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Published in:
Economics Bulletin

2009

Link to publication

Citation for published version (APA):
Byström, H. (2009). News Aggregators, Volatility and the Stock Market. *Economics Bulletin*, *29*(4), 2673-2682.

Total number of authors:
1

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Economics Bulletin

Volume 29, Issue 4

News aggregators, volatility and the stock market

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Abstract

In this paper we employ the news aggregator Google News to demonstrate a strong link between the volatility in the stock market and the amount of news available to market participants. The paper also highlights some other areas, in finance and elsewhere, where news aggregators could be useful.

Financial assistance from Stiftelsen Bankforskningsinstitutet and Handelsbankens Forskningstiftelser is gratefully acknowledged.
Citation: Hans Byström, (2009) "News aggregators, volatility and the stock market", *Economics Bulletin*, Vol. 29 no.4 pp. 2673-2682.
Submitted: Oct 15 2009. **Published:** October 26, 2009.

1. Introduction

In this paper we use *Google™ News*, the news aggregator provided by Google Inc., to investigate how the amount of stock market-related news (world-wide) released over a particular time period (the last thirty days) is related to the volatility of the global stock markets over the same time period. The effect of news on market volatility has been studied before, but we believe our study to be the first that uses news aggregators to specify the news volume dynamics.

In an early study on news and market volatility, French and Roll (1986) find significantly higher market volatility during trading hours than during non-trading hours. Mitchell and Mulherin (1992), in turn, analyze the effect of public information on stock market activity, finding only a weak link between the two. In another study, Berry and Howe (1994) relate the number of news releases by Reuter's News Service to stock price volatility and find the volatility to vary across time in a fashion similar to that of the news volumes. Ederington and Lee (1994), in turn, find scheduled macroeconomic news announcements to explain a substantial share of the market volatility, and more recently, Johnson and Marietta-Westberg (2004) find that the increase in idiosyncratic stock return volatility in recent decades is significantly related to the increase in firm-specific news.

Today, many hedge funds, proprietary trading desks and other sophisticated investors use news content in a systematic way to make money. In doing so, an increasing share of these market participants is also using specially programmed computers to try and outsmart their rivals (van Duyn (2007)). In some cases, the news that is fed into the machines is not even interpretable by humans; news releases are simply generated *by* computers *for* computers. Moreover, several companies are, allegedly, turning to the *internet* to capture market gossip. Measures of online activity, such as the number of times an issue is raised in blogs, news articles and scientific articles, are extracted from news aggregators/filters and used in computer-based trading strategies (Scholtes (2006)). Also, with the developments in *web-based* news aggregation there are new ways to study the news volume and its effect on market volatility. An interesting example of a web-based initiative that possibly could be used in this way is the news aggregator Google News described below. [1]

The novel idea in this paper is to build on this modern trend to answer whether there is a link between news volumes and market volatility. On a day-by-day basis, we use Google News to specify the volume of news on a certain topic (in our case the stock market). In this way, the entire dynamics of the news volume, and not only snapshots around certain news-generating events, can be traced. Our main finding is that in months with many stock market-related news-releases the volatility of the stock market is higher than in months when less news is available. We would like to stress, however, that we see many other areas where news aggregators such as Google News potentially could be useful.[2] Traders, for instance, could use news aggregator volumes to try and predict movements in various financial asset prices. Risk managers, in turn, could use the amount of news on a particular topic, such as stock market crashes, as an early warning signal. More specifically, an alternative investor fear gauge could be constructed along the lines of the VIX index but based on (negative) news volumes instead of on market activity. Two advantages of such a fear indicator would be its truly global nature and its flexibility when it comes to the exact design. Academics and policy makers, finally, could of course use proxies for the aggregated amount of news on a particular topic, say inflation, in models and policy decisions. And of course, the usage is not limited to finance and economics. Psychology, sociology and many other social sciences where news play a role are other areas where news aggregators could be used.

