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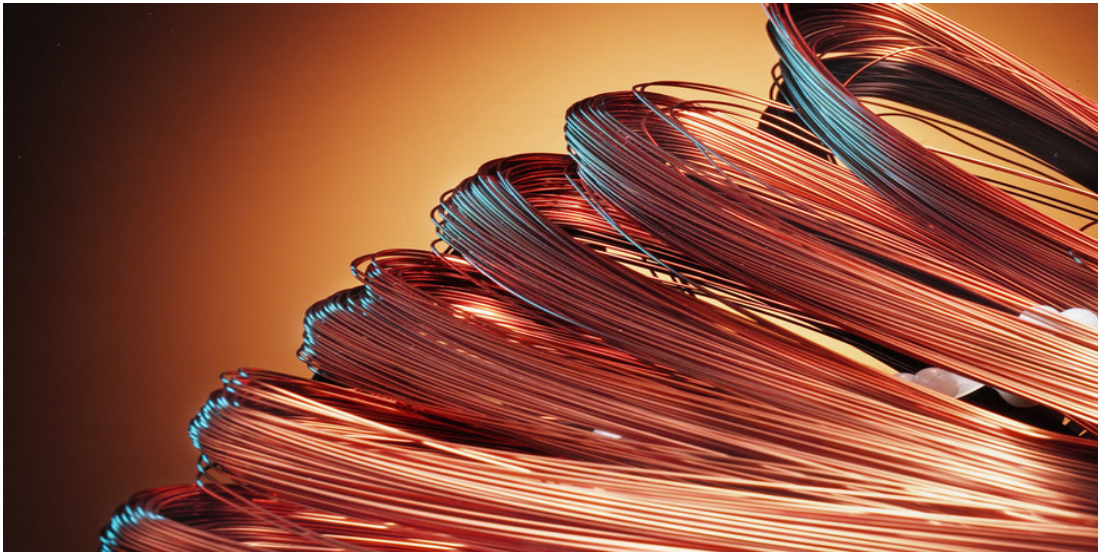
Copper as a Key Indicator of Economic Health

Submitted By

Deependra Singh Rao

Dissertation

Copper as a Key Indicator of Economic Health.



*Dissertation submitted in part fulfillment of the requirements
for the degree of
Masters of Business Administration in Finance
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MBA (FINANCE)

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Declaration

I, Deependra Singh Rao, hereby declare that this dissertation is the result of my own research hence every word so written is by me along with all details. All the sources are attributed and cited to their authors. This dissertation is solely meant for *Masters of Business Administration in Finance* and will not be a part of any other academic award.

Signed: *Deependra Singh Rao.*

Dated: *23rd May 2016*

Acknowledgement

The satisfaction and euphoria that accompany the successful completion of any task would be incomplete without the mentioning of the people whose constant guidance and encouragement made it possible. I take pleasure in presenting before you, our project, which is result of studied blend of both research and knowledge.

I express my earnest gratitude to my Dissertation Guide, Mr. Andrew Quinn, for his constant support, encouragement and guidance. I am very grateful for his cooperation and his valuable suggestions. It would not be possible to make this dissertation without his cooperation

I express my gratitude to all the participants who contributed in this research with their precious time and patience that is highly appreciated.

Finally I would like to thank my family specially my uncle for supporting me. It is because of them that I learned the value of a human being.

Abstract

Copper is the oldest metal known to humans. It plays important role in old civilizations like Egyptian and Romans. But the importance of copper is increased after the industrial revolution and today it played an important role in global economy. Even many market analysts see it as an indicator of economic health. Because of that it gained the title of “Doctor” and it known as Doctor Copper in economics. But from last few years market analyst thinks that it lost its Doctor title. Now it is not effective indicator of economic growth.

The main aim of this research is to find Is copper still economic indicator or not. The first part of this study will concentrate on whether copper is an economic indicator or not and also find the reason behind why it is economic indicator. The second part of this research aims on comparing copper with other metals and important commodity, to understand why not other metals seen like an economic indicator.

The third part of this research will propose the research design, Implementation and method of data collections. The final section of this study shows the outcome of primary data that is collected by three in depth semi structured interviews with the managers and trader who are working in copper industry. These interviews allowed researcher to conclude the research.

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CHAPTER I

1. INTRODUCTION

“Technology”, a word of great importance in today’s world, isn’t it?

Over the years, technology has advanced to such an extent that it plays a vital role from the basic level which involves an individual’s day to day activities such as mobile phones, computers, television, household appliances and so on, to the advanced technological levels such as cars, machines, satellites, etc.

We know that a basic requirement for any technology to operate is electricity. But, here, a question arises as to which is the key element which causes electricity to operate. The answer to this question is **COPPER**. The reason for which copper is used, as it is the only metal which is a good conductor of heat and electricity, which does not result in any adverse affect. Furthermore, copper cannot be replaced by any other metal due to its unique characteristics.

Copper is widely used in our daily lives through the technologies we depend on, which may be from television to a car, from a mobile phone to a laptop etc. Copper is also widely used to supply electricity to nations across the globe through cable wires. Therefore, we can say that copper is a basic element in our lives.

1.1 Evolution of Copper

Copper has played a vital role in the Human history. It has proven to be an important metal to mankind since the ancient times. Copper consists of many alloys which have also played a vital role in various civilizations, starting from the ancient Egyptians to the present culture around the globe. Sumerians and Chaldeans of Mesopotamia first utilized it around 5000 – 6000 years back. These groups of people created impressive skills in manufacturing copper.

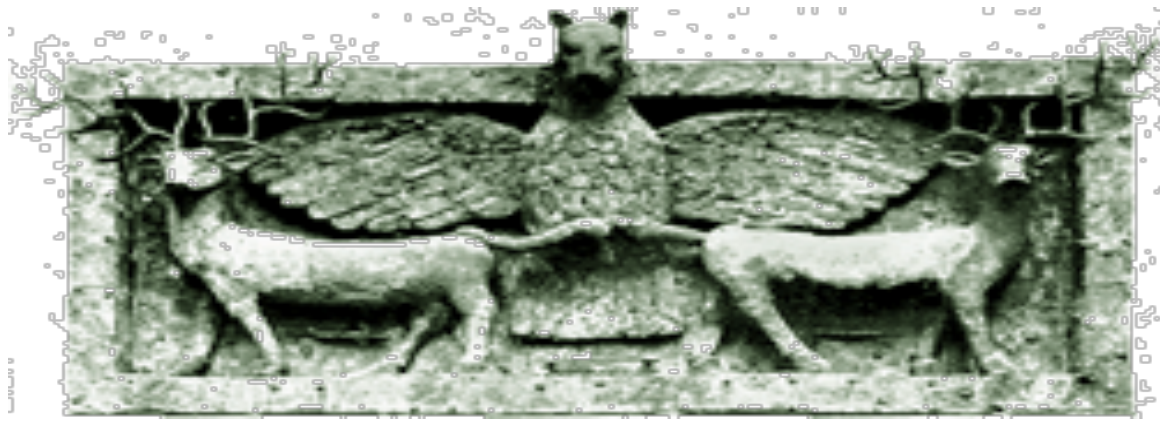


Fig. 1.1 Copper-relief found at Al'Ubaid, near Ur, dating from about 3100 B.C.

So over the period of time copper has been extracted and highly used by the humans, but the production of copper has drastically changed during the Industrial Revolution. In late 18th century around 230 tons of copper ore were extracted to produce 18 tons of copper. As time flies and the technology develops the demand of copper increases.

Today, copper is utilized as a part of assorted routes in numerous zones of life. Copper is a phenomenal electrical conductor thus it is utilized as a part of electrical wiring and gadgets. Copper is profoundly impervious to the harm of water and different components, so it is every now and again utilized as a part of construction. It is said that the measure of copper a country uses is a decent pointer of how innovatively propelled the country is. In the 1800's America was importing more than half of the copper it utilized. Today America is 100% independent, however the interest for copper is developing. There is dependably a need to open new mines and give this vital mineral to our future advancement.

1.2 Copper and Economy

Copper is a noteworthy segment of the economy and plays an especially vital part in rising nations. . The copper industry is a critical benefactor to the overall economy. Copper is more than just a mined metal. It is a supplier of occupations and a promoter of a higher desire for ordinary life. It is an essential piece of our day-by-day lives. One ton of copper bring 40 cars into function, powers 60,000 cellular telephones, empowers operations in 400 laptops and PC's, and disseminates power to 30 houses. The wide assortment of its applications, it is frequently proposed that

the patterns in the copper business sector are a helpful driving pointer of the condition of the world economy.

Advancements on the world economy have a solid connection with developments in the copper cost. Patterns in Chinese GDP development (and, to a lesser degree, US and EU GDP development) and world exchange play a vital part. The connection with China is the key variable in this setting. China represents the biggest share by a wide margin of worldwide copper utilization (around 46%), furthermore has a big share in the aggregate creation of immaculate copper (around 34%). Given these figures, it is not really shocking that monetary advancements in China are firmly fixing to the copper cost. The EU represents somewhere in the range of 18% of worldwide copper utilization, and the US for around 8%. Subsequently, the relationship with EU and US GDP development is marginally lower.

The connection between world exchange and copper value developments is too solid. Given that generation and utilization of metals for the most part take place in various parts of the world, worldwide exchange metals and refined metals (via area or ocean) are unavoidable. At the point when the copper value falls, this might indicate a fall sought after, and thusly a decrease in worldwide exchange dry mass products (iron mineral, copper, aluminum, and so forth). In this sense, the copper cost can serve as a pointer for world exchange volumes. Be that as it may, spikes in the copper cost (as happened in mid 2006) might disturb the examples and make it harder to survey world exchange volumes.

In financial market copper is mostly called by the name of Dr Copper because of its PhD in Financial Aspects, which is because of its ability to foresee defining moments in the worldwide economy. Demand for copper is frequently a solid driving pointer of financial wellbeing. Increasing cost of the metal recommend development, on the other hand decreasing cost may show the slow growth of economy. Copper has its use in wide varieties of applications in many areas of the economy from households and manufacturing plants to electronics appliances and power production & transmission.

Here, we aren't simply speaking "Dr." as in "Health expert" conveying wellbeing and imperativeness to the area, additionally utilizing the expression "Dr." to allude to an informed "doctorate" or Ph.D. in financial matters. Consistently and over the whole globe, one can viably see absolutely where we as a whole all in all, and a specific nation is going financially, basically by observing the cost and what they are as of now doing with copper. This implies whether you're discussing Big Construction ventures, base recharging, modification in medical, telecommunication, technology, energy etc. in this types of any event that it's occurring, then you will find Dr Copper at the operations. Over the last century, simply the demand of refined copper has expanded from 500,000 metric tons to more than 19 million metric tons. The sensational ascent in requirement for copper will actually build the interest for new mines and handling plants, as present offices are redesigned and extended. As those "less created" areas start to extend their foundations, copper actually serves as the most solid building obstruct" from which to manufacture another progress and enhance normal expectations for everyday comforts. An impeccable case is the thing that we have been seeing in the late Chinese development boom.

The major part of copper produce is consumed by the developing nations like China, India. In this type of countries the demand of copper shows the rate of development in the nation, and as the development continues people will get employments that will directly affect on the economic growth of the nation. Demand of copper tells the economic health of a nation. And as the demand increases price will also be increased proportionally.

As we know copper is used in almost all type of industry, no other metal can replace so the end consumers cannot substitute it as they can do for the other base metals. As the time passes uses of copper increases, in the beginning it was only using for the power transmission and supply but now days it has wide use of applications which increase the demand of copper worldwide.

1.3 Purpose of Research.

The main aim of this research is to find the relation between the copper and the global economic health. From very long period of time copper is seen as indicator of economic health. But since last few years it is not doing well which divides the market analyst into two parts. Many of them think that copper has loses its quality of predicting economic health. After the completion of result it will be cleared whether copper is an economic indicator or not in present scenario and will it be continue to be an economic indicator in future.

This research will also compare copper with other important metals and commodity and find out which metal is more effective in indicating economic health. In this research, researcher will also explains which countries are more sensitive to copper. It will also try to explain why copper is such an important commodity.

Objectives of the research

- To find the relation between copper and economic growth/health.
- Importance of copper.
- Which countries are more sensitive to copper?
- Compare copper with other metals and commodity.

Research Question

Primary Question

Is copper is still a leading key indicator of economic health?

Sub Questions

1. *Is Copper (excluding oil) the world's most important commodity? YES/NO (Why)*
2. *What industries are particularly sensitive to Copper prices?*
3. *What countries (economies) are particularly sensitive to Copper prices*
4. *Has Dr. Copper been an effective leading indicator of world economic growth?*
5. *Will Dr. Copper continues to be a leading indicator of world economic growth?*
6. *Are production levels (demand) for Copper a better indicator than its price?*

1.4 Dissertation Roadmap

This research will consist of Six Chapters Introduction, Literature Review, Research Methodology, Data Analysis/Findings, Discussion and Conclusion along with Personal Reflection. The first chapter is Introduction that will talk about the background and history of the topic, research question, and future scope. The next chapter is Literature Review it consists previous research conducted on the topic. It also include theories, concept, models that are relevant to the topic.



Fig. 1.2 Dissertation Roadmap

The Next two chapters consist of research methodology and Data Analysis/findings. Research Methodology chapter describes the underlying assumptions about the methodology of research. In this chapter researcher tried to explain the research onion by Saunders, and what methods he used to make this dissertation. In data analysis/ finding chapter data will be analyzed which is collected through case studies, grounded theory and interviews. The fifth chapter i.e. Discussion will give the answer of the research question and scope for future studies. The final Chapter is Conclusion in which researcher make a final result on the basis of primary and secondary research.

1.5 The Scope of Research.

In this research, researcher tries to include as much information as he can. As the research is based on copper, it includes the role of copper in economy, its uses, demand and supply game of copper, countries role in copper consumption, comparison between copper and other important commodity like oil, iron.

This research will also give benefit to the future researcher who will try to find the relation between copper and economic growth. It will provide a base for the future findings.

1.6 Reasons for choosing this topic

As the researcher is from science background, hence technical aspects of recent financial ups and downs grab his attention. As he did his bachelors in electronics and communication he understand the value of copper in a humans life. In the recent time all of sudden price of copper decreased that grab attention of researcher. So after some initial studies researcher finds some important facts about copper and its role in economy. But because of current conditions of copper and its role in economy comes under question. So the researcher wants to explore the copper industry as copper plays an important role in our life and economy also. This is why researcher chooses this topic as he already has a little knowledge about it which going to help him in making a good dissertation.

This Research is very important for researcher from his future career prospective as well as educational prospective. The experience gained during the research was very unique and enjoyable.

CHAPTER II

2. Literature Review

The Literature Review will give information about the concept behind the selected topic. It will show the recent studies on the topic with explanations. Furthermore it will explain the role of copper in economic health/growth. In this section, I will put some light on the production of copper, its economic importance, comparing it with other metals and economic commodities etc.

2.1 Copper's Production & Usages

2.1.1 Copper Production

To understand why copper is an important commodity we have to see how the production of copper is increased over the period of time. In this section, we find where it is found and how much copper is been mine or used till today.

