

PROSPECTS OF APPLICATION OF PENDING ORDER INFORMATION FOR OIL PRICE FORECASTING IN RUSSIA

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***Abstract:** Pricing in the oil market is currently due not so much to the cost and the law of supply and demand as to the exchange situation. The price is influenced by a significant number of objective and subjective factors, the ability to analyze which is the basis of modern exchange trade. Thus, the key to the analysis of the oil market to the short term is exchange summaries. The article discusses the current trends in the formation and influence of pricing factors of the oil market. The author identifies the features of the use of orders as pricing tools, analyzes Russian realities on pending orders in the oil market. The article reveals the specifics and prospects of application of pending orders for oil market analysis. This allows us to predict changes in the situation much faster than traditional statistical methods of analyzing transactions.*

The author concludes that the application of such an instrument as a pending orders will make it possible to better understand the market conditions for the main Russian oil of the Urals brand, as well as to make the market more predictable and, possibly, manageable by the state. This will mitigate the consequences of a sharp change in oil prices and subsequent changes in the cost of energy and fuel, will make the economy more resilient to crises. Also, improving the accuracy of forecasts will increase the income of Russian traders from transactions.

The scientific basis of the publication is the work of researchers in the field of exchange trading and data analysis, as well as materials from developers of exchange data analysis software.

Key words: pending orders, limit orders, order book, the price of oil, forecasting, oil futures.

JEL codes: Q 410, Q 490.

1. Introduction

Pricing in the oil market depends on two main groups of factors. Firstly, this is the macroeconomic situation and fundamental factors that affect the demand and, accordingly, the price of oil. These factors are objective, their influence is determined economically and on price

charts manifests itself as a general trend. There are a lot of such models: from time regression to complex multifactor functions. The list of factors taken into account starts from quite logical indicators of the country's GDP, Purchasing Managers' Index (Shakirova, 2015), exchange rates (Farooq & Umarb, 2019; Chen et al., 2016), tax level and ends with the influence of solar activity cycles (Belkin, 2017). In any case, market participants should study the reports for the period, make sure that the macroeconomic dynamics change and react, so the change in the price trend is manifested in the market with some time lag.

The second group of factors is due to the current situation. These factors are subjective, often they reflect market expectations, as well as are associated with collective perception of various events, minor political, social and other phenomena. It is this group that creates a constant fluctuation in the prices that are imposed on the trend. The art of playing on the stock exchange is just the ability to work with such current price spikes around the trend. The problem is complicated by the fact that it is impossible to unequivocally divide factors into fundamental and opportunistic ones.

In theory, the main fundamental factor is the ratio of supply and demand, but there is no such objective data in the world. This information can only be obtained indirectly from data on changes in oil reserves. Such statistics are regularly published in reviews by the American Petroleum Institute (API), the Information Agency of the US Department of Energy (EIA), and the International Energy Agency (IEA). However, these data are not accurate, industrial stocks are relatively objectively estimated only for OECD countries. The growth of production and strategic stocks indirectly indicates an excess of supply over demand, which should lead to lower prices.

Trading of crude oil in the absolute majority of cases is carried out through exchange mechanisms. In particular, it is futures trading, which quickly crowds out traditional transactions with real goods. According to statistics, the total daily volume of futures contracts on the world's largest oil exchanges NYMEX and LIPE for the main brands of Light Sweet and Brent oil exceeds 200 thousand, and oil production of the corresponding grades does not exceed 700-800 barrels per day (BP Statistical Review of World Energy, 2019). It turns out that the virtual volume of trading is about two orders of magnitude larger than the volume of physically existing oil. The oil market, in fact, has been divided into two parts: the physical oil market and the oil futures market, where the subject of transactions is no longer the product, but its financial implementation. This feature radically affects pricing. Futures are disconnected from real physical goods.

Real success in trading can be achieved only if there is a new algorithm for analyzing data, unknown to other participants or due to insider information. Therefore, the world is constantly trying to find new tools for searching and analyzing information, and due to this, get ahead of competitors in decision-making. One such tool was the analysis of pending orders, the features of the functioning of which in Russian realities is devoted to this article.

