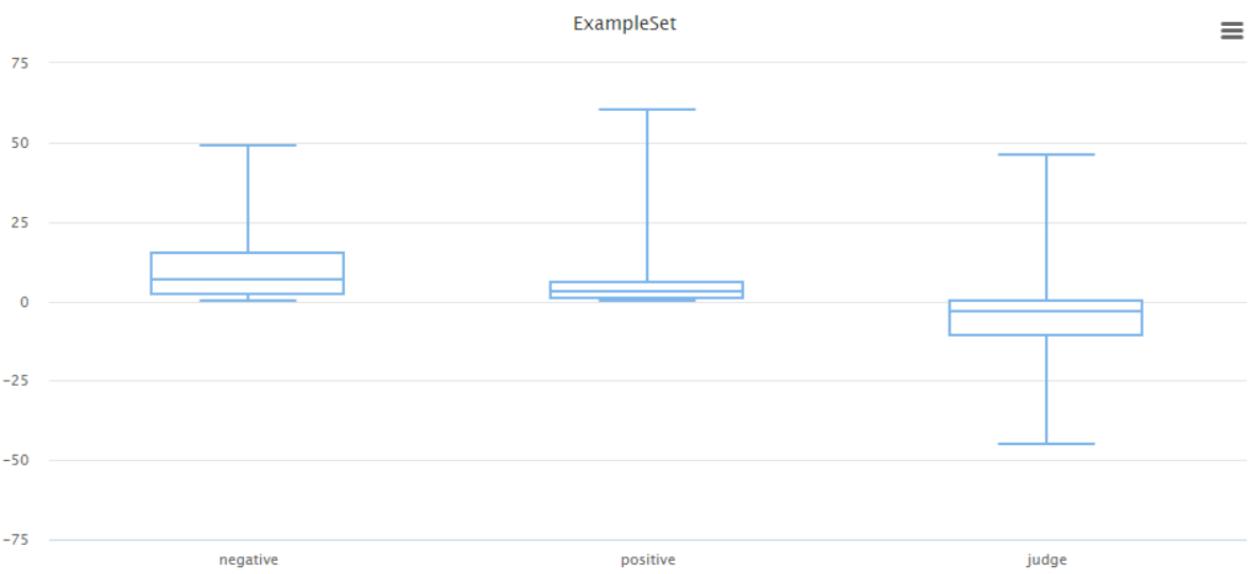
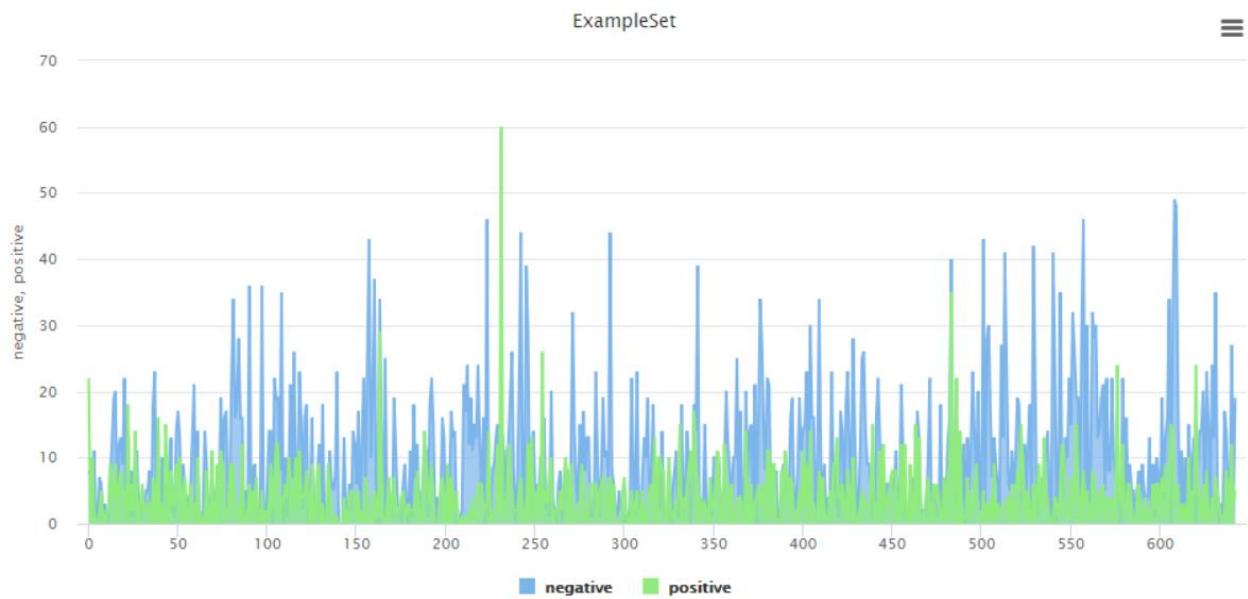
Let's take a brief look at how the stocks and ratings are arranged across the various phrases related to the stocks available.

## Year 2011

We can observe how the various stocks have been selected. First, we notice that the distribution of stocks for the year 2011 is quite uniform, with a predominance of observations for BAC and LUV:

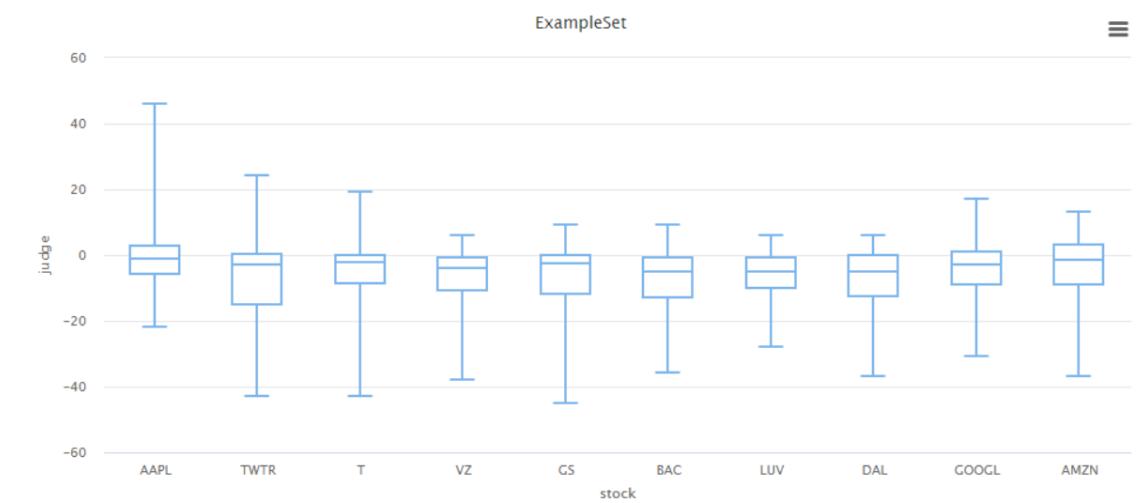
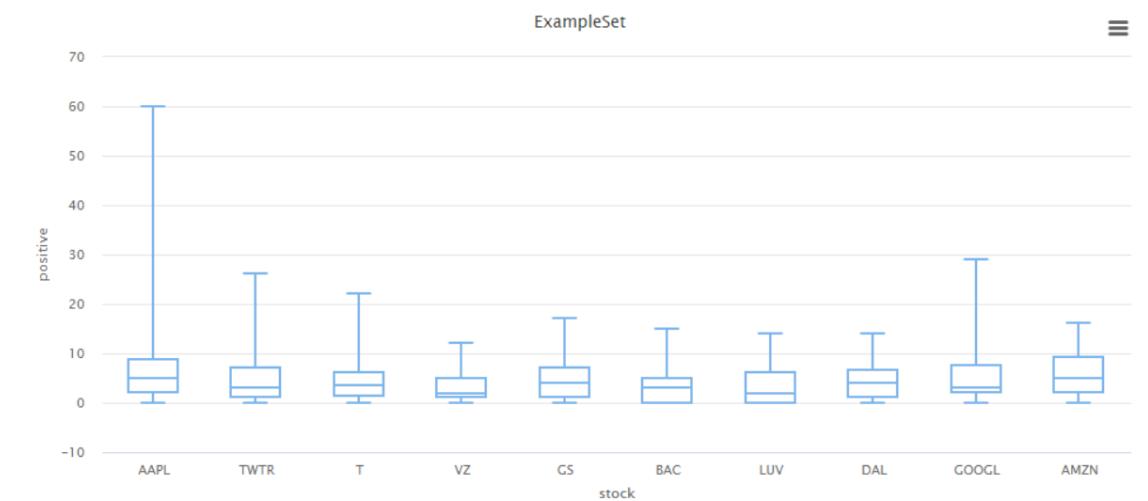
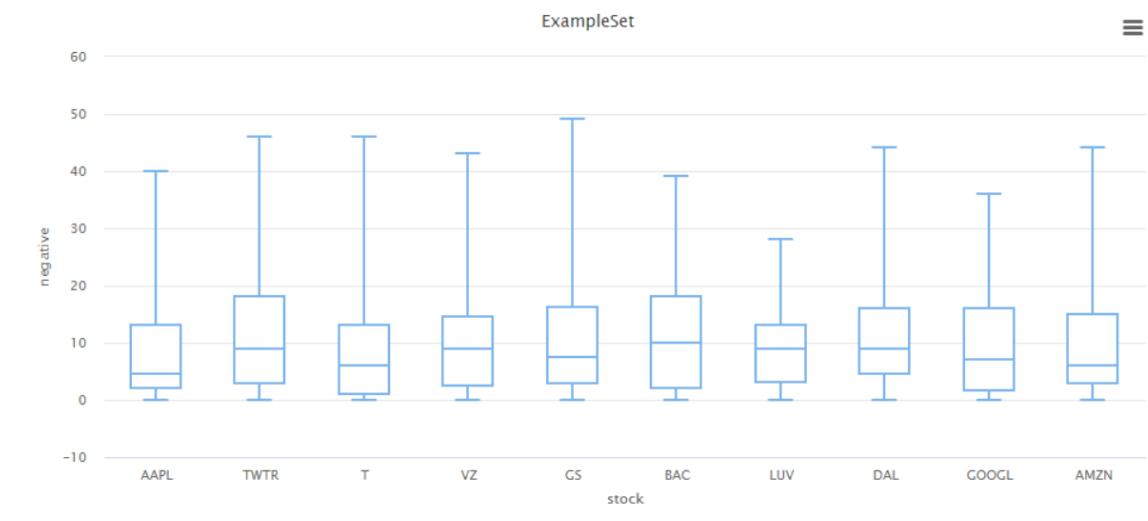


Let's look at positive and negative values.



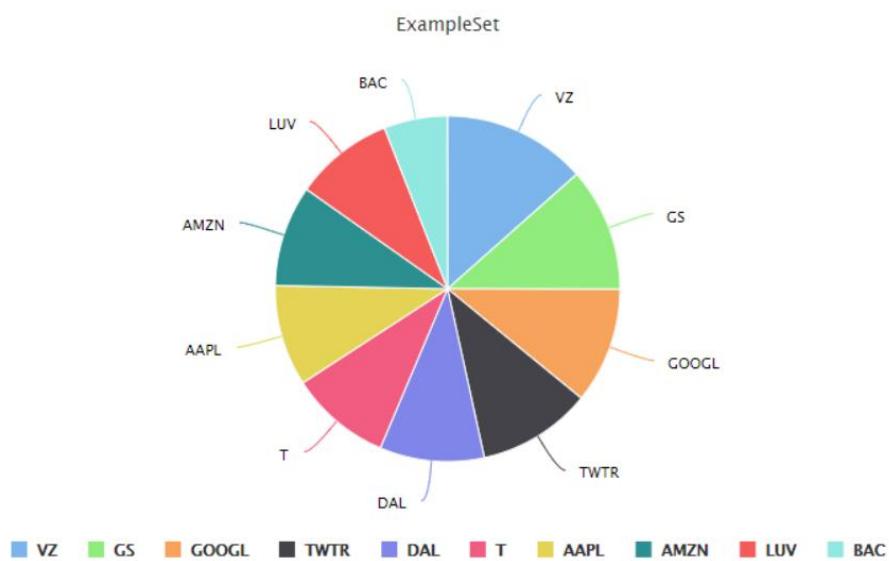
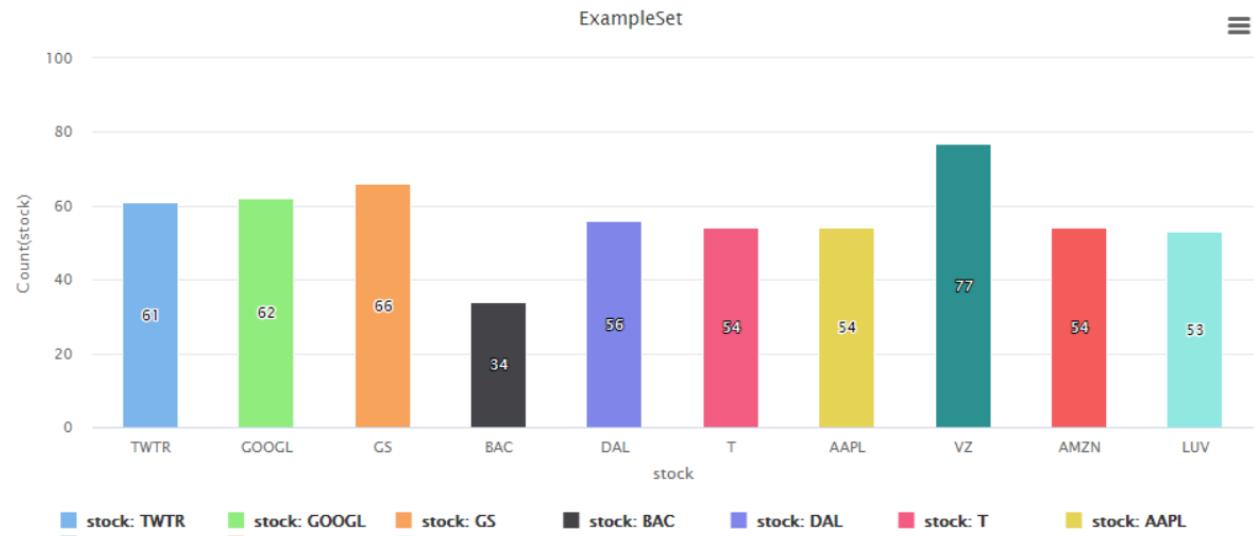
Row No.	average(judge)	sum(judge)	sum(positive)	sum(negative)
1	-5.719	-3677	2825	6502

Link among stock, positive, negative e judge.

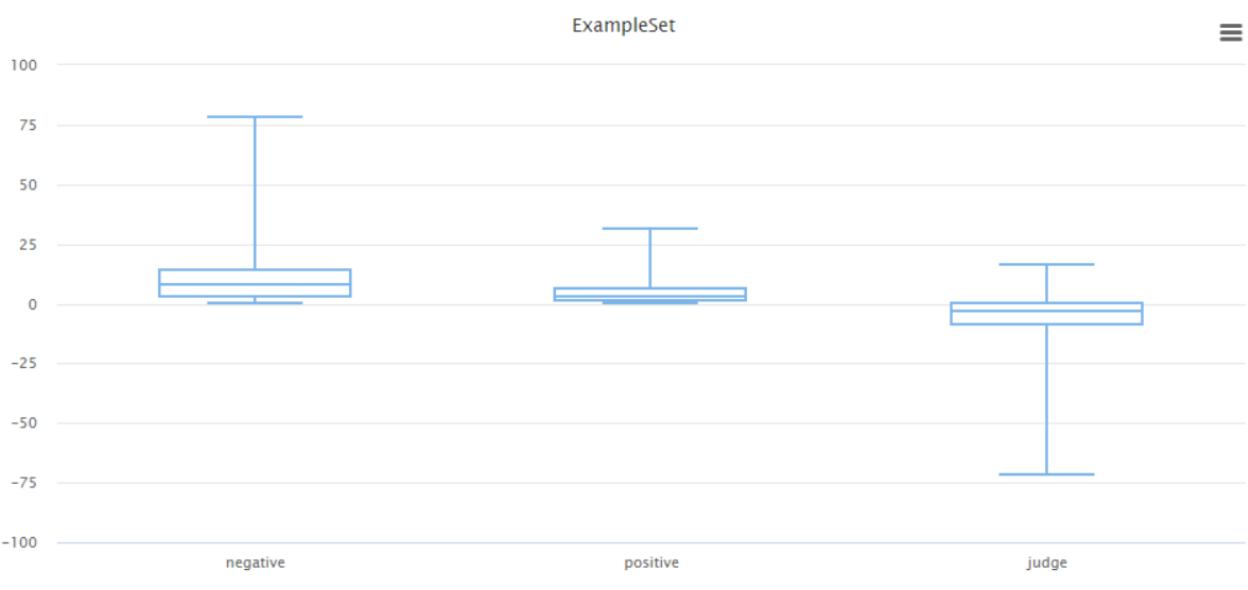
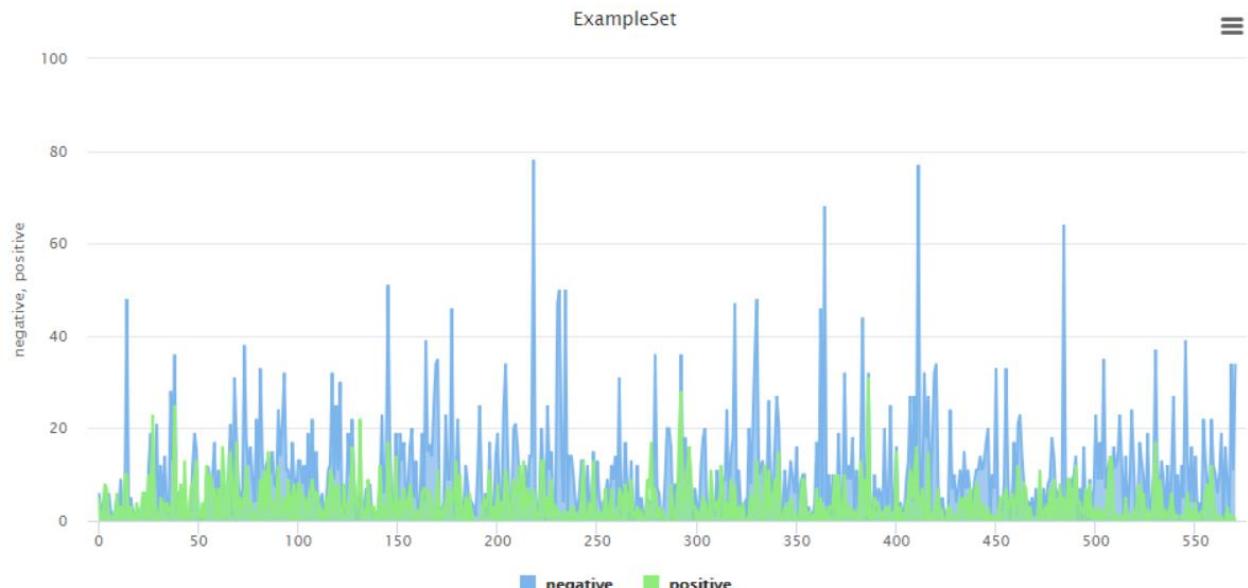


## Year 2013

We can observe how the various stocks have been selected. First, we notice that the distribution of stocks for the year 2011 is quite uniform, with a predominance of observations for VZ and GS, and few for BAC.

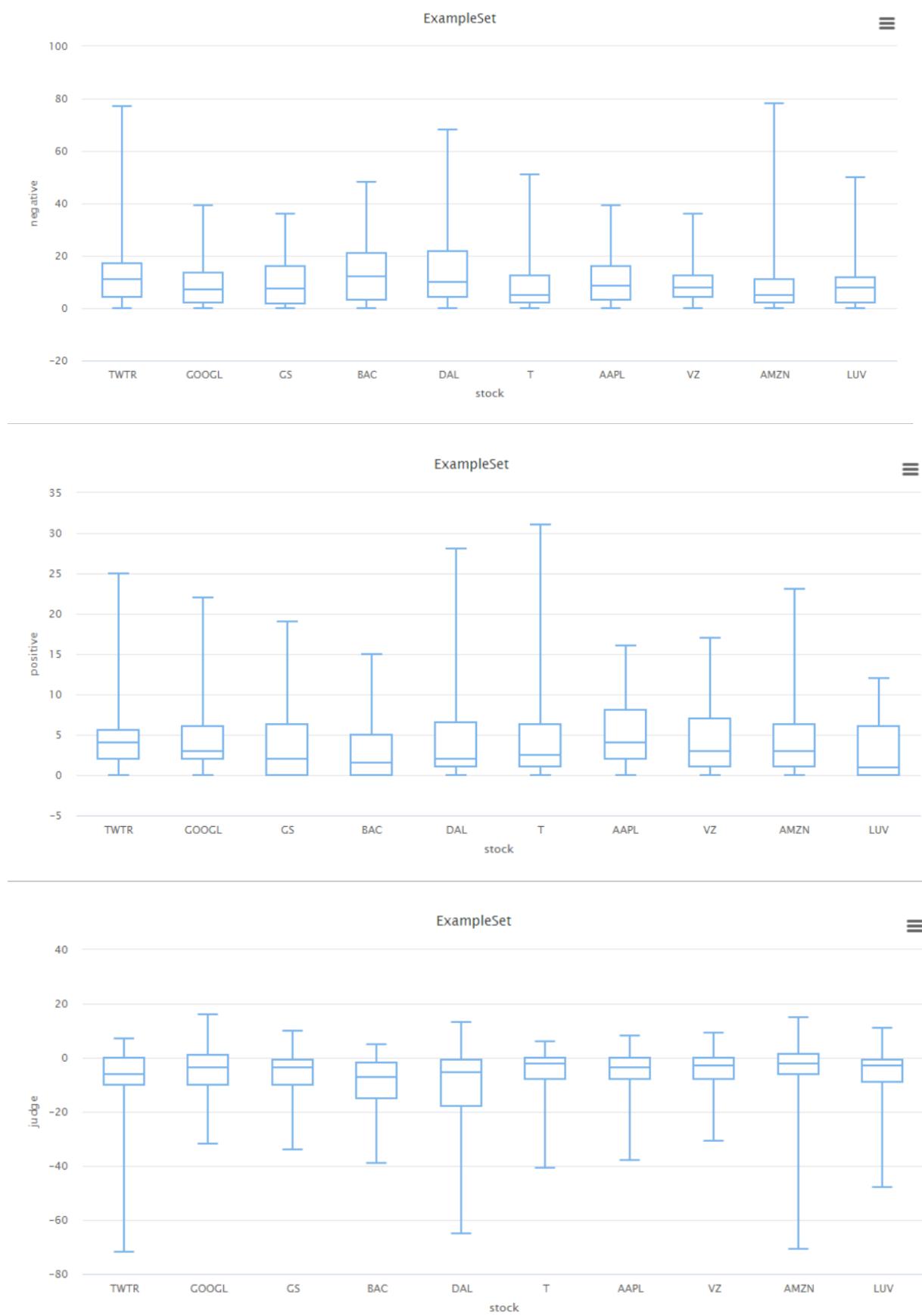


Let's look at positive and negative values.



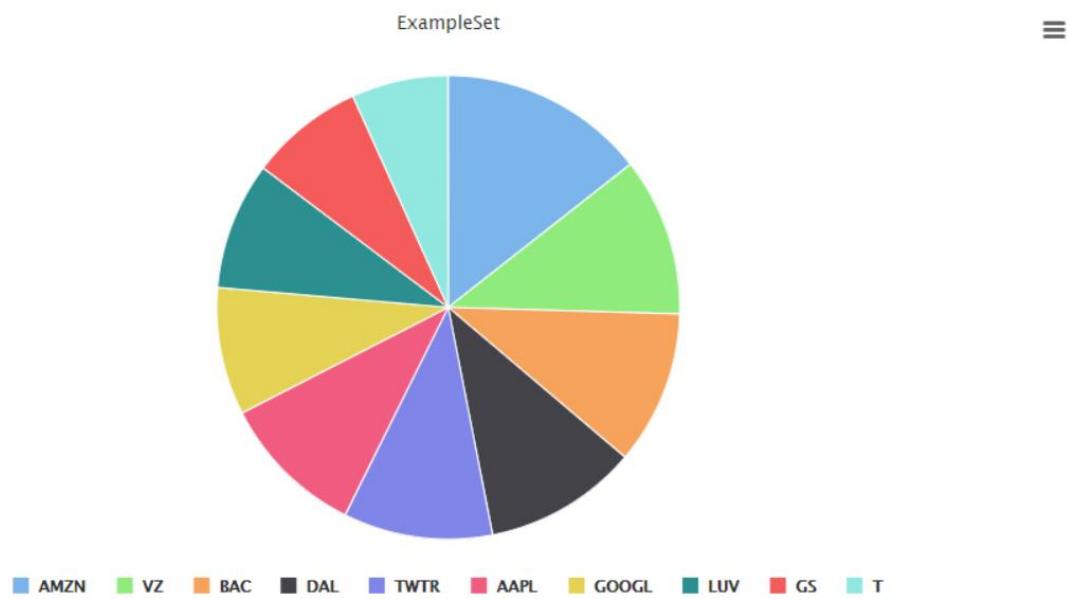
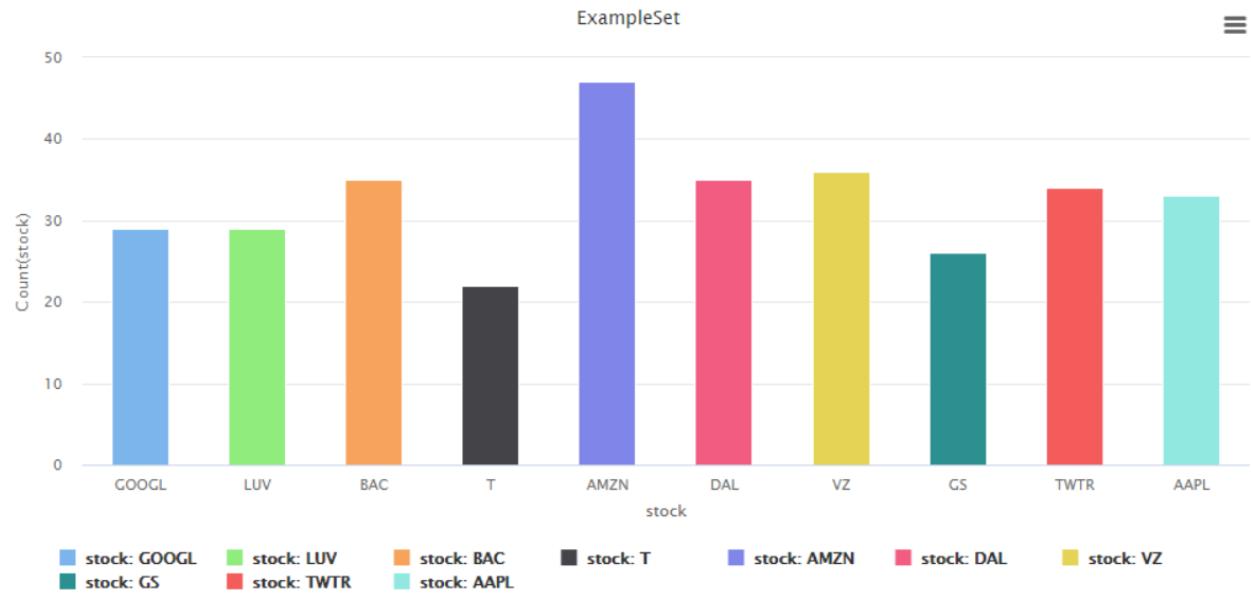
Row No.	average(judge)	sum(judge)	sum(positive)	sum(negative)
1	-6.580	-3757	2369	6126

Link among stock, positive, negative e judge.