2. Google News

Google News is an example of a so-called automated news aggregator that, without human intervention, collects, reorganizes and presents web news in groups. Google News gathers news from a multitude of sources on the web and at each instant in time it includes news articles that at some point during the past thirty days appeared in one or more of thousands of news sources. The English-language version currently gathers news stories from more than 4500 news sources. The stories collected by Google News are selected by computer algorithms based on their frequency of appearing on selected sites. No human editors are used, which minimizes potential political or ideological bias in the selection process (Google (2008)). In addition to collecting the actual news stories, Google News also presents the total number of collected news entries. In this paper this is the figure that is used (with a daily frequency) as a proxy for news volume over the last thirty days.

3. Data

The news volume data that we retrieve is the number of news stories appearing in the English language version of Google News when searching on the strings *stock market* and *stock market crash*, respectively. The data is collected daily at, approximately, the time of the opening of the major European stock exchanges. The time period is August 8, 2006 to August 8, 2009, i.e. the time period is exactly three years long and starts approximately one year before the onset of the current financial crisis.

In addition to the Google News data, we also collect stock market data.[3] As a proxy for the global stock market capitalization we use the MSCI World index (a global index covering 23 developed markets) and as a proxy for the global volatility we use the 30-day historical standard deviation of the MSCI World stock index returns. As an additional volatility estimate we use the CBOE VIX index of implied S&P500 volatilities.[4] This index is sometimes referred to as the *investor fear gauge* and since we want to link this fear indicator to the amount of news in circulation over the last thirty days we use an average of the last thirty daily VIX quotes.

4. News and Stock Market Volatility

In this section we present some new evidence on the link (correlation) between news volume and stock market volatility. We use two search strings in Google News; *stock market* and *stock market crash*. One of the strings is clearly an example of negative news regarding the stock market while the other is neutral. The volatility, in turn, is measured in two ways, as the historical 30-day standard deviation of the MSCI index returns and as the historical 30-day average of the VIX implied volatility.

Figure 1 shows the MSCI World stock index over our chosen time period. The first third of the sample coincides with an upward trend in the global stock markets. This period is followed by a steady downward slide in stock valuations throughout most of the remaining sample, except for the end of the sample where a clear recovery can be observed.[5]

Now, this study focuses on the volatility of the stock market movements (i.e. the *magnitude*, not the *direction*) and the volatility of the MSCI World index, together with the VIX volatility (both calculated on a daily basis) are pictured in Figure 2. The dynamics of the news volumes, in turn, is presented in Figures 3 and 4 (daily data). A comparison of Figures 2 and 3 reveals that the number of news pieces containing the word string *stock market*, i.e. news containing on average neutral opinions about the stock market, increases in tandem with the stock market

volatility. This is interesting, since it indicates that market volatility, in deed, does increase with the volume of market relevant news in circulation. The results are, qualitatively, the same when the number of news pieces containing the word string *stock market crash* in Figure 4, i.e. negative news, are compared to the volatilities in Figure 2.[6] Moreover, in Table I we present (Pearson) correlations between the news volume and the stock market volatility and the high correlations (0.60-0.82) clearly indicate that in months when a lot of stock market-related news is available, the volatility of the stock market is higher than when less news is available.[7]

5. Conclusions

In addition to being the first piece of finance research where news aggregators are used, this paper contributes to the literature in two ways. First, by using a new method of measuring the volume of news, based on so-called news-aggregators, we demonstrate a strong link between volatility and news volume; basically, in months with an abundance of stock market-related news, the volatility of the stock market is higher than when less news is available. Second, with these clear and concise findings we hope to convince the reader about the potential benefits of using news aggregators in all sorts of research, policy, or trading activity (for free or at a cost, depending on the stance of the owner of the aggregator).

The strong link between news and volatility has several implications. One is the possibility of creating an alternative (and truly global) *investor fear gauge* along the lines of the VIX index but based on news volumes instead of on market activity. Another question raised by this link is whether news (clustering), through some kind of feedback mechanism, is the cause of volatility clustering.

Endnotes

[1] The homepage of Google News is http://news.google.com.

