Quantitative analysis of turbos distributed to retail clients in the Netherlands

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Executive summary

Turbos are exchange traded structured products sold mainly to retail clients under names such as turbos, speeders, sprinters, etc. Turbos provide a leveraged, indirect (long or short) exposure to the underlying asset with the potential loss limited to the amount paid for them.

The European Security and Markets Authority (ESMA) and the AFM have introduced restrictions on the marketing, distribution and sale of contracts for differences (CFD). Both ESMA and AFM have noted that there are similarities between turbos and CFDs and have stated that they will closely monitor whether similar detrimental consequences from turbos develop for retail clients. As part of its monitoring activities, the AFM started an analysis of turbos at the end of 2018. The study is based on transaction data over the period from June 1, 2017 to June 30, 2018 provided by four large distributors, who together account for the distribution of the majority of the turbos sold in the Netherlands. This report presents the results of this study.

The main conclusion of the study is that turbos are generally traded with similar results as CFDs by retail clients. The following findings are particularly noteworthy:

- **The majority of clients made a loss**
  68% of the retail clients made a loss when trading turbos in the period observed (June 1, 2017 - June 30, 2018). The average return per client was negative: - €2,680. At transaction level, the average return was - € 38 (-2.9%).

- **High leverage results in higher losses**
  Retail clients generally trade with high leverage. For turbos with equity as underlying, the average leverage is 18 and for indices as underlying the average leverage is 62. Higher leverages result in higher losses. For turbos with an index as underlying, the average transaction return ranges from -1.7% for transactions with leverage lower than 30[1] to -8.6% for transactions with leverage higher than 100[2]. A similar correlation exists for turbos with other types of underlying.

- **Frequent trading leads to higher losses**
  The percentage of clients that make a loss increases with the number of transactions per client. 88% of the clients with more than 500 transactions made a loss compared to 64% of the clients with less than 10 transactions. Holding periods are generally short for turbos. 56% of the turbo positions are closed within 24 hours and 86% within 10 days.

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[1]   30% of the total number of transactions
[2]   14% of the total number of transactions

General disclaimer on the data used

This study on turbos is performed on transaction data requested from and provided by the turbo distributors. If some of the requested data was not available to the distributor, best estimates were used instead. Several quality checks have been performed to increase the reliability of the data and estimates.

01
Introduction

This report presents the findings of an analysis of turbos distributed to Dutch retail clients. The findings are based on an analysis of more than 1.8 million turbo transaction sets[3] (referred to below as transactions) provided to the AFM by four large Dutch turbo distributors, who together account for the distribution of the majority of the turbos sold in the Netherlands.

Investment services related to turbos are not included in this study. Nor does this study consider financial investments other than turbos that may or may not be part of the total investment portfolio of the retail clients. This means that the clients' portfolio composition does not form part of this study.

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[3] For the purpose of the report a transaction set is defined as the matching of an executed purchase order and an executed sale order. The matching is based on the FIFO method.

Background of this study

Turbos offer clients exposure to the underlying without directly trading in it. Trading in turbos can be significantly riskier than directly trading in the underlying because turbos facilitate trading with high leverages. Both ESMA[4] and the AFM[5] noted in their product intervention measures that there are similarities between turbos and CFDs and that they would monitor whether similar detrimental consequences from turbos develop for retail clients. This analysis forms part of the AFM monitoring activities on turbos and aims to provide insights into their trading results.

Previous review of turbos

The AFM previously conducted a review[6] of turbos in 2013. The main difference between the previous review and the study covered by this report is that the former was performed with a simulation model. In 2013 the AFM modelled the probability distribution of the expected return on a direct investment in the underlying and an investment in the underlying through a leveraged product. As mentioned above, the study described in this report is based on real transaction data provided by four large Dutch turbo distributors. No assumptions are made regarding the probability distribution of the underlying or trading activity of the retail client.

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[4] ESMA adopts final product intervention measures on CFDs and binary options, 01 June 2018: https://www.esma.europa.eu/press-news/esma-news/esma-adopts-final-product-intervention-measures-cfds-and-binary-options.

[5] https://www.afm.nl/en/professionals/onderwerpen/productinterventie.

[6] Report on leveraged products: https://www.afm.nl/~/profmedia/files/rapporten/engels/leveraged-products.ash.

02
Data

The AFM sent a request for information to four large turbo distributors to provide data on all turbo trades made for their clients in the period from June 1, 2017 to June 30, 2018. The four distributors account for the majority of the trades for Dutch retail clients and are as such representative of the whole Dutch turbo market.

The requested information concerned transactions executed for retail clients. Firms were asked to provide transaction details such as date and time, price, net result, leverage at purchase and the financing level.

Not all the requested data was directly available to the distributors. Some of the requested data had to be obtained from the relevant issuers. Other requested data was estimated by the distributor.

The 'First In First Out (FIFO)' method was applied to calculate the holding period, gross result, net result and costs. The choice for a specific method is relevant as not every purchase order can be matched to a sale order of the same size. An example to further clarify the FIFO method is given in the appendix.

03

Size of the Dutch retail turbo market

The turbo market for Dutch retail clients is relatively stable. The number of clients increased slightly from 2016 to 2018 after a fall in the number of clients from 2015 to 2016. From 2015 to 2018 the number of clients increased by 4%.

Number of clients who traded in turbos

2015	33 k
2016	31 k
2017	33 k
2018	35 k

Figure 1: the number of clients that traded in turbos. There is a small increase in the number of clients.