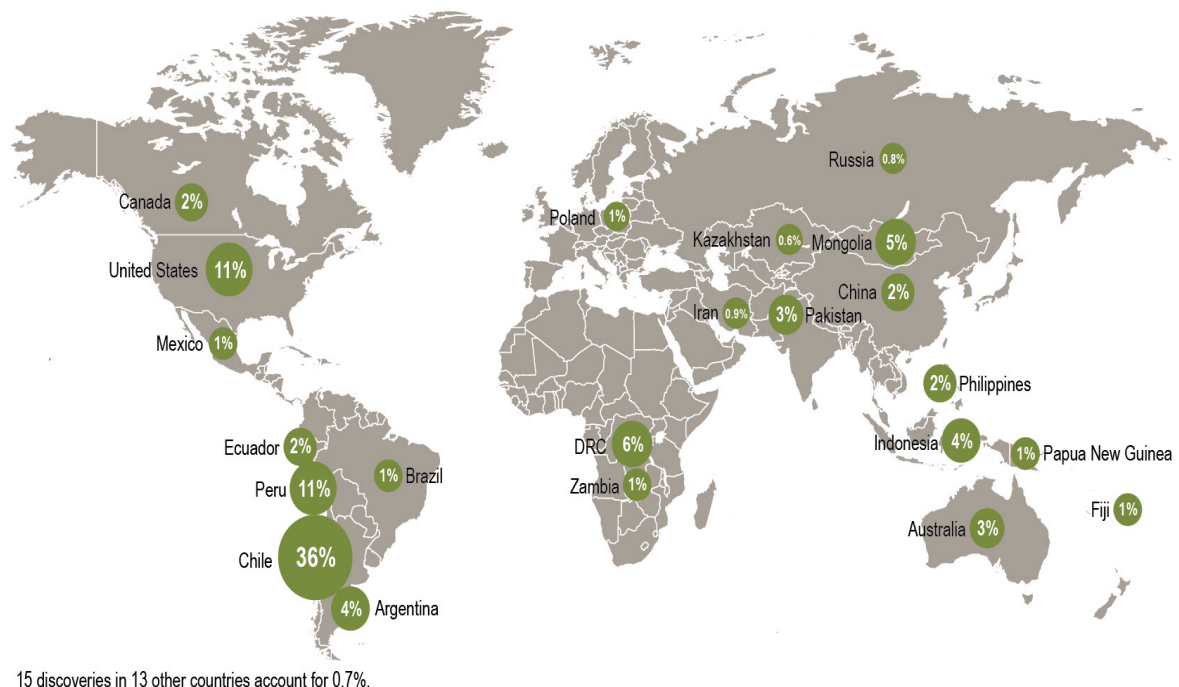


Fig. 2.1 Copper Producing Countries in the world. Source Prweb.com

There are two types of copper production in the world one is Primary Copper Production and other is Secondary Copper Production. The copper, which is directly produced from the mine through metallurgical process of raw material or SX-EW is called as primary Copper Production on the Other Hand Secondary Copper Production is referred to that copper which is produced by the recycling of the scrap material in which copper is used. Copper scrap gets from either metals disposed of in semi creation or completed item fabricating forms ("new scrap") or out of date end-of-life items ("old scrap"). (ICSG, 2015)

Copper is found in every continent around the world but only 10 countries in the world do the major share of copper production. As we can see from the graph and table that production of copper is rises over the last century. Since 1900, when global production of copper was below 500 thousand tons, world copper mine production has increased by 3.2% every year to 18.7million tons in 2014.(ICSG report 2015)

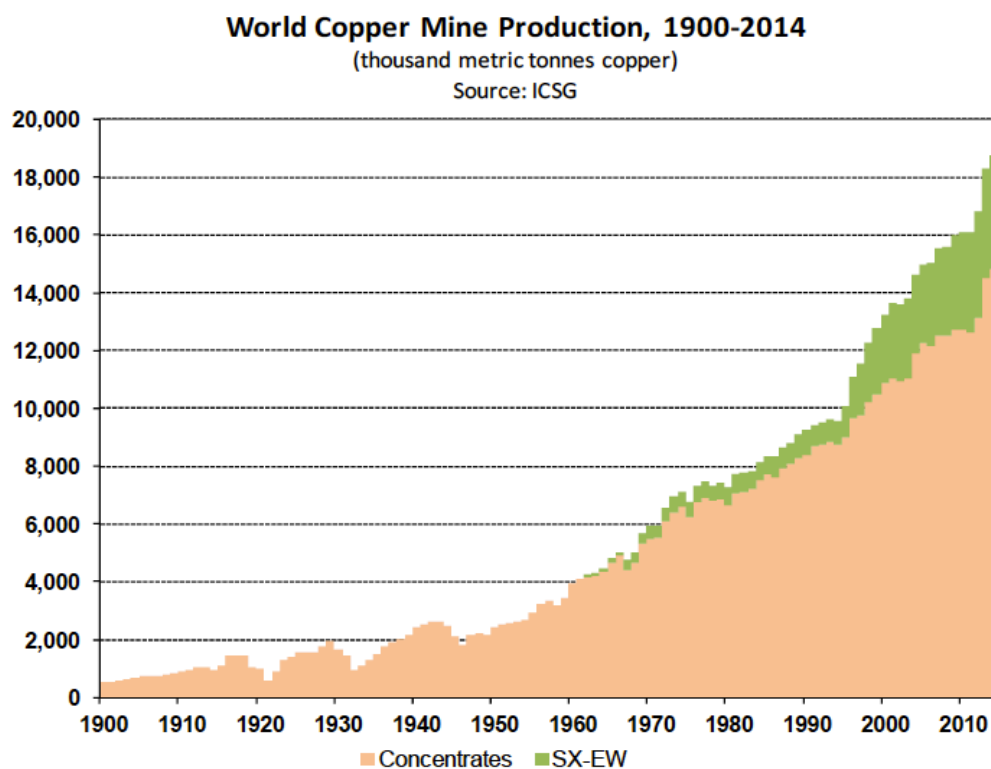


Figure 2.2 World Copper Mine Production Source ICSG

In last five years, the production of copper from mine was increased from 16,000 thousand metric tons to 19,138 which is around the 18 % of the 2011 Production. Global mine creation is evaluated to have grown by around 3.5% (650,000 tons) in 2015 as compare to the 2014. The effect of cost related mine terminations or creation cuts reported in the second 50% of the year predominantly in Africa, North America and Chile was more than balance by expansions in different areas. Concentrate creation expanded by 4% while Solvent extraction-electro winning (SX-EW) stayed stagnant.

The growth in mine production was for the most part because of a recuperation underway levels at working mines in Indonesia (53% development in Indonesian mine generation in light of the fact that 2014 yield was compelled by a seven month prohibition on concentrates trades) and a 23% expansion in Peruvian yield (profiting from higher generation rates at working mines and an incline up underway from mines that began in 2014/2015). Creation remained basically unaltered in Chile, the world greatest copper mine maker. On a provincial premise, generation ascended by 4.5% in South America, 2.5% in North America, 8% in Asia and 1.5% in Europe. Be that as it may, generation declined by 1.5% and 3.5% in Africa and Oceania, separately. The normal world mine ability use rate in 2015 declined to around 85% from 86% in 2014.

	2011	2012	2013	2014	2015
World Mine Production	16,056	16,767	18,240	18,490	19,138
Primary Production	16,132	16,604	17,255	18,557	18,893
Secondary Production	3,468	3,596	3,803	3,915	3,928
World Refined Copper Production.	19,599	20,201	21,059	22,472	22,821

Table 1 World Copper Production, 2011-15 (Thousand Metric Tons)

World refined creation is evaluated to have expanded by around 1.6% (350,000 t) in 2015 contrasted and refined generation in 2014: essential generation was up by 2% and optional generation (from scrap) remained basically unaltered as yield was obliged by tight supply of scrap. The principle supporter to development in world-refined production was China (up by 4%). Yield in Chile and Japan (the second and third driving refined copper makers) declined by 1.5% and 4.5%, individually, because of smelters' support shutdowns and operational disappointments. Generation expanded by 4% in the United States, the fourth biggest refined copper maker. On a local premise, refined yield is assessed to have expanded in Africa (1%), Asia (3%) and North America (4%) while declining in South America (- 1%), Europe (- 1%) and Oceania (- 4%). The normal world refinery limit use rate for 2015 remained for all intents and purposes unaltered at around 83.5% when contrasted with 2014.

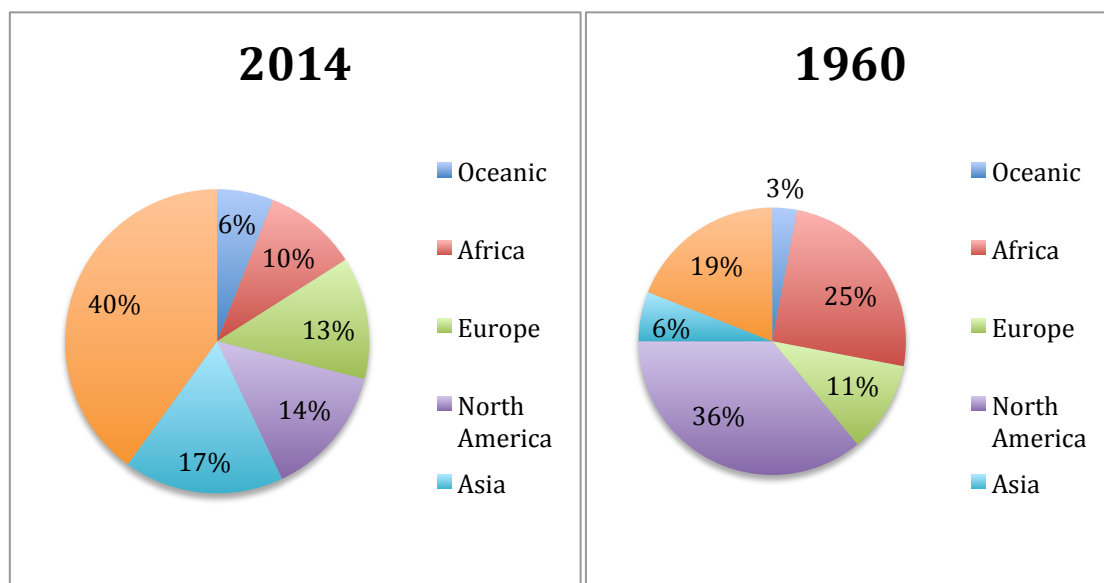


Figure 2.3 Copper Production according to Region from 1960 to 2014/15

In the above chart, it shows the share of copper production hold by each and every region since 1960 to 2014/15. From below 750,000 tons copper in 1960, copper production in Latin America increased to more than 7.5 million tons in 2014/15, speaking to 40% of the worldwide aggregate. In early 1900 US was the major producer of Copper but in 21st century Chile overtake it and become the world largest producer of copper. Currently Chile is the main producer of Copper, It produces at least 30% of world copper.

Asia has additionally displayed critical development. The locale's offer of worldwide production has grown from only 6% to 17% over the particular period.

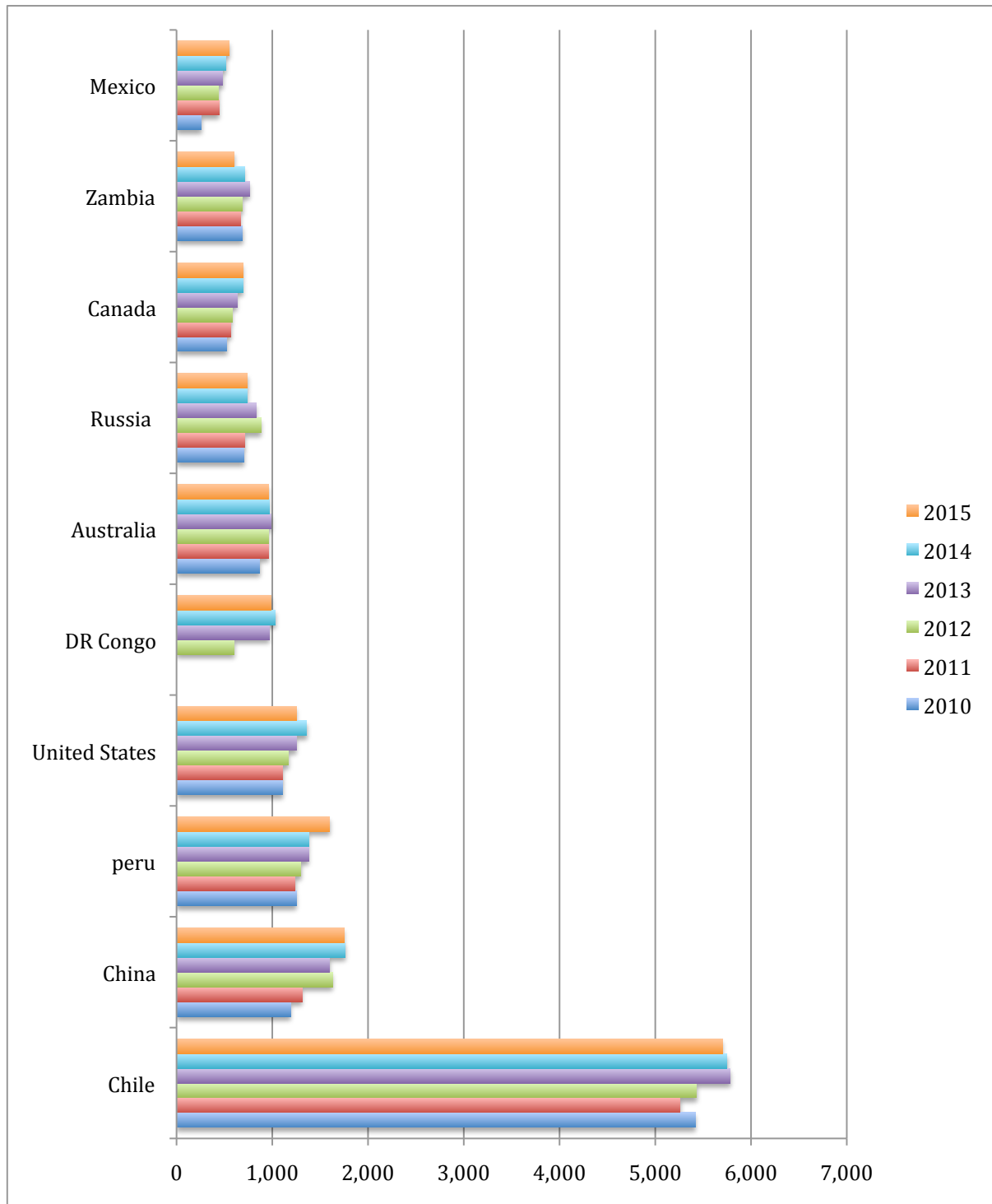


Figure 2.4 Top 10 Countries in Copper Mine Production Worldwide From 2010-15 (In 1,000 metric tons) Source: Statista.com

The top ten copper producing countries are Chile, China, Peru, USA, DR Congo, Australia, Russia, Canada, Zambia and Mexico. Chile is the main producer of Copper, Last year they mined around 5700 thousand metric tons of copper from Chile only which is almost 40% of the world copper production.

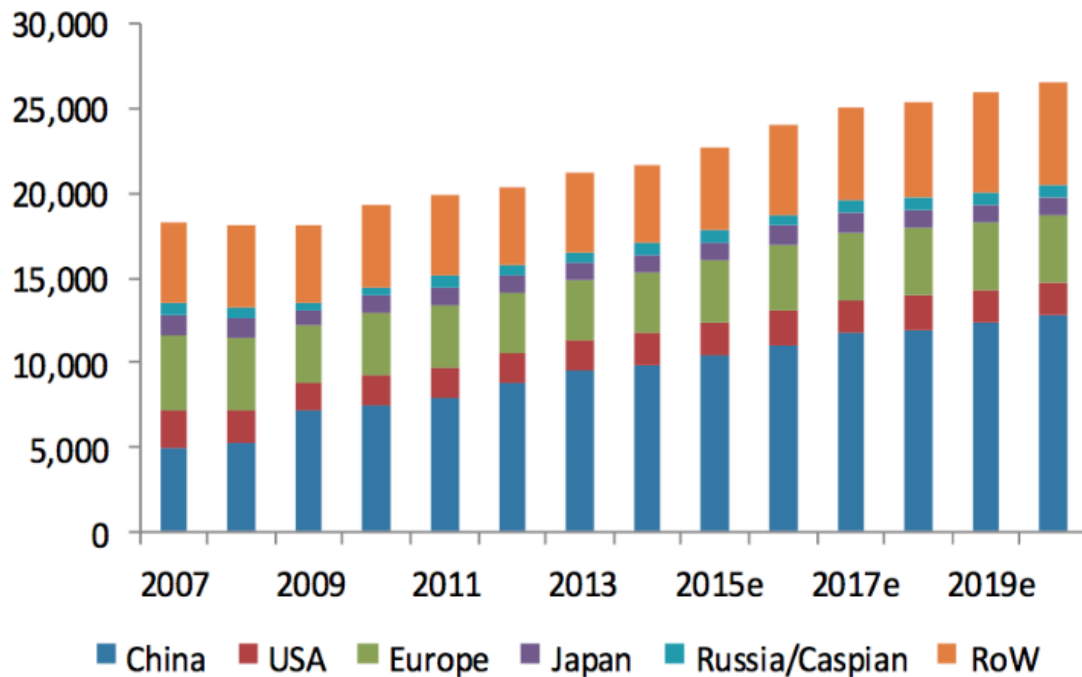


Figure 2.5 Consumption of Copper according to Country.