2. Methodology and Data

As basic research methods, we used a systematic approach, comparative and statistical analysis of indicative values of oil prices, external and internal factors of influence on pricing.

The work considers pending orders as a pricing tool in the oil market, as well as Russian realities of analysis on pending orders in the oil market.

During the study, topical statistical and analytical resources were considered (data from the Organization of Petroleum Exporting Countries, the EIA International Energy Agency, the American Petroleum Institute (API), the Russian Ministry of Energy), estimates and forecasts of oil and gas experts.

A specific feature of the oil market is the widespread use of futures contracts. If the goods or futures are simply to be sold or bought at the current time, the broker is instructed to issue or purchase the item at the current price. Such an order is called a Market Order. Recently, another scheme has become widespread in the oil market, when the opening of a position is postponed indefinitely until some event occurs. Such orders are called Pending Orders. They come of different types, but in the oil markets the so-called limit pending orders have gained the greatest popularity. In this case, it is possible to open an item only if the average exchange prices for similar goods are higher or lower than a certain limit level. This is convenient, since the broker, having received an instruction, can passively wait for the event to occur, and if it does not happen, then the transaction will not automatically take place. For example, after a long drop in oil prices, experts expect a change in trends and rising prices. The broker on the part of the buyer in advance receives a delayed order of the Buy Limit type for the purchase of the futures and waits for the moment the price drops to a certain value. Once the condition is met, the broker makes a purchase. Then you need to wait for the expected price increase, close the warrant and profit from the price difference. The opposite situation is possible when the transaction is made at a price higher than the current Sell Limit in the expectation of its further reduction.

The convenience of using pending orders for the participants in the transaction is obvious, but this tool also turned out to be extremely interesting for market analysis. Transactions with orders occur remotely, as a result, an order book is formed, through which buyers submit applications, and sellers offer quotes with the specified price and quantity. Given that all operations are carried out remotely, the information base is updated instantly and this is important for operational analysis.

Orders can be processed with classical statistical tools (frequency, correlation, regression analysis, etc.), but more advanced high-frequency analysis technologies can be used up to taking into account specific transactions. Theoretically, the importance of individual landmark events for market analysis has always been recognized, but it has not been possible to automatically identify and interpret them based on a huge array of rapidly changing information for a long time.

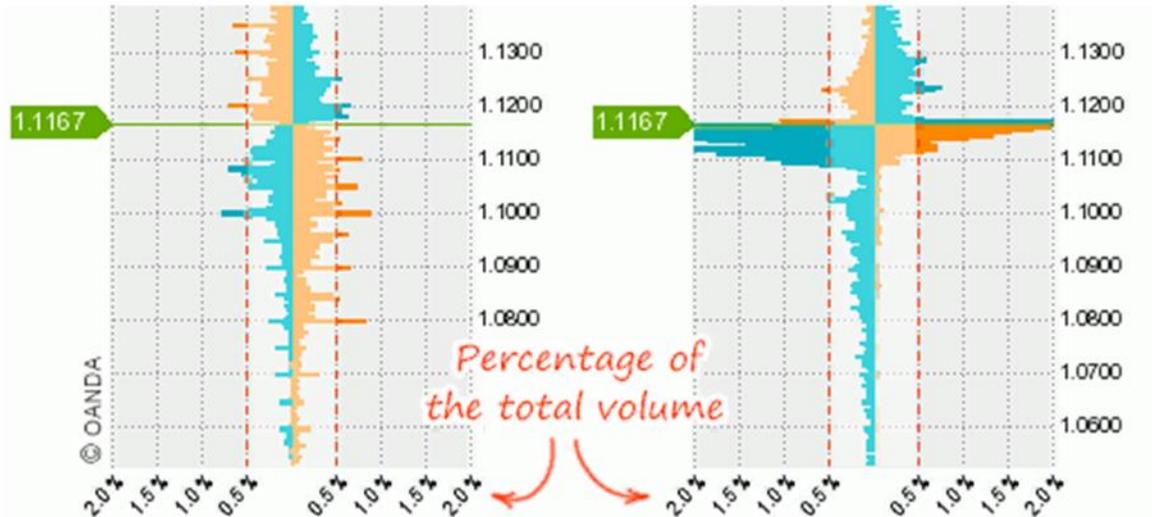
The increase in computer computing capacity has made it possible to gradually move from analysis of monthly market data to daily and intraday ones. For example, this opportunity is provided by the FXSSI platform for analyzing the situation in the Forex market (Order Book, 2000). It is integrated with the Matatrader terminal and allows you to visualize a special graphical indicator – Order Book. A "snapshot" of the order book is generated every 20 minutes.

