Entry Form
eResearch Australasia 2009 Visualization Challenge

TITLE OF WORK
No Boundaries: Financial Markets in Motion

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For each author, please provide name, affiliation, email address, postal address, and area of expertise.

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DESCRIPTION OF WORK
(Up to 500 words) Describe the data used, data analysis, visualization techniques applied, and main insights gained.

Description of data used: Data supplied by SIRCA (http://data.sirca.org.au/visualisation_challenge_data.csv.zip). The data consisted of a Reuters Information Code (RIC) that identifies the companies in the data, which make up the Dow30 of the Dow Jones Industrial Average (DJIA). The DJIA is also provided in the dataset. For each of these companies, information is recorded on Quotes, Trades and News events. These are recorded by a date and time. For the Quotes, a Bid and Ask price is provided. For the Trades, a Price is provided (a trade occurs where the Bid and Ask price match). For the News events, a Headline is provided.

Data Analysis: For our submission we chose to analyze the ways in which the price and volume of trades are affected by the quantity and type of news events that occurred during the given time period.

Visualization Technique Applied: We chose to visualize this data by creating a dashboard in Excel. Each of the components are dynamically updated from a external database, so we can see the activity occurring over the entire time period in the given dataset, in just a few minutes.

Our first component is an interactive bubble chart that we use to illustrate the influence of news events on stock trades (change in stock price and volume). An analyst can select one or more companies and compare their behavior. A radar chart is used to indicate the frequency particular words appear in news headlines that occur during the given time period. The radar chart provides summary of the type of news that is occurring by distinguishing between positive, negative and neutral words.

Finally a column graph shows the number of news events that have occurred for each company prior to the current date and the total so far for the current date and time. This illustrates what news events are occurring and to which companies. An analyst might use this to select companies to show in the interactive bubble chart.

Main Insights Gained:
Through our visualization it is clear that following October 1st, 2008, many components of the Dow 30 headed into a steady decline in price. Increases in news events in particular lead to an increase in trade volume. It also appears that...
following the initial decline in prices, the decline continued and appeared to be fueled by continual media coverage of the
negative news relating to the financial crisis.

We also noticed through our visualization that an increase in news events often leads to an increase in the volume of
trades. This occurs regardless of the type of words used in the news event.

From the bar chart we can see that there is also a particular news focus on large banks such as Citibank and the Bank of
America and the investment bank JP Morgan prior to and on October 1st. It is difficult to tell from the limited data if this
is a usual occurrence or an indication of events that were to follow. However, we notice that as the crisis sets in on
October 2nd, the high number of news events extends beyond banks to also include automotive manufacturer General
Motors. This is perhaps an indication of one company that proved to be quite vulnerable to changes in the financial
markets.

SCIENTIFIC AND/OR COMMERCIAL VALUE
(Up to 300 words) Describe the scientific and/or commercial value of the work.

We have developed a modified Excel implementation of the popular Google ‘Motion Charts’ to use within our
dashboard. Google Motion Charts, while free, are currently unable to cope with large volumes of data due to the fact that
data must be loaded into a Google spreadsheet before a motion chart object can be created. We have made this and two
other visualizations easily available to anyone with Excel access, through a visually appealing dashboard. This was done
using an Excel worksheet, with a Visual Basic script to access a MySQL database where the data is stored.

Both scientific and commercial worlds should benefit from the availability of this technique. Static charts often fail to
highlight movement and display it so changes over time can be clearly seen. Our technique allows this to occur using
large volumes of data. A dataset of any size can be used by our approach, as long as it can be loaded into the MySQL
database. This is an important feature particularly in financial market analysis where large volumes of data are not
uncommon.

Through understanding the relationship between news, price and volume, hopefully a greater understanding can be
gained that will prevent commercial organisations from sustaining heavy financial losses during such a crisis. This
understanding can help governments to make better policy decisions given the early warning signs shown in the data, and
to understand which parties were most affected by the global financial crisis. Scientific researchers can use this data to
analyse the events that took place and use it as a tool to isolate unusual patterns for further investigation.

EDUCATIONAL VALUE
(Up to 300 words) Describe the educational value of the work.

From participating in this task, we have learnt to use a common and popular tool, Excel, as an interface to create
visualizations that provide meaningful insights. We chose this as our medium as it is one of the most widely available
and popular data analysis platforms. Using a database allowed us to effectively handle the large quantity of data, through
the availability of indexes that helped to improve the performance of queries.

By using charts that updated with each time period, we were able to watch the patterns that occurred over several days
unfold in a matter of minutes in our visualisation. This increased speed highlights many of the changes that are not so
obvious when observing at a slower speed. It also brings to our attention unusual events that occur between time periods.

Capturing the relationship for multiple companies, while taking into consideration time, volume, price and news events is
a non-trivial task. Without the aid of a good visualisation, it is very difficult to see how each of these variables interacts
with the others. Often we are unable to process so much information at once and so tend to focus on one variable. This
visualisation task provides a tool to interpret many variables at once and to begin to make sense of what is happening on
a larger scale. This task has helped us to understand that visualization is a very important area of investigation and can
and should be used to help analysts understand a large variety of data.
LINK TO THE WORK
Please provide a link to the work. If it is protected, please provide the credentials needed to access it.

Our visualization can be found at the following location:

The file should conform to the following specifications. Images must be 300 dpi or higher.

<table>
<thead>
<tr>
<th></th>
<th>Image(s)</th>
<th>Video and Animation</th>
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LINKS TO RELATED PROJECTS OR WORKS
You may provide references or related links if relevant.

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