Number of retail client orders

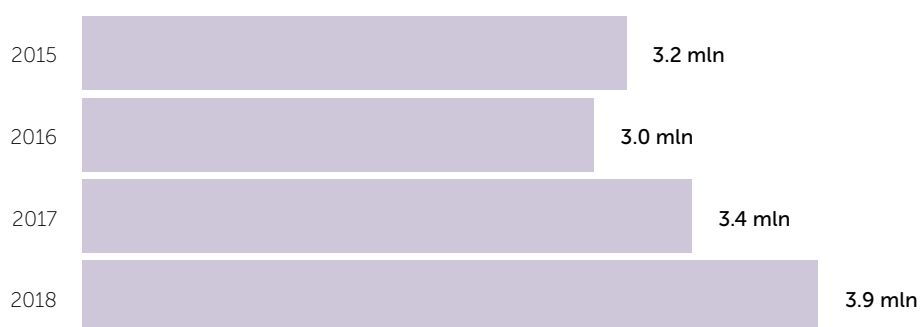|	
2015	3.2 mln
2016	3.0 mln
2017	3.4 mln
2018	3.9 mln

Figure 2: the number of retail client orders. There is an increase in the number of orders.

Figure 3 shows that the transaction size decreased[7]. The number of orders increased by 22% from 2015 to 2018, while the number of turbos purchased fluctuated and decreased by -7%.
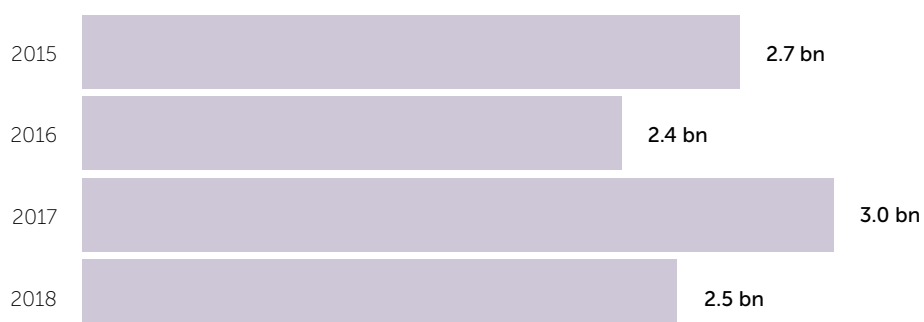
Number of turbos purchased

2015	2.7 bn
2016	2.4 bn
2017	3.0 bn
2018	2.5 bn

Figure 3: the number of turbos purchased. This number fluctuates and has declined since 2015.

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[7]   As mentioned in chapter 2, a transaction is defined in this report as a matched purchase order and a sale order. The transaction data set contains 1.8 million transactions, which is lower than the number of orders in figure 2.

Elaboration on the key findings

This chapter presents the key findings in more detail. It elaborates on the clients' returns, the impact of leverage and how frequent trading influences these results.

4.1 Basic insights

Some important basic insights:

- In the period from June 1, 2017 to June 30, 2018 the average amount per retail client transaction was €1,821. The majority of the transactions (76%) were in BEST[8] turbos and 65% of them were trades in turbos with a long position.

- The majority of the transactions consisted of turbos with indices (56%) and equity (36%) as underlying. The average leverage varies depending on the underlying assets. The average leverage of turbos with equity as underlying is 18 and that of turbos with indices as underlying is 62. Underlyings are generally liquid (e.g. AEX, DAX, large caps).

- The average holding period is 6 days. 56% of the turbo positions are closed within 24 hours[9]. Transactions with higher leverage tend to have a shorter holding period.

4.2 The majority of clients made a loss

Most clients (68%) made an overall loss trading in turbos. Figure 4 shows the distribution of the total return per client. The distribution of returns is not symmetric. There are more clients in each subgroup with a negative return than clients with a positive return.

The average total return per client was -€2,680. The majority of the clients (76%[10]) had a return between −€2,500 and +€2,500[11].

Clients returns

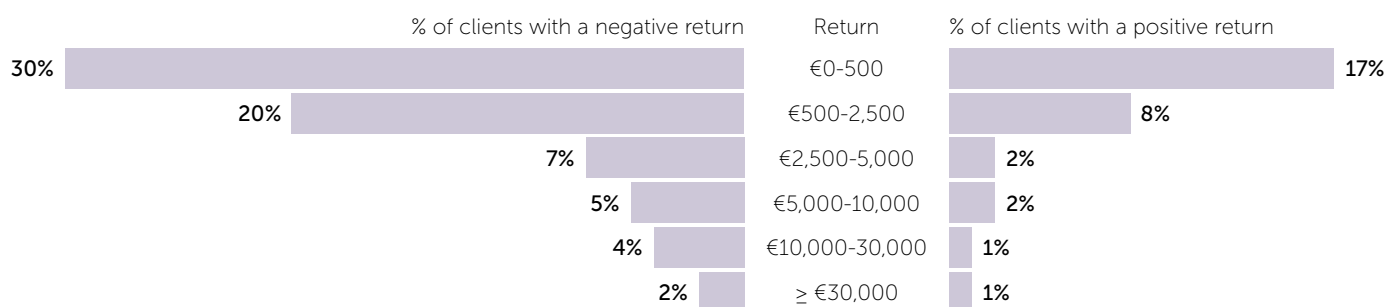| % of clients with a negative return	Return	% of clients with a positive return
30%	€0-500	17%
20%	€500-2,500	8%
7%	€2,500-5,000	2%
5%	€5,000-10,000	2%
4%	€10,000-30,000	1%
2%	≥ €30,000	1%

Figure 4: clients realize an overall loss more often than an overall profit.

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[8]   BEST turbos are turbos with no maturity date for which the stop-loss level is the same as the financing level. BEST stands for Barrier Equal Strike. Since the stop-loss level is at the same level as the financing level, higher leverage can be achieved than with Classic turbos. When stopped out a BEST turbo has no residual value to be paid to the investor.

[9]   Note that turbos can only be traded during trading hours of the exchange platform.

[10]   The numbers in the text can differ from the corresponding numbers in the figures due to rounding differences.

[11]   Throughout this report in the figures 'between A and B' means equal to or great than A and smaller than B (i.e. all x with A ≤ x < B).

4.2.1 The average transaction return is negative

Although more than half of the transactions result in a positive return (54%), the average return per transaction is negative during the observed period. The average relative return is -2.9% and the average nominal return is -€38.