China, Europe, and the US are among the world's greatest buyers of this vital industrial metal. Morgan Stanley as of late distributed an "Commodity Manual", separating the association's perspectives on the condition of different commodities. In their dialog of copper, they incorporated a Chart demonstrating which nations have the most elevated interest for the metal. These nations could profit by lower copper costs. China, with its big manufacturing region is by a long shot the greatest shopper of copper, and a Morgan Stanley take note of that 70% of copper utilized as a part of China is foreign made. Producing commercial ventures in Europe and the US additionally represent an expansive piece of copper utilization. (Business Insider, [Andy Kiersz](#) , 2015)

2.1.2 Copper Usages.

Copper is not a metal of today; it is the oldest metal known to human. So humans are using it from very last long. But initially it was only used as artifacts, weapons etc. as the technology develops the use of red metal increased very much as it is the only metal with the best heating and electrical conducting property. Since 1900 the use of copper or the demand of copper increased in 1900 it was less than 500 thousand metric tons, which is nothing in front of the usage today in 2015 the copper usage was around 23 million Metric tones. If we compare it over the century than it grew by compound annual growth of 3.4% per annum. As it can be seen in the graph below how the Usage of refined Copper has Changed over the period of time.

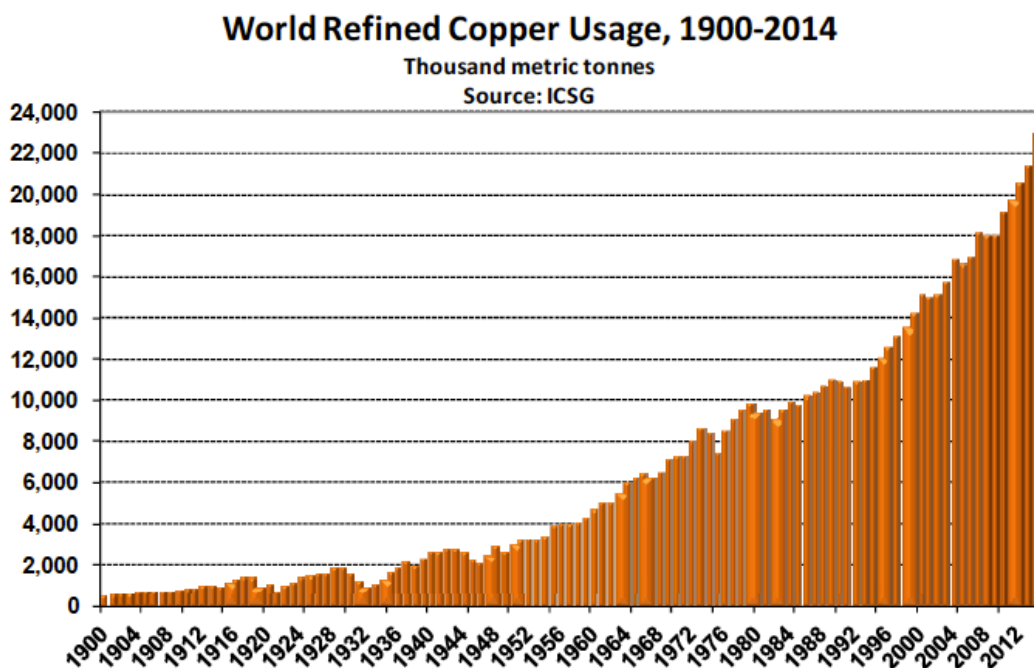


Figure 2.6 World refined Copper Usage 1900- 2014
Source ICSG

Usage By Region:

In the beginning of utilization of copper as Industrial metal Europe and North America are the major regions of the Refined Copper Usages. But over the period of time the usage of copper in these two continents remains almost same with some increment.

Asia shows the drastic development in the usage of Refined Copper. Today Asia is the Key Driver of the world refined Copper. In the last 30 Years the demand has been expanded by 8 times. In 1980 Usage by Asia was around 2000 thousand metric tonnes which was increased to around 16000 thousand metric tonnes in 2014/15.

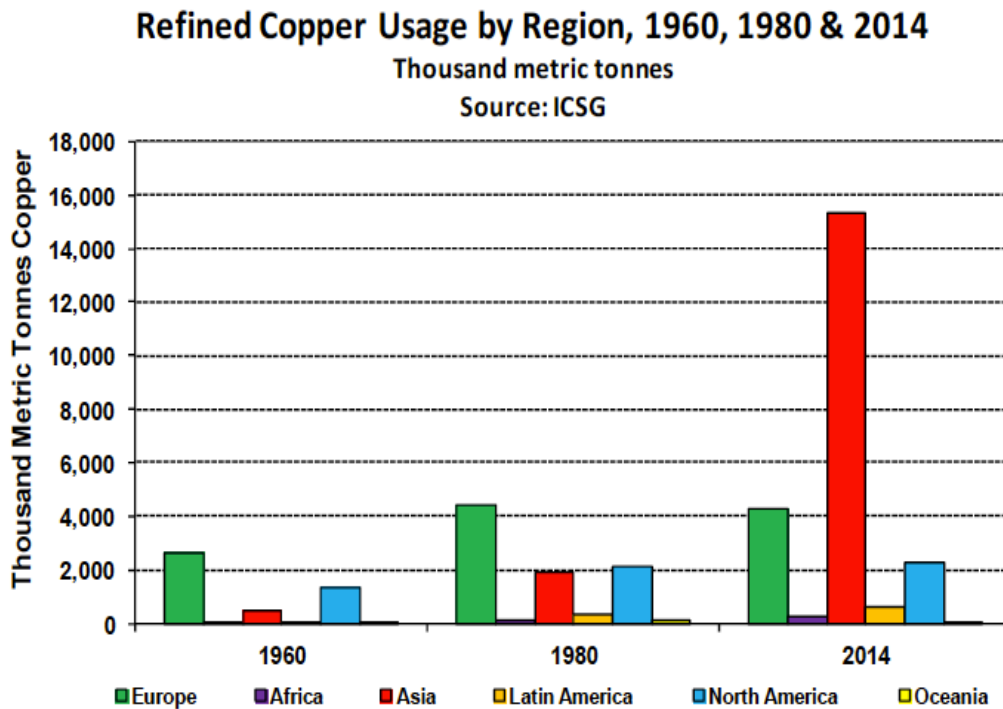


Figure 2.7 Refined Copper Usage by regions in 1960, 1980 & 2014

Currently Asia have the largest market share of Copper usage, 62% of refined copper is used by Asia. It is mostly because of the two biggest developed and populated country China and India.

The demand of copper in China and India is increased heavily, which makes Asia as the biggest Consumer of Copper in the world. Combine North and South America use only 14% of refined copper. Europe Uses 19% of the world refined copper and Rest Of the World uses the remaining 5%. Thus Most of the refined copper produced in the world comes to Asia.

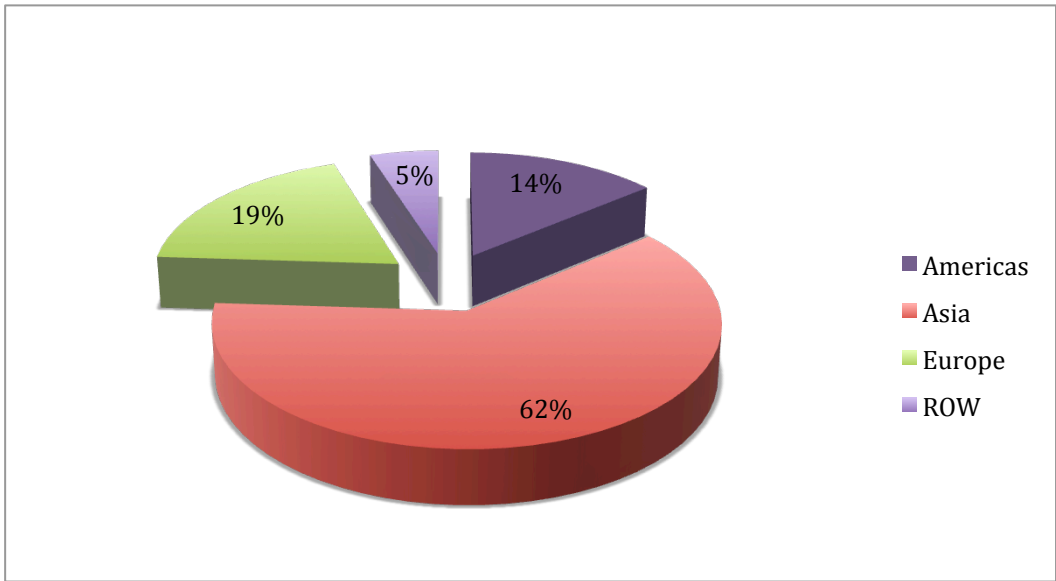


Figure 2.8 Share of copper consumption by region
Source ICSG

Copper Usages by different industries.

Copper is known as the industrial metal. It is the metal, which is used in almost all type of industries that affect the economy of nations. It is because of its conductivity against heat and Electricity. Copper is used in heavy Industries like Electrical, Electronics And Communications, Construction, and Transportation.

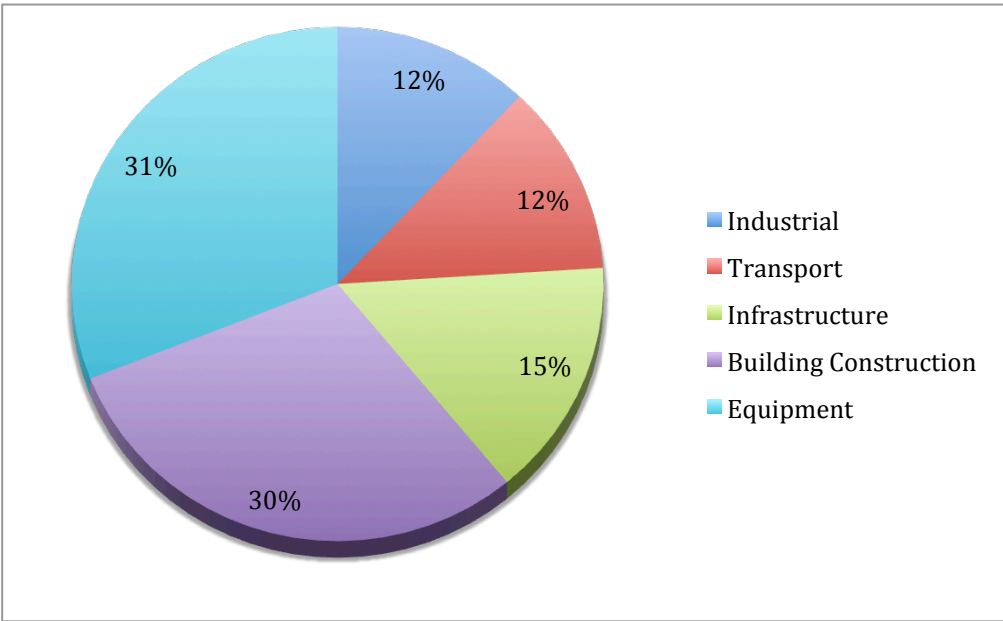


Figure 2.9 Share of copper usage by industries.
Source ICSG

- 1. Electrical Uses:** Copper is the best and valuable metal conveyor of power as it experiences a great deal less resistance contrasted and other ordinarily utilized metals. It sets the standard to which different conductors are looked at. Copper is additionally utilized as a part of power cables, either protected or non-protected, for high, medium and low voltage applications. Likewise, copper's uncommon quality, ductility and resistance to crawling and erosion make it the favored and most secure conveyor for business and private building wiring. Copper is a fundamental part of energy proficient generators, engines, transformers and renewable energy creation frameworks. Renewable energy sources such as solar, wind, geothermal, fuel cells and other technologies are all heavily reliant on copper due to its excellent conductivity. (ICSG Report, 2015)
- 2. Electronics and Communications:** Copper plays an important part in worldwide information and communications innovations. HDSL (High Digital Subscriber Line) and ADSL (Asymmetrical Digital Subscriber Line) innovation allows high-speed information transmission, including network access, through the current copper foundation of standard phone wire. Copper and copper composite items are utilized as a part of residential endorser lines, wide and local area network (WLAN & LAN), cellular telephones and PCs. Semiconductor producers have propelled a progressive "copper chip." By utilizing copper for hardware as a part of silicon chips, microchips can work at higher velocities, utilizing less vitality. Copper heat sinks expel heat from transistors and keep PC processors working at crest proficiency. Copper is likewise utilized widely as a part of other electronic hardware as wires, transformers, connectors and switches. (ICSG Report, 2015)
- 3. Construction:** Copper and brass are the metals of choice for pipes, taps, valves and fittings. Much appreciated to some extent to its tasteful request, copper and its combinations, for example, engineering bronze is utilized as a part of an assortment of settings to fabricate veneers, shades, entryways and window outlines. Not at all like plastic tubing, copper does not smolder, soften or discharge harmful or dangerous exhaust in case of a flame. Copper tubes additionally shield water system possibly deadly microorganisms, for example, legionella. Copper fire sprinkler systems are a profitable security highlight in

structures. The utilization of copper doorknobs and plates endeavors copper's biostatic properties to keep the exchange of infection and organisms. Copper material, notwithstanding being appealing, is surely understood for its imperviousness to compelling climate conditions. Real open structures, business structures and homes use copper for their water merchandise and material needs. The obvious green patina complete, that gives copper the exemplary look of warmth and lavishness, is the aftereffect of regular weathering. (ICSG Report, 2015)

4. Transportation: All real types of transportation rely on upon copper to perform the basic functions. Copper-nickel alloy are utilized on the structures of watercrafts and ships to lessen marine bio fouling, subsequently diminishing drag and enhancing fuel utilization. Cars and Trucks depend on copper engines, wiring, radiators, connectors, brakes and orientation. Today, the normal mid-sized car contains around 22.5 kg of copper, while extravagance autos by and large contains around 1,500 copper wires totaling around 1.6 km (1 mile) long. Electric and crossover vehicles can contain considerably more elevated amount of copper. As it prevalent heat conductivity, quality, erosion resistance and recyclability make it perfect for automobile radiators. New assembling advancements, forms and creative outlines are bringing about lighter, smaller and more effective radiators. Copper is likewise utilized widely as a part of planes, new high speed can utilize anywhere in the range to 2 to 4 tons of copper, altogether higher than the 1-2 tons utilized as a part of conventional electric trains (ICSG Report, 2015).

5. Industrial Machineries & equipment: Wherever mechanical apparatus and hardware is discovered, it is an easy win that copper and its composites are available. Because of their toughness, machinability and capacity to be thrown with high accuracy and resistances, copper alloys are perfect for making items, for example, apparatuses, direction and turbine cutting edges. Copper's better heat exchange capacities and capacity than withstand amazing situations settles on it a perfect decision for heat trade gear, weight vessels and vats. The corrosion resistant properties of copper and its alloys (for example, metal, bronze, and copper-nickel) make them particularly reasonable for use in marine and other requesting situations. Vessels, tanks and channeling presented to seawater,

propellers, oil stages and beachfront power stations, all rely on upon copper's consumption resistance for assurance (ICSG Report, 2015).

6. General Uses: From the starting of human civilization copper has been utilized by different social orders to make coins for money. Today, nations are supplanting lower section bills with copper based coins, as these coins last 10, 20 and even 50 times longer. In the United States, one-penny coins and five penny coins contain 2.5% and 75% copper, separately, while different U.S. coins contain an immaculate copper core and 75% copper face. In the as of late extended European Union, the Euro coins initially presented in 2002 additionally contain copper. Copper and copper based items are utilized as a part of workplaces, family units and working environments. PCs, electrical apparatuses, cookware, brassware, and bolts and keys are only a portion of the items misusing copper's preferences. Likewise, in territories known not copper lacking, agriculturists to supplement animals utilize copper and yield sustain (ICSG Report, 2015).

2.2 Copper's Economic Importance

When the global economy is booming and people are buying cars, homes and appliances, the demand is first seen in Industrial based commodities like Copper, aluminum, nickel, zinc, steel, tin and iron ore. It will be not wrong to say that no commodity is a better indication of health of the global economy than copper. The reason is that it plays a big role in all type of construction, infrastructure, transportation and telecommunication. (Bob Froehlich, 2010).

Copper is a key industrial metal with many applications from automobiles to building construction to heavy machinery and even power generation and transmission. It is seen as having predicative ability in relation to global economic growth. The demand dynamics are simple, of course. As demand for copper increases across a myriad of manufacturing industries it reveals stronger economic activity and economic growth. On the flip side, declining demand for copper reveals declining economic activity, which in turn is seen slowing economic growth (Kira Brecht, 2015).

In Commodity market copper is the biggest metal and no other metals have production and liquidity like it. It has 10.5% share of the Dow Jones Commodity

Index (DJCI) and more than 3% of S&P GSCI. In DJCI one-third share is of metals, where single metal weighted by aggregate liquidity during 5 years. In DJCI, even gold is slightly smaller than copper and it is more than double of the next big industrial metal i.e. aluminum.

