

# Private investors and the emergence of neo-brokers: Does payment for order flow harm private investors?

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## Abstract

Recently, so-called neo brokers, which offer clients to trade at almost zero costs, have emerged. Improved IT infrastructure combined with payment-for-order-flow business models, where all trading is routed through only one exchange venue (market maker), make these low costs possible. Because of the payment-for-order-flow and the limitation to one exchange venue (market maker), regulators have requested firms to assess their business practices.

This report is based on the trades of a large, randomly drawn customer set of a neo broker called Trade Republic Bank GmbH. We compared the executed trading prices of the provided sample with the Xetra order book prices right before the execution to create a comparable price for implicit costs, i.e. trading price delta of the provided trade sample vs. Xetra order book prices (see section 3). Explicit costs (see section 4), i.e. the fee structure of different trading brokerages, are easily comparable based on three different hypothetical but realistic customer trading patterns.

We find that the implicit costs are not only very rarely worse than on Xetra, but in fact, often better. The price advantage from narrower spreads is on average 0.52 Euro per 1,000 Euro traded, or 0.052%, meaning a Trade Republic customer saves this money *ceteris paribus* compared to the same trade on Xetra.

Furthermore, explicit trading costs are favorable compared to traditional online brokerages. Smaller, lower activity investors at traditional online brokerages typi-

cally pay around 1.5 - 3.5% in fees and higher activity traders with larger volumes pay between 0.5% and 1.0%. Explicit costs at Trade Republic are only 0.25% for the low activity customer and 0.08% for the high activity customer.

From this cost analysis, we conclude that payment for order flow ultimately does not harm private investors. On the contrary, customers benefit from this new business model.

*Keywords:* household finance; individual investor; fintech, neo-broker

This study was prepared on behalf of Trade Republic and completed by October 10, 2021. Trade Republic has commissioned this report, but apart from the data Trade Republic had no influence on the results. This report is part of a larger research project on the effect of trading at neo-brokers on the investment behavior of private clients.

## 1 Introduction

Over the last decade, we have witnessed some disruptive technological innovations. The internet has changed the way we search, share and create knowledge and information. The emergence of smartphones has made this knowledge and information available at almost any place and at any time. The combination of both innovations and the demand for personal financial decision-making,

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\*The views expressed in this paper are those of the author and do not necessarily reflect the views of any institution.

ultimately led to the emergence of neo-brokers. Neo-brokers offer near commission-free trading on a convenient, simple, and seamless mobile app or website. The low commissions are possible because the neo-brokers have innovated in extremely cost-efficient IT infrastructure. An additional element of enabling low commission participation on the capital markets, is to limit the number of market makers or stock exchanges for executing client orders.

From a societal perspective, the emergence of neo-brokers tackles two important problems. First, the declining generosity of public pension systems that put more responsibility on every household to complement public pension benefits and second, the surprisingly low stock market participation. Encouraging individuals to participate in the stock market should be ranking high on the agenda of policymakers. The reasons are the diversification potential of the stock market [1] and the high equity premium [2–4], which can be used as a private pension plan. The emergence of neo-brokers with their innovative design may attract significantly younger individuals by making it a 'trendy' thing to take care of financial matters and, ultimately, nudges these young people to save.

Second, neo-brokers provide almost zero transaction costs, i.e. explicit cost, allowing individuals with low savings to participate in the stock market, which is commonly seen as a significant impediment to higher stock market participation [5].

Most brokers allow trading at specialized market makers. These market makers offer bid and ask quotes for a large set of securities and make money from the spread when they receive matching orders in a short time interval. They share some of the revenues from that with the brokers that route trades to them, a practice named payment-for-order-flow. On the one hand this potentially leads to increased competition for orders from brokers and hence should result in lower bid-ask-spreads. On the other hand, it can also lead to worse outcomes for customers of some brokers, who might prioritize payment-for-order-flow over good prices for their customers.

