

## **THE TRADITIONAL BROKERS: WHAT ARE THEIR CHANCES IN THE FOREX?**

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The electronic brokers compete with the traditional brokers. The electronic brokers offer lower costs, increased speed and a better guarantee of transparency and of anonymity. The only real advantage of the traditional brokers is the gathering of information. We investigate whether the traders in the foreign exchange market consider that to be crucial, which is equivalent to asking “Do traditional brokers have any chance in the forex?” We build a simple model and use the results of a questionnaire that we elaborated and that was sent to the users of the brokers’ services in the Portuguese foreign exchange market. We also use transaction data from the most important dealer in the Portuguese market. Considering this dealer to be representative, we conclude that the main advantage of the traditional broker is not much valued by the dealers. This does not leave a promising future for the traditional broker.

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### **I. Introduction**

Presently, there are two kinds of brokers: traditional brokers and electronic brokers.<sup>1</sup> Electronic brokers can do what traditional brokers do with lower costs. Qualities like transparency and anonymity are better guaranteed by electronic brokers.<sup>2</sup> The time needed for traders to react to new information

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<sup>1</sup>The electronic brokers are electronic trading systems used by dealers. Some articles that may help the reader who wants to have a better understanding of an electronic trading system are Domowitz (1992, 1993a, 1993b) and Harris (1990).

<sup>2</sup>For a deep study of the importance of the anonymity in securities markets, see Forster and

is reduced when using electronic brokers. The only real advantage of traditional brokers is the ability to collect and supply information, and that is what may make their survival possible. The purpose of this paper is to investigate whether the traders in the foreign exchange market consider that ability to be crucial, which is equivalent to asking "Do traditional brokers have any chance in the forex?".

We use the results of the responses to a questionnaire that we elaborated and that was sent to all the users of the electronic brokers' services in the Portuguese foreign exchange market. They indicate that traders use traditional brokerage services because of information.

A simple model suggests that traditional brokers should be more used in periods of high price variability if traders value their ability to provide information. We use data on the total trades in Deutsche mark-Portuguese escudo of one of the most important dealers in the Portuguese market, and we find evidence that this trader does not use the traditional broker's services when price variability is higher. We discuss some implications of our findings in the conclusions.

Although the empirical elements were obtained in the Portuguese foreign exchange market, competition between traditional and electronic brokers is common to other markets. Automated trading systems were introduced in stock exchanges much earlier than in the foreign exchange market. Reuter's Instinet, for instance, was launched in 1969. Subsequently others appeared, especially in the last decade. In the foreign exchange market, the electronic broker was introduced with Reuter's Dealing 2000-2, in 1992. The next year, both EBS and Minex were launched. In 1996, EBS bought Minex, and nowadays there are only two electronic brokers operating in the spot forex. According to Hartmann et al. (2001) electronic brokers have also appeared in the money market, although traditional brokers are still dominant.

The spreading of electronic trading systems is an international phenomenon. They usually have terminals around the world and they have gained importance in many countries. For example, according to the Federal Reserve Bank of New York (2001), in the United States, from 1995 to 1998,

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George (1992). Admati and Pfleiderer (1991) is also very relevant. Madhavan (1996) is one of the most significant articles on market transparency.

electronic broking in the forex more than doubled its total market volume share, as well as its share of the brokers market.

## **II. The Argumentation**

Brokers have a better access to information. We can distinguish between two kinds of information: one about prices currently quoted by dealers – which is relevant in a decentralized market with search costs – and another about the market tendency. The electronic broker may stand on a superior position in the access to the first kind of information. However, the opposite is true for the second kind of information.

The contacts between the traditional broker and its clients occur in a personalized way, which allows it to feel the market tendency. In a conversation, it is often possible to understand the true motivation underlying the placement of an order (inventory imbalance or speculation), which improves the quality of the information about the market tendency. The electronic broker cannot have that. McCloskey and Klamer (1995, p.91) emphasize the important role of talking in information transmission: “(...) humans are talking animals, talking in their markets. The talk probably matters: why else would the human animals bother doing it? The usual economic view of the talk is that it issues orders and conveys information.”

