MAST
MARKET ABUSE
SURVEILLANCE TOOL

The Challenges Of Fixed Income Market Surveillance Series

Part Two: The Surveillance Problem

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Improving Efficiency and Effectiveness

In the first article in this series, we explored the difficulties of fixed income trade surveillance and the need to move from expressing risk as inventory (i.e. in terms of the notional for each of the bonds you hold) and into standardised trading risk measures, otherwise known as greeks.

In this article we consider market manipulation and how we might use market impact models to quantify (as opposed to just indicate) a trader's potential intent to manipulate markets. Such quantification is crucial for prioritising identified risks and thus ensuring that surveillance staff can be confident that they are addressing the most pressing risks first.

What is the most effective way to uncover the types of behaviours that constitute market abuse?

The Market Abuse Regulation (MAR) of the European Union (known properly as Regulation 596/2014) came into effect on 3 July 2016 and covers insider trading and market manipulation. Equivalent regulations exist in most major markets.

In MAR, insider trading covers both the release of material, non-public, corporate information as well as information around customer order flow. Controls around the release of inside information (for example, earnings data, drug trial results, takeovers etc.) will be covered in a subsequent piece. Here, we consider insider trading based on the anticipated change in price caused by customer orders, which puts us firmly in the domain of anticipated market impact.

An example of the language used in MAR to describe behaviours which constitute market abuse is found below. The example is drawn from Article 12 of the regulation (and has been paraphrased for brevity):

> The placing of orders to a trading venue, including any cancellation or modification thereof, ... [with the intention of]...
>
> (iii) creating or being likely to create a false or misleading signal about the supply of, or demand for, or price of, a financial instrument, in particular by entering orders to initiate or exacerbate a trend.
>
> Regulation (EU) No 596/2014 of the European Parliament and of the Council of 16 April 2014 on market abuse

When trying to identify acts of market manipulation, it is common to create a list of manipulation types outlined in MAR and then associate each with a set of rules intended to detect the particular behaviour. However, this approach typically results in a confusing nomenclature of abuse types, many of which are overlapping. Worse still, it generally results in a very large number of rules, all of which need to be sense-checked, approved and

calibrated. When the rules are applied, the vast range of alerts generated all seem to be of equal value until further examination.

However, taking a model-based approach rather than a rules-based one enables us to draw out the relative impact of a trader's actions. We can begin to summarise the concept of market abuse as follows:

It is acceptable to trade or place orders with the intention of speculation or of facilitating customer business or for speculating/hedging (subject to the provisions of the Volcker Rule or other applicable regulations). However, it is not acceptable to trade with the intention of moving the price (or attempting to move the price) of a financial instrument. Using trades and/or orders to attempt to move the price of one or more financial instruments therefore constitutes market abuse. Whether the attempt to move the price of the instrument was successful or not is entirely irrelevant to whether the behaviour constitutes market abuse; it is the intention that is important (i.e., an unsuccessful attempt to manipulate the price of an instrument is still market abuse).

Putting aside the approach of spreading false or misleading information, should a trader set out to move the price, there are two tools available to them: executing trades or placing orders.

To understand market manipulation and have a good chance of prioritising the significance of what we find, we therefore need to look at the impact on the price of a financial instrument due to a trader's activity; through both the execution of trades and the placing and cancelling of orders. Put differently, the most effective way to uncover the types of behaviour outlined in MAR is to model the market impact of trades and orders. Such an approach employs market impact modelling.

Why market impact modelling is the most effective way to achieve meaningful surveillance

> In financial markets, market impact is the effect that a market participant has when it buys or sells an asset.

Market impact models attempt to generate a mathematical framework which estimates how much a trade, order, or combination of both, will move the price of a financial instrument. Such models are used widely across finance, particularly in the domain of trade execution where limiting price movement in the executing instrument is essential. This is especially relevant when large orders are being executed and which may require considerable time and multiple transactions to execute fully. Executing traders need to have a very subtle impact on the instrument price in order to minimise transaction cost. Their approach is akin to skimming a stone across a pool to minimise the ripples created, rather than throwing in a huge rock and creating chaos.

Basic characteristics of a market impact model

- Buying a security causes its price to increase, selling it causes its price to decrease.
- All things being equal, buying more will move the price more, but ideally by a diminishing amount.
- Market impact of transactions will be higher in illiquid markets where daily traded volume is low.
- Market impact of transactions will be higher in volatile markets (where there is more uncertainty about fundamental value).
- Market impact is a result of introducing a temporary imbalance in supply/demand. Impact will therefore decay over time and return to its unimpacted clearing level.
- Market impact modelling should be self-consistent – a series of small trades done quickly will have the same impact as one large trade with the same aggregate amount.
- Market impact modelling should be compatible with other models which capture asset price correlation.

Whilst the approach is widely used elsewhere in finance, using market impact models to detect and measure market abuse is relatively novel and, currently, few market abuse detection tools utilise this type of mathematics. As such, it is worth exploring some of the characteristics that such a model would require.

Importantly, market impact models are theoretical constructs; it is, of course, impossible to know the actual impact of a trade in isolation. The price of any instrument is influenced by a multitude of factors all acting in concert and any trade will be just one of those factors. Moreover, it is simply impossible to explicitly know the impact of a trade as we can never know what would have happened had we not executed the trade (for that we would need two parallel universes – one in which the trade was executed and one in which it was not).