To prevent this behavior, special rules are in place for some market makers. For illustration we take the market maker Lang & Schwarz TradeCenter AG & Co. KG at its electronic trading system LS EXCHANGE as an example. LS EXCHANGE is a segment at the Hamburg Stock Exchange. The trading is controlled and monitored by the Trading Surveillance Office of the Hamburg Stock Exchange, to ensure good execution quality for their retail investors. In addition to the mandatory trading surveillance that every stock exchange is obliged to do, a further quality control has been set up for LS EXCHANGE. It is ensured by an advisory board, which is appointed by the BÖAG Börsen AG and consists of trading participants. [6] The

specific regulations of the Hamburg Stock Exchange for the LS EXCHANGE segment requires it to mirror the prices of trades at the most liquid local reference market. The most liquid market in Germany is XETRA.

However, legislators have doubts that payment-for-order-flow is beneficial for the customers. The European Securities and Markets Authority (ESMA) "[...] warns firms and investors about risks arising from payment for order flow" [7]. It questions whether payment for order flow is compatible with MiFID II [8] and its requirements on best execution, conflicts of interest, inducements, and cost transparency. Putting these into perspective for neo-brokers. Reducing the fees for customers means that payment-for-order-flow revenues make up a larger share of their income, compared to traditional brokers, which generate the majority of their revenues through fees structures. This study takes up the call by the ESMA to provide an assessment of the customer value of trading in a neo-broker environment. The letter and the analyses focus on the customer perspective. The main questions we aim to answer within this paper are:

1. What are the implicit (difference between the execution and alternative prices at the leading exchange) costs of trading at neo-brokers?
2. What are the explicit (direct trading costs charged to clients) costs?

In the next sections we analyze the provided trading data from Trade Republic (TR) along these dimensions.

## 2 Data

We investigate the implicit and explicit costs of neo-brokers using a sample of trading data of 100,000 customers from Trade Republic (see table 1). The customers were drawn randomly from the entire customer base that had opened accounts before July 2020. Drawing a sample in July 2020 makes sure that we can observe clients' trading behavior for at least 12 months - as we include data up to June 17, 2021. In the data we see the ISIN of a security, timestamp of the transaction (exact time down to milliseconds), the number of shares traded, the execution price, an indicator for purchases or sells and the order book at Xetra at the time of the transaction. We have no information on a client identifier for reasons of confidentiality.

The accounts in our sample performed their first trade on February 19, 2019, and the last one on June 17, 2021. In line with the existing research on online brokerage [9] we focus on trades in stocks and ETFs only. Therefore, retail structured products are not part of this report. We might analyse this market in a future study. Note that the studied neo-broker does not offer to trade in actively managed mutual funds.

METRIC	VALUE
<b>Number of trades</b>	2,212,708
– Purchases	1,428,156
– Sales	784,552
<b>Securities</b>	1,921
– Stocks	1,136
– ETFs	785
<b>Average trade value in €</b>	
<b>(volume in shares)</b>	1433.30 (89)
– 25th percentile	163,37 (03)
– Median	459.00 (10)
– 75th percentile	1159.90 (31)

Table 1: Descriptive statistics

We observe transactions in 1,921 specific securities (ISIN codes) listed on Xetra, the reference market we consider for this study. 1,136 of these ISINs are stocks, of which 607 are listed in the CDAX, the EuroStoxx, or the S&P 500. The remaining securities are ETFs. In total, the customers within this sample placed 2,212,708 trades, of which 1,428,156 (64.5%) are purchases. On average, the absolute value in Euro per transaction is 1,433 Euro (median: 459 Euro)(see table 1). The most-traded securities and the ones with the highest net long position are depicted in figures 1 and 2.

### 3 Implicit costs

We assess the implicit costs of trading at a neo-broker by comparing the order execution price of Trade Republic to Xetra prices at the timestamp of execution (see figure 3 for an illustration). We thus compute the hypothetical trading price if the trade would have been channelled through Xetra. Naturally, this approach neglects any direct influence the trade could have had on prices on Xetra.