The average return per transaction is negative because the losses exceed the profits. The average return of loss-making transactions is -€392 (-32.8%) and the average return of profit-making transactions is €266 (+22.6%). A possible explanation for this observation lies in the loss aversion theory of behavioral economics. Retail clients may be more inclined to take a profit than to take a loss.

Figure 5 shows the distribution of transaction returns. Clients can achieve a positive return higher than 100% with turbos. The loss is limited to the amount paid for the turbo and thus cannot exceed 100%. 2% of the transactions has a (positive) return equal to or higher than 100%. 6% of the transactions result in a total loss of the amount paid.
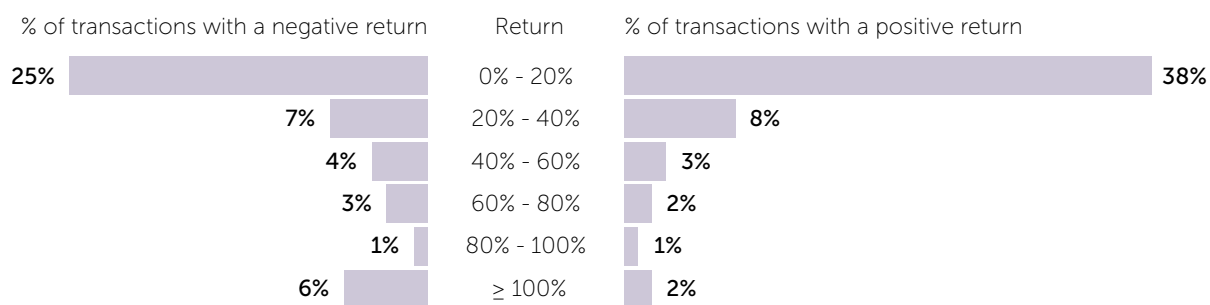
Transaction returns

% of transactions with a negative return	Return	% of transactions with a positive return
25%	0% - 20%	38%
7%	20% - 40%	8%
4%	40% - 60%	3%
3%	60% - 80%	2%
1%	80% - 100%	1%
6%	≥ 100%	2%

Figure 5: histogram of the transaction returns.

4.2.2. Returns are more negative for turbos short

Turbos are used to take both short and long positions in the underlying. Long positions are more common. There are twice as many turbo long transactions (65%) as turbo short transactions (35%). The relative return on turbos short (-5.52%) is less than the relative return on turbos long (-1.53%). Table 1 and figure 6 show the returns of turbos long and short.

Table 1 also shows that the leverage of turbos short is generally higher than turbos long[12] and that the holding period of turbos short is shorter than turbos long. The higher leverage of short turbos may be a contributing factor for the worse returns of turbos short (see section 4.3). Figure 7 shows that when corrected for leverage, turbos short still show worse results than turbos long.

Position	% trans-actions	Avg return	Avg leverage equity	Avg leverage indices	Avg holding period	% equity	% indices	% other under-lying
Long	65%	-1,53%	17	53	197h	47%	45%	8%
Short	35%	-5,52%	23	71	70h	15%	77%	8%

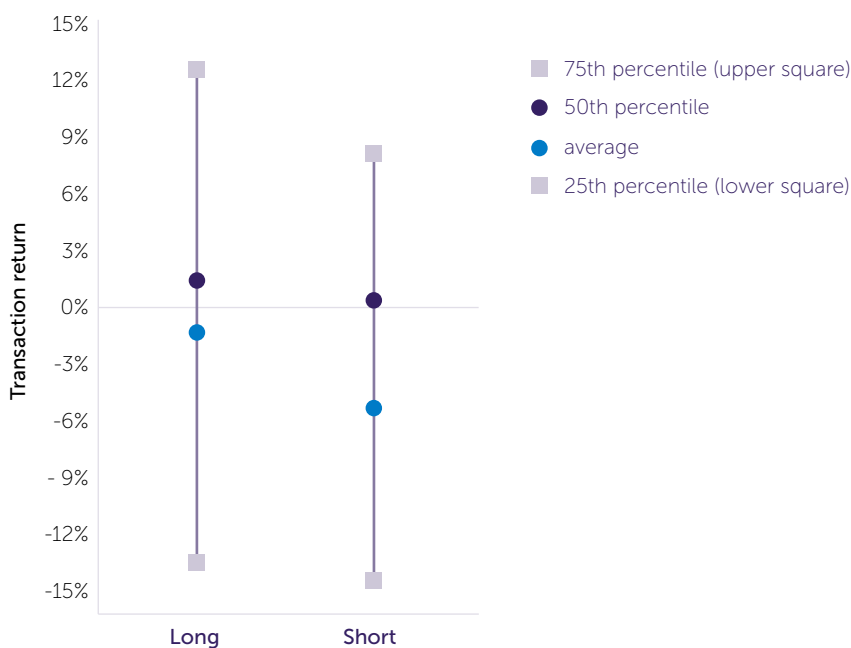Table 1: position of the turbo and several statistics.

Figure 6: boxplot[13] of the (relative) transaction return against the market position. Short transactions show more negative results.

