



Measuring market integrity

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Prof. Michael Aitken, founder of SMARTS and Chief Scientist of the Capital Markets Cooperative Research Centre, is a globally recognized expert on market integrity and capital market design. In this article he discusses how to practically measure a market's integrity by distilling trading behavior down to three actions that can help identify prohibited trading behavior.

Most research that claims to be interested in discovering the consequences of market design changes on market quality, deals with the impact of particular market design changes (e.g. a change in tick size or in the competitive structure of a market) on market efficiency. More often than not, such research uses transaction cost as a proxy for market efficiency.

Notwithstanding that efficiency is far more multi-dimensional than a single measure proxy implies¹, efficiency itself is just one aspect of a regulatory mandate. Fairness or market integrity² is equally important.

This, of course, begs the obvious question: If regulators are required to ensure that market design changes (e.g. changes in regulation, participants, financial instruments, technology) pass the joint test of efficiency and integrity, why don't they, and the academics who assist them, measure the impact of market design changes on both efficiency and integrity? I have asked this question many times and have been somewhat surprised by the answers, the most common of which is that the concept of market integrity is difficult if not impossible to measure.

Difficult it may be, but given the importance of market integrity to achieving the mandates of securities regulators, one has to try. Accordingly, this article will outline measures that I believe provide a logical and useful start to measuring the impact of market design changes on market integrity.

As usual, we need to start with a definition of the concept. I define market integrity as the extent to which investors engage in prohibited trading behaviour. One could add the words "and get away with it" to this definition. This would add an assessment of enforcement capabilities to the measuring process, but for the moment I am going to keep my definition simple.

Using this definition, the higher the incidence of obvious prohibited trading behaviours, the lower the integrity of a marketplace. Following from this definition, I suggest that insider trading, market manipulation and front-running would be three classic, though perhaps not the only, forms of prohibited trading behaviours². Each of these behaviours is not directly observable, so we need to build proxies for them. We don't, for example, specifically identify trades as those belonging to insiders.

¹ I would argue that price discovery is another important attribute of market efficiency that needs to be measured.

² One might also include short-selling in the presence of regulations banning it and failing to disclose material information in an environment of continuous disclosure.

Insider Trading

Borrowing from the excellent work of the U.K. Financial Services Authority (FSA), I suggest that information leakage can be a useful proxy for insider trading. Information leakage measures the extent to which information is preceded by an unusual run-up or rundown in price.

Information leakage typically includes parties who pick up on insiders' actions either explicitly (because insiders tell them the nature of the information) or implicitly (by observing insiders or their associates trading behavior). I believe that all leakage - prior to a formal information announcement by the relevant company - can be used as a measure of market integrity. Whether the trades are by an actual insider or through parties reacting to insiders or their associates, such behavior is not a "good look" for markets.

An algorithm to detect this type of leakage, which is readily available through systems like SMARTS³, will almost certainly be a first step in catching insiders. But more importantly it provides an estimate of the maximum extent of the problem with illegal insiders being a subset of the total.

Market Manipulation

Market manipulation is another market event that is not directly observable because it would require knowing the intent of the trader(s) behind the trade. A frequently used proxy, which is based on publically available information, is unusual movement in the end-of-day price⁴. As information leakage can indicate insider trading, dislocation of the end-of-day price (DEP) can signal market manipulation. A subset of all DEP (more likely when it occurs at the end of a quarter or on a derivative expiry date) will be purposeful manipulation. Notwithstanding that only a subset will be purposeful manipulation, one could argue that any DEP is a threat to market quality to the extent that it is created by a short-term liquidity imbalance. This is particularly germane when the end-of-day price is used as a reference or benchmark price.

Algorithms to measure DEP are routinely available from SMARTS as are indications of how much DEP represents a percentage of a given's stocks' trading activity. As with information leakage, SMARTS is capable of identifying this monetarily, either as a percentage of the market or by individual security. In the wake of a decision to change the opening or closing algorithm one might, therefore, measure the incidence of these types of prohibited trading behaviours pre- and post- the change as a way to measure the change's impact on market integrity.

³ See www.smartsgroup.com

⁴ If one has access to full order book data then a range of other measures like "misleading trading" or "misleading trading with a switch" which seeks to identify parties who place orders into a market that are designed to fool other parties into believing that there is information not yet revealed in price.

Front running

Front-running, the third of the prohibited trading behaviours referred to here, is particularly interesting because most markets do not require brokers to inform exchanges when they are trading as principal or as agent. This means that it is impossible for exchanges, or regulators to detect this behavior.

Working in association with its research associate Capital Markets Cooperative Research Centre (CMCRC) and one of its clients, Investment Industry Regulatory Organization of Canada (IIROC), SMARTS is funding research to help identify proxies for this type of behaviour. We are looking for relationships between brokers and traders where a broker buys stock and passively places it back in the market to be subsequently taken out by another broker's order.

We can use all three proxies to estimate both the number and monetary value of incidents as a way to measure market integrity. Measuring these proxies pre- and post- significant market design changes can be used to provide a numerical estimate of the impact of design changes on market integrity, in the same way that transaction costs are used to simulate efficiency.

While not perfect, these proxies provide a talking point to help lift our collective game on the impact of market design changes on market quality where quality reflects the dual criteria of market efficiency and the lesser understood, market integrity (see Figure 1).

SMARTS, A NASDAQ OMX Company

NASDAQ OMX technology supports the operations of over 70 exchanges in 50 countries. As part of NASDAQ OMX's extensive offering, SMARTS Group Holdings business' is conducted primarily through two subsidiary companies, SMARTS Market Surveillance Pty Ltd, which provides solutions to securities exchanges and market regulators, and SMARTS Broker Compliance Pty Ltd, which provides solutions to brokers. SMARTS Group is the leading provider of market surveillance solutions worldwide. Established in 1994 with the aim to build and deploy technology and services to enhance securities markets, SMARTS is part of NASDAQ OMX Group, the world's largest exchange company with trading, technology and public company service capability spanning six continents. Today SMARTS is the unrivalled market leader in surveillance technology with over 30 national exchange and regulatory customers as well as 50 national and multinational broking clients across 30 markets.

The Capital Markets Cooperative Research Centre (CMCRC)

The Centre was formed in 2001 under the auspices of the Australian Federal Government to bring together the best in innovative research and technology to the capital markets domain. SMARTS is a founding industry partner of the CMCRC. The CMCRC's mission is to contribute directly and indirectly to wealth creation by creating and promoting technologies that increase the efficiency and integrity of capital markets. Technology innovation in capital markets directly affects the wealth of market participants and the economy as a whole. The CMCRC acts as a bridge between the practical needs of capital markets and pioneering academic research. It researches new technologies and improvements in capital market design which contribute to the improvement of capital market efficiency and fairness for the benefit of all.

Figure 1



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