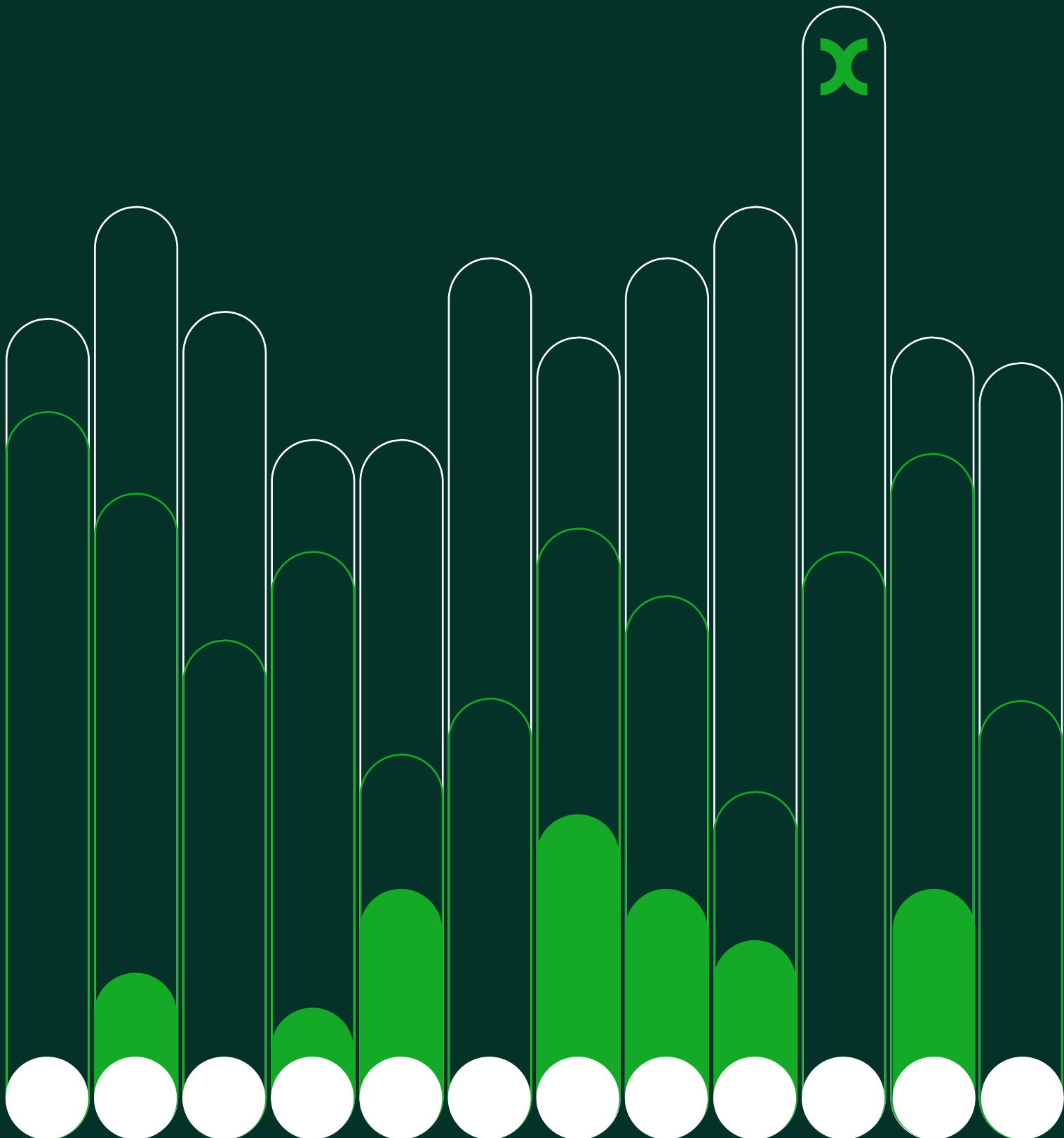


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# 1 Introduction

In May 2024, the Comissão de Valores Mobiliários (CVM) published a Regulatory Impact Analysis (RIA) on the internalisation of orders.<sup>1</sup> The RIA is accompanied by a consultation paper (TPS), which asks market participants to provide their views on CVM's analysis and whether off-exchange internalisation should be permitted in Brazil.<sup>2</sup>

The TPS is not associated with a specific draft resolution, but is part of a broader exercise by CVM to consider the overall costs and benefits of internalisation in its assessment of potential amendments to the current regulatory framework.

B3 has asked Oxera to review and comment on CVM's RIA from an economic perspective. The objective of this report is to set out our analysis of the RIA, based on insights from the economics literature, insights from experiences with internalisation across different jurisdictions, and our own knowledge and understanding of the functioning of trading markets, to help inform B3's overall response to the consultation.

The RIA is an extensive document—and our conclusion is that, overall, it provides a comprehensive and robust review and analysis of the relevant aspects of internalisation. Therefore, we do not discuss or repeat all of the points raised in the RIA here, but instead discuss in more detail a number of key points that we have identified.<sup>3</sup> This report should therefore be read in conjunction with the RIA itself.

For ease of reading, the rest of this report follows a similar structure to the RIA.

- Section 2 comments on CVM's economic framework (the 'Regulatory Problem' section of the RIA).
- Section 3 discusses the academic literature regarding internalisation.
- Section 4 reviews CVM's description of the regulatory landscape in other financial centres (the 'International Benchmarks' section of the RIA).

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<sup>1</sup> CVM Economic Analysis and Risk Management Department (2024), 'Internalisation of orders: study based on the Regulatory Impact Analysis (RIA) methodology Partial RIA', May.

<sup>2</sup> ASA/CVM Public Notice for Subsidies No. 01/24.

<sup>3</sup> We do not comment in detail on CVM's description of the current legal framework in Brazil (section 4 of the RIA), or CVM's analysis of the affected participants (section 5 of the RIA).

- Section 5 concludes.

## 2 Framework for analysis

### 2.1 What is internalisation?

Internalisation refers to the practice of brokers or dealers matching trades through their own internal books or against other clients' trades. The decision to internalise order flow is linked to the broader practice of order flow segmentation, in which liquidity providers try to separate types of order flow according to their characteristics.

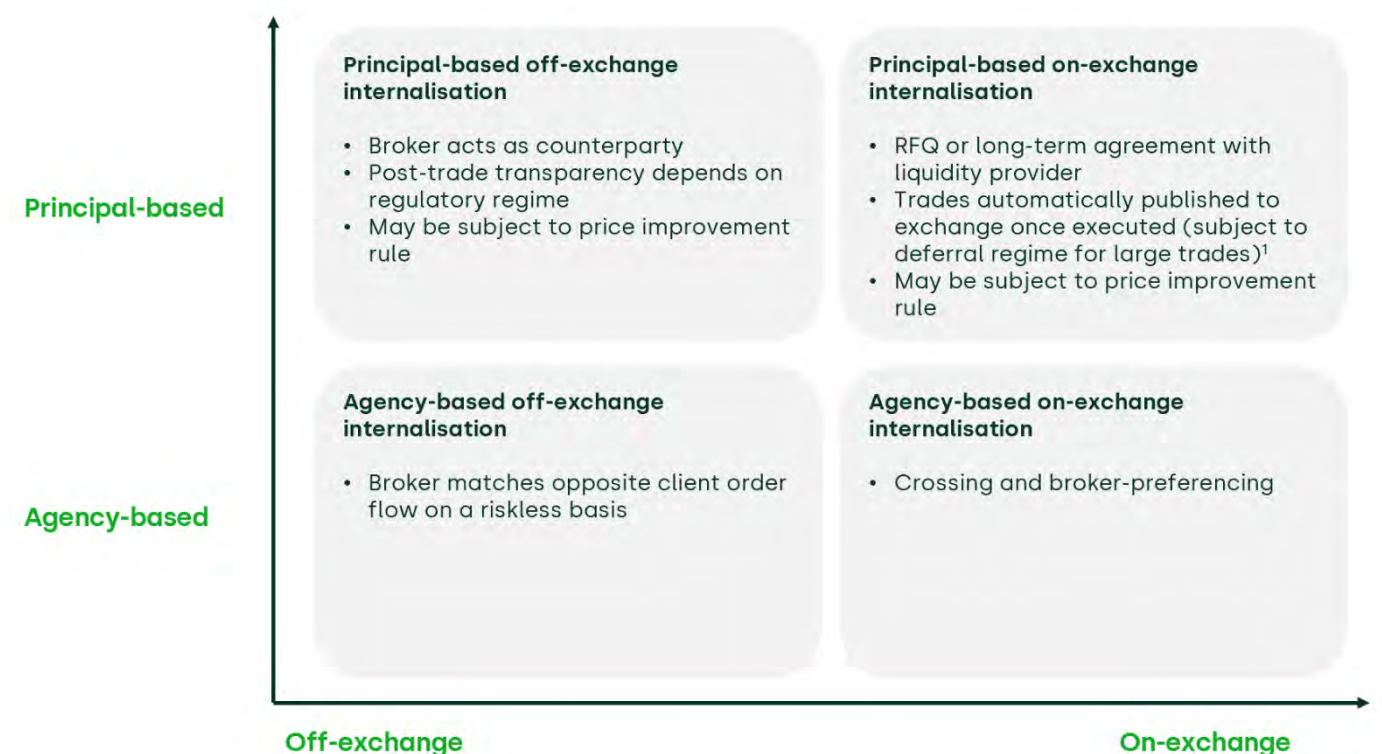
CVM defines internalisation in its report as 'the interposition, by a securities intermediary, of a trade that might otherwise find different counterparties in the process of competition and price formation'.<sup>4</sup>

For completeness, we can categorise different models of internalisation according to two dimensions: (1) agency- vs principal-based; and (2) on-exchange vs off-exchange (see Figure 2.1).

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<sup>4</sup> Comissão de Valores Mobiliários (2024), 'Internalization of orders: regulatory impact analysis', May, p. 41.

Figure 2.1 Different types of internalisation



Note: <sup>1</sup> Jurisdictions such as the EU operate a deferral regime for large trades (above a defined size) that permits the publication of trades to be delayed for a defined period. See, for example, Euronext (2023), '[Euronext TCS trading manual – OPTIQ](#)', p. 13. Source: Oxera.

The first dimension of internalisation relates to the role played by the broker/dealer in the transaction. In agency-based models, the broker/dealer matches opposing orders from its own clients and does not trade on its own account, and therefore does not take on any risk. In principal-based internalisation, the broker/dealer executes client orders on its own account, matching them against the broker/dealer's own inventory. By acting as a counterparty, the broker/dealer will take on the risk associated with the position and will account for this in the bid–ask spread that they quote.

The second dimension of internalisation relates to whether the internalisation takes place on-exchange or off-exchange. Compared with the first dimension, there is more variation in where internalisation can take place.