While, in the foreign exchange market, the electronic broker in its present form is neutral in relation to any of its clients, the traditional broker may hint to its best clients thus using its superior information to attract them. Our question is whether this distinguishing feature is relevant to the dealers' choice of the way to trade, that is, through a traditional broker, through an electronic broker or directly contacting other dealers.

To assess the advantages and disadvantages of both traditional and electronic broker's services from the dealers' perspective, we use data from a survey conducted on 12 banks participating in the Portuguese foreign exchange market. Details on the survey are provided in Appendix 1. The survey reveals that the market participants consider the decisive advantages of the electronic broker to be: speed, in the first place; price, in the second place; and the dimension of the market within reach, in the third place. On the other hand, the traditional broker is considered to have as main advantages its human

nature, capable of passing relevant information, the possibility of effecting trades between dealers who do not have open mutual credit lines, and the larger flexibility in defining the trading amount. The first reason is the most mentioned one.

The same survey database reveals that, in Portugal, in 1997, the volume of transactions intermediated by a traditional broker was only half the volume of transactions intermediated by an electronic broker. With the complete adaptation to the new electronic system, this discrepancy has subsequently risen. This is evidence that by and large the advantages of the electronic broker outweigh the advantages of the traditional broker. Is it enough to lead us to the conclusion that the electronic broker will completely replace the traditional broker? No, if the advantages of the traditional broker are sufficiently valued to guarantee its survival, although in a secondary position. And that was possibly what 71.4% of the market participants that answered the survey were thinking would happen.

In order to investigate the true value the dealers attach to the transmission of information by the traditional broker – its main competitive advantage – we now introduce some structure in our reasoning, and present a simple model that delivers a testable prediction.

### **A. A Simple Structure**

We consider several dealers but only one broker (traditional) that participate in the market for a foreign currency. Transactions are sequential and the quantity traded is one.

There are 2 periods. In the first period, by trading through the broker, a dealer gets information about the true value ( $V$ ) of a currency. The broker sends a signal that may take two values:  $\bar{V}$  or  $\underline{V}$ , with  $\bar{V} > \underline{V}$ . If it is  $\bar{V}$ , then there is a recommendation to buy that currency. If it is  $\underline{V}$ , then the recommendation is to sell. The unconditional distribution of  $V$  assigns equal probability to each event.

When one dealer receives the information, he is already trading through the broker, that is, he gets information about the true value ( $V$ ) of the currency after the trade is made. However, the information is long-lived, it is still useful thereafter. We consider that the signal received is useful to forecast the true value of the currency in the next period. Obviously, if there were more periods

the broker could still be useful as a provider of information for those periods.

The broker has superior information because he observes a large part of the total order flow and is particularly attentive to all news that may influence the market. This ability works like an anticipated observation of the realisation of  $V$ . Nevertheless, the broker may err. There is noise in the anticipated observation of the realisation of  $V$ . On one hand, the broker does not observe the complete order flow in the market. On the other hand, it may not interpret correctly the consequences of a piece of news. Therefore, it may happen that the broker signals a  $\bar{V}$  when the true value turns out to be  $\underline{V}$ , or *vice versa*. If the broker is mistaken, whoever follows its advice loses. The probability that the broker is mistaken is  $\rho$ .<sup>3</sup>

The cost of trading through the broker is  $c$ .<sup>4</sup>  $c$  must be less than  $\bar{V} - E(V)$  and less than  $E(V) - \underline{V}$ .

When a dealer decides whether to use the broker's services, he must take into account the possibility of meeting and trading with another dealer that has received the same information, next period.  $\gamma$  is the probability that the dealer he will be trying to trade with next time has also used the broker's services. Dealers trade only for speculative reasons. They must be convinced they are going to profit from the trade. They are not forced to trade by any liquidity motive. Consequently, when the dealers value the currency in the same way, no transaction takes place.

