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Market Cleanliness in the New Zealand Equity Market – 2025 Update

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Abstract

This report contributes to the FMA's commitment to regularly monitor the overall integrity of New Zealand's equity market. It improves and updates the two measures of market cleanliness, set out in the FMA's 2024 report *Market Cleanliness in the New Zealand Equity Market*[1], with data for 2024 and 2025. This includes both the headline Market Cleanliness Statistic (MCS) and the supplementary Abnormal Trading Volume Ratio (ATVR).

Overall, the two new data points and altered methodologies do not alter the long-term trends found in the 2024 report, with the MCS trending downwards from 2004 through to the mid-2010s (representing an improvement to market cleanliness), before plateauing in the following years. In 2024 and 2025, the MCS has continued its short-term downward trend following a spike in 2020. On the other hand, the ATVR displays two consecutive increases, signalling a possible deterioration in cleanliness in the appended 2024 and 2025 data. This apparent deterioration should not be of immediate concern given the higher risk of misidentification associated with the ATVR method. However, the FMA will continue to monitor this indicator in the future.

While the two indicators can provide some useful top-down insights into the market, they also come with limitations. While actions are taken to mitigate some of these, others are inevitable given the statistical approach used. As a result, emphasis is placed on the trends in the data, not single-year changes.

Key words

Financial market conduct, market cleanliness, insider trading, equity market regulation, financial market integrity, market abuse detection, empirical finance, statistical methods in market surveillance, material price-sensitive announcement, pre-announcement price movement, abnormal trading volume

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Foreword

Market cleanliness is an essential part of any well-functioning market. As New Zealand's financial conduct regulator, the Financial Markets Authority – Te Mana Tātai Hokohoko (FMA) has a statutory obligation to promote and facilitate capital markets that are fair, efficient, and transparent, to provide an environment that encourages investor participation and allows for businesses to raise funds. Market abuse such as insider trading can erode trust in markets. The FMA priorities monitoring, detecting and deterring market abuse.

A clean market is one that is free of insider trading. By regularly measuring market cleanliness, we maintain an aggregate view of overall market conduct. This complements our core work investigating individual insider trading cases referred to us by NZ RegCo, NZX's oversight firm.

As highlighted in the 2025 Financial Conduct Report, insider conduct is a priority for the FMA. We first published a suite of market cleanliness measures in October 2024, and this type of measurement is now as important as ever. This importance is reflected in our enforcement actions during 2025, which focused on the inappropriate use of material information by insiders. These included the sentencing of a former treasury accountant with Heartland Bank Limited on three charges of insider trading, as well as a Court of Appeal judgement increasing the sentence handed down in an earlier insider trading case. Such cases demonstrate that the FMA is committed to holding individuals accountable and reinforcing the integrity of New Zealand's financial markets.

The statistics in this update show that market cleanliness is fairly stable, with slight improvements continuing since 2020. In 2025, about 1 in 11 market-moving announcements saw unusual stock price activity beforehand. This is not necessarily concerning, as some price shifts can occur for unrelated reasons, so a perfect market cleanliness score is unlikely even in an orderly market.

This paper reinforces and updates the measures originally shared with the market in October 2024. It is important not to over-interpret the one-year shifts in the statistics. Trends in market cleanliness can be volatile, and the measures used are imperfect. Rather than providing a definitive signal of the degree of insider trading, this update gives a sense of the overall trends and underscores the value and relevance of such measures.

The FMA intends to continue updating these measures of market cleanliness and publishing them on a regular basis. In the current update we have implemented some of the methodology improvements suggested by our academic reviewer, Professor Hai Lin, in 2024. We will look to make ongoing technical improvements to our measurement approach as the opportunity arises.

Louise Unger
Executive Director, Response and Enforcement
February 2026

1. Introduction

The FMA has an objective of promoting fair, efficient, and transparent financial markets, including capital markets. We want to ensure that New Zealand's financial markets preserve their reputation and integrity, to help encourage investor participation.

One way this integrity can become undermined is with the occurrence of insider trading, whereby individuals take advantage of material information that is not yet available to the market. A prevalence of this kind of behaviour (together with other forms of misconduct) can erode investors' confidence, and in the worst-case scenario, lead to them exiting the market altogether.