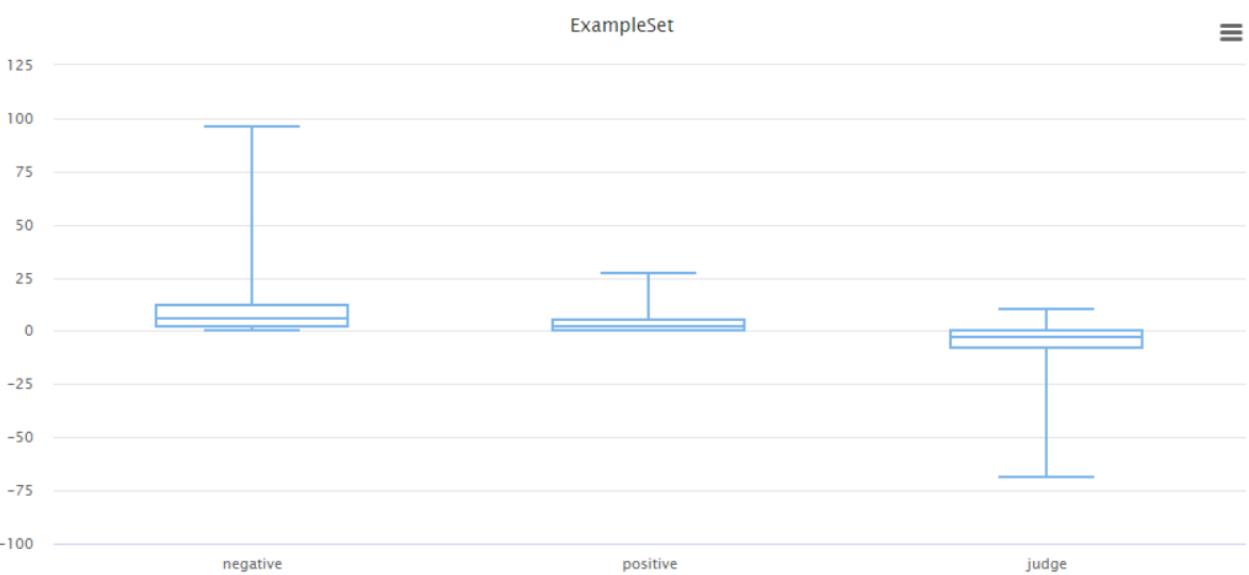
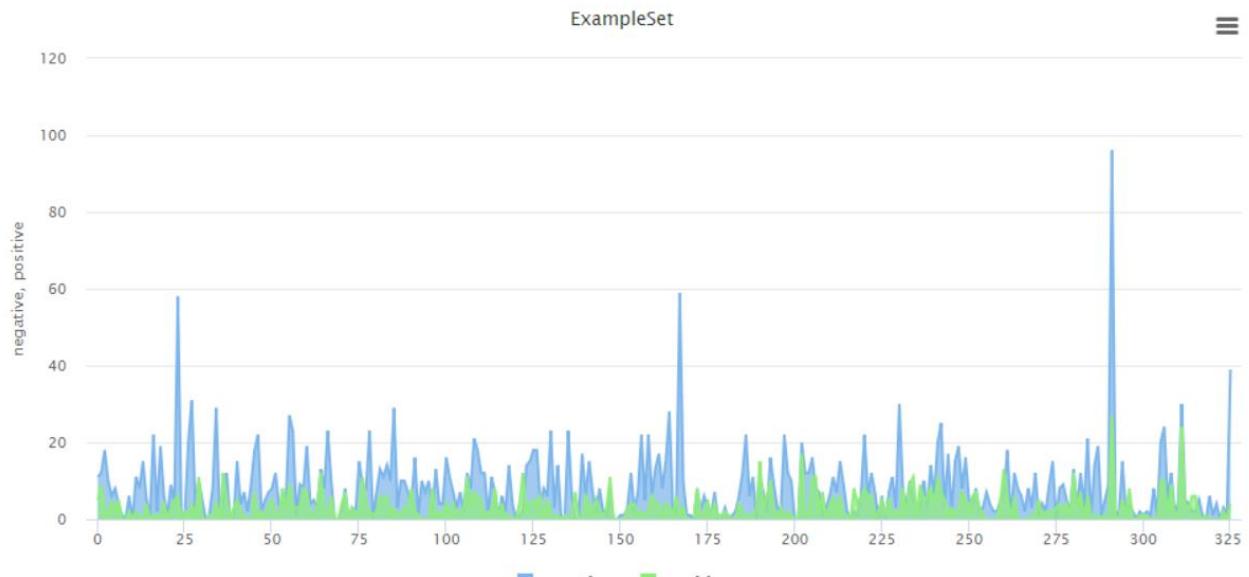


## Year 2015

We can observe how the various stocks have been selected. First, we notice that the distribution of stocks for the year 2015 is quite uniform, with a predominance of observations for AMZN and few for T.

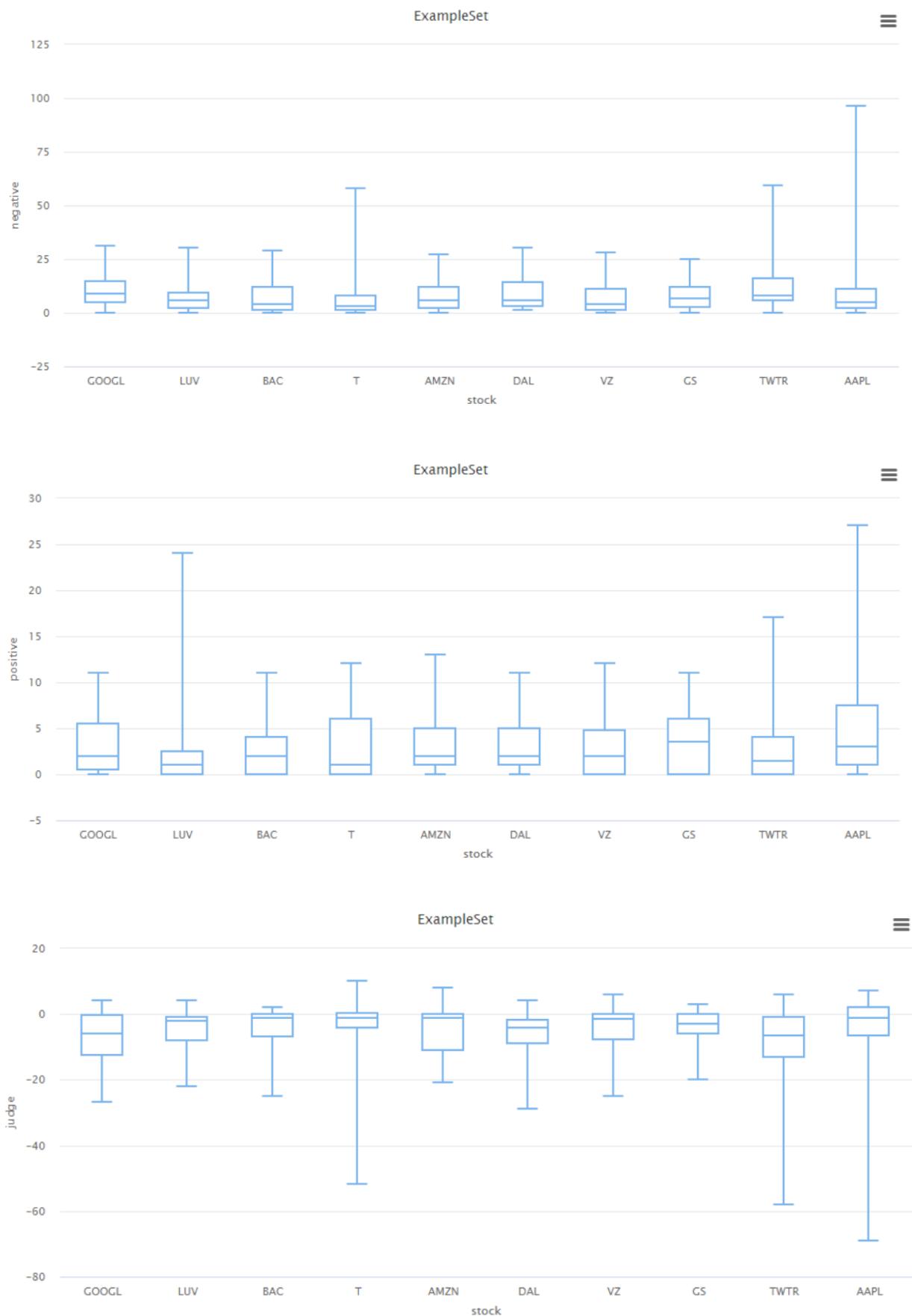


Let's look at positive and negative values.

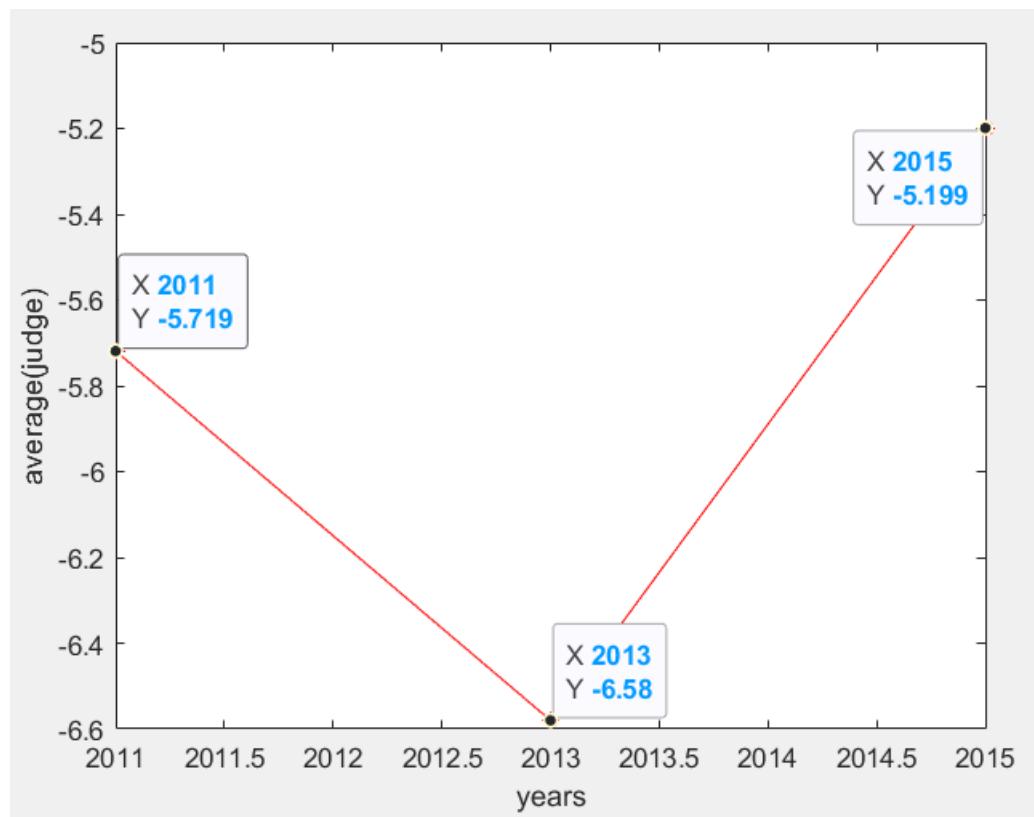


Row No.	average(judge)	sum(judge)	sum(positive)	sum(negative)
1	-5.199	-1695	1027	2722

Link among stock, positive, negative e judge.

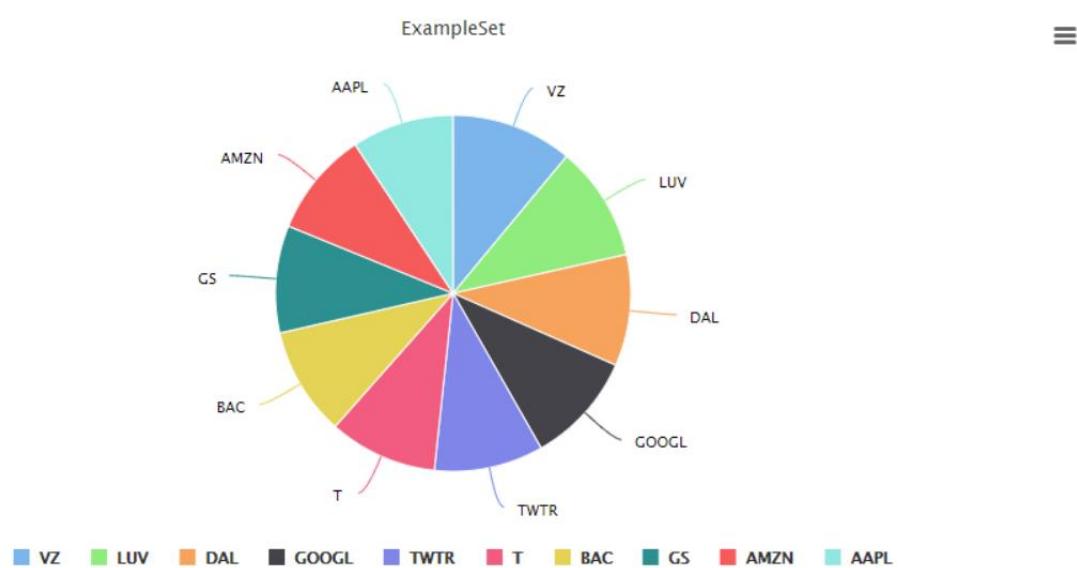


We can summarize what has been explored since now with the following plot:

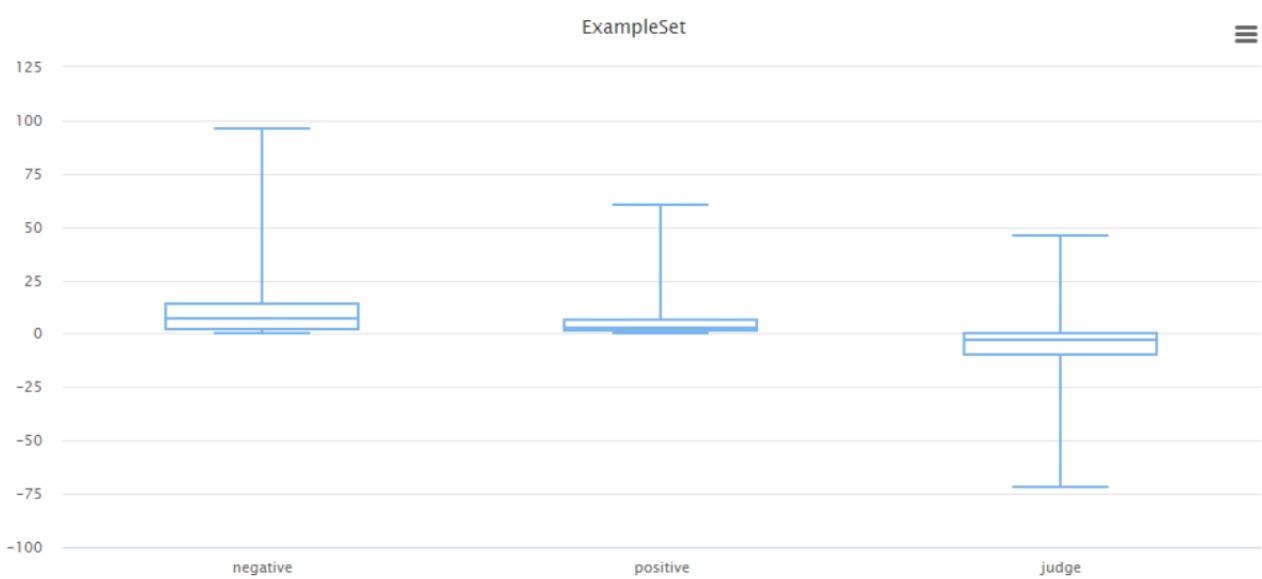
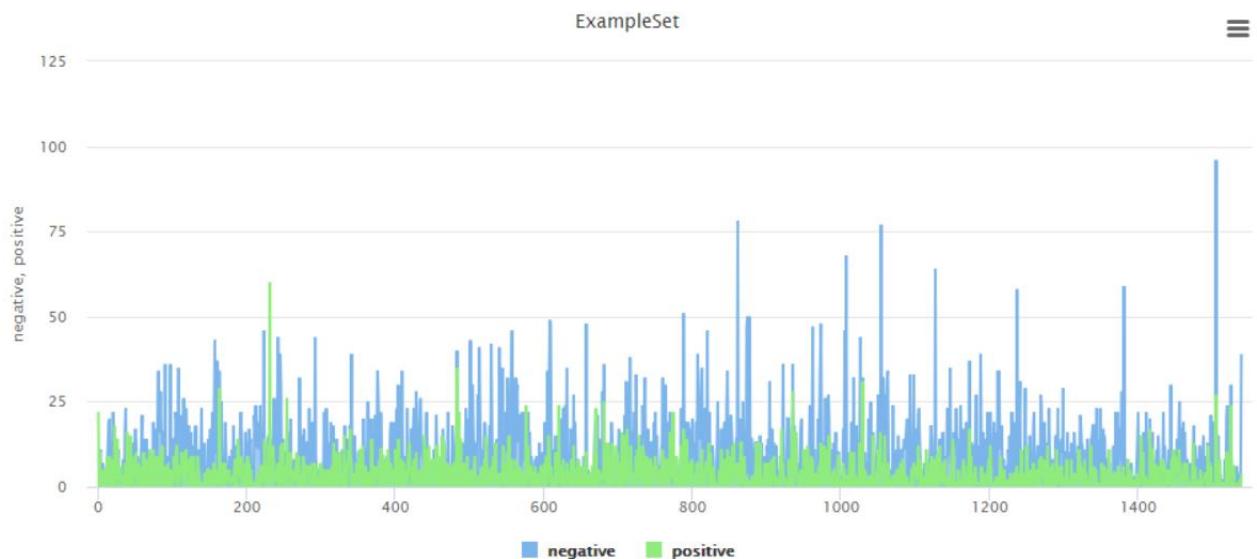


## Years 2011, 2013, 2015

Possiamo osservare come sono stati presi i vari stock. Innanzitutto notiamo che la distribuzione degli stock nei 3 anni è molto uniforme, con prevalenza di osservazioni per VZ:

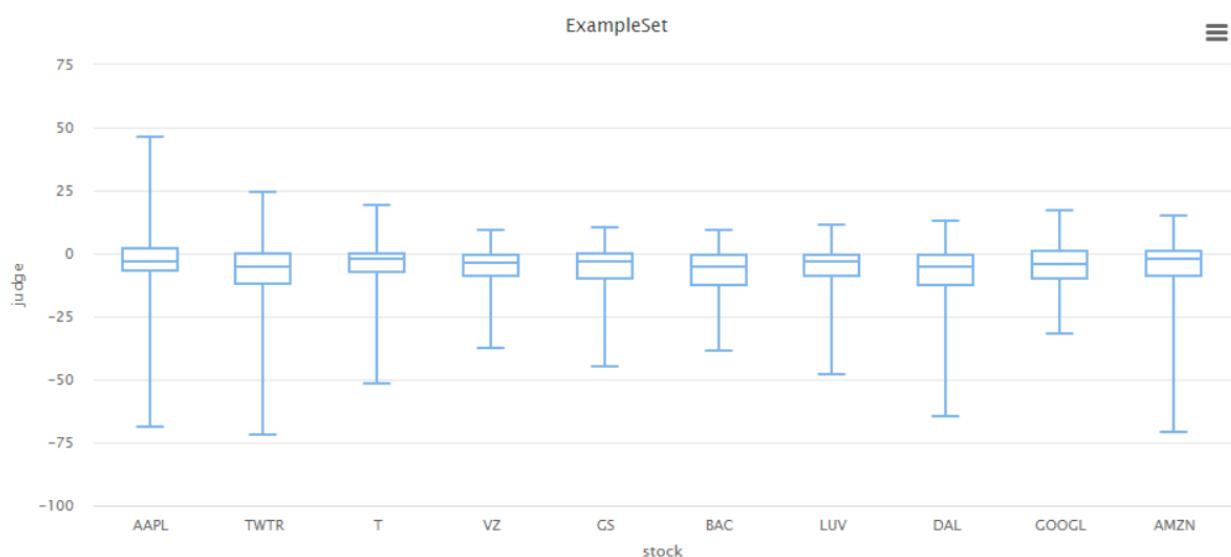
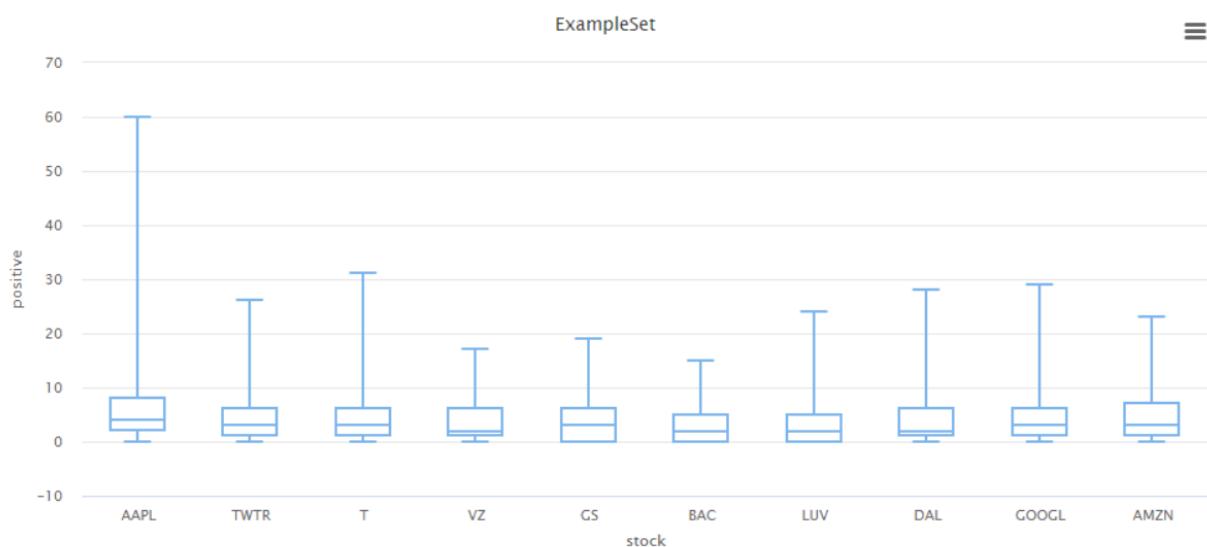
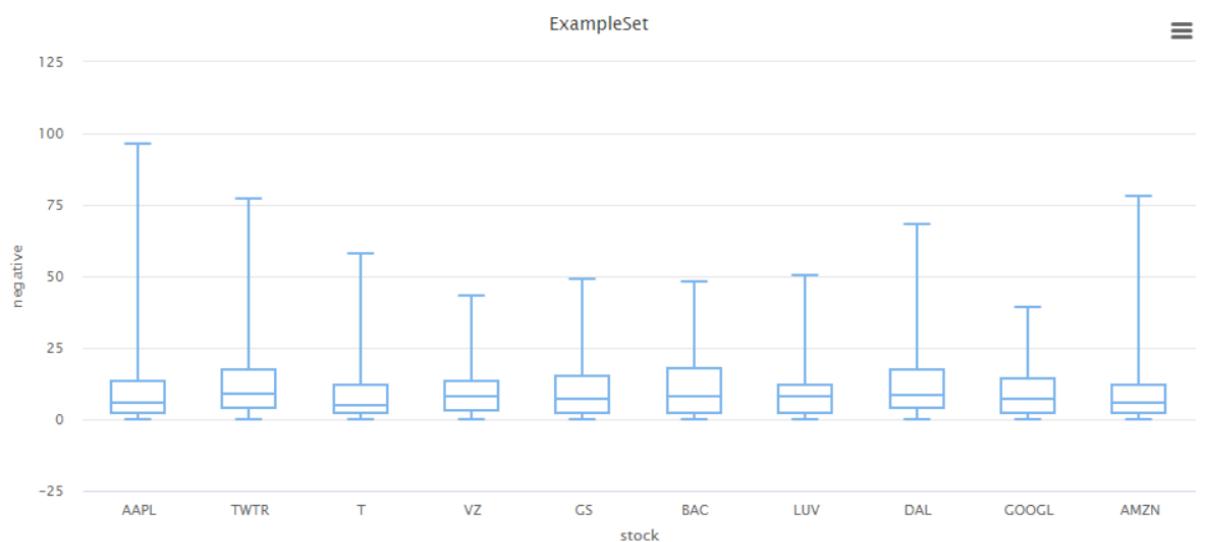


Let's look at positive and negative values.



Row No.	average(judge)	sum(judge)	sum(positive)	sum(negative)
1	-5.928	-9129	6221	15350

Link among stock, positive, negative e judge.



## PHASE 2: CLUSTERING

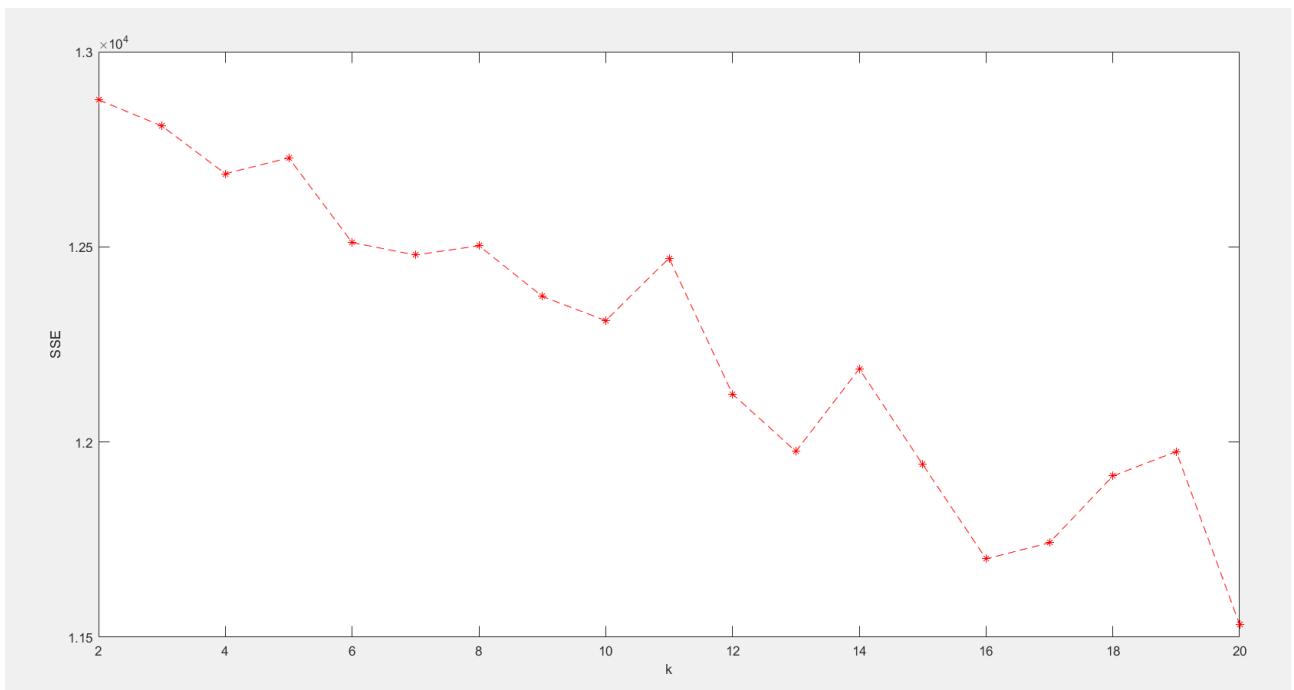
Before performing clustering, let's reduce the dataset by removing data containing news that is not in English (text vectorization), and select the relevant variables for clustering: 'date' (renamed from 'ts'), 'positive', 'negative', 'body', and 'stock'. For the 'body' attribute, we apply the 'process document from data' operator, excluding words with a frequency lower than 5% and higher than 99%

### 2.1 K-means

#### 1. JUDGE NORMALIZED; DATE NORMALIZED

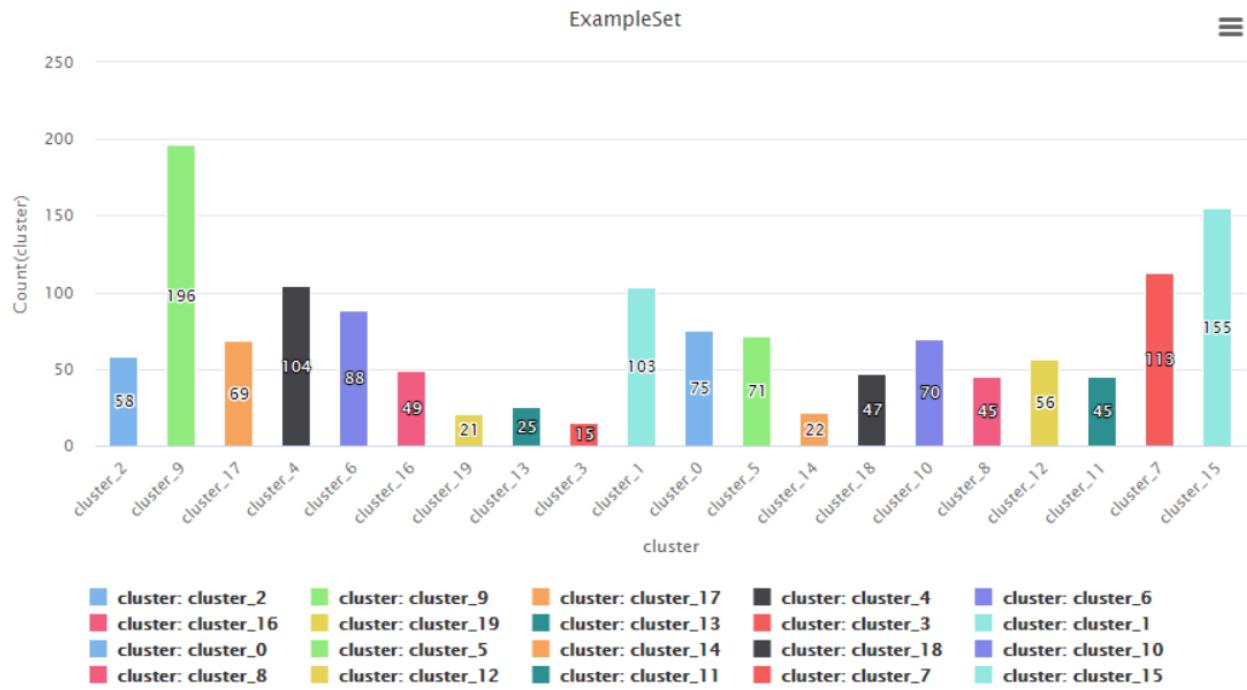
We introduce a new variable called 'judge' (= 'positive' - 'negative'), which we normalize along with the 'date' attribute, while simultaneously removing 'positive' and 'negative'.