The expected value of the profit made with a transaction when a dealer uses the broker's services is:

$$\begin{aligned}
 E(\pi | B) = & 0.5 (1 - \rho) \gamma (-c) + 0.5 (1 - \rho) (1 - \gamma) (\bar{V} - E(V) - c) + \\
 & 0.5 \rho \gamma (-c) + 0.5 \rho (1 - \gamma) (-\bar{V} + E(V) - c) + \quad (1) \\
 & 0.5 \rho \gamma (-c) + 0.5 \rho (1 - \gamma) (\underline{V} - E(V) - c) + \\
 & 0.5 (1 - \rho) \gamma (-c) + 0.5 (1 - \rho) (1 - \gamma) (-\underline{V} + E(V) - c)
 \end{aligned}$$

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<sup>3</sup> In an efficient market, the broker would have a probability of being mistaken of 0.5, since there is no such thing as superior information, and  $V$  may take two values with equal probability. In that case, the services of the brokers would not be informationally valuable.

<sup>4</sup>  $c$  is the broker's receipt. As pointed out by the referee, this model discusses only the

Note that for simplicity we only include the second period trade (with another dealer) and the first period cost of trading through the broker. The expected value of the first period trade is not included because it is not affected by the acquisition of information.

The expected value of the profit made with a transaction when a dealer does not use the broker's services is:

$$E(\pi | N) = 0.5 (1 - \rho) \gamma (-\bar{V} + E(V)) + 0 + 0.5 \rho \gamma (\bar{V} - E(V)) + 0 + 0.5 \rho \gamma (E(V) - \underline{V}) + 0 + 0.5 (1 - \rho) \gamma (\underline{V} - E(V)) + 0 \quad (2)$$

Zeros are left in the expression to stress that the number of possible outcomes is the same in the two situations: using or not using the broker's services. In the second case, four of those outcomes are zero. Also, and as before, the expected value of the first period trade is not included because it is not affected by the acquisition of information.

We now have that:

$$\begin{aligned} E(\pi | B) > E(\pi | N) &\Leftrightarrow \\ -c + (0.5 - \rho) (1 - \gamma) (\bar{V} - \underline{V}) > \gamma (\bar{V} - \underline{V}) (\rho - 0.5) &\Leftrightarrow \\ \rho < 0.5 - c / (\bar{V} - \underline{V}) &\quad (3) \end{aligned}$$

It is profitable for the dealer to use the broker's services if and only if the probability of receiving a wrong signal is less than  $0.5 - c / (\bar{V} - \underline{V})$ , which is obviously less than 0.5. The credibility of the broker must be larger the larger the value it charges for its services, proportionally to the potential profits. Particularly, when the broker is never mistaken, the condition for trading through the broker is  $c < 0.5(\bar{V} - \underline{V})$ , which is equivalent to demanding that the broker does not charge more for its services than the dealer may expect to profit from the hinted transaction.

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demand for brokerage services. In some other financial markets, depending on the value of  $c$ , the broker could use the superior information to its own profit. However, in the foreign exchange market this complexity does not arise, since no dual trading is allowed.

If the condition for deciding to use the broker's services is verified for all dealers at the same time, then no one profits from the information for no one is willing to trade.<sup>5</sup> To avoid this problem we may assume that dealers are heterogeneous. For instance, the parameter  $\rho$  may be a subjective one, varying from dealer to dealer, depending on the history of the results they have obtained with previous information received from the broker. Alternatively, we may add dealers that trade for liquidity motives.

We could introduce new features that would make the framework closer to reality. For instance, we could endogenize the broker's credibility. However, the simple expression (3) we arrived at is enough to show our point. That expression indicates that the larger the price dispersion,  $(\bar{V} - \underline{V})$ , the larger the probability of a client deciding to use the broker's services with the purpose of obtaining superior information. This is the main implication of the analysis. The intuition is plain.  $(\bar{V} - \underline{V})$  is a simple form of expressing the volatility of the security price, since it is the amount of its possible variation. The larger the possible variation of the exchange rate, the larger the incentive to use the broker's services because the larger the potential gain obtained with the information received from the broker. Therefore, we should expect that if a dealer attaches great importance to the broker's ability to transmit information, he will increase his use of the broker's services when volatility is higher.