At one end of the spectrum, internalisation can take place separately from the exchange—for example, in a broker-operated internal crossing network or on an over-the-counter (OTC) basis. The current regulatory framework in Brazil does not allow brokers to execute orders against

their own inventory or against matching client orders outside of an exchange.<sup>5</sup>

At the other end of the spectrum, internalisation can occur directly on an exchange central limit order book (CLOB) or in an exchange-operated auction. This can happen via opposing orders from the same broker being submitted at the same time (sometimes referred to as 'intentional crosses'), or via opposing orders from the same broker being submitted at different points in time (sometimes referred to as 'unintentional crosses'). On some trading platforms, crosses are facilitated by the practice of broker preferencing, where trading venues allow an incoming order to match first with other orders from the same broker/dealer, ahead of orders from other participants that are at the same price and that have time priority ('price-broker-time' priority).<sup>6</sup>

Within this spectrum, there are a range of models. In some cases, even though internalisation takes place outside of the exchange's CLOB, the matching process takes place on infrastructure provided by the exchange, or the infrastructure is provided by other parties, but the transactions are reported to the exchange operator after execution (sometimes referred to as 'on-exchange off-book' transactions). In other cases, internalisation occurs via an additional layer within the existing CLOB of the exchange. The price from the exchange's CLOB is used as a reference price for internalisation (e.g. via a direct peg or as an input into the dealer's pricing decision).

Depending on the regulatory regime, brokers may need to publish or report internalised trades shortly after they are executed, for the purposes of post-trade transparency. CVM recognises the potential differences in transparency for different internalisation models in its report, explaining that not all dark trading is 'internalised'<sup>7</sup> and not all internalisation takes place without transparency (i.e. there are mechanisms for internalising orders using self-regulated and transparent stock markets).

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<sup>5</sup> Article 94 of CVM Resolution No.135. Comissão de Valores Mobiliários (2022), '[CVM Resolution No. 135](#)', 10 June. In some cases, block trades may occur through investors identifying counterparties for blocks via phone or electronic messaging with broker-dealers. After agreeing on a price (within the prevailing bid-ask spread), the trade is executed on the exchange as a 'direct cross'.

<sup>6</sup> See, for example, Canadian Securities Administrators, Industry Regulatory Organization of Canada (2020), '[Joint CSA/IIROC Staff Notice 23-327 – Update on Internalization within the Canadian Equity Market](#)', 20 August.

<sup>7</sup> An example of such a mechanism in the EU would be a 'dark' Multilateral Trading Facility (MTF) operating under the Reference Price Wavier (RPW). In this venue, buy and sell orders are matched at the midpoint of the best bid and offer of the reference venue (usually the lit central limit order book of the primary venue) without the interposition of an intermediary. There is no pre-trade transparency on such a venue.

## 2.2 CVM's framework for analysis

CVM presents a framework for analysing internalisation that sets out and discusses several important economic concepts. The framework recognises, for example, the potential negative externalities in trading markets, the role of adverse selection costs, and potential consequences of the 'free-rider problem'.

### 2.2.1 Negative externalities and adverse selection costs

In particular, the RIA sets out the following two economic mechanisms that are critical in analysing the potential effects of allowing internalisation.

- Individual traders have their own preferences when executing trades depending on their priorities as to factors such as explicit costs, implicit costs, immediacy, and certainty of execution.<sup>8</sup> There is a negative market 'externality' associated with trading away from lit venues. Although the RIA does not make this point explicitly, the 'externality' arises because, when making their trading decisions, investors do not factor in the wider benefit that trading on 'lit' venues (those with pre-trade transparency) has on price formation and the quality of the market as a whole.
- Lower adverse selection costs<sup>9</sup> make retail order flow more attractive (on average) to liquidity providers, thus increasing the incentives for brokers to 'segment' such order flow away from the rest of the market (see Appendix A1).

From a policymaker's perspective, the first economic force (the negative externality) means that the outcome in a fragmented market with multiple trading mechanisms may result in 'too much' trading taking place away from lit venues.<sup>10</sup> This point is clearly acknowledged in CVM's RIA.

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<sup>8</sup> For example, the pecking order theory states that investors may, in the first instance, prefer to use midpoint dark venues that offer the lowest cost (explicit and implicit). However, the probability of execution and immediacy of these venues is often lower (partly due to the lack of transparency). As certainty and immediacy of order execution become more important and the opportunity cost of failing to execute trades increases, investors may prefer to trade on lit venues. See Menkveld, A.J., Yueshen, B.Z. and Zhu, H. (2017), 'Shades of darkness: A pecking order of trading venues', *Journal of Financial Economics*, **124**:3, pp. 503–34.

<sup>9</sup> Adverse selection refers to the costs that arise where there is asymmetric information between a buyer and a seller, such that one party is able to benefit from a transaction at the expense of the other. Retail flow is generally perceived as being less informed, on average, meaning that liquidity providers face lower adverse selection costs. In Appendix A1, we describe the various cost factors that can affect liquidity (reflected in bid-ask spreads). These factors have been discussed extensively in the academic literature.

<sup>10</sup> This does not mean that, in equilibrium, all traders will trade away from lit venues. In general, the more investors there are in the market competing to buy or sell at or near the current price, the



One point that is not made as explicitly in the RIA is that the second economic mechanism (adverse selection costs) can be self-reinforcing. If the shift of trading activity away to internalisation mechanisms causes liquidity to worsen on the lit market, this may make segmentation and internalisation even more attractive, prompting a *further* shift of volumes away from lit venues.

### 2.2.2 Free-riding and transaction costs

The RIA makes two other points when describing the potential impact of internalisation, which merit further discussion.

First, the RIA refers to a 'free-rider' problem if entities use lit venue prices as a reference price when internalising orders. In economics, a 'free rider' problem arises when those who benefit from a resource do not pay for it, or pay too little. In other words, users do not contribute to the cost of production. This is slightly different to the negative externality referred to above.

Strictly speaking, a free-rider problem occurs when a good is both non-rivalrous (i.e. consumption by one user does not prevent consumption by another) and non-excludable (i.e. it is impossible to prevent someone from consuming it).

In the case of price data from a lit venue, venues may be able to make access to the data subject to a licence fee. In principle, this free-rider problem can be reduced if trading venues have flexibility to charge different types of user different fees based on the value generated by the data. This ensures that all users who are benefiting from the price data are contributing to its costs of production. For example, a lit venue could charge a higher fee for the use of its data as a reference price within a trading system.

Second, the RIA states that:

Internalized operations can be cheaper from the perspective of transaction costs for investors, both at the time of negotiation and afterwards, depending on the legal and regulatory framework.

In this way, it may be part of the more generalized competitive process for some participants to offer internalized operations, since they may be

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narrower the spread between the bid and offer and thus the lower the cost of trading. All other things being equal, traders will therefore prefer to send orders to venues where other investors are. This 'network effect' can incentivise traders to remain on the lit venue.

more attractive to the investor from the operational perspective of transaction costs.

With regard to explicit costs, internalisation may be attractive because, if the trade takes place away from an exchange, it can avoid exchange trading fees. Similarly, if internalisation is facilitated on the infrastructure of an exchange, the operator may offer fee discounts relative to the fees charged for CLOB trading.<sup>11</sup> Depending on the regulatory regime, post-trade transaction costs may also be lower for internalised trades if requirements for clearing and settlement are less extensive.

Moreover, depending on the regulatory regime or industry practice, these trading fees and post-trade costs (and any savings) may be passed on directly to the end-investor or incurred by the broker and passed on indirectly via broker commissions or narrower bid–ask spreads (for example, in the case of principal-based internalisation). Therefore, who benefits from any costs savings from internalisation will depend on the level of pass-through to the end-investor, directly or indirectly.

It is important to note that all trade execution incurs some level of costs. For example, executing orders off-exchange still requires the recovery of costs associated with the relevant brokerage firm's internal trading infrastructure.<sup>12</sup> So, even if the full benefit of avoiding exchange fees is passed on to the end-investor, the brokerage may recover other costs through the broker commission and/or through the bid–ask spread. Therefore, to understand the full impact of internalisation on transaction costs, the full range of explicit and implicit costs needs to be considered together with the level of pass-on from intermediary to end-investor. We discuss the challenges of measuring implicit costs in section 3.

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<sup>11</sup> For example, in Brazil B3 offers participants who use Retail Liquidity Provider (RLP) orders in the cash equity market reduced fees on trades executed through RLP order accounts. See B3 (2024), '[Rules and trading parameters: Retail Liquidity Provider \(RLP\)](#)', accessed 30 July 2024.

<sup>12</sup> The brokerage firm's costs may be lower when compared with exchange fees if, for example, the regulatory requirements that apply to the brokerage are less extensive, reducing the costs of compliance. See, for example, Comissão de Valores Mobiliários (2024), 'Internalization of orders: regulatory impact analysis', May, p. 63. To the extent that the investment in trading infrastructure represents an upfront fixed cost, smaller brokers may choose to route their orders to larger brokers rather than building their own systems. Larger brokers that have more order flow are also more likely to be able to net buy and sell orders, reducing the risk associated with internalisation. The nature of the costs associated with internalisation may therefore lead to consolidation among brokers in Brazil.

### 2.2.3 Competitive impacts of internalisation

As part of its economic framework, the RIA discusses the competitive impacts of internalisation. While not explicitly set out, the RIA essentially distinguishes between:

- competition between different execution mechanisms: for example, the competition between internalisation and trading on a lit venue;
- competition between execution mechanisms of the same type: for example, competition between multiple exchange operators.

If one of the aims of internalisation is to impose competitive pressure on the exchanges' trade execution fees, then experience in other financial centres shows that allowing internalisation of retail order flow is unlikely to be an effective tool to achieve that objective. This experience shows that, for exchanges, an effective way to respond to internalisation of retail order flow by brokers is to segment order flow themselves with the aim of also offering price improvement to retail investors.<sup>13</sup> Although this response is logical from an exchange perspective, from a market design perspective this further segmentation of retail order flow may not be beneficial because, as explained above, it could have a negative impact on the quality of the lit market. Some exchanges may offer a reduction in trading fees, but such reductions tend to be limited and would only benefit retail investors.

A more effective way of imposing competitive pressure on exchanges is to facilitate entry by additional multilateral trading venues—the experience of financial centres in the USA and Europe is that this can result in effective competitive pressure on exchanges' trade execution fees for all market participants.<sup>14</sup>

Indeed, this appears to be consistent with findings in the RIA, which notes that fragmentation across more than one venue of the same type (e.g. multiple competing lit venues) is: (1) not problematic from a market design perspective per se; (2) beneficial from a competition

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<sup>13</sup> For example, Euronext introduced Best of Book to attract more retail order flow across Europe, and in the USA the major incumbent exchanges NYSE and NASDAQ introduced NYSE RLP and NASDAQ RPI, respectively, to compete for retail order flow.

<sup>14</sup> This can involve the entry of additional exchanges or of non-exchange multilateral trading venues (e.g. MTFs in the EU and Alternative Trading Systems, ATS, in the USA). For an analysis of the impact of introducing competition in Europe, see Oxera (2011), 'Monitoring prices, costs and volumes of trading and post-trading services', Report prepared for European Commission DG Internal Market Services, May.

perspective; and (3) a possibility that is already provided for in the current regulatory framework in Brazil.