It is informative to measure prevalence of insider trading (and other types of misconduct) at a market, top-down level, even while NZ RegCo continues their bottom-up oversight of the New Zealand Stock Exchange. It was to this end that the FMA's report *Market Cleanliness in the New Zealand Equity Market* was published in 2024 (FMA, 2024).

The report details two measures of market cleanliness, the price-based Market Cleanliness Statistic (MCS) and the volume-based Abnormal Trading Volume Ratio (ATVR). While methodologically different, these measures both provide insight into the overall market conditions. These models also both come with shortcomings, and while some of these can be mitigated, some are an unavoidable result of the statistical approach that these models take.

2024's publication presented the two metrics from 2004 through mid-2024, finding that while both were highly volatile, they displayed a downward trend over the 20 years, signifying an improvement in market cleanliness. This report updates those measures with additional data from 2024 and 2025 while also making slight methodological adjustments to reduce the measures' volatility.

The rest of the report is structured as follows. Section 2 details the updates and presents the results for the Market Cleanliness Statistic. Section 3 details the updates and presents the results for the Abnormal Trading Volume Ratio. Section 4 concludes.

2. Market Cleanliness Statistic

2.1 Methodology & data updates

The headline Market Cleanliness Statistic (MCS) relies on evaluating stock prices around material price-sensitive announcements (MPSAs), i.e. those which impact prices *around* the time of announcement more than usual. Then, by comparing price changes *before* an announcement with the history of price changes for each stock, the algorithm identifies the prior price movement that would be considered normal for a given announcement. Any change larger than that threshold is counted as an Abnormal Pre-announcement Price Movement (APPM). The MCS is then calculated as the percentage of MPSAs with APPM.

A deeper explanation of the MCS methodology, along with formulae, is given in Section 4.1 (pg. 9) of 2024's publication.

This year's update introduces several changes in methodology. The largest such change is a reduction in the sensitivity in defining a MPSA and an APPM. This loosens the criteria needed for an announcement to be

considered a MPSA or have APPM. In 2024's publication, an announcement was a MPSA if its returns were smaller than the 1st percentile or larger than the 99th percentile of the bootstrap sample of historical returns. This has been changed to smaller than the sample's 5th percentile or larger than the 95th percentile. This may increase the risk of misidentifying announcements as MPSAs or displaying APPM but has been done to increase the sample size significantly, thereby reducing the volatility of the series. This change is in line with the suggestion by Professor Hai Lin (Victoria University of Wellington) in the 2024 report's academic peer review.

The other notable change is to the trend line used for analysis[1]. In 2024's publication a linear trend line was used, displaying a downward trend across the years analysed. For the updated analysis, we use a non-linear Locally-Estimated Scatterplot Smoothing (LOESS) trend line. This tracks the series more closely and allows for the trend to vary over time.

The data used remains largely unchanged from 2024's publication, with the only difference being the addition of 20 months of data. The dataset now runs from January 1st 2004 through December 31st 2025, at a daily frequency. The sources remain the same as 2024's publication, with historical stock and index price data collected from Yahoo Finance and price-sensitive announcements collected from NZX Company Research. Both listed funds and equities are included in the analysis, and all other data cleaning steps and methodological choices are consistent with the original publication.

2.2 Limitations

The MCS comes with limitations in its measure of market misconduct. Significant price movements may not be a result of insider trading, with factors such as volatility, market stress, and speculation all possibly playing a role. This risk is somewhat mitigated by the requirement of a directional match between the movement before and after the announcement, but some levels of misidentification may remain.

Conversely, insider trading may not result in an APPM and therefore may not be detected by the methods used in this paper. Trading based on inside information may be done on too small a scale to significantly affect the price, may occur long before an announcement, or may take place indirectly. While these activities may not be captured by the metrics of this paper, the FMA continues to independently monitor them along with NZ RegCo.

New Zealand has a small equity market. While changes have been made to the methodology to limit the impact of this small sample size, it remains an important consideration. While the sample can theoretically provide sufficient data for analysis, its size results in noisy statistics. The small size also adds complexity to the first issue, as infrequently traded stocks can present large changes in price with only a small number of trades.

