



ASIC
Australian Securities &
Investments Commission



Review of Australian equity market cleanliness

1 November 2015 to 31 October 2018

Report 623 | July 2019

About this report

This report sets out the findings of our review of Australian equity market cleanliness for the period 1 November 2015 to 31 October 2018. It focuses on possible insider trading and information leaks ahead of material, price-sensitive announcements.

We applied two different methodologies to measure market cleanliness. This report examines the results across industry sectors, market capitalisation and announcement types.

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Overview

This report summarises the results of our review of market cleanliness in the Australian equity markets for the three years to 31 October 2018. We found that Australian equity markets continued to operate with a high degree of integrity.

Maintaining the integrity of Australia's equity markets is essential to ensure a fair, strong and efficient financial system for all Australians. Confidence in the integrity of Australia's equity markets:

- › encourages investor participation
- › contributes to liquidity
- › stimulates more competitive pricing
- › lowers the cost of capital.

However, markets can't operate with a high degree of integrity unless the information they run on is fairly accessible. That is why market cleanliness is essential to investor confidence. In a clean market, prices react immediately after new information is released through the proper channels available to the public.

Insider trading and information leaks ahead of major announcements can create false markets and affect market integrity. Reduced confidence in market integrity discourages investors from risking their savings by investing in an unfair market. This can lead to lower turnover, higher cost of trading and inefficient allocation of capital.

Measuring market cleanliness

Our review measured Australian equity market cleanliness for the period 1 November 2015 to 31 October 2018. It focused on possible information leaks and insider trading ahead of material price-sensitive announcements (MPSAs).

We used two methods to measure market cleanliness:

- › the 'established methodology'—widely used by international regulatory counterparts and academics—relies on abnormal pre-announcement price moves (APPMs) in a relatively short window (e.g. five days) ahead of MPSAs to indicate possible information leaks and/or insider trading
- › the 'internal methodology', developed by ASIC, measures the concentration of timely, profitable and suspicious trading ahead of MPSAs to more directly assess market cleanliness. This measure recognises that insider trading may not result in APPMs and that trading may occur in a longer window (e.g. 10 days) before an MPSA.

The high-level logic of both methodologies is discussed in this report. However, for detailed conditions and design features for each of the methodologies, see [Report 487](#) *Review of Australian equity market cleanliness* (REP 487).

Findings

We found that:

- › the overall cleanliness of the market fluctuated between 2015 and 2018—despite a deterioration in 2016, market cleanliness improved in 2017 and 2018 to settle around 2015 levels
- › on average, 0.6% of accounts that traded before an MPSA were deemed suspicious. Suspicious accounts profitably traded on average 5.1% of the volume before each announcement
- › while the percentage of suspicious accounts remained stable over the period, the volume traded by those accounts appears to have increased
- › on the whole, there was more suspicious trading before announcements related to mergers and acquisitions (M&As) than for other announcement types. However, the suspicious trading was generally accompanied by less abnormal price reactions
- › there was more suspicious trading and abnormal price reactions before unscheduled announcements than scheduled announcements. Suspicious trading and/or abnormal price reactions before unscheduled announcements were less likely to be driven by normal speculation than scheduled announcements
- › announcements by smaller companies were more likely to appear unclean. Many of these smaller companies were in the materials sector.

What next?

In light of these results, we will continue to strengthen our surveillance of listed equity markets. We are examining practical ways of using the internal market cleanliness measure to supplement misconduct detection. Monitoring the historical accumulation of anomalous trading patterns ahead of MPSAs will further enhance our market supervision work and inform our regulatory focus. In future, we aim to increase our monitoring of brokers with high concentrations of anomalous order flow and clients, or groups of clients, that exhibit repeat patterns of anomalous trading.

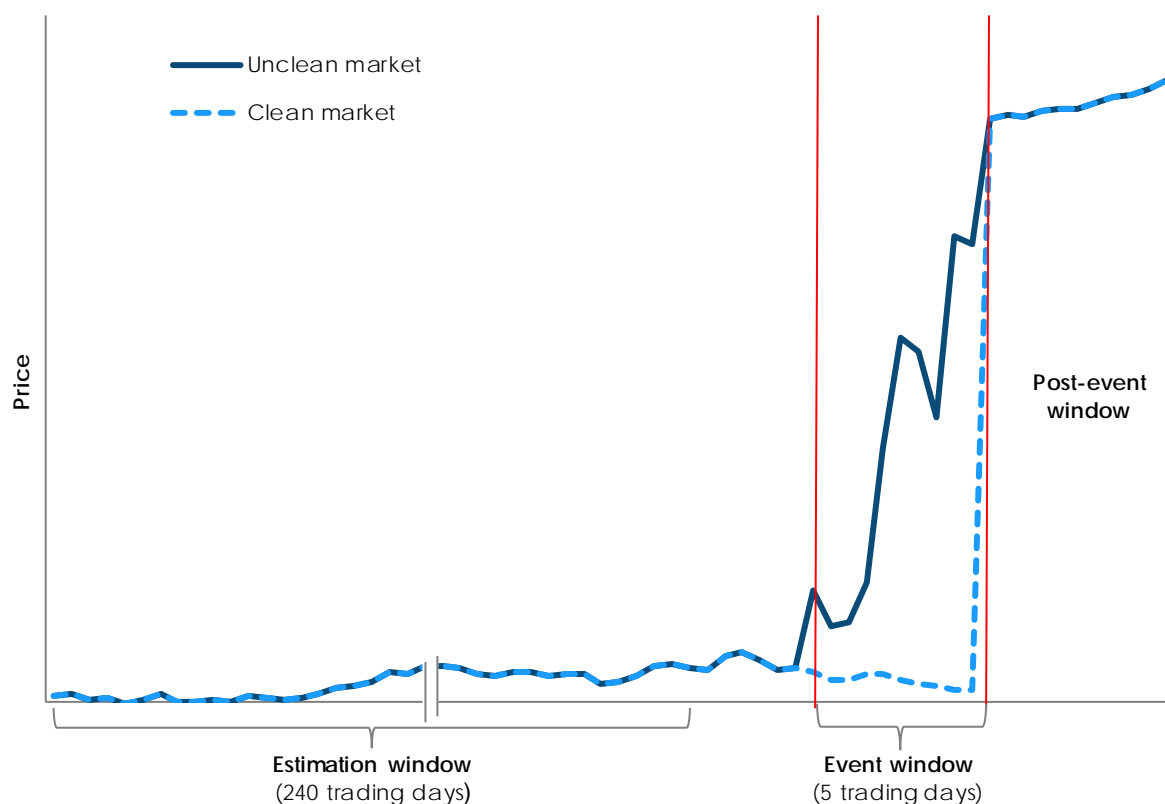
Established market cleanliness measure and results

Established market cleanliness methodology

The established market cleanliness methodology measures APPMs ahead of MPSAs. Price moves before an MPSA—in the same direction and significantly different from normal volatility—can raise concerns about market integrity and efficiency. In a clean market, security prices should react instantaneously to new information released through the proper channels and should be preceded by minimal anomalous trading or anticipatory price moves. Significant and abnormal price reactions and anomalous trading patterns ahead of announcements may signal information leaks and indicate an unclean market.

This is illustrated in Figure 1. In an unclean market, the share price rises in anticipation of the announcement. By contrast, in a clean market, the share price reacts instantaneously to the announcement.

Figure 1: Illustration of established market cleanliness methodology



Note: This graph is explained in the paragraphs above (accessible version).

The established measure of market cleanliness is calculated as the percentage of MPSAs preceded by APPMs.

$$\text{Percentage of APPMs} = \frac{\text{No. of APPMs}}{\text{Total number of MPSAs}}$$

This methodology has been widely applied by international financial market regulators, exchange market operators, industry think tanks and academics. The results will form the basis for further analysis through time and across equity market segments (i.e. industry sectors, market capitalisation quintiles and announcement types).