Finally, the RIA suggests that internalisation may ultimately harm the general process of competition among lit venues if it distorts incentives for exchanges to invest in the infrastructure needed to support the price formation process. We note that this is consistent with the 'free-rider' problem discussed in section 2.2.2.

### 3 Insights from the economics literature

The RIA refers to several academic papers in its report, recognising that each study may have a different jurisdictional focus and that some studies are focused on dark trading on venues as well as internalisation.<sup>15</sup>

It draws the following key conclusions from its review of the academic literature.

- There is a consensus that markets without pre-trade transparency make a marginal or zero contribution to the overall price formation process.
- Tick-size restrictions are relevant in directing the flow to certain trading mechanisms, if there is a possibility of arbitrage between different execution mechanisms.
- Retail investors usually obtain lower spreads in situations with internalisation, and start obtaining higher spreads in situations where internalisation is prohibited.
- There are empirical studies that measure complementary relationships between dark trading or internalisation and lit trading, which consider that off-exchange trading attracts different types of order flow.
- However, most studies consider that there is some deterioration in some liquidity metrics in lit markets with the introduction of dark trading or internalisation, usually after some threshold has been crossed.

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<sup>15</sup> In particular, Table 2 in CVM's report presents a summary of the following papers: Preece, R.G. (2012), 'Dark pools, internalization, and equity market quality', CFA Institute Position Paper; Foley, S. and Putnins, T. (2014), 'Regulatory efforts to reduce dark trading in Canada and Australia: How have they worked?', CFA Institute Position Paper; Devani, B., Anderson, L. and Zhang, Y. (2014), 'Impact of the Dark Rule Amendments', IIROC Trading Review and Analysis; Comerton-Forde, C. and Putnins, T.J. (2015), 'Dark trading and price discovery', *Journal of Finance*, **118**:1, pp. 70–92. Degryse, H., de Jong, F. and Kervel, V. (2015), 'The Impact of Dark Trading and Visible Fragmentation on Market Quality', *Review of Finance*, **19**:4, pp. 1587–1622; Aquilina, M., Diaz-Rainey, I., Ibikunle, I. and Sun, Y. (2017), 'Aggregate Market Quality Implications of Dark Trading', FCA Occasional Paper 17; Chioh, W.S., Chua, B.S., Ang, A., Fan, J.R. and Sim, B. (2019), 'Effects of Dark Trading on Liquidity of Singapore Equity Market', MAS Staff Paper No.56; Hasbrouck, J. (2021), 'Price Discovery in High Resolution', *Journal of Financial Econometrics*, **19**:3, pp. 395–430; Genaro, A. and Saffi, P. (2021), 'The introduction of Retail Liquidity Provider Orders in Brazil: Impact on Market Quality', Working Paper; Aramian, F. and Norden, L.R. (2023), 'Costs and benefits of trading with stock dealers: the case of systematic internalisers', *European Financial Management*, **30**:3, pp. 1094–1124; Aramian, F. and Norden L.R. (2020), 'High-frequency traders and single-dealer platforms', Working Paper; and Securities and Exchange Commission Release No. 34-96495 (Order Competition Rule).

Overall, the RIA presents a useful summary of the main findings in the empirical literature. We would emphasise the following points.

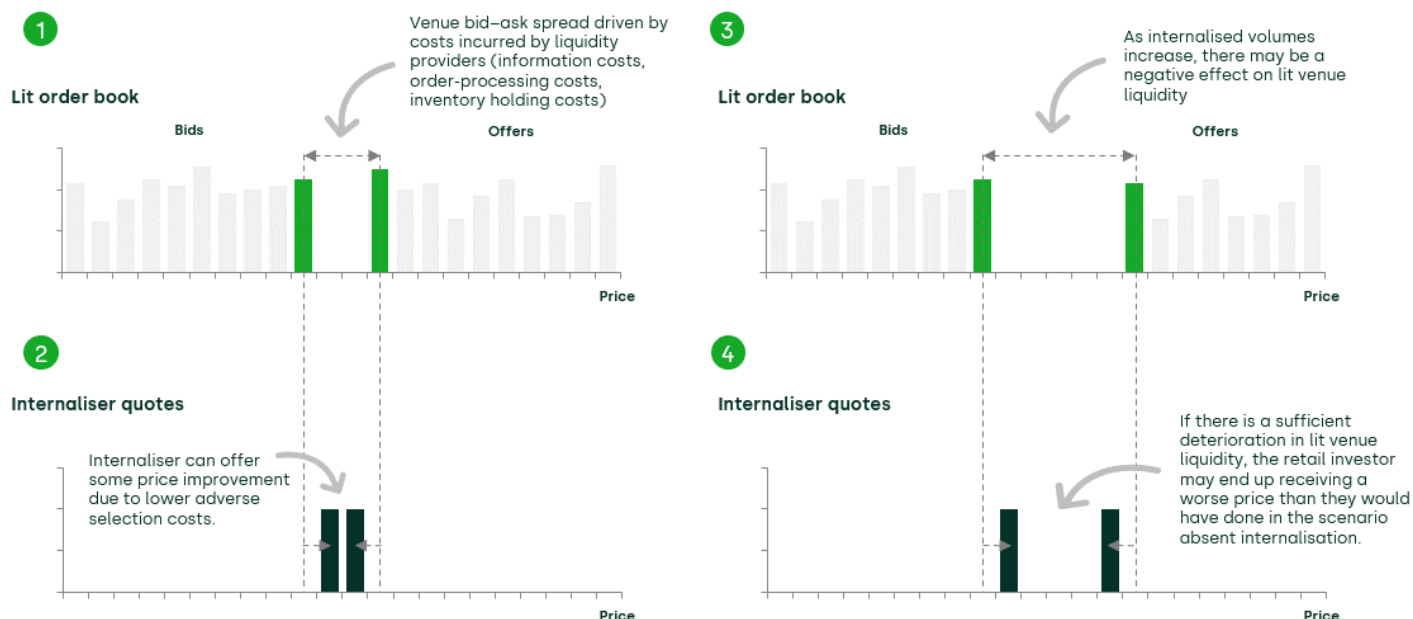
- As flagged by the RIA, much of the empirical literature considers the usage (and impact) of dark trading, as well as internalisation. In many of the studies, the market being examined is fragmented and traders may route orders to a wide range of mechanisms, including multiple lit venues, dark pools and periodic auctions, as well as off-exchange internalisation. It can therefore be challenging in practice to disentangle the effects of off-exchange internalisation from other market dynamics.
- The RIA concludes that 'retail investors usually obtain lower spreads in situations with internalisation, and start obtaining higher spreads in situations with restrictions'. While the academic literature generally finds that order flow segmentation can lead to retail investors receiving price improvement *relative to the prevailing lit market price*, it is important to note that:
  - measuring overall outcomes for retail investors from segmentation depends on the price benchmark used,<sup>16</sup> and may need to take into account a wider range of factors (e.g. whether the internalisation mechanism offers liquidity in different volumes to the lit venue, or more frequently provides quotes in illiquid shares);
  - while it may be possible to measure the level of price improvement received by the retail investor, it is less straightforward to assess what proportion of the overall reduction in adverse selection cost benefits the retail investor as opposed to the liquidity provider;
  - if the level of internalisation increases above a certain threshold, then overall liquidity on the lit market may decrease such that retail investors ultimately get worse prices than they would do in a scenario with no segmentation.<sup>17</sup> This can be seen in the stylised example shown in Figure 3.1 below (panel 4 vs panel 1).

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<sup>16</sup> For example, whether the price obtained by the retail investor is compared to the best bid and offer on the primary venue or the consolidated best bid and offer across all venues where that instrument is traded.

<sup>17</sup> While some papers have sought to estimate the threshold at which more internalisation has a negative effect on the lit market, this threshold cannot be easily identified before it is breached. This is because any empirical model can only be estimated using data on the levels of internalisation actually observed. See, for example, Ibikunle, G., Aquilina, M., Diaz-Rainey, I. and

Figure 3.1 Stylised example of price improvement offered by internalisation



Source: Oxera.

For completeness, we note that there are several other relevant empirical papers that are not cited explicitly in the RIA, which provide some additional insight into the effects of trading away from lit venues, including internalisation. The main insights of these papers are as follows.

- Overall, the analysis supports the conclusion that off-exchange trading can be problematic above a certain threshold.<sup>18</sup> As with the papers cited in the RIA, the exact findings depend a lot on the specific market context. For example, empirical papers can

Sun, Y. (2021), 'City goes dark: Dark trading and adverse selection in aggregate markets', *Journal of Empirical Finance*, 64:1, pp. 1–22.

<sup>18</sup> Jurisdictions such as the EU and USA do not have caps on the overall level of off-exchange trading that is allowed. While not a cap on the overall level of off-exchange trading, the EU has introduced the double volume cap mechanism to cap the level of dark trading. This mandates that: (1) the level of dark trading in an equity instrument on an individual venue cannot exceed 4% of the total volume of trading in that instrument in the EU; and (2) the level of dark trading in an equity instrument across all EU trading venues cannot exceed 8% of the total volume of trading in that instrument in the EU. In 2024, this has been replaced with a single volume cap mechanism that replaces the two thresholds with one threshold, which mandates that the level of dark trading in an equity instrument across all EU trading venues cannot exceed 7% of the total volume of trading in that instrument in the EU. The EU has also adjusted the rules for systematic internalisers to create a more level playing field with exchanges. For example, in 2019 the EU applied the same tick-size regime that applies to exchanges to systematic internalisers. See European Commission (2024), 'Regulation (EU) 2024/791', 28 February, *Official Journal of the European Union*; European Commission (2019), 'Regulation (EU) 2019/2033', 27 November, *Official Journal of the European Union*.

measure only the effects of *actually observed* levels of off-exchange trading, and cannot answer what will happen if the off-exchange trading exceeds these levels.

- Recent research in a UK context highlights that trading on lit venues contributes significantly more to price formation than off-exchange trading (including internalisation), even after accounting for their relative shares of trading activity.
- One potential effect of off-exchange trading in a high-frequency environment is the risk of latency arbitrage. This can mean that trades on dark venues take place at reference prices that are out of date.<sup>19</sup> When this happens, it is typically high-frequency traders who benefit.

For a summary of the key findings of each paper, see Table 3.1 below.

**Table 3.1 Additional empirical studies on the market quality impacts of trading away from lit venues**

Academic paper	Methodology	Key findings
Aquilina et al. (2016) <sup>1</sup>	Authors analyse the proportion of trades on UK dark pools that occur at stale reference prices, their costs, and impacts on different market participants.	<p>Of all dark midpoint trades analysed, 3.54% reference a stale price. This proportion increased from 3.36% in 2014 to 4.05% in June 2015.</p> <p>In 96% of cases, high frequency traders are on the side of the trade that benefits from the trade being executed at a stale price.</p>
Hatheway, Kwan and Zheng (2017) <sup>2</sup>	Authors analyse the proportion of trades taking place on dark pools in a sample of US stocks in 2011.	<p>A 10% rise in the dark market share leads to a 9% increase in lit market effective bid–ask spreads.</p> <p>The dark market share is negatively related to price efficiency, with a tipping point around 10%.</p>

<sup>19</sup> The implicit latency costs associated with dark pools has been cited as one of the reasons why several EU exchange operators have recently launched co-located dark venues. See, for example, WatersTechnology (2024), '[Dark horse: Deutsche Borse building dark pool](#)', March.