The Order Book as a market analysis tool has been known for a long time. In its simplest form, it includes only limit orders (What is an order book..., 2020). This can be a table, each row of which contains information about the price and volume of assets put up for sale or purchase. More illustrative is the Order Book in the form of a histogram. These simple forms are available on almost all exchanges in the world. The problem is that units operate with real-time information other than the mentioned FXSSI. For most other companies, the processing of huge amounts of exchange information has so far proved to be an unsustainable task.

FXSSI offers an extended version of the Order Book with a breakdown of information by all types of deferred orders. In addition, the indicator OrderBook displays open trades and deferred orders of traders in the form of a histogram (Figure 1), which consists of two parts. On the left side (left «glass») all pending orders are displayed. The right half of the histogram displays transactions of market participants that are currently open. All transactions are distributed to 10 price levels, which allows you to perform a frequency analysis of prices. The amount of transactions placed at each of these levels is determined as a percentage of the total trading volume. For clarity, the data is displayed on the histogram in axes price level - volume percentage. The trade volume histogram column typically covers transactions containing 0 to

2%. It is believed that transactions with a volume of more than 0.5% are of analytical value. Smaller transactions in theory should also be considered, but they require other, more complex analysis algorithms that are absent from the program.

Fig. 1. Example OrderBook



Source: according to BP Statistical Review of World Energy, 2019.

The left half of the histogram reflects purchase warrants, the right - for sale. There may be some relationship between the two halves. For example, in a speculative market there are many double deals when first the goods are bought, and then sold at a margin.

OrderBook does not give an unambiguous indication of the necessary action and requires special additional methods for analyzing the histogram. In fact, the analysis boils down to finding abnormal distribution patterns in the structure of sellers and buyers. A detailed analysis guide is available on the FXSSI platform developer's website OrderBook.

At the moment, there are many unresolved issues of automatic processing of large arrays of exchange data. Not all information is objective, it is important to identify a significant event and distinguish it from a random or logical one. Many limit orders are not implemented, since the necessary event did not occur. Thus, for an adequate conclusion, it is necessary not only to analyze the appearance of new orders, but also to track how orders really turn into transactions. This requires complex analysis algorithms, so so far the main method of processing data is to collapse them to analytical tables and visual histograms with subsequent visual evaluation.

3. Results and Discussion

Market analysis on pending orders is gaining popularity in Russia, this tool is actively advertised by traders as one of the promising mechanisms for market analysis, there is and is being promoted the Russian version of FXSSI. The Internet is full of recommendations on the use of pending orders in exchange trading. The most popular trading platform for the Forex market, the Matatrader trading terminal involves extensive opportunities to work with pending orders. Other trading platforms are not lagging behind in technology.

The problem is that in Russia, analysis on warrants exists only due to the built-in capabilities of exchange terminals. We copy foreign experience, we have little research in this area, although this topic has been actively developing abroad for more than 10 years. A number of special studies are devoted to the market of limit orders (Gould et al., 2015; Gould et al., 2013; Parlour & Seppi, 2008; Abergel, 2016). Many works relate to algorithms for processing data of the order database (Cont & de Larrard, 2013; Cont et al., 2010) and documenting empirical laws (Ait-Sahalia & Saglam, 2017).

