

# Optimal Market Access Pricing: Executive Summary

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January 2021

This report is sponsored by:



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Disclosures: This report has been sponsored by the Plato Partnership. However, the views expressed in the paper are the views of the authors and do not necessarily reflect the views of the Plato Partnership.

# 1 Introduction

Access fees and rebates in securities markets are at the top of the agenda of financial regulators and market operators around the world.

First, following the introduction of Regulation National Market System (Reg NMS, 2007) in the US (and related regulation in Europe), market access pricing has become a strategic tool for trading platforms and exchanges to attract trading volume especially for liquid stocks (Cardella, Hao and Kalcheva, 2015 and O'Hara, 2015). Rebates incentivize investors to submit certain types of orders, while investors using other order types are charged fees. For example, Maker-Taker pricing pays investors rebates when their limit orders (making liquidity) are executed and charges fees on market orders (taking liquidity), while under Taker-Maker (also called inverted) pricing the fees and rebates are reversed. The economic magnitude of access pricing revenue for exchanges is material. For example, for the London Stock Exchange group, it totals £407m, which represents 19 percent of the Total Group income in 2019.

Second, fees and rebates for taking and making liquidity via market and limit orders can alleviate trading frictions from price discreteness: the existence of a price grid with prices constrained by a tick size limits the prices at which investors can transact as they cannot trade intra-tick. Access fees and rebates can be used to adjust net transaction prices, and allow investors to trade intra-tick, thereby, adjusting rewards and costs for liquidity supply and demand.

Third, trading fees are subject to regulatory scrutiny as rebate-based access pricing has been criticized (e.g., Angel, Harris, and Spatt (2013), Harris (2015), and Spatt (2019)) on agency, price transparency and regulatory grounds. Access fees and rebates may have important potential effects via the transparency of economic prices (price + access pricing) vs quoted prices, the efficacy of regulatory protections based on quoted prices, agency issues when brokers do not pass through fees and rebates to their clients, and impeding intermarket competition. Harris (2015) points out further that negative fees allow for intra-tick trading, thus by-passing the Reg NMS trade-through rule.

Our paper models optimal access pricing in a dynamic limit order market and follows seminal theoretical research by Colliard and Foucault (2012); Foucault, Kadan, and Kandel (2013); and Chao, Yao, and Ye (2018) showing how fees and rebates for taking and making liquidity via market and limit orders can alleviate trading frictions from price discreteness. Our analysis is based on the principle that

constraining trade to a discrete price grid creates trading frictions and that access pricing potentially reduces those frictions.

All sets of considerations are likely to be important. Moreover, a complete understanding of access pricing is likely to involve interactions between these various effects and price frictions.

## 2 Institutional Framework

The U.S. Regulation National Market System (Reg NMS) includes an explicit limit on the cost of accessing (i.e., posting and trading on) quotes displayed by U.S. equity trading platforms. Rule 610 caps access fees to no more than \$0.003 per share for stocks priced over \$1, and to no more than 0.3% of the quoted price for stocks priced below \$1. In addition, the Sub-Penny Rule 612 of Reg NMS prohibits exchanges, market makers, and electronic platforms from displaying, ranking or accepting quotes on NMS securities in subpenny increments unless a stock is priced less than \$1 per share. Thus, under Reg NMS, access fees cannot exceed one third of the tick size.<sup>1</sup>

In Europe, MiFID II (Directive 2014/65/EU) and MiFIR (Regulation 600/2014/EU) mandates a reduction in the tick size for European stocks and thereby implicitly reduced the maximum access fees given that the standard practice on European exchanges is to cap fees relative to the tick size.<sup>2</sup> MiFID II also sharpened the regulation of access fees by requiring new incentives on market making agreements under Stress Market Conditions (RTS 8), a maximum Order-To-Trade ratio for each instrument (RTS 9), and a periodic disclosure by exchanges of the percentage of fees and rebates on total turnover (RTS 27). It also bans “cliff-edge” pricing structures in which customer-specific fees are reduced retroactively for market participants who reach a trading volume threshold (RTS 10).