## B. The Econometric Model

The structure presented in Section II.A suggests that we search for a relation

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<sup>5</sup> This resembles the situation present in Grossman and Stiglitz (1980): their paper also analyses the conditions for demanding information when it costs  $c$  and there is some probability of the information being wrong. The price of a risky asset is a result of supply and demand. The demand for the risky asset depends on the information obtained about the return of the risky asset and on the price. The supply is a random variable. Grossman and Stiglitz conclude that if the variance of supply is small, the equilibrium price reveals most of the information acquired by those who decided to pay for it. Therefore, the observation of the equilibrium price is almost equivalent to the observation of the information and it is not very interesting to pay for this. In an efficient market, where the price reveals all the information, there is no possible equilibrium, because if the price has all the information, no one is interested in paying for it; but if no one acquires the information, it cannot be incorporated in the price. Several ways of overcoming this problem are possible.

between the use of the traditional broker's services and the level of volatility. The hypothesis we want to test is: There is a significant positive relation between the use of the traditional broker's services and exchange rate variability. If this hypothesis is confirmed, then we will conclude that the traditional broker is highly valued as an information provider having, therefore, a large probability of survival. Otherwise, we will conclude that the traditional broker is not much valued as an information provider, and as that is its main advantage compared to the electronic broker, its probability of survival will be reduced.

Since we want to investigate how a qualitative variable responds to another variable, and the qualitative variable takes only two values – one if the transaction was made through the broker and zero otherwise – the probit is the appropriate econometric model. In estimating the model, we considered the possibility that the volatility acts on the dealer's decision with some lag. We assumed that if there is any influence, it should have been noted after three periods. We use transaction time: each period corresponds to one transaction.

Although we want to focus on the relationship between the traditional broker's services and the level of volatility, the introduction of two other variables in the set of explanatory variables improves the general quality of the model. The two mentioned variables are the transaction value and a dummy variable indicating whether the transaction was a dealer's sale or a dealer's purchase. The inclusion of the days of the week was also tried but did not improve the quality of the model. The empirical findings are similar to the ones with only current and lagged values of exchange rate variability as explanatory variables.

The estimated model is the following:

$$broker_t = \begin{cases} 1 & \text{if } br_t^* > 0 \\ 0 & \text{if } br_t^* \leq 0 \end{cases} \quad (4)$$

$$br_t^* = \alpha_0 + \alpha_1 |\Delta P_t| + \alpha_2 |\Delta P_{t-1}| + \alpha_3 |\Delta P_{t-2}| + \alpha_4 |\Delta P_{t-3}| + \alpha_5 v + \alpha_6 ty + \varepsilon_t \quad (5)$$

*broker* is a dummy variable that takes the value one when the current transaction is made through the traditional broker, and which is zero otherwise.  $br_t^*$  in the talent variable.  $|\Delta P_t|$  is the absolute value of the price



variation between the previous and the current periods.  $P$  refers to the Deutsche mark-Portuguese escudo foreign exchange rate.  $v$  is the current transaction value.  $ty$  is the dummy variable that expresses the type of the previous transaction. It is 1 when the transaction is a purchase from our dealer's point of view and it is -1 when the transaction is a sale from our dealer's point of view.  $\varepsilon_i$  is assumed to have a normal distribution with zero mean.

If the hypothesis stated above is correct, we should find some of the  $\alpha_i$  ( $i=1, \dots, 4$ ) statistically significant and positive. To test the relationship, we used a database with the transactions of one of the most important dealers/banks in the Portuguese foreign exchange market. The database is presented in Appendix 2.

### III. The Results

The estimation results, presented in Table 1, show a weak relationship between volatility and the decision to use a traditional broker's services.

The absolute price variation of the last two transactions seems to have little importance in the choice of the counterpart. Although  $\alpha_3$  is highly significant, its sign is negative, which is against what we expected to find in case volatility induced a demand for the traditional broker's services in the short term.

The high significance of  $\alpha_3$  is in line with the statistics shown in Table 5 of the Appendix 2. These statistics reveal that the average value of transactions made through the electronic broker is about three times larger than the average value of transactions made through the traditional broker.