Let's look at the SSE plot:

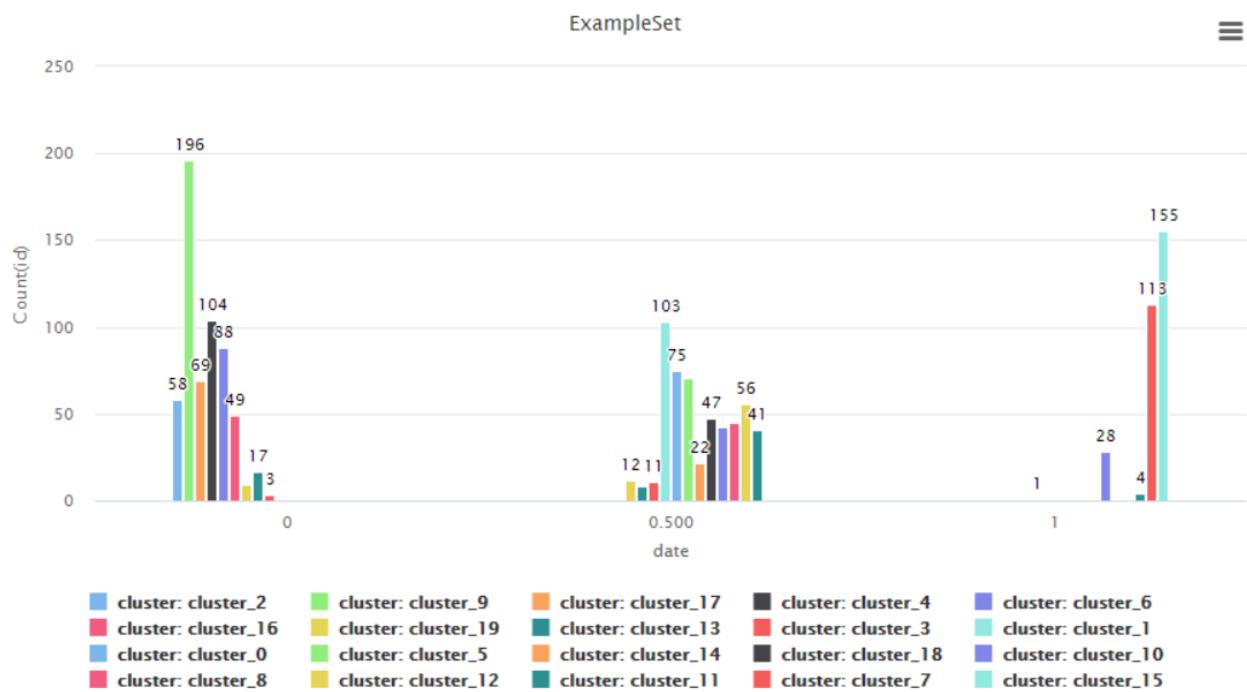


An evident elbow is not visible.

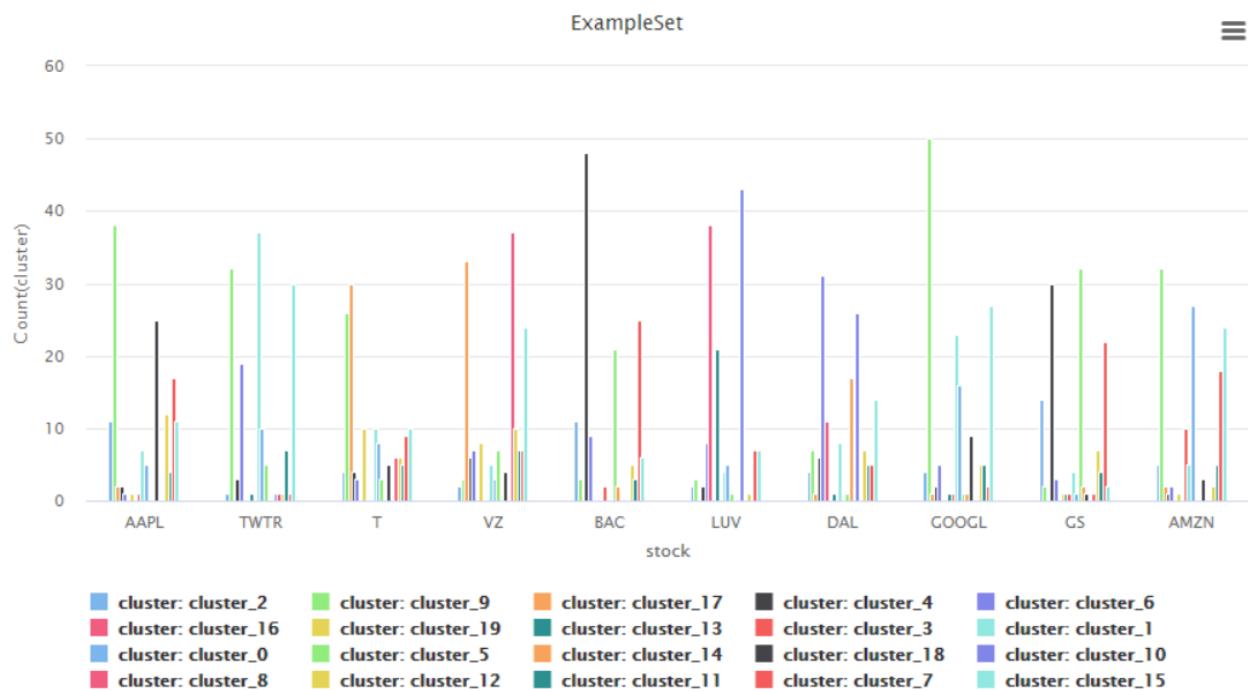
In order to reduce the SSE value, let's see how the clusters are organized with  $k = 20$  (SSE=11532.133).



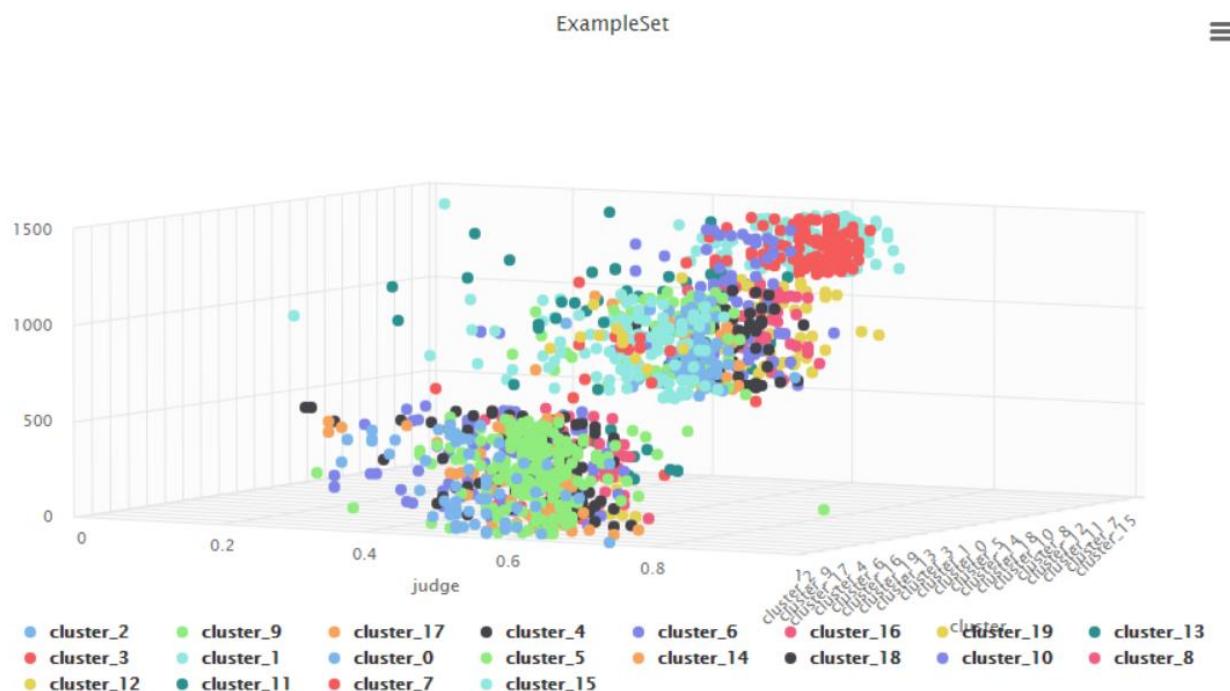
With respect to *date*:



With respect to stock:



With respect to judge:

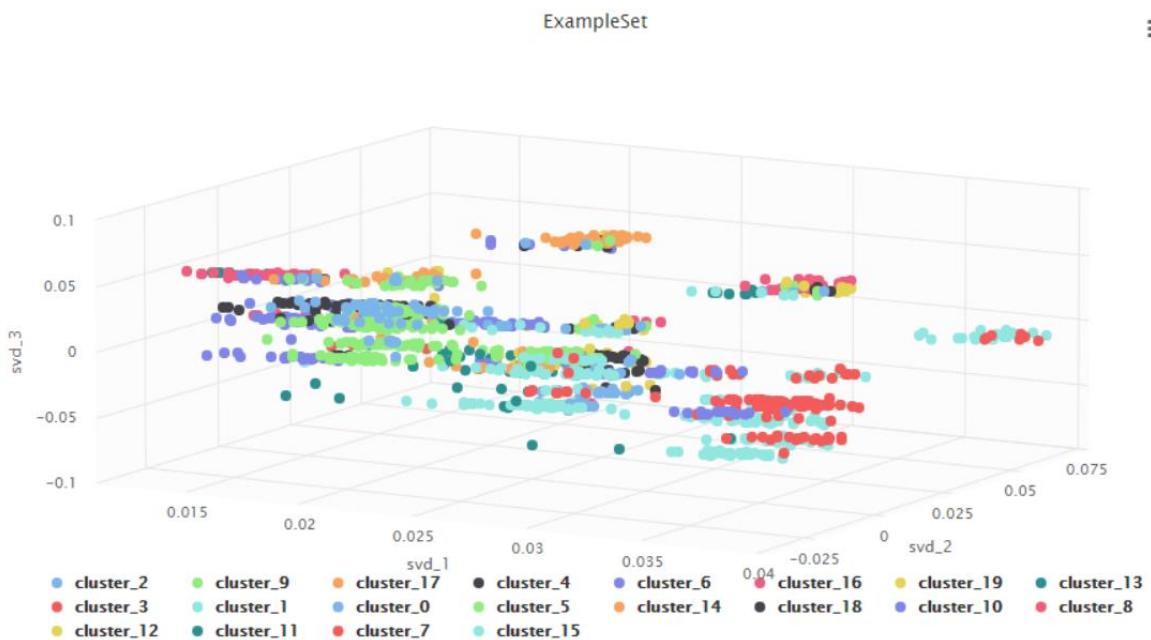


Let's take a look at the cohesion measures of the clusters:

## PerformanceVector

```
PerformanceVector:  
Avg. within cluster distance: -154.893  
Avg. within cluster distance for cluster 0: -117.738  
Avg. within cluster distance for cluster 1: -164.048  
Avg. within cluster distance for cluster 2: -84.736  
Avg. within cluster distance for cluster 3: -17.117  
Avg. within cluster distance for cluster 4: -159.620  
Avg. within cluster distance for cluster 5: -107.466  
Avg. within cluster distance for cluster 6: -139.297  
Avg. within cluster distance for cluster 7: -179.283  
Avg. within cluster distance for cluster 8: -58.672  
Avg. within cluster distance for cluster 9: -314.488  
Avg. within cluster distance for cluster 10: -98.532  
Avg. within cluster distance for cluster 11: -70.117  
Avg. within cluster distance for cluster 12: -84.441  
Avg. within cluster distance for cluster 13: -28.730  
Avg. within cluster distance for cluster 14: -30.189  
Avg. within cluster distance for cluster 15: -252.951  
Avg. within cluster distance for cluster 16: -62.131  
Avg. within cluster distance for cluster 17: -101.285  
Avg. within cluster distance for cluster 18: -67.632  
Avg. within cluster distance for cluster 19: -24.921
```

Let's take a look at the SVD plot along three dimensions:



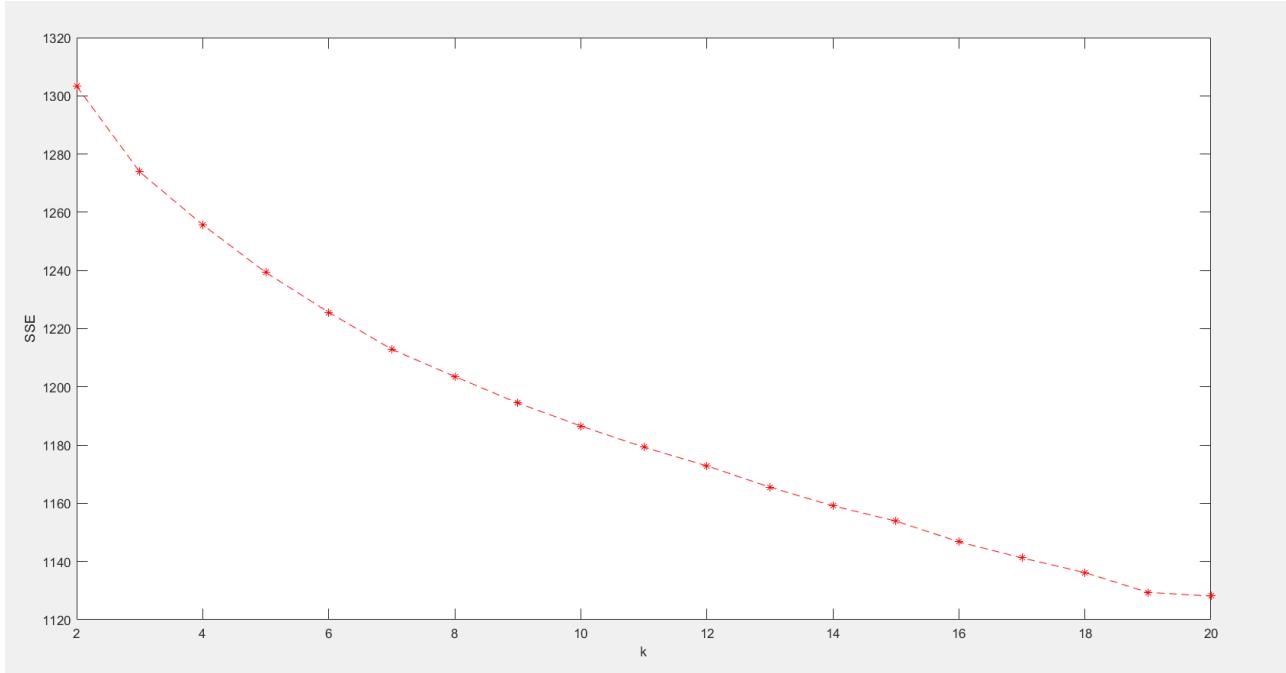
Explained variance: 5.7%

Notice that with 500 attributes of the SVD we would explain the 82.6% of the variance.

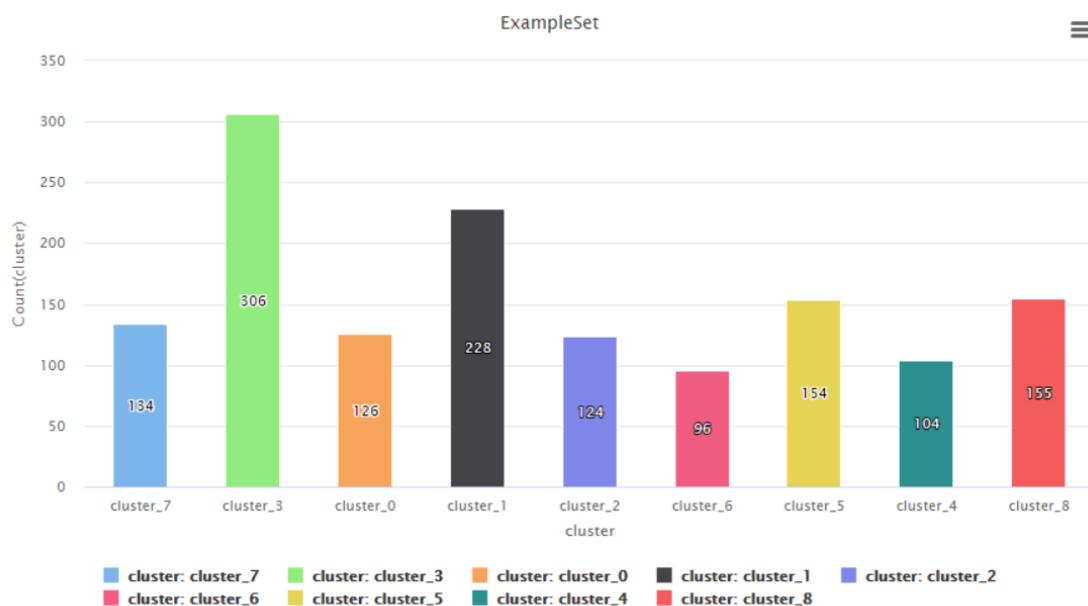
## 2. POSITIVE AND NEGATIVE NORMALIZED; NO DATE; NO STOCK

In order to reduce the SSE value and determine more homogeneous clusters, we keep the 'positive' and 'negative' attributes, normalizing them, while removing 'date' and 'stock'.

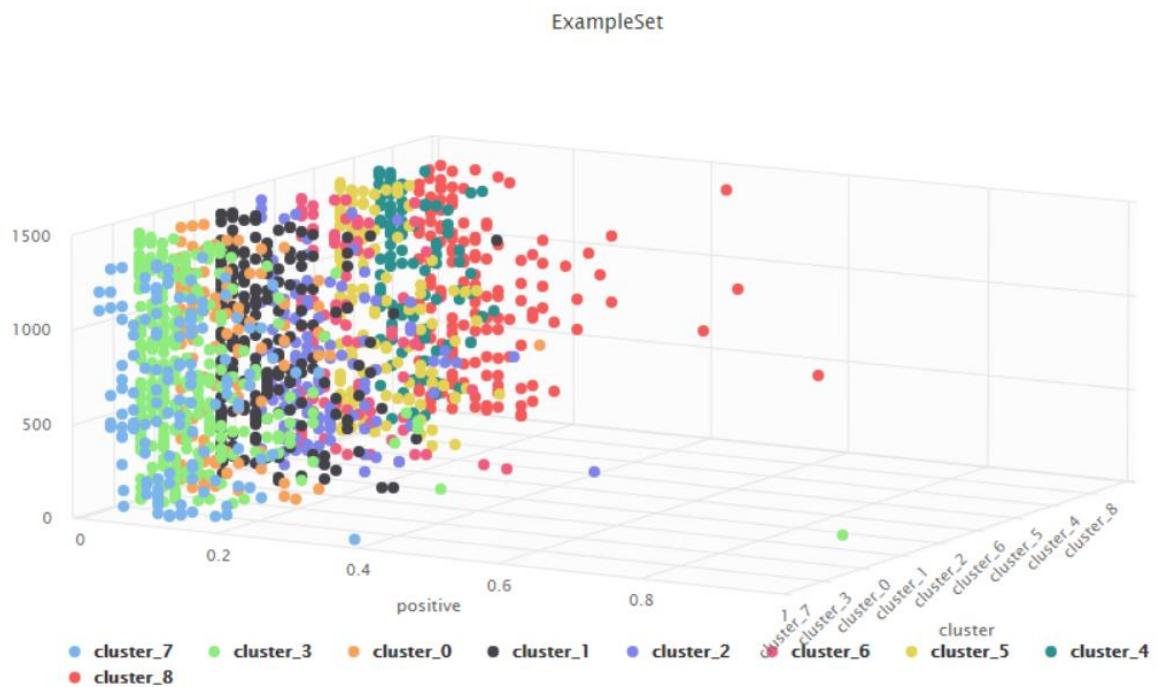
Let's take a look at the SSE plot:



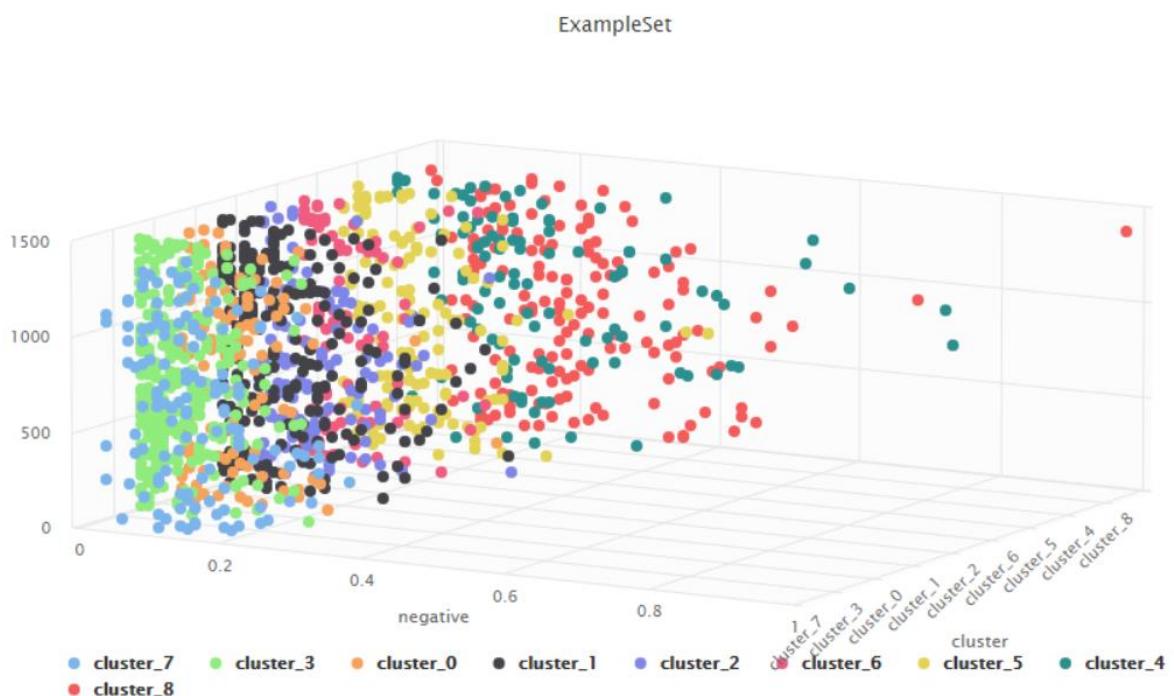
For  $k=9$ , fairly balanced clusters are created, and moreover, the SSE value is significantly lower than before (1194.458). Although the elbow of the graph might be at a value of  $k$  greater than 9, we believe that this measure is suitable for exploring association rules within the clusters, avoiding issues caused by excessive reduction of their sizes (such as data misalignment and the consequent generation of an enormous number of frequent itemsets). Let's take a look at the emerging clusters for  $k=9$  (SSE=1194.458):



With respect to *positive*:



With respect to *negative*:



Let's take a look at the cohesion measures of the clusters:

## PerformanceVector

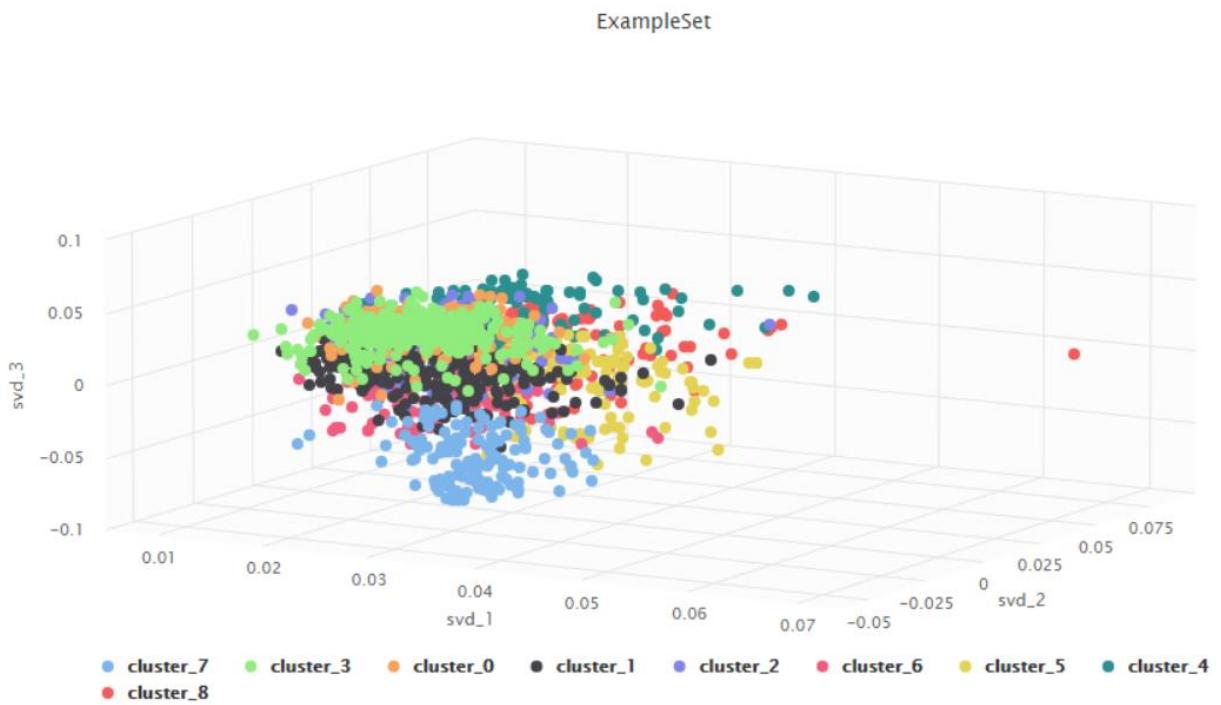
```
PerformanceVector:  
Avg. within cluster distance: -239.722  
Avg. within cluster distance for cluster 0: -157.318  
Avg. within cluster distance for cluster 1: -298.986  
Avg. within cluster distance for cluster 2: -155.601  
Avg. within cluster distance for cluster 3: -415.654  
Avg. within cluster distance for cluster 4: -133.693  
Avg. within cluster distance for cluster 5: -187.656  
Avg. within cluster distance for cluster 6: -120.555  
Avg. within cluster distance for cluster 7: -159.532  
Avg. within cluster distance for cluster 8: -205.508
```

Let's take a look at the distance measures of the clusters:

## PerformanceVector

```
PerformanceVector:  
Avg. within centroid distance: 0.837  
Avg. within centroid distance_cluster_0: 0.792  
Avg. within centroid distance_cluster_1: 0.866  
Avg. within centroid distance_cluster_2: 0.798  
Avg. within centroid distance_cluster_3: 0.927  
Avg. within centroid distance_cluster_4: 0.838  
Avg. within centroid distance_cluster_5: 0.754  
Avg. within centroid distance_cluster_6: 0.807  
Avg. within centroid distance_cluster_7: 0.718  
Avg. within centroid distance_cluster_8: 0.888  
Davies Bouldin: 5.032
```

Let's take a look at the SVD plot along three dimensions:



Explained variance: 2.8%

Notice that with 500 attributes of the SVD we would explain the 80.7% of the variance.