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[12] The table shows turbos with equity and indices as underlying. The same conclusion can be drawn for other types of underlying as well.
[13] The boxplots show the Q1 percentile, the median, the Q3 percentile and the average. The median (dark blue line) is the value separating the higher half (50%) from the lower half (50%) of the dataset (e.g. 50% of the values are higher than the median). The Q1 percentile separates the upper 25% of the dataset from the lower 75% of the dataset. The Q2 percentile separates the upper 75% of the dataset from the lower 25% of the dataset. The average is the light blue line.
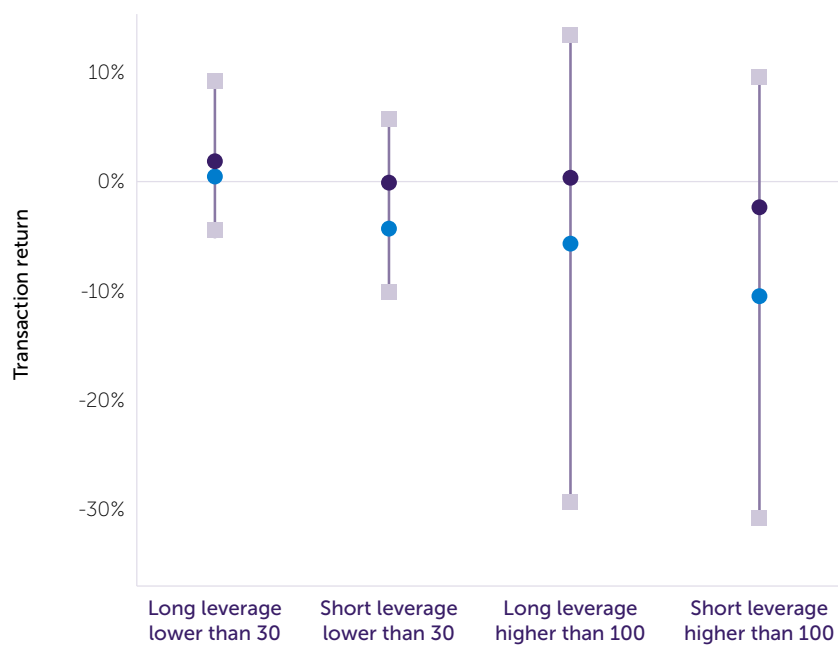
Figure 7: boxplot of the (relative) transaction return against the position and leverage for turbos with **indices as underlying**. It shows that for comparable leverage, turbos short have a worse return than turbos long.

4.2.3 Highest dispersion of returns for turbos with equity as underlying

The underlying of the turbo varies from large indices to small cap equity. The volatility of the turbo varies significantly depending on the underlying as well as its leverage. For the analysis in this section, turbos are divided into four categories according to the underlying asset: equity, commodities, indices and forex[14]. Equity and indices are the most common assets (see the second column in table 2).

The average return is negative for all categories of underlying. Turbos with equity as underlying perform better on average than other underlyings (see table 2 and figure 8). The dispersion of transaction returns is higher for turbos with equity as underlying than other underlyings (see figure 8).
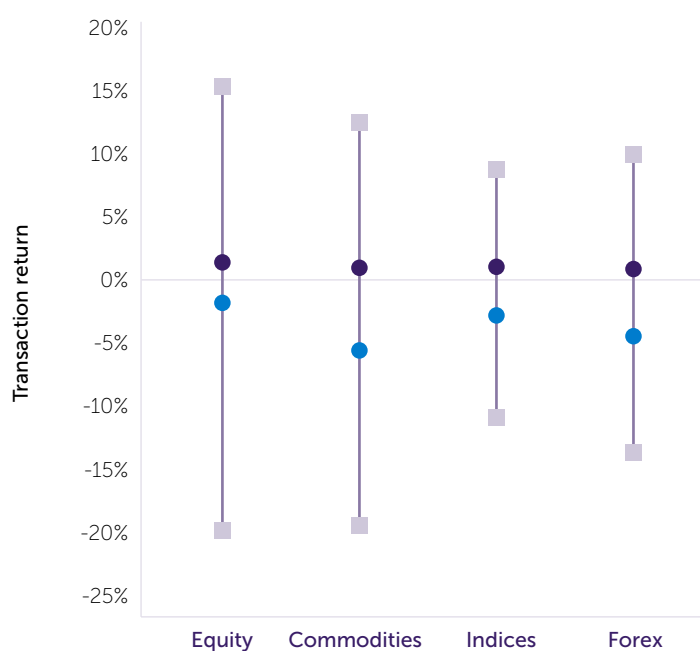
Figure 8: boxplot of the relative return on turbos for the four categories of underlyings. The dispersion for equity is the largest of the four categories.

Type of the underlying	% transactions	Avg return	Avg leverage	Avg holding period
Equity	36%	-2.11%	18	285h
Indices	56%	-3.11%	62	65h
Commodities	4%	-5.83%	33	223h
Forex	4%	-4.71%	102	113h

Table 2: Statistics regarding the types of the underlying.

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[14] Transactions with bonds as underlying are relatively infrequent (3,964 transactions, 0.22% of total) and are, for this reason, excluded from this report.

4.3 High leverage results in higher losses

4.3.1 Trading happens with high leverage
Turbos are traded with high leverage.
The average leverage is 45 and varies
significantly between the different types of
underlying. The average leverage of turbos
with indices as underlying is 62 and that
of turbos with equity as underlying is 18.
Figure 9 shows a boxplot of the leverage
for both equity and indices as underlying.