There is fundamental work on market analysis based on data from pending orders (Ait-Sahalia & Saglam, 2017; Rosu, 2008) and the use of an Order Book. The lack of domestic research on this topic does not allow an objective assessment of the prospects for the use of such analysis in the Russian Federation. Only the transfer of foreign research materials to the domestic market is possible. Russia's lag in applying pending orders analysis can be partly explained by the fact that such research requires large markets with a large number of transactions and a developed IT infrastructure.

First of all, this should include energy markets and, in particular, the oil market. The Moscow exchange in terms of the scale of oil trade is still far from leaders. It should also be noted that the described FXSSI instruments are intended for the Forex exchange, and oil is traded more at other sites, for Russia it is MICEX. Its QUIK trading terminal provides full functionality for working with pending orders, but analytical capabilities are limited by displaying a simple Order Book.

How applicable and effective is order-based analysis to the oil market? A University of Maryland study (Roberts, 2018) examines the U.S. oil market, in particular the Texas Oil Futures (WTI) market on the Chicago Mercantile Exchange (CME). This market is one of the most active, and therefore has the most representative statistics. The WTI market is closely linked to the world's largest economy. Actually, for this reason, it is used as an indicator of the

macroeconomic situation. Of course, Urals oil is the most interesting for Russia and direct transfer of quantitative indicators for WTI is impossible, but using a similar qualitative approach to analysis is quite acceptable. In addition, it should be noted that only a few grades of oil are traded on the largest world exchanges - Brent and WTI, and pricing for other grades is based on premiums and discounts to these standards.

The study provides a variety of statistics and different methods of data analysis. In particular, it is stated that in the order book 97% of changes are not related to previously observed transactions and only three percent of events can affect the vector of the quoted price in the future. About two-thirds of transactions occur immediately at the best quotes and do not affect the price situation. If such an influence is noted, it mainly concerns the level of best prices. The study argues that the development of information technologies makes available the widespread use of new methods for analyzing exchange information. Many questions related to the development of the oil market, liquidity, price forecasting can find answers based on high-frequency analysis of orders.

Another important area is the development of data visualization technologies, which allows you to get a much more complete idea of the market, its time dynamics, to trace the relationship between the movement of quotes and the depth of the market for buyers and sellers. Visual display allows you to analyze patterns and draw conclusions about the depth of the market, its liquidity, responsiveness to various events.

Modern electronic markets allow participants to track intentions through lost responses linked to subsequent events. In other words, the most effective transactions occur when there is a tendency in the market to respond to new information.

The importance of information from orders stimulates exchanges to increase the information content of their databases. So, the Chicago Exchange began to provide additional data on placing orders in line. This should have significant implications for the quality of the analysis.

At the same time, it is worth noting that most of the proposed specific analysis algorithms have so far been tested only on test data banks. They have not yet found mass use, have not been included in the analytical packages, which means the need for further development of exchange information technologies, in which Russia can take a more worthy place.

4. Conclusions

Trade in oil on Russian exchanges is constantly growing, and trade in related instruments and futures is increasing accordingly. The market is developing and the use of new marketing tools is becoming more and more relevant for it. Such a tool is the analysis of pending orders. Its application will, firstly, make it possible to better understand the market conditions for the main Russian oil of the Urals brand, and secondly, make the market more predictable and possibly manageable by the state, which will mitigate the consequences of a sharp change in oil prices and subsequent changes in the cost of energy and fuel, make the economy more resilient to crises. Finally, improving the accuracy of forecasts will increase the income of Russian traders from transactions.

Analysis of oil prices on pending orders in Russia is quite possible and necessary, but it requires improving the IT infrastructure. The value of information from orders is determined by the time it appears, which means that a gradual transition to real-time processing of information is necessary. In the Russian Federation, there is no own analytical platform like FXSSI, and the capabilities of domestic trading terminals have not yet reached world level. For Russian business, there is a modern way to increase its efficiency.

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