## 2.2 Dbscan

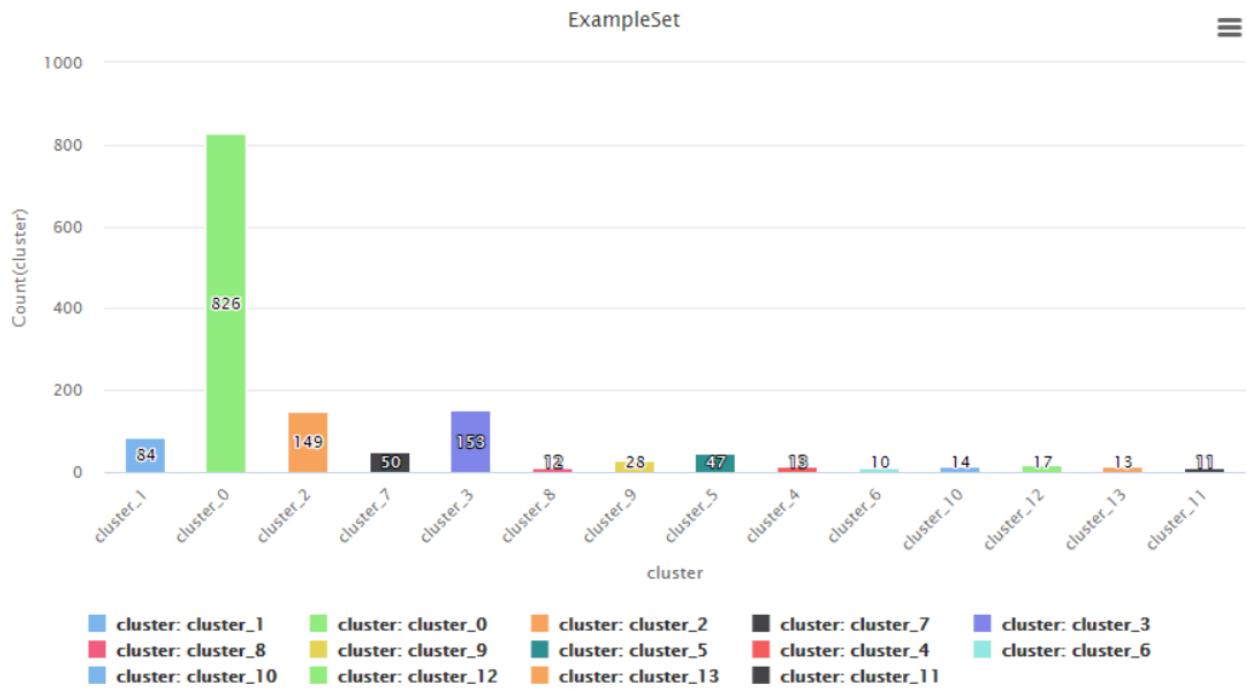
### 1.JUDGE NORMALIZED; DATE NORMALIZED

Even in this case, as we did with k-means, we introduce a new variable called 'judge' (= 'positive' - 'negative'), which we normalize along with the 'date' attribute; then, we remove 'positive' and 'negative'. Let's take a look at the  $k$ -dist plot to have insights for the choice of a reasonable  $\text{eps}$ :

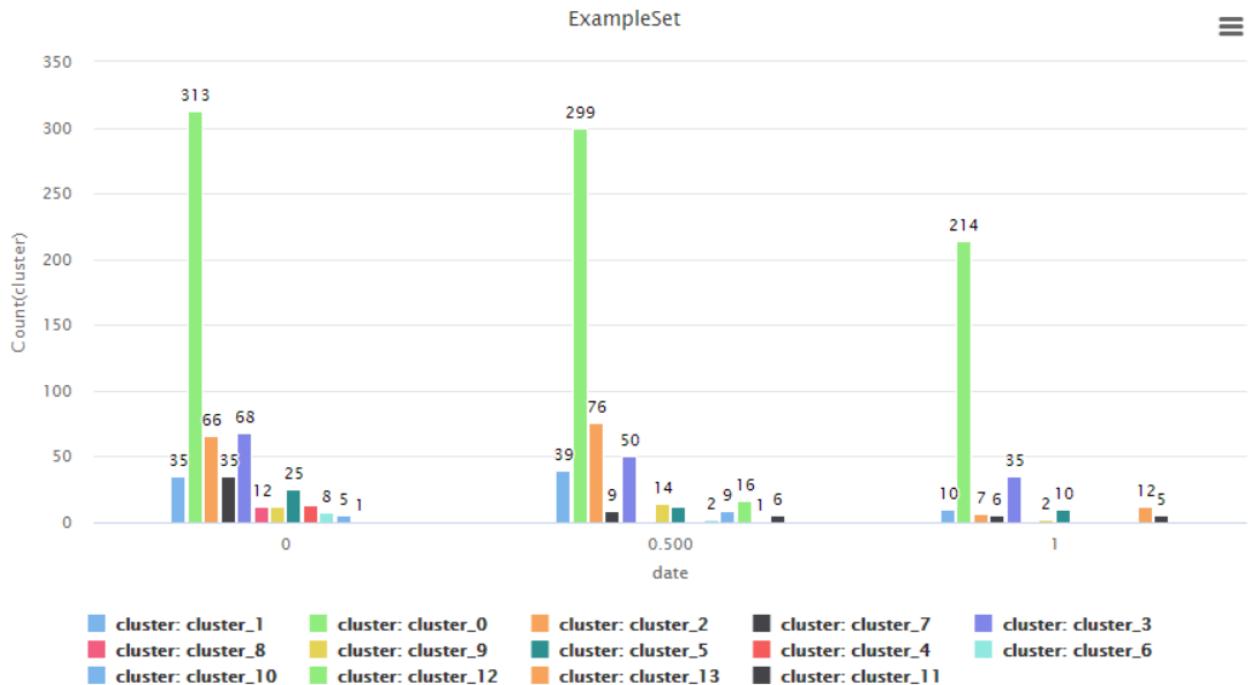


From this graph, it is clear that an acceptable value for  $\text{eps}$  could be around 1.2.

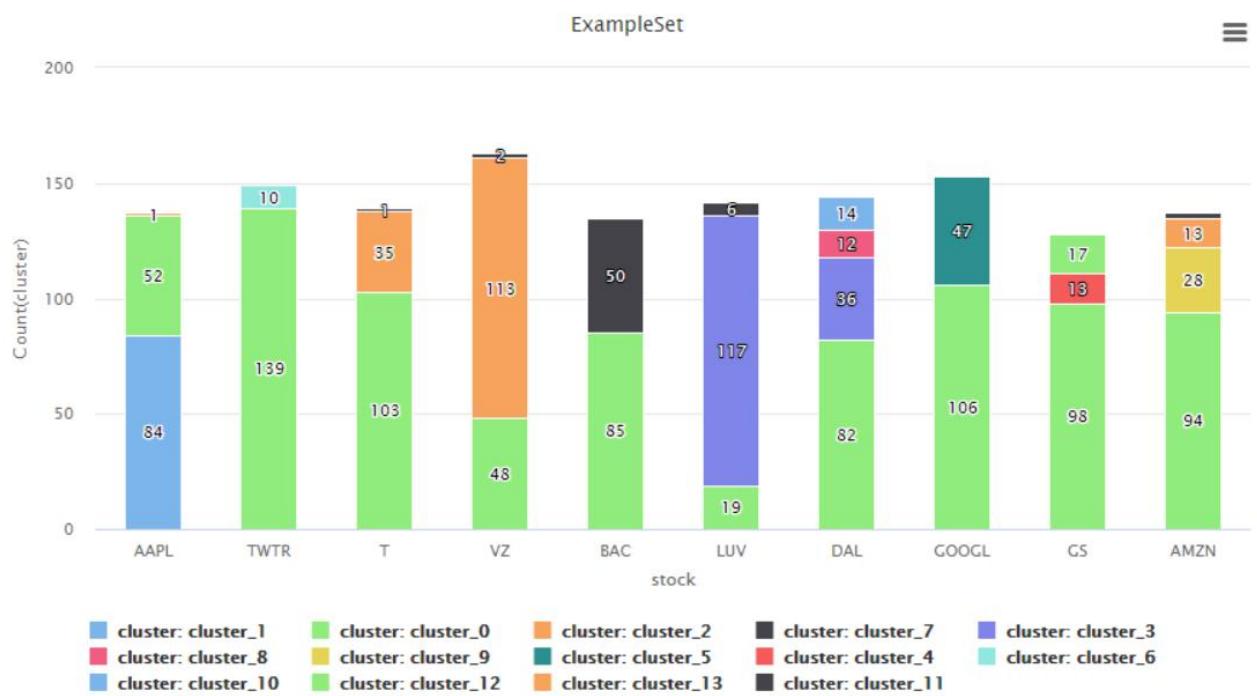
Setting  $minpoint=10$  and  $eps=1.2$  (SSE=633.751) the emerging clusters are the following.



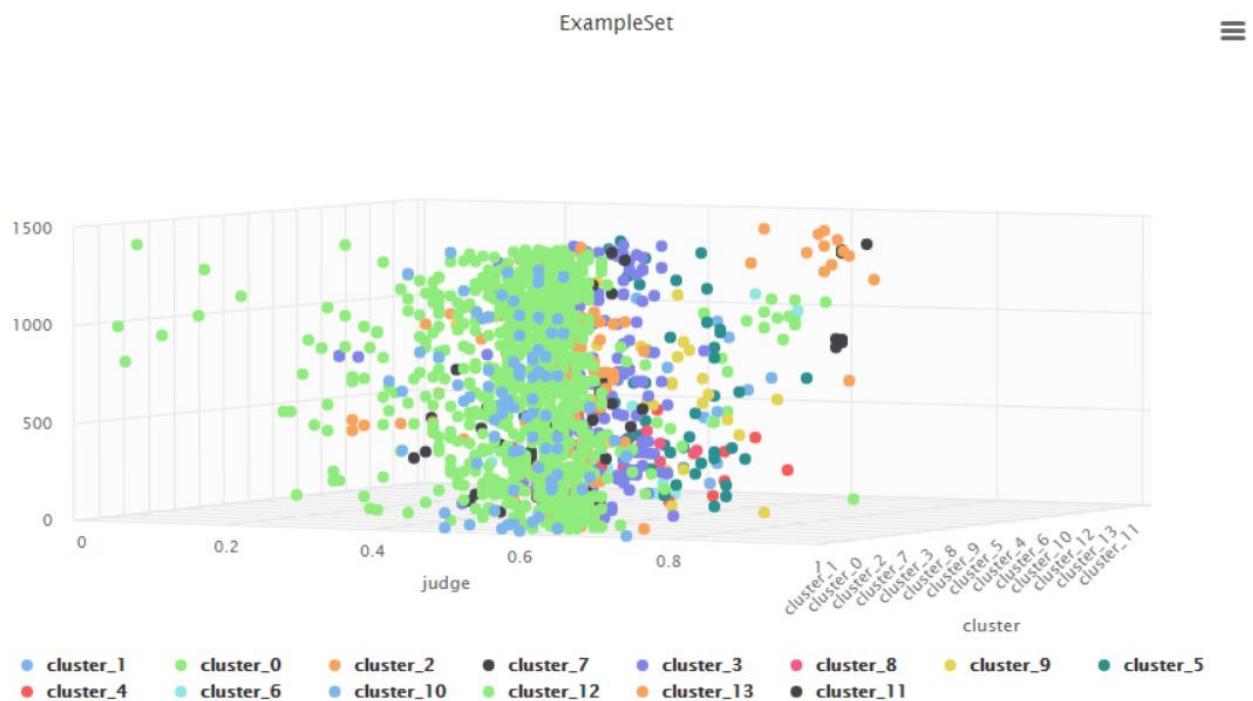
With respect to *date*:



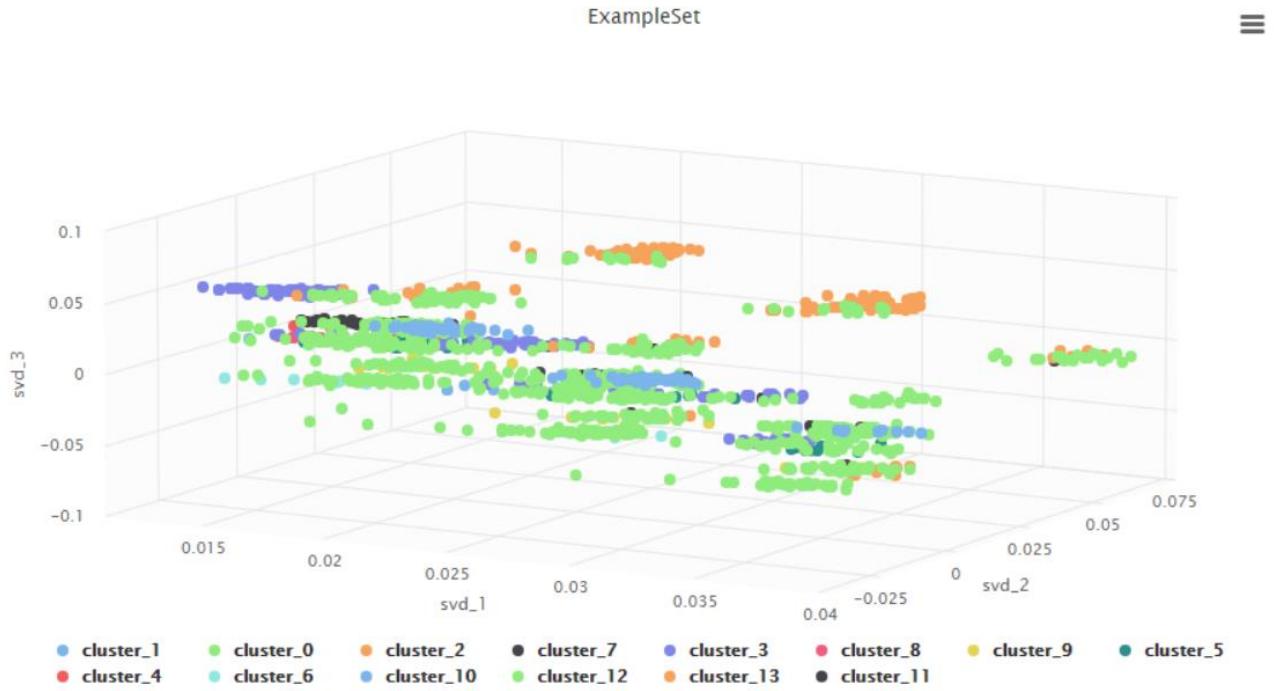
With respect to stock:



With respect to judge:



Let's take a look at the SVD plot along three dimensions:



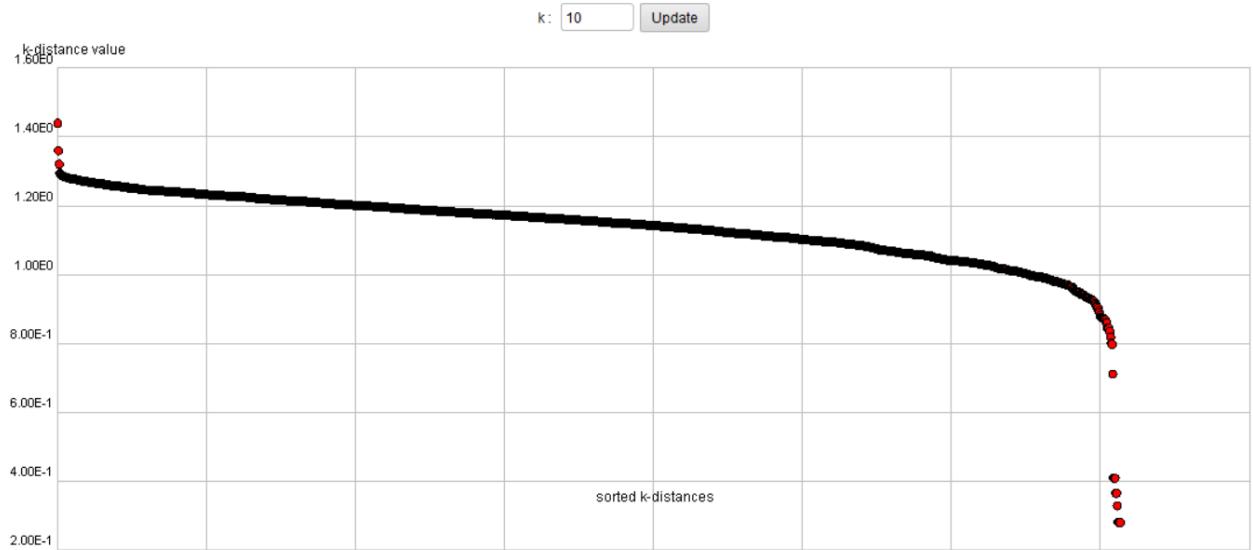
Explained variance: 5.7%.

Notice that with 500 attributes of the SVD we would explain the 82.6% of the variance.

## 2. POSITIVE AND NEGATIVE NORMALIZED; NO DATE; NO STOCK

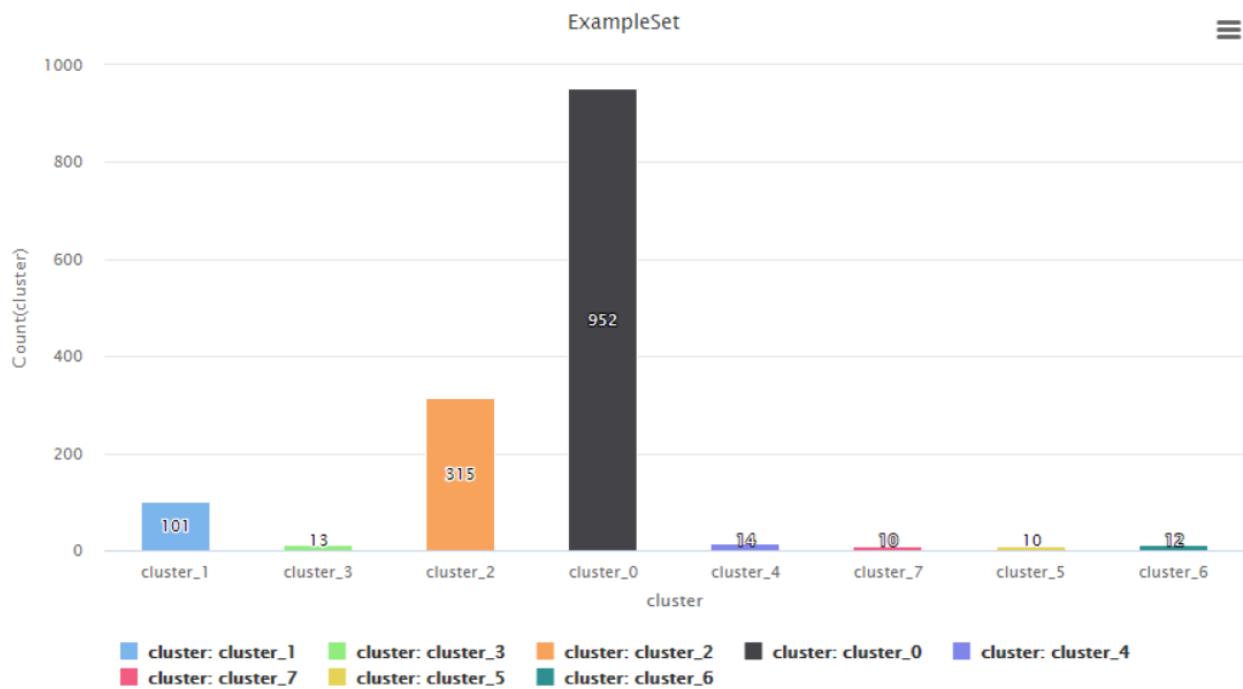
We remove the 'stock' attribute, keeping 'positive' and 'negative', hoping to achieve better results than those produced by k-means.

First of all, let's look at the *k-dist* PLOT to get an idea of how to choose *eps*:

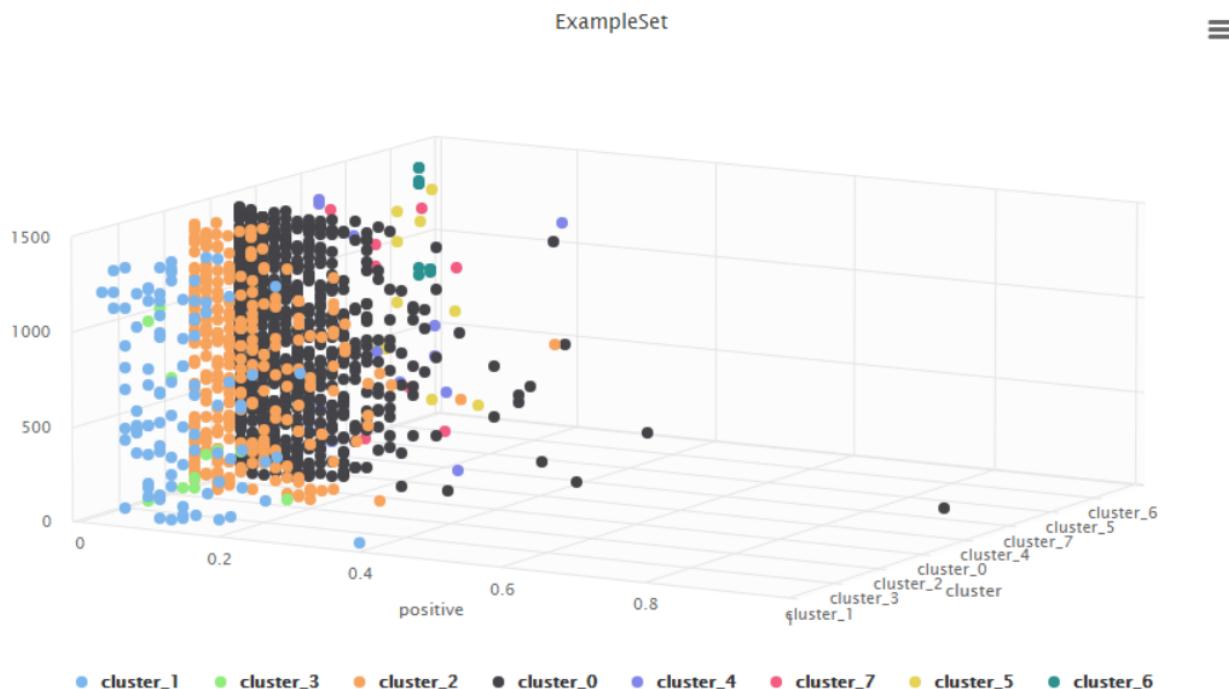


In this case, it seems that an acceptable value for *eps* could be around 1.1.

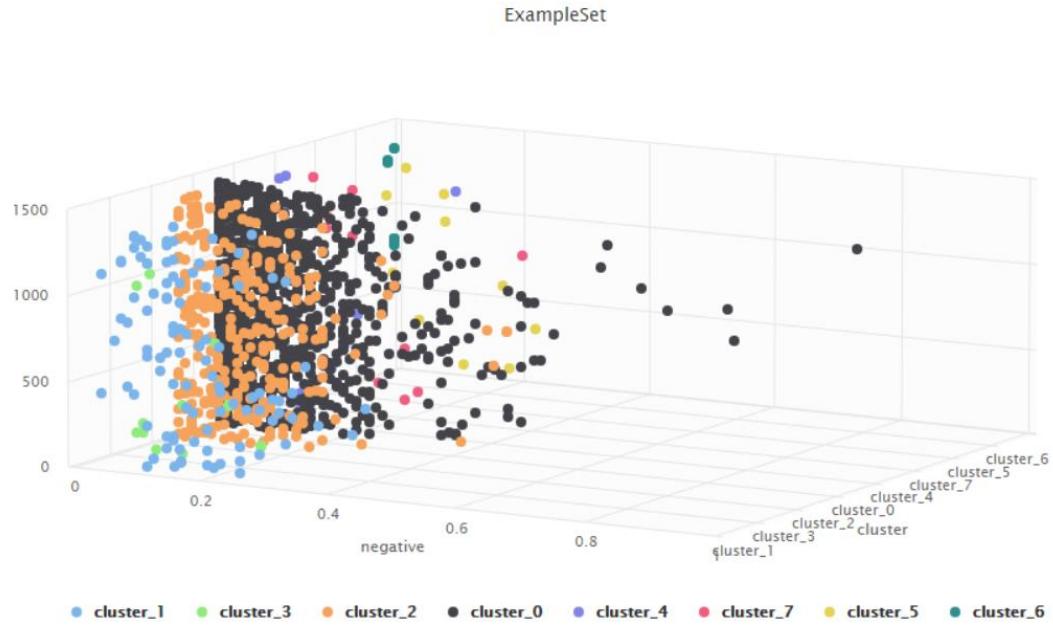
Setting  $minpoint=10$  and  $eps=1.05$  ( $SSE=375.830$ ), the emerging clusters are the following.



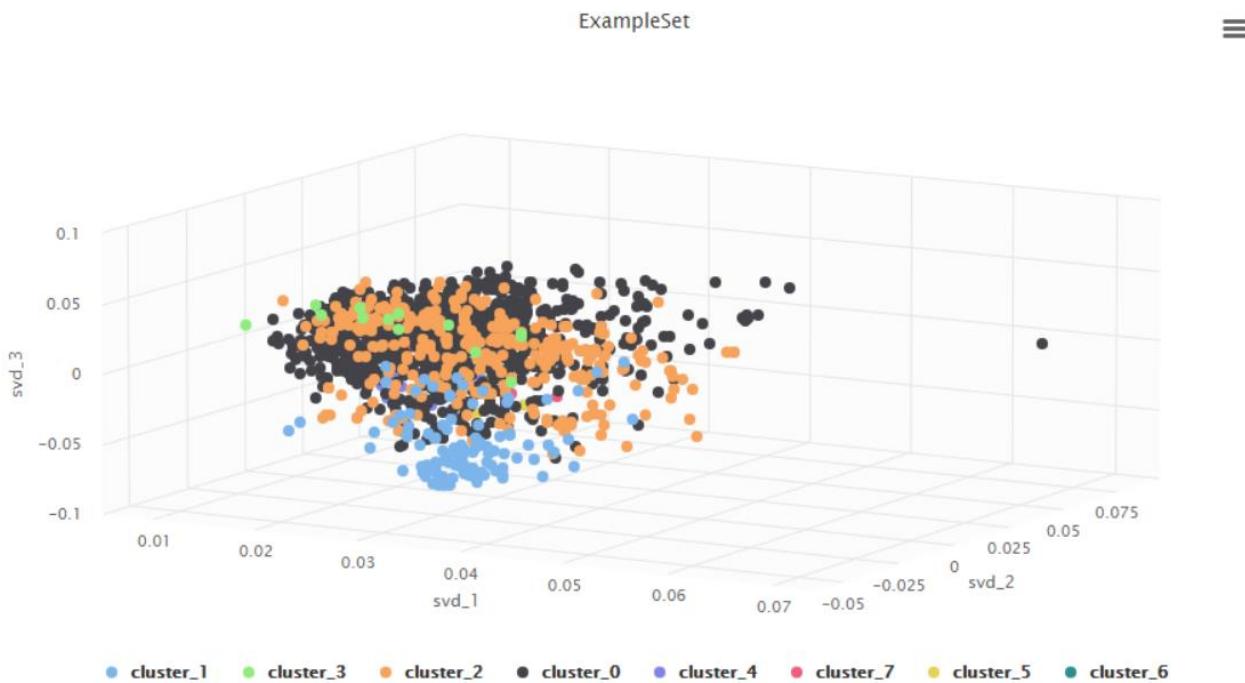
With respect to *positive*:



With respect to *negative*:



Let's take a look at the SVD plot along three dimensions:



Explained variance: 2.8%.

Notice that with 500 attributes of the SVD we would explain the 80.7% of the variance.

The last two cluster models are more imbalanced than their predecessors, due to the heterogeneity present in the available data. Therefore, although the SSE values obtained with the DBSCAN algorithm are lower than those obtained through partitioning clustering, we believe that the latter, in this case, provides the groups that are more suitable for exploring potential association rules

### PHASE 3: ASSOCIATION RULES

Considering that the algorithm used for the rules' extraction, namely FP-GROWTH, is not particularly efficient with sparse data, let's analyse its application to the 9 groups identified with the k-means algorithm during the second clustering session.