Leverage is negatively correlated with
the holding period. Figure 10 shows
the average holding period for different
leverage subgroups. The holding period
decrease with the leverage.
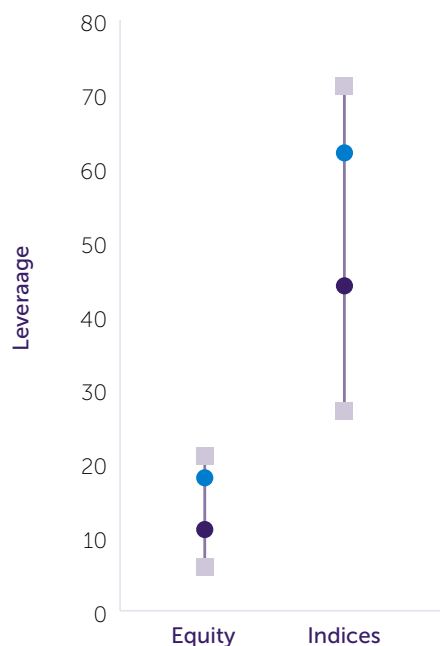
Figure 9: Boxplot of the leverage for equity
and indices as underlying.
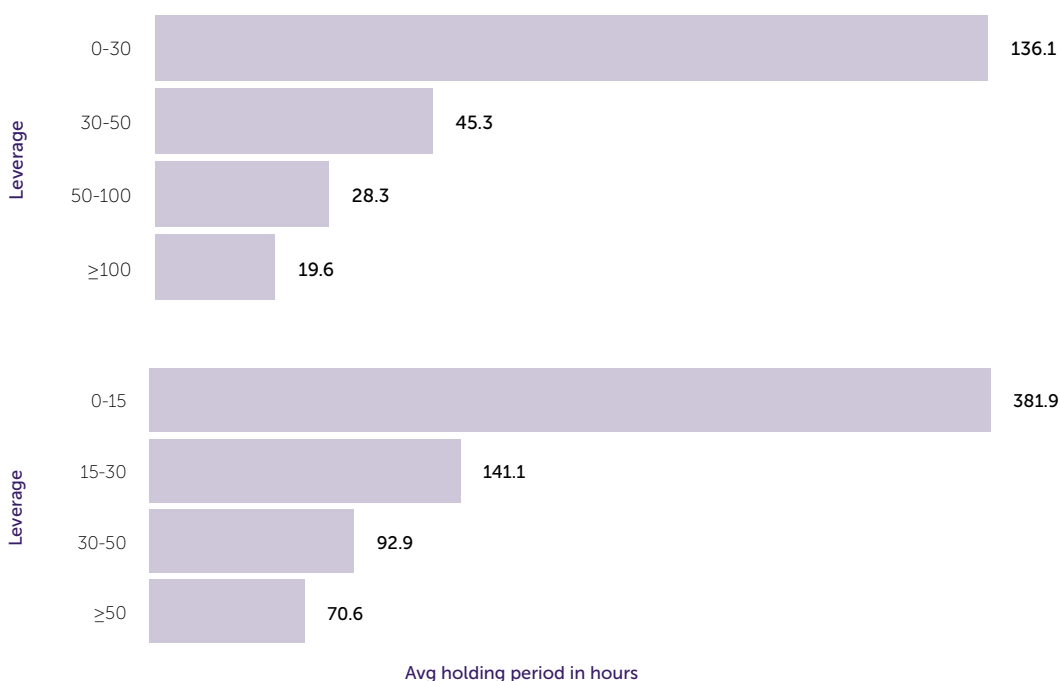
Figure 10: The holding period (in hours) decreases with the leverage for turbos
with **indices (top) and equity (bottom) as underlying**.

4.3.2 Higher leverage results more frequent in losses and in higher losses

Transactions with higher leverage result more frequently in a loss. Figure 11 shows the percentage of transactions that result in a loss for turbos with equity as underlying for different leverages. Figure 11, for instance, shows that for turbos with equity as underlying, 55% of the transactions with leverage higher than 50 result in a loss compared to 45% of the transactions in turbos with leverage lower than 15. Figure 12 shows a similar result for turbos with indices as underlying.

Higher leverage not only results more often in a loss: as figures 13 and 14 show, the losses are also higher. The average return decreases with the leverage. The decrease of the 25th percentile with the leverage is greater than the increase of the 75th percentile with the leverage. Therefore, higher leverages have a greater tendency to increase losses than to increase profits.
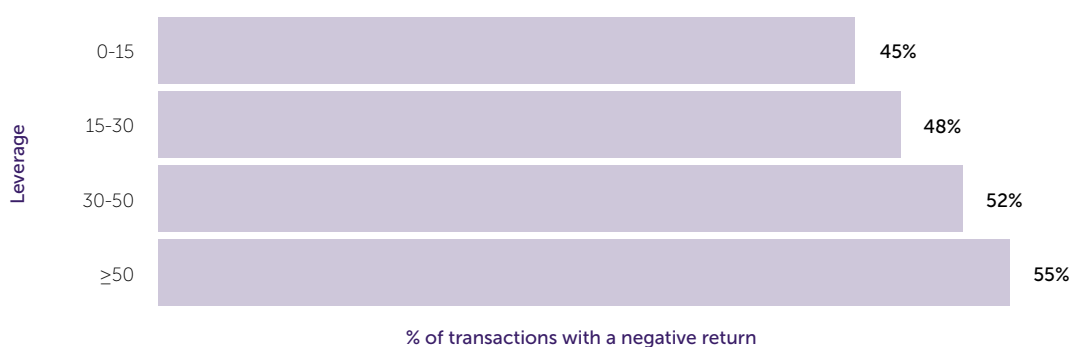

% of transactions with a negative return

Figure 11: the percentage of transactions that resulted in a loss against leverage for turbos with **equity as underlying**. This percentage increases with the leverage.
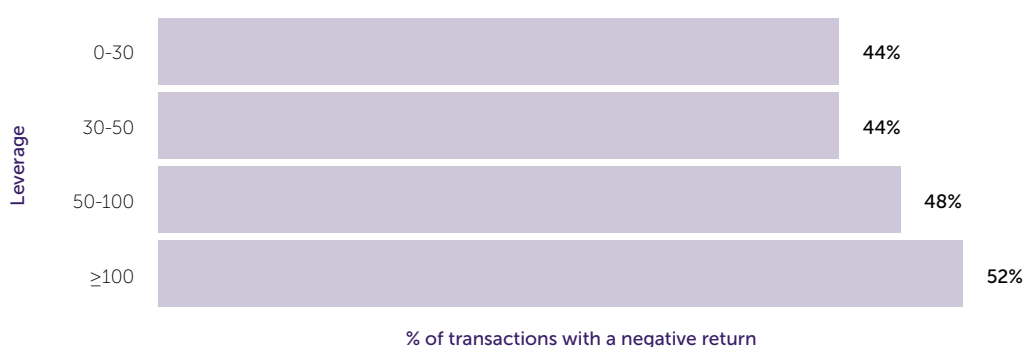