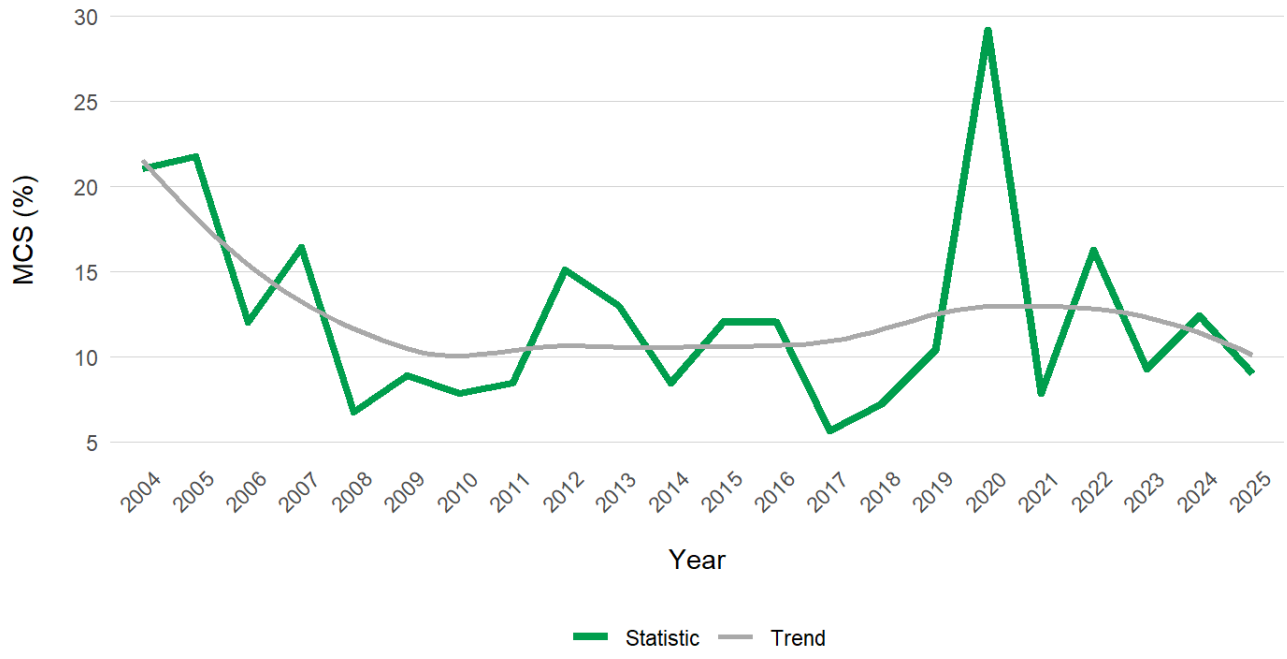
2.3 Results

Table 1 and Figure 1 show the price-based stock-level Market Cleanliness Statistic (MCS) in the New Zealand equity market from 2004 to 2025. The continued volatility of the series since 2024's publication highlights the need to focus on trends rather than year-on-year analysis.

[1] We have also made some small corrections to the method so the updated series may not match the original series exactly. However, the overall trend remains intact.

The MCS displays two separate trends. In the early years of the data set the MCS shows a strong decreasing trend which then flattens throughout the timeframe examined. 2020 displays a radical increase in the MCS (resulting in a slight hump in the trend). This coincides with the Covid-19 pandemic and the accompanying extreme levels of market volatility. As stated in 2024's publication, this sharp decrease in market cleanliness in 2020 is not localised to New Zealand (ASIC, 2024; FCA, 2024). The years following 2020 are volatile, with large increases and decreases year-on-year. The additional 2024/25 data continue this behaviour, with 2025 showing a decrease after an increase in 2024. Despite this elevated volatility, the series displays a clear downward trend following 2020, emphasised by the fall (improvement in cleanliness) in 2025.

Figure 1: Price-based Market Cleanliness Statistic



Source: Authors' calculations.