Copper is the only metal with the desirable physical and chemical properties, which make it as an industrial metal since it is a good conductor of electricity and heat, malleable and rust-less. All these characteristics makes copper highly usable in electronic gadgets, wiring, construction, plumbing, automobiles, heating and cooling machines. It does not get rust so it is very helpful in making shipbuilding and ships. It plays an important role in alloys like tin, nickel and brass that increases their malleability. (Jodie Gunzberg, 2015)

Lets look at one tiny piece of the global economy, residential housing. As the emerging market economies around the world strive to create a middle class, there will no doubt b a housing boom. That means the demand of more copper will rise for wiring for electricity, plumbing, basic electrical appliances al of which have huge amount of copper inside. (Bob Froehlich, 2010)

Economic activity drives the demand for metals because they are required as inputs to manufacturing processes. As the supply of most metals is fairly inelastic in the short term, prices tend to rise in the face of increasing demand, contributing to overall inflation. This increase in overall inflation then induces a given country's central bank to raise interest rates in order to prevent the economy from overheating.

When this happens, economic expansion reaches its peak before growth slows and investments decline due to higher financing costs. With a lag of several months, the higher interest rate reduces the demand for metals, resulting in a drop in prices. From this perspective, it appears there is a strong link between economic activity and industrial metals.

Industrial Metal	Correlation with world GDP
Copper	39%
Aluminum	35%
Nickel	31%
Lead	36%

Table 2 : Correlation between Industrial Metals & Economic Growth since the 1980's. Source: Bloomberg, Thomson Datastream, S&P Dow Jones Indices. Data from June 1986 for copper, March 1987 for lead and nickel and September 1987 for aluminium to April 2012 (SPindices)

Obviously, the investigation above demonstrates that there is a positive relationship between financial development and modern metal returns. It is likewise significant that copper is by all accounts the most emphatically connected to world economy execution. Having set up that copper is identified with GDP, it is intriguing to look at how copper returns change in various business cycles, utilizing a system like the one proposed by Adams, Füss and Kaiser (2008). As demonstrated beforehand, there is regularly a slack before the economy enrolls the impacts of an ascent in financing costs. Thus, quarterly world modern creation is liked to world GDP for the second part of the investigation, which looks at how copper returns changed truly in various business cycles.

The quarterly changes in mechanical creation are part into four distinctive sub-periods: solid extension, frail development, solid retreat and feeble subsidence. With the end goal of this examination, solid development is characterized as a period in which development is sure and expanding for two quarters though feeble development relates to a period in which development is certain however diminishing. A solid subsidence happens when development turns out to be progressively negative for no less than two quarters and a feeble retreat is meant by two back-to-back quarters of negative yet enhancing development.

Between 1987 and 2012, there were 81 quarters of growth and 19 quarters of recession. The average copper returns during those periods are shown below.

Business Cycle	Quarters	Average Copper Return per year
Strong Expansion	38	23%
Weak Expansion	43	11%
Weak Recession	14	7%
Strong Recession	5	-30%

Table 3: Copper business cycle

Source: Bloomberg, Thomson Datastream, S&P Dow Jones Indices, Data from March 1987 to April 2012. Calculations are based on LME cash copper prices. (SPindices)

The results above show that copper returns appear top in the strong expansion phase and low in the strong recession phase. However, what is most remarkable is that returns seem to hold up quite well during periods of weak recession. (Daniel Ung, 2012)

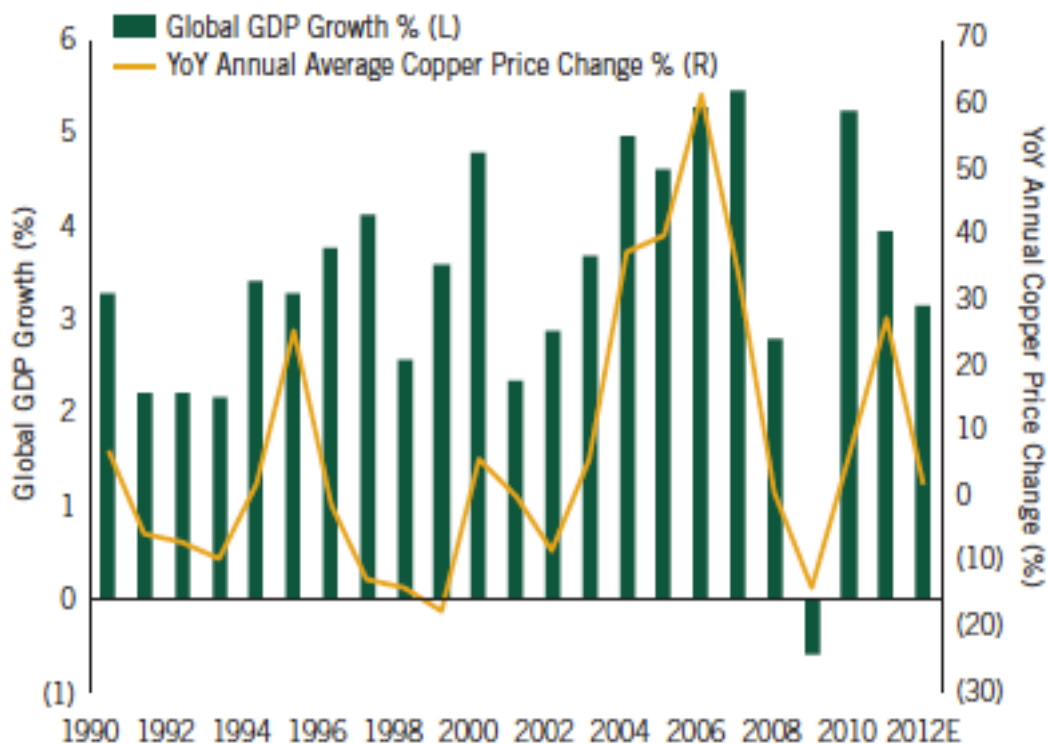


Figure 2.10 Correlation between GDP growth and annual copper price change percentage.

Source CME, IMF

According to Mandrekar (2013) Copper has come to be referred to verifiably as a sensibly dependable indicator of overall monetary wellbeing. In blast times, if more homes and structures are being developed in China, more vehicles are being made in the U.S., and more air cooling units are being acquired in Brazil, copper will be in more prominent interest and — different things rise to — its cost will rise. Obviously, it works the inverse path amid a retreat. That is the reason copper has earned the "Dr. Copper" nickname — for its capacity to figure development like an accomplished financial analyst. In spite of the fact that copper is a long way from faultless as a pointer, generally there has been a sensibly close connection between's copper costs and worldwide GDP development (Figure 2.10)

With regards to dissecting the condition of the worldwide economy, copper is a vital indicator. In November 2015, this mechanical metal was blazing a critical cautioning signal about worldwide financial shortcoming and the value way of crude materials. The drawback value change in copper is simply one more sign that economic development was still not upcoming for the world around then. (Andrew Hecht, 2015)

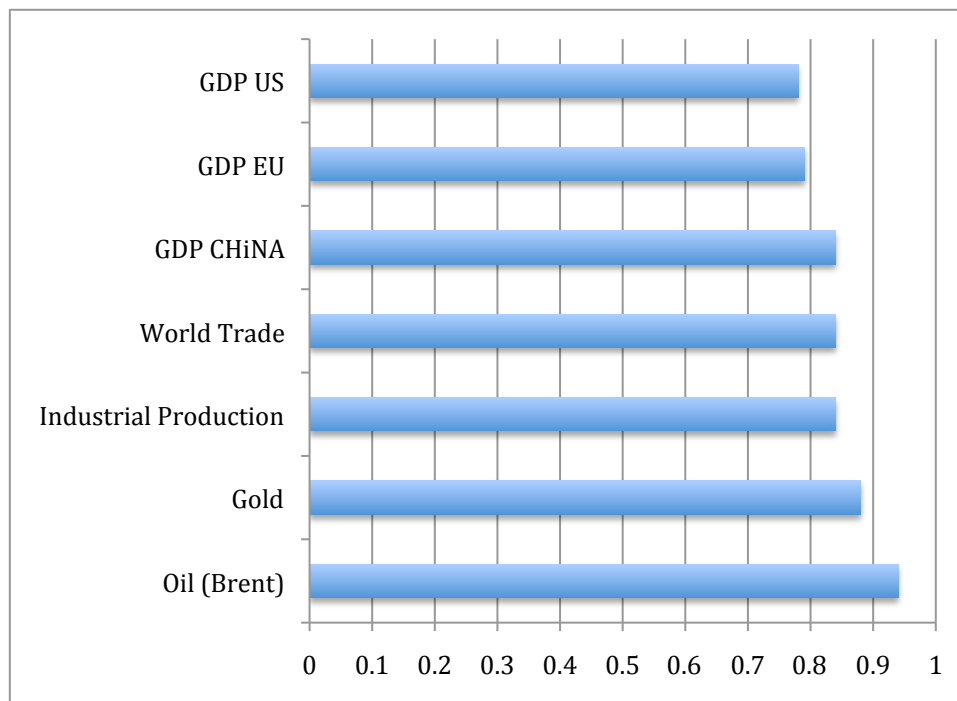


Figure 2.11 Long Term Correlation between copper prices & economic indicators.

The copper business gives advantages to more than simply the organizations mining copper and manufacturing items from it. Copper provides occupation in neighborhood and local economies for a scope of employments, from handymen and circuit repairmen to car specialists and electronic gear makers. These "downstream" segments utilize a gigantic number of individuals and speak to a bigger part of the neighborhood, provincial, and world economies. (Copper alliance)

2.3 Copper price and Economic trends

According to the Gunzberg global head of commodities at S&P Dow Jones Indices "Copper is reputed to have earned a Ph.D. in economics because of its ability to predict turning points in the global economy," That's because copper is widely used in a number of manufacturing and building applications across industries. Demand for copper can be a proxy for rising and falling economic activity.

The fundamental motivation behind copper (just about 70% of the aggregate use in 2012) is in the assembling of electric and electronic items and in the development of structures. In the present examination, the copper value utilized is that of the refined copper and the world interest is measured by the gross domestic product (GDP), which incorporates the development division, as opposed to industrial production, which is frequently the marker utilized as a part of oil value contemplates. (Michael Pedersen 2014)

According to David Hricik (1988) Copper is used in durable goods, including electrical production and transmission equipment, automobiles, construction, electrical devices, plumbing, consumer goods, military applications, and coinage. These are the products of industrialized, developed countries and thus, consumption of copper is closely related to the development of a nation.

The rise and fall in the price of copper is regarded as an accurate bellwether to the health or otherwise of the global economy (MJ Morgan 2013). Copper a prime ingredient in everything from basic home plumbing & wiring to fancy telecommunications equipment is among the hottest of the industrial metals, all of which have been moving higher on the brightening world-wide economic outlook. (Levingston, S.E. 1994)

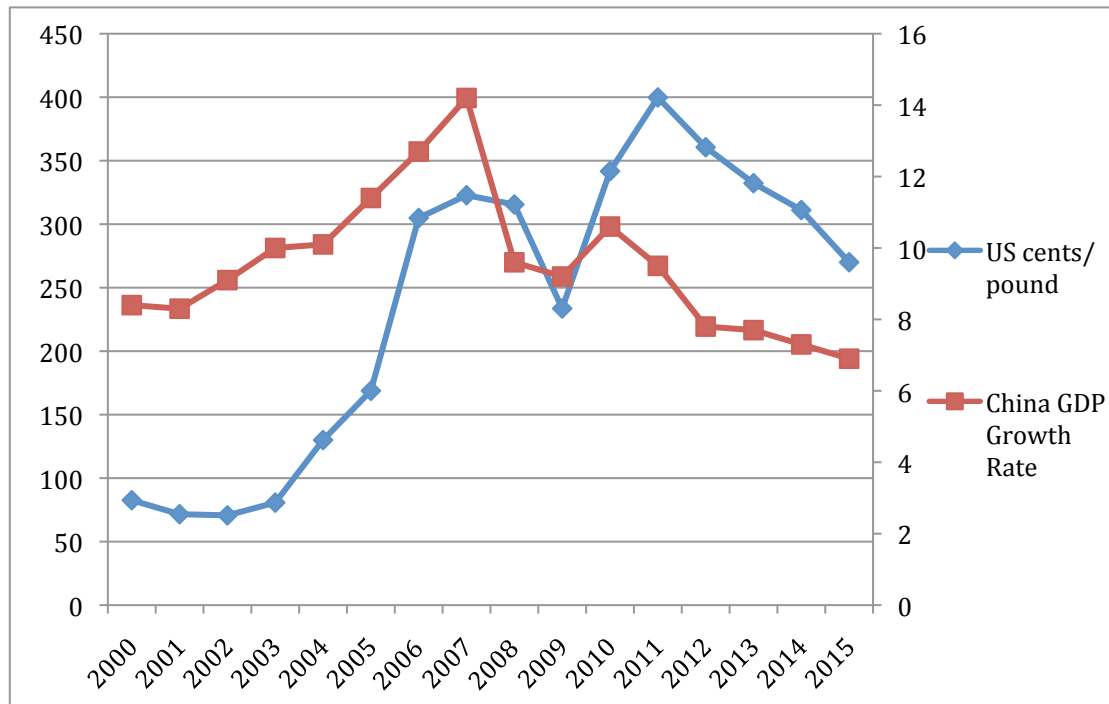


Figure 2.12 China GDP and Copper price relation.
Source World Bank

According to Henry Sanderson (2016) growth rate of 12 per cent. In one year, 2000, China's copper consumption grew 23 per cent compared with the previous year. In 2009, it rose 27.5 per cent. Those kinds of percentage growth figures are almost certainly gone for good. China has a voracious appetite for the industrial metal. China's demand for refined copper is about twice that of Europe, and roughly four times more than the U.S., said Gunzberg.

"Chinese economic growth is important to copper. However, on a per capita basis, Chinese consumption of copper is still only about half of North American consumption. This makes copper particularly likely to increase with increases in Chinese demand," China's strong demand for copper is seen as a prime indicator of the momentum behind its economic growth. Globally, some analysts point to rising copper prices as a sure sign of economic recovery taking root. So, when copper starts to build up in bonded warehouses in China, rather than being in the domestic market, alarm bells start ringing (Bank, 2014). China has made considerable progress in its economic development over the past two decades. During 1980-1999 average GDP growth rate was 10.4% annually. The industrial growth rate was at

12.7% per year in the same period. The average annual growth rate of GNP per year capita was 8.3% during 1985-1995 (Antonio Focacci, 2007)

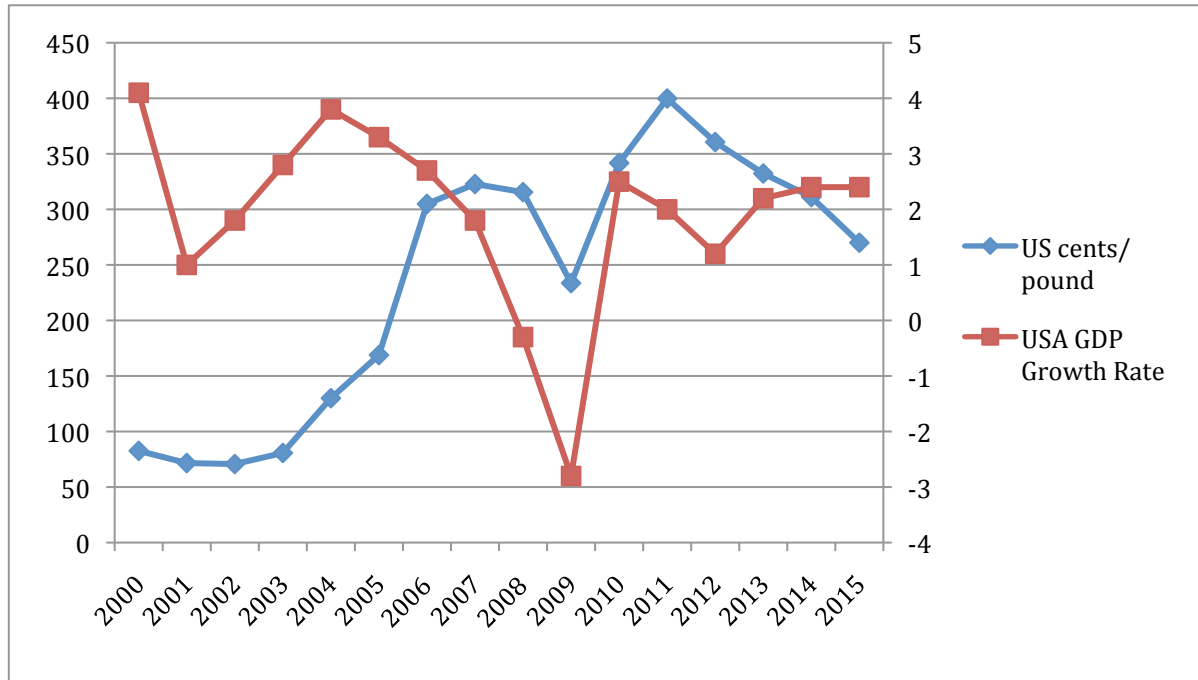


Figure 2.13 USA GDP growth rate and Copper price relation.
Source World Bank

In the 1900's USA was the main consumer of copper. It played an important role in the development of US. It can be seen from the above graph (figure 2.13) copper is really an indicator of economic health. The ups and down in the price of copper and US economy are running parallel with each other, like price of copper increasing therefore economy also growing and vice versa. But from last two years both are on different path. That is the price of copper is decreasing and US GDP growth rate is increasing.