In general, we are aware that the activity of market makers might, in theory, impact the prices if these orders were directly routed to the exchange. Please note, that this order flow will eventually be executed

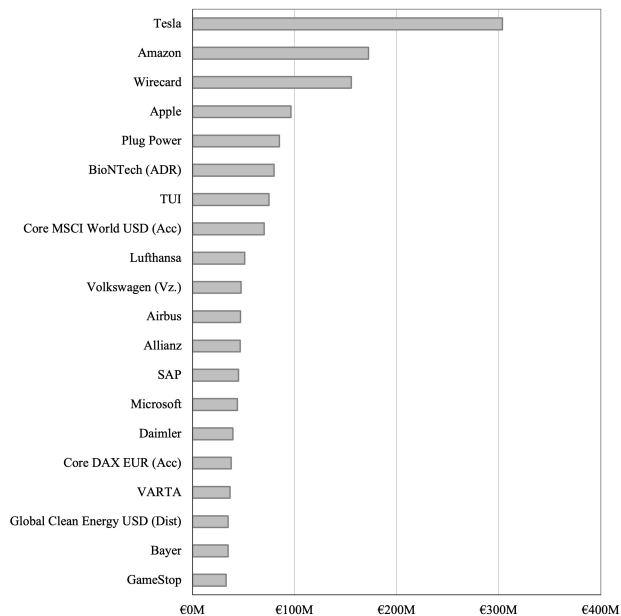


Fig. 1: Most traded stocks and ETFs by volume

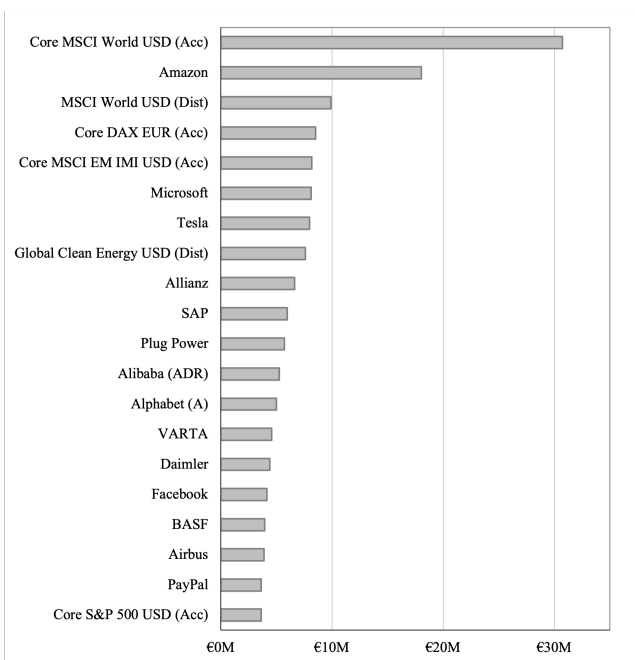


Fig. 2: Stocks and ETFs with the highest net long position ( $shares_{bought} - shares_{sold}$ ) ·  $price_{last\ observed}$

at the stock exchange such as Xetra, but perhaps with a small time delay. Because of the overall small relative volume of retail order flow activity to the Xetra volume, we believe that in reality price impacts are insignificant. To validate this belief, we compare volumes of Xetra with estimated volumes at Trade Republic. We have one full year of data for all 100,000 customers in the sample, ranging from June 18 2020 to June 17 2021. They did trades with a combined volume of 2.2 billion Euro in that time frame. Trade Republic

announced in May 2021 that they had reached 1 million customers. [10] Hence, we estimate the Trade Republic volume to be around 22 billion Euro in this year. On Xetra, the equities trading volume in the year between June 2020 and May 2021 was 1.364 trillion Euro using single-counted volume of on-exchange transactions. [11] Against this background, Trade Republic volume is around 0.8% of the Xetra volume and most unlikely to significantly impact Xetra prices. However, we suggest analyzing this topic in future studies.

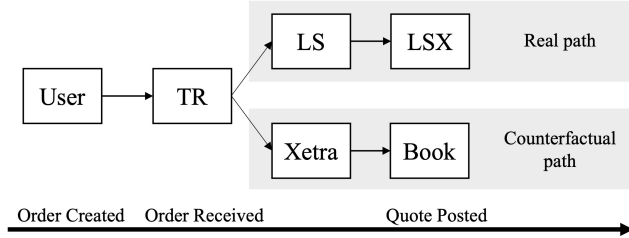


Fig. 3: Real and counterfactual path  
*TR = Trade Republic, LS = Lang&Schwarz, LSX = Lang&Schwarz Exchange*

Our analysis on the implicit costs is based on three different measures:

1. We analyze the fraction of trades executed for a price equal, lower, or higher than the hypothetical price on the reference market.
2. We analyze the price difference in Euro per 100 shares or 1,000 Euro traded.
3. We calculate the average spread improvement. E.g. if a security is quoted 22.10 / 22.20 on Xetra (bid/ask), and quoted 22.12 / 22.18 on LS Exchange, the spread improvement would be 40% (10 cents spread vs. 6 cents spread).