Table 1: Market Cleanliness Statistic from 2004-2025

Year	Material price-sensitive announcements	Material price-sensitive announcements with Abnormal Pre-announcement Price Movements	Market cleanliness statistic (%)
2004	38	8	21.05
2005	46	10	21.74
2006	50	6	12
2007	67	11	16.42
2008	74	5	6.76
2009	45	4	8.89
2010	51	4	7.84
2011	59	5	8.47
2012	53	8	15.09
2013	69	9	13.04
2014	71	6	8.45
2015	91	11	12.09
2016	83	10	12.05
2017	88	5	5.68
2018	110	8	7.27
2019	135	14	10.37
2020	151	44	29.14
2021	89	7	7.87
2022	123	20	16.26
2023	108	10	9.26
2024	145	18	12.41
2025	111	10	9.01

Source: Authors' calculations.

3. Abnormal Trading Volume Ratio

3.1 Methodology & data updates

The supplementary Abnormal Trading Volume Ratio (ATVR) evaluates the number of trades in the 10 days preceding an announcement and compares it with the number of trades in the 10 to 30 days preceding the announcement. If there is a statistically significant difference between the two, then the announcement is considered to have abnormal trading volume. The ATVR is then calculated as the percentage of announcements that show an abnormal trading volume.

A deeper explanation along with formulae is given in Section 5.1 (pg.20) of 2024's publication.

The only methodology change to the ATVR is the shift from a linear trend line to a LOESS trend line. As detailed above, this allows for the trend to vary over time rather than remaining static.

The data has been updated to include the complete years of 2024 and 2025, meaning the data now covers from January 1st, 2004 through December 31st, 2025, with the same daily frequency as with the MCS. The sources remain the same as 2024's publication, with historical stock and index price data collected from Yahoo Finance

and price-sensitive announcements collected from NZX Company Research. Both listed funds and equities are included in the analysis, and all other data cleaning steps and methodological choices are consistent with the original publication.