The established market cleanliness measure calculated using this methodology should be interpreted in the context of the methodology's limitations: see [REP 487](#) at paragraphs 33–41. Despite its limitations, however, the established methodology is intuitively attractive and practical

to apply. It can give regulators and industry stakeholders a broad indication of changes in the level of market integrity when applied consistently over time.

Established market cleanliness results

The established market cleanliness methodology uses abnormal price reactions ahead of MPSAs to measure market cleanliness through time and across different market segments. A low percentage of APPMs indicates that markets are relatively clean. Conversely, a high percentage of APPMs indicates that markets are relatively unclean.

Figure 2 shows the established market cleanliness measure in Australia based on our sample of MPSAs from 2006 to 2018 (full years to end October). Following a general improvement in market cleanliness from 1 November 2006 to 31 October 2015, there was an overall stabilisation in the three years from 1 November 2015 to 31 October 2018. A somewhat pronounced deterioration in market cleanliness in 2016 was followed by two consecutive years of improvement in 2017 and 2018. With the deterioration in 2016 and subsequent improvement in the following two years, the measure returned to approximately 2015 levels.

Note: All years referenced in this report start on 1 November and end on 31 October (e.g. 2018 refers to the period 1 November 2017 to 31 October 2018).

Figure 2: Established market cleanliness measure



Note: See Table 1 for the data shown in this figure (accessible version).

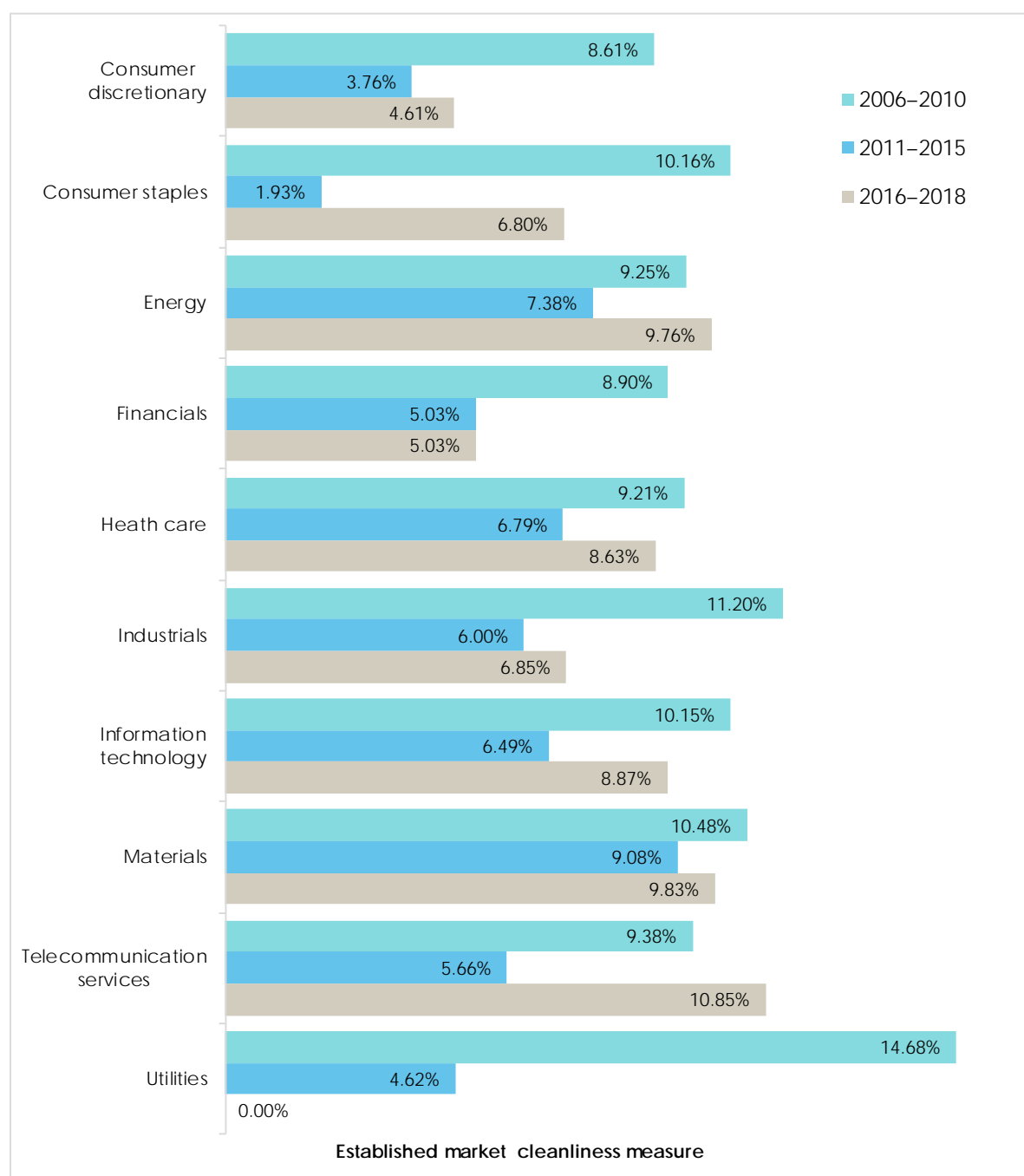
In 2015, 6.07% of MPSAs were preceded by APPMs. In 2016, anomalous MPSAs rose to 9.37% and then fell to 8.56% in 2017 and 6.76% in 2018. One reason for the increase in 2016 is that the market capitalisation of companies making MPSAs tended to be smaller than in 2015. These smaller companies generally exhibited lower liquidity and trading volume. This meant that trading ahead of the MPSAs was more likely to result in price impact. The internal market cleanliness measure echoes this finding—that is, the average percentage of anomalous accounts and volume ahead of MPSAs was slightly higher in 2016 compared to 2015. Both measures improved in 2017 and 2018, back towards 2015 levels.

This pattern was generally reflected in our analysis across sectors, market capitalisation and announcement types. Further, during the three years from 1 November 2015 to 31 October 2018, the traditional market cleanliness measure across industry sectors, market capitalisation quintiles and announcement types was generally better than in the first five years from 1 November 2006 to 31 October 2010, but worse than that of the second five years from 1 November 2010 to 31 October 2015.

Industry sector

To examine market cleanliness across industry sectors we used the 10 sectors that make up the structure of the Global Industry Classification Standard (GICS)—that is, energy, materials, industrials, consumer discretionary, consumer staples, health care, financials, information technology, telecommunication services and utilities.

Figure 3: Established market cleanliness measure by industry sector



Note: See Table 2 for the data shown in this figure (accessible version).

We grouped the announcements made by companies in each industry sector to explore whether there were any industry-specific patterns of variation in the established market cleanliness measure over the periods 2006–10, 2011–15 and 2016–18 (the last period being three rather than five years): see Figure 3.

Our analysis of the sectors using the established method indicates the highest percentage of APPMs was in the period 2006–10. There was a substantive improvement in 2010–15 which was not continued in 2016–18, as the measure stabilised. While the rate of improvement was not sustained over the most recent period (2016–18), most sectors still showed an overall improvement in cleanliness compared to the first study period (2006–10). This suggests long-term improvement in market cleanliness for most sectors.

The utilities sector improved in each study period, along with a reduction in MPSAs. Historically, however, this sector has been volatile in the market cleanliness measure. The financial sector has maintained its cleanliness (5.03%) and comes after the consumer discretionary sector (4.16%) as the third cleanest sector.

Market cleanliness scores for the telecommunication services and energy sectors deteriorated in the most recent three-year period and had the poorest and third poorest market cleanliness scores (10.95% and 9.76% respectively)—the materials sector has the second poorest market cleanliness measure (9.83%). It should be noted that the materials sector accounted for over 40% of MPSAs in the 2016–18 period.

Size—Market capitalisation

To examine market cleanliness by company size we grouped companies into quintiles according to their market capitalisation—Quintile 1 being the 20% of companies with the smallest market capitalisation and Quintile 5 being the 20% of companies with the largest market capitalisation. Market capitalisation for each company was determined using the average market capitalisation for the five days before the MPSA.

