TITLE OF WORK
Role of Information and Order imbalance on Stock Price Movements

AUTHORS
Author 1
Name: Rasika Amarasiri
Affiliation: Department of Accounting and Finance, Monash University, Australia
Email: Rasika.Amarasiri@buseco.monash.edu.au
Postal address: 900, Dandenong Road, Caulfield East, Vic, 3145, Australia
Area of expertise: Rasika Amarasiri is Manager, Research IT Services at the Department of Accounting Finance. He has a PhD in information Technology and over 15 years of experience in the industry and academia. His strengths are in data mining and advanced high performance computing. He assists researchers in the department to utilize high performance computing facilities in the University and advises on other IT related issues.

Author 2
Name: Vijaya B Marisetty
Affiliation: Department of Accounting and Finance, Monash University, Australia
Email: Vijay.Marisetty@buseco.monash.edu.au
Postal address: 900, Dandenong Road, Caulfield East, Vic, 3145, Australia
Area of expertise: Vijaya B Marisetty is a Senior Lecturer in finance at Monash University. He has a PhD in finance from Monash University. Vijay works on financial markets microstructure and has published several research papers in reputed international finance journals.

COPYRIGHT HOLDER
Copyrights are held by the authors.

DESCRIPTION OF WORK
Financial theories argue that stock prices move mainly due to arrival of new information or stock inventory imbalances (Order imbalances). However, it is hard for students or investors to visualize and assess the magnitude of these effects on stock prices. Hence, we propose to develop a visualization tool to demonstrate these effects for better understanding of stock price dynamics.

We use Lee and Ready (1991) trade assignment algorithm on the cleaned data to distinguish buyer-initiated and seller-initiated trades. And we arrive at order imbalance measure by taking the difference on buyer-initiated and seller initiated trades. We compute order imbalance for each minute and for each stock. We then remove those order imbalance data that overlaps with any news announcements. This will reduce the contamination while explaining the role of order imbalance on the prices.

The data used for the analysis was the data provided by SIRCA for the competition. The order imbalance was calculated using the number of quotes for buy and sell and matched with the trades. These figures were then plotted on high resolution graphs using Gnuplot. To identify possible locations where there are no overlaps of with news items, the data for whole days and in some instances for the whole period were plotted on very high resolution graphs at 8000x4800 pixels and visualized using an optiportal.

Given the volatility of the market during the period of data provided, it was hard to identify a large number of samples that met our criteria. Once the periods were identified, graphs were generated for a two hour window (one hour before and one hour after) around the time under study. This was made easy by a generalized program that was given the stock in concern, the date and time as parameters.

Utilizing these graphs it was easy to visualize the changes on a normal PC, the effect of order imbalance on the movement of price.

The combination of the use of very high resolution graphs over the whole period on larger optiportals enabled us to see the bigger picture and easily identify the scenarios which would have otherwise taken other complicated analysis and programming to achieve. Once these points are identified, it was much easier to analyze the details around these scenarios.
Main Insights:

- Order imbalance gives direction to the volume. Observing volume cannot explain why prices move up or down. However, order imbalance can explain the price movements.
- Prices move not only because of information but also due to the liquidity and inventory effects in the stock markets.
- Order imbalance can predict the future price movements much quicker than information.

Scientific and/or Commercial Value

- The predictive power of order imbalance can help in devising trading strategies that can benefit traders. At the same time such trading process can make markets efficient.
- Understanding the role of order imbalance on prices is less researched topic in finance. Our visual representation of the order imbalance role will help finance researchers to develop the alternative asset pricing theories.

Educational Value

Visual representation of price behaviour and its determinants can have huge positive impact on the students learning outcomes. This can be used in any courses related to financial markets and trading behaviour.

Link to the Work


Graph of detailed order imbalance scenario 3508x2480 tiff format [http://vm-alice.buseco.monash.edu.au/visualization/AA.N-20080929-10%3A40%3A00.tiff](http://vm-alice.buseco.monash.edu.au/visualization/AA.N-20080929-10%3A40%3A00.tiff) (341K)


Links to Related Projects or Works


Permission to Display and Distribute

By entering the eResearch Australasia 2009 Visualization Challenge, you are granting permission to display the work at the eResearch Australasia 2009 Conference and for the competition sponsors to distribute the work online and via DVD.