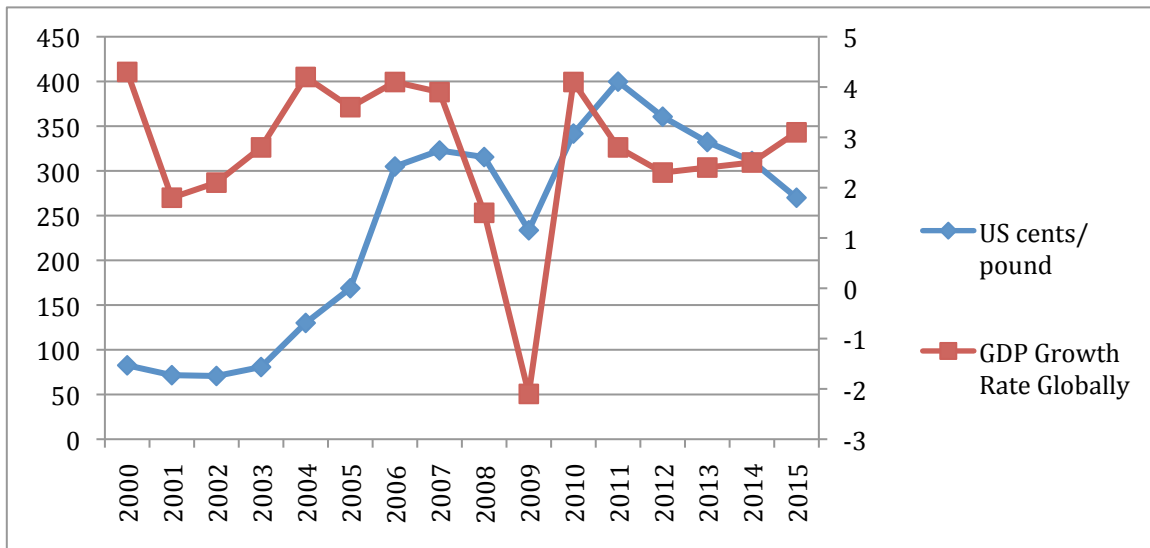


Figure 2.14 Average Copper Price from 2000 to 2015 Source Statista, Annual Growth globally (%) Source World Bank, Ycharts

As it can be seen in the above (figure 2.14) the pattern of annual GDP growth rate globally and price of copper are very much similar. From 2001 to 2006 price of copper increasing so the GDP. Similarly from 2010 to 2012 price of copper decreased so as the GDP but from last few years GDP increasing but the copper prices are decreasing. So it can be said that trend in copper tells about the economy health.

2.4 Copper as Dr. Copper

For decades, copper has served as an effective barometer of the economic health of a region. While scarce precious metals like gold and silver are often perceived as safe havens or inflation hedges because of their inherent value, copper is an industrial metal that's seen as a leading indicator for the future of global economic growth. It's often called "Dr. Copper" because of its past success in forecasting the direction of the economy (Ben Baden, 2011). The metal is lauded as 'Dr Copper' because it is reputed to be the only commodity with a PhD in Economics. Certainly its price reflects the general wellbeing of the global economy and sometimes even appears to anticipate events.

Dr. Copper was one of the best economic commodity indicators out there, but it isn't clear right now what the doctor is prescribing," said Kevin Kerr, president of Kerr

Trading International. The metal has historically been dubbed a “doctor” for its ability to serve as an indicator for economic trends and equity markets (Myra, 2015). Correlations have certainly broken down between equities and copper prices,” said Brinker Capital senior portfolio manager Andrew Rosenberger. Market participants used to look towards copper as an indicator of equity returns,” he said. “That may be true in a capital-expenditure driven economy like we had in 2005-2008, but this recovery, to date, has been devoid of meaningful capex.” Data on the metal’s prices and U.S. equities show a directional divergence, with stocks doing well while copper isn’t, and with the economy showing modest growth (Myra, 2013).

Why does copper matter? Because it’s used in all sorts of building materials and historically its price movements were tracked for insights into the robustness of industrial activity. “Copper is a good barometer of economic health and always has been,” said Robin Bhar head of metals research at Societe Generale (Debbie Carlson, 2015).

Although copper is not the largest base-metal market (aluminum is way bigger), nor the most valuable of the primary base metals (nickel is worth several times more per pound), it is still arguably the most important base metal. As the base metal of choice for investors and speculators, copper's price offers great insights into how traders view the global economic outlook. Every long-term investor should own the world's best copper miners, as their stocks' appreciation potential in the coming years is vast. And every speculator ought to consider trading copper stocks, as they tend to mirror and nicely amplify moves in the broader stock markets (Adam Hamilton, 2009).

2.5 Comparison of copper and other important commodities.

2.5.1 Copper and Oil.

Like copper, oil is also an important commodity. It is also an indicator of economic growth. In this part we will discuss which is more accurate indicator of economic health Oil or Copper.

Oil has dependably been an indicator for economic growth in 20th and 21st century, much because of the World's high reliance on oil items. Moreover, the cost of oil is of basic significance to presents world economy, given that oil is the biggest globally exchanged great, both in volume and quality terms. The effect of world financial development on oil cost can be found in the light of the oil market power. Truth be told, as World monetary development builds the interest for oil increments which pushes up oil costs. Oil costs then, have a tendency to be unpredictable, in any event incompletely because of varieties in the business cycle. .(Ghalayini, 2011)

While the expansion in GDP development and monetary movement in general, has prompted increments in demand of energy, a criticism relationship exists which can moderate this impact. The recognition that oil value spikes have a genuine negative impact on the economies is construct to a great extent with respect to the nearby connection in the planning of oil value spikes and monetary downturns. This was knowledgeable about 2000, 2004 and 2008(see the figure 2.15) Value flexibility of oil demand is dependably considered as negative - that is interest falls by a specific rate at a specific rate cost ascent of some component contribution, for this situation oil. Ordinary economic thinking, typified in the thought of "price flexibility" of demand, is that substantial oil value rises will fundamentally cut oil request and decrease financial development or economic growth. (Ghalayini, 2011)

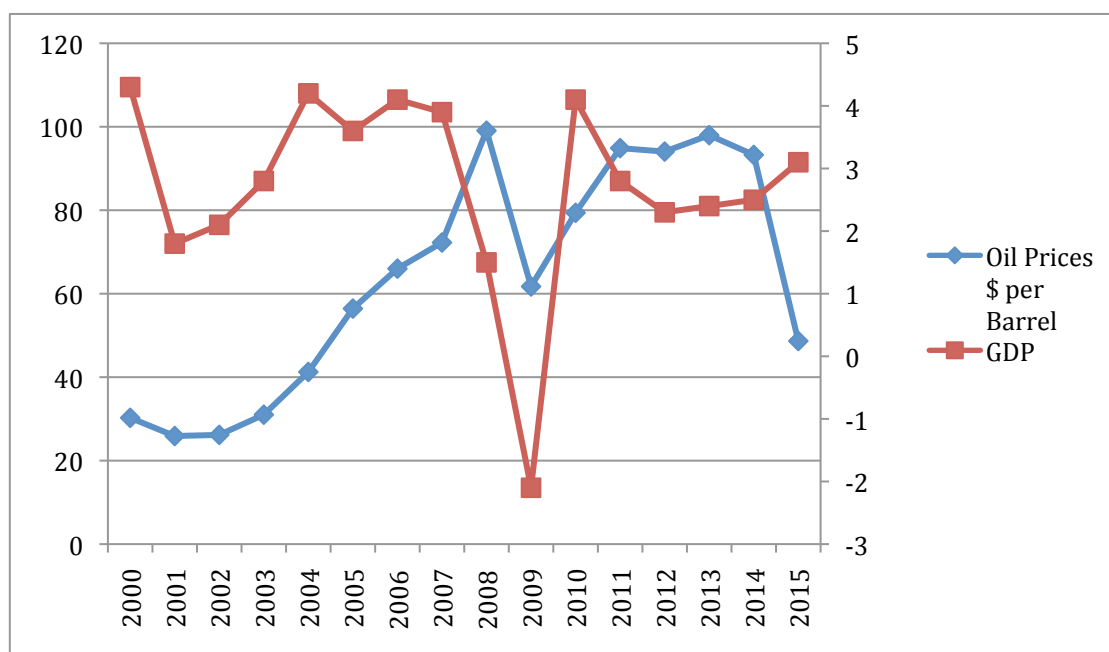


Figure 2.15 Oil prices and world GDP Relation

As it can be seen from the graph that the price of oil increases GDP decreases and vice versa. But in case of copper it is different as the price of copper increases GDP increases and vice versa.

2.5.2 Copper And Iron ore

Iron metal is second greatest commodity exchanged globally by volume (after oil). It is the primary metal in the creation of steel.

China is by a wide margin the number one maker of steel and importer of iron ore (more than 60% of seaborne metal goes to China) (Weisenthal Joe., 2012). The metal provides the backbone of skyscrapers, bridges and motorways, and the carapace and internal components of cars, fridges and washing machines.(*The Economist*, 2012)



Figure 2.16 Iron ore Prices and Global GDP relation

In the above graph iron ore prices and Global GDP Percentage has been compared. If we remove the recession period than iron ore prices and GDP shares different image. From 2003 to 2007 the price of iron is rising but if we saw the GDP it is trying to maintain in those years. In last few years the price of iron is going down while the World GDP is doing well. So it can't be see iron as bellwether of global economy.

In compare to copper, the consumption of iron ore is way ahead of consumption of copper. It is because of its uses, it is main element of making steel, and in modern world iron & steel are the main components of infrastructure. Even though iron and copper are both utilized as industrial metals, they have altogether different demand and supply progression. To begin with, the geographic areas of iron and copper shift significantly. China is the world's biggest mineworker of iron mineral, creating 47% of the world aggregate in 2014, trailed by Australia (21%) and Brazil (10%). Copper mining is vigorously moved in Chile, which created 31% of the 2014 world supply, trailed by China (9%) and Peru and the United States (7% each). Since copper and iron, which is 500 times as rich as copper, are for the most part delivered from various areas and mines, vacillations in supply are not exceptionally corresponded. Worldwide mining information from the U.S. Land Survey demonstrates that somewhere around 1994 and 2014 the connection of year-on-year changes in copper and iron mineral creation was - 0.36. This goes far towards clarifying why copper and iron value examples are so distinctive.

The demand side of the condition for iron and copper is presumably all the more very associated, given that both metals are vigorously utilized as a part of building materials and mechanical items, including shopper merchandise. This ought to roll out them comparable touchy to improvements in the worldwide economy. All things considered, copper and iron are infrequently substitutable and their interest base, geology, is entirely diverse also. In spite of the fact that China is the world's biggest maker of iron metal (47% 2014), it utilized more than 70% of the world aggregate iron mineral creation. By correlation, as indicated by the 2014 GFS Copper Survey, China's utilization of world copper in 2013 added up to 43% of world aggregate – still a substantial share however significantly less than it's hankering for iron.(Norland, 2015)

2.5.3. Copper and Aluminum

Aluminum is a standout amongst the most generally utilized metals as a part of the industrial sector. It has applications in the bundling, development, aviation, car, transportation, energy and customer durables businesses. Since it is popular for such a large number of features of industry, aluminum is viewed as a decent intermediary for the health of the worldwide economy. (Daniel Cross, 2015)

It might be difficult to accept yet just 150 years back aluminum was thought to be silver from dirt and a greatly costly sort of metal. Today, aluminum positions number two in the utilization volumes among all the metals, surpassed just by steel (iron ore). In the coming decades the interest for aluminum will keep expanding at relentless rates. Late improvements in the automobile industry, the fast development of urban areas, new potential employments of aluminum as a substitute to copper in the force business – these and numerous different patterns imply that the winged metal is all around set to reinforce its prevailing position as a key auxiliary material of the 21st century. (UC Rusal, 2015)

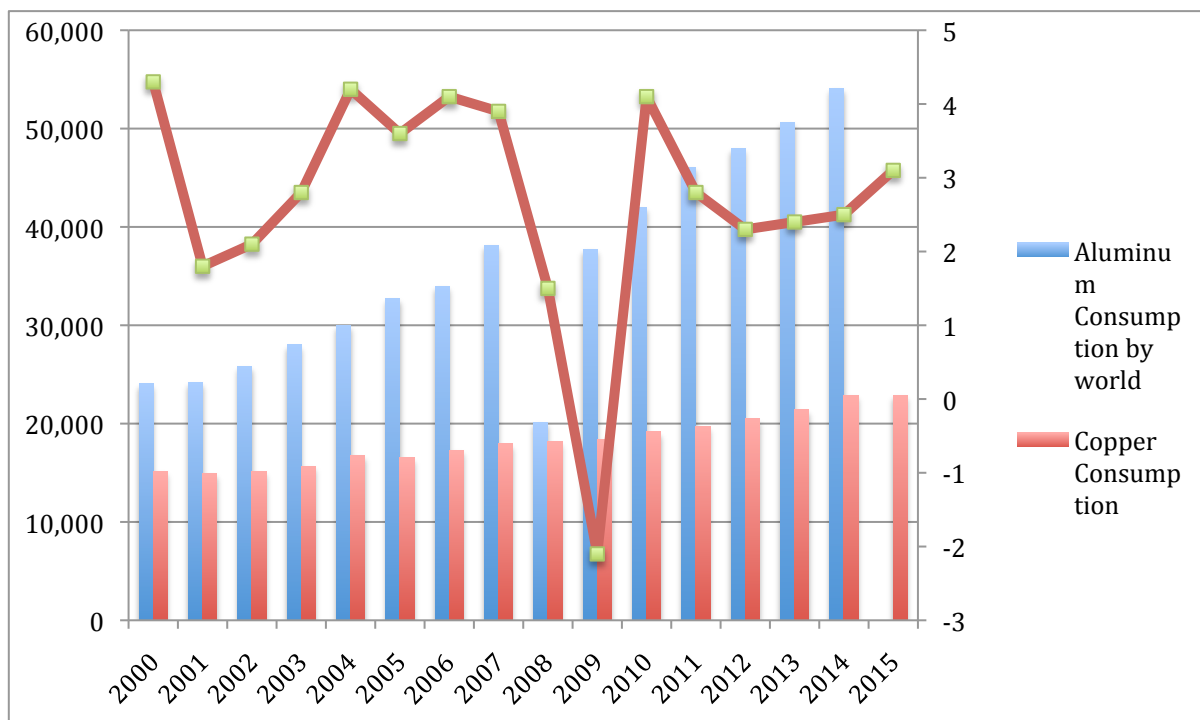


Figure 2.17 aluminum and copper consumption and Global GDP
Source ICSG, Aluminumleader.com

As it can be seen in the above graph the consumption of aluminum is much way more than copper. But when the graph is closely examined one can see during the recession period i.e. 2008-09 the consumption of aluminum decreased drastically. But the usage of copper didn't decrease and there is positivity in the demand of copper that led us that this period will be over soon. Even in the recent years the price of copper is decreased and very low but the demand of copper is still rising which tell that either the economy is bad or the price of copper is bad. The consumption of copper will continue to grow and can be seen as an indicator of economic health.

Here also China plays a vital role in aluminum industry. It consumes almost around 50% of aluminum produced globally. So the aluminum price and demand is majorly depended on china, as it is the biggest importer of it. In recession time they lowered the demand of aluminum but they didn't lower the demand of copper. From this calculation it is easy to understand how important is copper for a country.

