TokenInsight

Methodology of Exchange Liquidity Score Calculation

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Purpose

In the fields of commerce, economy, and investment, liquidity refers to an indicator that an individual can quickly buy or sell the underlying assets without suffering a substantial price loss. Mature markets should maintain better liquidity for a long time. Similar to stocks trading, in the secondary market of digital assets, liquidity is very important for investors. In addition, the same crypto is often listed and traded on many exchanges at the same time. Therefore, choosing an exchange with good liquidity is the homework that investors (especially those with large amounts of funds) must do. The purpose of the launch of the TokenInsight exchange liquidity data platform is to help investors observe the liquidity of the exchange more accurately and conveniently.

Evaluation Dimension

TokenInsight exchange liquidity score is calculated by calculating the depth and slippage data of designated trading pairs on the exchange, and combining the number of trading pairs (contract trading only), trading volume (contract trading only) and open interest (contract trading only), and other data are comprehensively obtained. All data is obtained through the open market API of the exchange. Anyone can repeat the calculation process of verifying the liquidity score according to the method used by TokenInsight through the public API interface.

Spot exchange liquidity score

The formula for calculating the liquidity score of spot exchanges:

$$LS_{Ex_i} = \alpha_i \sum OBScore_{pair_i}$$

Including:

LS_{Ex_i} ($Liquidity\_Score_{Exchange_i}$), which represents the liquidity score of exchange i.

α_i represents the adjustment coefficient of the i exchange, which is determined by the exchange data return form and web page views.

$OBScore_{pair_i}$ represents the handicap liquidity score of trading pair i on the exchange.

α — Exchange adjustment factor

Two factors are mainly considered in the adjustment factor, including the distribution characteristics of the data returned by the exchange interface and the number of page views.

- The distribution characteristics of the data returned by the exchange interface refer to whether the returned data is normal and reasonable. For example, whether the distribution of the transaction data returned in the Trades interface of the exchange is reasonable, whether the trading volume, transaction time, and other data characteristics of the transaction are abnormal. For specific analysis of this part, please refer to "TI-Exchange Real Trading Volume Research Report".

- Page views are also used as an adjustment factor for the exchange's liquidity score. TokenInsight uses the web traffic data monitored by the third-party (such as SimiliarWeb) as the data source in the calculation method of the exchange liquidity score.

OBScore— Handicap liquidity score

The calculation of the handicap (orderbook) liquidity score is divided into the following steps:

1. Calculate the liquidity score of the same base currency for each exchange.

2. The calculation of liquidity score includes two dimensions: depth and slippage.

3. Obtain the cross-section data of all trading pairs under the same base of all exchanges at a certain point in time.

4. By calculating the sum of the value of all orders in the price range of 5‰₀, 1‰ and 2‰ under the current market price, and unified into the same unit, obtain the depth data of each trading pair in the price range of 5‰₀, 1‰ and 2‰.

5. Calculate the difference based on the maximum and minimum depth data, and determine the depth data size corresponding to each unit score.

6. Assign values to the three depths of each trading pair, and calculate the scores under the three depths.

7. Calculate slippage: Use the amount of $50k and $300k to carry out a "stress test" (that is, simulate a smash) on the cross-section data obtained above, and then calculate the slippage value of a single pressure test.

8. Calculate the scores corresponding to the two amounts according to the above steps 5 and 6.

9. Average the five scores calculated above to obtain the liquidity score of a single trading pair on the exchange *OBScore*.

The trading pair score is calculated by comparing the same base currency of all exchanges to compare the liquidity of the same currency in different trading markets.

Due to the different API interface standards of different exchanges, the depth levels returned by the Orderbook interface of the exchanges are different (for example, the current Coinbase spot can return all depths, about 10,000 levels; Kucoin also provides Level3 Orderbook data to return the full order book; Binance returns 5,000 levels ; Huobi Global returns 150 files at most; OKEx returns 200 files, etc.), and the accuracy of the combined depth cannot be unified in different exchanges, etc., it is unreasonable to use a fixed level to determine the depth. Thus, we choose 5‰₀, 1‰ and 2‰ depth.

