

## **Abstract**

In the doctoral dissertation, I report the results of the study on copper price discovery on the London Metal Exchange (LME) in the period 1998–2017. In what follows I test for whether the law of one price applies to the prices of spot and 3-month copper futures contracts. To this end I estimate a combined vector error correction and dynamic conditional correlation multivariate GARCH model (VEC DCC-MGARCH) on the daily sampled data exhibiting the prices of copper contracts, the copper stock in the LME's warehouses, the US dollar to British pound exchange rate, and the CBOE VIX volatility index. To identify the periods of financial market instability I use the OFR Financial Stress Index and the Global Economic Policy Uncertainty Index. I perform computations using Stata 16 SE and Microfit 5.0.

The dissertation is divided into four chapters.

In Chapter 1, I report on the role and importance of copper in the modern economy. I point out its basic physical and chemical properties, areas of application and the location of mining and processing. I characterise the copper futures markets, the dynamics of copper futures prices and trading volumes over the past twenty years.

In Chapter 2, I sketch the theory of commodity futures pricing and highlight the problems of specification and estimation of underlying empirical models. I also provide a review of literature on the copper futures pricing.

In Chapter 3, I introduce the concept of financial market instability and discuss indicators to be used in empirical work. I identify the sources and periods of financial markets instability.

In Chapter 4, I report on the results of empirical study on the copper price setting mechanism at the LME.

The analysis leads to the following conclusions regarding the copper price discovery:

1. the spot and the 3-month copper futures prices were in the long run equilibrium relationship; and their spread had the co-integrating property which confirms that the LOP applied to copper prices,
2. the risk premium was time-varying and depended on the copper in stock at the LME's warehouses,
3. in the short run, the futures contract price significantly departed from the long-run equilibrium relationship; the same did not apply for the spot price,
4. time  $t - 1$  and earlier change in 3-month futures price impacted its time  $t$  change; the same applied to the spot price,
5. the spot price Granger caused the 3-month futures price; the causality other way around was not present,
6. time  $t$  and earlier change in the copper in stock at the LME's warehouses, the US dollar to British pound exchange rate and the CBOE VIX volatility index significantly impacted time  $t$  futures contract price change; the same applied to the spot price,
7. the day of a week effects in copper prices were present,
8. the price volatility of both the spot and 3-month futures contract was greater in the periods of financial market instability compared to those of market stability,
9. the correlation of spot and 3-month futures contract prices as measured by their conditional correlation coefficient remained close to unity in the whole period in question.

**keywords:**

London Metal Exchange, copper prices, VECM DCC-MGARCH, risk premium