[2] Upon permission by the owner of the news aggregator, of course. In the case of Google News, the Terms of Use can be found on http://news.google.com.

[3] The stock market data was provided by Datastream.

[4] The VIX index refers almost exclusively to US stocks. Here, however, we interpret the VIX index as much as a (global) fear indicator as a proxy for the world stock volatility.

[5] Whether the significant drop in overall stock valuations from October 2007 to February 2009 should be labeled a stock market crash or not is left for others to decide.

[6] In Figure 4, the news volume during the crisis months of October/November 2008 is capped in order to show the rest of the dynamics.

[7] The daily data used in this paper is overlapping in the sense that, each day, the data refers to the amount of news/volatility over the last thirty days. When non-overlapping data series (one observation every thirty days) are used all the results in the paper remain qualitatively the same. The same holds for an exclusion of the worst crisis months; for the time period August 8, 2006 to September 9, 2008 (an earlier version of the paper that was written before the Lehman Brothers collapse) the correlations in Table I are 0.53-0.83. In other words, it is not the peaks in volatilities and news volumes in October/November 2008 that drive the correlations.

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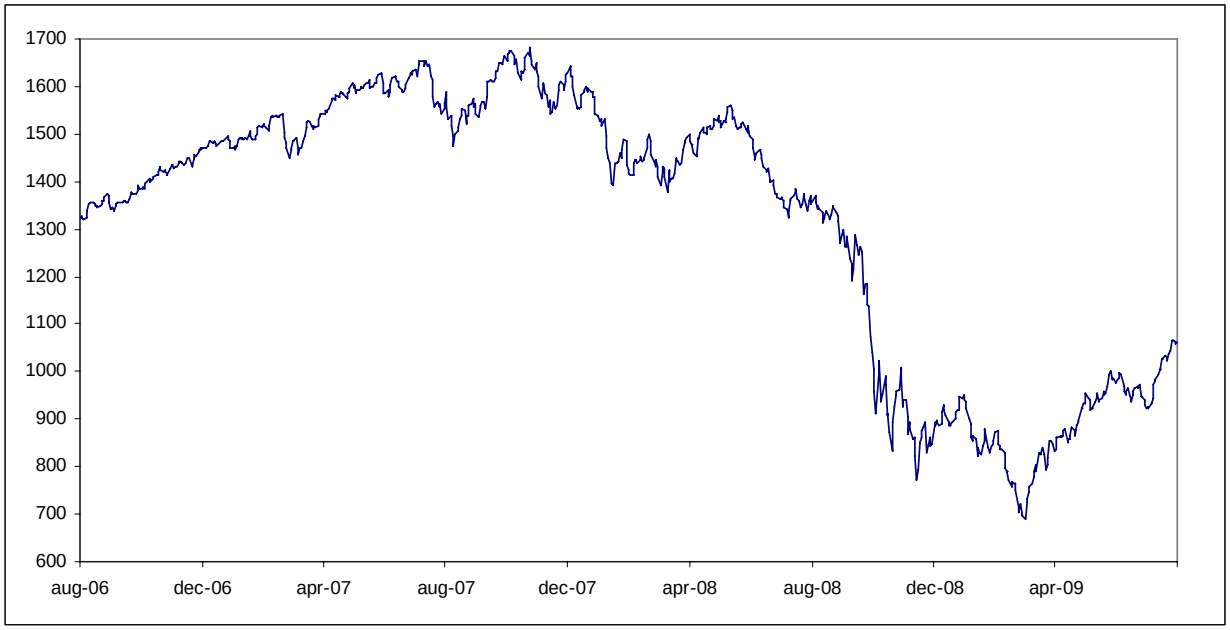


Figure 1
MSCI World Index (USD).