% of transactions with a negative return

Figure 12: the percentage of transactions that resulted in a loss against leverage for turbos with **indices as underlying**. This percentage increases with the leverage.
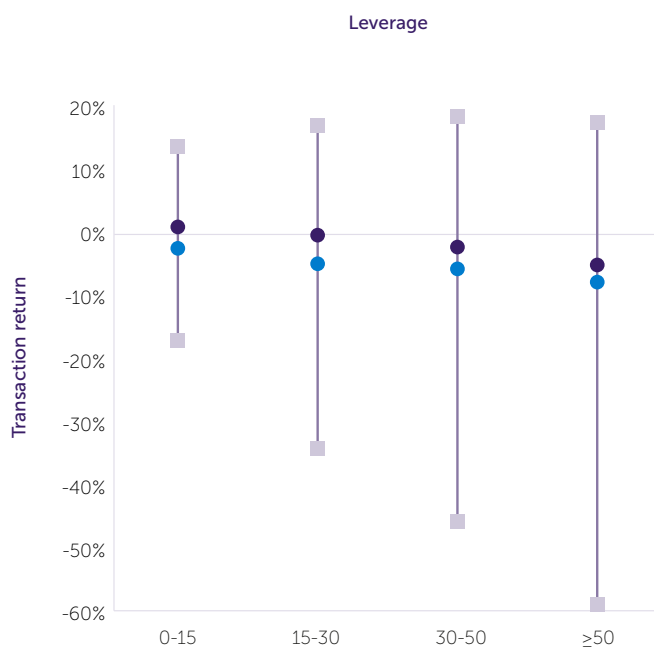
Leverage

Figure 13: boxplot of the relative return of turbos with **equity as underlying** for different leverages. The leverage boxes contain 313,214, 108,649, 49,523 and 29,797 transactions respectively. There is a sharp decrease of the 25th percentile with the leverage and a slight increase of the 75th percentile.
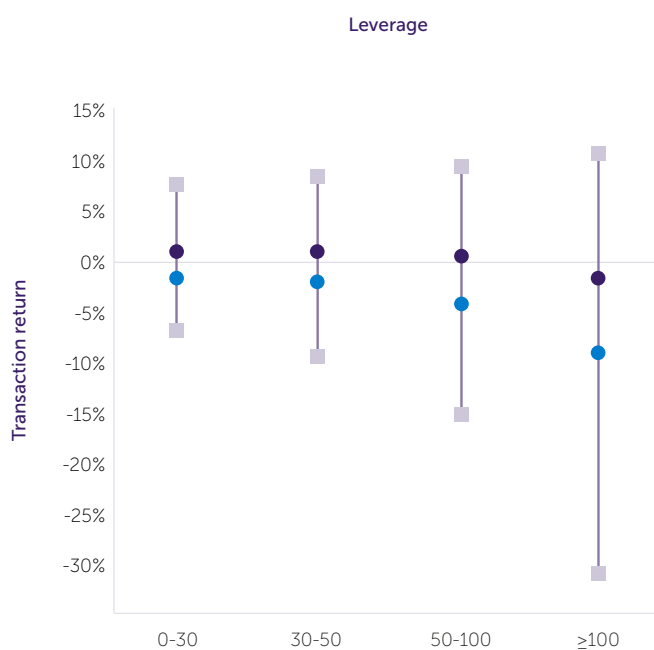
Leverage

Figure 14: boxplot of the relative return of turbos with **indices as underlying** for different leverages. The leverage boxes contain 202,351, 193,376, 189,325 and 95,570 transactions respectively. Similar results can be observed as in figure 14.

Turbos with higher leverage are stopped out more often than turbos with lower leverage. This can be explained by the smaller distance between the price of the underlying and the stop-loss level for turbos with higher leverage.

Figure 15 shows the percentage of the turbos stopped out for different leverages. Turbos with equity as underlying have a higher tendency to be stopped out than turbos with indices as underlying.
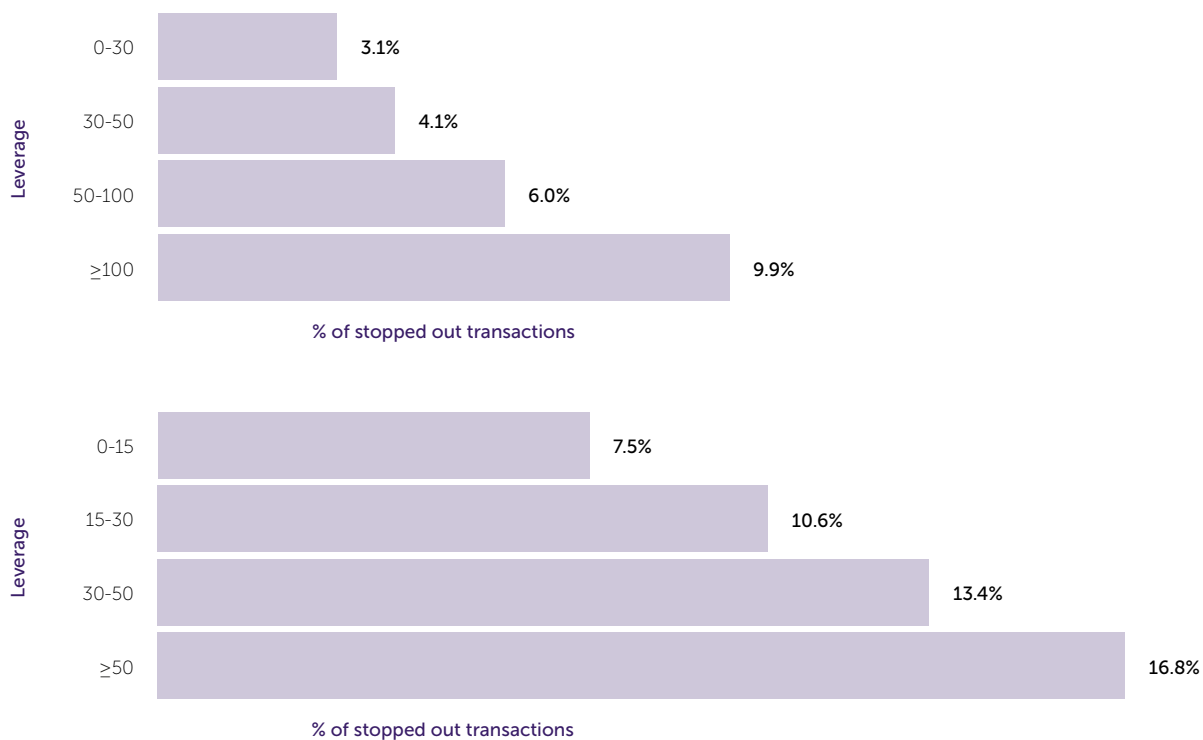
Figure 15: Percentage of stopped out transactions increases with the leverage for turbos with **indices (top) and equity (below) as underlying**.

