**Project Proposal**

**EBGN645: Computational Economics**

**Due: 11AM September 24th, 2025**

*Summary and Research Question*

In 2025, the copper market experienced unprecedented volatility driven by unpredictable U.S. trade policy. In July 2025, copper futures rose 13% in a single day amid threats of a 50% tariff on copper imported into the United States. It was reportedly the largest single-day increase in copper prices on record, dating back to 1968[[1]](#footnote-1). In August 2025, it was announced that the 50% tariff would apply only to imported copper products (e.g., wire, pipes), and copper futures posted their largest one-day decline, falling 22%[[2]](#footnote-2).

Copper is a critical input for renewable energy, electric vehicles, and telecommunications. As such, geopolitical risks, such as tariffs in the U.S. - China trade dispute or potential U.S. tariffs on Latin American producers (e.g., Chile or Peru), can disrupt supply chains, affect investment in mining operations, and influence global market structure.

Chile is the world’s largest copper producer, supplying about 27% of global output. In 2022, Chile’s copper ore sector produced 5.3 million tons of copper[[3]](#footnote-3). Mining contributed 13.6% of the country’s GDP, and mining exports accounted for 58% of total exports. The industry remains a key pillar of Chile’s economy[[4]](#footnote-4). Given the magnitude of this sector, it is imperative to ask:

**What are the global copper-market equilibrium impacts if Chile restricts exports of copper ore?**

*Literature Review*

1. [The response of the Chinese economy to the U.S.-China Trade War: 2018-2019](https://ink.library.smu.edu.sg/cgi/viewcontent.cgi?params=/context/soe_research/article/3414/&path_info=china_2021_5.pdf)

Analyzed the impacts of the 2018–2019 U.S. - China trade war on the Chinese economy. Used highly disaggregated monthly trade and tariff data to identify import and export demand/supply elasticities and embedded these estimates in a general equilibrium model to quantify partial and general equilibrium effects.

1. [Non‑renewable resource extraction over the long term: empirical evidence from global copper production](https://link.springer.com/content/pdf/10.1007/s13563-022-00352-0.pdf)

Analyzed global copper production with a structural time-series model to identify demand and supply shocks, including scenarios of unexpected global expansion and government interventions. Estimated a VAR with three endogenous variables: percent change in GDP, percent change in copper production, and log price of copper.

1. [Using Scenarios to Investigate the Long-term Future of Copper Mining and Guide Exploration Targeting Strategies](https://www.researchgate.net/profile/John-Sykes-2/publication/310753489_Using_Scenarios_to_Investigate_the_Long-term_Future_of_Copper_Mining_and_Guide_Exploration_Targeting_Strategies/links/5835dec908ae86654322866c/Using-Scenarios-to-Investigate-the-Long-term-Future-of-Copper-Mining-and-Guide-Exploration-Targeting-Strategies.pdf?origin=publication_detail&_tp=eyJjb250ZXh0Ijp7ImZpcnN0UGFnZSI6Il9kaXJlY3QiLCJwYWdlIjoicHVibGljYXRpb25Eb3dubG9hZCIsInByZXZpb3VzUGFnZSI6InB1YmxpY2F0aW9uIn19&__cf_chl_tk=Hcoo39l7z8vxjfIJ7anPeiC8rtJDQ3NLOXcf9bUzabU-1758638613-1.0.1.1-vQY1TeYRT0zmjk8s7SibWbejj_vNWXiDG4C8cOIr9YI)

Employed the Oxford Scenarios methodology to analyze plausible futures for copper mining and the resulting implications for exploration targeting strategies.

1. [A Microeconometric Dynamic Structural Model of Copper Mining Decisions](http://aguirregabiria.net/wpapers/copper_mining.pdf)

This paper proposes and estimates a dynamic structural model of copper-mine operations using a unique mine-level dataset covering 330 mines, accounting for over 85% of global production, from 1992–2010. The model captures key industry and operational decisions: whether to remain active or idle; if active, how much to produce; how much to invest in capacity (equipment); and how much to invest in in-mine exploration.

*Modeling the problem and hurdles*

The model will be a market-equilibrium framework. It will include a minimization problem representing Chile’s export quota on copper ore. To start, the model will include two blocks: (i) copper-ore production in Chile and which will be $/tonne and tonnage produced (ii) global demand which is tonnage consumed. A refinement ratio will be introduced to map ore into refined copper, capturing treatment and refining in China.

*Overview of available data*

From S&P Global: mine-level copper-ore production (“paid copper”); cost components (labor, energy, reagents, other onsite, TCRC + shipment, royalties, and mine/mill); ore characteristics (copper content, moisture); copper-ore prices; China’s refining capacity; and current TC/RC charges.

1. Towfighi, John. “Copper Prices Have Surged to Record Highs — and They Could Jump Higher. Here’s Why.” *CNN*, 17 July 2025, [Link](http://www.cnn.com/2025/07/17/investing/copper-prices-us-market-tariffs). [↑](#footnote-ref-1)
2. Dezember, Ryan. “Copper Prices Fall 22% in Record Daily Drop.” *The Wall Street Journal*, 1 Aug. 2025, [Link](https://www.wsj.com/livecoverage/stock-market-today-dow-sp-500-nasdaq-07-31-2025-2/card/copper-prices-fall-22-in-record-daily-drop-vpr2PFq2N4KYq6cKSFUI?gaa_at=eafs&gaa_n=ASWzDAjq4b7lVrFomWNM-cyCE7h0oYlql2q6gMoChZy-MJTMuDYnUG4HwDDftUVp79E%3D&gaa_ts=68d1da0a&gaa_sig=TE5NV3YSyP-OMr_5gTaZsUDLAhIFRax0eJ2bO2MS_D_WJdCKcn-Pt3mClibT0bVzBc27d797kpL0DMyB6O5lwg%3D%3D). [↑](#footnote-ref-2)
3. Venditti, Bruno. “Which Countries Produce the Most Copper?” *World Economic Forum*, 12 Dec. 2022, [Link](https://d.docs.live.net/d1be4977e08d367f/Desktop/COMPUTATIONAL%20ECONOMICS/Venditti,%20Bruno.). [↑](#footnote-ref-3)
4. International trade administration. “Chile - Mining.” *Www.trade.gov*, 7 Dec. 2023, [Link](https://d.docs.live.net/d1be4977e08d367f/Desktop/COMPUTATIONAL%20ECONOMICS/International%20trade%20administration.). [↑](#footnote-ref-4)