Our analysis by size (market capitalisation quintile) shows that larger companies generally exhibited better market cleanliness.

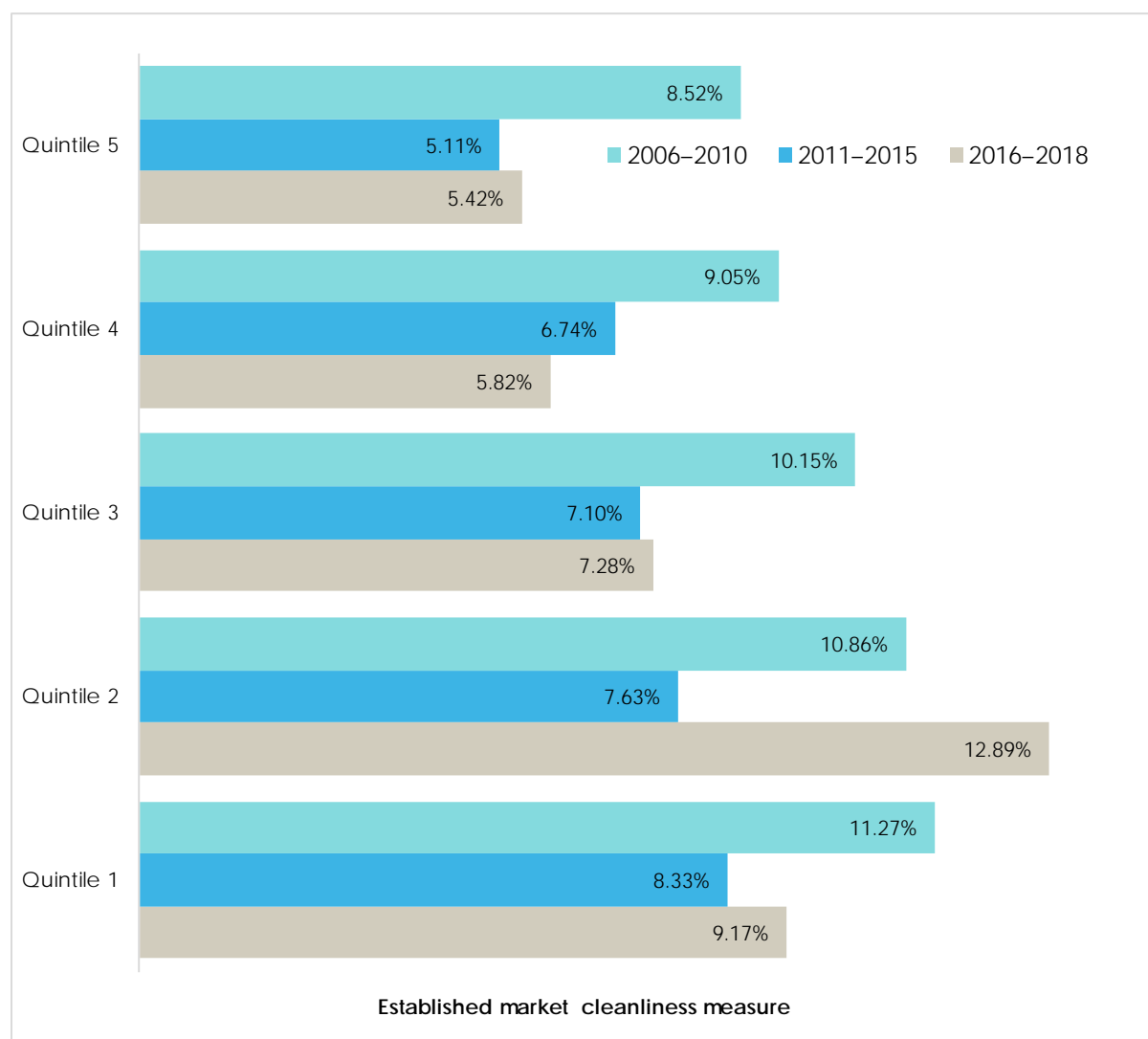
During the 2016–18 period, four out of five quintiles had poorer market cleanliness compared to the 2011–15 period. However, only Quintile 2 (the second smallest group of stocks) had their market cleanliness deteriorate further than 2006–10 levels. See Figure 4.

The probable reason for this is that nearly half of the MPSAs were by smaller companies in the materials sector with relatively limited liquidity. A significant proportion were in exploration where inside information (such as drilling results) can be known by multiple parties and is short lived due to continuous disclosure obligations.

Quintile 1 had the second poorest market cleanliness score in the 2016–18 period and included MPSAs made by a similar composition of companies.

In general, larger companies may have better market cleanliness scores because they have more resources devoted to compliance for continuous disclosure and management of confidential information. On the trading side, larger companies have greater liquidity, which can better absorb the price impact of anomalous trading ahead of announcements.

Figure 4: Established market cleanliness measure by market capitalisation quintile—
Quintile 5 (largest) to Quintile 1 (smallest)



Note: See Table 3 for the data shown in this figure (accessible version).

Announcement type

This section examines the established market cleanliness measure by announcement type: see Figure 5.

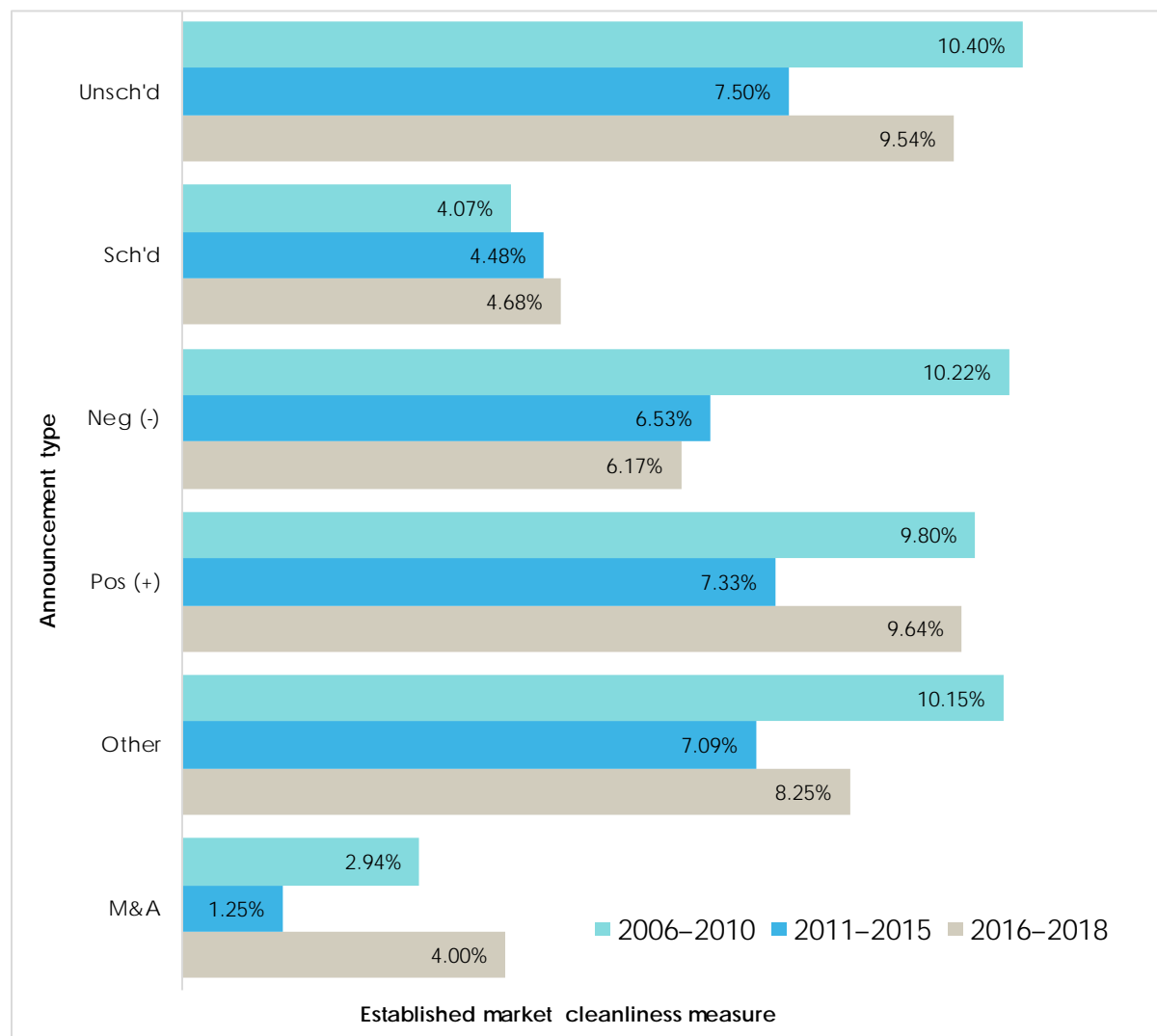
Consistent with [REP 487](#), M&A announcements had the best market cleanliness score of the six types. Given that the number of people working on M&A deals would be quite large, this result is somewhat surprising. Indeed, it is in direct contrast with the internal market cleanliness measure, which exhibited worse cleanliness for M&As. The reasons for the contrasting results is explained in the following section on the internal market cleanliness measure.