The Kullback-Leibler  $R^2$  does not give evidence of a good fit of the model, either. It is, however, the best model that we could test given the available data that relates the use of the traditional broker's services and exchange rate variability. The score  $n$  statistics test the null hypothesis of no serial correlation of order  $n$  and show no evidence of serial autocorrelation at either of the considered lags. The likelihood ratio test1 compares the loglikelihood of the presented model with the one of a model with only a constant term. The null hypothesis is that all coefficients, except for the constant term, are zero. The introduction of the variables significantly improves the model. The likelihood ratio test2 tests the null hypothesis of homoscedasticity against

**Table 1. Estimation Results**

Parameter	Estimated value	t-statistic	P-value
$\alpha_0$	-0.505607	-2.66367	0.008
$\alpha_1$	-14.9643	-1.54176	0.123
$\alpha_2$	5.30403	0.60868	0.543
$\alpha_3$	-34.5579	-2.70813	0.007
$\alpha_4$	-8.06378	-0.88537	0.376
$\alpha_5$	-0.1809E-6	-3.49520	0.000
$\alpha_6$	0.157158	1.64256	0.100
Log-likelihood	-113.303		
Kullback-Leibler $R^2$	0.136921		
score1	0.105577		0.745
score2	0.000401		0.984
score4	0.215633		0.642
score20	0.307174		0.579
Likelihood ratio test1	35.954		0.000
Likelihood ratio test2	3.566		0.312
Normality test	0.00264		0.999

Note: The test  $score_n$  tests the existence of autocorrelation of order  $n$ , mainly as a result of the omission of lags in the endogenous variable. They have  $\chi_1^2$  distributions. The likelihood ratio test 1 tests  $H_0: \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = 0$ . It has a  $\chi_6^2$  distribution. The likelihood ratio test 2 tests the null of homoscedasticity against heteroscedasticity where the variance is a function of the current absolute variation of the price, of the absolute variation of the price lagged one period and of the dummy variable indicating the type of transaction. It has a  $\chi_3^2$  distribution. The normality test is a LM test for probits that tests the normality of the residuals. It has a  $\chi_2^2$  distribution. More details can be found in Murphy (1994).

heteroscedasticity where the variance is a function of several of the explanatory variables of the model. It does not signal heteroscedasticity. A test for normality of the residuals was introduced. It is a LM test for probits. The null hypothesis of normality is not rejected.

#### **IV. Conclusion**

This paper has analyzed the chances of survival of the traditional brokers confronted with the competition of electronic brokers. We have argued that traditional brokers will only survive if their main competitive advantage – the ability to capture and transmit information about the tendency of the market – is significantly valued by dealers. We built a simple model that leads to a positive association between the use of a traditional broker's services and the exchange rate variability. This association was tested using a database with the transactions of one of the most important dealers/banks in the Portuguese foreign exchange market.

In face of the results, we conclude that this dealer does not value highly the information the traditional broker may transmit.<sup>6</sup> It is possible that the explanation for this is the following. A trader with superior information prefers to trade through an electronic broker, since his information is better kept. However, if all informed traders avoid trading through the traditional broker, the quality of the information that the traditional broker gets decreases. Therefore, although the electronic broker is not a true substitute for the traditional broker as an information supplier, it manages to weaken the strength of the traditional broker.

Considering that the rest of the market is not very different from the dealer we studied, we conclude that the main advantage of the traditional broker is not much valued by the dealers. This does not leave a promising future for the traditional broker.

#### **Appendix 1. The Survey Database**

In 1997, we built a questionnaire that was sent to the banks operating in the Portuguese foreign exchange market that already used the Reuter's electronic trading system Dealing 2000-2. The total population was 12 banks.

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<sup>6</sup> The few transactions made through the traditional broker must have corresponded to situations where the dealer still considered to be of interest to know the information signaled by the broker, together with the other motives for choosing to trade through a traditional broker expressed in the survey responses, as the larger flexibility in the transactions design.

The answering banks accounted for 77% of the assets of the complete set of banks.

In the conception of the questionnaire we took into account the need to avoid a large number of non-responses. Therefore, the questionnaire had a short number of questions and the questions allowed for quick answers. The questions were the following ones:

1 - What is the percentage trading volume in the foreign exchange market that your bank makes through a traditional broker?

2 - What is the percentage trading volume in the foreign exchange market that your bank makes through an electronic broker (Dealing 2000-2)?

3 - What was the percentage trading volume in the foreign exchange market that your bank made through a traditional broker before using the electronic broker?

