

Zero-Revelation RegTech: Detecting Risk through Corporate Emails and News

by Sanjiv R. Das, Seoyoung Kim, Bhushan Kothari

Market manipulation and suspicious stock recommendations on social media

by Thomas Renault

Sébastien Fries

Paris-Saclay University and Crest

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- **A common ground fact:**
 - Companies and markets consist of people working and trading with each other.
 - Agents are the the primary drivers of firms and stock prices.
 - Information about their behaviours and decisions *is* information about the future of a business or future returns of an asset.
- Agents' behaviour was typically *totally unobservable*...
- ... Until the advent of the internet and social media
 - Massive revelation of individual contacts, emotions, opinions, intentions, etc.

- **A common goal:**

- Connect the dots between financial events and signals extracted from this new *social* data.

- Two problematics :

- Does corporate email content exhibit early signals of financial risks ?
- Can fraudulent Twitter activity be linked to abnormal price returns ?

- Hurdles :

- Processing massive amounts of unstructured textual data
- Identifying scattered relevant pieces of information

- Design of a toolbox to automatically analyse the emails exchanged by the top management alongside news articles.
 - Visual and user-friendly, use case illustrated by Enron's demise (01/2001-12/2001, 100 000 emails and 1302 news article)
 - Allow fast processing of a large amount of textual data.
 - **Ensures the confidentiality** of the email content.

Comments on Zero-Revelation RegTech (i)

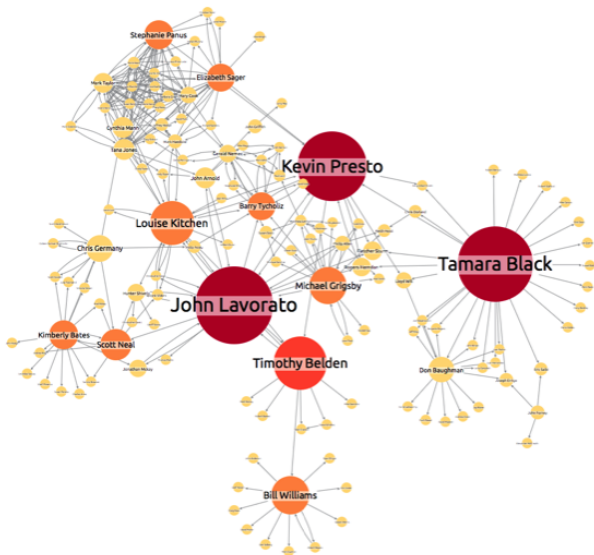
- Regarding the temporal analysis of section 3
 - Some series might exhibit **non-stationarity** (e.g. stock prices, header sentiment)
 - The regression of weekly Returns, serially uncorrelated *a priori*, on the MA header sentiment, possibly $I(1)$, might be misleading.
 - ⇒ Visual inspection of co-movements might also be misleading : why not **test for stationary and co-integration** ?
- Regarding the predictive power of email Length on stock returns:
 - ⇒ **Adaptive managers** aware of this fact could try to "game" the toolbox by lengthening their mails

Comments on Zero-Revelation RegTech (ii)

- Regarding network analysis:
 - Some descriptive statistics could summarise a lot of information: e.g. average in and out-degrees, centrality measures, average path
 - **Betweenness of a node:** # of shortest paths going through this node.
⇒ Rank the nodes from the most central to the least. Does the ranking change other time ? Might indicate shifts of power.
- Don't hesitate to play with the network visualisation to highlight key managers.

Example of Enron visualisation based on Betweenness

Credit Cambridge Intelligence

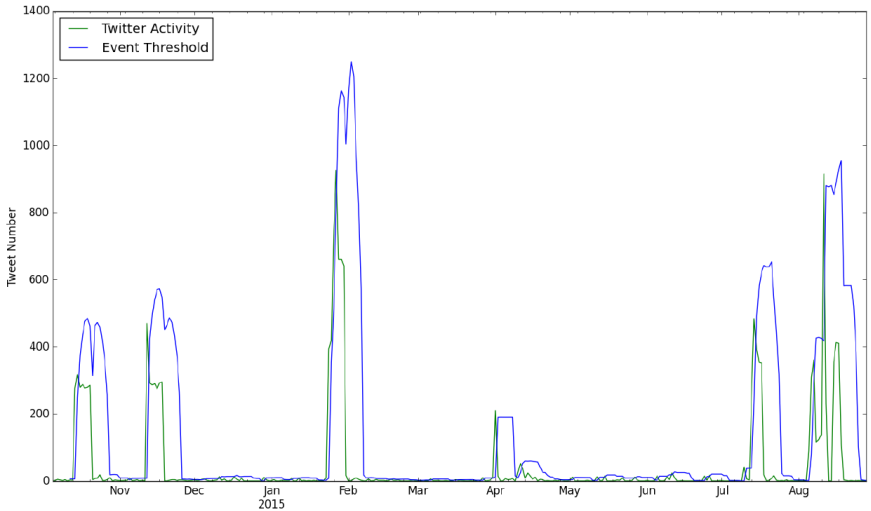


- Empirical investigation into market manipulation through the lens of social media.
 - Very precise and concise synthesis of the Security and Exchange Commission Litigation: manual breakdown of 273 cases.
 - Naturally leads to consider the stocks traded on the OTC Markets Group as most prone to manipulation, and social media as a main leverage.
 - Experiment design:
 - Identify the OTC-listed firms most mentioned on Twitter between 10/2014 and 09/2015.
 - Identify abnormal firm promotion campaigns on Twitter and compute abnormal returns.
 - Checking the co-occurrence of Twitter activity burst and price spikes and reversals

Comments on Pump-and-Dump

- Date t is a *Twitter event* if the number of messages about a firm exceeds the 7-day average plus λ standard dev.
 - with $\lambda = 2$, *small* events are likely.
For instance: assume a daily uniform distribution of tweets between 0 and 20 in a "quiet" period.
stationary mean = 10 and std ≈ 6
thus, we can expect that any anomaly above 22 tweets after a quiet week will be considered an event.
- $\Rightarrow \lambda > 2$ might be desirable (more conservative)
- Small (non) events might pollute the experiment

Fig. 2. SinglePoint, Inc (\$SING) - Twitter Activity and Event Detection



Comments on Pump-and-Dump (i)

- Disentangling between Noise Trader and Pump-and-Dump schemes
 - Maybe by considering *external* news about companies around the Twitter events ?
 - Could the volume help ? That is, should the volumes evolve differently around the Twitter event under the two cases ?
- The convicted Scottish trader is an example of *downward* market manipulation. Could such strategy be more widespread?