Banking on the Green Transition: The Financialization of Tomorrow's Essential Metals

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Abstract

The transition to a net-zero economy critically depends on metals like copper, lithium, cobalt, and nickel, with global demand projected to increase twelvefold by 2050. Despite their growing importance, these critical metal markets have received less attention regarding financialization compared to traditional energy commodities. This paper examines financialization levels across these essential metals and analyzes emerging investment opportunities. We find that financialization progresses at different paces, reflecting unique market structures. Copper remains most accessible for financial investment, while lithium lacks physical LME trading but offers cash-settled lithium hydroxide futures. Cobalt and nickel feature both cash-settled and physically settled contracts. Metal markets differ fundamentally from equity or bond markets, involving physical commodities or derivatives trading. Our analysis suggests financialization will accelerate as demand grows, driving the development of new financial instruments, including ETFs that facilitate project financing and improve market liquidity for critical transition metals.

The transition to a net-zero emissions economy has become imperative in the face of climate change. Net-zero refers to the balance between the amount of greenhouse gases emitted into the atmosphere and the equivalent amount being removed, resulting in no net increase in overall greenhouse gas levels. Critical metals, including copper, lithium, cobalt and nickel, play a pivotal role in enabling this transition.

Due to their importance in the traditional economy, the oil and gas markets were heavily studied in the context of investments in financial markets and their financialization (Szafranek et al., 2023; Czudaj, 2019; Papież et al., 2022). On the contrary, the crucial metal markets got much less attention. Financialization, which refers to the increasing role and influence of financial investors and instruments in commodity markets, occurs at different paces for various commodities (Domanski and Heath, 2007). Assets from the traditional energy sector, such as oil and gas, are already included in portfolios and are widely discussed in the literature as hedges or safe havens (Al-Nassar et al., 2023; Ciner et al., 2013). Some commodity markets have operated similarly to the financial markets for years (Zaremba, 2015), and become a popular asset class in portfolio assets with limited interest in hedging physical exposures (Cheng and Xiong, 2014). The lack of such trading opportunities for some critical metals results in a lower awareness of the price sensitivities of these assets and their co-dependence on other assets.

Climate change and the global transition toward a net-zero emission global economy increase the demand for critical metals and make the new strategic assets' pricing and financialization more important. The concept of balancing greenhouse gas removal with greenhouse gas emissions is complex (The Economist, 2021). As indicated in a report from European Comission (2020) the global transition to a low-carbon economy will require the production of some metals to increase 12 times by 2050. It will probably heavily impact the cross-dependencies within the energy and metal markets.

Lithium, cobalt, copper and nickel are crucial in the green transformation. Lithium and cobalt are essential for the production of high-capacity rechargeable batteries (Qiao et al., 2024). Copper is important for the construction of efficient systems and installations. More than just metal, nickel is an indispensable catalyst in clean technologies, supporting the deployment of various sustainable solutions such as geothermal energy, hydrogen systems and advanced battery storage (Lu et al., 2023).

In this paper, we focus on the answer to the question, what is the level of financialization of metals crucial in the green and what are the investment opportunities for investing in metals such as lithium, copper, cobalt and nickel.

The literature presents a massive amount of studies related to the dependencies between green assets and the traditional (conventional) ones (Mensi et al., 2022; Naeem et al., 2021; Tiwari et al., 2022; Naeem et al., 2022; Naqvi et al., 2022). For instance, Naqvi et al. (2022) indicate that green energy investments are profitable and they shift the efficient frontier upward. However, the four metals are rarely considered as examples of green assets or commodities. This is caused by the fact that they do not have the "green" label, but they enhance the economy to become more green in the future. Also, the important issue is the limited availability of data from the metal markets.