Overall, positive MPSAs appeared less clean than negative MPSAs, which can be affected by naked short selling restrictions.

It is interesting to see that the market cleanliness measure for unscheduled MPSAs appeared significantly worse than for scheduled MPSAs. Scheduled announcements are expected and they may be managed with analyst briefings, company announcements and market research before the announcement. Also, leaks can occur over a more prolonged period of time. Additionally, one would expect scheduled MPSAs to be preceded by increased liquidity and speculation in

both directions, which may mask the anomalous trading and make it more difficult to create any APPMs. On the other hand, unscheduled MPSAs tend to be less clean than scheduled MPSAs by both measures, which is indicative of possible market misconduct rather than traders betting ahead of scheduled MPSAs.

Figure 5: Established market cleanliness measure by announcement type



Note: See Table 4 for the data shown in this figure (accessible version).

Internal market cleanliness measure and results

Internal market cleanliness methodology

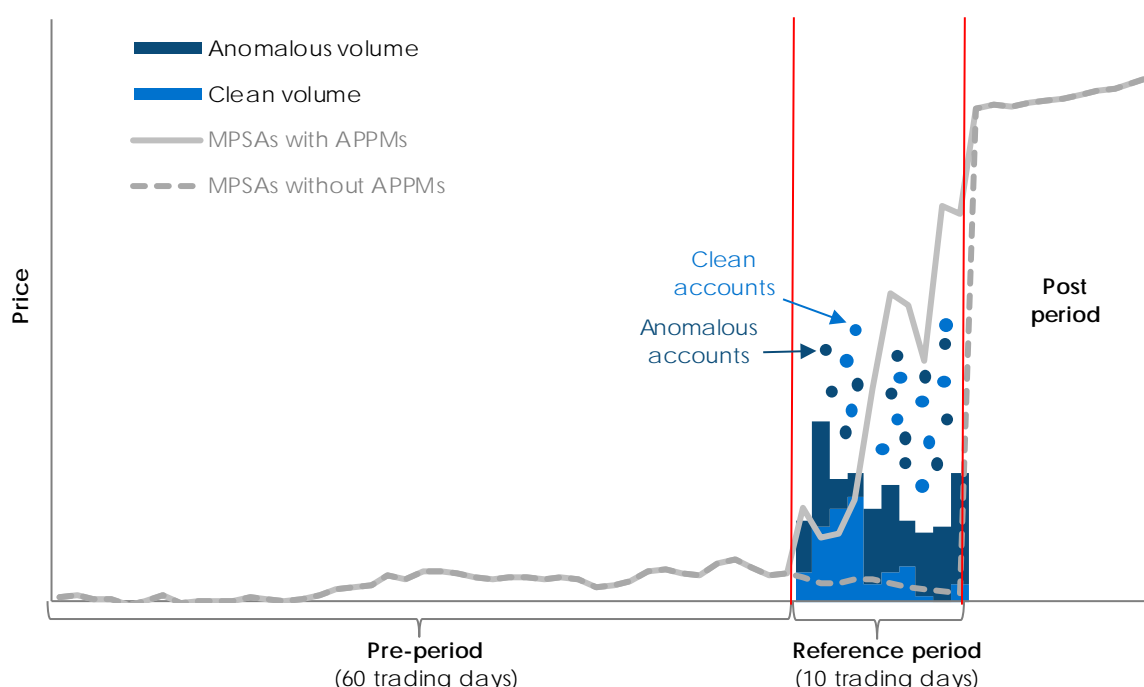
We developed an innovative market cleanliness methodology that is independent of the established methodology. It removes the reliance on price reactions to indicate an 'unclean market'. Instead of relying on the price impact of possibly suspicious trading, we look at the anomalous trading itself.

The internal methodology was inspired by our market surveillance activity and made possible by our access to enhanced surveillance data through our Market Analysis Intelligence (MAI) system, which allows the identification of individual origin of order IDs (accounts). Market participants were required to provide origin of order IDs in the regulatory data feed from 28 July 2014. The internal measure started on 1 November 2014 to allow for a clean period following 28 July 2014.

This report updates our review of Australian equity market cleanliness to the end of October 2018. Given that in the original study (see [REP 487](#)) our internal market cleanliness methodology only made use of one year of origin of order ID data (i.e. 1 November 2014 to 31 October 2015), this extension allows us to conduct a time series analysis on the internal methodology (i.e. 1 November 2014 to 31 October 2018).

We examined timely and profitable trading before MPSAs and identified accounts that demonstrated anomalous behavioural patterns compared to their historical trading behaviour and the rest of the market's trading behaviour. We isolated accounts that not only traded in a timely and profitable manner during the reference period (i.e. 10 trading days before an MPSA) but had notably diverged from how they had behaved historically during the pre-period (i.e. 60 trading days before the MPSA) and/or how the rest of the market behaved: see Figure 6.

Figure 6: Illustration of internal market cleanliness methodology



Note: This graph is explained in the paragraph above (accessible version).

In doing so, we measured the extent and intensity of anomalous trading (rather than price reaction) ahead of MPSAs. It is similar to how a surveillance analyst would screen for suspected insider trading. For example, the methodology attempts to identify traders who exhibit various combinations of certain characteristics, including (but not limited to) traders who:

- › have not traded the security of interest for an extended period of time, but have suddenly started aggressively trading in the security of interest just ahead of the MPSA
- › changed from historical trading and portfolio diversification behaviours to increased trading and position concentration in the security of interest just ahead of the MPSA
- › significantly increased the size of trading in the security of interest just ahead of the MPSA, and/or
- › made a material profit as a result of the timely trading.

This was done by systematically filtering timely buying or selling, profitability, the ratio of trading in the relevant security to the entire portfolio during the pre-period compared to the reference period, and abnormal trading volume. For example:

- › a large average stock-to-portfolio ratio in the reference period indicated that the account bought a concentrated stake in the relevant security or liquidated existing holdings in the portfolio to buy the relevant security ahead of a positive MPSA
- › a much lower average stock-to-portfolio ratio in the pre-period showed that the account historically traded a diversified range of securities
- › the account accumulated a much larger stake in the relevant security during the reference period compared to what it bought during the pre-period
- › the accumulated relevant security during the reference period was substantial, relative to its historical trading in other securities
- › the total profit from trading ahead of the MPSA was significant.

Market cleanliness measures can be constructed by looking at the percentage of accounts trading before MPSAs that demonstrate anomalous behavioural patterns (internal market cleanliness measure 1), and the percentage of volume they traded (internal market cleanliness measure 2).