Key characteristics of a market impact model which could be applied to the detection of market abuse are:

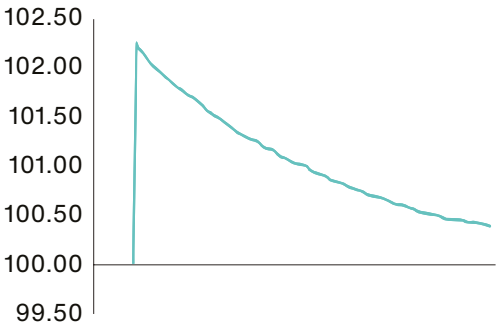
- The model should be applicable across all instruments and all asset classes. Historically, market impact modelling was developed to optimise order execution in equities, but if we are to use such an approach in trade surveillance it must cover the entire financial universe.
- Such a model would apply to single trades, multiple trades, single orders and multiple orders. The impact of two identically-sized trades executed simultaneously must be the same as the impact of a single trade with the same combined notional amount. Similarly, cancelling an order instantly after placement should reverse the market impact of the original order.
- In the case of orders, the model would need to understand that the market impact of an off-market order would be lower than that produced by an order placed at market. For example, an order to sell shares at a price of 1000 in an instrument which is trading at a price of 50/51 will have

minimal market impact (as it is unrealistic that the order will be executed), whereas an order to sell shares at 50 (or similarly an at-market sell order) will have virtually the same impact as an actual trade (as it is almost certain to be executed).

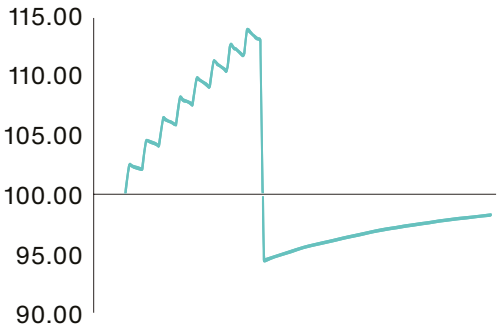
- The model would need to apply an immediate impact on the market price which then decays over time, so that after considerable time has passed (and the knowledge of the trade has been digested), the market returns to the level it was at before the trade was executed.
- Since market manipulation can be cross-instrument, our market impact models need to consider relationships (such as correlation and beta) between instruments and the liquidity and volatility of each of these. Cross-asset manipulation (which occurs when traders allegedly place orders or trade one financial asset with the intent of impacting the market of a related asset, or the same but traded on a different venue) requires the use of closely related assets, and as such, the volatility of each instrument used in the abuse is likely to be similar, however the liquidity of each may be very different. For example, in fixed income a trader might use a series of trades in a liquid instrument to move the price of a much less liquid instrument.

The accuracy of any market impact model used in the detection of market abuse is less important than it might be in, for example, a model built to minimise trade execution costs. The latter might have very precise estimates of how liquidity changes during a trading day or on different days of the week. Such complexities are excessive in the market abuse detection space where we are more concerned with an estimate of the impact and the overall impression of what a trader is seeking to achieve through trade or order placement.

Graph 1: The theoretical market impact of a single purchase of a financial instrument



Graph 2: The theoretical market impact of a ramp



In this case, the trader has made ten purchases in quick succession followed by a single sale in the aggregate amount of the ten individual trades.

How a market impact model can help you understand the abuse severity

Market impact modelling, by its nature, provides evidence of both the scale and existence of market abuse. Therefore, the approach allows us to rank instances of abuse by their relative severity.

In the example shown in Graph 2, the trader has attempted to artificially drive the price of the security up through ten purchases before quickly attempting to monetise any artificial and temporary price change by offloading the full position in a single sale. Since each purchase has had a market impact (even if only temporary), a market impact model will be able to calculate the impact of each individual trade as well as the cumulative impact of all ten trades. This total amount can then be illustrated as the amount of potential market abuse.

This could, for example, allow a surveillance analyst to see a commodity ramp attempt as more urgently needing

investigation than an equity spoofing attempt because the amount of potential market abuse is significantly higher in the commodity ramp. In turn, this helps monitoring teams to focus their attention on the most important cases. This is critical for improving efficiency within hard-pressed teams.

Summary

Market impact models act as a lens through which different types of abuse can be viewed. This approach has the benefit of removing the confusion around abuse type nomenclature and reduces the problem of market abuse detection down to the analysis of a trader's actions in attempting to move prices.

Furthermore, a market impact model allows us to compare the severity of the abuse across different markets, different instruments and even different types of abuse.

This approach allows for the focused detection of true cases of market abuse while dramatically reducing false positives and allowing organisations to take a risk-based approach to surveillance. This approach can be readily adopted across a wide range of asset classes and products once the underlying mathematical modelling is in place. Though not trivial mathematically, once modelled, the approach is easily deployable.

Next in this series, we will conclude the modelling journey by exploring why 'General Market Modelling' is the necessary final step for effective fixed income surveillance.

Advance your surveillance function

Improve your detection of market abuse, reduce false positives and prioritise high-risk alerts.

Reach out to learn more.

tradinghub.com/MAST

tradesurveillance@tradinghub.com

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