2.5.4. Copper and Nickel

Nickel is not an ancient metal. It is the metal of modern times. It was discovered in late 18th century. It is widely used in industrial, marine, construction, transport, and military applications. It is mostly utilized to make alloys mixed with chromium and other metals to produce stainless and heat resisting steels. In fact Major portion of copper produced is used to manufacture stainless steels around 65% percent of nickel is used for this purpose only. (INSG, 2015)

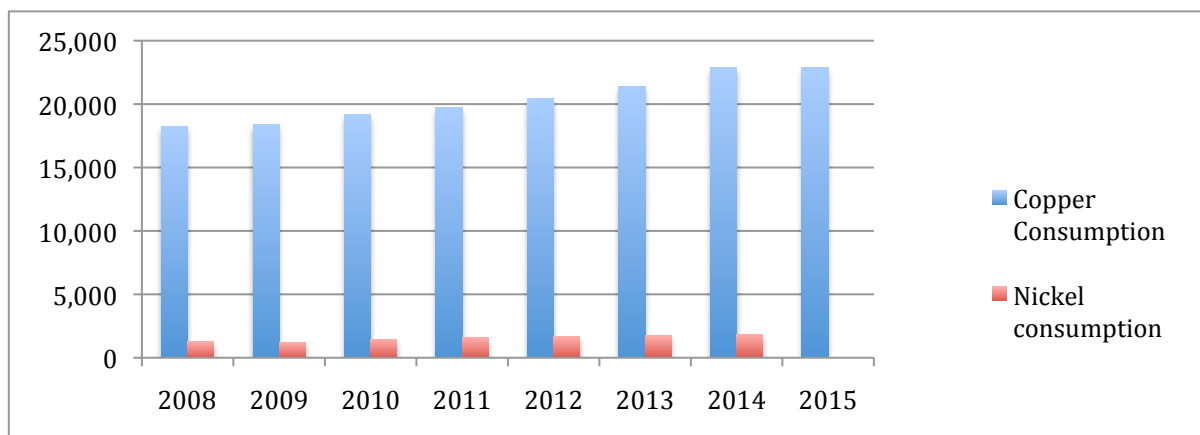


Figure 2.18 Copper and Nickel Consumption globally.
Source ICSG, Statista.com

As the time passed the usage of nickel increased and sometime it is correlated to economic development. The demand for nickel has expanded from 907 thousand tons in 1990 to 1.465 million tons in 2010, a yearly normal development rate of 2.3%. From that point forward the solid development recorded by the Chinese economy has further quickened the expansion in nickel demand that recorded in just six years, from 2010 up to 2015, a yearly development rate of 5.0%. Asia is presently by a long shot the biggest local business sector for nickel as of now speaking to 71% of aggregate world interest. China alone now represents near 52% of world nickel request thought about with 18% ten years prior. (INSG, 2015)

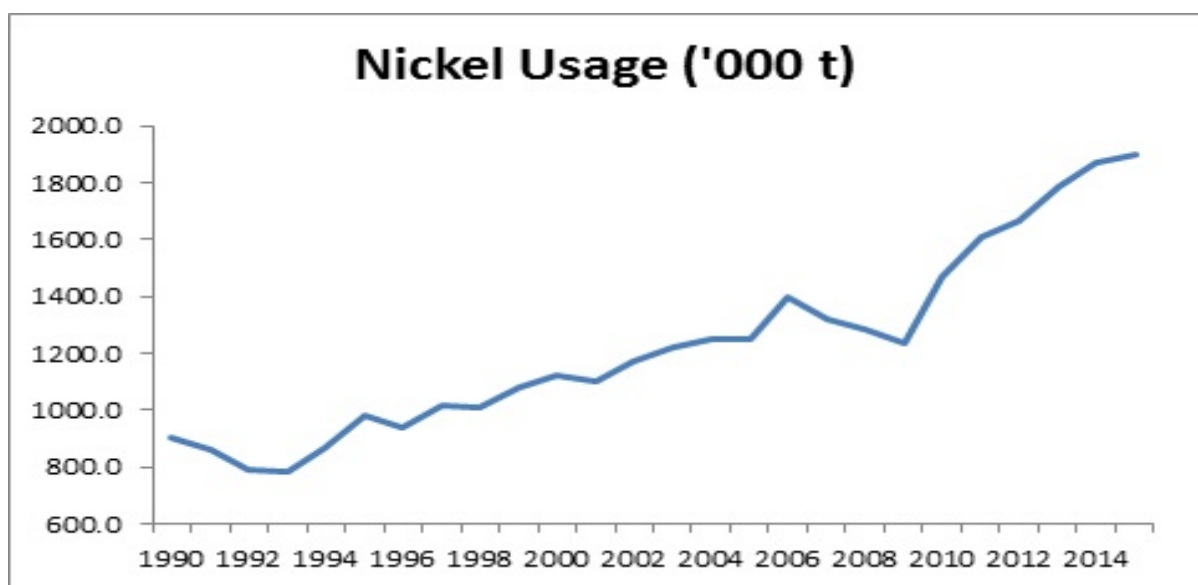


Figure 2.19 Nickel Usages from 1990 to 2014
Source INSG

“Only about 1 million ton of new or primary nickel are produced and consumed annually in the world, compared with over 10 million ton of copper and nearly 800 million ton of steel.”(INSG, 2015)

Consumption of nickel is very less in compare to copper and even with other metals. So it is very difficult to say weather how much it affects on the economy. It has some effect on economy as like the other metals but it still need time to reach that level of importance like copper or iron ore. Copper is mostly used as alone, while the nickel is mostly used to make alloys. To prove its importance nickel has to mixed it up with some other metal while on the other hand copper doesn't need to mix it up to prove its importance.

2.6 Importance of Copper in Modern Era.

From thousands years ago to today, copper plays an important role in mankind. From time to time the uses and importance of copper changed and today it become so much important that all the technology, vehicles, construction etc. needs copper. (J.R..Davis 2001) Copper is not a metal of today; it is the oldest metal known to mankind. It is being used 10000 years ago; if we saw in the past all the great civilization like Egyptian, Greek, and Roman used copper and its product for different purposes.

Over the period of time the importance copper increased initially it was used as Decorative items, jewelry, weapons and utilitarian purposes. But the value of copper is increased when the industrial revolution start. It is industrial Revolution that brings about a tremendous change in the production and consumption of copper. It has the unique mixture of physical and mechanical properties, good corrosion and wear resistance. All these characteristics of copper make it so special that it is being widely used in industries like Building construction, electrical and electronic appliances. It is also used in various demanding applications in marine, automotive, chemical, and electronics industry. As the new discoveries in superconductors, electric vehicles, solar heating and big scale desalination of water clearly says that copper will continue play an important role in the future.

The demand of copper is increased after the arrival of electricity, as copper is the best conductor of electricity. It is difficult to expect a more vital discovery in the development of modern world than the invention of electricity. It would be very difficult for us to imagine our life without electricity. Our life would be much more hazardous without electricity, we will not able to make worldwide communications, healthcare and transport. Even though the making of electricity was done but to make it in the proper use we need to transmit it to the users, which can only be done through good quality copper wire. As the technology develops the need for the copper is also increases as it is an important element of technology. (Michael Coulon, 2012)

Copper is crucial for the production, transmission, circulation and utilization of power –without which human life would crumble. Copper is particularly essential for the supply of naturally well-disposed energy since it's such a magnificent transmitter of electricity and heat. With familiarity with manageability and eco-accommodating energy arrangements on the ascent, copper will turn out to play a vital role in the future in energy sector. From the beginning days of electronics and communication, copper has provided a way to transmission of signals from one point to another. Many years of advancement and achievements in communications would not be possible without copper. Also, the increased demand we put on data innovation – speedier conveyance of data, rapid connections and ensured accessibility all over the place – are prompting rising interest for copper.

Apart from the electrical industry, copper also played an important role in automobile industry. It would be impossible to make electrical and electronic components, intelligent engine and gear management without copper. As the comfort level and technology increases in automobiles it directly increases the demand of copper. As the automobile industry is moving towards more eco-friendly and fuel-efficient engines and electric cars all these new developments are dependent on copper.

Today a hybrid car engine has about 50kg of copper. The modern period would not have come without copper. The occasions that denoted its first light - the disclosure of America and the creation of the printing press - would essentially not have been conceivable without copper.

Hundreds of years after the fact, copper-zinc alloys were utilized to make Brass, which has various employments. Brass helped Britain change itself into a main modern country. Since the revelation of electric current, copper has been utilized as a part of all fields and is a crucial material in present day industry.*(History | Come home to copper,)*

Copper is easily stretched, molded, and shaped; is resistant to corrosion; and conducts heat and electricity efficiently. As a result, copper was important to early humans and continues to be a material of choice for a variety of domestic, industrial,

and high technology applications today. It resulted in a steady rise of consumption of copper.(Jeff Doebrich, 2009)

The consumption of copper and its products is increased after the industrial revolution. The global demand for copper continues to grow: world refined usage has more than tripled in the last 50 years thanks to expanding sectors such as electrical and electronic products, building construction, industrial machinery and equipment, transportation equipment, and consumer and general products (ICSG 2015).

Without Copper, our mobile world and latest technology that we are using will not be able to function. In spite of expansions in mine production, the production is nearly double since 1980; phenomenal demand has strained supplies and pushed costs to the record levels of late years.(*Copper - Oracle Mining Corp*, 2012)

According to Bill Carter, for very long time copper has been playing an important role in the driving the civilizations. For example we can see The United States. A great many people surmise that gold was the sole main thrust of our push into the West, however as gold turned into the image of "striking it rich," copper unobtrusively formed into a long haul, beneficial industry with its own particular list of head honchos and burglar aristocrats. With the approach of power in the 1870s, the world generally changed. We required more copper than we could even imagine. (Madden, 2012)

As the technology developing the importance and demand of copper is also increasing and in future also copper will be an important metal for humans as it was in past.

CHAPTER III

3. Research Methodology

Somekh and Lewin (2005) define research methodology as not only “the collection of methods or rules by which a particular piece of research is undertaken but also principles, theories and values that underpin a particular approach to research”. Walter (2006) states that methodology is the framework of reference for the undertaken research, which is stimulated by the paradigm in which our theoretical perspective is placed or developed. In conducting this research, an inductive approach will be used by qualitative data collection with in-depth interviews.

The sole purpose of this study is to find weather copper plays and important role in the economic growth and is still be a leading key indicator of economic growth. Research has a particular focus on the relationship between the Copper and Global Economic Growth. This segment of the study subtle elements the strategy behind the exploration including the research design, data collection and analysis methods, and also the related predicaments that research of this nature can experience.

3.1 Proposed Methodology

This part contains the brief information about the methodology, which is utilized as a part of the research. It discusses the information accumulation where I will clarify and discuss the sort of information gathering technique being utilized as a part of the exploration to assemble the data. The section likewise discusses the exploration reasoning and what theory will inferred close by Research approach, Research sampling. Where the data with respect to the sorts and procedures of these will be examined which is utilized as a part of the research.

3.2 Research Design

The research design of this will follow The ‘research onion’ model by Saunder et al. (2009) represents several layers, which have to be peeled back one by one in order to reveal the core in the research process, see Figure.

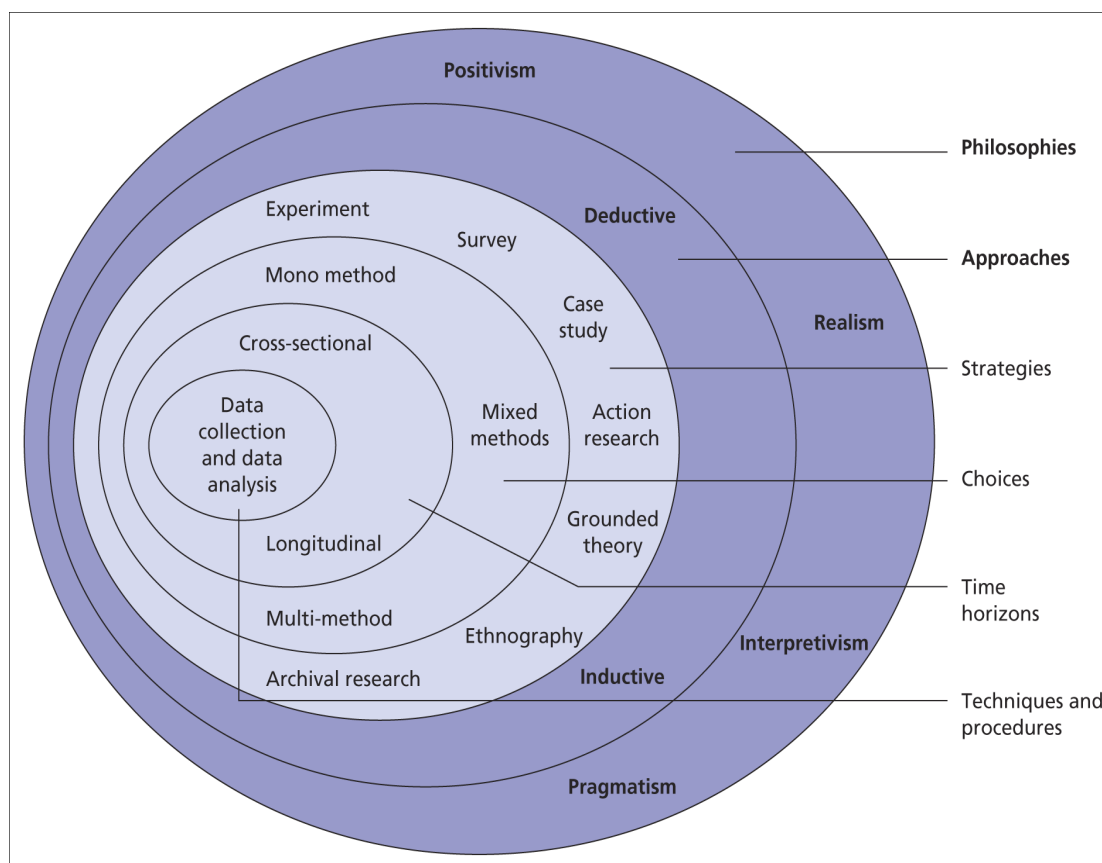


Figure 3.1 Research onion by Saunders (2009)

3.2.1 Research Philosophy

The principal layer of Research onion begins with the philosophy which as indicated by Saunders et al. (2009), "contains vital presumptions, these presumptions will support your research strategy and the techniques you pick as a major aspect of the procedure". Moreover the procedure is associated with the advancement of information and "the nature of that knowledge" Saunders et al (2009).

Building up a philosophical point of view requires that the researcher make a few center presumptions concerning two measurements: "the nature of society and the way of science" (Burrell and Morgan, 1979). Society is seen as bound together and firm, while the Sociology of radical change sees society as in steady clash as people battle to free themselves from the mastery of societal structures (Burrell and Morgan, 1979).

The other measurement, science, includes either a subjective or a target way to deal with research, and these two noteworthy philosophical methodologies are outlined by a few center presumptions concerning Ontology (reality), epistemology (learning/knowledge), human instinct (pre-decided or not), and approach (Holden and Lynch, 2004).

Ontology deals with the way of reality and suppositions researchers have about the way the world works and the dedication held to a specific perspective (Saunders et al, 2009).

Epistemology deals with the investigation of learning and what we acknowledge as being legitimate information (Collis and Hussey, 2003). An Epistemological issue concerns the subject of what is (or ought to be) viewed as adequate learning in a control (Bryman, 2004). As indicated by Saunders et al, 2007 there are three epistemological ways to deal with exploration logic: Positivism, Realism and Interpretivism.

Positivism

Researchers that like to look for certainties or reasons for social or business phenomena utilizing intelligent thinking, for example, accuracy and objectivity as techniques for investigating, normally follow the positivism methodology.

The positivism methodology is followed by a specialist that wants to work with a detectable social reality keeping in mind the end goal to think of law-like speculations like those created by the physical and natural researchers (Remenyi et al, 1998), and in this custom, the scientist turns into a objective expert, coolly making segregated translations about those information that have been gathered in a clearly esteem free way (Saunders et al, 2003). Besides, the accentuation is on a profoundly organized system to encourage replication (Gill and Johnson, 1997) and on quantifiable perceptions that loan themselves to factual investigation (Saunders et al, 2003). The suspicion is that the researcher is free of and neither influences nor is influenced by the subject of the examination (Remenyi et al, 1998; Saunders et al, 2003).