- Cluster 0:  $\text{minsup}=0.5$ ,  $\text{minconf}=0.5$ . The dimensions of the frequent itemsets vary from 1 to 7.  
Topic: telephone services.

Association rules:

No.	Premises ↑	Conclusion	Support	Confidence	Lift	Conviction
775	positive = E	negative = E, group	0.556	0.565	1.016	1.021
776	positive = E	said, network	0.556	0.565	1.002	1.002
777	positive = E	compani, plan	0.556	0.565	1.002	1.002
778	positive = E	negative = E, said, year	0.556	0.565	1.016	1.021
779	positive = E	negative = E, said, servic	0.556	0.565	1.002	1.002
780	positive = E	negative = E, compani, year	0.556	0.565	1.016	1.021
781	positive = E	said, wireless, edit	0.556	0.565	1.016	1.021
782	positive = E	verizon, wireless, report	0.556	0.565	1.016	1.021
783	positive = E	communic, compani, edit	0.556	0.565	1.016	1.021
784	positive = E	communic, wireless, report	0.556	0.565	1.016	1.021
785	positive = E	communic, mobil, inc	0.556	0.565	0.988	0.984
786	positive = E	negative = E, said, inc, edit	0.556	0.565	1.016	1.021
787	positive = E	negative = E, compani, wireless, inc	0.556	0.565	1.016	1.021
789	positive = E	said, verizon, compani, wireless	0.556	0.565	1.016	1.021
790	positive = E	said, verizon, compani, mobil	0.556	0.565	1.016	1.021
791	positive = E	said, verizon, compani, inc	0.556	0.565	1.016	1.021
792	positive = E	negative = E, said, verizon, communic, edit	0.556	0.565	1.016	1.021
793	positive = E	negative = E, said, report, inc, edit	0.556	0.565	1.016	1.021
882	positive = E	group	0.563	0.573	1.016	1.021
883	positive = E	said, year	0.563	0.573	1.016	1.021
884	positive = E	compani, year	0.563	0.573	1.002	1.003
885	positive = E	negative = E, said, plan	0.563	0.573	1.016	1.021
886	positive = E	said, inc, edit	0.563	0.573	1.016	1.021

890	positive = E	negative = E, verizon, report, inc	0.563	0.573	1.016	1.021
891	positive = E	negative = E, communic, compani, mobil	0.563	0.573	1.016	1.021
892	positive = E	negative = E, communic, wireless, inc	0.563	0.573	1.002	1.003
893	positive = E	negative = E, compani, report, inc	0.563	0.573	1.016	1.021
894	positive = E	negative = E, wireless, report, edit	0.563	0.573	1.016	1.021
895	positive = E	said, verizon, compani, report	0.563	0.573	1.016	1.021
896	positive = E	said, communic, compani, report	0.563	0.573	1.016	1.021
897	positive = E	said, report, inc, edit	0.563	0.573	1.016	1.021
898	positive = E	verizon, communic, compani, report	0.563	0.573	1.016	1.021
900	positive = E	negative = E, said, compani, report, edit	0.563	0.573	1.016	1.021
901	positive = E	negative = E, said, mobil, report, edit	0.563	0.573	1.016	1.021
902	positive = E	negative = E, verizon, communic, compani, inc	0.563	0.573	1.016	1.021
903	positive = E	negative = E, verizon, communic, report, edit	0.563	0.573	1.016	1.021
904	positive = E	said, verizon, communic, report, edit	0.563	0.573	1.016	1.021
1076	positive = E	negative = E, oper	0.571	0.581	1.016	1.022
1077	positive = E	said, plan	0.571	0.581	1.016	1.022
1078	positive = E	said, servic	0.571	0.581	1.002	1.003
1079	positive = E	negative = E, wireless, edit	0.571	0.581	1.016	1.022
1080	positive = E	verizon, mobil, inc	0.571	0.581	0.989	0.984
1081	positive = E	verizon, report, inc	0.571	0.581	1.016	1.022
1084	positive = E	compani, report, inc	0.571	0.581	1.016	1.022
1085	positive = E	wireless, report, edit	0.571	0.581	1.016	1.022
1086	positive = E	negative = E, verizon, communic, edit	0.571	0.581	1.016	1.022
1087	positive = E	negative = E, verizon, wireless, inc	0.571	0.581	1.002	1.003
1088	positive = E	negative = E, communic, report, inc	0.571	0.581	1.016	1.022
1089	positive = E	said, verizon, communic, edit	0.571	0.581	1.016	1.022
1746	positive = E	negative = E, said, report, inc	0.587	0.597	1.016	1.023
1747	positive = E	negative = E, verizon, compani, mobil	0.587	0.597	1.016	1.023
1748	positive = E	negative = E, verizon, report, edit	0.587	0.597	1.016	1.023
1749	positive = E	negative = E, communic, compani, report	0.587	0.597	1.016	1.023
1750	positive = E	negative = E, compani, report, edit	0.587	0.597	1.016	1.023
1751	positive = E	said, verizon, communic, inc	0.587	0.597	1.003	1.004
1752	positive = E	said, verizon, report, edit	0.587	0.597	1.016	1.023
2108	positive = E	percent	0.595	0.605	1.016	1.024
2109	positive = E	negative = E, mobil, edit	0.595	0.605	1.016	1.024
2110	positive = E	said, wireless, report	0.595	0.605	1.016	1.024
2111	positive = E	said, mobil, inc	0.595	0.605	1.003	1.004
2112	positive = E	said, report, inc	0.595	0.605	1.016	1.024

3892	positive = E	report, inc	0.635	0.645	1.016	1.029
3893	positive = E	said, compani, mobil	0.635	0.645	1.016	1.029
3894	positive = E	said, compani, report	0.635	0.645	1.016	1.029
3895	positive = E	verizon, communic, inc	0.635	0.645	0.991	0.984
3896	positive = E	negative = E, said, communic, compani	0.635	0.645	1.016	1.029
4285	positive = E	negative = E, communic, mobil	0.643	0.653	1.004	1.007
4286	positive = E	said, verizon, report	0.643	0.653	1.016	1.030
4287	positive = E	said, communic, report	0.643	0.653	1.016	1.030
4288	positive = E	verizon, communic, report	0.643	0.653	1.016	1.030
4289	positive = E	negative = E, said, verizon, wireless	0.643	0.653	1.004	1.007
4619	positive = E	communic, mobil	0.651	0.661	0.992	0.984
4620	positive = E	negative = E, compani, inc	0.651	0.661	1.016	1.031
17471	positive = E	negative = E, compani	0.833	0.847	1.016	1.088
18183	positive = E	communic	0.841	0.855	0.997	0.984
18184	positive = E	negative = E, verizon	0.841	0.855	1.007	1.039
18810	positive = E	compani	0.849	0.863	1.007	1.042
19524	positive = E	verizon	0.857	0.871	0.998	0.984
19525	positive = E	negative = E, said	0.857	0.871	1.007	1.046
20525	positive = E	said	0.873	0.887	1.007	1.054
24372	positive = E	negative = E	0.968	0.984	1.008	1.476

No.	Premises	Conclusion ↑	Support	Confidence	Lift	Conviction
24907	oper	positive = E	0.579	0.986	1.002	1.175
24917	negative = E, said, wireless, inc	positive = E	0.579	0.986	1.002	1.175
24921	negative = E, communic, wireless, mobil	positive = E	0.579	0.986	1.002	1.175
24929	said, verizon, communic, mobil	positive = E	0.579	0.986	1.002	1.175
24930	verizon, communic, compani, wireless	positive = E	0.579	0.986	1.002	1.175
24938	negative = E, said, verizon, communic, inc	positive = E	0.579	0.986	1.002	1.175
24941	negative = E, network	positive = E	0.587	0.987	1.003	1.190
24942	negative = E, servic	positive = E	0.587	0.987	1.003	1.190
24943	said, wireless, inc	positive = E	0.587	0.987	1.003	1.190
24944	compani, wireless, mobil	positive = E	0.587	0.987	1.003	1.190
24951	negative = E, said, mobil, inc	positive = E	0.587	0.987	1.003	1.190
24955	said, verizon, communic, inc	positive = E	0.587	0.987	1.003	1.190
24960	said, mobil, inc	positive = E	0.595	0.987	1.003	1.206
24961	verizon, compani, mobil	positive = E	0.595	0.987	1.003	1.206

24968	negative = E, said, communic, mobil	positive = E	0.595	0.987	1.003	1.206
24978	negative = E, said, verizon, communic, wireless	positive = E	0.595	0.987	1.003	1.206
24979	billion	positive = E	0.603	0.987	1.003	1.222
24982	said, communic, mobil	positive = E	0.603	0.987	1.003	1.222
24983	verizon, compani, inc	positive = E	0.603	0.987	1.003	1.222
24984	communic, compani, inc	positive = E	0.603	0.987	1.003	1.222
24989	negative = E, said, communic, inc	positive = E	0.603	0.987	1.003	1.222
24995	said, verizon, communic, wireless	positive = E	0.603	0.987	1.003	1.222
24999	negative = E, mobil, inc	positive = E	0.611	0.987	1.003	1.238
25000	said, communic, inc	positive = E	0.611	0.987	1.003	1.238
25001	communic, compani, wireless	positive = E	0.611	0.987	1.003	1.238
25004	negative = E, said, communic, wireless	positive = E	0.611	0.987	1.003	1.238
25007	negative = E, verizon, wireless, mobil	positive = E	0.611	0.987	1.003	1.238
25008	year	positive = E	0.619	0.987	1.003	1.254
25046	plan	positive = E	0.635	0.988	1.004	1.286
25103	compani	positive = E	0.849	0.991	1.007	1.714
25104	negative = E, said	positive = E	0.857	0.991	1.007	1.730
25105	said	positive = E	0.873	0.991	1.007	1.762
25106	negative = E	positive = E	0.968	0.992	1.008	1.952

No.	Premises ↑	Conclusion	Support	Confidence	Lift	Conviction
2349	negative = E	mobil, edit	0.595	0.610	1.011	1.017
2350	negative = E	positive = E, mobil, edit	0.595	0.610	1.011	1.017
2351	negative = E	said, compani, wireless	0.595	0.610	1.011	1.017
2352	negative = E	said, compani, inc	0.595	0.610	1.011	1.017
2353	negative = E	said, mobil, inc	0.595	0.610	1.011	1.017
2354	negative = E	verizon, compani, inc	0.595	0.610	0.998	0.997
2355	negative = E	communic, compani, inc	0.595	0.610	0.998	0.997
2356	negative = E	positive = E, said, communic, mobil	0.595	0.610	1.011	1.017
2357	negative = E	positive = E, said, compani, wireless	0.595	0.610	1.011	1.017
2358	negative = E	positive = E, said, compani, inc	0.595	0.610	1.011	1.017
2359	negative = E	positive = E, verizon, compani, inc	0.595	0.610	1.011	1.017
2360	negative = E	positive = E, communic, compani, inc	0.595	0.610	1.011	1.017
2361	negative = E	said, verizon, communic, report	0.595	0.610	0.998	0.997
2362	negative = E	positive = E, said, verizon, communic, wireless	0.595	0.610	1.011	1.017

2695	negative = E	billion	0.603	0.618	1.011	1.018
2696	negative = E	positive = E, billion	0.603	0.618	1.024	1.039
2697	negative = E	verizon, edit	0.603	0.618	0.998	0.997
2698	negative = E	positive = E, verizon, edit	0.603	0.618	0.998	0.997
2699	negative = E	said, communic, mobil	0.603	0.618	1.011	1.018
2700	negative = E	said, mobil, report	0.603	0.618	1.011	1.018
2701	negative = E	communic, compani, wireless	0.603	0.618	0.998	0.997
2702	negative = E	communic, report, edit	0.603	0.618	0.998	0.997
2703	negative = E	positive = E, said, communic, inc	0.603	0.618	1.011	1.018
2704	negative = E	positive = E, said, mobil, report	0.603	0.618	1.011	1.018
2705	negative = E	positive = E, communic, compani, wireless	0.603	0.618	1.011	1.018
3002	negative = E	positive = E, mobil, inc	0.611	0.626	1.011	1.019
3003	negative = E	said, communic, inc	0.611	0.626	1.011	1.019
3004	negative = E	verizon, compani, wireless	0.611	0.626	0.998	0.997
3005	negative = E	positive = E, said, communic, wireless	0.611	0.626	1.011	1.019
3006	negative = E	positive = E, verizon, compani, wireless	0.611	0.626	1.011	1.019
3007	negative = E	positive = E, verizon, wireless, mobil	0.611	0.626	1.011	1.019
3371	negative = E	wireless, report	0.619	0.634	1.011	1.020
3372	negative = E	mobil, report	0.619	0.634	1.011	1.020
3373	negative = E	mobil, inc	0.619	0.634	0.999	0.998
3374	negative = E	positive = E, wireless, report	0.619	0.634	1.011	1.020
3375	negative = E	positive = E, mobil, report	0.619	0.634	1.011	1.020
3376	negative = E	said, communic, wireless	0.619	0.634	1.011	1.020
3741	negative = E	positive = E, plan	0.627	0.642	1.012	1.021
3742	negative = E	report, inc	0.627	0.642	1.012	1.021
3743	negative = E	positive = E, wireless, inc	0.627	0.642	1.012	1.021
3744	negative = E	positive = E, report, inc	0.627	0.642	1.012	1.021
3745	negative = E	said, verizon, mobil	0.627	0.642	1.012	1.021
3746	negative = E	said, verizon, report	0.627	0.642	0.999	0.998
3747	negative = E	said, verizon, inc	0.627	0.642	1.012	1.021
3748	negative = E	said, communic, report	0.627	0.642	0.999	0.998
3749	negative = E	said, compani, mobil	0.627	0.642	1.012	1.021
3750	negative = E	said, wireless, mobil	0.627	0.642	1.012	1.021
5778	negative = E	positive = E, verizon, mobil	0.667	0.683	1.012	1.026
5779	negative = E	positive = E, verizon, inc	0.667	0.683	1.012	1.026
5780	negative = E	positive = E, communic, report	0.667	0.683	1.001	1.001
5781	negative = E	positive = E, wireless, mobil	0.667	0.683	1.012	1.026
5782	negative = E	positive = E, verizon, communic, wireless	0.667	0.683	1.012	1.026

No.	Premises	Conclus... ↑	Support	Confidence	Lift	Conviction
24349	inc	negative = E	0.738	0.979	1.003	1.131
24350	said, communic	negative = E	0.738	0.979	1.003	1.131
24351	said, compani	negative = E	0.738	0.979	1.003	1.131
24353	positive = E, said, compani	negative = E	0.738	0.979	1.003	1.131
24354	report	negative = E	0.754	0.979	1.003	1.155
24356	positive = E, report	negative = E	0.754	0.979	1.003	1.155
24357	positive = E, said, verizon	negative = E	0.754	0.979	1.003	1.155
24358	said, verizon	negative = E	0.762	0.980	1.003	1.167
24360	mobil	negative = E	0.778	0.980	1.004	1.190
24361	positive = E, verizon, communic	negative = E	0.778	0.980	1.004	1.190
24364	wireless	negative = E	0.810	0.981	1.005	1.238
24365	positive = E, communic	negative = E	0.825	0.981	1.005	1.262
24366	positive = E, compani	negative = E	0.833	0.981	1.005	1.274
24368	positive = E, verizon	negative = E	0.841	0.981	1.005	1.286
24371	said	negative = E	0.865	0.982	1.006	1.321
24372	positive = E	negative = E	0.968	0.984	1.008	1.476
24374	said, group	negative = E	0.500	0.984	1.008	1.524
24375	communic, group	negative = E	0.500	0.984	1.008	1.524
24376	report, plan	negative = E	0.500	0.984	1.008	1.524
24468	said, market	negative = E	0.508	0.985	1.009	1.548
24469	mobil, billion	negative = E	0.508	0.985	1.009	1.548
24472	said, mobil, year	negative = E	0.508	0.985	1.009	1.548
24473	verizon, wireless, edit	negative = E	0.508	0.985	1.009	1.548
24474	communic, wireless, edit	negative = E	0.508	0.985	1.009	1.548
24475	communic, mobil, edit	negative = E	0.508	0.985	1.009	1.548
24476	wireless, mobil, edit	negative = E	0.508	0.985	1.009	1.548
24477	mobil, inc, edit	negative = E	0.508	0.985	1.009	1.548
24580	wireless, billion	negative = E	0.516	0.985	1.009	1.571
24581	wireless, percent	negative = E	0.516	0.985	1.009	1.571
24582	report, year	negative = E	0.516	0.985	1.009	1.571
24701	said, oper	negative = E	0.532	0.985	1.009	1.619
24828	group	negative = E	0.556	0.986	1.010	1.690
24908	inc, edit	negative = E	0.579	0.986	1.011	1.762
24980	billion	negative = E	0.603	0.987	1.011	1.833

Premises	Conclusion	Support	Confidence	Lift	Conviction ↓
inc, edit	negative = E, report	0.579	0.986	1.308	18.206
inc, edit	positive = E, negative = E, report	0.579	0.986	1.308	18.206
positive = E, inc, edit	negative = E, report	0.579	0.986	1.308	18.206
communic, edit	report	0.619	0.987	1.283	18.183
communic, edit	positive = E, report	0.619	0.987	1.283	18.183
verizon, inc, edit	negative = E, report	0.524	0.985	1.307	16.484
wireless, report	negative = E, edit	0.563	0.899	1.287	2.978
said, wireless, report	positive = E, negative = E	0.587	0.987	1.019	2.381
said, report, inc	positive = E, negative = E	0.587	0.987	1.019	2.381

Setting  $\text{minsup}=0.4$

Premises	Conclusion	Support	Confidence	Lift	Conviction
buy	negative = E	0.484	0.984	1.008	1.476
vodafone	negative = E	0.484	0.984	1.008	1.476
corp	negative = E	0.452	0.983	1.007	1.381

**Positive:** operation, year, plan.

**Negative:** inc, report, group, wireless, buy-Vodafone, corp.

- Cluster 1:  $\text{minsup}=0.3$ ,  $\text{minconf}=0.5$ . The dimensions of the frequent itemsets vary from 1 to 6.  
Topic: banks

Association rules:

No.	Premis... ↑	Conclusion	Support	Confidence	LaPlace	Lift	Conviction
4103	positive = E	negative = E, bank, said	0.601	0.626	0.817	1.004	1.007
4252	positive = E	negative = E, year	0.605	0.630	0.819	0.991	0.984
4410	positive = E	bank, year	0.610	0.635	0.821	0.978	0.961
4697	positive = E	billion	0.618	0.644	0.826	0.985	0.973
5525	positive = E	market	0.645	0.671	0.839	0.981	0.961
5526	positive = E	said, year	0.645	0.671	0.839	0.994	0.987
6069	positive = E	report	0.662	0.689	0.848	0.995	0.989
7413	positive = E	negative = E, said	0.706	0.735	0.870	1.010	1.027
7539	positive = E	year	0.711	0.740	0.872	0.986	0.961
7661	positive = E	negative = E, bank	0.715	0.744	0.875	0.998	0.995
7662	positive = E	bank, said	0.715	0.744	0.875	0.998	0.995
10704	positive = E	said	0.825	0.858	0.931	1.004	1.022
10854	positive = E	bank	0.829	0.863	0.933	0.994	0.961
11235	positive = E	negative = E	0.842	0.877	0.940	1.004	1.032

No.	Premises	Conclu... ↑	Support	Confidence	Lift	Conviction
13212	offer	positive = E	0.395	0.968	1.008	1.224
13213	negative = E, capit	positive = E	0.395	0.968	1.008	1.224
13214	said, time	positive = E	0.395	0.968	1.008	1.224
13215	negative = E, bank, compani	positive = E	0.399	0.968	1.008	1.237
13218	negative = E, bank, said, america	positive = E	0.399	0.968	1.008	1.237
13221	negative = E, said, america	positive = E	0.412	0.969	1.009	1.276
13223	negative = E, said	positive = E	0.706	0.970	1.010	1.311
13224	negative = E, sell	positive = E	0.303	0.972	1.012	1.401
13225	compani, time	positive = E	0.303	0.972	1.012	1.401
13230	negative = E, said, time	positive = E	0.303	0.972	1.012	1.401
13232	said, billion, time	positive = E	0.303	0.972	1.012	1.401
13238	negative = E, bank, said, billion, america	positive = E	0.303	0.972	1.012	1.401
13240	negative = E, said, plan	positive = E	0.307	0.972	1.012	1.421
13249	said, compani, group	positive = E	0.311	0.973	1.013	1.441
13277	rais	positive = E	0.338	0.975	1.015	1.559
13278	compani, offer	positive = E	0.338	0.975	1.015	1.559
13279	negative = E, offer	positive = E	0.346	0.975	1.015	1.599
13282	negative = E, report, compani	positive = E	0.351	0.976	1.016	1.618
13288	negative = E, firm	positive = E	0.382	0.978	1.018	1.757
13293	negative = E, compani, offer	positive = E	0.303	0.986	1.026	2.763
13297	financ	positive = E	0.307	0.986	1.026	2.803
13300	negative = E, said, report, compani	positive = E	0.311	0.986	1.027	2.842
13301	negative = E, said, firm	positive = E	0.320	0.986	1.027	2.921
13302	negative = E, said, billion, compani	positive = E	0.320	0.986	1.027	2.921
13304	negative = E, said, year, compani	positive = E	0.333	0.987	1.028	3.039
13305	negative = E, bank, said, compani	positive = E	0.338	0.987	1.028	3.079
13306	negative = E, said, compani	positive = E	0.421	0.990	1.030	3.829

No.	Premises ↑	Conclusion	Support	Confidence	Lift	Conviction
4196	negative = E	billion	0.548	0.628	0.961	0.932
4682	negative = E	said, year	0.561	0.643	0.952	0.910
5171	negative = E	market	0.575	0.658	0.962	0.924
5172	negative = E	positive = E, report	0.575	0.658	0.994	0.988
5899	negative = E	report	0.596	0.683	0.986	0.970
6038	negative = E	positive = E, bank, said	0.601	0.688	0.963	0.915
6191	negative = E	positive = E, year	0.605	0.693	0.976	0.944
6783	negative = E	bank, said	0.623	0.714	0.957	0.888
7208	negative = E	year	0.636	0.729	0.972	0.921
9387	negative = E	positive = E, said	0.706	0.809	0.981	0.919
9645	negative = E	positive = E, bank	0.715	0.819	0.988	0.946
10035	negative = E	said	0.728	0.834	0.975	0.873
10593	negative = E	bank	0.746	0.854	0.984	0.903
13191	negative = E	positive = E	0.842	0.965	1.004	1.122

No.	Premises	Conclusion ↑	Support	Confidence	Lift	Conviction
11275	share	negative = E	0.351	0.879	1.007	1.052
11277	positive = E, goldman	negative = E	0.351	0.879	1.007	1.052
11278	positive = E, sach	negative = E	0.351	0.879	1.007	1.052
11284	positive = E, goldman, sach	negative = E	0.351	0.879	1.007	1.052
11302	positive = E, said, billion, compani	negative = E	0.320	0.880	1.008	1.056
11316	million	negative = E	0.421	0.881	1.009	1.066
11339	said, compani	negative = E	0.425	0.882	1.010	1.076
11340	includ	negative = E	0.329	0.882	1.011	1.081
11341	positive = E, plan	negative = E	0.329	0.882	1.011	1.081
11354	manag	negative = E	0.430	0.883	1.012	1.086
11368	market, compani	negative = E	0.333	0.884	1.013	1.094
11382	positive = E, said, year, compani	negative = E	0.333	0.884	1.013	1.094
11390	invest, group	negative = E	0.303	0.885	1.014	1.102
11407	positive = E, report, edit	negative = E	0.439	0.885	1.014	1.106

11562	base	negative = E	0.329	0.893	1.023	1.187
11563	positive = E, share	negative = E	0.329	0.893	1.023	1.187
11566	percent, compani	negative = E	0.329	0.893	1.023	1.187
11601	follow	negative = E	0.303	0.896	1.027	1.224
11611	positive = E, compani, offer	negative = E	0.303	0.896	1.027	1.224
11619	positive = E, bank, said, group	negative = E	0.303	0.896	1.027	1.224
11629	equiti	negative = E	0.342	0.897	1.027	1.230
11642	positive = E, said, compani	negative = E	0.421	0.897	1.028	1.237
11645	positive = E, compani, group	negative = E	0.307	0.897	1.028	1.240
11649	bank, said, deal	negative = E	0.307	0.897	1.028	1.240
11650	said, year, group	negative = E	0.307	0.897	1.028	1.240
11672	positive = E, includ	negative = E	0.311	0.899	1.030	1.256
11694	compani	negative = E	0.513	0.900	1.031	1.272
11804	bank, deal	negative = E	0.342	0.907	1.039	1.367
11849	positive = E, bank, group	negative = E	0.346	0.908	1.040	1.383
11892	positive = E, base	negative = E	0.311	0.910	1.043	1.417
11896	positive = E, year, group	negative = E	0.311	0.910	1.043	1.417
11938	positive = E, compani	negative = E	0.500	0.912	1.045	1.445
11942	said, deal	negative = E	0.364	0.912	1.045	1.447
11946	positive = E, said, group	negative = E	0.364	0.912	1.045	1.447
11954	positive = E, percent, compani	negative = E	0.320	0.912	1.045	1.454
11971	positive = E, equiti	negative = E	0.325	0.914	1.047	1.472
11995	positive = E, bank, deal	negative = E	0.329	0.915	1.048	1.490
12057	group	negative = E	0.443	0.918	1.052	1.555
12069	deal	negative = E	0.399	0.919	1.053	1.574
12080	positive = E, said, deal	negative = E	0.351	0.920	1.054	1.581
12176	percent, group	negative = E	0.311	0.922	1.056	1.632
12200	positive = E, group	negative = E	0.417	0.922	1.057	1.638
12304	positive = E, deal	negative = E	0.386	0.926	1.061	1.726
12508	inc	negative = E	0.316	0.935	1.071	1.959
12740	positive = E, inc	negative = E	0.303	0.945	1.083	2.321

Premises	Conclusion	Support	Confidence	Lift	Conviction ↓
year, deal	positive = E, said	0.316	0.947	1.149	3.333

Setting *minsup*=0.2

Premises	Conclusion	Support	Confidence	Lift	Conviction
stake	negative = E	0.232	0.914	1.047	1.475
servic	negative = E	0.246	0.889	1.018	1.145
intern	positive = E	0.272	0.984	1.025	2.487
friday	positive = E	0.259	0.983	1.024	2.368
euro	positive = E	0.250	0.983	1.023	2.289
initi	positive = E	0.250	0.983	1.023	2.289
told	positive = E	0.250	0.983	1.023	2.289
corp	positive = E	0.246	0.982	1.023	2.250
work	positive = E	0.246	0.982	1.023	2.250
talk	positive = E	0.237	0.982	1.022	2.171
ad	positive = E	0.232	0.981	1.022	2.132
cost	positive = E	0.232	0.981	1.022	2.132
set	positive = E	0.228	0.981	1.021	2.092
head	positive = E	0.224	0.981	1.021	2.053
monday	positive = E	0.215	0.980	1.020	1.974
thursday	positive = E	0.215	0.980	1.020	1.974
demand	positive = E	0.211	0.980	1.020	1.934
potenti	positive = E	0.206	0.979	1.019	1.895
rais	positive = E	0.338	0.975	1.015	1.559
part	positive = E	0.294	0.971	1.011	1.362
govern	positive = E	0.285	0.970	1.010	1.322
offer	positive = E	0.395	0.968	1.008	1.224
london	positive = E	0.250	0.966	1.006	1.164
put	positive = E	0.246	0.966	1.005	1.145
corpor	positive = E	0.241	0.965	1.005	1.125
partner	negative = E	0.202	0.920	1.054	1.590

**Positive:** offer, raise, finance, intern, Friday, euro-initial-told, corp-work, talk, add-cost, set, head, Monday, Thursday, demand, potential, part, govern, offer, London, put, corporation.