The results are shown in table 2. We find that 21.10% of trades are executed at prices better than the Xetra price, 78.05% at the same price, and only 0.85% at worse prices. In line with these results, our customers save 0.52 Euro per 1000 Euro traded or 6.85 Euro per 100 shares traded. To outline, the majority of price improvements originate from foreign stocks and ETFs.

Calculating the average spread improvement of the neo-broker requires an approximation because the quotes are not perfectly aligned in time between the two markets.

In order to get a volume-adjusted estimate for our analysis, we look at the quoted spread at each trade point for the respective trade size, a quantity known as Effective Quoted Spread or EFQ.

Metric	Improvement
<b>Execution Price in %</b>	
– better than Xetra	<b>21.1</b>
– equal than Xetra	<b>78.1</b>
– worse than Xetra	<b>0.9</b>
<b>Price differences in Euro</b>	
– per 100 shares	<b>6.85</b>
– per 1,000 Euro	<b>0.52</b>
<b>Total benefit in Euro</b>	<b>1,780,227</b>
<b>Effective Quote Spread</b>	<b>57.1%</b>
<b>Average Spread Improvement</b>	<b>42.9%</b>

Table 2: Implicit costs and trading efficiency

The EFQ formula (equation) is:

$$EFQ = \frac{\sum_{buys} (act_b - mid) + \sum_{sell} (mid - act_b)}{\sum_{buys} (ask_r - mid) + \sum_{sell} (mid - bid_r)} \quad (1)$$

where:

- $ask_r$  = Ask price of the reference exchange
- $bid_r$  = Bid price of the reference exchange
- $act_b$  = Execution price of broker
- $mid$  = mid point of the reference market

EFQ compares the spread for all trades to hypothetical executions at the reference exchange (see Equation 1). The average spread improvement is 1-EFQ, which in the case of the neo-broker is estimated at 42.9%.

Summing the savings of all trades (see table 2) would result in 1.780 million Euro.

Overall, the different measures illustrate that execution prices of the studied neo-broker are better than the Xetra prices at the time of execution. Hence, we do not find that the payment for order flow harms execution quality. On the contrary, we find even better execution for these trades.

	<b>LOW</b> (Trading Activity)	<b>MEDIUM</b> (Trading Activity)	<b>HIGH</b> (Trading Activity)
<b>Savings Plan Executions per Month</b>	3	1	0
– Avg Volume	€ 50	€ 250	€ 0
<b>Trade Executions per Month</b>	1	4	20
– Avg Volume	€ 250	€ 500	€ 1,200
<b>Total Volume</b>	€ 400	€ 2,250	€ 24,000

Table 3: Definition of prototypical customers

	<b>LOW</b> (Trading Activity)	<b>MEDIUM</b> (Trading Activity)	<b>HIGH</b> (Trading Activity)
<b>Studied Neobroker</b> (Execution Fee)	€ 1.00	€ 4.00	€ 20.00
Execution fee in percent of traded volume	(0.25%)	(0.18%)	(0.08%)
<b>Online Broker 1</b> (Execution Fee)	€ 5.90	€ 23.60	€ 118.00
Execution fee in percent of traded volume	(1.48%)	(1.05%)	(0.49%)
<b>Online Broker 2</b> (Execution Fee)	€ 14.65	€ 53.35	€ 248.00
Execution fee in percent of traded volume	(3.66%)	(2.37%)	(1.03%)

Table 4: Comparison of explicit costs of the studied neo-broker to the costs of two large German brokers – Flatex [12] (Online Broker 1) and comdirect [13] (Online Broker 2)

#### 4 Explicit costs

Explicit costs can easily be compared across different brokers. We use the price lists of the two sizable online brokerages in Germany and compare the trading costs based on the trades executed at the online brokerage.

To compare and assess the explicit cost differences, we look at three hypothetical customers with low, medium, and high activity, as they appear in other papers and dataset. The details can be found in table 3.