Academic paper	Methodology	Key findings
Ibikunle et al. (2021) <sup>3</sup>	Authors exploit the implementation of the double volume cap under MiFID II to investigate the impact of dark trading on liquidity and informational efficiency.	Restricting dark trading is associated with higher transaction costs on lit venues, due to market makers becoming less incentivised to post competitive quotes in lit venues after dark trading is restricted. <sup>4</sup> Limiting dark trading also tends to reduce informational efficiency. <sup>5</sup>
Buti, Rindi and Werner (2022) <sup>6</sup>	Authors analyse data on trading in dark pools and via OTC internalisation in US equity markets in both 2009 and 2020	<p>Executing small-caps on dark pools or via OTC internalisation is more attractive when the lit market is illiquid. For large-caps, OTC market makers internalise more when depth is high (market makers can easily hedge) or when spreads are wide.</p> <p>Both a higher dark pool market share and more internalisation by OTC market makers lead to lower spreads (but have no effect on short-term volatility) in 2009. In the 2020 sample, more dark pool trading leads to higher short-term volatility overall, and both wider spreads and higher short-term volatility for the ex-COVID-19 sample. However, the authors find no evidence that more internalisation affects market quality in 2020.</p>
Neumeier et al. (2023) <sup>7</sup>	Authors investigate the relationship between transaction costs and venue choice using transaction-level data from institutional trade executions in the UK equity market, around the introduction and lifting of the EU Double Volume Cap (DVC).	<p>For a given institutional investor, a higher share of trading on midpoint dark pools is associated with lower execution costs.</p> <p>Neither the introduction nor lifting of the DVC significantly affected transaction costs for large trade executions, as most order flow is reallocated to other venues such as periodic auctions.</p>
Hagströmer, B. and Menkveld, A.J. (2024) <sup>8</sup>	Authors analyse the informativeness of trades on different types of trading venue, for a sample of London Stock Exchange listed stocks, adjusting for biases caused by periods with no trades.	Authors find that, for large-cap stocks, price quotes contribute at least 48% to price discovery, on-exchange trades contribute at least 28%, and all types of off-exchange venue (dark pools, periodic auctions and systematic internalisers) jointly contribute at most 1%.

Academic paper	Methodology	Key findings
Brugler and Comerton-Forde (2024) <sup>9</sup>	Authors analyse data on all dark trades in a sample of Australian stocks between 2017 and 2019, and use a fixed effects model to test whether the use of broker-operated and exchange-operated dark pools lead to different outcomes.	Broker-operated dark pools are associated with less information leakage and lower adverse selection costs than exchange-operated dark pools because they can restrict access to specific investors and segment order flow. <sup>10</sup>

Source: <sup>1</sup> Aquilina, M., Foley, S., O'Neill, P. and Ruf, T. (2016), '[Asymmetries in dark pool reference prices](#)', FCA Occasional Paper 21. <sup>2</sup> Hatheway, F., Kwan, A. and Zheng, H. (2017), 'An empirical analysis of market segmentation on US equity markets', *Journal of Financial and Quantitative Analysis*, **52**:6, pp. 2399–2427. <sup>3</sup> Ibikunle, G., Li, W., Mare, D. and Sun, Y. (2021), 'Dark matters: The effects of dark trading restrictions on liquidity and informational efficiency', *Journal of International Financial Markets, Institutions and Money*, **75**:1. <sup>4</sup> Specifically, inter-venue competition forces market makers to post competitive quotes in lit venues in order to attract order flow from other venues, including dark pools. This state of competition is weakened when dark trading is restricted, and hence market makers on lit venues are not fully incentivised to attract order flow from dark venues as they would be in a market with competing (dark) venues. Therefore, spreads are wider and market depth declines for stocks with dark trading halts. <sup>5</sup> A potential explanation provided in the paper is that when dark trading is restricted, uninformed trading volumes fall. As informed traders typically execute against uninformed order flow, informational efficiency is impaired because informed traders become disincentivised to acquire information that could be incorporated into prices through their trading activity. <sup>6</sup> Buti, S., Rindi, B. and Werner, I.M. (2022), 'Diving into dark pools', *Financial Management*, **51**:4, pp. 961–994. <sup>7</sup> Neumeier, C., Gozluklu, A., Hoffmann, P., O'Neill, P. & Suntheim, F. (2023), 'Banning dark pools: venue selection and investor trading costs', *Journal of Financial Markets*, **65**. <sup>8</sup> Hagstromer, B. and Menkveld, A.J. (2024), 'Trades, Quotes and (Unbiased) Information Shares', Working paper. <sup>9</sup> Brugler, J. and Comerton-Forde, C. (2024), 'Differential access to dark markets and execution outcomes', Working paper. <sup>10</sup> Exchange-operated dark pools are accessible to all trader types, as exchanges are prohibited from imposing any access restrictions. In contrast, broker-operated dark pools can restrict access by high-frequency traders and electronic liquidity providers, who can learn about the direction of institutional order flow by trading on dark pools, which allows them to anticipate future order flow better (adversely affecting execution outcomes for institutional orders).

## 4 International comparison

### 4.1 Introduction

The RIA report also includes a comparison of the regulatory landscape for trading in Brazil relative to other major financial centres. Specifically, it considers equity trading in the USA, EU, Canada and Australia.

On the basis of these international comparisons, the RIA draws the following conclusions.

- The foreign jurisdictions analysed have different legal frameworks and market situations from each other and from Brazil.
- The jurisdictions analysed have regulatory regimes that can be considered less restrictive than Brazil's, but all of them have their own particularities.
- In all jurisdictions, unlike Brazil, there is some degree of competition between trading environments of different types in the execution of orders, including via internalisation.

Overall, we agree with the RIA's conclusion regarding the particularities of each jurisdiction. Reviewing trading mechanisms used in different financial centres can help to identify elements that work well, general patterns and drivers of trading activities, and lessons learned. However, care should be taken when making precise comparisons of the features and performance of various trading mechanisms.<sup>20</sup>

In the rest of this section, we discuss in more detail the regulatory landscape in the USA, EU, Canada and Australia, highlighting where there have been recent policy developments or where empirical evidence is not captured in the RIA.

We also discuss the broader context behind the different regulatory regimes. In the jurisdictions analysed within the RIA, the questions that regulators faced when introducing new rules were often different to

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<sup>20</sup> The data available is generally not sufficient to allow for such a comparison. Existing empirical analyses of price improvements by different models often rely on different benchmarks (e.g. 'touch price' on the primary exchange, volume-weighted price on the primary exchange, volume-weighted price across multiple venues), and the overall level of retail price improvement offered by a model is a combination of the proportions of all retail trades that receive price improvement and the magnitude of price improvement received by those trades. In some cases, the system for internalisation may execute a high proportion of total retail order flow but with a lower average price improvement per order, or execute at larger trade sizes, while other models may offer larger price improvement but execute only a small proportion of the order flow (for example, if it is subject to a minimum price improvement requirement).

those facing CVM in Brazil. In these jurisdictions, internalisation was already taking place, meaning that the focus for the regulator was on whether to restrict (or otherwise more strictly regulate) internalisation. CVM now has the opportunity to learn lessons from other jurisdictions as it considers whether to allow internalisation, or what type to allow.

## 4.2 USA

Overall, the RIA provides a useful summary of the regulatory landscape in the USA and captures the most significant regulatory developments affecting US equity markets. In this section, we expand on certain points mentioned in the RIA by providing additional details and perspectives. For brevity, we do not repeat all of the analytical findings here.

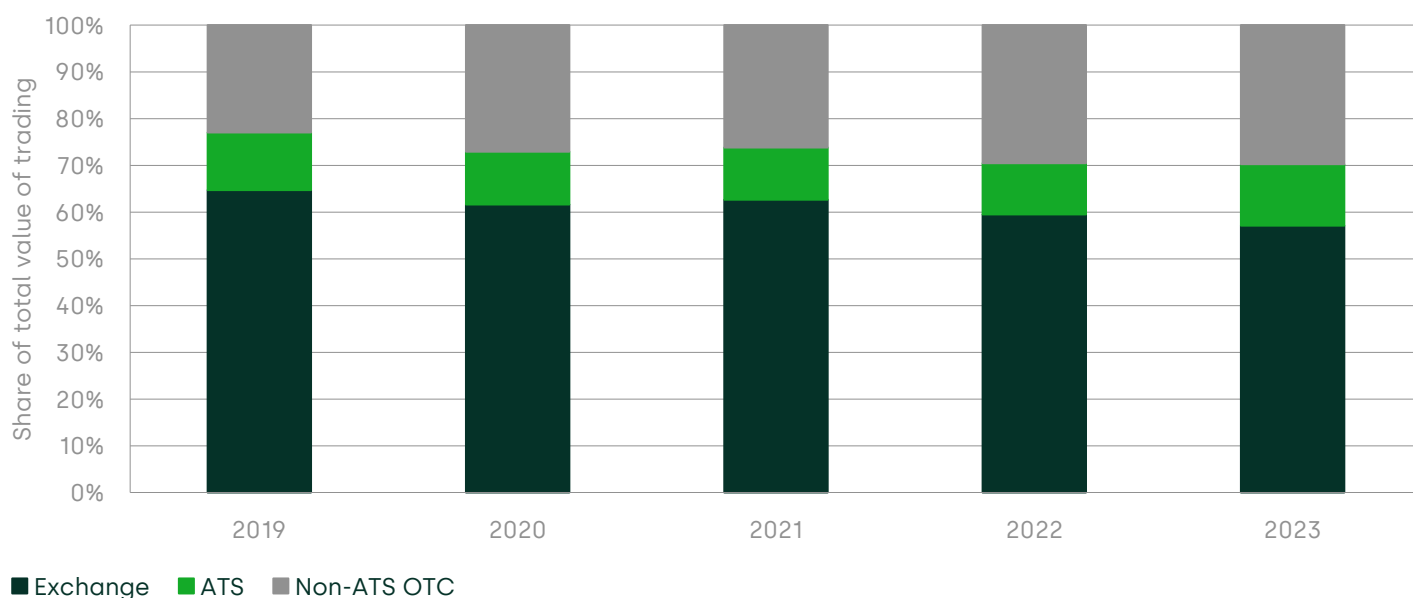
The RIA refers to the market shares of the different trading environments permitted in the USA. These are exchanges, Alternative Trading Systems (ATS) and OTC (comprising wholesalers and other broker-dealers). The data cited in the RIA covers only Q1 2022.<sup>21</sup> To understand how the shares of different trading environments have evolved and what is driving regulatory changes, it is necessary to consider a longer time period.