Table 3 shows the results split for BEST turbos and Classic turbos[15]. BEST turbos account for 76% of the transactions and are the most popular turbos. The average transaction return of BEST turbos (-3.42%) is less than that of Classic turbos (-0.81%).

Type	% trans-actions	Avg return	Avg leverage equity	Avg leverage indices	Avg holding period	% equity	% indices	% other under-lying
BEST	76%	-3.42%	22	71	124h	35%	57%	9%
Classic	21%	-0.81%	6	29	262h	40%	51%	9%

Table 3: Several statistics regarding BEST and Classic turbos.

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[15]   Limited turbos are excluded from this analysis as they are traded relatively infrequently (48,148 transactions, 2,65% of total).

4.3.3 Total client return decreases with the number of transactions

There is a group of frequently trading clients. Table 4 shows several statistics regarding the degree of activity of clients. 3% of the clients account for 46% of all transactions.

14% (3% + 11%) of the clients account for 81% (35% + 46%) of the transactions. Figure 16 shows the average leverage used by clients with different degrees of activity. The average leverage increases with the number of transactions.

Number of transactions	% clients	% transactions
0 - 10	51%	2%
10 - 100	35%	17%
100 - 500	11%	35%
≥ 500	3%	46%

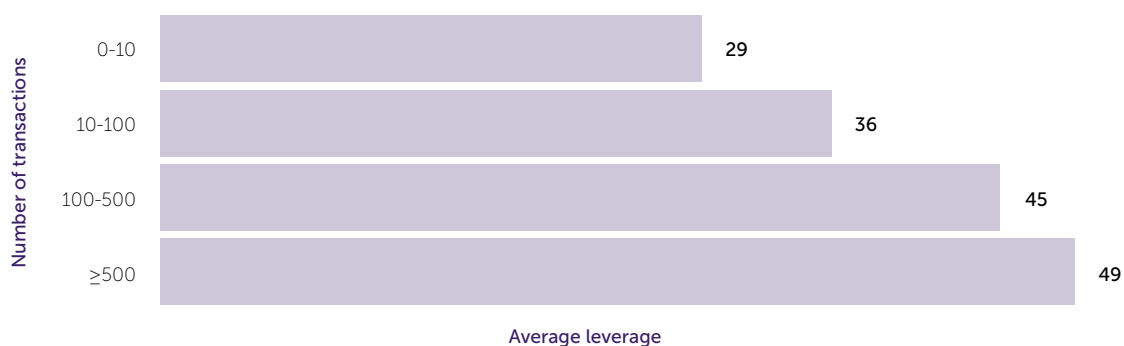Table 4: some statistics based on the number of transactions per client.

Figure 16: the average leverage increases with an increase in the client's total number of transactions. The finding holds for transactions in both equity and indices as underlying.

Figure 17 shows the percentage of clients making a loss and the number of transactions. The percentage of clients that made a loss increases with the number of transactions. 88% of the 'active' trading clients (500+ transactions per year) made an overall loss. These clients constitute 3% of the total number of clients. However, these clients account for a significant percentage of all transactions (46%). The size of the loss increases as more transactions are executed. Figure 18 shows the distribution of total returns for clients with varying degrees of activity. The total return per client decreases with the number of transactions.
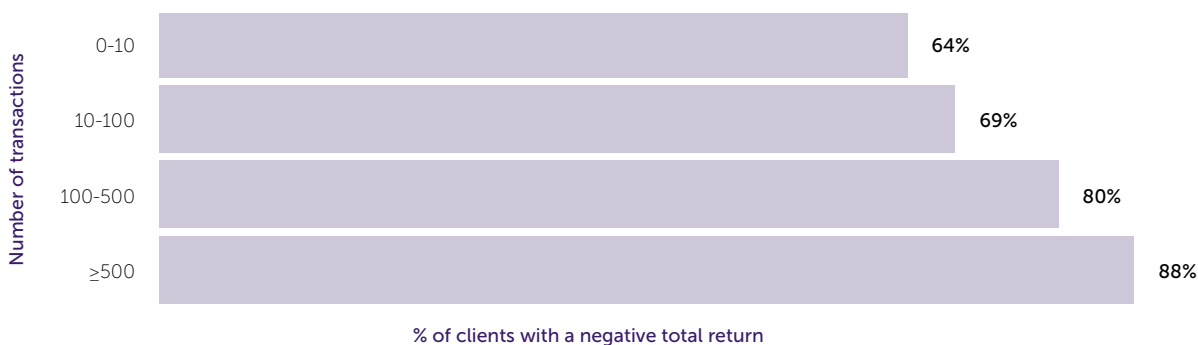
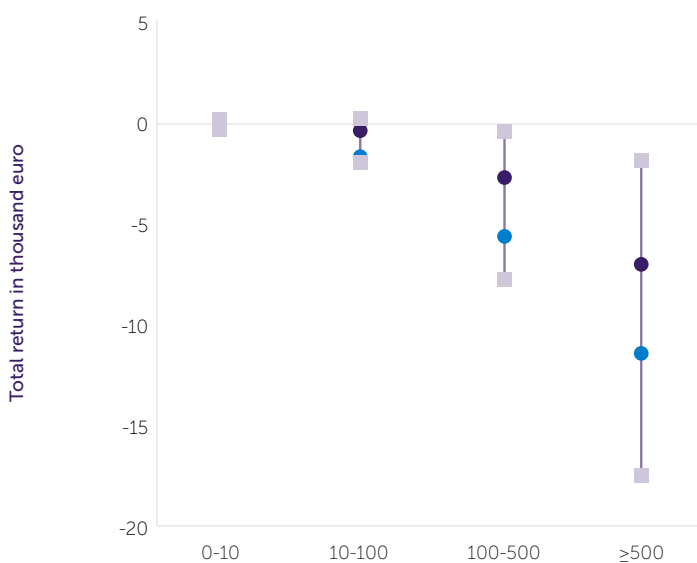Figure 17: the percentage of clients that made a loss increases with the number of transactions.