Internal market cleanliness measure 1 is calculated as the percentage of accounts demonstrating timely and anomalous trading ahead of MPSAs.

$$\text{Suspicious accounts \%} = \frac{\text{No. of accounts with anomalous trading ahead of MPSA}_i}{\text{Trading no. of accounts ahead of MPSA}_i}$$

Internal market cleanliness measure 2 is calculated as the percentage of volume traded using the accounts ahead of MPSAs.

$$\text{Suspicious volume \%} = \frac{\text{Volume traded by anomalous accounts ahead of MPSA}_i}{\text{Total volume ahead of MPSA}_i}$$

Where securities are volatile, it is difficult to distinguish APPMs. Even where there is no pre-announcement price move we are still concerned with illegal and unfair activity. Therefore, in

addition to APPMs, market cleanliness should examine the nature and pattern of trading by each account prior to MSPAs.

This measure is subject to the strictness of our quantitative filters that deem trading patterns as timely, profitable and anomalous, based on our usual surveillance activities. The exact quantitative thresholds and parameters used to generate the internal market cleanliness measure are designed to profile and stylise general sets of trading patterns informed by our internal surveillance activity. We have conducted various sensitivity and robustness checks by altering some of the parameters and applying different model specifications in our day-to-day surveillance. Like APPMs in the traditional market cleanliness methodology, the internal measure provides an indication of possible undesirable activity (e.g. insider trading and information leaks), while not asserting that the entire measure is attributable to such conduct.

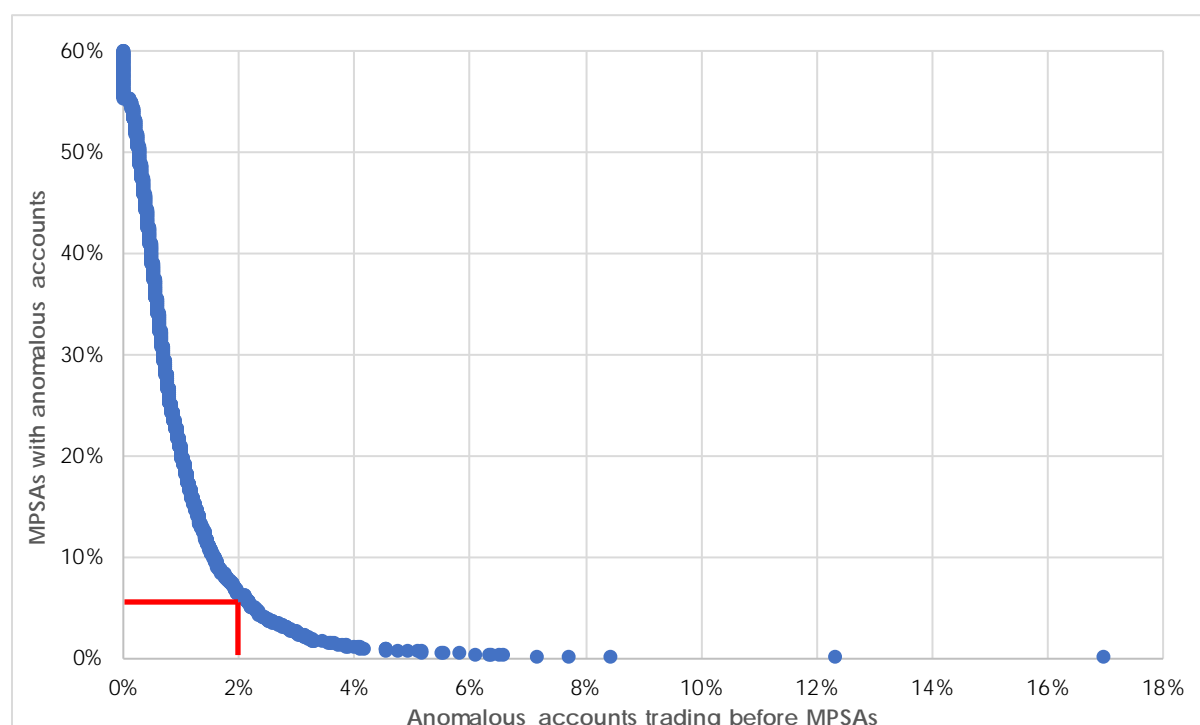
Internal market cleanliness results

This section extends our analysis of the internal market cleanliness measure results previously published in [REP 487](#). Our analysis in REP 487—for the year 1 November 2014 to 31 October 2015—indicated that approximately 62% of MPSAs exhibited no anomalous trading behaviour leading up to the announcement. Of the 38% of MPSAs that had some level of anomalous trading, around 5% were preceded by more than 2% of accounts demonstrating anomalous trading patterns, and around 5% contained more than 12% of volume traded by anomalous accounts.

Cumulative market cleanliness measures

The internal market cleanliness measures for the years 1 November 2014 to 31 October 2018 indicate that approximately 45% of MPSAs exhibited no anomalous trading behaviours at the account level. Of the 55% of MPSAs that had some level of anomalous trading, around 5% contained more than 2% of accounts (roughly the same as in REP 487) demonstrating anomalous trading patterns ahead of the announcement: see Figure 7.

Figure 7: Internal market cleanliness measure—Cumulative MPSA % by account

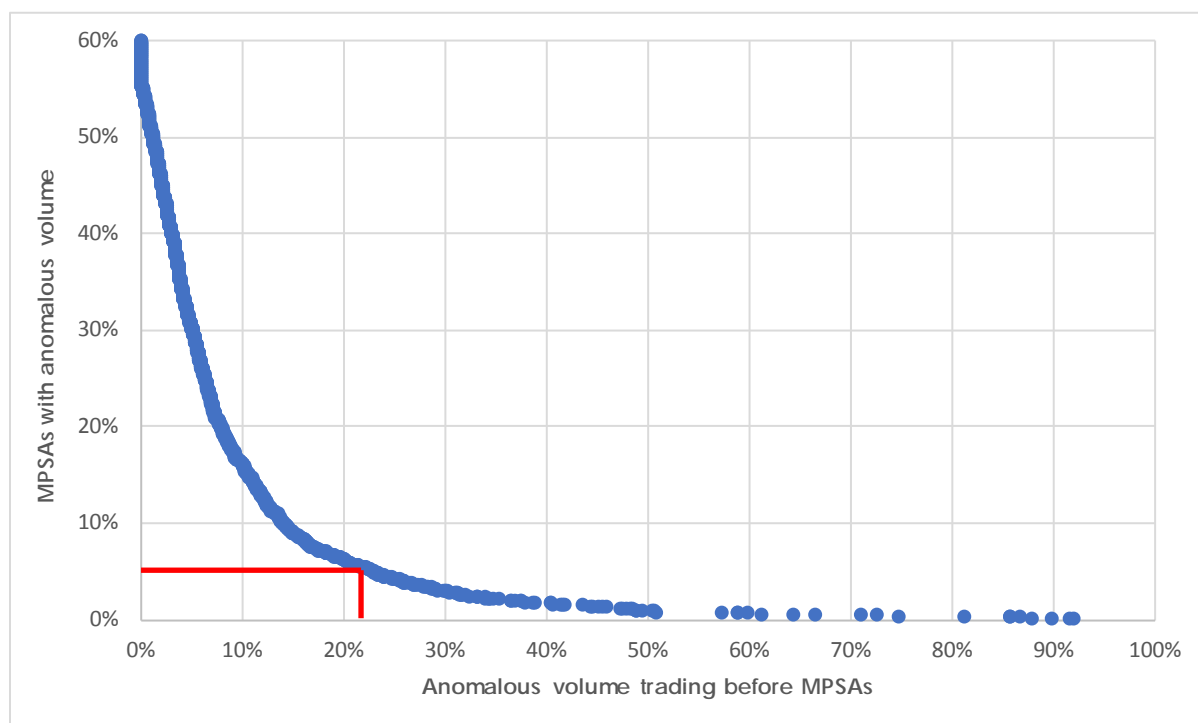


Note: This graph is explained in the paragraph above (accessible version).