Figure 4.1 shows the market shares of trading environments in National Market System (NMS) stocks between 2019 and 2023. The share of trading on exchanges has trended downwards from 65% in 2019 to 57% in 2023. At the same time, the share of non-ATS OTC, which includes internalisation by broker-dealers, has increased from 23% in 2019 to 30% in 2023. This shows that there has been a steady trend towards off-exchange trading in US equity markets. In contrast to those in Brazil, US equity markets already permit off-exchange internalisation and also feature competition among trading venue providers.

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<sup>21</sup> Comissão de Valores Mobiliários (2024), 'Internalization of orders: regulatory impact analysis', May, pp. 99–100.

Figure 4.1 Trading in NMS stocks by venue type, 2019–23



Source: FINRA (2023), '[2023 FINRA Industry Snapshot](#)', February; FINRA (2024), '[2024 FINRA Industry Snapshot](#)', July.

Recent regulatory developments in the USA need to be considered in the context of such shifts in trading from on-exchange to off-exchange. One such development, which the RIA summarises, is the SEC's proposals for an order competition rule.<sup>22</sup> This rule, which is yet to be finalised, mandates that certain retail orders are subjected to open competition for execution on auctions operated by exchange or ATSs. Then, only if not executed in full, can the order be internalised by a wholesaler.<sup>23</sup>

The RIA makes a brief reference to the SEC's motivation for this rule. Importantly, it recognises that the SEC is not aiming to limit segmentation. Rather, its focus is to ensure that retail investors capture a larger portion of the benefit from segmentation by introducing competition for order flow:

In this sense, the SEC, in its regulatory proposal (p. 11), recognizes the effects of adverse selection and is not against order segmentation. It does, however, seek to remedy possible market failures which, in its opinion, would restrict competition and reduce the price improvement

<sup>22</sup> Comissão de Valores Mobiliários (2024), 'Internalization of orders: regulatory impact analysis', May, pp. 100–102.

<sup>23</sup> Securities and Exchange Commission (2022), '[Proposed rule: order competition rule](#)'.

provided to the retail investor in relation to its optimal level, proportional to adverse selection.<sup>24</sup>

Indeed, the key motivation for the SEC's proposals is that 'the amount of price improvement individual investors receive does not fully compensate for the lower adverse selection risk of their orders'.<sup>25</sup> The proposed rules would introduce an auction mechanism that allows market participants to bid for individual investor orders that would otherwise be internalised by wholesalers, facilitating competition to provide liquidity to individual investors by drawing additional liquidity from market participants other than the wholesalers that handle the majority of individual investor orders.<sup>26</sup> Additionally, price efficiency would be improved as a result of the dissemination of qualified auction messages, which would increase transparency regarding the trading interest of individual investors.<sup>27</sup>

The RIA also discusses the SEC's regulatory impact analysis of the order competition rule as one of the 12 pieces of literature supporting its discussion of adverse selection in the regulatory problem section.

One of the key questions that the SEC analysed was the degree of price improvement received by retail orders in the current market. Table 4.1 shows the average price improvement offered to retail trades, based on SEC analysis. This data shows that the majority of trades in S&P500 stocks received some price improvement, with an average improvement of 1.47bps.

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<sup>24</sup> Comissão de Valores Mobiliários (2024), 'Internalization of orders: regulatory impact analysis', May, footnote 182.

<sup>25</sup> Securities Exchange Commission (2022), '[Order competition rule: proposed rule](#)', p. 189.

<sup>26</sup> Securities Exchange Commission (2022), '[Order competition rule: proposed rule](#)', p. 256.

<sup>27</sup> Securities Exchange Commission (2022), '[Order competition rule: proposed rule](#)', p. 279.

Table 4.1 Wholesaler execution quality for NMS stocks, Q1 2022

	All	S&P500	Non-S&P500	ETFs
Percentage of shares executed at NBBO	8.38%	5.86%	10.97%	10.69%
Percentage of trades executed with price improvement	89.85%	93.33%	85.43%	87.93%
Conditional amount of price improvement (bps)	2.54	1.47	6.16	0.99
Percentage of shares executed at midpoint	31.69%	32.47%	28.46%	33.44%
Percentage of shares executed with <0.1 cent price improvement	18.64%	16.62%	20.58%	20.64%
Percentage of shares executed at sub-penny prices (excl. midpoint)	47.60%	46.82%	47.03%	49.68%

Note: NBBO refers to National Best Bid and Offer.

Source: Securities and Exchange Commission (2022), '[Proposed rule: order competition rule](#)', Table 7.

In a footnote to its summary, the RIA references some of the criticism of the SEC's analysis.<sup>28</sup> Wholesalers have argued that the metrics used by the SEC underestimate the amount of price improvement provided by wholesalers to retail investors. Indeed, when measuring price improvement, it is important to consider what the right benchmark is. In its analysis, the SEC used the National Best Bid and Offer (NBBO) for its benchmark. However, this has several potential issues.<sup>29</sup>

- The NBBO does not reflect all available displayed liquidity. For example, the NBBO does not include odd-lot quotes, meaning that there could be liquidity at prices better than the NBBO. If a retail order were routed to the exchange it would execute against this liquidity. Correcting for this would decrease the amount of price improvement measured. The SEC has proposed changes to the rules such that odd lots would be included in the calculation of the NBBO.
- The retail order may be larger than the liquidity available at the NBBO (or better). This could result in 'slippage', where part of

<sup>28</sup> Comissão de Valores Mobiliários (2024), 'Internalization of orders: regulatory impact analysis', May, footnote 62.

<sup>29</sup> Arguments put forward by wholesalers criticising the SEC's analysis should be assessed on their merits considering potential biases. Virtu Financial (2021), '[Measuring real execution quality](#)', 27 August, p. 10.

the order is executed above the benchmark price. A more accurate benchmark would be a volume-weighted average price of all displayed quotes for the required order size. Correcting for this would increase the amount of price improvement measured.<sup>30</sup>

This illustrates the complexity of measuring price improvement and the importance of selecting the right benchmark for comparison. While the market microstructure in Brazil is not as fragmented as in the USA, CVM will need to carefully consider the metrics used when assessing the impacts of internalisation in Brazil.

Regardless of whether the SEC's Order Competition Rule is enacted, several exchanges in the USA have introduced on-exchange retail liquidity programmes with the aim of competing for the marketable retail order flow against internalising brokers. The RIA briefly mentions the existence of exchange RLP programmes in the USA, but does not analyse them.



#### **Box 4.1    Retail liquidity provider programmes in the USA**

The NYSE Retail Liquidity Program (RLP) was introduced in a pilot stage in 2012. The programme was designed to allow retail liquidity providers to interact on-exchange with order flow originating from retail brokers. The retail liquidity providers quote prices for retail order flow with a minimum guaranteed price improvement of at least \$0.001 over the immediately accessible NBBO.<sup>1</sup> These quotes are not displayed but are executed as 'on exchange off-book' trades.

NASDAQ offers a similar model to NYSE's RLP called Retail Price Improvement (RPI).

Overall, these models have provided investors with some price improvement.

- For NYSE RLP, the average price improvement was equal to \$0.0014 per share between 2012 and 2018—with a total price improvement to retail investors of \$12.3m.

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<sup>30</sup> This is referred to as size improvement.



- For NASDAQ RPI, the average price improvement per share between September 2014 and May 2018 was equal to \$0.0036.

In addition, RLP programmes typically do not charge an access fee to individual investor orders.

Despite offering a price improvement to 99.4% and 100% of the programmes' volumes respectively, NYSE RLP and NASDAQ RPI have attracted only a small fraction of retail orders. For example, in 2021 less than 0.2% of consolidated volume was executed in exchange RLP programmes.<sup>2</sup> There are several potential reasons for this.

- Retail brokers may have more incentives to sell their order flow to wholesale brokers if they receive greater compensation through this channel (e.g. payment for order flow).
- Retail brokers may lack direct access to exchanges offering RLPs, and the means of indirect access may be too costly for RLPs relative to routing to wholesalers.
- Wholesale brokers have more incentives to execute retail orders (with lower adverse selection risk) against their order flow, given that these orders are generally profitable to market makers.
- If only retail order flow with higher adverse selection risk is sent to RLPs, liquidity providers in the RLP may widen spreads, making the RLP less competitive relative to wholesalers.

The experience of these two programmes in the US market highlights that it can be difficult for exchanges to compete with incumbent internalisers for retail order flow, despite offering price improvement.

Note: <sup>1</sup> This is also referred to as the Protected Best Bid and Offer (PBBO). The PBBO differs from the NBBO by excluding any quotations that are made manually. Quotations made on manual markets may be delayed by matters of seconds and are therefore not immediately accessible. SEC (2015), '[Notice of Filing and Immediate Effectiveness of Proposed Rule Change Specifying in Exchange Rules the Exchange's Use of Certain Data Feeds for Order Handling and Execution, Order Routing, and Regulatory Compliance](#)', 2 March. <sup>2</sup> See Securities and Exchange Commission (2022), '[Proposed rule: order competition rule](#)', p. 208. In earlier analysis the SEC found that the total volume executed on the programmes accounted for less than 0.1% of all US-listed securities trades. The combined market shares of the two programmes are based on the findings of the two SEC papers. Trades executed in the NYSE RLP accounted for less than 0.1% of consolidated NYSE-listed volume in 2016–17. Executed trades on the NASDAQ RPI

accounted for 0.05% of total consolidated volume in US-listed securities in the last quarter of 2017.

Source: Securities and Exchange Commission (2022), '[Proposed rule: order competition rule](#)'; SEC (2019), '[Notice of Filing of Proposed Rule Change to Make Permanent the Pilot Program for the Exchange's Retail Price Improvement Program](#)', 9 May; SEC (2019), '[Order Granting Accelerated Approval of a Proposed Rule Change, as Modified by Amendment No. 1, to Make Permanent the Retail Liquidity Program Pilot](#)', 15 February; New York Stock Exchange (2024), '[Liquidity programs: NYSE and NYSE National Retail Liquidity](#)', accessed 10 September 2024; Nasdaq (2022), '[BX Retail Price Improvement](#)'; New York Stock Exchange (2024), '[Rule 7.44. Retail Liquidity Program](#)'; Securities and Exchange Commission (2019), '[Notice of filing and immediate effectiveness of proposed rule change of new rule 7.44 to operate its Retail Liquidity Program on Pillar, the exchange's new technology trading platform](#)', 23 May, pp. 9–10.

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## 4.3 EU

### 4.3.1 The EU regulatory landscape

Overall, the RIA provides a helpful summary and captures the main elements of the regulatory regime in the EU, although a number of changes have been put forward recently by regulators which are not mentioned in the report. We describe these in more detail below.

The RIA focuses its analysis on the Systematic Internaliser (SI) regime in the EU. It also notes that SIs in the EU can be divided into bank-operated SIs and electronic liquidity providers (ELPs). Analysis performed by the regulator in France, AMF, in 2020 found that bank-operated SIs accounted for 76% of volumes in French equities, while ELP SIs accounted for 24%.<sup>31</sup>

For brevity, we do not repeat all of the analytical findings set out in the RIA here. However, we make a number of observations in Table 4.2 below regarding certain points raised by CVM. In particular, we note that there have been recent regulatory changes in the EU (around the same time as the RIA was published).