Figure 18: boxplot of the total return of a client in thousands of euros related to the client's number of transactions. The relative return decreases as the number of transactions increases. The percentage of each subgroup of the total clients is 51%, 35%, 11%, 3%.

4.3.4 The holding period is generally short

Most positions in turbos are held for a short period. Figure 19 shows that 56% of the turbo positions are closed within 24 hours. 5% of the turbo positions have a holding period longer than 30 days (=240 hours)[16].

Tables 5 and 6 include some findings regarding the holding period. Turbos that are held relatively long (> 720 hours) are mostly long turbos with equity as underlying asset and a low leverage. The average leverage decreases with the holding period.

Table 5 shows that the average relative return is negative for a shorter holding period (< 720

hours). For a holding period longer than 720 hours the average relative return is positive (+12.8%). A possible explanation is the 'survivorship' bias. Trades that are stopped out within 720 hours are filtered out. A turbo position that is held for longer than 720 hours is by definition not stopped out within 720 hours, and is therefore more likely to have a positive return.

Figure 20 shows the dispersion of the return for different holding periods. The dispersion increases with the holding period. For longer holding periods the average and median return are positive.
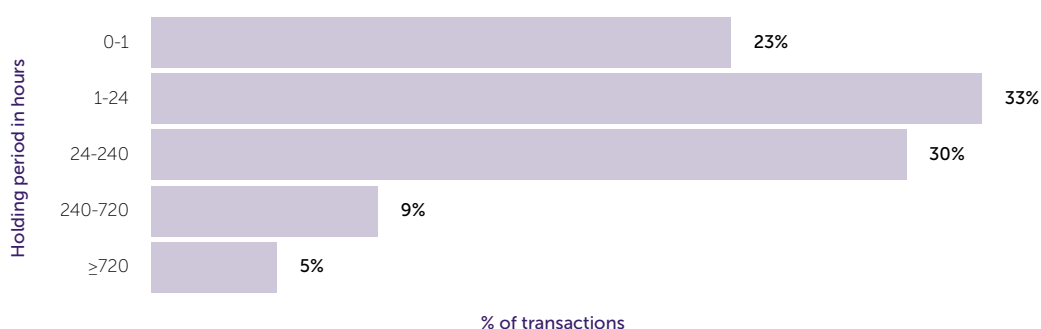

Figure 19: holding periods are generally short.

Holding period in hours	% trans-actions	Avg return	Avg leverage equity	Avg leverage indices
0 - 1	23%	-0.86%	26	75
1 - 24	33%	-2.39%	23	63
24 - 240	30%	-7.19%	17	50
240 - 720	9%	-4.77%	12	33
> 720	5%	+12.77%	9	21

Table 5: Several turbo characteristics split by the holding period.

[16] Only transactions that could be matched in this period are taken into account in the analysis.

Holding period in hours	% long	% short	% equity	% indices	% other underlying
0 - 1	54%	46%	17%	78%	5%
1 - 24	60%	40%	28%	65%	7%
24 - 240	69%	31%	45%	46%	10%
240 - 720	80%	19%	64%	27%	9%
≥ 720	88%	11%	75%	17%	8%

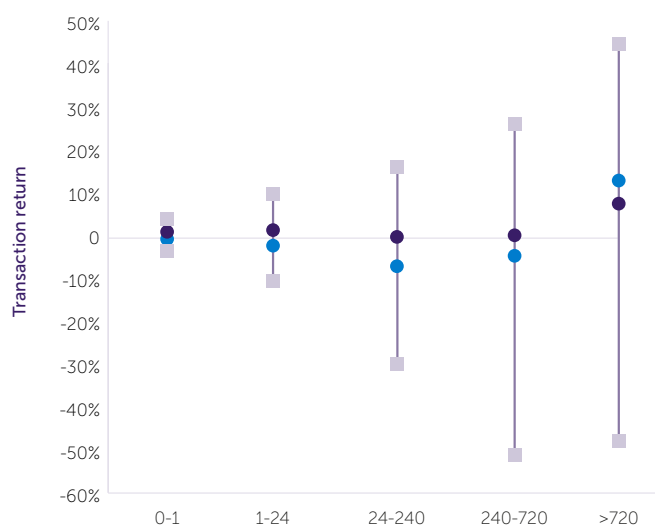Table 6: Several turbo characteristics split by the holding period.

Figure 20: boxplot for the (relative) transaction return against the holding period. Note that the dispersion increases with the holding period and that the returns improve for the highest holding periods.

Appendix

5.1 Illustration of the FIFO method

This section provides an illustration of how the FIFO method works. Suppose that, at time = 1, a buy order for 10 turbos at a price of €5 is executed. At time = 2 a buy order for 20 turbos at €6 is executed. At time = 4 a sell order for 5 turbos is executed at price €8. At time = 5 a sell order for 25 turbos is executed at price €9.

The table below gives the position in turbos in time.

# of turbos	Price				
	€5	€6	€7	€8	€9
30					
25					
20					
15					
10					
5					
Time	t=1	t=2	t=3	t=4	t=5

When the FIFO method is applied the executed orders result in 3 transactions as shown in the table below.

Transaction number	Time of purchase	Time of sale	Number of turbos	Price purchase	Price sale	Return per turbo	Total return
1	1	4	5	€5	€8	€3	€15
2	1	5	5	€5	€9	€4	€20
3	2	5	20	€6	€9	€3	€60

The total nominal return equals €15 + €20 + €60 = €95. This corresponds with the total nominal return from the first table: 25*€9 + 5*€8 − 10*€5 − 20*€6 = €95.

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