**Negative:** base, follow, (in)equity, company, group, deal, inc, stake, service, partner.

- Cluster 2:  $minsup= 0.4$ ,  $minconf=0.5$ . The dimension of the frequent itemsets is 6.  
Topic: smartphone technologies

Regole di associazione:

No.	Premises ↑	Conclusion	Support	Confidence	LaPlace	Lift	Conviction
1606	positive = E	appl, said, maker	0.508	0.558	0.789	1.047	1.057
1607	positive = E	appl, report, edit	0.508	0.558	0.789	1.047	1.057
1608	positive = E	negative = E, said, maker	0.508	0.558	0.789	1.080	1.094
1609	positive = E	negative = E, compani, inc	0.508	0.558	0.789	1.032	1.039
1610	positive = E	appl, said, report, edit	0.508	0.558	0.789	1.064	1.075
1860	positive = E	appl, googl	0.516	0.566	0.793	0.989	0.986
1861	positive = E	appl, month	0.516	0.566	0.793	0.989	0.986
1862	positive = E	negative = E, googl	0.516	0.566	0.793	1.003	1.004
1863	positive = E	compani, report	0.516	0.566	0.793	1.018	1.023
1864	positive = E	appl, negative = E, percent	0.516	0.566	0.793	0.989	0.986
1865	positive = E	appl, negative = E, maker	0.516	0.566	0.793	1.080	1.097
1866	positive = E	said, inc, report	0.516	0.566	0.793	1.064	1.079
1867	positive = E	appl, negative = E, said, year	0.516	0.566	0.793	1.003	1.004
1868	positive = E	appl, negative = E, said, devic	0.516	0.566	0.793	1.003	1.004
2263	positive = E	said, maker	0.524	0.575	0.797	1.049	1.063
2264	positive = E	compani, inc	0.524	0.575	0.797	1.019	1.025
2265	positive = E	compani, year	0.524	0.575	0.797	0.939	0.911
2266	positive = E	appl, said, percent	0.524	0.575	0.797	0.964	0.949
2267	positive = E	appl, said, mobil	0.524	0.575	0.797	1.005	1.006
2268	positive = E	negative = E, said, percent	0.524	0.575	0.797	0.991	0.987
2269	positive = E	negative = E, said, mobil	0.524	0.575	0.797	1.005	1.006
2270	positive = E	negative = E, inc, report	0.524	0.575	0.797	1.065	1.082
2271	positive = E	appl, negative = E, said, share	0.524	0.575	0.797	1.005	1.006
2480	positive = E	googl	0.532	0.584	0.802	0.979	0.969
2481	positive = E	appl, maker	0.532	0.584	0.802	1.050	1.066
2482	positive = E	negative = E, maker	0.532	0.584	0.802	1.081	1.105
2483	positive = E	appl, negative = E, mobil	0.532	0.584	0.802	1.020	1.028
2788	positive = E	inc, report	0.540	0.593	0.806	1.066	1.090
2789	positive = E	appl, said, year	0.540	0.593	0.806	0.967	0.951
2790	positive = E	appl, said, devic	0.540	0.593	0.806	0.980	0.971
3289	positive = E	maker	0.548	0.602	0.810	1.051	1.073

6542	positive = E	appl, said, inc	0.597	0.655	0.835	1.028	1.051
7066	positive = E	negative = E, smartphon	0.605	0.664	0.840	1.004	1.007
7067	positive = E	negative = E, edit	0.605	0.664	0.840	1.029	1.055
7068	positive = E	appl, negative = E, report	0.605	0.664	0.840	1.042	1.079
7069	positive = E	appl, said, report	0.605	0.664	0.840	1.055	1.103
7070	positive = E	negative = E, said, edit	0.605	0.664	0.840	1.042	1.079
7614	positive = E	year	0.613	0.673	0.844	0.959	0.911
7615	positive = E	devic	0.613	0.673	0.844	0.981	0.961
7616	positive = E	negative = E, market	0.613	0.673	0.844	0.993	0.985
7617	positive = E	appl, negative = E, inc	0.613	0.673	0.844	1.042	1.084
104...	positive = E	negative = E, report	0.653	0.717	0.865	1.034	1.082
104...	positive = E	said, report	0.653	0.717	0.865	1.046	1.111
109...	positive = E	negative = E, inc	0.661	0.726	0.869	1.046	1.117
119...	positive = E	inc	0.677	0.743	0.878	1.036	1.100
119...	positive = E	report	0.677	0.743	0.878	1.036	1.100
123...	positive = E	compani	0.685	0.752	0.882	0.972	0.911
161...	positive = E	appl, negative = E, said	0.774	0.850	0.928	1.033	1.179
175...	positive = E	appl, said	0.806	0.885	0.945	1.007	1.051
182...	positive = E	negative = E, said	0.823	0.903	0.954	1.027	1.243
185...	positive = E	appl, negative = E	0.831	0.912	0.958	1.028	1.276
197...	positive = E	said	0.855	0.938	0.970	1.003	1.041
202...	positive = E	appl	0.863	0.947	0.975	1.004	1.063

No.	Premises	Conclusion ↑	Support	Confidence	Lift	Conviction
19204	appl, base	positive = E	0.411	0.927	1.018	1.220
19214	inc, time	positive = E	0.411	0.927	1.018	1.220
19219	appl, negative = E, phone	positive = E	0.411	0.927	1.018	1.220
19233	appl, inc, devic	positive = E	0.411	0.927	1.018	1.220
19235	appl, devic, edit	positive = E	0.411	0.927	1.018	1.220
19243	negative = E, inc, devic	positive = E	0.411	0.927	1.018	1.220
19244	negative = E, devic, edit	positive = E	0.411	0.927	1.018	1.220
19251	appl, negative = E, report, year	positive = E	0.411	0.927	1.018	1.220
19252	appl, negative = E, report, share	positive = E	0.411	0.927	1.018	1.220
19256	appl, said, devic, edit	positive = E	0.411	0.927	1.018	1.220
19259	negative = E, said, inc, percent	positive = E	0.411	0.927	1.018	1.220
19260	negative = E, said, report, smartphon	positive = E	0.411	0.927	1.018	1.220
19262	negative = E, said, report, percent	positive = E	0.411	0.927	1.018	1.220
19264	negative = E, said, devic, edit	positive = E	0.411	0.927	1.018	1.220

19285	edit	positive = E	0.629	0.929	1.019	1.242
19293	appl, use	positive = E	0.419	0.929	1.019	1.242
19305	compani, inc	positive = E	0.524	0.929	1.019	1.242
19306	report, time	positive = E	0.419	0.929	1.019	1.242
19311	appl, negative = E, samsung	positive = E	0.419	0.929	1.019	1.242
19340	appl, negative = E, market, report	positive = E	0.419	0.929	1.019	1.242
19341	appl, negative = E, inc, year	positive = E	0.419	0.929	1.019	1.242
19342	appl, negative = E, inc, share	positive = E	0.419	0.929	1.019	1.242
19353	negative = E, said, year, edit	positive = E	0.419	0.929	1.019	1.242
19372	appl, negative = E, mobil	positive = E	0.532	0.930	1.020	1.260
19384	negative = E, samsung	positive = E	0.427	0.930	1.020	1.264
19385	negative = E, android	positive = E	0.427	0.930	1.020	1.264
19389	inc, devic	positive = E	0.427	0.930	1.020	1.264
19399	appl, report, year	positive = E	0.427	0.930	1.020	1.264
19952	inc	positive = E	0.677	0.944	1.036	1.579
19953	report	positive = E	0.677	0.944	1.036	1.579
19991	appl, inc, mobil	positive = E	0.411	0.944	1.036	1.597
19992	appl, share, maker	positive = E	0.411	0.944	1.036	1.597
20004	said, share, maker	positive = E	0.411	0.944	1.036	1.597
20014	appl, negative = E, report, mobil	positive = E	0.411	0.944	1.036	1.597
20034	appl, negative = E, said, market, report	positive = E	0.411	0.944	1.036	1.597
20038	appl, negative = E, said, report, devic	positive = E	0.411	0.944	1.036	1.597
20044	report, edit	positive = E	0.556	0.945	1.037	1.619
20045	appl, negative = E, edit	positive = E	0.556	0.945	1.037	1.619
20074	appl, negative = E, use	positive = E	0.419	0.945	1.037	1.626
20093	said, inc, mobil	positive = E	0.419	0.945	1.037	1.626
20124	appl, said, report, share	positive = E	0.419	0.945	1.037	1.626
20665	maker	positive = E	0.548	0.958	1.051	2.099
20683	said, report, edit	positive = E	0.556	0.958	1.052	2.129
20684	appl, negative = E, said, edit	positive = E	0.556	0.958	1.052	2.129
20704	appl, negative = E, said, report	positive = E	0.581	0.960	1.053	2.218
20742	inc, maker	positive = E	0.403	0.962	1.055	2.306
20743	edit, maker	positive = E	0.403	0.962	1.055	2.306
20751	appl, said, report	positive = E	0.605	0.962	1.055	2.306
20782	said, edit, maker	positive = E	0.403	0.962	1.055	2.306

21304	inc, report	positive = E	0.540	0.971	1.066	3.060
21353	appl, negative = E, report, maker	positive = E	0.403	0.980	1.076	4.524
21356	appl, said, report, maker	positive = E	0.403	0.980	1.076	4.524
21359	negative = E, said, report, maker	positive = E	0.403	0.980	1.076	4.524
21386	negative = E, share, maker	positive = E	0.411	0.981	1.076	4.613
21418	appl, report, maker	positive = E	0.419	0.981	1.077	4.702
21421	negative = E, report, maker	positive = E	0.419	0.981	1.077	4.702
21422	said, report, maker	positive = E	0.419	0.981	1.077	4.702
21472	report, maker	positive = E	0.435	0.982	1.077	4.879
21557	appl, negative = E, said, maker	positive = E	0.492	0.984	1.080	5.500
21563	negative = E, said, maker	positive = E	0.508	0.984	1.080	5.677
21567	appl, negative = E, maker	positive = E	0.516	0.985	1.080	5.766
21569	negative = E, maker	positive = E	0.532	0.985	1.081	5.944
electron		positive = E	0.435	0.931	1.022	1.286

No.	Premi... ↑	Conclusion	Support	Confidence	Lift	Conviction
9393	negative = E	positive = E, inc	0.661	0.701	1.035	1.078
9969	negative = E	said, compani	0.669	0.709	0.977	0.944
10473	negative = E	market	0.677	0.718	0.978	0.944
10475	negative = E	appl, compani	0.677	0.718	0.978	0.944
11458	negative = E	inc	0.694	0.735	1.024	1.065
11459	negative = E	report	0.694	0.735	1.024	1.065
12788	negative = E	compani	0.718	0.761	0.983	0.944
15135	negative = E	appl, said, positive = E	0.774	0.821	1.017	1.078
17044	negative = E	appl, said	0.823	0.872	0.992	0.944
17046	negative = E	said, positive = E	0.823	0.872	1.020	1.132
17391	negative = E	appl, positive = E	0.831	0.880	1.020	1.146
19506	negative = E	said	0.879	0.932	0.996	0.944
19507	negative = E	positive = E	0.879	0.932	1.022	1.297
19764	negative = E	appl	0.887	0.940	0.996	0.944

No.	Premises	Conclusion ↑	Support	Confidence	Lift	Conviction
20838	firm	negative = E	0.411	0.962	1.020	1.496
20841	appl, oper	negative = E	0.411	0.962	1.020	1.496
20846	said, positive = E	negative = E	0.823	0.962	1.020	1.496
20849	said, oper	negative = E	0.411	0.962	1.020	1.496
20851	appl, report, smartphon	negative = E	0.411	0.962	1.020	1.496
20852	appl, report, maker	negative = E	0.411	0.962	1.020	1.496
20865	said, positive = E, world	negative = E	0.411	0.962	1.020	1.496
20866	said, inc, devic	negative = E	0.411	0.962	1.020	1.496
20868	said, report, maker	negative = E	0.411	0.962	1.020	1.496
20871	positive = E, inc, devic	negative = E	0.411	0.962	1.020	1.496
20872	positive = E, smartphon, share	negative = E	0.411	0.962	1.020	1.496
20873	positive = E, devic, edit	negative = E	0.411	0.962	1.020	1.496
20874	positive = E, share, maker	negative = E	0.411	0.962	1.020	1.496
20875	compani, inc, report	negative = E	0.411	0.962	1.020	1.496
20988	accord	negative = E	0.427	0.964	1.021	1.552
20996	inc, time	negative = E	0.427	0.964	1.021	1.552
20997	report, maker	negative = E	0.427	0.964	1.021	1.552
21006	appl, positive = E, make	negative = E	0.427	0.964	1.021	1.552
21008	appl, inc, devic	negative = E	0.427	0.964	1.021	1.552
21016	said, inc, mobil	negative = E	0.427	0.964	1.021	1.552
21057	report, time	negative = E	0.435	0.964	1.022	1.581
21067	positive = E, inc, percent	negative = E	0.435	0.964	1.022	1.581
21068	inc, report, edit	negative = E	0.435	0.964	1.022	1.581
21074	appl, said, report, devic	negative = E	0.435	0.964	1.022	1.581
21076	appl, positive = E, report, devic	negative = E	0.435	0.964	1.022	1.581
21081	said, positive = E, inc, year	negative = E	0.435	0.964	1.022	1.581
21085	said, inc, report, edit	negative = E	0.435	0.964	1.022	1.581
21091	positive = E	negative = E	0.879	0.965	1.022	1.595
21093	said, inc	negative = E	0.661	0.965	1.022	1.599
21094	said, report	negative = E	0.661	0.965	1.022	1.599
21096	oper	negative = E	0.444	0.965	1.023	1.609

21132	inc, mobil	negative = E	0.452	0.966	1.023	1.637
21134	appl, inc, edit	negative = E	0.452	0.966	1.023	1.637
21138	positive = E, report, year	negative = E	0.452	0.966	1.023	1.637
21139	positive = E, report, devic	negative = E	0.452	0.966	1.023	1.637
21143	appl, said, inc, edit	negative = E	0.452	0.966	1.023	1.637
21152	said, positive = E, market, inc	negative = E	0.452	0.966	1.023	1.637
21155	appl, said, positive = E, compani, inc	negative = E	0.452	0.966	1.023	1.637
21157	appl, said, positive = E, inc, report	negative = E	0.452	0.966	1.023	1.637
21159	report, smartphon	negative = E	0.460	0.966	1.024	1.665
21162	appl, report, devic	negative = E	0.460	0.966	1.024	1.665
21173	said, report, year	negative = E	0.460	0.966	1.024	1.665
21174	said, report, devic	negative = E	0.460	0.966	1.024	1.665
21176	positive = E, inc, year	negative = E	0.460	0.966	1.024	1.665
21183	inc	negative = E	0.694	0.966	1.024	1.675
21465	research	negative = E	0.435	0.982	1.041	3.105
21481	appl, positive = E, inc, smartphon	negative = E	0.435	0.982	1.041	3.105
21489	appl, use	negative = E	0.444	0.982	1.041	3.161
21494	positive = E, phone	negative = E	0.444	0.982	1.041	3.161
21508	positive = E, iphon	negative = E	0.452	0.982	1.041	3.218
21512	appl, positive = E, iphon	negative = E	0.452	0.982	1.041	3.218
21519	said, positive = E, inc, smartphon	negative = E	0.452	0.982	1.041	3.218
21541	said, use	negative = E	0.476	0.983	1.042	3.387
21544	positive = E, inc, smartphon	negative = E	0.476	0.983	1.042	3.387
21549	use	negative = E	0.492	0.984	1.043	3.500

Setting *minsup*=0.3

Premises	Conclusion	Support	Confidence	Lift	Conviction
corp	positive = E	0.387	0.960	1.053	2.218
launch	positive = E	0.395	0.942	1.034	1.538
run	negative = E	0.379	0.959	1.017	1.383
phone	negative = E	0.484	0.952	1.009	1.185

**Positive:** maker, edit, launch, electron.

**Negative:** firm (apple operation), accord, operation, use, run, phone.

- Cluster 3:  $\text{minsup}=0.1$ ,  $\text{minconf}=0.5$ . The maximal dimension of the frequent itemsets is 8.  
Topic: social platforms

Regole di associazione:

No.	Premises ↑	Conclusion	Support	Confidence	Lift	Conviction
98	positive = E	said, report	0.533	0.564	1.033	1.042
99	positive = E	negative = E, said, edit	0.533	0.564	1.052	1.064
131	positive = E	negative = E, year	0.552	0.585	0.973	0.960
140	positive = E	said, edit	0.556	0.588	1.053	1.071
171	positive = E	negative = E, compani	0.572	0.606	0.996	0.994
172	positive = E	negative = E, edit	0.572	0.606	1.053	1.077
179	positive = E	year	0.575	0.609	0.971	0.953
185	positive = E	negative = E, report	0.578	0.612	1.019	1.029
222	positive = E	compani	0.592	0.626	0.998	0.997
232	positive = E	edit	0.595	0.630	1.053	1.086
246	positive = E	report	0.601	0.637	1.020	1.034
434	positive = E	negative = E, said	0.758	0.803	1.011	1.044
465	positive = E	said	0.781	0.827	1.012	1.058
733	positive = E	negative = E	0.922	0.976	1.002	1.079

No.	Premises	Conclusion ↑	Support	Confidence	Lift	Conviction
92387	trade	positive = E	0.141	0.977	1.035	2.444
92470	april	positive = E	0.144	0.978	1.035	2.500
92471	govern	positive = E	0.144	0.978	1.035	2.500
92472	hold	positive = E	0.144	0.978	1.035	2.500
92557	offici	positive = E	0.147	0.978	1.036	2.556
92604	pay	positive = E	0.150	0.979	1.036	2.611
92645	capit	positive = E	0.154	0.979	1.037	2.667

92779	statement	positive = E	0.167	0.981	1.038	2.889
92782	negative = E, former	positive = E	0.167	0.981	1.038	2.889
92787	million, servic	positive = E	0.167	0.981	1.038	2.889
92794	said, report, york	positive = E	0.167	0.981	1.038	2.889
92795	said, report, billion	positive = E	0.167	0.981	1.038	2.889
92797	year, edit, make	positive = E	0.167	0.981	1.038	2.889
92815	negative = E, compani, chief	positive = E	0.170	0.981	1.039	2.944
92819	said, compani, chief	positive = E	0.170	0.981	1.039	2.944
92820	said, report, call	positive = E	0.170	0.981	1.039	2.944
92826	negative = E, compani, report, million	positive = E	0.170	0.981	1.039	2.944
92827	negative = E, year, report, million	positive = E	0.170	0.981	1.039	2.944
92829	said, compani, year, execut	positive = E	0.170	0.981	1.039	2.944
92831	former	positive = E	0.173	0.981	1.039	3
92893	tuesday	positive = E	0.190	0.983	1.041	3.278
92894	negative = E, thursday	positive = E	0.190	0.983	1.041	3.278
92897	negative = E, tuesday	positive = E	0.190	0.983	1.041	3.278
92899	negative = E, said, follow	positive = E	0.190	0.983	1.041	3.278
92901	negative = E, compani, say	positive = E	0.190	0.983	1.041	3.278
92902	said, report, unit	positive = E	0.190	0.983	1.041	3.278
92905	thursday	positive = E	0.193	0.983	1.041	3.333
92957	negative = E, edit, includ	positive = E	0.252	0.987	1.045	4.333
92958	negative = E, said, month	positive = E	0.258	0.988	1.046	4.444
92960	edit, includ	positive = E	0.265	0.988	1.046	4.556
92961	said, month	positive = E	0.268	0.988	1.046	4.611
92969	negative = E, said, year, edit	positive = E	0.350	0.991	1.049	6
92970	negative = E, year, edit	positive = E	0.369	0.991	1.050	6.333
92971	said, year, edit	positive = E	0.373	0.991	1.050	6.389
92972	year, edit	positive = E	0.392	0.992	1.050	6.722
92973	negative = E, said, edit	positive = E	0.533	0.994	1.052	9.111
92974	said, edit	positive = E	0.556	0.994	1.053	9.500
92975	negative = E, edit	positive = E	0.572	0.994	1.053	9.778
92976	edit	positive = E	0.595	0.995	1.053	10.167
92995	wednesday	positive = E	0.160	1	1.059	∞
92996	monday	positive = E	0.144	1	1.059	∞

No.	Premises ↑	Conclusion	Support	Confidence	Lift	Conviction
82	negative = E	said, edit	0.536	0.550	0.985	0.981
105	negative = E	positive = E, year	0.552	0.567	0.986	0.981
137	negative = E	positive = E, compani	0.572	0.587	0.993	0.990
138	negative = E	positive = E, edit	0.572	0.587	0.987	0.982
145	negative = E	edit	0.575	0.591	0.988	0.982
150	negative = E	positive = E, report	0.578	0.594	0.988	0.982
195	negative = E	year	0.601	0.617	0.984	0.974
196	negative = E	report	0.601	0.617	0.989	0.982
216	negative = E	compani	0.608	0.624	0.995	0.991
404	negative = E	positive = E, said	0.758	0.779	0.997	0.989
451	negative = E	said	0.794	0.815	0.998	0.992
638	negative = E	positive = E	0.922	0.946	1.002	1.035

For the next following, confidence is > 0.8

No.	Premises	Conclusion ↑	Support	Lift	Conviction
91924	follow	negative = E	0.255	1.001	1.046
91925	earlier	negative = E	0.127	1.001	1.046
91926	photo	negative = E	0.127	1.001	1.046
91927	store	negative = E	0.127	1.001	1.046
92074	generat	negative = E	0.131	1.002	1.072
92075	rate	negative = E	0.131	1.002	1.072
92076	televis	negative = E	0.131	1.002	1.072
92209	critic	negative = E	0.134	1.002	1.098
92210	softwar	negative = E	0.134	1.002	1.098
92211	watch	negative = E	0.134	1.002	1.098
92231	san, francisco	negative = E	0.134	1.002	1.098
92298	state	negative = E	0.275	1.003	1.124
92299	hous	negative = E	0.137	1.003	1.124
92382	monday	negative = E	0.141	1.004	1.150
92383	platform	negative = E	0.141	1.004	1.150
92384	popular	negative = E	0.141	1.004	1.150
92385	trade	negative = E	0.141	1.004	1.150
92464	show	negative = E	0.288	1.004	1.176
92465	featur	negative = E	0.144	1.004	1.176
92466	francisco	negative = E	0.144	1.004	1.176
92467	govern	negative = E	0.144	1.004	1.176
92468	retail	negative = E	0.144	1.004	1.176
92469	team	negative = E	0.144	1.004	1.176
92556	repres	negative = E	0.147	1.005	1.203

92602	ceo	negative = E	0.150	1.005	1.229
92603	file	negative = E	0.150	1.005	1.229
92643	world	negative = E	0.307	1.005	1.255
92644	global	negative = E	0.154	1.005	1.255
92684	hope	negative = E	0.157	1.006	1.281
92759	intern	negative = E	0.163	1.007	1.333
92760	rais	negative = E	0.163	1.007	1.333
92806	servic	negative = E	0.337	1.007	1.373
92892	march	negative = E	0.190	1.009	1.542
92932	chang	negative = E	0.212	1.011	1.725
92830	appl	negative = E	0.173	1.008	1.412

For the next following, confidence is =1

92981	meet	negative = E	0.137	1.027	$\infty$
92982	known	negative = E	0.124	1.027	$\infty$
92983	california	negative = E	0.121	1.027	$\infty$
92984	confer	negative = E	0.121	1.027	$\infty$
92985	area	negative = E	0.114	1.027	$\infty$
92986	collect	negative = E	0.114	1.027	$\infty$
92987	great	negative = E	0.114	1.027	$\infty$
92988	job	negative = E	0.114	1.027	$\infty$
92989	full	negative = E	0.111	1.027	$\infty$
92990	washington	negative = E	0.111	1.027	$\infty$
92991	corpor	negative = E	0.108	1.027	$\infty$
92992	join	negative = E	0.108	1.027	$\infty$
92993	valu	negative = E	0.108	1.027	$\infty$
92994	further	negative = E	0.101	1.027	$\infty$

No.	Premises	Conclusion	Support	Confidence	Lift	Conviction
924...	said, investor	positive = E, compani	0.141	0.977	1.652	17.974
780...	compani, francisco	negative = E, san	0.105	0.914	5.380	9.684
855...	year, ceo	negative = E, compani	0.111	0.944	1.554	7.059
855...	positive = E, said, ceo	negative = E, compani	0.111	0.944	1.554	7.059
856...	positive = E, market, technolog	negative = E, compani	0.111	0.944	1.554	7.059
856...	positive = E, market, investor	negative = E, compani	0.111	0.944	1.554	7.059
857...	said, market, technolog	negative = E, compani	0.111	0.944	1.554	7.059

893...	unit, billion	positive = E, said	0.101	0.969	1.240	7.007
893...	group, billion	positive = E, said	0.101	0.969	1.240	7.007
893...	billion, chief	positive = E, said	0.101	0.969	1.240	7.007
894...	negative = E, year, offici	positive = E, said	0.101	0.969	1.240	7.007
894...	negative = E, servic, billion	positive = E, said	0.101	0.969	1.240	7.007
895...	compani, report, state	positive = E, said	0.101	0.969	1.240	7.007
895...	compani, edit, call	positive = E, said	0.101	0.969	1.240	7.007
895...	compani, edit, start	positive = E, said	0.101	0.969	1.240	7.007
895...	compani, execut, billion	positive = E, said	0.101	0.969	1.240	7.007
895...	year, edit, offer	positive = E, said	0.101	0.969	1.240	7.007
895...	year, edit, made	positive = E, said	0.101	0.969	1.240	7.007
895...	year, edit, look	positive = E, said	0.101	0.969	1.240	7.007
895...	year, servic, execut	positive = E, said	0.101	0.969	1.240	7.007
895...	year, percent, share	positive = E, said	0.101	0.969	1.240	7.007
905...	report, edit, site	negative = E, said	0.108	0.971	1.222	7
901...	report, edit, march	negative = E, said	0.105	0.970	1.221	6.794
788...	busi, invest	negative = E, compani	0.108	0.917	1.508	4.706
788...	market, follow	negative = E, compani	0.108	0.917	1.508	4.706
788...	market, share	negative = E, compani	0.108	0.917	1.508	4.706
788...	servic, product	negative = E, compani	0.108	0.917	1.508	4.706
848...	year, critic	negative = E, said	0.108	0.943	1.187	3.603
848...	report, major	negative = E, said	0.108	0.943	1.187	3.603
848...	report, offici	negative = E, said	0.108	0.943	1.187	3.603

**Positive:** april-governance-hold,official, pay, capital, statement, former, Tuesday, Thursday, edit, investor.

**Negative:** rate-television, critic-software –watch, feature-San Francisco-retail-team, state, house, Monday,

platform-popular-trade, show, repression, ceo-file, global, hope, intern-raise, march, change, apple.

- **Cluster 4**:  $\text{minsup}=0.3$ ,  $\text{minconf}=0.5$ . The maximal dimension of the frequent itemsets is 6.  
Topic: laws.