4 - Do you think that the electronic broker may completely substitute for the traditional broker? Why?

5 - What are the main motives for using an electronic broker? a) Speed; b) Trading anonymity; c) Little impact of trades on the market; d) Bid-ask spreads; e) Trading costs; f) Control of the negotiation process; g) Other.

All the answers show that the introduction of the electronic broker increased the global trading volume. And it also increased the proportion of transactions intermediated by a broker.

Only one of the answering institutions (14.3%) traded a larger volume through a traditional broker than through an electronic broker.

The decisive characteristics for the decision of using an electronic broker's services are: 1<sup>st</sup>, Speed (85.7%); 2<sup>nd</sup>, Bid-ask spreads and trading costs (57.1%); 3<sup>rd</sup>, Access to a larger market (42.8%).<sup>7</sup>

Nevertheless, only 28.6% of the banks believe that the electronic broker is going to completely take the place of the traditional broker. The reasons for believing in the traditional broker's survival are its human nature, capable of passing relevant information, the possibility of effecting trades between dealers who do not have open mutual credit lines, and the larger flexibility in defining the trading amount.

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<sup>7</sup> This characteristic was mentioned in the field "g) Other" of question 5.

## Appendix 2. The Transactions Database

Our transactions database was provided by the most important dealer acting in the Portuguese foreign exchange market. The data set consists of 416 observations of the following variables: operation type (purchase or sale), transaction price (Portuguese escudo/Deutsche mark exchange rate), transaction volume in PTE and in DEM, type of counterpart (traditional broker, electronic broker, dealer or customer), transaction day of occurrence. The data were collected between 2 January 1998 and 30 March 1998.

Some statistics are presented in order to characterize the dealer. Table 2 gives information about transactions volume. During the sample period, this dealer had, in the spot market, a total transactions volume of 1,569,076,331 DEM. That corresponds to 160,639,560,000 PTE. The average quantity dealt was 3,771,818 DEM. The median transaction was 2,000,000 DEM. The largest transaction was 102,400,000 DEM, and it occurred on 13 February 1998. This large transaction was a dealer's purchase made through an electronic broker. The smallest transactions were 1,361 DEM. There were two such transactions: two sales from clients to the dealer, both on 17 February 1998.

**Table 2. Transactions Volume**

Transactions volume (DEM)	
Total volume	1,569,076,331
Average volume	3,771,818
Median volume	2,000,000
Maximum volume	102,400,000
Minimum volume	1,361
Standard deviation	7,079,685

Table 3 shows that there were more sales from the dealer than purchases, though the correspondent volumes were quite similar, which means that the average purchase quantity was larger than the average sale quantity.

**Table 3. Number and Value of Total Transactions**

	Dealer's purchases	Dealer's sales
Number of transactions	181 (43.5%)	235 (56.5%)
Total value (DEM)	802,048,340 (51%)	767,027,991 (49%)
Average value (DEM)	4,431,206	3,263,949
Average value (PTE)	453,682,673	334,140,410

As may be confirmed in Table 4, during the sample period, the maximum number of transactions made by this dealer was 37, on 28 January 1998. On two days there were no transactions: on 9 January and on 21 January. Taking into account the two days without transactions, the daily average number of transactions was 7. The daily median was 6 transactions.

**Table 4. Number of Daily Transactions**

Average (taking into account the two days without transactions)	7.05
Median	6
Maximum	37
Minimum	0
Standard deviation	6.54

As reported in Table 5, this dealer clearly prefers to trade through the electronic broker. He uses the electronic broker in 77 % of all his transactions. This corresponds to 92% of the value of transactions. The average value of the transactions made through the Dealing 2000-2 is considerably superior to the average value of the transactions made otherwise.

**Table 5. The Type of Counterpart Relative Importance**

	Dealing 2000-2	Traditional broker	Client	Another dealer
Average value of transactions (in DEM)	4,496,485	1,415,483	829,715	2,100,000
Total value of transactions (in DEM)	1,443,371,814 (91.99%)	58,034,794 (3.70%)	29,869,724 (1.90%)	37,800,000 (2.41%)
Number of transactions	321 (77.16%)	41 (9.86%)	36 (8.65%)	18 (4.33%)

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