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<sup>1</sup> According to the more recent S.E.C. (2018) Release No.34-82873 on Transaction Fee Pilot for NMS Stocks “For maker-taker exchanges, the amount of the taker fee is bounded by the cap imposed by Rule 610(c) on the fees the exchange can charge to access its best bid/offer for NMS stocks. This cap applies to the fees assessed on an incoming order that executes against a resting order or quote, but does not directly limit rebates paid. The Rule 610(c) cap on fees also typically indirectly limits the amount of the rebates that an exchange offers to less than \$0.003 per share in order to maintain net positive transaction revenues. For taker-maker exchanges, the amount of the maker fee charged to the provider of liquidity is not bounded by the Rule 610(c) cap, but such fees typically are no more than \$0.003, and the taker of liquidity earns a rebate.” If the price of a protected quotation is less than \$1.00, the access fee is no more than 0.3% of the quotation price per share SEC (2009).

<sup>2</sup> See Article 49 of MiFID II and the following Regulatory Technical Standard 11 (RTS 11, ESMA 2017). ESMA (2015)

### 3 Main Findings and Policy Implications

Our model shows that regulatory constraints have important effects on access pricing and on trading. With regulatory caps on access fees, an exchange's optimal access pricing decision and the relation between access pricing and welfare both depend on the mix of investors in a market and on the tick size. Access pricing rebates are optimal in markets populated by short-term speculative traders with small gains-from-trade, whereas strictly positive fees with no rebates are optimal in markets populated by long-term investors with large gains-from-trade. The intuition is that when the market is mainly populated by speculative investors without large gains from trade, the exchange has an incentive to subsidize trading via rebate-based pricing. When instead the market is mainly populated by large institutional investors with large net trading interests, trading demand is naturally high and the exchange has a stronger incentive to set positive fee, thus charging both liquidity supply and liquidity demand.

Our model also shows that, when the tick size is smaller, the frictions generated by the existence of a discrete price grid weaken because the price grid becomes more dense. Hence the exchange has less of an incentive to offer rebate-based pricing. In addition, if the fees are capped relative to the tick size, reducing the tick size tightens the constraint on fees allowed by regulation and therefore it also reduces the exchange's degrees of freedom to offer rebate-based pricing.

Consistent with the line of reasoning that rebates are optimal in equilibrium when trading demand is more constrained by price frictions (or when there is a need to subsidize trading), our model shows that the exchange's incentive to subsidize trading by offering rebate-based pricing decreases with the liquidity of the stocks. However, this is inconsistent with current practice showing that rebates are used extensively in liquid markets.

We provide a solution to this puzzle that follows from the role of high-frequency trading in liquidity provision. When HFT market makers are added to the price-friction model, an exchange's incentives to use rebate-based pricing increase. Thus, our analysis identifies the growth of HFT market making, which is prevalent in liquid stocks, as a cause for widespread rebate-based access pricing by exchanges in US and European markets. Our model shows that exchange profits increase when HFTs are active in the market. The reason is that HFTs are willing to both buy and sell unlike other regular traders who have directional trading demand. Thus, participation by HFT firms can generate greater volume, hence an incentive for the exchange to subsidize their participation.

Our welfare analysis of access pricing compares a market with optimal access pricing by a profit maximizing exchange with two other related markets: one market with no access fees or rebates and another market with optimal access pricing set by a Social Planner who maximizes the total welfare of all market participants. Optimal rebate-based access pricing by an exchange increases total welfare in markets characterized by speculative investors with small gains from trade. However, when investor valuations are sufficiently ex ante heterogeneous, i.e., in markets populated by long term institutional investors, then rebate-based pricing by an exchange reduces total welfare given the reduced need to cross-subsidize trading. In contrast, we show a Social Planer always uses rebate-based access pricing to improve total welfare.

Therefore, our welfare results show that rebate-based pricing is not detrimental per se to investors given the existence of price frictions. It is how exchanges set fees in combination with rebates that can generate dead weight welfare losses. Our result, therefore, suggests a positive potential role for regulation limiting the ability of exchanges to set fees that are too large. Moreover, our results show that with HFTs, optimal rebate-based pricing by an exchange leads to increased total welfare, but Pareto transfers are needed to improve investor welfare.

Our results also have policy implications for the regulatory cap on access fees. When rebates are needed to encourage trading, a cap on fees potentially reduces the possible rebates the exchange can afford. In contrast, when the exchange uses strictly positive fees, which increase its profits but which lead to deadweight welfare losses, a tighter cap on access fees can alleviate this problem. Taken together, our welfare analysis indicates a possible positive role for rebate-based access pricing and for the regulation of access fees.

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