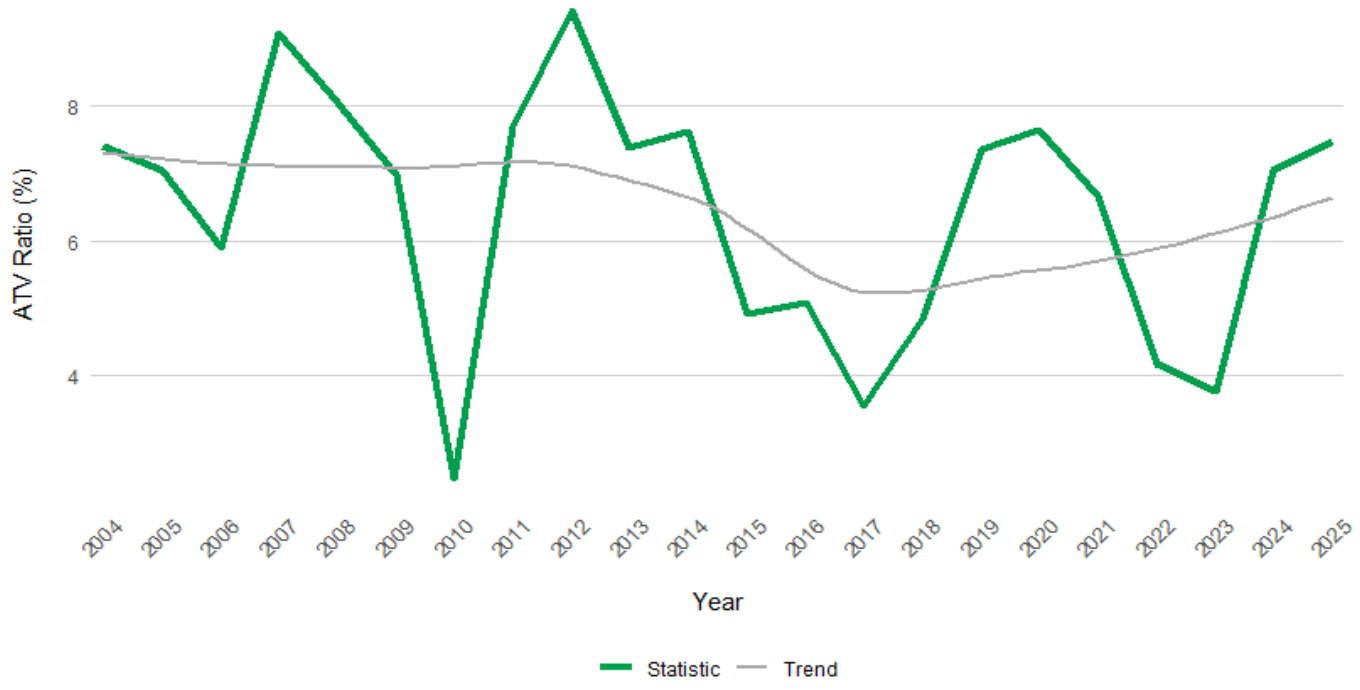
3.2 Potential issues

The ATVR potentially suffers from similar issues to the MCS (e.g. misidentification, unidentified insider trading, limited sample size). The ATVR is particularly exposed to the risk of misidentification as it does not require the directional match that underpins the MCS (although this difference does result in a larger sample size). We use the ATVR to supplement the findings of the MCS, as the limited robustness of the ATVR means it should not be regarded as a standalone measure of market cleanliness.

3.3 Results

Table 2 and Figure 2 show the volume-based ATVR from 2004 to 2025. The ATVR is broadly stable in a trend sense over the past 20 years, although there is considerable volatility around that trend. The ATVR has increased over the latest two years, going from 3.77% in 2023 to 7.47% in 2025. While the series remains highly volatile (and as such the year-on-year movements should be treated with caution), the consecutive years of increases have contributed to an increasing trend in recent years.

Figure 2: Volume-based Abnormal Trading Volume Ratio



Source: Authors' calculations.

Table 2: Abnormal Trading Volume Ratio from 2004-2025

Year	Total number of announcements	Number of announcements with Abnormal trading	Abnormal Trading Volume Ratio (%)
2004	27	2	7.41
2005	71	5	7.04
2006	68	4	5.88
2007	99	9	9.09
2008	87	7	8.05
2009	86	6	6.98
2010	81	2	2.47
2011	78	6	7.69
2012	85	8	9.41
2013	95	7	7.37
2014	105	8	7.62
2015	122	6	4.92
2016	138	7	5.07
2017	141	5	3.55
2018	186	9	4.84
2019	258	19	7.36
2020	340	26	7.65
2021	375	25	6.67
2022	385	16	4.16
2023	398	15	3.77
2024	241	17	7.05
2025	308	23	7.47

Source: Authors' calculations.

There is a multitude of reasons that might explain the recent increase in the ATVR and its upward trend in recent years. While this could represent a decrease in market cleanliness, it is unlikely to be the case, given that the MCS continues to show high levels of volatility including a decrease in 2025. One possible explanation for this deviation is that, as mentioned in section 3.2, the ATVR is more susceptible to misidentification given the lack of the directional match requirement, which is present in the MCS.

Increasing global volatility and uncertainty may be a driving factor of the upward trend. This was discussed in 2024's publication, which identified a link between the ATVR measure and market volatility, suggesting that the recent increase in uncertainty across global markets may be affecting the ATVR measure. In its recent market cleanliness update, the Financial Conduct Authority (FCA) similarly notes that elevated market volatility, driven by global factors, may be affecting its ATVR measure (FCA, 2025).

4. Conclusion

This report updates the measures of market cleanliness established in 2024's *Market Cleanliness in the New Zealand Equity Market* report. Both the price-based Market Cleanliness Statistic (MCS) and volume-based Abnormal Trading Volume Ratio (ATVR) are estimated on updated data with slight changes in methodology.

Both measures remain highly volatile, with the MCS appearing particularly volatile in recent years following the Covid-19 pandemic. Both measures still display an overall decrease in the last 20 years, signifying a long-term increase in market cleanliness, which reiterates the main finding from 2024's publication. This finding predominantly arises from the improvement in the first half of the estimation period. Despite the volatility, the MCS in 2024 and 2025 has contributed towards a downward trend (improvement in cleanliness) following the spike in 2020. Conversely, the ATVR displays an increasing trend in the most recent years, in large part due to two consecutive increases in the appended 2024/25 data.