Regole di associazione:

No.	Premises ↑	Conclusion	Support	Confidence	Lift	Conviction
1112	negative = E	case, inc	0.308	0.552	1.125	1.137
1115	negative = E	positive = E, court, report	0.308	0.552	0.911	0.879
1125	negative = E	positive = E, case, compani	0.308	0.552	1.007	1.008
1129	negative = E	positive = E, case, inc	0.308	0.552	1.125	1.137
1146	negative = E	said, report, edit	0.308	0.552	0.989	0.987
1186	negative = E	positive = E, said, report, edit	0.308	0.552	0.989	0.987
1551	negative = E	said, compani	0.317	0.569	0.954	0.937
1555	negative = E	court, year	0.317	0.569	1.020	1.026
1558	negative = E	court, inc	0.317	0.569	1.138	1.160
1560	negative = E	case, year	0.317	0.569	1.020	1.026
1562	negative = E	report, edit	0.317	0.569	1.003	1.004
1563	negative = E	positive = E, said, compani	0.317	0.569	0.954	0.937
1571	negative = E	positive = E, court, year	0.317	0.569	1.020	1.026
1577	negative = E	positive = E, court, inc	0.317	0.569	1.138	1.160
1581	negative = E	positive = E, case, year	0.317	0.569	1.020	1.026
1585	negative = E	positive = E, report, edit	0.317	0.569	1.003	1.004
2156	negative = E	said, inc	0.327	0.586	1.108	1.139
2168	negative = E	positive = E, said, inc	0.327	0.586	1.108	1.139
2184	negative = E	said, court, case	0.327	0.586	0.871	0.790
2187	negative = E	said, court, edit	0.327	0.586	1.070	1.092
2201	negative = E	positive = E, said, court, case	0.327	0.586	0.871	0.790
2207	negative = E	positive = E, said, court, edit	0.327	0.586	1.070	1.092
2622	negative = E	said, report	0.337	0.603	0.897	0.824
2627	negative = E	court, edit	0.337	0.603	1.082	1.115
2635	negative = E	positive = E, said, report	0.337	0.603	0.897	0.824
2645	negative = E	positive = E, court, edit	0.337	0.603	1.082	1.115

3511	negative = E	inc	0.356	0.638	1.144	1.222
3514	negative = E	positive = E, inc	0.356	0.638	1.144	1.222
3881	negative = E	court, case	0.365	0.655	0.921	0.837
3888	negative = E	positive = E, court, case	0.365	0.655	0.921	0.837
4186	negative = E	year	0.375	0.672	1.028	1.057
4189	negative = E	positive = E, year	0.375	0.672	1.028	1.057
4192	negative = E	said, edit	0.375	0.672	1.044	1.086
4196	negative = E	positive = E, said, edit	0.375	0.672	1.044	1.086
4594	negative = E	edit	0.385	0.690	1.055	1.115
4598	negative = E	positive = E, edit	0.385	0.690	1.055	1.115
6887	negative = E	court	0.490	0.879	1.005	1.036
6889	negative = E	positive = E, court	0.490	0.879	1.005	1.036

No.	Premises	Conclusion ↑	Support	Lift	Conviction
1399	report, edit	negative = E	0.317	1.003	1.004
1402	positive = E, report, edit	negative = E	0.317	1.003	1.004
1414	court	negative = E	0.490	1.005	1.006
1416	positive = E, court	negative = E	0.490	1.005	1.006
1423	case, compani	negative = E	0.308	1.007	1.008
1433	positive = E, case, compani	negative = E	0.308	1.007	1.008
1554	court, year	negative = E	0.317	1.020	1.026
1559	case, year	negative = E	0.317	1.020	1.026
1570	positive = E, court, year	negative = E	0.317	1.020	1.026
1580	positive = E, case, year	negative = E	0.317	1.020	1.026
1809	year	negative = E	0.375	1.028	1.037
1812	positive = E, year	negative = E	0.375	1.028	1.037
2095	said, edit	negative = E	0.375	1.044	1.058
2099	positive = E, said, edit	negative = E	0.375	1.044	1.058

2264	edit	negative = E	0.385	1.055	1.074
2268	positive = E, edit	negative = E	0.385	1.055	1.074
2484	said, court, edit	negative = E	0.327	1.070	1.096
2491	positive = E, said, court, edit	negative = E	0.327	1.070	1.096
2626	court, edit	negative = E	0.337	1.082	1.115
2644	positive = E, court, edit	negative = E	0.337	1.082	1.115
3074	said, inc	negative = E	0.327	1.108	1.158
3086	positive = E, said, inc	negative = E	0.327	1.108	1.158
3295	case, inc	negative = E	0.308	1.125	1.187
3299	positive = E, case, inc	negative = E	0.308	1.125	1.187
3379	court, inc	negative = E	0.317	1.138	1.211
3399	positive = E, court, inc	negative = E	0.317	1.138	1.211
3510	inc	negative = E	0.356	1.144	1.222
3513	positive = E, inc	negative = E	0.356	1.144	1.222

Setting  $minsup=0.2$

Premises	Conclusion	Support	Confidence	Lift	Conviction
googl	negative = E	0.250	0.812	1.457	2.359

Setting  $minsup=0.1$

Premises	Conclusion	Support	Confidence	Lift	Conviction
search	negative = E	0.135	0.875	1.569	3.538

**Positive:** -.

**Negative:** inc, edit, google, search.

- Cluster 5:  $minsup=0.4$ ,  $minconf=0.5$ . The dimensions of the frequent itemsets vary from 1 to 8. Topic: flight companies.

Association rules:

No.	Premises ↑	Conclusion	Support	Confidence	Lift	Conviction
3289	positive = E	airlin, report, delta	0.552	0.556	1.007	1.008
3290	positive = E	said, report, delta	0.552	0.556	1.007	1.008
3291	positive = E	negative = E, air, line	0.552	0.556	1.007	1.008
3303	positive = E	airlin, said, negative = E, flight	0.552	0.556	1.007	1.008
3304	positive = E	airlin, said, negative = E, delta	0.552	0.556	1.007	1.008
3305	positive = E	airlin, said, report, airport	0.552	0.556	1.007	1.008

11558	positive = E	airlin, said, report, southwest	0.636	0.641	1.007	1.012
11559	positive = E	said, negative = E, report, edit	0.636	0.641	1.007	1.012
12537	positive = E	airlin, delta	0.643	0.647	1.007	1.012
12538	positive = E	airlin, said, line	0.643	0.647	1.007	1.012
12540	positive = E	negative = E, report, edit	0.643	0.647	1.007	1.012
13358	positive = E	said, flight	0.649	0.654	0.997	0.994
13359	positive = E	airlin, said, airport	0.649	0.654	1.007	1.012
14085	positive = E	delta	0.656	0.660	1.007	1.013
14086	positive = E	airlin, line	0.656	0.660	1.007	1.013
14087	positive = E	said, airport	0.656	0.660	1.007	1.013
14088	positive = E	said, line	0.656	0.660	1.007	1.013
14750	positive = E	airlin, flight	0.662	0.667	0.997	0.994
15656	positive = E	line	0.669	0.673	1.007	1.013
15657	positive = E	report, southwest	0.669	0.673	1.007	1.013

No.	Premises ↑	Conclusion	Support	Confidence	Lift	Conviction
3277	negative = E	said, report, southwest, edit	0.494	0.555	1.029	1.035
3278	negative = E	positive = E, said, report, southwest, edit	0.494	0.555	1.029	1.035
3280	negative = E	airlin, said, report, southwest, edit	0.494	0.555	1.029	1.035
3281	negative = E	positive = E, airlin, said, report, southwest, edit	0.494	0.555	1.029	1.035
3832	negative = E	report, southwest, edit	0.500	0.562	1.030	1.038
3833	negative = E	positive = E, airlin, said, carrier	0.500	0.562	0.995	0.993
3835	negative = E	positive = E, airlin, report, line	0.500	0.562	0.984	0.979
3837	negative = E	positive = E, report, southwest, edit	0.500	0.562	1.030	1.038
3839	negative = E	airlin, said, report, line	0.500	0.562	0.995	0.993
3840	negative = E	airlin, report, southwest, edit	0.500	0.562	1.030	1.038
3841	negative = E	positive = E, airlin, said, report, line	0.500	0.562	0.995	0.993
3843	negative = E	positive = E, airlin, report, southwest, edit	0.500	0.562	1.030	1.038

6889	negative = E	said, southwest, edit	0.532	0.599	1.024	1.035
6890	negative = E	said, air, delta	0.532	0.599	0.991	0.987
6891	negative = E	positive = E, airlin, air, delta	0.532	0.599	0.981	0.970
6893	negative = E	positive = E, said, southwest, edit	0.532	0.599	1.036	1.051
6895	negative = E	positive = E, said, air, delta	0.532	0.599	0.991	0.987
6897	negative = E	airlin, said, southwest, edit	0.532	0.599	1.024	1.035
6898	negative = E	airlin, said, air, line	0.532	0.599	0.991	0.987
6899	negative = E	positive = E, airlin, said, southwest, edit	0.532	0.599	1.036	1.051
6901	negative = E	positive = E, airlin, said, air, line	0.532	0.599	0.991	0.987
7707	negative = E	said, percent	0.539	0.606	0.982	0.972
7708	negative = E	southwest, edit	0.539	0.606	1.025	1.038
7709	negative = E	positive = E, said, percent	0.539	0.606	0.993	0.988
7711	negative = E	positive = E, southwest, edit	0.539	0.606	1.037	1.054
19438	negative = E	airlin, said, report, edit	0.623	0.701	1.028	1.063
19439	negative = E	positive = E, airlin, said, report, edit	0.623	0.701	1.028	1.063
20461	negative = E	airlin, report, edit	0.630	0.708	1.029	1.068
20462	negative = E	positive = E, airlin, report, edit	0.630	0.708	1.029	1.068
21404	negative = E	said, report, edit	0.636	0.715	1.030	1.072
21405	negative = E	positive = E, said, report, edit	0.636	0.715	1.030	1.072
22422	negative = E	report, edit	0.643	0.723	1.030	1.077
22423	negative = E	positive = E, report, edit	0.643	0.723	1.030	1.077
25597	negative = E	said, southwest	0.669	0.752	1.016	1.047
25598	negative = E	positive = E, said, southwest	0.669	0.752	1.025	1.073
25600	negative = E	airlin, said, southwest	0.669	0.752	1.016	1.047
25601	negative = E	positive = E, airlin, said, southwest	0.669	0.752	1.025	1.073
26409	negative = E	airlin, said, edit	0.675	0.759	1.025	1.078
26410	negative = E	positive = E, airlin, said, edit	0.675	0.759	1.035	1.105
27004	negative = E	airlin, edit	0.682	0.766	1.026	1.084
27005	negative = E	positive = E, airlin, edit	0.682	0.766	1.035	1.112
27751	negative = E	said, edit	0.688	0.774	1.027	1.090
27752	negative = E	positive = E, said, edit	0.688	0.774	1.036	1.119
28557	negative = E	southwest	0.695	0.781	0.994	0.979
28558	negative = E	edit	0.695	0.781	1.028	1.097
28559	negative = E	positive = E, southwest	0.695	0.781	1.002	1.008
28561	negative = E	positive = E, edit	0.695	0.781	1.037	1.127

No.	Premises	Conclusion ↑	Support	Confidence	Lift	Conviction
42510	report, edit	negative = E	0.643	0.917	1.030	1.325
42512	positive = E, report, edit	negative = E	0.643	0.917	1.030	1.325
42516	report, southwest, edit	negative = E	0.500	0.917	1.030	1.325
42522	positive = E, report, southwest, edit	negative = E	0.500	0.917	1.030	1.325
42525	airlin, report, southwest, edit	negative = E	0.500	0.917	1.030	1.325
42533	positive = E, airlin, report, southwest, edit	negative = E	0.500	0.917	1.030	1.325
42744	positive = E, airlin, said, edit	negative = E	0.675	0.920	1.035	1.386
42765	positive = E, airlin, edit	negative = E	0.682	0.921	1.035	1.398
42810	positive = E, said, southwest, edit	negative = E	0.532	0.921	1.036	1.404
42815	positive = E, airlin, said, southwest, edit	negative = E	0.532	0.921	1.036	1.404
42820	positive = E, said, edit	negative = E	0.688	0.922	1.036	1.411
42854	positive = E, southwest, edit	negative = E	0.539	0.922	1.037	1.419
42858	positive = E, airlin, southwest, edit	negative = E	0.539	0.922	1.037	1.419
42875	positive = E, edit	negative = E	0.695	0.922	1.037	1.423

Premises	Conclusion	Support	Confidence	Lift	Conviction ↓
said, delta, carrier	positive = E, airlin, air	0.435	0.985	1.405	20.312
line, carrier	positive = E, air	0.455	0.986	1.380	20.286
delta, carrier	positive = E, air	0.455	0.986	1.380	20.286
airlin, line, carrier	positive = E, air	0.455	0.986	1.380	20.286
airlin, delta, carrier	positive = E, air	0.455	0.986	1.380	20.286
delta, percent	positive = E, air	0.448	0.986	1.380	20
airlin, delta, percent	positive = E, air	0.448	0.986	1.380	20
report, unit, delta	positive = E, air	0.448	0.986	1.380	20
line, carrier	positive = E, delta	0.435	0.944	1.439	6.109
report, line	positive = E, air	0.545	0.933	1.307	4.286
said, negative = E, line	positive = E, air	0.545	0.933	1.307	4.286
air, line, year	positive = E, airlin, said	0.422	0.985	1.053	4.286
unit, line, percent	positive = E, airlin, said	0.422	0.985	1.053	4.286
said, report, line, delta	negative = E, air	0.455	0.875	1.418	3.065
said, negative = E, line, delta	positive = E, report, air	0.455	0.875	1.418	3.065
positive = E, air	airlin, said, negative = E, unit, delta	0.422	0.591	1.358	1.381
year	negative = E, unit	0.468	0.727	1.167	1.381
year	positive = E, negative = E, unit	0.468	0.727	1.167	1.381
airlin, year	negative = E, unit	0.468	0.727	1.167	1.381
airlin, year	positive = E, negative = E, unit	0.468	0.727	1.167	1.381
southwest, unit	positive = E, air	0.448	0.793	1.110	1.381

Setting *minsup*= 0.3:

Premises	Conclusion	Support	Confidence	Lift	Conviction
said, air, percent	positive = E, southwest, unit, delta	0.325	0.641	1.702	1.737
said, air, percent	positive = E, airlin, southwest, unit, delta	0.325	0.641	1.702	1.737
airlin, said, air, percent	positive = E, southwest, unit, delta	0.325	0.641	1.702	1.737
air, percent	positive = E, southwest, unit, delta	0.331	0.646	1.714	1.759
air, percent	positive = E, airlin, southwest, unit, delta	0.331	0.646	1.714	1.759
airlin, air, percent	positive = E, southwest, unit, delta	0.331	0.646	1.714	1.759
line, percent	positive = E, said, southwest, unit, delta	0.318	0.662	1.821	1.884
line, percent	positive = E, airlin, said, southwest, unit, delta	0.318	0.662	1.821	1.884
airlin, line, percent	positive = E, said, southwest, unit, delta	0.318	0.662	1.821	1.884
line, percent	positive = E, said, southwest, air, unit, delta	0.318	0.662	1.821	1.884
line, percent	positive = E, airlin, said, southwest, air, unit, delta	0.318	0.662	1.821	1.884
airlin, line, percent	positive = E, said, southwest, air, unit, delta	0.318	0.662	1.821	1.884
said, line, percent	positive = E, southwest, unit, delta	0.318	0.671	1.782	1.896
said, line, percent	positive = E, airlin, southwest, unit, delta	0.318	0.671	1.782	1.896
jet	negative = E	0.331	0.962	1.082	2.925
inc	negative = E	0.331	0.944	1.062	1.987
inc	positive = E, negative = E	0.331	0.944	1.062	1.987
chief	negative = E	0.338	0.945	1.063	2.024
price	negative = E	0.318	0.942	1.059	1.913
market	negative = E	0.370	0.934	1.050	1.683
execut	negative = E	0.318	0.925	1.039	1.463
hold	negative = E	0.305	0.922	1.036	1.407
group	negative = E	0.383	0.908	1.020	1.196

**Positive:** -.

**Negative:** edit (report flight), jet, inc, chief, price, market, executive, hold, group.

- Cluster 6:  $\text{minsup}=0.6$ ,  $\text{minconf}=0.5$ . The maximal dimension of the frequent itemsets is 6.  
Topic: investments

Association rules:

No.	Premis... ↑	Conclusion	Support	Confidence	Lift	Conviction
542	positive = E	compani, percent	0.688	0.710	1.002	1.005
543	positive = E	percent, edit	0.688	0.710	1.002	1.005
544	positive = E	percent, expect	0.688	0.710	1.002	1.005
545	positive = E	negative = E, year, percent	0.688	0.710	1.002	1.005
786	positive = E	report, percent	0.719	0.742	1.003	1.009
787	positive = E	percent, said	0.719	0.742	1.003	1.009
862	positive = E	edit	0.729	0.753	0.990	0.969
863	positive = E	expect	0.729	0.753	1.004	1.011
864	positive = E	negative = E, report	0.729	0.753	0.990	0.969
865	positive = E	negative = E, percent	0.729	0.753	1.004	1.011
866	positive = E	year, report	0.729	0.753	0.990	0.969
982	positive = E	share	0.740	0.763	0.990	0.969
983	positive = E	year, compani	0.740	0.763	0.990	0.969
984	positive = E	year, percent	0.740	0.763	1.004	1.013
1137	positive = E	said	0.750	0.774	0.991	0.969
1672	positive = E	report	0.781	0.806	0.993	0.969
1673	positive = E	percent	0.781	0.806	1.005	1.023

No.	Premises	Conclusi... ↑	Support	Confidence	Lift	Conviction
6215	report, million	positive = E	0.656	0.969	1.000	1.016
6216	percent, quarter	positive = E	0.656	0.969	1.000	1.016
6220	negative = E, report, expect	positive = E	0.656	0.969	1.000	1.016
6221	negative = E, percent, share	positive = E	0.656	0.969	1.000	1.016
6222	year, compani, percent	positive = E	0.656	0.969	1.000	1.016
6223	year, percent, expect	positive = E	0.656	0.969	1.000	1.016
6226	compani, percent, share	positive = E	0.656	0.969	1.000	1.016
6227	report, percent, edit	positive = E	0.656	0.969	1.000	1.016
6228	percent, said, share	positive = E	0.656	0.969	1.000	1.016
6233	year, million	positive = E	0.667	0.970	1.001	1.031
6234	said, expect	positive = E	0.667	0.970	1.001	1.031
6235	share, expect	positive = E	0.667	0.970	1.001	1.031
6242	negative = E, report, percent	positive = E	0.667	0.970	1.001	1.031
6243	negative = E, percent, said	positive = E	0.667	0.970	1.001	1.031

6245	year, percent, edit	positive = E	0.667	0.970	1.001	1.031
6246	report, percent, share	positive = E	0.667	0.970	1.001	1.031
6248	report, percent, expect	positive = E	0.667	0.970	1.001	1.031
6249	negative = E, expect	positive = E	0.677	0.970	1.001	1.047
6252	year, report, percent	positive = E	0.677	0.970	1.001	1.047
6254	year, report, expect	positive = E	0.677	0.970	1.001	1.047
6256	year, percent, said	positive = E	0.677	0.970	1.001	1.047
6257	year, percent, share	positive = E	0.677	0.970	1.001	1.047
6258	report, percent, said	positive = E	0.677	0.970	1.001	1.047
6259	million	positive = E	0.688	0.971	1.002	1.062
6261	compani, percent	positive = E	0.688	0.971	1.002	1.062
6262	percent, edit	positive = E	0.688	0.971	1.002	1.062
6263	percent, expect	positive = E	0.688	0.971	1.002	1.062
6267	negative = E, year, percent	positive = E	0.688	0.971	1.002	1.062
6268	year, expect	positive = E	0.698	0.971	1.002	1.078
6271	report, expect	positive = E	0.708	0.971	1.003	1.094
6272	percent, share	positive = E	0.708	0.971	1.003	1.094
6273	report, percent	positive = E	0.719	0.972	1.003	1.109
6274	percent, said	positive = E	0.719	0.972	1.003	1.109
6275	expect	positive = E	0.729	0.972	1.004	1.125
6277	negative = E, percent	positive = E	0.729	0.972	1.004	1.125
6278	year, percent	positive = E	0.740	0.973	1.004	1.141
6279	percent	positive = E	0.781	0.974	1.005	1.203

No.	Premises ↑	Conclusion	Support	Confidence	Lift	Conviction
2690	negative = E	positive = E, compani	0.802	0.846	1.003	1.016
3677	negative = E	year	0.833	0.879	0.993	0.948
3678	negative = E	compani	0.833	0.879	1.005	1.034
6029	negative = E	positive = E	0.917	0.967	0.998	0.948

No.	Premises	Conclusion ↑	Support	Confidence	Lift	Conviction
5608	positive = E, compani	negative = E	0.802	0.951	1.003	1.055
5752	compani	negative = E	0.833	0.952	1.005	1.094

Premises	Conclusion	Support	Confidence	Lift	Conviction ↓
compani, report, percent	positive = E, share	0.615	0.952	1.287	5.382
compani, expect	positive = E, share	0.604	0.951	1.286	5.295

compani, expect	positive = E, percent	0.604	0.951	1.217	4.448
share, million	positive = E, report	0.604	0.951	1.217	4.448
expect, million	positive = E, report	0.604	0.951	1.217	4.448
said, share, expect	positive = E, percent	0.604	0.951	1.217	4.448
percent, expect	positive = E, report	0.667	0.941	1.205	3.719
year, percent, expect	positive = E, report	0.635	0.938	1.201	3.555
negative = E, year, expect	positive = E, report	0.625	0.938	1.200	3.500
positive = E, negative = E, report, percent	said	0.625	0.938	1.200	3.500
year, share, expect	positive = E, report	0.625	0.938	1.200	3.500
year, said, share	positive = E, percent	0.625	0.938	1.200	3.500
positive = E, year, percent, edit	said	0.625	0.938	1.200	3.500
year, said, edit	positive = E, percent	0.625	0.938	1.200	3.500
year, share, expect	positive = E, percent	0.625	0.938	1.200	3.500
positive = E, report, percent, share	said	0.625	0.938	1.200	3.500
report, said, share	positive = E, percent	0.625	0.938	1.200	3.500
positive = E, report, percent, expect	said	0.625	0.938	1.200	3.500
report, said, expect	positive = E, percent	0.625	0.938	1.200	3.500
percent, said, expect	positive = E, report	0.625	0.938	1.200	3.500
report, share, expect	positive = E, percent	0.625	0.938	1.200	3.500
percent, share, expect	positive = E, report	0.625	0.938	1.200	3.500
quarter	negative = E, percent	0.625	0.833	1.111	1.500
negative = E, percent	year, compani	0.635	0.847	1.099	1.500
expect	negative = E, year	0.667	0.889	1.067	1.500
quarter	negative = E, year	0.667	0.889	1.067	1.500
report	negative = E, share	0.677	0.833	1.159	1.688
edit	positive = E, report, said	0.635	0.836	1.180	1.774
year, percent	negative = E, edit	0.635	0.836	1.180	1.774
report	negative = E, expect	0.677	0.833	1.194	1.812
year, said	negative = E, edit	0.615	0.843	1.190	1.856

positive = E, share	negative = E, report	0.646	0.873	1.148	1.890
year, share	negative = E, report	0.646	0.873	1.148	1.890
percent, said	negative = E, report	0.646	0.873	1.148	1.890
negative = E, edit	expect	0.615	0.868	1.157	1.889
negative = E, edit	positive = E, said	0.615	0.868	1.157	1.889
share, edit	positive = E, said	0.615	0.868	1.157	1.889
negative = E, year, report	quarter	0.615	0.868	1.157	1.889
share, edit	negative = E, percent	0.615	0.868	1.157	1.889
positive = E, report, expect	negative = E, percent	0.615	0.868	1.157	1.889
positive = E, report	negative = E, expect	0.656	0.840	1.204	1.888
positive = E, percent	said, share	0.656	0.840	1.204	1.888
year, expect	negative = E, percent	0.625	0.870	1.159	1.917
share	negative = E, percent	0.677	0.878	1.171	2.056

Setting *minsup*= 0.4

Premises	Conclusion	Support	Confidence	Lift	Conviction
report	negative = E, year, percent, profit	0.448	0.551	1.103	1.114
report	negative = E, year, said, profit	0.448	0.551	1.151	1.161
report	negative = E, year, share, profit	0.448	0.551	1.151	1.161
report	negative = E, year, quarter, inc	0.448	0.551	1.203	1.207
report	negative = E, year, inc, million	0.448	0.551	1.203	1.207
report	negative = E, compani, percent, billion	0.448	0.551	1.151	1.161
report	negative = E, compani, edit, inc	0.448	0.551	1.176	1.184
report	negative = E, compani, expect, inc	0.448	0.551	1.203	1.207
report	negative = E, percent, share, profit	0.448	0.551	1.151	1.161
report	negative = E, percent, expect, billion	0.448	0.551	1.176	1.184
report	negative = E, percent, million, analyst	0.448	0.551	1.203	1.207
report	negative = E, said, share, profit	0.448	0.551	1.176	1.184
report	negative = E, said, edit, inc	0.448	0.551	1.176	1.184
report	negative = E, said, expect, market	0.448	0.551	1.203	1.207
corp	negative = E	0.438	0.955	1.007	1.146
servic	negative = E	0.438	0.955	1.007	1.146
corp	positive = E, negative = E	0.438	0.955	1.041	1.833
positive = E, corp	negative = E	0.438	0.955	1.007	1.146
positive = E, trade	negative = E	0.448	0.956	1.008	1.172
trade	negative = E	0.458	0.957	1.009	1.198
compar	negative = E	0.406	0.975	1.029	2.083
stock	negative = E	0.438	0.977	1.030	2.240

invest	positive = E	0.417	0.976	1.007	1.281
time	positive = E	0.427	0.976	1.008	1.312
trade	positive = E	0.469	0.978	1.010	1.438
unit	positive = E	0.490	0.979	1.011	1.500

**Positive:** percent, expect, invest, time, unit.

**Negative:** corporative-service, comparison, stock.

- **Cluster 7:**  $\text{minsup}=0.6$ ,  $\text{minconf}=0.5$ . The maximal dimension of the frequent itemsets is 8.  
Topic: market indexes.

