MEASURING MARKET QUALITY

The regulator’s mandate is to ensure markets are fair and efficient. Since the Flash Crash tested the financial markets, people are questioning the merits of electronic trading, especially the high frequency variety, as well as short selling and other practices. The decision to allow, ban or restrict these practices should be taken within the context of striving for optimal market design.

Several factors affect market design, including technology, regulation, information, participants and instruments. Sub-systems within technology include order routing, trading, surveillance, clearing and settlement. Industry stakeholders (e.g. regulators, market operators and financial intermediaries) change these factors from time-to-time, and regulators approve them on the basis that they positively affect (or at the least do not negatively affect) market fairness and efficiency. But what does fair and efficient mean, and how can this information be put to practical use?

“I define an efficient market as one that’s cheap to trade on and where the price at which I’m trading reflects all available information,” said Mike Aitken, Chief Scientist at the Capital Markets CRC. “If I want to know if a change in information or regulation is good for a market’s efficiency based on my definition, I need to measure factors like transaction cost and price discovery pre and post the market design change.”

Surveillance professionals are the guardians of the fairness aspect of market quality. Among other irregularities, they look for manipulation of end-of-day prices or prices of options close to expiry. They look for spikes in prices or volume prior to expected or unexpected announcements that may indicate insider trading, a subset of information leakage. They also monitor for signs of broker-client conflict such as front-running. In effect, besides identifying wrong doers, surveillance analysts actively participate in the debate on market design change by offering metrics for fairness that can be studied pre and post market design changes.

The CMCRC has established a database incorporating data from securities markets around the world and begun to measure metrics for efficiency and integrity on a quarterly basis. It recently compared the efficiency and integrity of Asia-Pacific, European and North American markets by measuring transaction costs and price discovery. Using transaction costs as a proxy for efficiency, the results indicate that North American markets are twice as efficient as those in Europe, which are twice as efficient as Asia-Pacific markets. Using

Optimal market design requires regulators to regularly assess the impact of market design changes on integrity and efficiency.

Transaction costs and price discovery are key measures of efficiency, while incidents of manipulation, insider trading and broker-client conflicts are key measures of integrity.

The CMCRC has created a research framework within which it will eventually be possible to trace the inter-relationships between integrity, efficiency and market design changes.
information leakage as a proxy for integrity, the results show information leakage at .02% (of trading value) in North America, .03% in Europe and .09% in Asia-Pacific.

Ultimately, the goal is to strike the right balance between integrity and efficiency. As Aitken said, it is important to avoid making market design changes that increase efficiency but decrease integrity and vice versa.

Frederick Harris, John B. McKinnon Professor of Economics and Finance at the Wake Forest School of Business, explained the CMCRC’s framework for measuring the effects of market design changes on efficiency and integrity. In essence, it involves a three-way simultaneous equation in which market design change, efficiency, and integrity are the independent variables requiring explanation.

Harris compared various SMARTS screenshots to give the audience a sense of how surveillance information can be used. In one instance, the arrival of normal positive information led to a permanent change in the level of the security by around 10%. Another instance showed a security trading up about 10% on very heavy volume but, the next morning, reverting back to the mean price prior to close. A statistically significant event like this can happen for several reasons including a rumor that is successfully rebutted overnight by the company, a partial disclosure that has been misunderstood, a misleading disclosure that has been clarified overnight or an attempt at ramping manipulation.

Data was collected from 31 exchanges worldwide between 2000 and 2005 to determine the number of ramping events per day per thousand listed securities. This metric ranged from a low of only .08 to a high of 1.76. The sample mean worldwide was .88.

“With about 250 trading days a year, one in every four to five stocks requires a screen alerting surveillance professionals to a ramp sometime during the year,” said Harris. “Our interest has been in trying to figure out why there’s so much variation in that number — from one in fifty in the highest integrity markets to one in two stocks in lower integrity markets — and then modeling it.”

The study found that the liquidity deciles are extremely diverse. A person ramping at the least liquid level is easily detected, indicted and prosecuted. In the most liquid level, a manipulator has to ramp the volume enough to convince partially-informed liquidity traders that they can benefit from an information leak. That is a far more expensive proposition for the manipulator. Meanwhile, ramping activity in the middle liquidity levels is extensive.

Aiken and Harris’ research framework enabled them to look beyond correlations and actually trace the inter-relationships between integrity, efficiency and market design changes. Their results show that markets that are more manipulable are 31-59 basis points dearer to trade in, providing for the first time a quantifiable indicator of the benefits to markets with higher market integrity.

Their studies revealed that ramping manipulation leads to greater induced volatility and less aggressive order placement because there is less chance of not executing. As a result, if there is a ramping event in the market, the prices for larger trades will spread away from the BBO substantially. Essentially, there is a 99% positive correlation between ramping incidents and the size effect on spreads.

Using data from the 31 exchanges to trace the effect of market design on market quality and efficiency, Harris and Aitken studied the probability of transaction costs having an effect on market integrity.

Their research also showed a positive change in integrity and efficiency when a market design change, such as introducing a real-time surveillance system, is introduced. Some variables considered included whether the marketplace had a closing auction, direct market access and price limits, as well as the jurisdiction’s legal environment (e.g. codified civil law or English common law). So far, the model indicates that direct market access, rules on market surveillance, a commitment to enforcement and real-time surveillance enhances both efficiency and integrity, but circuit breakers and some closing auction designs appear to result in an efficiency/integrity tradeoff. For the full paper see, “Trade-Based Manipulation and Market Efficiency after the Introduction of Real-Time Surveillance: A Cross Market Comparison” working paper, CMCRC 2010.

No doubt this information piqued the interest of the audience, and they will look forward to further analysis in the future.