While the two measures provide useful indications (particularly in the trends), they come with limitations and considerations. These measures are not definitive measures of insider trading, nor of all malicious behaviour. While approaches are taken in the methodology to address some of those limitations, some are a necessary byproduct of the statistical approaches these models take. Based on analysis of the two metrics we believe there is no strong evidence of a deterioration in market cleanliness in the New Zealand equity market.

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Appendix: Analysis with previous methodology

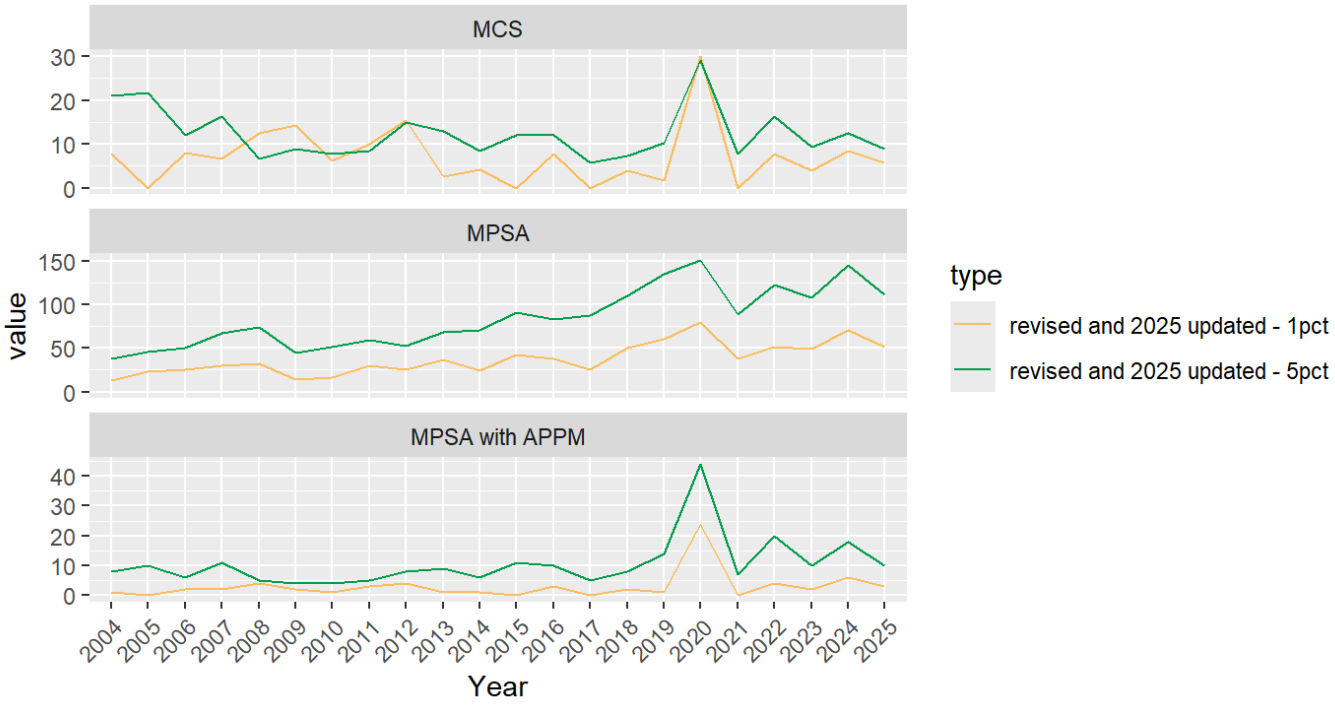
1st/99th Percentile Market Cleanliness Statistic

The largest change in our analysis from 2024's publication is the shift in determination of a MPSA. This increases the sample size of MPSAs that is used for the construction of the MCS (both directly in the calculation as well as increasing the sample size used to calculate the number of MPSAs with APPM).

Figure 3 displays the difference in the number of MPSAs and MPSAs with APPM, in addition to the difference in MCS when utilising the 1st/99th percentile cutoff and the 5th/95th percentile cutoff. The increase in sample size for MPSAs follows through to an increase in MPSAs with APPM, most visibly in recent years.

The MCS is typically larger when utilising the 5th/95th percentile cutoff, with the most notable increases being in 2005 and 2013. The 1st/99th percentile cutoff returns a higher MCS in 2008 and 2009 (the years of the Global Financial Crisis). Both methods display 2020 as a massive spike in the MCS, drawn from an increase in the number/proportion of MPSAs that have APPM.

