SMM Quantitative Trading Strategy

| Contract		Arbitrage Type
Non-Ferrous	SHFE Copper	None
	SHFE Aluminum	None
	SHFE Lead	Inter-Commodity
	SHFE Zinc	None
	SHFE Nickel	None
Ferrous	SHFE Steel Rebar	Inter-Commodity
	SHFE Hot-rolled coil	Inter-Commodity
	DCE Iron Ore	None

Source: SHFE, SMM

Methodology:

In this report, we use the statistical arbitrage strategy to find the historically correlated underlying assets, the profitability of pairs trading is selected by using the co-integration method in China's commodity market over the period of 2017 to 2018.

Co-integration Matrix   **Correlation Matrix：**
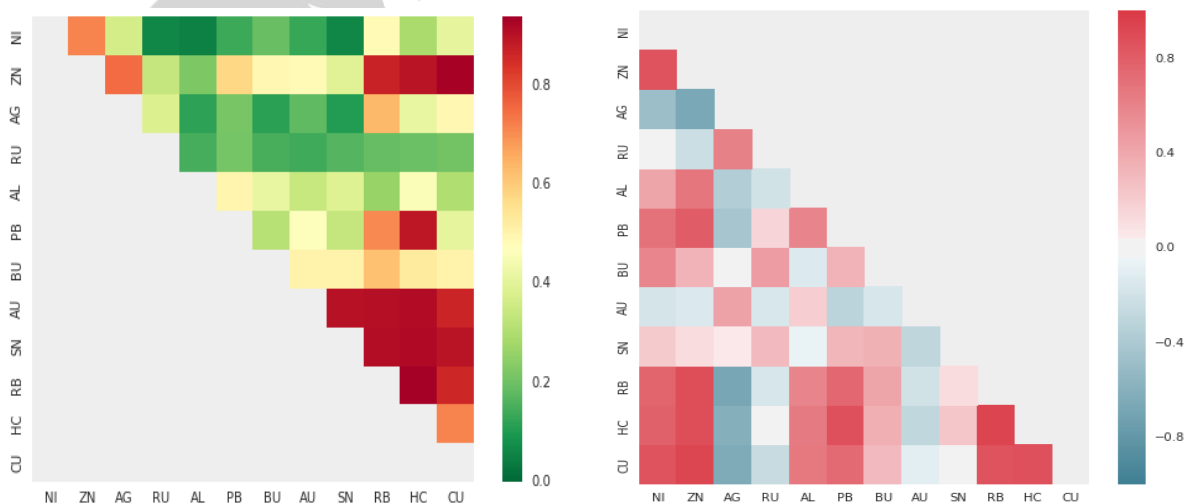
Source: SMM

Note: Darker colors indicate higher correlation/co-integration

After applying the unit root test (in this case, the ADF method is applied) to identify the feasibility of the potential trading pairs, we choose the high-correlated pairs ($\rho > 0.80$) as follows:

Table1: Selected Correlation Matrix

	PB	HC	RB
PB	1.0000	0.8686	0.7521
HC	0.8686	1.0000	0.9397
RB	0.7521	0.9397	1.0000

Source: SMM

We use linear regression to determine the integration equation (in mt).

After standardising the residuals series, we determine the long/short position of each portfolio as follows:
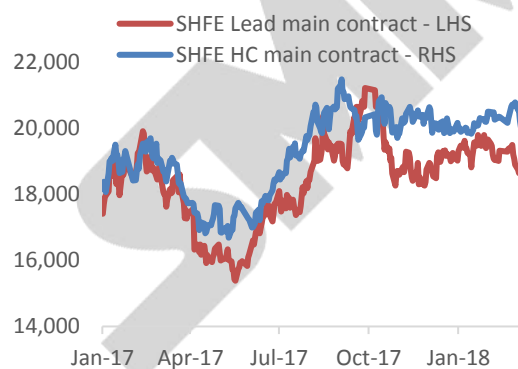
Table2: Trading Pairs

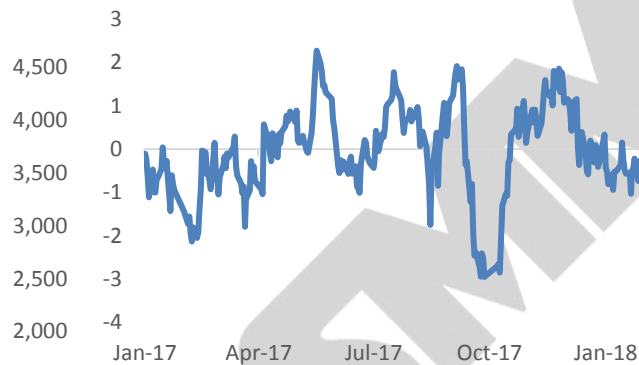| Contract	Trading Pair	Portfolio	Position
SHFE Hot-rolled coil	SHFE Lead	3*HC1805-PB1804	Short
	SHFE Steel Rebar	HC1805-RB1805	Short