These changes are aimed at raising the level of pre-trade transparency of SIs, and making it easier for investors to understand the order-routing policies of their brokers (particularly where a broker may trade on their own account).

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<sup>31</sup> This analysis was undertaken before the UK's departure from the EU. As many of the SIs in the EU were domiciled in the UK, these market shares may have changed. AMF (2020), '[Quantifying systematic internalisers' activity: their share in the equity market structure and role in the price discovery process](#)', May.

Table 4.2 Observations on RIA analysis of EU regulatory landscape

Area	RIA statement	Oxera comment
OTC trading	OTC markets in the EU cannot be used for equity trading (p. 106).	<ul style="list-style-type: none"> <li>• MiFIR does permit OTC equity trading providing the trade is carried out between eligible counterparties and does not contribute to the price discovery process.<sup>1</sup></li> </ul>
Double Volume Cap (DVC)	the revised regulation in the EU aims to replace the DVC with a single limit (p. 109).	<ul style="list-style-type: none"> <li>• In February 2024, the EU replaced the DVC mechanism with a single volume cap (SVC) of 7%.<sup>2</sup></li> <li>• The EU also amended rules so that the SVC only applies to trades executed under the Reference Price Waiver.</li> </ul>
SI transparency	'the standard transparency regime of trading venues is mirrored to a large extent by the SI, both pre-trade and post-trade, with mandatory transparency being the default' (p. 110).	<ul style="list-style-type: none"> <li>• SI pre-trade transparency is not directly comparable with the regime that applies to trading venues. SIs are required to make firm quotes of at least 10% of the standard market size (SMS),<sup>3</sup> and are required to make public all quotes that they provide in order sizes up to SMS.</li> <li>• Analysis by the AMF in 2019 found that 78% of SI trades were not subject to pre-trade transparency.<sup>4</sup></li> <li>• Due to concerns about pre-trade transparency, ESMA is consulting on increasing the 'firm quote threshold' to be at least SMS and increasing the 'pre-trade transparency threshold' to be at least 2x SMS.<sup>5</sup></li> </ul>
SI price improvement	'SIs can make price improvements, subject to the spread offered and the tick-size of the trading venues' (p. 118).	<ul style="list-style-type: none"> <li>• In February 2024, the EU amended the MiFIR rules on tick sizes to permit SIs to match orders of any size at midpoint.<sup>6</sup></li> </ul>
Best execution	RIA refers to the best execution obligation under Article 27 MiFID (p. 116).	<ul style="list-style-type: none"> <li>• In February 2024, the EU removed the obligation on investment firms to publish execution venue reports.<sup>7</sup></li> <li>• MiFID Article 27 states that best execution for retail investors should be determined in terms of the 'total consideration, representing the price of the financial instrument and the costs relating to execution, which shall include all expenses incurred by the client which are directly relating to the execution of the order, including execution venue fees, clearing and settlement fees and any other fees paid to third parties involved in the execution of the order'.</li> <li>• ESMA is consulting on changes to best execution policies, including requiring firms to set out the ways in which they prevent conflicts of interest when dealing on own account.<sup>8</sup></li> </ul>

Area	RIA statement	Oxera comment
Payment for order flow (PFOF)	PFOF is likely to be prohibited in the EU (p. 118).	<ul style="list-style-type: none"> <li>In February 2024, the EU introduced a ban on PFOF.<sup>9</sup> However, the regulation includes a transitional provision which permits member states where PFOF was allowed to exempt firms until July 2026. Germany is the only member state that has made use of this provision.</li> </ul>

Note: <sup>1</sup> See Article 23 of European Commission (2024), '[Consolidated text: Regulation \(EU\) No 600/2014](#)', 15 May, *Official Journal of the European Union*. CDR 2017/587 defines the following types of transaction as not contributing to the price discovery process: the transaction is executed by reference to a price that is calculated over multiple time instances according to a given benchmark, including transactions executed by reference to a volume-weighted average price or a time-weighted average price; the transaction is part of a portfolio trade which includes five or more different shares; the transaction is contingent on the purchase, sale, creation or redemption of a derivative contract or other financial instrument where all the components of the trade are to be executed only as a single lot. See Article 2 of European Commission (2016), '[Commission Delegated Regulation \(EU\) 2017/587](#)', 14 July, *Official Journal of the European Union*. <sup>2</sup> See European Commission (2024), '[Regulation \(EU\) 2024/791](#)', 28 February, *Official Journal of the European Union*. <sup>3</sup> SMS varies depending on the liquidity of the particular equity instrument. <sup>4</sup> Autorité des Marchés Financiers (2020), '[Quantifying systematic internalisers' activity: their share in the equity market structure and role in the price discovery process](#)', May. <sup>5</sup> ESMA (2024), '[Third consultation package \(CP 3\): On equity transparency \(RTS 1 and CDR 2017/567\), volume cap \(RTS 3\) circuit breakers \(new RTS\), SI \(new ITS on SI notification\), the equity CTP \(new RTS on input / output data of the pre-trade and post-trade equity CTP\) and the flags for non-equity transparency \(RTS 2\)](#)', 10 July. <sup>6</sup> Previously, SIs could only match large-in-scale orders at midpoint. See European Commission (2024), '[Regulation \(EU\) 2024/791](#)', 28 February, *Official Journal of the European Union*. <sup>7</sup> European Commission (2024), '[Directive \(EU\) 2024/790](#)', 28 February, *Official Journal of the European Union*. <sup>8</sup> ESMA (2024), '[Consultation paper: Technical Standards specifying the criteria for establishing and assessing the effectiveness of investment firms' order execution policies](#)', 16 July. <sup>9</sup> See European Commission (2024), '[Regulation \(EU\) 2024/791](#)', 28 February, *Official Journal of the European Union*.

### 4.3.2 The wider context

As noted above, the RIA provides a helpful and comprehensive summary of the regulatory regime in the EU as it relates to internalisation. However, it should be recognised (as the RIA does) that the current regulatory landscape in Europe has evolved in a different way to that of Brazil.

In 2007, MiFID I removed the 'concentration rule', which previously required investment firms to route equity orders only to the stock exchange on which the company was listed. This change allowed equity trading to also be executed on a multilateral basis on competing MTFs, as well as on traditional stock exchanges. Alongside MiFID's provision of SIs for bilateral trading, orders were matched internally by investment firms. Many larger brokers did not choose to internally match orders as

an SI, but executed client orders OTC through broker-crossing networks, which were subject to less strict regulatory requirements.

When MiFIR and MiFID II were introduced in 2018, one of the regulatory objectives was to address some of the unintended consequences of MIFID I. This included establishing a tighter framework around off-exchange internalisation. For example, the MiFID II impact assessment noted that:<sup>32</sup>

New trading venues and market structures, such as broker crossing systems and derivative trading platforms, have emerged that carry out similar activities to MTFs or systematic internalisers without being subject to the same regulatory requirements, both in terms of transparency and investor protection.

Furthermore, although there is evidence that explicit costs of trading fell following MiFID I, it is not straightforward to assess the level of competitive constraint imposed specifically by off-exchange internalisation on the primary stock exchanges in the EU. This is because the growth of off-exchange internalisation in the EU (via broker crossing networks) took place at the same time as the entry and growth of new MTFs, which competed to attract order flow away from the primary exchanges.<sup>33</sup>

#### 4.4 Canada

Overall, the RIA presents a comprehensive description of the regulatory regime in Canada, taking into account recent developments. We provide some insights on the wider trends in the Canadian equity market in this section.

The Canadian market does not allow off-exchange internalisation. However, internalisation in the form of intentional and unintentional crosses on the exchange is allowed.

Unintentional crosses accounted for 13.5% of the trades between January 2016 and July 2019 in terms of volume and 12.8% in terms of the value of all trades.<sup>34</sup> The majority of these trades (c. 80%) were client-to-client trades rather than client-to-broker's inventory trades (around

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<sup>32</sup> European Commission (2011), '[Impact assessment of MiFID](#)', 20 October.

<sup>33</sup> For a detailed discussion of the competition for order flow between Chi-X and London Stock Exchange, see Ibikunle, G. (2018), 'Trading places: Price leadership and the competition for order flow', *Journal of Empirical Finance*, **49**, pp. 178–200.

<sup>34</sup> Canadian Securities Administrators, Industry Regulatory Organization of Canada (2020), 'Joint CSA/IIROC Staff Notice 23-327 – Update on Internalization within the Canadian Equity Market'.

10% of the number of trades and 9% of the value traded).<sup>35</sup> The average size of an unintentional cross is slightly below the average order size in Canada, suggesting that unintentional crosses include orders of retail order size. Less than half of the unintentional crosses occurred due to broker preferencing.<sup>36</sup>

Although intentional crosses accounted for only 0.09% of all trades on Canadian exchanges (for the period from January 2016 to July 2019), they constituted 12% of the total traded value.<sup>37</sup> This indicates that intentional crosses are typically used for very large trades.<sup>38</sup> This may also indicate that intentional crosses are hardly used by retail brokers.

An additional aspect of Canadian markets related to the segmentation of retail order flow is the design of exchange fee models. Retail investors may tend to demand immediacy of trade execution by employing market or marketable limit orders. This may result in retail orders being more costly for a dealer to execute, particularly when executing trades on exchanges that charge a fee for orders (e.g. market orders) that remove liquidity from an order book.<sup>39</sup> This fee model can disincentivise brokers from executing retail orders on exchange.

In Canada, some marketplaces have inverted the fee model by paying a rebate to an order that removes liquidity from an order book and charging a fee for the execution of an order that provides liquidity.<sup>40</sup> In this context, Canadian regulators noted that the inverted fee model is attractive to cost-sensitive retail dealers as well as to liquidity providers who are seeking to take the other side of retail orders, and who are willing to pay a fee to do so.<sup>41</sup> However, fee models that pay retail brokers to route orders to a particular marketplace for execution may introduce conflicts of interest. For example, brokers

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<sup>35</sup> Canadian Securities Administrators, Industry Regulatory Organization of Canada (2020), 'Joint CSA/IIROC Staff Notice 23-327 – Update on Internalization within the Canadian Equity Market'.

<sup>36</sup> If unintentional crosses would have matched regardless of whether price-broker-time priority or price-time priority is used, it is said that the crosses would have occurred irrespective of broker preferencing. Canadian Securities Administrators, Industry Regulatory Organization of Canada (2019), 'Joint CSA/IIROC Staff Notice 23-327 – Internalization within the Canadian Equity Market'.

<sup>37</sup> Canadian Securities Administrators, Industry Regulatory Organization of Canada (2020), 'Joint CSA/IIROC Staff Notice 23-327 – Update on Internalization within the Canadian Equity Market'.

<sup>38</sup> With a share of trades of 0.09% and a volume of 12.0%, intentional crosses are more than 130 times as large as the average trade size on Canadian exchanges.