Further, of the 55% of MPSAs that had some level of anomalous trading, around 5% contained more than 23% of volume traded by anomalous accounts. This is higher than in our previous review (see REP 487), where around 5% of MPSAs contained more than 12% of volume traded by anomalous accounts. This is a much larger proportion than by accounts: see Figure 8.

This shows that accounts engaging in anomalous trading may have traded larger volumes than the average account at each level of the cumulative distribution. It is also driven by the longer sample period of four years. Note that the denominator of percentage volume is the single-sided total volume ahead of the MPSA, hence resulting in above 50% reading.

Figure 8: Internal market cleanliness measure—Cumulative MPSA % by volume



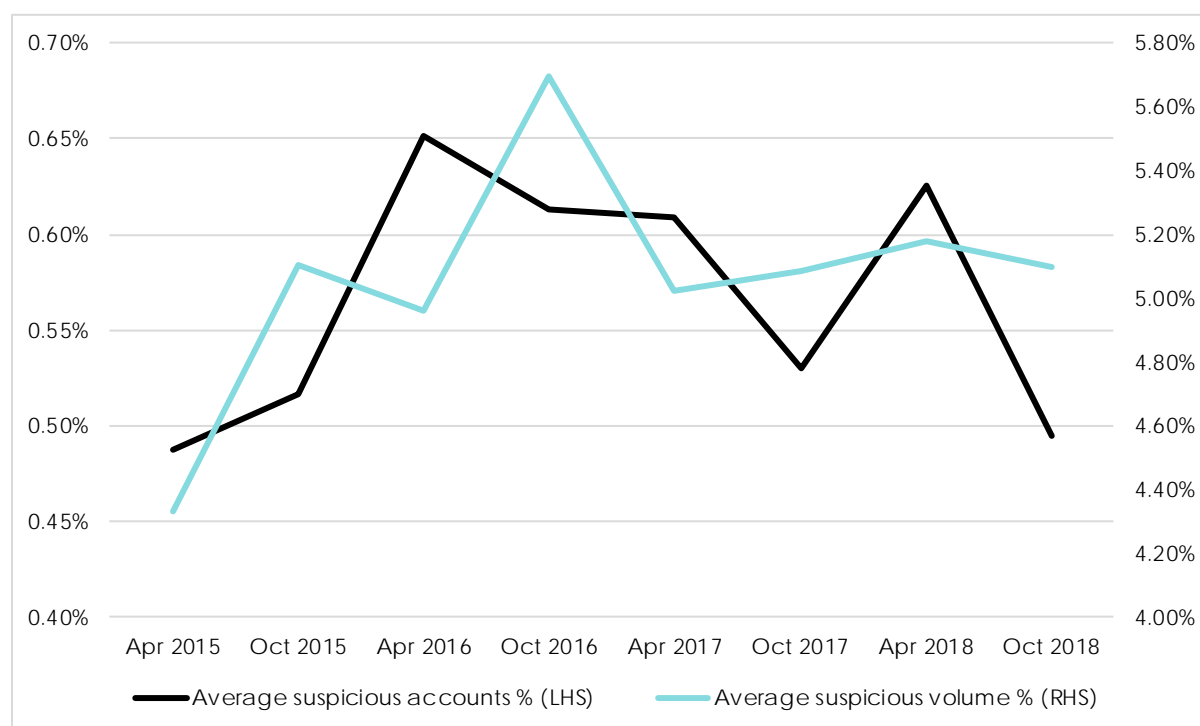
Note: This graph is explained in the paragraph above (accessible version).

Market cleanliness measures over time

Figure 9 sets out the internal market cleanliness measures from 1 November 2014 to 31 October 2018. It shows that the average proportion of suspicious accounts preceding MPSAs increased from 0.49% for the half year between 1 November 2014 and 30 April 2015 to 0.65% for the half year between 1 November 2015 and 30 April 2016, before falling back to 0.49% for the half year between 1 May 2018 and 31 October 2018. This indicates that market cleanliness fluctuated around a stable level.

The average proportion of suspicious volume preceding MPSAs increased from 4.33% for the half year between 1 November 2014 and 30 April 2015 to 5.70% for the half year between 1 May 2016 and 31 October 2016, before falling back to stabilise around 5% for the rest of the sample periods until 31 October 2018.

Figure 9: Internal market cleanliness measures



Note: See Table 5 for the data shown in this figure (accessible version).

Industry sector

The internal market cleanliness measures by industry sector over 2015–18 showed that consumer staples, materials and industrials had the highest percentage of anomalous accounts preceding MPSAs, while financials, telecommunication services and materials had the highest percentage of anomalous volume preceding MPSAs.

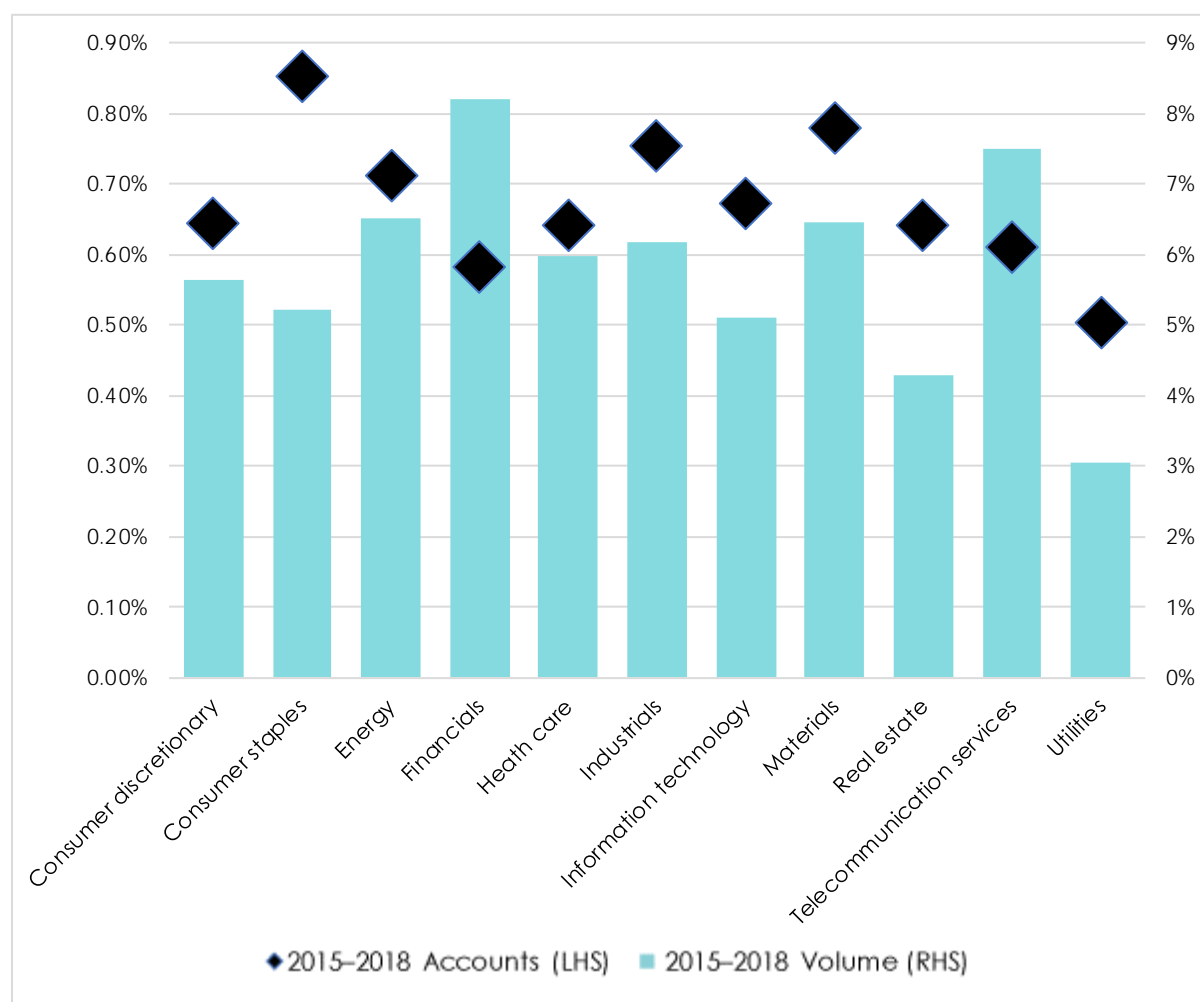
Utilities was the cleanest sector with measures of only 3% by volume and 0.50% by accounts. Real estate, followed by information technology, were the next cleanest sectors by percentage of volume.