Realism

Realism expresses that genuine articles exist autonomous of human awareness, yet that learning is socially made (Saunders et al, 2007).

As indicated by Blaikie (1993), whilst authenticity is worried with what sorts of things there are, and how these things carry on, it acknowledges that reality may exist regardless of science or perception, thus there is legitimacy in perceiving substances that are just asserted to exist or act, whether demonstrated or not. Like interpretive, authenticity recognizes that characteristic and sociologies are distinctive.

From a hierarchical point of view, Hatch and Cunliffe (2006) portray the realist specialist as enquiring into the components and structures that underlie institutional structures and practices, how these rise after some time, how they may engage and oblige social performing artists, and how such structures might be evaluated and changed. Realists take the perspective that examining from various edges and at different levels will all add to comprehension since reality can exist on numerous levels (Chia, 2002).

Interpretivism

There have been numerous reactions on positivism, which characterize "laws" similarly as physical sciences in the intricate social universe of business and administration. This drove numerous researchers to contend for an interpretivistic approach. Interpretive studies are portrayed by the prioritization of subjective implications and social-political and additionally typical activity in the process through which people build and remake their world (Orlikowski and Baroudi, 1991). Interpretive approach concentrates on assorted societies, financial conditions, and the encounters and view of the performing artists included (Avgerou and Walsham, 2000), which accentuates on doing research among individuals as opposed to objects.

With the end goal of this study includes measuring human conduct and administrations (elusive by nature) the specialist adjusts an Interpretative philosophy. The exploration includes a level of social world understanding of encounters and recognitions inside the copper industry.

Thus this philosophy is appropriate to the study as "Interpretivism is an epistemology that supporters that it is important for the researcher to comprehend contrasts between people in our part as social performers." (Lewis and Thornhill, 2007 p.106)

As far as exploration ontology (nature of reality) the examination will include a subjective approach to deal with the study on the grounds that the exploration will include investigation of the individuals (Finance manager, Trader, Project manager) translation of administration and their encounters and recognitions. The part of the researcher as per Saunders, Lewis and Thornhill (2007) is to, "try to comprehend the subjective reality of the individuals keeping in mind the end goal to have the capacity to understand and comprehend their thought processes, activities and aims in a way that is important".

As the Research Question ought to permit to be replied on subjective strategy, it is superbly to work with Interpretive rationality, Interpretivism is "connected with the philosophical position of vision, and is utilized to aggregate together different methodologies, including social constructionism, phenomenology and hermeneutics; approaches that reject the objectivist see that significance lives inside the world autonomously of cognizance" (Collins, 2010).

3.2.2 Research Approach

The next element or layer of the onion is the type of approach, which will be used in the research. There are two types of research approaches namely inductive and deductive research.

Deductive Approach

Bryman (2004: 8) expresses that deductive methodology is a way to deal with the relationship amongst theory and research in which the last is directed with reference to hypothesis and thoughts derived from the previous research.

Inductive Approach

Saunders et al. (2007: 17) express that inductive approach includes the advancement of a theory as an aftereffect of the perceptions of experimental

information. Qualitative technique is viewed as inductive. As indicated by Rocco et al. (2003), inductive rationale and qualitative methods are by and large utilized with the objective of comprehension a specific wonder of enthusiasm inside its social setting.

Researchers followed the inductive methodology concentrate on comprehension the implications and understandings of 'social performers' and to comprehend their reality from their perspective, is exceptionally logical and consequently is not broadly generalisable (Saunders, Lewis and Thornhill, 2007). With the end goal of this study the methodology favored is the inductive methodology.

In this research, researcher followed the inductive research approach since it incorporates the procedure of qualitative data collection and creates theory from the information investigation. Inductive methodology permit to get a vibe of what's going on and to understand the way of the issue.(Saunders et al, 2007). In inductive methodology theory is produced from the perception of exact reality. It includes moving of individual perceptions to explanations of general patterns. (Collis and Hussey, 2009).

Involve what, how, Is type questions are the center of this study which mean the inductive methodology is more reasonable for this research. Adaptability in building speculations and an adaptable structure is another normal for the study that adjusts itself all the more positively to an inductive methodology. Saunders, Lewis and Thornhill (2007 p.120), depict the inductive methodology as an accentuation on "picking up a comprehension of the implications people append to occasions, a more adaptable structure to allow changes of exploration accentuation as the research advances".

The inductive approach is choose because of the qualitative data collection which will collect data with realation between copper and economic health. The result would be analysed is copper a leading key indicator of economic health or not.

3.2.3 Research Strategy

The following level of the research onion is the research strategy. According to Saunders et al, (2003) the research strategy as a non specific arrangement managing the path for the researcher to answer the research questions put forward. Every sort of examination methodology could be utilized for each of the three purposes: Exploratory, descriptive and explanatory (Yin, 2003).

As per Collis and Hussey (2003), there are many research strategies which could be follow like: cross sectional studies, experimental studies, longitudinal studies, surveys, action research, case studies, ethnography, grounded theory, hermeneutics, and participative enquiry. The case that one research strategy is superior to the next research strategy is a myth (Saunders et al, 2007).

Research strategy for exploring “is copper still a leading key indicator of economic health” will include case studies and grounded theory strategies. As per Saunders et al (2007, p139) referring to Robson (2002:178) characterizes Case study as the strategy that includes the experimental examination of a specific marvel inside the genuine connection by the utilizing the distinctive methods of confirmation. The Case study strategy likewise has significant capacity to produce answers to the inquiry "why?" and additionally the "what?" and "how?" questions. Therefore the case study strategy is frequently utilized as a part of illustrative and exploratory examination. With this study looking to get the answer ‘why’ and ‘how’ questions on the relation between copper and economic health, this is a suitable strategy to utilize.

Again because of the informative and exploratory nature of the point, there is one more strategy which can be executed that is Grounded theory strategy. Saunders, Lewis and Thornhill (2007 p.142) "A grounded theory strategy is, as per Goulding (2002), especially supportive for research to foresee and clarify behaviour, the accentuation being after creating and building theory.

As quite a bit of business and administration is about individuals' practices, for instance shoppers' or representatives', a grounded theory strategy can be utilized to investigate an extensive variety of business and administration issues. In grounded

theory, information gathering begins without the arrangement of an underlying hypothetical structure. Theory is produced from information created by a progression of perceptions".

The interview which will be conducted during the research are semi-structured interview. These interviews will help the researcher to answer the research question and also help to analyse and compare the data with the results of the case study strategy and the grounded theory strategy.

3.2.4 Research Choice

The next layer of the Research Onion is Research choice. There are two types of Research Choices one is Qualitative and other is Quantitative research.

Qualitative Research

As per Creswell (2003) Qualitative research is one in which the analyst usually makes learning claims in view of constructivist viewpoints. Systems utilized as a part of this research plan include ethnographies, participative inquiry, phenomenologies, case studies, or grounded theory studies. Qualitative research ordinarily underscores words instead of evaluation in the gathering and examination of information (Bryman, 2004: 206).

Quantative Research

According to Creswell, (2003) Quantitative research is one in which the analyst fundamentally utilizes post positivist cases for creating learning for instance; circumstances and end results considering, diminishment to particular variables, speculations and inquiries, utilization of estimations and perceptions, and the test of the hypotheses.

Systems typically utilized as a part of this examination configuration are test concentrates on, overviews, and foreordained instruments utilized as a part of information. What's more, Bryman (2004: 266) states that quantitative research for the most part stresses on quantification in the accumulation and examination of information.

In this Dissertation, the researcher will follow qualitative method of research. The nature of research is case study, so researcher follows a single data collection method, in other words mono method is being used for data collection. In-depth Interview will be used as the primary data to seek qualitative information from the participants.

Three In-depth interviews are carried out across 2 different firms in the copper industry. The interviews consist of 1 Finance Manager, 1 Project Manager and 1 Copper Trader who are working in Copper Industry from long time. 2 Interviews are taken from the managers of Mopani Copper Mine (Zambia) of Glencore Plc. 1 Interview is taken from a copper trader of Zambia.

"In-depth interviews are very helpful in collecting the qualitative data that can be utilized for various purposes, including needs appraisal, program refinement, issue recognizable proof, and vital arranging. In-depth interviews are most suitable for circumstances in which you need to ask open-ended inquiries that evoke profundity of data from moderately few individuals (instead of reviews, which have a tendency to be more quantitative and are directed with bigger quantities of individuals)" Guion L, Diehl D, and McDonald D, (2011). In this way the structure of the In-depth interviews will be semi-organized (permitting space for subsequent inquiries where reasonable) with a system of inquiries that look for profundity of data from participants. Depth is needed from the reactions so the analyst can completely assess an exploratory investigation of administration quality in the copper industry. Interviews will be recorded/Saved to permit researchers to enough investigate and assess the information.

3.2.5 Time Horizon

The following layer of the research onion alludes to the time horizon of the research. There are two kinds of time horizons, cross-sectional studies and longitudinal studies. Longitudinal research includes study over longer timeframes and is commonly required in measuring change amid this time period which is not suited to ventures with fleeting time confinements while cross-sectional studies are noted as previews of a specific phenomenon at a specific time (Saunders et al, 2007).

Because of the limited time for the research to be finished before last date of submission, this thesis will be a cross-sectional study. A cross-sectional study draws in the collecting data on more than one case at one particular time with a specific end goal to gather quantitative or quantifiable information when more than one variable is viewed as (Bryman and Bell, 2003). In this manner the examination concerning on the current relation between copper and economic growth/ health not on the over the years relation. As there was a relation between copper and economic growth but in recent time the relation is breaking up. Also depicted by Saunders, Lewis and Thornhill (2007, p.148) as "the investigation of a specific phenomenon (or wonders) at a specific time."

3.2.6 Data Collection Method

The topic of this research is exploratory and investigative in nature (Is copper still a leading key indicator of economic growth), so the qualitative method was followed. Additionally as the research techniques utilized in this research are non numerical or factual in nature therefore in this research qualitative method is more favorable than quantitative method. As the examination subject is investigative and exploratory in nature (examining administration quality holes in the budgetary area), the exploration technique is subjective. Additionally as the exploration systems utilized are non-numerical or factual in nature subjective is more apt to the point than quantitative examination. "Qualitative method is utilized dominantly as an equivalent word for any data collection technique, (for example, interviews) or data analysis procedure, (for example, classifying information) that produces or uses non-numerical information." Saunders, Lewis and Thornhill (2007, p.145)

According to Walliman (2011) that there is a "consistent transaction amongst gathering and investigation" with qualitative researches, which "creates a slow development of comprehension". While shortcomings of qualitative interviews may contain potential one-sided reactions, interviewee reflexivity and conceivable defects because of poor questioner review of learning as indicated by Saunders et al. (2009), the positive sides of this technique incorporate direct remarks on the research topic and the potential for more prominent knowledge to be picked up where a solid association amongst interviewer and interviewee may emerge.

There are two types of data collection one is Primary Data Collection and Second is Secondary Data Collection.

Primary Data Collection.

Primary data is the new data, which was collected by researcher through interviews. This data is very important because it minimize the chance of error occurrence while conducting the research.

The goal of the research is to investigate “ **is copper still a key leading indicator in economic health**”. Taking in depth interviews will collect primary data for the research with the different people of copper industry who are working in this industry from a long time like finance managers, project manager and trader. These interviews were taken via email and telephonic conversation.

The interviews Questions Asked during the interviews are:

- 1. Is Copper (excluding oil) the world's most important commodity?**
- 2. What industries are particularly sensitive to Copper prices?**
- 3. What countries (economies) are particularly sensitive to Copper prices**
- 4. Has Dr. Copper been an effective leading indicator of world economic growth?**
- 5. Will Dr. Copper continues to be a leading indicator of world economic growth?**
- 6. Are production levels (demand) for Copper a better indicator than its price?**

The interviews are conducted with the employees of Mopani Copper Mine (Glencore PLC), Zambia. It is a copper mine which is owned by the Glencore Plc in Zambia and also with a trader from Israel.

Secondary Data

Secondary Data is the data, which is available publically i.e that data which is available in public domain. This data was collected through previous studies, articles, journals, books and Websites etc. on the copper.

3.2.7 Sampling

According to Mason (2002) " Sampling and selection are standards and techniques utilized to recognize, pick, and access to data sources". it would be impossible for the researcher to collect data from the whole population so researcher have to choose a sample. This will be similarly vital whether researcher wants to utilize interviews, polls, perceptions or some other data collection technique (Saunders, 2007).

As per Field (2005) A Sample is "a littler gathering of units from a population utilized to decide truth/facts about that population." As indicated by Saunders et al (2007) there are two kinds of sampling techniques one is probability or representative sampling most normally connected with survey based methodologies where researcher need to make induction from tests around a population to answer research question and second sample technique is non-probability or judgmental sampling gives a scope of option strategies to choose tests in light of researcher subjective judgment.

In this research, qualitative research method is used therefore the non-probability or judgmental sampling is use by the researcher. As the size of copper industry is huge it is impossible to take interviews from each every firms related to copper industry. Also time and budget were also taken into the consideration, as they are limited. All the samples were not randomly selected and cannot be randomly distributed.

While non-probability sampling will end in fewer data, according to Saunders et al (2009), the material collected and analyzed will be more specific. "Non-probability sampling (or non-random sampling) provides a range of alternative techniques to select samples based on your subjective judgment. In the exploratory stages of some research projects, a non probability sample may be the most practical." Saunders, Lewis and Thornhill (2007, p.226). This is important for this study, as its aim is to ascertain generalized perceptions, which could lead to new and more in-depth research on the topic of copper as a key leading indicator in economic health.

Hence the suitable selective samples are chosen within the copper industry. Three Interviews has been conducted in this research, all three participants are currently working in copper industry in different fields. One Interview is with the Financial Manager of Mopani copper mine owned by Glencore plc. Second interview is with project manager of same company. Third Interview is with a Copper Trader. The selection of people is not random, so the applicable people with good experience in copper industry have been chosen to find is copper a leading key indicator of economic health/growth.

Reactions exist with accommodation inspecting in view of the reason that there is inclination in the samples, which are not illustrative of the complete picture. "In spite of the fact that this system is utilized generally, it is inclined to predisposition and impacts that are outside your ability to control, as the cases show up in the sample simply because of the simplicity of acquiring them. Saunders, Lewis and Thornhill (2007, p.234).

3.3 Research Ethics

Moral/Ethical concerns were raised as researcher plans his research, look for access to association/organization and to individual, gather, examine and report your information. Cooper and Schindler (2008:34) characterizes ethics as the 'standards or gauges of conduct that guide moral decisions about our conduct and our association with others.' Research ethics therefore identify with inquiries regarding how we plan and elucidate our research topic, outline and review our examination discoveries in a good and dependable way (Saunders, 2009).

So during the research, researcher had take care of the moral parameters of the association whose mangers or authorities had participated. The people who took part in this research are completely educated about the research topic. Interviewee has the privilege of security, on the off chance that him/her need to keep his identity secret than his/her personality won't be uncovered.

The Data Protection Acts (1988, 2003) had been entirely taken after with the preparing and storage of data. As indicated by Saunders (2009) individual information must be handled reasonably and legitimately, satisfactory, significant and not unnecessary in connection to the reason for which they are prepared, precisely, stayed up with the latest and kept safely.

3.4 Research Limitations

Before starting the research, researcher must identify the limitations of the research and try to eliminate or decrease them to a minimum. The most challenging part in the research is Time Management, because the research will be done over a short period of time, and sometime it is a bit difficult to get the proper time from the busy schedule of managers of the copper organization. Therefore to eliminate this problem researcher should fix meetings at the initial stage of research.

Unwavering quality of information/data is another potential confinement of the examination. The genuineness of reactions from meetings can be corrupted because of corporate strategies of the association and secrecy requirements. Likewise with the specialist's proficient job inside the organization implies the privacy variable could be exacerbated and additionally any individual inclination. The researcher empowers trust in the member and makes them feel quiet.

During this research it is not possible to take face to face interviews because the interviewees are in other countries. So the interviews were conducted via telephone and email.

CHAPTER IV

4. Data Analysis And Finding

4.1 Introduction

This part of research is concentrated on the analysis and finding of the research based on Three Interviews conducted with the two managers of a copper mine and one copper trader. The participant's response were inspected and scanned for themes and patterns that permitted to answer the main question of this dissertation. This part will explain what participated had answered the questions.

4.2 Methodology of research

This dissertation is based on in depth interviews taken between the two managers of a copper mine, and one trader, all of whom are working in the copper industry for a very long time and have strong experience in the field.