Figure 3: Comparative results of Market Cleanliness Statistic with 1st/99th percentile vs 5th/95th percentile



Source: Authors' calculations.

Linear trends

The other notable change from 2024's publication is the shift to a LOESS trend line over a linear one. While the LOESS line is utilised for the primary analysis, below we present the MCS and ATVR with a linear trend line added.

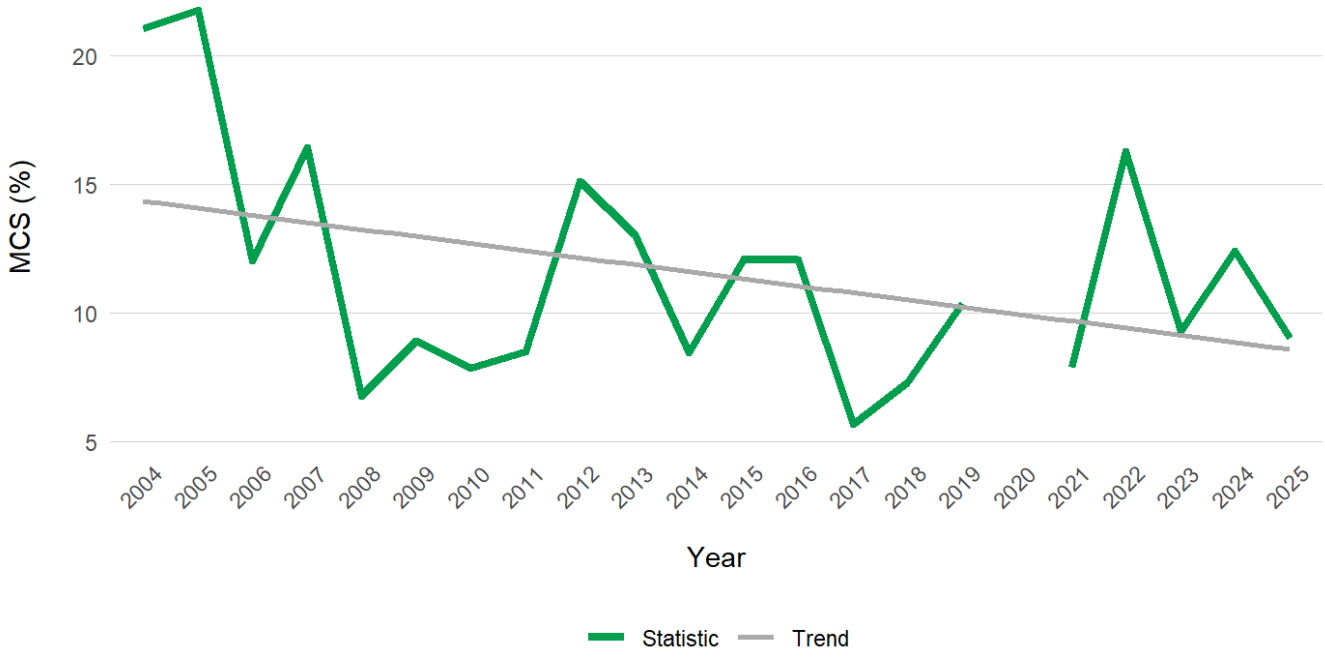
Figure 5 shows the MCS with a linear trend. Similar to the figure in 2024's publication, the trend is decreasing. The trend is deeper than the equivalent graph in 2024's publication (Figure 3, pg. 15), given the decrease in 2025.

Figure 4: Market Cleanliness Statistic with linear trend line

Source: Authors' calculations.

Similar to 2024's publication, we once again present the MCS with 2020 omitted. This change deepens the downward trend.

Figure 5: Market Cleanliness Statistic with linear trend line (excluding 2020)



Source: Authors' calculations.

The ATVR also presents a decreasing linear trend over the last 20 years. The trend is slightly shallower than the equivalent graph in 2024's publication (Figure 6, pg. 22), given the consecutive increases in 2024/25.

Figure 6: Abnormal Trading Volume Ratio with linear trend line

Source: Authors' calculations.