In the actual calculation process, the handicap liquidity data is obtained once every 10 minutes, which means that the score is calculated once every 10 minutes. Then take the average of the 6 scores calculated in one hour and use it as the latest score for one hour.

Derivatives exchange liquidity score

Derivatives liquidity score calculation formula:

$$LS_{Ex_i} = \alpha_i \{ W_l * \sum (W_{OB} * OBScore_{pair_i} + W_{OI} * OIScore_{pair_i} + W_{TV} * TVScore_{pair_i}) \} + W_{\#_{Pairs}} * PairsScore_{Ex_i}$$

Including:

LS_{Ex_i} ($Liquidity\_Score_{Exchange_i}$), which represents the liquidity score of exchange i.

α_i represents the adjustment coefficient of the i exchange, which is determined by the exchange data return form and web page views.

W_l indicates that the weight of trading pair's handicap, open interest, and trading volume. W_l accounts for 80% of the exchange's final liquidity score.

$OBScore_{pair_i}$ represents the handicap liquidity score of trading pair i on the exchange, and W_{OB} represents the weight of handicap liquidity score (generally 50%).

$OIScore_{pair_i}$ represents the open interest score of trading pair i on the exchange, and W_{OI} represents the weight of the open interest score (generally 25%).

$TVScorepair_i$ indicates the trading volume score of trading pair i in the exchange, and W_{TV} indicates the weight of the trading volume score (generally 25%).

$PairsScore_{Ex_i}$ indicates the number score of trading pairs on exchange I, and $W_{\#Pairs}$ indicates the weight of the number score of trading pairs (generally 20%).

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$OBScore$ — Handicap liquidity score

The calculation of the handicap (orderbook) liquidity score is divided into the following steps:

1. Calculate the liquidity score of the same base currency for each exchange.

2. The calculation of liquidity score includes two dimensions: depth and slippage.

3. Obtain the cross-section data of all trading pairs under the same base of all exchanges at a certain point in time.

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In the actual calculation process, the handicap liquidity data is obtained once every 10 minutes, which means that the score is calculated once every 10 minutes. Then take the average of the 6 scores calculated in one hour and use it as the latest score for one hour.

$OIScore$ — Open interest liquidity score

The open interest liquidity score is also the same base currency as a category for comparison. The specific calculation method is similar to $OBScore$, that is, sort all trading pairs of the same base currency, and then calculate the open interest scores of the same base currency and different trading pairs in the same way as in steps 5-6 of the above calculation. .

When calculating the open interest liquidity score, calculators need to pay attention to converting different contract targets into a unified unit of measurement. In the actual calculation process, the open interest liquidity score is consistent with the handicap liquidity score, and the data is obtained every ten minutes and the score is calculated once. Then take the average of the six scores calculated in one hour and use it as the latest score for one hour.

TVScore— Trading volume liquidity score

The methodology of trading volume liquidity score is similar to the above two score calculation methodology. It is also calculated by calculating the relative trading volume score of the same base currency trading pair and then repeating the above steps to get the score. In terms of data frequency, data is also obtained every ten minutes, and the average score of six times within an hour is regarded as the one-hour score.

PairsScore— The number of trading pairs liquidity score

The number of trading pairs is also one of the indicators for evaluating exchange liquidity, accounting for 20% of the total liquidity indicators. The calculation method of trading pair liquidity score is relatively simple.

Trading pair liquidity score = Min (30 + number of trading pairs * 8, 100).

That is, the greater the number of trading pairs, the more points will be scored, up to 100 points. It accounts for 20% of the total liquidity score, and the highest score in this part is 20 points.

Total score calculation

After calculating the sum of the liquidity scores of all trading pairs on any exchange, calculate the hourly liquidity score of the exchange according to the formula provided at the beginning of the method description document. In order to smooth the data and avoid extreme data at an extreme moment (obtained once in 10 minutes, 6 averages are already for this purpose), the liquidity score of the exchange finally seen by the user is the average of the liquidity score of the past 24 hours at any time.

We openly accept any opinions or suggestions on this method.

You can contact us by sending an email to: research@tokeninsight.com.