<sup>39</sup> The 'maker-taker' model charges a fee for orders that remove liquidity from an order book (e.g. market orders) while providing a payment known as a rebate to orders that add liquidity (e.g. limit orders). This is designed to incentivise market-makers to provide liquidity on the order book.

<sup>40</sup> Known as the 'taker-maker' model. Similar models have been employed by trading venues in other jurisdictions, such as the USA. See Securities Exchange Commission (2015), '[Memorandum: Maker-taker fees on equities exchanges](#)', pp. 2 and 19.

<sup>41</sup> Liquidity providers may be willing to pay a fee in this model as retail orders are valuable to them because they are less risky to trade against. Canadian Securities Administrators, Industry Regulatory Organization of Canada (2019), 'Joint CSA/IIROC Consultation Paper 23-406 – Internalization within the Canadian Equity Market', p. 15.

may prioritise marketplaces that pay a rebate rather than searching out the venue likely to deliver the best execution of its customer's order, especially if rebates are not fully passed-on to the retail investor.<sup>42</sup>

## 4.5 Australia

Below we highlight some key points regarding the regulatory regime for internalisation in Australia, as identified in the RIA.

The Australian Securities & Investments Commission (ASIC) carried out a major set of revisions to its rules governing equity trading markets in 2013, focusing on rules on dark liquidity and high-frequency trading.<sup>43</sup> In 2017, ASIC consolidated a number of rulebooks to create a single point of reference for the Market Integrity Rules (MIRs) that are common between markets.<sup>44</sup>

With regard to internalisation, MIR 6.1.1 states that transactions need to take place on a pre-trade transparent order book unless the trade is: (1) a block trade; (2) a large portfolio trade; (3) a trade with price improvement; (4) a trade in the permitted pre- or post-trading hours period; or (5) an out-of-hours trade.<sup>45</sup> Therefore, for a retail trade to be internalised during the main trading period, price improvement needs to be offered.

Internalisation can occur in two ways. First, broker-dealers operate 'crossing systems' that allow client orders to be automatically matched with orders of the crossing system operator.<sup>46</sup> All crossing systems are dark and hence rely on the exemptions from MIR 6.1.1. Second, exchanges in Australia, such as ASX and Cboe, offer broker preferencing, which enables market participants to trade with their own or their clients' orders ahead of others' orders at the same price. Only dark or

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<sup>42</sup> For example, in an analysis of US equity markets, Battalio et al. (2016) found evidence that certain retail brokers appeared to route all non-marketable limit orders to the venue offering the largest rebate. They also found a negative relationship between several measures of limit order execution quality and rebate level. We note that, while this study focused on non-marketable limit orders in a 'maker-taker' model, a similar dynamic might be expected for marketable orders in a 'taker-maker' model. See Battalio, R., Corwin, S.A. and Jennings, R. (2016), 'Can Brokers Have It All? On the Relation between Make-Take Fees and Limit Order Execution Quality', *The Journal of Finance*, **71**:5, pp. 2193–2237.

<sup>43</sup> ASIC (2015), '[Dark liquidity and high frequency trading](#)'.

<sup>44</sup> ASIC (2017), '[Proposals to consolidate the ASIC market integrity rules](#)', January.

<sup>45</sup> Australian Government (2024), '[ASIC Market Integrity Rules \(Securities Markets\) 2017](#)'.

<sup>46</sup> Not all crossing systems are used for internalisation. They can also be operated on an agency basis. See ASIC (2022), '[Guidance on ASIC market integrity rules for participants of securities markets](#)', August, p. 73.

hidden orders are eligible for broker preferencing and hence also rely on the exemptions from MIR 6.1.1.<sup>47</sup>

In June 2024, below block size dark trades (i.e. those receiving price improvement) accounted for just over 10% of the total value traded in Australian equity markets (internalised retail trades would be captured in this category).<sup>48</sup> Total dark trades accounted for under 30% of total value traded. Therefore, over 70% of the total value traded in Australia is pre-trade transparent, which is a much higher proportion than in jurisdictions such as the USA and EU.<sup>49</sup>

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<sup>47</sup> Broker preferencing is available on ASX Centre Point and for Cboe hidden orders. See ASIC (2015), '[Review of high-frequency trading and dark liquidity](#)', October, p. 56; ASX (2024), '[Order controls](#)'; Cboe (2024), '[Cboe Australia equities FIX specification](#)', 12 September, p. 58.

<sup>48</sup> In the period June 2018–June 2024 this proportion has not been above 15%.

<sup>49</sup> ASIC (2024), '[Equity market data for quarter ending June 2024](#)'.



## 5 Conclusion

Overall, the RIA provides a comprehensive and robust review and analysis of the relevant aspects of internalisation. Our main findings can be summarised as follows.

- First, as recognised by the RIA, internalisation is linked to the broader practice of the segmentation of 'benign' less informed order flow from 'informed' order flow. Through this segmentation, market makers can offer retail brokers and/or investors prices that are more reflective of the risks underlying their orders, potentially generating cost savings for the brokers and/or the investors. Retail investors are typically viewed as less informed than institutional traders, and their orders may therefore be considered less risky.
- Second, the economic literature has highlighted that, although internalisation of retail order flow may benefit retail investors, the flipside is that it can come at the cost of harming liquidity and price formation in the lit market, worsening the market quality (for all participants). There may also be a risk of some users benefitting from the price formation process provided by a 'lit' venue but do not contribute to its costs of production.
  - The academic literature generally supports the RIA's conclusion that off-exchange trading can have a negative impact on market quality above a certain threshold. The exact empirical findings (and the implied 'optimal' threshold) depend a lot on the specific market context (including the existing liquidity, the amount of internalisation taking place, and the mechanism of internalisation used).
  - When making their trading decisions, investors do not factor in the wider benefit that trading on 'lit' venues (those with pre-trade transparency) has on price formation and the quality of the market as a whole; this can be referred to as an 'externality'. This is why some financial regulators have been cautious in their approach to allowing internalisation of order flow.
- Third, if one of the aims of internalisation is to impose competitive pressure on the exchanges' trade execution fees, then the experience in other financial centres shows that allowing internalisation of retail order flow is unlikely to be an effective tool to achieve that objective. This experience shows that, for exchanges, an effective way to respond to

internalisation of retail order flow by brokers is to segment order flow themselves with the aim of also offering price improvement to retail investors. This would result in further segmentation of order flow, potentially worsening the market quality in the lit venues. A more effective way of imposing competitive pressure on exchanges is to facilitate entry by additional multilateral trading venues.

# A1 Components of the bid-ask spread

The bid-ask spread represents a markup charged by liquidity providers to compensate for the various costs they face.<sup>50</sup> In particular, the academic literature has highlighted three key costs that can explain the existence of bid-ask spreads:<sup>51</sup>

- Liquidity providers need to cover the costs of submitting orders and maintaining a presence in the market (order-processing costs). These costs may include overheads and other fixed costs (e.g. establishing and maintaining connectivity and IT systems) as well as fees required to execute orders.
- Liquidity providers face a risk that prices will move unfavourably against them while they are holding (temporary) positions in an asset, and must be compensated for bearing this 'inventory risk'.
- Liquidity providers need to cover the costs of potential losses when encountering informed traders ('adverse selection costs').<sup>52</sup> The quoted prices offered by liquidity providers will therefore reflect their current expectations of the likelihood of encountering 'informed' traders.

The actual level of adverse selection costs cannot be directly observed. Structural spread decomposition models attempt to proxy for the importance of adverse selection relative to other components, by fitting observed transaction data to an underlying theoretical model of trading behaviour.

The basic intuition of these models is that market orders are expected to have different effects on the dynamics of prices depending on the relative prevalence of adverse selection, order processing, and inventory holding costs. In particular, suppliers of liquidity will be

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<sup>50</sup> In this context we are referring to a markup relative to their belief as to the 'fundamental' value of the asset i.e. a higher price in situations where the liquidity provider is offering to sell and a lower price where the liquidity provider is offering to buy.

<sup>51</sup> See, for example, Stoll, H.R. (1978), 'The supply of dealer services in security markets', *Journal of Finance*, 33, pp. 1133–1151.

<sup>52</sup> 'Informed traders' are those who trade in order to profit from private information about the value of stock, whereas 'uninformed traders' are motivated to trade by a need to rebalance portfolios and smooth their consumption streams over time. An 'informed' trader will buy when the value of the stock is higher than the available price, and vice versa. Thus an 'uninformed' trader will lose out when trading with an 'informed' trader.

expected to permanently adjust their bid and ask prices in response to the information content of trades they observe.<sup>53</sup>

As with any structural model, spread decomposition models are sensitive to the underlying assumptions of the theoretical model. For example, many of these models take a simplifying approach of assuming that informed and uninformed traders submit market orders. In reality, informed traders will also use limit orders to trade. Many of these theoretical models also assume that prices are continuous variables, while in reality prices and quotes are constrained by a discrete tick size. This class of models have been discussed extensively in the academic literature.<sup>54</sup>

Using data on a sample of equities in Brazil, we have estimated a version of the spread decomposition model described in Madhavan, Richardson and Roomans (1997), which attempts to isolate adverse selection costs from other components of the spread.<sup>55</sup>

The data used for our model consists of transaction-level data provided by B3 for the stocks subject to the equities RLP and a sample of non-RLP stocks.<sup>56</sup> The sample period is July 2024. For brevity, we do not discuss the mechanisms of the equities RLP in detail here.

Table A1.1 and Table A1.2 present some descriptive statistics for the non-RLP and RLP stocks respectively.

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<sup>53</sup> For a detailed discussion of the underlying theory and models see, for example, Foucault, T., Pagano, M. and Roell, A. (2013), *Market Liquidity: Theory, Evidence and Policy*, Oxford University Press; Hasbrouck, J. (2007), *Empirical Market Microstructure: The Institutions, Economics, and Econometrics of Securities Trading*, Oxford University Press.

<sup>54</sup> See, for example, Glosten, L.R. and Harris, L.E. (1988), 'Estimating the components of the bid-ask spread', *Journal of Financial Economics*, 21:1, pp. 123-142; Huang, R.D. and Stoll, H.R. (1997), 'The components of the bid-ask spread: a general approach', *Review of Financial Studies*, 10:4, pp. 995-1034; Madhavan, A., Richardson, M. and Roomans, M. (1997), 'Why do security prices change? A transaction-level analysis of NYSE stocks', *Review of Financial Studies*, 10:4, pp. 1035-1064; Hagstromer, B., Henricsson, R. and Norden, L.L. (2016), 'Components of the bid-ask spread and variance: a unified approach', *Journal of Futures Markets*, 36:6, pp. 545-563.

<sup>55</sup> See: Madhavan, A., Richardson, M. and Roomans, M. (2015), 'Why do Security Prices Change? A Transaction-Level Analysis of NYSE Stocks.' *Review of Financial Studies*, 10:4, pp. 1035-1064. We implement a modified version of the MRR model as set out in Theissen, E. and Zehnder, L.S. (2015), 'Estimation of trading costs: Trade indicator models revisited', Working Paper.