Compared to equity, bond or cryptocurrency markets, metals markets are specific in that they involve trading physical commodities such as copper or lithium, or derivatives based on these metals, mainly futures and options. Thus, investors can trade with a physical delivery of a given metal, or just on prices with no delivery, so-called cash-settled derivatives. Metal trading occurs on commodity exchanges (e.g. COMEX, LME), but also through over-the-counter (OTC) markets and bilateral contracts between buyers and sellers. The prices of metals depend on global supply and demand dynamics, production costs, industrial usage or investor speculation (Zhang, 2022). The returns on metals investment are generated from price fluctuations and potential industrial demand. The investor's opportunities to invest in critical metals differ. Out of the four metals, copper appears to be the most accessible and the easiest to invest in. The most common sources of copper prices in the literature are the metal spot and futures prices from the London Metal Exchange (LME) (Hu et al., 2020) or futures prices from the Commodity Exchange Inc. (COMEX) which is located in the US (Li et al., 2024). In the case of lithium, it is not tradable on the LME as a physical asset, but since July 2022 the exchange has offered cash-settled futures contracts for lithium hydroxide. The LME also offers cash-settled future contracts for cobalt and a physically settled cobalt contract, but the latter results in real delivery in less than 1% of contracts. In the case of nickel, the LME Nickel future contracts facilitate the physical delivery of high-standard metals. There are also alternative sources of the data Hu et al. (2020). Data on prices of copper and lithium are available on the website of the Chilean Copper Commission (cochilco.cl). Hu et al. (2020) apply the copper spot price of Yangtze River nonferrous metals in China and the copper futures price of the Shanghai Futures Exchange. Another database which serves as the source of the data for empirical studies is the Asian Metal (2024) database with weekly prices of metals, not the prices of financial instruments. Within Asian Metal, copper and nickel are among the basic metals, while lithium and cobalt are in the minor metals group. Moreover, Zhao et al. (2023) use Index Mundi (2024) database, which compiles information from several sources but lacks an explanation for how information was gathered. From the data-gathering process point of view, one more issue seems to be important: the frequency of the available data is mixed. Li et al. (2023) elaborates on the unavailability of trusted data sources in the past. In the presence of many such sources, there is a need to indicate the relations between the prices of one metal from different sources. Within the paper, we aim to answer questions such as: do the geographical locations of exchanges or institutions which settle prices have an impact on them? Are there any arbitrage opportunities? Are the open and widely available data, such as Asian Metal (2024) or Daily Metal Prices (2024), reliable?

Traditional energy sources are available for trading on financial markets and are well-explored in the literature. Oil prices are a good example – one could easily find the prices for oil on different financial markets in various regions of the world. However, most of the metals and minerals important in the green transformation are still not investable for investors. Due to the increasing importance of the metals, we expect the financialisation process to accelerate. Initial efforts in that area are focused on building a portfolio of different companies involved in green energy processes.

The financialization of commodity markets is perceived from several perspectives. Academic literature widely acknowledges that financialization has led to a greater presence of speculative investors and commodity futures indexes in metal markets. While physical supply and demand remain crucial, financialization can partially "de-link" commodity markets from these material conditions of production and use. There's an ongoing debate about whether financialization distorts commodity prices and contributes to price bubbles. Some studies suggest that financial speculation can accentuate price moves, while others argue that fundamental market effects can still predominate, even in highly financialized markets. Also, financialization can influence risk sharing in commodity markets by providing liquidity to hedgers. However, speculation may also distort price discovery, leading to temporary price

booms that are not always reflective of underlying fundamentals.

From the point of view of investors, market participants and speculators, it is important to know the prices of financial instruments and not those which require physical deliveries. This need is met by the LME, which launched a new program for investing in electric vehicle EV-related metals such as lithium hydroxide or cobalt. Another solution is the issuance of ETFs, which offer the opportunity to build highly diversified portfolios and thus have long been used as investment vehicles to facilitate the financing of projects (Naqvi et al., 2022). Among such instruments, Global X-Lithium and Battery Tech (LIT) ETF, which started in July 2022, is worth mentioning and can be considered a proxy for lithium prices.

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