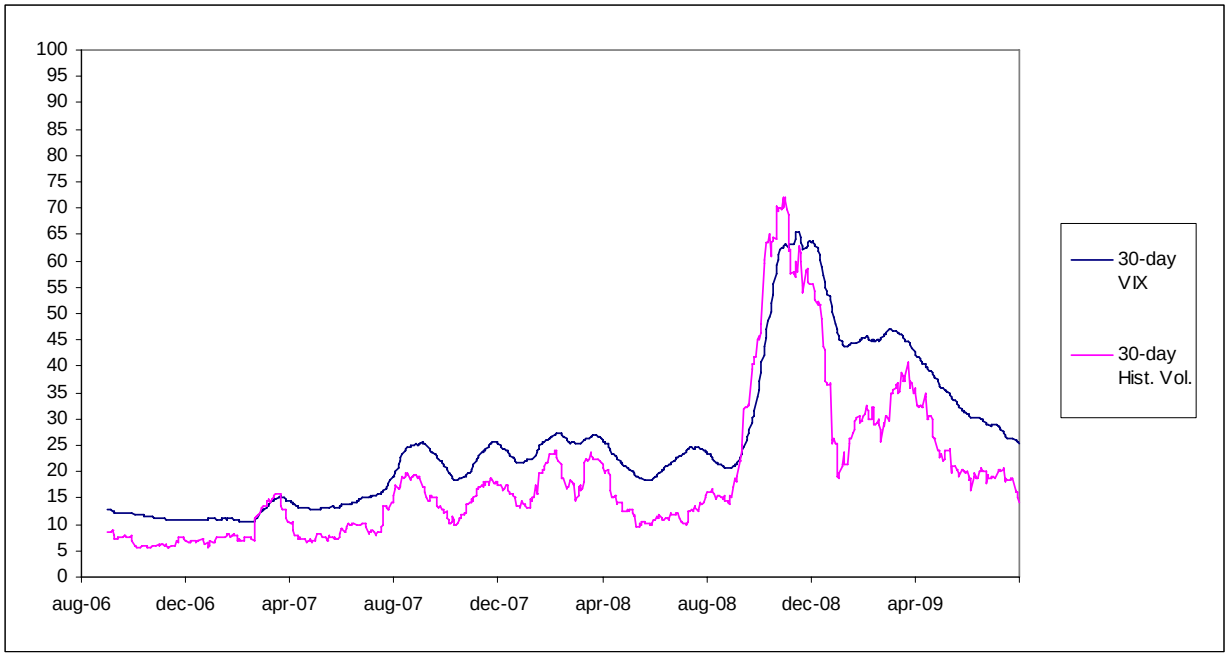


Figure 2
30-Day Historical Volatility of the MSCI World Index and 30-Day Historical Average of the VIX Volatility-Index.