Source: SMM

SHFE Hot-rolled coil pair trading analysis

3*HC1805-PB1804
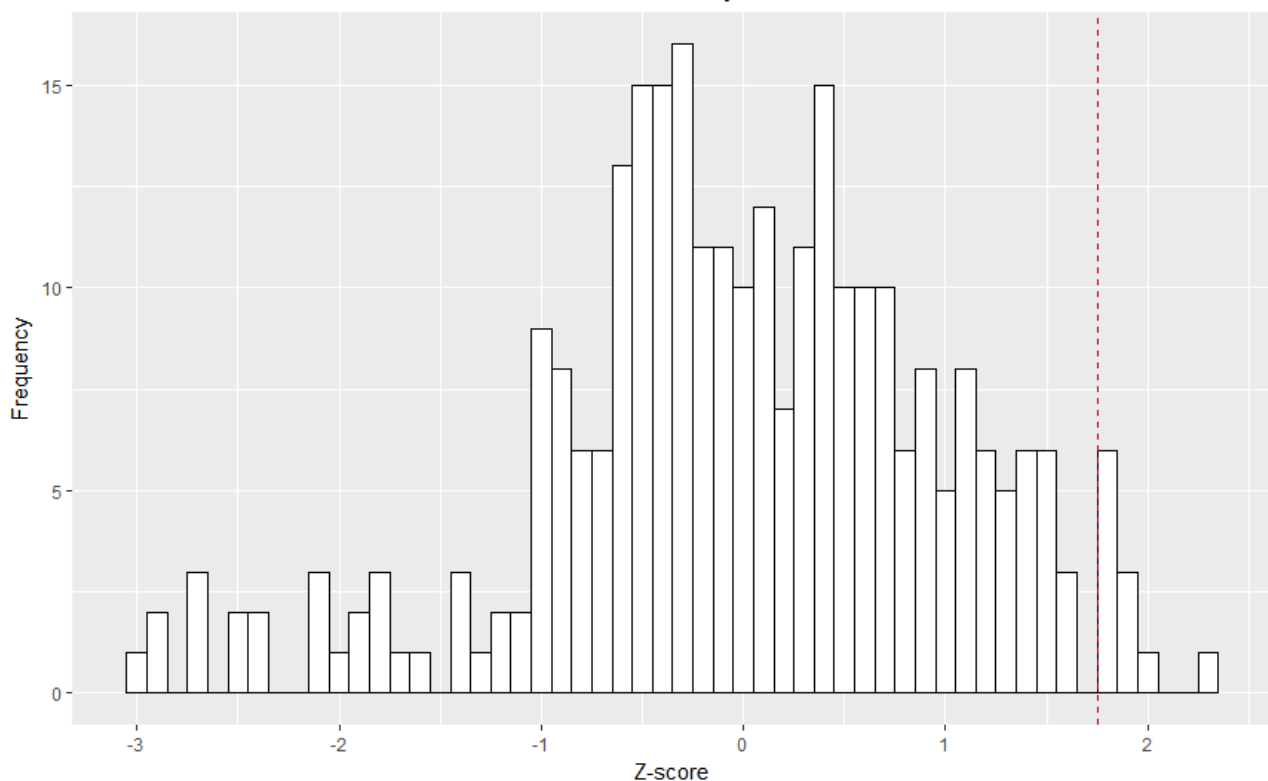
1.SHFE Close Price(Yuan/mt)

2.Residual Series

3.Histogram

Z-score Analysis

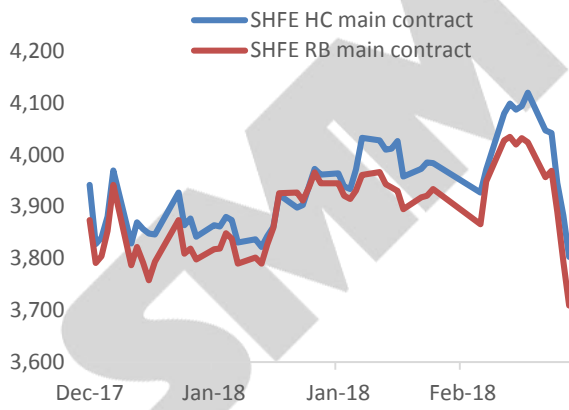*Dash line: Current z-score by March 9,2018*

