

## Bill's Building Blocks

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### Refining Raw Ideas

Coming off the Covid pandemic sometime in 2021 should cause us to refocus on the basic ideas underlying our supply chains. When I teach about **multi-echelon supply chains** at NYU, I rarely describe more than five echelons from the end customer through DELIVER, MAKE, and SOURCE. But what about going all the way upstream to **raw material**, to the earth, to mining copper ore for example?

The price of copper is an important indicator of economic activity. I had noticed on the *NY Times* financial website that the price of copper seemed to be going up. I had read that Chinese **market demand** consumed a lot of copper to build infrastructure. So, I asked my son, who is an architect, if he was seeing any impact due to a price increase in copper? "Oh, my yes," he said, then explained that costs for wiring, switch gear, and plumbing **products** in new construction contracts had to be renegotiated with rising copper pricing.

This led to some Internet searches to get the facts. The **price** of copper was 2.1005 \$/lb on March 23<sup>rd</sup> when the economy shut down due to Covid and increased to 3.571 \$/lb on December 28<sup>th</sup> [[www.nasdaq.com/market-activity/commodities/hg%3Acmx](http://www.nasdaq.com/market-activity/commodities/hg%3Acmx)]. This increase is 70%. China consumes 51% of the world demand [[www.statista.com/statistics/693466/distribution-of-global-refined-copper-consumption-by-region/](http://www.statista.com/statistics/693466/distribution-of-global-refined-copper-consumption-by-region/)].

Well then what about **supply**? In 2019 the top five countries mining copper included Chile at 5.6 million tonnes, Peru at 2.4 million tonnes, China at 1.6 million tonnes, Democratic Republic of Congo (DRC) at 1.3 million tonnes, and the United States at 1.3 million tonnes [<https://www.nsenergybusiness.com/news/top-five-copper-mining-countries/>].

Which leads to the question of what is driving the price up now? Economic theory would say that limited supply against a sustained demand drives price up. Certainly, there is pent-up demand from infrastructure projects in both China and the United States. Does that mean that the supply of copper ore is limited? Now supply chain theory comes into play. While the supply of copper ore is plentiful, it is expensive to mine, process, and transport. Mine workers and truck drivers have contracted the disease, **inventories** have become depleted, equipment is out of position, and ports are backed-up. The impact of the pandemic has slowed **cashflow**, delayed **investment**, and stalled available **capacity**.

Understand basic economic and supply chain factors in your business. Happy New Year!

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