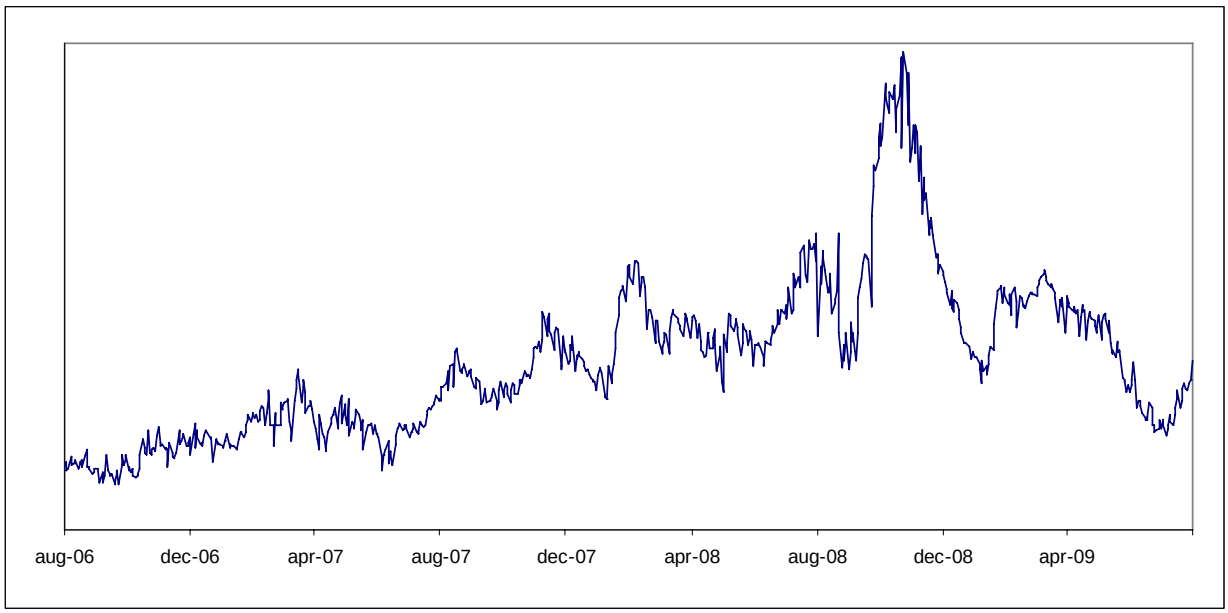


Figure 3
Google News Volume – Neutral News (*Stock Market*).

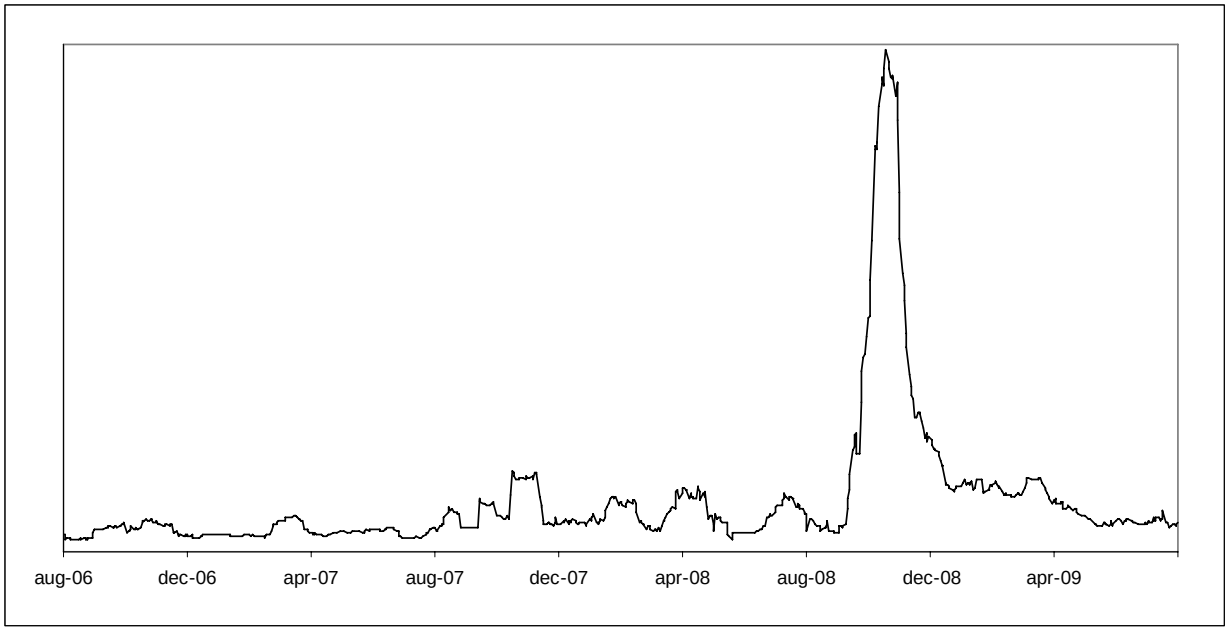


Figure 4
Google News Volume – Negative News (*Stock Market Crash*).

Table I Sample correlations between daily calculated stock market-related news volumes (number of news pieces in Google News that contain the word strings *stock market* or *stock market crash*) and daily calculated stock market volatilities (historical 30-day MSCI World volatilities or historical 30-day averages of implied VIX volatilities). The time period is August 8, 2006 to August 8, 2009.

	30-day Hist. MSCI vol.	30-day average VIX vol.
News: *stock market*	0.82	0.74
News: *stock market crash*	0.80	0.60