Following utilities, financials and telecommunication services were relatively clean by percentage of accounts. However, these sectors had the poorest measures by percentage of volume at 8.19% and 7.50% respectively.

Financials are primarily large cap stocks that are highly liquid and widely traded so it is easy to understand that a smaller proportion of accounts would appear anomalous—but for those accounts, the volume may be quite high. This is similar for telecommunication services where the composition of stocks is mainly large.

Telecommunication services, materials and energy were consistently poor in both the established and internal market cleanliness measures.

Figure 10: Internal market cleanliness measures by sector



Note: See Table 6 for the data shown in this figure (accessible version).

Size—Market capitalisation

The internal market cleanliness measure over 2015–18 showed a gentle improvement in cleanliness from the largest companies (Quintile 5) to the smallest companies (Quintile 1). The one exception was Quintile 2.

This differs from the established market cleanliness measure where it improved from the smallest companies (Quintile 1) to the largest companies (Quintile 5). One reason for this is the difference in the methodologies. The established measure is based on price moves, and small companies exhibit greater volatility in price compared to large companies.

Quintile 2, the second smallest companies by market capitalisation (from about \$20 million to \$85 million), had the poorest market cleanliness at 7.09% of volume and 0.81% of accounts: see Figure 11.

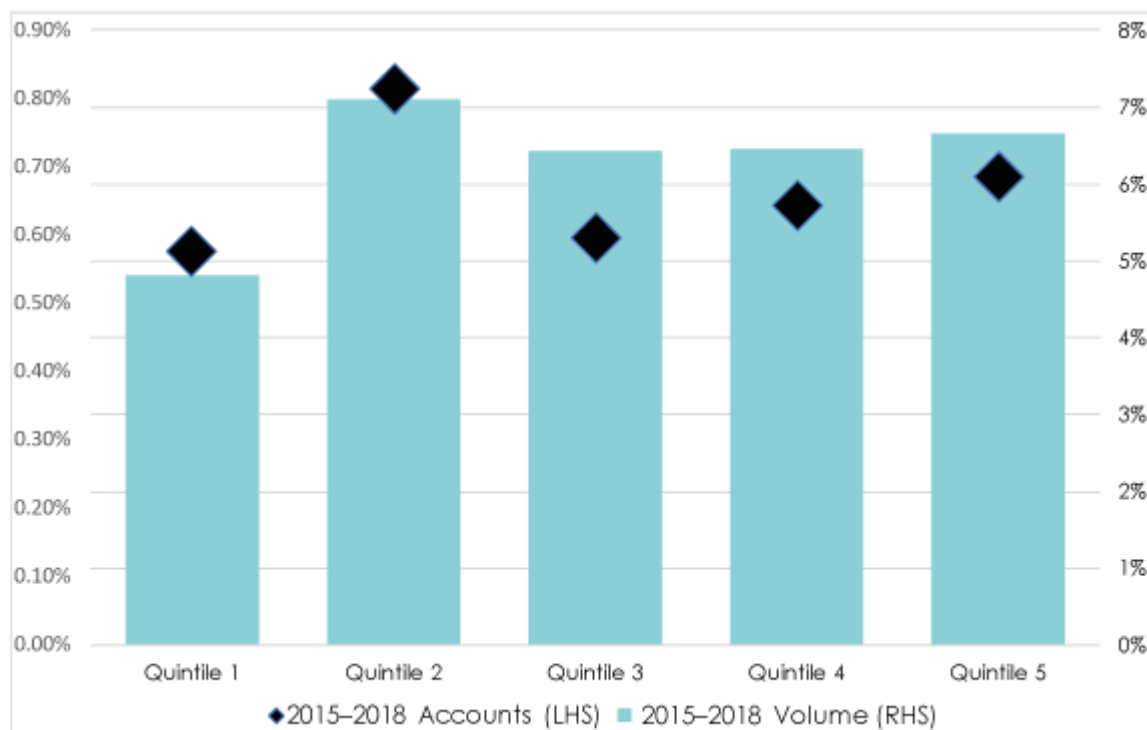
This is consistent with the established market cleanliness measure for Quintile 2. The reason for this may be that 48% of stocks in Quintile 2 were resource stocks (materials and energy). Further, a significant portion of announcements are unscheduled.

Quintile 1 was also dominated by the smallest materials stocks (which were 58% of the composition). However, the accounts and trading that were classified as anomalous for Quintile 1 were less than that of Quintile 2. One possible explanation for this is that there is a conditional filter

that the account has to have made a substantial profit—this may be difficult to achieve in very small and illiquid stocks.

Quintile 5 had a more diverse spread of sectors. The largest sectors were consumer staples, materials, financials and industrials, which ranged from 15% to 12% of composition.

Figure 11: Internal market cleanliness measures by market capitalisation quintile



Note: See Table 7 for the data shown in this figure (accessible version).

Announcement type

The one standout announcement type for the internal market cleanliness measure was M&As which had 12.47% of volume and 1.09% of accounts: see Figure 12. This result differs from the established measure where M&A announcements had the best market cleanliness score: see Figure 5.

All other announcement types had similar measures, ranging from 5.65% to 6.44% of volume and from 0.61% to 0.70% of accounts.

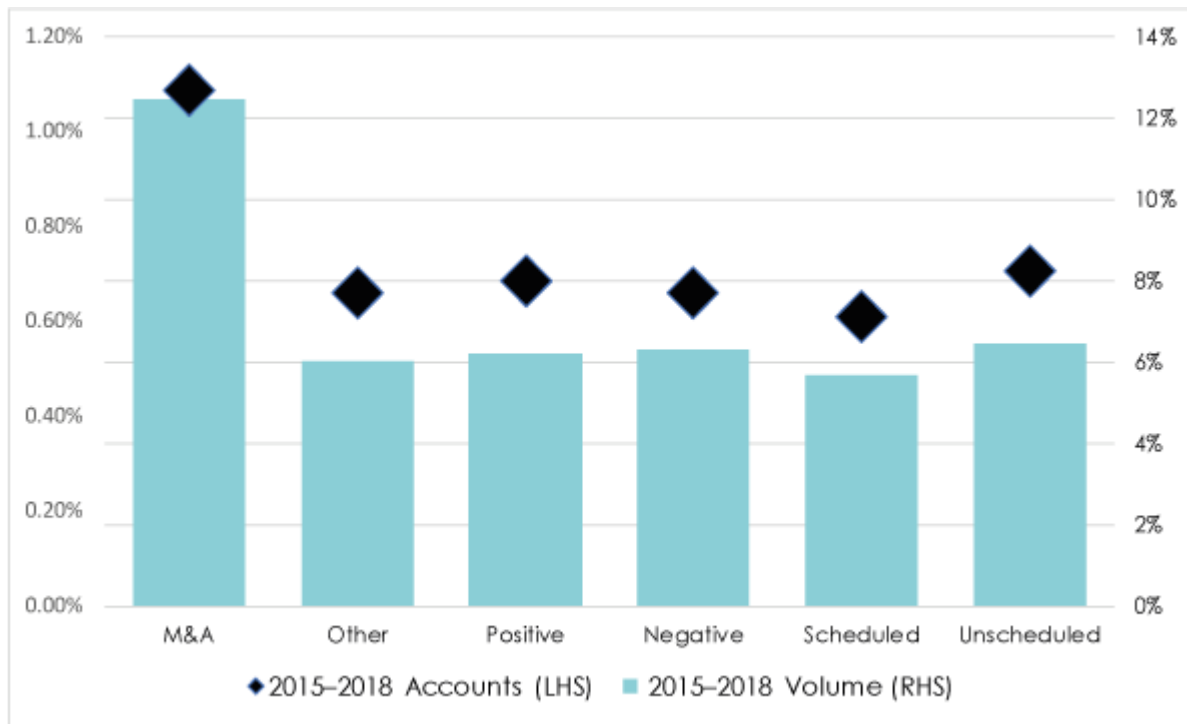
The reason for the difference between established and internal measures for M&As may be twofold. First, the established method has a low reading because M&As tend to be larger, more liquid, stocks and insiders potentially are aware of the information months in advance. Thus, they are less likely to have a price impact.