Association rules:

No.	Premises ↑	Conclusion	Support	Confidence	Lift	Conviction
2689	positive = E	york	0.604	0.669	1.019	1.038
2690	positive = E	percent, york	0.604	0.669	1.019	1.038
2692	positive = E	said, jone	0.604	0.669	1.008	1.016
2733	positive = E	stock, index, week	0.604	0.669	1.043	1.084
2734	positive = E	stock, report, year	0.604	0.669	1.008	1.016
2735	positive = E	stock, industri, dow	0.604	0.669	1.019	1.038
2736	positive = E	stock, industri, jone	0.604	0.669	1.019	1.038
2737	positive = E	stock, dow, nasdaq	0.604	0.669	1.019	1.038
3321	positive = E	industri, dow	0.612	0.678	1.020	1.042
3322	positive = E	industri, jone	0.612	0.678	1.020	1.042
3323	positive = E	dow, nasdaq	0.612	0.678	1.020	1.042
3324	positive = E	percent, stock, nasdaq	0.612	0.678	1.020	1.042
3326	positive = E	percent, market, year	0.612	0.678	0.976	0.949
3328	positive = E	percent, market, averag	0.612	0.678	0.976	0.949
3330	positive = E	percent, report, industri	0.612	0.678	0.998	0.996
3332	positive = E	percent, industri, dow	0.612	0.678	1.020	1.042
3334	positive = E	percent, industri, jone	0.612	0.678	1.020	1.042

3914	positive = E	nasdaq	0.619	0.686	1.021	1.046
3915	positive = E	percent, month	0.619	0.686	0.978	0.951
3917	positive = E	percent, nasdaq	0.619	0.686	1.021	1.046
3919	positive = E	said, dow	0.619	0.686	1.010	1.022
3920	positive = E	said, trade	0.619	0.686	1.010	1.022
3921	positive = E	stock, data	0.619	0.686	1.021	1.046
3922	positive = E	stock, jone	0.619	0.686	1.010	1.022
3923	positive = E	market, week	0.619	0.686	1.033	1.069
3924	positive = E	negative = E, expect	0.619	0.686	1.010	1.022
3935	positive = E	percent, market, week	0.619	0.686	1.033	1.069
3937	positive = E	percent, negative = E, expect	0.619	0.686	1.010	1.022
3939	positive = E	percent, negative = E, gain	0.619	0.686	0.978	0.951
3941	positive = E	percent, industri, averag	0.619	0.686	0.999	0.998
3943	positive = E	said, stock, week	0.619	0.686	1.045	1.093
3944	positive = E	said, stock, investor	0.619	0.686	1.021	1.046
4565	positive = E	jone	0.627	0.694	1.011	1.025
4566	positive = E	percent, jone	0.627	0.694	1.011	1.025
4568	positive = E	said, data	0.627	0.694	1.011	1.025
4569	positive = E	said, investor	0.627	0.694	1.011	1.025
4571	positive = E	index, week	0.627	0.694	1.034	1.074
4607	positive = E	percent, said, stock, fell	0.627	0.694	1.057	1.123
5916	positive = E	stock, fell	0.642	0.711	1.058	1.135
6491	positive = E	percent, stock, week	0.649	0.719	1.047	1.115
7133	positive = E	fell	0.657	0.727	1.037	1.095
7134	positive = E	percent, fell	0.657	0.727	1.037	1.095
8999	positive = E	week	0.679	0.752	1.039	1.114
32324	positive = E	stock	0.873	0.967	1.012	1.354
32325	positive = E	percent, stock	0.873	0.967	1.012	1.354

No.	Premises	Conclusion ↑	Support	Lift	Conviction
24413	jone	positive = E	0.627	1.011	1.116
24415	percent, jone	positive = E	0.627	1.011	1.116
24416	said, data	positive = E	0.627	1.011	1.116
24417	said, investor	positive = E	0.627	1.011	1.116
24427	dow, jone	positive = E	0.627	1.011	1.116
24430	percent, said, data	positive = E	0.627	1.011	1.116
24432	percent, said, investor	positive = E	0.627	1.011	1.116
24452	percent, dow, jone	positive = E	0.627	1.011	1.116
24519	said, stock, market, expect	positive = E	0.627	1.011	1.116
24528	percent, said, stock, market, expect	positive = E	0.627	1.011	1.116
24560	stock, trade	positive = E	0.634	1.012	1.128
24567	percent, stock, trade	positive = E	0.634	1.012	1.128
24583	stock, report, expect	positive = E	0.634	1.012	1.128
24595	percent, stock, report, expect	positive = E	0.634	1.012	1.128
24603	stock	positive = E	0.873	1.012	1.129
24607	percent, stock	positive = E	0.873	1.012	1.129
24614	investor	positive = E	0.642	1.013	1.140
24617	percent, investor	positive = E	0.642	1.013	1.140
24622	stock, dow	positive = E	0.642	1.013	1.140
24633	percent, stock, dow	positive = E	0.642	1.013	1.140
24648	stock, market, share	positive = E	0.642	1.013	1.140
24663	percent, stock, market, share	positive = E	0.642	1.013	1.140
24684	expect	positive = E	0.724	1.013	1.143
24690	percent, expect	positive = E	0.724	1.013	1.143
24698	data	positive = E	0.649	1.014	1.152
24699	dow	positive = E	0.649	1.014	1.152
24700	trade	positive = E	0.649	1.014	1.152
24703	percent, data	positive = E	0.649	1.014	1.152

24705	percent, dow	positive = E	0.649	1.014	1.152
24707	percent, trade	positive = E	0.649	1.014	1.152
24751	stock, index, share	positive = E	0.649	1.014	1.152
24752	stock, index, expect	positive = E	0.649	1.014	1.152
24755	stock, market, expect	positive = E	0.649	1.014	1.152
24763	percent, stock, index, share	positive = E	0.649	1.014	1.152
24765	percent, stock, index, expect	positive = E	0.649	1.014	1.152
24771	percent, stock, market, expect	positive = E	0.649	1.014	1.152
24891	said, stock, share	positive = E	0.687	1.019	1.213
24892	said, stock, expect	positive = E	0.687	1.019	1.213
24896	percent, said, stock, share	positive = E	0.687	1.019	1.213
24898	percent, said, stock, expect	positive = E	0.687	1.019	1.213
24906	york	positive = E	0.604	1.019	1.220
24909	percent, york	positive = E	0.604	1.019	1.220
24916	industri, nasdaq	positive = E	0.604	1.019	1.220
24917	averag, dow	positive = E	0.604	1.019	1.220
24932	percent, industri, nasdaq	positive = E	0.604	1.019	1.220
24934	percent, averag, dow	positive = E	0.604	1.019	1.220
24961	stock, industri, dow	positive = E	0.604	1.019	1.220
24962	stock, industri, jone	positive = E	0.604	1.019	1.220
24963	stock, dow, nasdaq	positive = E	0.604	1.019	1.220
25017	percent, stock, industri, dow	positive = E	0.604	1.019	1.220
25019	percent, stock, industri, jone	positive = E	0.604	1.019	1.220
25021	percent, stock, dow, nasdaq	positive = E	0.604	1.019	1.220
25066	said, stock, point, share	positive = E	0.604	1.019	1.220
25073	stock, industri, dow, jone	positive = E	0.604	1.019	1.220
25105	percent, said, stock, point, share	positive = E	0.604	1.019	1.220
25119	percent, stock, industri, dow, jone	positive = E	0.604	1.019	1.220

25270	stock, nasdaq	positive = E	0.612	1.020	1.233
25276	industri, dow	positive = E	0.612	1.020	1.233
25277	industri, jone	positive = E	0.612	1.020	1.233
25278	dow, nasdaq	positive = E	0.612	1.020	1.233
25291	percent, stock, nasdaq	positive = E	0.612	1.020	1.233
25303	percent, industri, dow	positive = E	0.612	1.020	1.233
25305	percent, industri, jone	positive = E	0.612	1.020	1.233
25307	percent, dow, nasdaq	positive = E	0.612	1.020	1.233
25337	stock, market, industri	positive = E	0.612	1.020	1.233
25339	stock, industri, averag	positive = E	0.612	1.020	1.233
25349	industri, dow, jone	positive = E	0.612	1.020	1.233
25405	percent, stock, market, industri	positive = E	0.612	1.020	1.233
25409	percent, stock, industri, averag	positive = E	0.612	1.020	1.233
25429	percent, industri, dow, jone	positive = E	0.612	1.020	1.233
25620	nasdaq	positive = E	0.619	1.021	1.247
25622	percent, nasdaq	positive = E	0.619	1.021	1.247
25626	stock, data	positive = E	0.619	1.021	1.247
25640	percent, stock, data	positive = E	0.619	1.021	1.247
25656	said, stock, investor	positive = E	0.619	1.021	1.247
25668	stock, index, industri	positive = E	0.619	1.021	1.247
25671	stock, report, share	positive = E	0.619	1.021	1.247
25684	percent, said, stock, investor	positive = E	0.619	1.021	1.247
25708	percent, stock, index, industri	positive = E	0.619	1.021	1.247
25714	percent, stock, report, share	positive = E	0.619	1.021	1.247
25802	stock, share	positive = E	0.716	1.022	1.261
25803	stock, expect	positive = E	0.716	1.022	1.261
25821	percent, stock, share	positive = E	0.716	1.022	1.261
25823	percent, stock, expect	positive = E	0.716	1.022	1.261

25908	stock, investor	positive = E	0.634	1.023	1.275
25926	percent, stock, investor	positive = E	0.634	1.023	1.275
25950	stock, point, share	positive = E	0.634	1.023	1.275
25962	percent, stock, point, share	positive = E	0.634	1.023	1.275
26075	said, stock, industri	positive = E	0.649	1.025	1.303
26085	percent, said, stock, industri	positive = E	0.649	1.025	1.303
26153	stock, industri	positive = E	0.672	1.028	1.344
26160	percent, stock, industri	positive = E	0.672	1.028	1.344
26907	market, week	positive = E	0.619	1.033	1.439
26931	percent, market, week	positive = E	0.619	1.033	1.439
27207	index, week	positive = E	0.627	1.034	1.455
27223	percent, index, week	positive = E	0.627	1.034	1.455
27351	said, fell	positive = E	0.642	1.035	1.488
27365	percent, said, fell	positive = E	0.642	1.035	1.488
27499	fell	positive = E	0.657	1.037	1.520
27504	percent, fell	positive = E	0.657	1.037	1.520
27579	week	positive = E	0.679	1.039	1.568
27581	percent, week	positive = E	0.679	1.039	1.568
27664	stock, index, week	positive = E	0.604	1.043	1.669
27698	percent, stock, index, week	positive = E	0.604	1.043	1.669
28448	said, stock, week	positive = E	0.619	1.045	1.707
28476	percent, said, stock, week	positive = E	0.619	1.045	1.707
28977	stock, week	positive = E	0.649	1.047	1.785
28993	percent, stock, week	positive = E	0.649	1.047	1.785
30297	said, stock, fell	positive = E	0.627	1.057	2.134
30318	percent, said, stock, fell	positive = E	0.627	1.057	2.134
30512	stock, fell	positive = E	0.642	1.058	2.183
30525	percent, stock, fell	positive = E	0.642	1.058	2.183

No.	Premis... ↑	Conclusion	Support	Confidence	Lift	Conviction
5816	negative = E	said, stock, positive = E, point	0.604	0.711	1.013	1.031
5823	negative = E	said, stock, market, point	0.604	0.711	1.024	1.057
5828	negative = E	stock, index, positive = E, point	0.604	0.711	1.013	1.031
5832	negative = E	stock, index, report, point	0.604	0.711	1.035	1.083
5843	negative = E	percent, said, stock, positive = E, report	0.604	0.711	0.982	0.954
5845	negative = E	percent, said, stock, positive = E, point	0.604	0.711	1.013	1.031
5859	negative = E	percent, said, stock, market, point	0.604	0.711	1.024	1.057
5869	negative = E	percent, stock, index, positive = E, point	0.604	0.711	1.013	1.031
5877	negative = E	percent, stock, index, report, point	0.604	0.711	1.035	1.083
6530	negative = E	averag	0.612	0.719	0.964	0.904
6531	negative = E	percent, averag	0.612	0.719	0.964	0.904
6533	negative = E	stock, year	0.612	0.719	0.984	0.957
6535	negative = E	point, gain	0.612	0.719	1.059	1.143
6535	negative = E	point, gain	0.612	0.719	1.059	1.143
6539	negative = E	percent, stock, year	0.612	0.719	0.984	0.957
6543	negative = E	percent, point, gain	0.612	0.719	1.059	1.143
6555	negative = E	said, index, gain	0.612	0.719	1.025	1.063
6560	negative = E	said, market, rose	0.612	0.719	1.004	1.010
6562	negative = E	said, report, rose	0.612	0.719	1.025	1.063
6564	negative = E	stock, index, expect	0.612	0.719	1.015	1.037
6568	negative = E	stock, positive = E, rose	0.612	0.719	1.015	1.037
6569	negative = E	stock, positive = E, expect	0.612	0.719	1.004	1.010
6570	negative = E	stock, positive = E, gain	0.612	0.719	1.048	1.117
6574	negative = E	stock, point, rose	0.612	0.719	1.036	1.090
7180	negative = E	positive = E, gain	0.619	0.728	1.049	1.125
7197	negative = E	percent, index, expect	0.619	0.728	1.006	1.015
7203	negative = E	percent, positive = E, expect	0.619	0.728	1.006	1.015
7205	negative = E	percent, positive = E, gain	0.619	0.728	1.049	1.125
7990	negative = E	stock, report, gain	0.627	0.737	1.062	1.163
7993	negative = E	index, report, point	0.627	0.737	1.029	1.078
8005	negative = E	percent, said, market, point	0.627	0.737	1.018	1.049
8023	negative = E	percent, stock, report, gain	0.627	0.737	1.062	1.163

8648	negative = E	stock, index, gain	0.634	0.746	1.041	1.115
8653	negative = E	stock, market, point	0.634	0.746	1.030	1.085
8660	negative = E	percent, said, positive = E, report	0.634	0.746	0.989	0.968
8666	negative = E	percent, stock, index, rose	0.634	0.746	1.020	1.056
8668	negative = E	percent, stock, index, gain	0.634	0.746	1.041	1.115
8678	negative = E	percent, stock, market, point	0.634	0.746	1.030	1.085
8689	negative = E	said, stock, index, market	0.634	0.746	0.989	0.968
8692	negative = E	percent, said, stock, index, market	0.634	0.746	0.989	0.968
9141	negative = E	report, gain	0.642	0.754	1.053	1.155
9159	negative = E	percent, report, gain	0.642	0.754	1.053	1.155
134...	negative = E	stock, gain	0.687	0.807	1.050	1.199
134...	negative = E	percent, stock, gain	0.687	0.807	1.050	1.199
149...	negative = E	gain	0.701	0.825	1.042	1.191
149...	negative = E	percent, gain	0.701	0.825	1.042	1.191
149...	negative = E	said, stock, index	0.701	0.825	0.987	0.936
149...	negative = E	percent, said, stock, index	0.701	0.825	0.987	0.936
155...	negative = E	rose	0.709	0.833	1.015	1.075
189...	negative = E	point	0.739	0.868	1.021	1.134

No.	Premises	Conclusion ↑	Support	Confidence	Lift	Conviction
17714	week	negative = E	0.619	0.856	1.006	1.034
17716	percent, week	negative = E	0.619	0.856	1.006	1.034
17718	index, expect	negative = E	0.619	0.856	1.006	1.034
17720	positive = E, expect	negative = E	0.619	0.856	1.006	1.034
17726	percent, index, expect	negative = E	0.619	0.856	1.006	1.034
17730	percent, positive = E, expect	negative = E	0.619	0.856	1.006	1.034
17741	said, index, rose	negative = E	0.619	0.856	1.006	1.034
17761	index, market, report	negative = E	0.619	0.856	1.006	1.034
17775	percent, said, index, rose	negative = E	0.619	0.856	1.006	1.034
17815	percent, index, market, report	negative = E	0.619	0.856	1.006	1.034
17933	stock, index, report	negative = E	0.664	0.856	1.006	1.035
17942	percent, stock, index, report	negative = E	0.664	0.856	1.006	1.035
17951	report	negative = E	0.761	0.857	1.008	1.045
17953	percent, report	negative = E	0.761	0.857	1.008	1.045

17955	said, rose	negative = E	0.672	0.857	1.008	1.045
17960	percent, said, rose	negative = E	0.672	0.857	1.008	1.045
18012	said, stock, index, point	negative = E	0.627	0.857	1.008	1.045
18024	percent, said, stock, index, point	negative = E	0.627	0.857	1.008	1.045
18036	stock, report	negative = E	0.724	0.858	1.009	1.054
18039	percent, stock, report	negative = E	0.724	0.858	1.009	1.054
18048	expect	negative = E	0.679	0.858	1.009	1.055
18051	percent, expect	negative = E	0.679	0.858	1.009	1.055
18056	market, report	negative = E	0.679	0.858	1.009	1.055
18062	percent, market, report	negative = E	0.679	0.858	1.009	1.055
18070	market, rose	negative = E	0.634	0.859	1.009	1.055
18075	percent, market, rose	negative = E	0.634	0.859	1.009	1.055
18153	said, stock, rose	negative = E	0.642	0.860	1.011	1.066
18154	said, stock, expect	negative = E	0.642	0.860	1.011	1.066
18429	index, rose	negative = E	0.657	0.863	1.014	1.087
18432	percent, index, rose	negative = E	0.657	0.863	1.014	1.087
18516	stock, index, expect	negative = E	0.612	0.863	1.015	1.091
18521	stock, positive = E, rose	negative = E	0.612	0.863	1.015	1.091
18563	percent, stock, index, expect	negative = E	0.612	0.863	1.015	1.091
18573	percent, stock, positive = E, rose	negative = E	0.612	0.863	1.015	1.091
18645	rose	negative = E	0.709	0.864	1.015	1.095
18647	percent, rose	negative = E	0.709	0.864	1.015	1.095
18664	said, positive = E, point	negative = E	0.619	0.865	1.016	1.102
18670	index, positive = E, point	negative = E	0.619	0.865	1.016	1.102
18671	index, market, point	negative = E	0.619	0.865	1.016	1.102
18681	percent, said, positive = E, point	negative = E	0.619	0.865	1.016	1.102
18693	percent, index, positive = E, point	negative = E	0.619	0.865	1.016	1.102
18695	percent, index, market, point	negative = E	0.619	0.865	1.016	1.102

18895	stock, rose	negative = E	0.679	0.867	1.019	1.119
18897	percent, stock, rose	negative = E	0.679	0.867	1.019	1.119
18919	positive = E, rose	negative = E	0.634	0.867	1.020	1.125
18927	percent, positive = E, rose	negative = E	0.634	0.867	1.020	1.125
18933	stock, index, rose	negative = E	0.634	0.867	1.020	1.125
18946	percent, stock, index, rose	negative = E	0.634	0.867	1.020	1.125
18977	point	negative = E	0.739	0.868	1.021	1.134
18981	percent, point	negative = E	0.739	0.868	1.021	1.134
19043	stock, positive = E, point	negative = E	0.649	0.870	1.023	1.148
19048	percent, stock, positive = E, point	negative = E	0.649	0.870	1.023	1.148
19088	said, market, gain	negative = E	0.604	0.871	1.024	1.157
19118	percent, said, market, gain	negative = E	0.604	0.871	1.024	1.157
19148	said, stock, market, point	negative = E	0.604	0.871	1.024	1.157
19185	percent, said, stock, market, point	negative = E	0.604	0.871	1.024	1.157
21076	gain	negative = E	0.701	0.887	1.042	1.318
21078	percent, gain	negative = E	0.701	0.887	1.042	1.318
21104	said, stock, gain	negative = E	0.649	0.888	1.044	1.330
21122	percent, said, stock, gain	negative = E	0.649	0.888	1.044	1.330
21268	said, report, gain	negative = E	0.604	0.890	1.046	1.358
21302	percent, said, report, gain	negative = E	0.604	0.890	1.046	1.358
21564	stock, positive = E, gain	negative = E	0.612	0.891	1.048	1.373
21622	percent, stock, positive = E, gain	negative = E	0.612	0.891	1.048	1.373
21791	positive = E, gain	negative = E	0.619	0.892	1.049	1.388
21797	percent, positive = E, gain	negative = E	0.619	0.892	1.049	1.388
21933	stock, gain	negative = E	0.687	0.893	1.050	1.398
21937	percent, stock, gain	negative = E	0.687	0.893	1.050	1.398
22169	report, gain	negative = E	0.642	0.896	1.053	1.433
22175	percent, report, gain	negative = E	0.642	0.896	1.053	1.433
22645	point, gain	negative = E	0.612	0.901	1.059	1.509
22649	percent, point, gain	negative = E	0.612	0.901	1.059	1.509
23112	stock, report, gain	negative = E	0.627	0.903	1.062	1.542
23145	percent, stock, report, gain	negative = E	0.627	0.903	1.062	1.542

Premises	Conclusion	Support	Confid...	Lift	Conviction ↓
industri	positive = E, nasdaq	0.604	0.802	1.295	1.922
industri	percent, positive = E, nasdaq	0.604	0.802	1.295	1.922
percent, industri	positive = E, nasdaq	0.604	0.802	1.295	1.922
industri	said, point, jone	0.604	0.802	1.295	1.922
industri	stock, index, nasdaq	0.604	0.802	1.295	1.922
industri	stock, positive = E, jone	0.604	0.802	1.295	1.922
point, gain	percent, negative = E	0.612	0.901	1.059	1.509
said, fell	stock, positive = E	0.627	0.913	1.046	1.459
said, fell	percent, stock, positive = E	0.627	0.913	1.046	1.459
report, gain	negative = E	0.642	0.896	1.053	1.433
report, gain	percent, negative = E	0.642	0.896	1.053	1.433
percent, report, gain	negative = E	0.642	0.896	1.053	1.433
nasdaq	stock, positive = E	0.612	0.911	1.043	1.427
nasdaq	percent, stock, positive = E	0.612	0.911	1.043	1.427
percent, nasdaq	stock, positive = E	0.612	0.911	1.043	1.427
gain	stock, negative = E	0.687	0.868	1.067	1.413
gain	percent, stock, negative = E	0.687	0.868	1.067	1.413
percent, gain	stock, negative = E	0.687	0.868	1.067	1.413
industri, dow	stock, positive = E	0.604	0.910	1.042	1.411
industri, jone	stock, positive = E	0.604	0.910	1.042	1.411
dow, nasdaq	stock, positive = E	0.604	0.910	1.042	1.411
industri, dow	percent, stock, positive = E	0.604	0.910	1.042	1.411
percent, industri, dow	stock, positive = E	0.604	0.910	1.042	1.411
industri, jone	percent, stock, positive = E	0.604	0.910	1.042	1.411
percent, industri, jone	stock, positive = E	0.604	0.910	1.042	1.411
dow, nasdaq	percent, stock, positive = E	0.604	0.910	1.042	1.411
percent, dow, nasdaq	stock, positive = E	0.604	0.910	1.042	1.411

**Positive:** dow-trade-data, jone, nasdaq, investor, stock, expect, New York, fell (percent), week (percent).

**Negative:** rose (percent), point (percent), gain (percent).

- Cluster 8:  $\text{minsup}=0.2$ ,  $\text{minconf}=0.5$ . The maximal dimension of the frequent itemsets is 7.  
Topic: government.

Association rules:

No.	Premises ↑	Conclusion	Support	Confidence	Lift	Conviction
23927	positive = E	govern, edit	0.542	0.583	1.039	1.053
25983	positive = E	said, report, edit	0.548	0.590	1.064	1.086
32178	positive = E	report, edit	0.574	0.618	1.064	1.098
44485	positive = E	said, state	0.626	0.674	0.985	0.969
46808	positive = E	said, year	0.639	0.688	0.969	0.929
49504	positive = E	said, report	0.652	0.701	1.016	1.037
52318	positive = E	said, edit	0.665	0.715	1.046	1.110
53620	positive = E	said, govern	0.671	0.722	1.009	1.022
54923	positive = E	state	0.677	0.729	0.991	0.977
57323	positive = E	edit	0.690	0.743	1.047	1.130
60112	positive = E	year	0.703	0.757	0.978	0.929
61110	positive = E	govern	0.710	0.764	1.012	1.038
61111	positive = E	report	0.710	0.764	1.021	1.066
82583	positive = E	said	0.858	0.924	0.994	0.929

No.	Premises	Conclusion ↑	Support	Confidence	Lift	Conviction
83314	provid	positive = E	0.277	0.935	1.006	1.088
83362	week	positive = E	0.471	0.936	1.007	1.107
83474	report, take	positive = E	0.297	0.939	1.010	1.159
84570	administr	positive = E	0.213	0.943	1.015	1.242
84571	lead	positive = E	0.213	0.943	1.015	1.242
84574	year, twitter	positive = E	0.213	0.943	1.015	1.242
84922	street	positive = E	0.219	0.944	1.017	1.277
85640	report	positive = E	0.710	0.948	1.021	1.372
85814	said, china	positive = E	0.245	0.950	1.023	1.419
86019	china	positive = E	0.258	0.952	1.025	1.490
86368	twitter	positive = E	0.303	0.959	1.032	1.739
86444	addit	positive = E	0.329	0.962	1.036	1.881
86914	appear	positive = E	0.206	0.970	1.044	2.342
87215	detail	positive = E	0.213	0.971	1.045	2.413
87504	tuesday	positive = E	0.219	0.971	1.046	2.484
87867	edit	positive = E	0.690	0.973	1.047	2.602

88274	inform	positive = E	0.265	0.976	1.051	2.981
88275	system	positive = E	0.265	0.976	1.051	2.981
88349	effort	positive = E	0.277	0.977	1.052	3.123
88529	respons	positive = E	0.219	1	1.076	$\infty$

No.	Premises	Conclusi... ↑	Support	Confidence	Lift	Conviction
33843	follow	negative = E	0.226	0.625	1.196	1.273

No.	Premises ↑	Conclusion	Support	Confidence	Lift	Conviction
17391	negative = D	nation	0.219	0.557	0.960	0.947
17394	negative = D	mani	0.219	0.557	1.080	1.093
17398	negative = D	positive = E, countri	0.219	0.557	1.028	1.035
17399	negative = D	positive = E, ani	0.219	0.557	1.393	1.356
17400	negative = D	said, say	0.219	0.557	0.971	0.962
17401	negative = D	said, countri	0.219	0.557	1.028	1.035
17409	negative = D	said, ani	0.219	0.557	1.350	1.326
17424	negative = D	govern, say	0.219	0.557	1.094	1.108
17445	negative = D	positive = E, year, report	0.219	0.557	1.067	1.079
17446	negative = D	positive = E, year, edit	0.219	0.557	1.080	1.093
17457	negative = D	positive = E, report, state	0.219	0.557	1.054	1.064
17482	negative = D	said, govern, report	0.219	0.557	1.080	1.093
17502	negative = D	said, state, edit	0.219	0.557	1.108	1.122
17522	negative = D	govern, report, edit	0.219	0.557	1.234	1.239
17539	negative = D	positive = E, said, govern, report	0.219	0.557	1.122	1.137
17568	negative = D	positive = E, govern, report, edit	0.219	0.557	1.252	1.254
21717	negative = D	includ	0.226	0.574	1.059	1.075
21719	negative = D	time	0.226	0.574	1.098	1.120
21720	negative = D	sinc	0.226	0.574	1.112	1.135
21743	negative = D	govern, week	0.226	0.574	1.412	1.393
21746	negative = D	report, state	0.226	0.574	1.022	1.029
21752	negative = D	state, edit	0.226	0.574	1.085	1.105
21755	negative = D	state, week	0.226	0.574	1.412	1.393
21771	negative = D	said, year, govern	0.226	0.574	1.071	1.090
21776	negative = D	said, year, edit	0.226	0.574	1.126	1.150
25855	negative = D	peopl	0.232	0.590	1.005	1.007
25856	negative = D	presid	0.232	0.590	1.039	1.055
25857	negative = D	group	0.232	0.590	1.102	1.133

25858	negative = D	month	0.232	0.590	1.102	1.133
25860	negative = D	positive = E, week	0.232	0.590	1.253	1.291
25870	negative = D	said, week	0.232	0.590	1.253	1.291
25873	negative = D	year, report	0.232	0.590	1.051	1.070
25874	negative = D	year, state	0.232	0.590	1.064	1.086
25875	negative = D	year, edit	0.232	0.590	1.102	1.133
25896	negative = D	positive = E, year, govern	0.232	0.590	1.116	1.149
25900	negative = D	positive = E, govern, state	0.232	0.590	1.158	1.196
25919	negative = D	said, govern, state	0.232	0.590	1.129	1.165
29480	negative = D	say	0.239	0.607	1.000	1.000
29481	negative = D	countri	0.239	0.607	1.033	1.049
29505	negative = D	positive = E, said, state	0.239	0.607	0.969	0.951
29535	negative = D	said, report, edit	0.239	0.607	1.093	1.131
29576	negative = D	positive = E, said, report, edit	0.239	0.607	1.106	1.148
33698	negative = D	ani	0.245	0.623	1.399	1.472
33711	negative = D	govern, report	0.245	0.623	1.136	1.198
33714	negative = D	report, edit	0.245	0.623	1.073	1.112
33724	negative = D	positive = E, said, year	0.245	0.623	0.975	0.958
33729	negative = D	positive = E, govern, report	0.245	0.623	1.178	1.249
33732	negative = D	positive = E, report, edit	0.245	0.623	1.085	1.129
36982	negative = D	week	0.252	0.639	1.270	1.377
36989	negative = D	year, govern	0.252	0.639	1.113	1.181
36995	negative = D	govern, state	0.252	0.639	1.152	1.234
37003	negative = D	positive = E, said, report	0.252	0.639	0.981	0.966
37044	negative = D	positive = E, said, govern, edit	0.252	0.639	1.209	1.306
40687	negative = D	positive = E, govern, edit	0.258	0.656	1.210	1.331
43634	negative = D	positive = E, state	0.265	0.672	0.992	0.984
43636	negative = D	said, report	0.265	0.672	0.974	0.945

43637	negative = D	said, state	0.265	0.672	0.983	0.964
43662	negative = D	said, govern, edit	0.265	0.672	1.226	1.377
47186	negative = D	govern, edit	0.271	0.689	1.227	1.408
50619	negative = D	said, year	0.277	0.705	0.993	0.984
53581	negative = D	positive = E, year	0.284	0.721	1.026	1.065
53589	negative = D	positive = E, said, govern	0.284	0.721	1.075	1.181
53590	negative = D	positive = E, said, edit	0.284	0.721	1.085	1.204
56110	negative = D	state	0.290	0.738	1.003	1.008
56111	negative = D	positive = E, report	0.290	0.738	1.039	1.107
56112	negative = D	positive = E, edit	0.290	0.738	1.069	1.181
59037	negative = D	said, edit	0.297	0.754	1.103	1.286
61908	negative = D	report	0.303	0.770	1.030	1.096
61909	negative = D	edit	0.303	0.770	1.086	1.265
61910	negative = D	said, govern	0.303	0.770	1.076	1.237
64804	negative = D	positive = E, govern	0.310	0.787	1.109	1.362
67235	negative = D	year	0.316	0.803	1.038	1.148
69564	negative = D	positive = E, said	0.323	0.820	0.955	0.787
71649	negative = D	govern	0.329	0.836	1.108	1.495
79748	negative = D	said	0.355	0.902	0.971	0.722
81783	negative = D	positive = E	0.361	0.918	0.988	0.866

No.	Premises	Conclusion	Support	Confidence	Lift	Conviction
15100	positive = E, govern, week	negative = D	0.213	0.550	1.398	1.348
15344	ani	negative = D	0.245	0.551	1.399	1.350
15594	positive = E, state, week	negative = D	0.206	0.552	1.402	1.353
16980	govern, week	negative = D	0.226	0.556	1.412	1.365
16985	state, week	negative = D	0.226	0.556	1.412	1.365
27121	govern, state, week	negative = D	0.200	0.596	1.515	1.502
27124	govern, edit, week	negative = D	0.200	0.596	1.515	1.502
29020	govern, ani	negative = D	0.206	0.604	1.534	1.531

**Positive:** provide, week, report, lead (year twitter), street, china, twitter, additional, appear, detail, Tuesday, edit, inform-system, effort.

**Negative:** follow.

**Very negative:** ani.