<sup>56</sup> The non-RLP stocks do not represent a random sample of Brazilian equities and therefore the results for these stocks cannot be extrapolated to the market as a whole. These stocks were selected using a 'nearest neighbour' approach in which each RLP stock is matched to a stock not included in the RLP pilot. The nearest neighbour algorithm identifies the closest matching non-RLP stock in terms of 1) value traded, 2) price volatility, 3) average quoted bid-ask spread and 4) proportion of retail trades, using data over a 6-month period prior to the introduction of the equities RLP pilot (August 2021 – January 2022). We do not identify a nearest neighbour for VALE3 and PETR4 as they have no closely comparable non-RLP stocks.

Table A1.1 Descriptive statistics for non-RLP stocks, July 2024

Stock	Mid-price (R\$)		Daily volume traded (m shares)		Daily value traded (R\$m)		Daily average quoted spread (R\$)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
BBDC3	11.4	11.4	4.15	4.11	47.2	47.3	0.011	0.011
BRAP4	18.9	19	2.09	1.95	39.6	36.2	0.01	0.011
CEAB3	9.5	9.37	2.17	1.9	20.6	17.5	0.009	0.009
ENAT3	21.9	22.2	1.64	1.36	35.6	30.4	0.015	0.015
EVEN3	6.4	6.43	0.47	0.46	3	2.93	0.011	0.011
GGBR4	18.3	18.2	7.31	6.46	134	118	0.011	0.011
HAPV3	4.01	4	38	39.3	153	158	0.01	0.01
HBOR3	2.26	2.26	0.42	0.3	0.96	0.67	0.011	0.011
JHSF3	4.11	4.08	2.49	2.35	10.3	9.86	0.01	0.01
KEPL3	10.1	10	0.86	0.87	8.65	8.61	0.013	0.012
MRVE3	6.82	6.82	8.3	8.04	56.7	53.7	0.01	0.01
PRIO3	45.9	45.7	5.16	4.84	237	219	0.014	0.013
PTBL3	4.86	4.86	0.48	0.48	2.3	2.33	0.009	0.01

Source: Oxera analysis of B3 data.

Table A1.2 Descriptive statistics for RLP stocks, July 2024

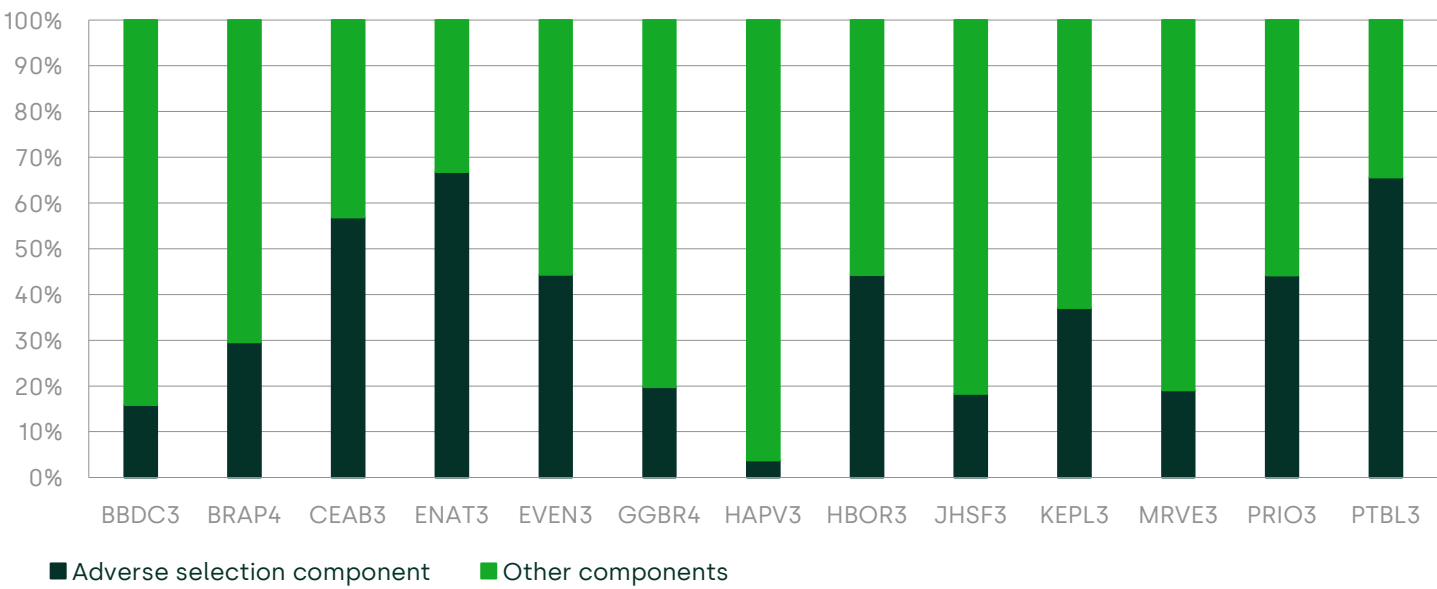
Stock	Mid-price (R\$)		Daily volume traded (m shares)		Daily value traded (R\$m)		Daily average quoted spread (R\$)	
	Mean	Median	Mean	Median	Mean	Median	Mean	Median
RLP group 1 (RLP is always on)								
ARZZ3	52.3	52.7	1	1.03	52.3	53.5	0.028	0.028
BBDC4	12.5	12.5	19.3	18.6	241	235	0.012	0.012
BBSE3	33.9	34.1	2.53	2.26	85.50	77.30	0.013	0.013
BLAU3	11.4	11.6	0.16	0.14	1.85	1.59	0.018	0.018
FESA4	8.52	8.56	0.48	0.45	4.12	3.78	0.014	0.015
LWSA3	4.42	4.44	5.82	5.71	25.9	24.8	0.01	0.01
ROMI3	10.9	10.9	0.17	0.14	1.85	1.53	0.014	0.014
USIM3	7.38	7.63	0.51	0.26	3.37	1.95	0.014	0.015
VALE3	62	61.8	16	14.4	990	885	0.014	0.014
RLP group 2 (RLP is active when spread is wider than one tick)								
ABEV3	11.6	11.6	19.6	19.4	228	225	0.0107	0.0107
AGRO3	26.8	26.8	0.19	0.16	5.05	4.22	0.0257	0.0256
BMOB3	14.5	14.5	0.22	0.17	3.14	2.49	0.0155	0.0153
CASH3	5.91	5.85	1.08	0.84	6.43	4.79	0.0114	0.0112
DASA3	3.26	3.38	1.29	1.28	4.23	4.08	0.0108	0.0107
ITUB4	33.7	33.8	13	12.5	439	423	0.0131	0.0129
LEVE3	33.2	33.3	0.24	0.21	8.02	6.94	0.0331	0.033
PETR4	38	38.2	22	20	834	763	0.0125	0.0126
RDOR3	28.2	28.2	3.17	3.1	89.3	87.6	0.0136	0.0136

Note: We are unable to estimate a spread decomposition for APER3 due to limited trades in July 2024.

Source: Oxera analysis of B3 data.

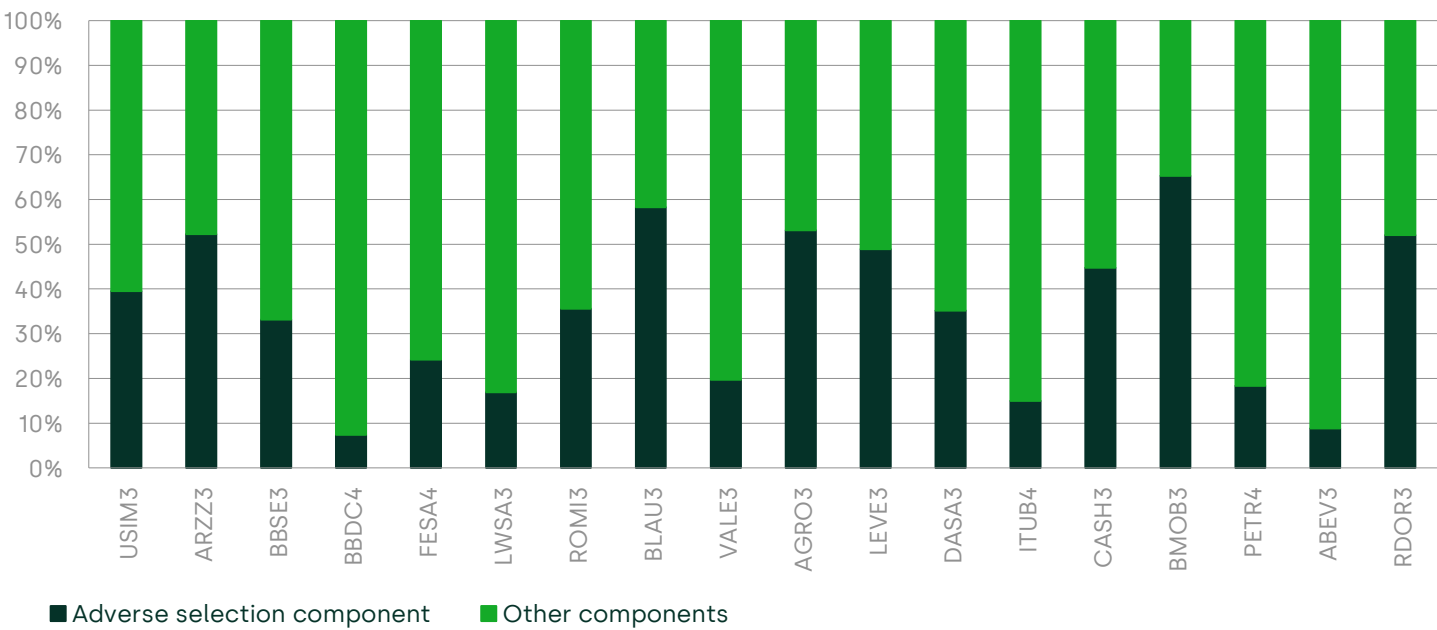
As shown in Figure A1.1 and Figure A1.2 below, the Madhavan, Richardson and Roomans (1997) spread decomposition model suggests there may be considerable cross-sectional variation in the relative importance of adverse selection as a driver of spreads across both the non-RLP and RLP stocks.

Figure A1.1 Relative contribution of adverse selection (non-RLP stocks)



Note: The percentage represents the percentage contribution to the overall effective bid-ask spread.  
Source: Oxera analysis of B3 data.

Figure A1.2 Relative contribution of adverse selection (RLP stocks)



Note: The percentage represents the percentage contribution to the overall effective bid-ask spread. We remove RLP trades before estimating the decomposition model.  
Source: Oxera analysis of B3 data.





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A photograph of an office interior seen through a glass window. Three modern, white, bowl-shaped pendant lights hang from the ceiling. In the background, the word "oxera" is displayed in large, white, three-dimensional letters. A desk with papers and a laptop is visible in the foreground, and a wooden slatted partition is at the bottom. The background shows lush green foliage outside the window.

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