Second, the internal method can have a high reading on M&As because it does not rely on price run-ups as a proxy; rather, the internal method looks at suspicious trading itself. Due to the nature of M&As, relatively more people tend to know about the upcoming activity before the announcement. Hence the internal method would register an arguably more compelling measure of M&A market cleanliness than the established method.

We remind all parties involved in an M&A transaction, bidders and advisers (and then targets and their advisers) in particular, to put in place meaningful confidentiality arrangements at the start of a potential transaction and make sure these are rigorously followed.

Unscheduled announcements have the second worst score for market cleanliness. Scheduled announcements are consistent in their low market cleanliness measure for both the established and internal methods, which is indicative of possible market misconduct rather than traders betting ahead of scheduled MPSAs.

Figure 12: Internal market cleanliness measures by announcement type



Note: See Table 8 for the data shown in this figure (accessible version).

Appendix 1: Accessible versions of figures

This appendix is for people with visual or other impairments. It provides the underlying data for the figures in this report.

Table 1: Established market cleanliness measure

Year ended 31 October	APPM	APPM%
2006	109	11.11%
2007	95	9.16%
2008	150	10.62%
2009	67	10.67%
2010	33	6.75%
2011	64	7.04%
2012	71	8.70%
2013	61	8.18%
2014	23	4.01%
2015	46	6.07%
2016	67	9.37%
2017	66	8.56%
2018	62	6.76%

Note: This is the data contained in Figure 2.

Table 2: Established market cleanliness measure by industry sector

Sector	2006–2010	2011–2015	2016–2018
Consumer discretionary	8.61%	3.76%	4.61%
Consumer staples	10.16%	1.93%	6.80%
Energy	9.25%	7.38%	9.76%
Financials	8.90%	5.03%	5.03%
Health care	9.21%	6.79%	8.63%
Industrials	11.20%	6.00%	6.85%
Information technology	10.15%	6.49%	8.87%
Materials	10.48%	9.08%	9.83%
Telecommunication services	9.38%	5.66%	10.85%
Utilities	14.68%	4.62%	0.00%

Note: This is the data contained in Figure 3.

**Table 3: Established market cleanliness measure by market capitalisation quintile—
Quintile 5 (largest) to Quintile 1 (smallest)**

Review period	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
2006–2010	11.27%	10.86%	10.15%	9.05%	8.52%
2011–2015	8.33%	7.63%	7.10%	6.74%	5.11%
2016–2018	9.17%	12.89%	7.28%	5.82%	5.42%

Note: This is the data contained in Figure 4.

Table 4: Established market cleanliness measure by announcement type

Review period	M&A	Other	Positive	Negative	Scheduled	Unsch'd
2006–2010	2.94%	10.15%	9.80%	10.22%	4.07%	10.40%
2011–2015	1.25%	7.09%	7.33%	6.53%	4.48%	7.50%
2016–2018	4.00%	8.25%	9.64%	6.17%	4.68%	9.54%

Note: This is the data contained in Figure 5.

Table 5: Internal market cleanliness measures

Year ended 30 October	Average suspicious accounts %	Average suspicious volume %
April 2015	0.49%	4.33%
October 2015	0.52%	5.10%
April 2016	0.65%	4.96%
October 2016	0.61%	5.70%
April 2017	0.61%	5.03%
October 2017	0.53%	5.08%
April 2018	0.63%	5.18%
October 2018	0.49%	5.10%

Note: This is the data contained in Figure 9.

Table 6: Internal market cleanliness measures by sector

Sector	2015–2018 Accounts	2015–2018 Volume
Consumer discretionary	0.65%	5.65%
Consumer staples	0.85%	5.22%
Energy	0.71%	6.51%
Financials	0.58%	8.19%
Health care	0.64%	5.98%
Industrials	0.75%	6.17%
Information technology	0.67%	5.10%

Sector	2015–2018 Accounts	2015–2018 Volume
Materials	0.78%	6.45%
Real estate	0.64%	4.27%
Telecommunication services	0.61%	7.50%
Utilities	0.50%	3.05%

Note: This is the data contained in Figure 10.

Table 7: Internal market cleanliness measures by market capitalisation quintile

Quintile	2015–2018 Accounts	2015–2018 Volume
Quintile 1	0.58%	4.81%
Quintile 2	0.81%	7.09%
Quintile 3	0.60%	6.42%
Quintile 4	0.64%	6.45%
Quintile 5	0.69%	6.66%

Note: This is the data contained in Figure 11.

Table 8: Internal market cleanliness measures by announcement type

Announcement type	2015–2018 Accounts	2015–2018 Volume
M&A	1.09%	12.47%
Other	0.66%	6.04%
Positive	0.69%	6.24%
Negative	0.66%	6.32%
Scheduled	0.61%	5.65%
Unscheduled	0.70%	6.44%

Note: This is the data contained in Figure 12.

Appendix 2: Sample company and MPSA summary statistics

Table 9 shows a summary of company and announcement data which reveals that the composition of the sample has not changed dramatically over the relevant period.

Table 9: Company and announcement summary statistics

Year ended 31 Oct	Mean market cap.	Median market cap.	No. M&A	% of M&A	No. positive MPSAs	No. negative MPSAs	No. total MPSAs
2006	\$2,347m	\$131m	31	3.16%	618	363	981
2007	\$4,641m	\$153m	24	2.31%	591	446	1037
2008	\$9,092m	\$159m	18	1.27%	683	729	1412
2009	\$2,161m	\$122m	8	1.27%	373	255	628
2010	\$2,172m	\$150m	21	4.29%	286	203	489
2011	\$1,705m	\$144m	21	2.31%	538	371	909
2012	\$1,272m	\$130m	22	2.70%	453	363	816
2013	\$1,608m	\$147m	10	1.34%	403	343	746
2014	\$1,845m	\$206m	10	1.75%	298	275	573
2015	\$2,671m	\$127m	17	2.24%	396	362	758
2016	\$1,619m	\$150m	18	2.52%	426	289	715
2017	\$1,422m	\$105m	16	2.08%	423	348	771
2018	\$2,208m	\$153m	41	4.47%	500	417	917
Total	\$2,674m	\$144m	257	2.44%	5,988	4,764	10,752

Key terms

account (origin of order ID)	For each side (buy and/or sell) of the order or transaction where the participant acts as agent for a client, a unique notation, code or number used by the participant to identify the person on whose instructions the order is submitted, or transaction was executed
APPM	Abnormal pre-announcement price move
ASIC	Australian Securities and Investments Commission
established market cleanliness measure	Market cleanliness measure based on APPMs in the security ahead of MPSAs
financial market	As defined in s767A of the Corporations Act, a facility through which offers to acquire or dispose of financial products are regularly made or accepted
GICS	Global Industry Classification Standard, an industry taxonomy developed in 1999 by MSCI Inc. and Standard & Poor's Financial Services LLC
internal market cleanliness measure	Market cleanliness measure based on anomalous trading behaviour by accounts ahead of MPSAs
MAI	ASIC's Market Analytics and Intelligence surveillance system
market cleanliness	Measure of market integrity based on the perceived indicators of insider trading and information leaks ahead of MPSAs
MPSA	Material price-sensitive announcement
REP 487 (for example)	An ASIC report (in this example numbered 487)
stock-to-portfolio ratio	The time-weighted proportion of the security to the entire portfolio of securities accumulated by an entity during a period of time