Table 4 compares the explicit costs for the three prototypical customers. They trade via the studied neo-broker (Trade Republic), or two alternative competitors. In all cases the investor faces the lowest explicit trading costs with the neo-broker. Clients of the neo-broker pay only a fraction of 10-20% of the fees they would have paid elsewhere. Note that the comparison still looks favorable to the neo-broker when we assume that the investor with high activity generates the same turnover with fewer trades. Because of caps on the maximum fees the difference becomes smaller but remains still sizeable.

#### 5 Conclusion

We find that:

1. Execution prices at Trade Republic are on average better than at Xetra and worse only on very rare occasions. Overall, this leads to lower implicit trading

costs.

2. Trade Republic’s explicit trading costs are much lower than the costs of two large German brokers.

From this cost analysis, we conclude that payment for order flow ultimately does not harm private investors. On the contrary, customers benefit from this new trading venue. Future research needs to address how these low costs impact trading activity and returns and long-term stock market participation, which might result in higher pension savings. We will focus on these questions in subsequent studies.

#### References

- [1] Guiso, L., Haliassos, M., and Jappelli, T., 2003. “Household stockholding in europe: Where do we stand and where do we go?”. *Economic Policy*, **18**, 04, pp. 123–170.
- [2] Mehra, R., and Prescott, E. C., 1985. “The equity premium: A puzzle”. *Journal of Monetary Economics*, **15**(2), pp. 145–161.
- [3] Mehra, R., and Prescott, E., 2003. “The equity premium in retrospect”. In *Handbook of the Economics of Finance*, G. Constantinides, M. Harris, and R. M. Stulz, eds., 1 ed., Vol. 1, Part 2. Elsevier, ch. 14, pp. 889–938.

- [4] Dimson, E., Marsh, P., and Staunton, M., 2009. *Triumph of the Optimists: 101 Years of Global Investment Returns*. Princeton University Press. URL: <https://github.com/PubInv/tetrobot/blob/gh-pages/doc/Gluss.pdf>.
- [5] Vissing-Jorgensen, A., 2002. Towards an explanation of household portfolio choice heterogeneity: Nonfinancial income and participation cost structures. Working Paper 8884, National Bureau of Economic Research, April.
- [6] Börsen Hamburg-Hannover, 2021. Regelwerk lang schwarz exchange. URL: <https://www.boersenag.de/Regelwerke>.
- [7] Lunden, I., 2021. Esma warns firms and investors about risks arising from payment for order flow. URL: <https://www.esma.europa.eu/press-news/esma-news/esma-warns-firms-and-investors-about-risks-arising-payment-order-flow>  
<https://www.esma.europa.eu/press-news/>.
- [8] Securities, E., and (ESMA), M. A., 2018. Mifid ii/mifir entered into force on 3 january 2018. this legislative framework strengthens investor protection and improve the functioning of financial markets making them more efficient, resilient and transparent. URL: <https://www.esma.europa.eu/policy-rules/mifid-ii-and-mifir>  
<https://www.esma.europa.eu/policy-rules/mifid-ii-and-mifir>.
- [9] Barber, B. M., Lee, Y.-T., Liu, Y.-J., and Odean, T., 2007. “Is the aggregate investor reluctant to realise losses? evidence from taiwan”. *European Financial Management*, **13**(3), pp. 423–447.
- [10] Lunden, I., 2021. Berlin’s trade republic nabs \$900m led by sequoia at a \$5b+ valuation to take its neobroker app across europe. URL: <https://techcrunch.com/2021/05/20/berlins-trade-republic-nabs-900m-led-by-sequoia-at-a-5b-valuation-to-take-its-neo-broker-app-across-europe/>  
<https://techcrunch.com/2021/05/20/berlins>.
- [11] Börse, D., 2021. Monthly statistics cash market. URL: <https://www.deutsche-boerse-cash-market.com/dbcm-en/instruments-statistics/statistics/cash-market-statistics/monthly-statistics-cash-market>  
<https://www.deutsche-boerse-cash-market.com/dbcm-en/>.
- [12] flatexDEGIRO Bank AG, 2021. Preise und leistungen. URL: <https://www.flatex.de/preise/>.
- [13] comdirect – eine Marke der Commerzbank AG, 2021. Konditionen für den wertpapierhandel - die wichtigsten preise und entgelte im Überblick.