Source: SHFE, SMM

Statistical arbitrage analysis: By March 09,2018, the standardised residual of the corresponding portfolio 3*HC1805-PB1804 is 0.83 which is **higher than 80%** of the sample observed. **Thus, SMM forecasts the spread to revert to the previous mean.**
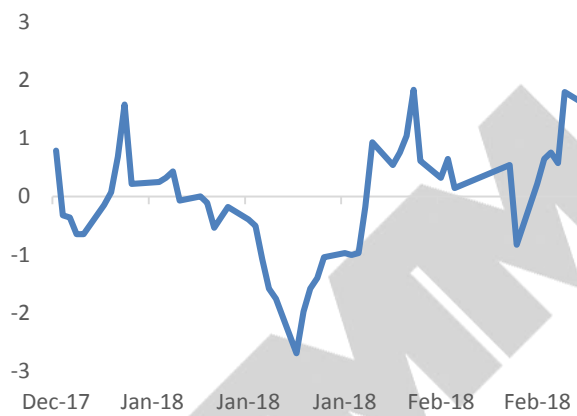
Recommended strategy: **Taking the long position of the portfolio, close position when the standardised residual close to zero.**

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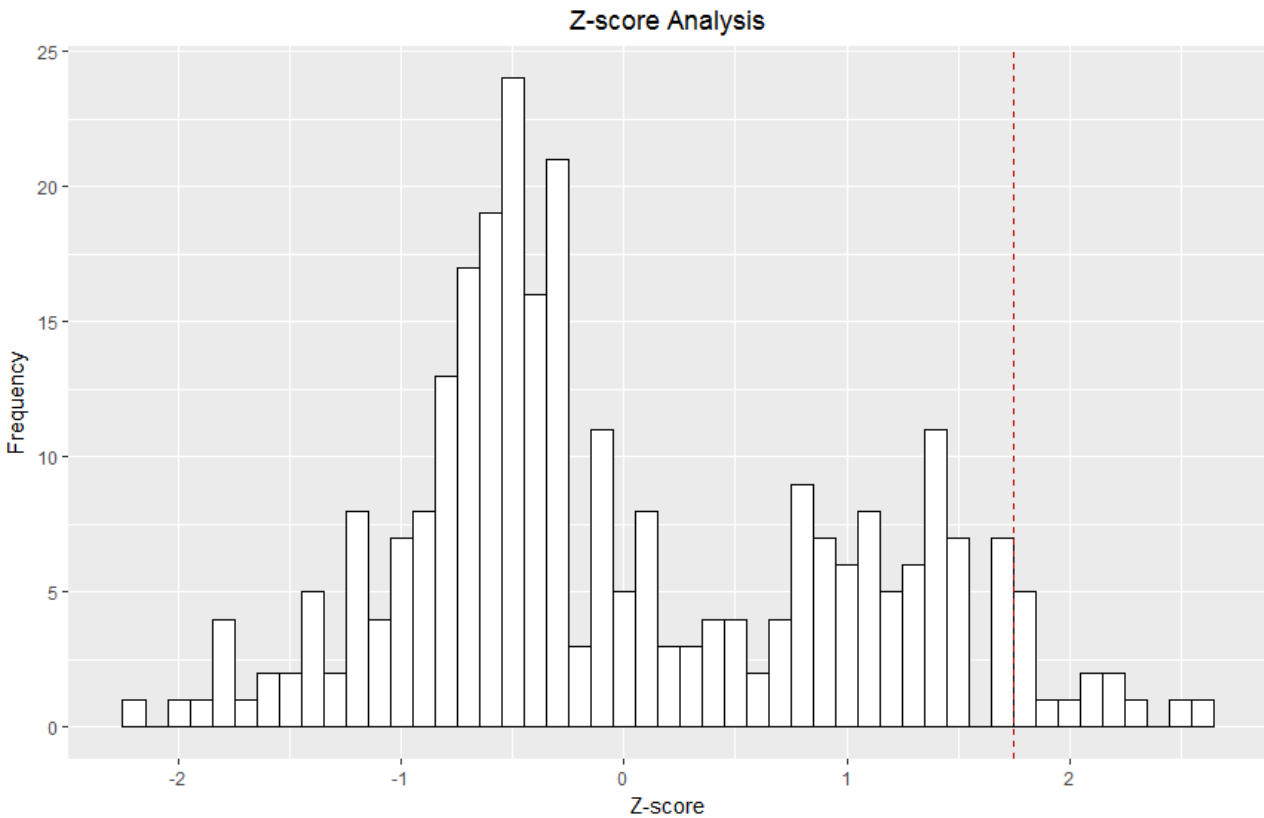
HC1805-RB1805

1.SHFE Close Price(Yuan/mt)

2.Residual Series

3.Histogram

Z-score Analysis

Dash line: Current z-score by March 9,2018

Source: SHFE, SMM

Statistical arbitrage analysis: By March 09,2018, the three-month standardised residual of the corresponding portfolio HC1805-RB1805 is 1.74, which is **higher than 95%** of the sample observed. **Thus, SMM forecasts the spread to revert to the previous mean.**

Recommended strategy: **Taking the short position of the portfolio, close position when the standardised residual close to zero.**

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