All of the participants who participated in this research belong to different fields however they all are part of big copper industry. The interviewees are Finance Manager, Project Manager of Mopani copper mine owned by Glencore PLC and trader. The aim of these interviews is to find what the individuals think about copper as a leading indicator of economic growth/health. All three interviewees are work in different fields of copper industry, as it is necessary for the research to be look out from different views. As all three interviewees are way different in work.

Two out of three interviews were conducted via email and one interview was done via telephonic conversation. The structure of the In-depth interviews will be semi-organized (permitting space for subsequent inquiries where reasonable) with a system of inquiries that look for profundity of data from participants. Each interviewee got the form (Appendix) explains the aim of research. As the participants of this research don't have any problem with revealing their identity, so the names of participants were revealed in this research. Same questions were asked to the each and every participants to maintained the focus on the research question.

4.3 Participants Information

(A) Participants Gender

All the participants in this research who were interviewed were Male (100%). As the participants are working on mines so there is no female participants.

(B) Participant details

During this research three Participants were interviewed their name and experience in copper industry is given below:

- Participant Name: Mr. Hanuman Singh Rao
Participant Position: Project Manager
Work Experience in Copper Industry: 8 years
Name of Company: Mopani Copper Mine owned by Glencore
Country: Zambia
- Participant Name: Mr. Paul Lwiindi
Participant Position: Finance Manager
Work Experience in Copper Industry: 3 year
Name of Company: Mopani Copper Mine owned by Glencore
Country: Zambia
- Participant Name: Mr. Josh Diamond
Participant position: Copper Trader
Work Experience in Copper Industry: 12 years
Name of Company: JB Commodities
Country: Israel

4.4 Interviews

During this research, the researcher took three interviews. The interviewees are Finance Manager, Project Manager of Mopani copper mine owned by Glencore PLC and trader. The aim of these interviews is to find what the individuals think about copper as a leading indicator of economic growth/health. All three interviewees are work in different fields of copper industry, as it is necessary for the research to be look out from different views. As all three interviewees are way different in work.

1. Is Copper (excluding oil) the world's most important commodity? YES/NO (Why)

According to Mr. Lwiindi (Finance manager of Mopani copper mine, Zambia) Yes, you can say that, as it is a major component in most of the things. No other metal is as good as copper when it comes to conducting electricity and today almost every thing runs on electricity. So we can see copper as an important commodity.

As per Mr. Rao (Project manager of Mopani copper mine, Zambia) - yes, copper is best conductor of electricity and for this simple reason it has been the power transmission industry all across the world. Electricity is undoubtedly the most important thing in the human life thus so is copper.

According to Mr. Josh, the most important thing first look at all metals together you know they all have different roles. May be at one point of time copper was next to oil but many years ago not presently. As the prices has gone up and it became more expensive so there are many substitute came up made by us. As you only need copper for parts and for electricity and for as conductor. So you can say that copper is an important commodity as it is essential for electricity but I will not say that it is most important after oil as consumption of iron and aluminum is much more that copper.

2. What industries are particularly sensitive to Copper prices?

Mr. Lwiindi said that today copper has lots of uses. It is used in lots of industries. But Electronics, Defense, Mining, Transport are the industry which are affected by the copper prices as these industries uses a major portion of overall copper production.

Copper is an industrial metal it is used by almost every industry but I would say biggest consumption of copper is in electrical (Power Grid), housing as it used in pipes, wires etc. and automobile. The use of copper in automobile is increasing as automobile companies are focusing on hybrid or electric cars according to Mr. Josh

Almost all industries are sensitive to copper because of its usage, but Electrical/Electronics (power transmission) and telecommunication industries are most sensitive to copper along with automobile industry according to Mr.Rao.

3. What countries (economies) are particularly sensitive to Copper prices?

Every country needs electricity and for electricity you need copper. But the Countries that are more sensitive to copper prices are Chile, Congo, and Zambia as the major portion of their economy is depend on Copper. Countries like China and USA are also sensitive to copper as they are the world largest consumer of copper. Developing countries like India are also sensitive to copper price, as demand of copper is more in developing countries according to Mr. Josh.

According to Mr. Rao most developing countries are sensitive to copper prices. China has been the biggest end user of copper due to their world's biggest manufacturing units of electrical cables etc. India is also sensitive to copper price, as they are second biggest manufacturer of copper product as well as user. Copper Producing countries (economies) like Chile, Zambia are also sensitive to copper prices because copper plays an important role in their economy.

As per Mr. Lwiindi All the major copper producer as well as major consumers such as the USA and China are sensitive to copper prices. Developing countries are also sensitive to copper prices as the demand of copper is greater in developing countries.

4. Has Dr. Copper /copper been an effective leading indicator of world economic growth

It can be seen as an economic indicator because the economy of a nation is based on the development in the country and copper plays an important role in development. If we see the history then copper is a very effective leading indicator. It always tells about the economic health of the nation as the demand of copper is still growing in the country than we can see it as positive for the economy according to Mr. Lwiindi.

Copper has still the leading indicator of economic growth according to Mr. Rao.

According to Mr. Josh It is an effective indicator for some regions like China, Chile, and Zambia etc. as their economy can be seen through the production and consumption of copper. There are also other metals, which can be seen as effective indicators like iron ore, aluminum and nickel as the consumption of them is more than copper worldwide. But as far as concern about world gross production copper is a bit better than other metals.

5. Will Dr. Copper continue to be a leading indicator of world economic growth?

According to Mr. Rao We can see like that economic growth depends on the development of the nations. As the development increases the demand of copper will also increase, as there is no substitute of copper when it comes to electricity and heat conductor. So, yes, copper will continue to be a leading indicator of world economic growth

As per Mr. Josh, if we see present situation then the indicator title doesn't go with copper, as it is not doing well for few years. But the need of copper will not decrease in future I am sure that the demand of copper will rise in future as the technology develops because of its unique property of conducting electricity and heat. The economy of a country depends on the development and as far as development continues the demand of copper will continue to rise. I will not say that copper will continue to be leading indicator in future as we never know about the future but yes I can say that it will play an important role in the economic growth in future

Copper has been going through a bad period during the last 2 years and the global economy is doing well and because of that many market analyst thinks that copper is no longer an indicator of economic health. In my opinion is little different from them, as the usage of copper will never decrease. It is playing an important role in infrastructure development and in technology also. So in future also we can continue to see copper as a leading indicator. Until or unless in future if we find the substitute of copper according to Mr. Lwiindi.

6. Are production levels (demand) for Copper a better indicator than its price?

Don't necessarily think production and demand are quite the same thing. Mining and metals is generally cyclical and good times, capacity is increased and reduced in bad economic times. The capital-intensive nature of the industry means that it takes a while to add to capacity and similarly reduce capacity. Investment decisions should be tested more robustly for sensitivity to changes in pricing and other industry dynamics according to Mr Lwiindi. He also added "The future for copper is generally bright as there is currently no known substitute that is as efficient to produce and use."

The price thumb rule for any commodity is demand and supply. For the basic reason copper production level are definitely the price indicators but at the same time copper has been used for stocking and borrowing in China. The copper stocking rate and borrowing for industrial manufacturing in China can also be the second leading indicator of copper price according to Mr. Rao.

Mr. Josh thinks that production levels means demand of copper is much better indicator than copper price as prices are easy to manipulate. It is not that at what price you are buying copper; to saw the growth of nations economy sees the consumption of copper by the particular country. For example you can see china the demand of copper in last decade in china grows a lot on the same side the growth of Chinese economy also rise. And recently the demand of copper decreases in china so as the Chinese economy.

CHAPTER V

5. Discussion & Conclusion

In this chapter researcher will review his work and try to interpret result and answer the research question. During this research, researcher got to know a lot about the copper and its importance.

Starting with the beginning of this dissertation, initially the researcher got to know how the copper is evolved. As it is first metal known to human. As the human civilization developed the importance of copper also increased. The importance of copper increased after the discovery of electricity, as it is the only metal conducting electricity.

As the time passes copper is evolved with economy also. People start seeing copper as indicator of good economy as it was widely use in almost everything from housing to transportation or Defense to electrical equipments. Because of this reason it is also known as “Doctor Copper” in economics. Over the last century the demand of copper has expanded from 500,000 metric tons to more than 19 million metric tons. From this data we can clearly understand the value of copper.

Every country needs electricity and for electricity they need copper. One can saw how good the economy of a country doing just by watching the consumption of copper by the particular. China plays a big role in copper consumption as it consumes almost 40% of overall copper produced. And there is no need to say how well is china’s economy doing from last 10 years. The researcher also tries to show the consumption of copper region wise as well as industry wise, and he also explained what kind of industries uses copper and why.

In this research, the researcher tries to do some quantitative calculation also. He tried to show the relation between copper prices and World GDP through graphs, which gives a clear image about is the degree of doctor suits to copper or not. The researcher also compared copper with other metals and important commodity so that he cold get a clear result why copper is the only metal to look out and why not other metal or commodity.

To complete this research, researcher conducted several interviews to complete the primary research of this dissertation. He conducted interviews with professionals who have worked in the industry for a long time. A summary of what the participants said and what researcher concluded from his research follows.

Q1. Is Copper (excluding oil) the world's most important commodity?

Two out of three participants clearly said yes as it is widely used as major component in most of things. No other metal is as good as copper when it comes to conducting electricity. So it is an important commodity. But the view of third participant was little different as he said at some point time copper is next to oil. He also said that major portion of copper is used for electricity so it is an important commodity but next after the oil it bit difficult to say. As the consumption of other metals like iron ore and aluminum is more.

After studying so much on copper, researcher think that copper is the most important commodity after oil. To run the modern world, two things are very necessary one is oil and second is electricity. Now oil is a commodity but what about electricity. All the discoveries in technology wouldn't be possible without electricity. Human civilization would be in dark if electricity would not be discovered, but electricity is not like oil, which we can find in earth's crust, and you can transfer oil from one place to another by physical medium as it is in liquids form. What makes electricity different is that it needs to be transferred to reach out each and every house. So for transferring electricity we need wires and it can only be passed though copper wires. So that's why copper is an important commodity after copper. And you never know in future it will pass the oil and become the most important commodity. The new discoveries in automobile field in which they are making hybrid cars and electric automobiles that runs on electricity rather than oil.

Q2. What Countries are particularly sensitive to Copper prices?

According to all the participants' countries like Chile, Zambia, Congo means copper producing countries are sensitive to copper prices and also countries like China, USA biggest consumer of copper they are also sensitive to copper. Last but not the least countries like India (Developing Countries) are also sensitive to copper prices.

The researcher also felt the same thing that copper producing countries and Copper consuming countries are sensitive to copper prices. Developing countries are also very sensitive to copper prices, as the developing country needs more copper. For example India, the demand of copper in India is increasing which can also see like that the economic growth of India is also Increasing and according to World Bank Report it will cross Chinese economic growth by the next year,

Q3. What industries are particularly sensitive to Copper prices?

As per the participants, copper is an industrial metal it has various uses. In almost all type of industry needs copper. But the industries like Electrical/Electronics, telecommunication, transportation and defense are more sensitive to copper as they consume more percentage of copper than other industries.

The researcher agrees with the participants' answers, as during the research he also finds which industries use more percentage of copper. Copper is used in heavy Industries like Electrical, Electronics, Communications, Construction and Transportation. Major portion of copper produced is used by the Electrical, Electronics & Communications industries, whilst Transportation and Construction uses around 15% of all copper production. Therefore these are the industries that get affected by the price of copper.

Q4. Has Dr. Copper /copper been an effective leading indicator of world economic growth?

The participants have different views on this question. One of them thinks economy is based on development and copper plays an important role in development. So copper can be effective leading indicator of economic growth of some countries which developing with a great rate. Other participant totally agrees with this fact that copper is an effective leading indicator of world economic growth. The last participants said that it is an effective indicator of some regions only like China, Chile and Zambia as the major portion of their economy is based on production and consumption of copper.

According to the researcher, copper played an effective leading indicator of world economic growth in past. But during the research researcher also get to know that the from last few years copper has not doing well while on the other side global economy is doing well. Researcher also agree with this fact that the copper has more role in developing countries and how good their economy is doing can be seen through how much copper they are using.

Q5. Will Dr. Copper continues to be a leading indicator of world economic growth?

Participants think that copper will continue to be a leading indicator of world economic growth. Copper will continue to play important role in development.

According to the researcher, the future is uncertain and we can't predict future. Copper is an important metal and it plays a very important role in development. As the human civilization develops the need of copper increases we can see it from the past data or facts. The modern era is of Technology, every next day some new discoveries come into existence. All these new discoveries would not be possible without electricity and copper is the most important for electricity. So researcher think that copper will continue to see as an indicator of economic health.

Q6. Are production levels (demand) for Copper a better indicator than its price?

All the participants agree on the point that demand of copper is better indicator than the price of copper. The price is easy to manipulate. The consumption of copper by a nation shows the development or the growth of the country.

During making this dissertation, the researcher studied many facts about copper and he also thinks that the demand of copper, or we can say that the consumption of copper, is much more better indicator than its price. As we know that price of anything depend on the demand of it, if the demand is high than price will go up and vice versa if the supply of item is low than the price will go up. In the case of copper supply is sufficient the only thing that manipulate its price is demand.

There is a saying, that to know the health of a nation just see what they are doing with copper.

Conclusion

The main aim of this research is to find whether copper is a leading key indicator or not. In past time it is seen as key indicator of economic health/growth. But during last few years many market analyst think that now its time for copper to lose its 'Doctor' title.

After reviewing past literature, doing some calculations and Interview some people who work in this industry researcher comes to a conclusion that **YES copper is still a leading key indicator of Economic Growth/Health.**

Copper is an essential metal for modern world, without copper our world will be in dark. The Economic Importance of copper is also increased with time, as today the consumption of copper by a particular country tells us how well is the economy doing. According to the economic pattern when there is a demand there is supply, likewise from the researcher's point of view the demand of the copper production is increasing day-by-day so the supply has to increase as well.

The copper business is an important contributor to the worldwide economy. Copper is more than only a mined metal. It is a supplier of employments and a promoter of a higher expectation for everyday life. One tone of copper gets 40 cars running, powers 60,000 cellular telephones, empowers operations in 400 PCs, and disperses power to 30 homes.

Copper industries play a vital role in the growth of the economy as around the world its production is becoming very vast. The researcher's view after a critical analysis and the data collected, the researcher thinks copper is a key indicator for all the growing countries in context to copper.

During this research, the researcher compared why copper (except oil) has been seen as more accurate indicator of economic growth, even though there are many other metals and commodities which are more heavily consumed around the globe than copper.

The answer for that is the any development would not be possible without copper.

For each and every other metal there is one industry that consumes major portion of that metal. So by watching their consumption, we can only tell about one or maximum two industries growth. In comparison copper is being used in almost every industry from Housing to Defense, Electrical to Transportation, and Electronics to Constructions.

The copper business gives advantages to more than simply the organizations mining copper and manufacturing items from it. Copper provides business in local and territorial economies for a scope of employments, from handymen and circuit repairmen to car specialists and electronic gear makers. These "downstream" segments utilize a colossal number of individuals and speak to a bigger part of the neighborhood local, territorial, and world economies.

The researcher analyzes the theories and strategies that have a huge impact on the copper industries. The study tests, impacts the effect of copper value variability on the economy by looking at the aftereffects of a model arrangement with a smooth pattern example of copper cost with arrangements acquired by accepting different fluctuating examples of copper costs. In the long run the viability of financial and money related strategies, and business approaches in the copper business, in balancing any negative impacts of the variability of copper costs is investigated.

At the end of the research the researcher concludes that in spite of the expectation, adjustment of cash supply or government spending does not diminish the unsteadiness of genuine variables. An approach of yield augmentation in the copper business can be utilized to diminish the genuine instability of gross residential yield caused by copper costs variability.

Recommendations

The researcher concluded copper is a very important metal for human civilization and it continues to play an important role in economic growth. According to current conditions the copper is not doing very well, but that doesn't mean that it lost his 'Doctorate' title. There is further research required on this topic, but it appears that whether or not the price of copper is low, the demand for copper will not decrease.

CHAPTER VI

6. PERSONAL REFLECTION

6.1 INTRODUCTION

Along with rest of class of Masters in Business Administration at Dublin Business School, I researched and wrote my dissertation in 2016. Having to choose from an ocean of topics to research on, the researcher came up with a unique concept with a question that involves the growth of one important factor in a country.

“Is copper still a leading key indicator of economic growth or health”.

Yes, Copper is an important metal. It plays a vital role in economic growth and we can see it as a key indication of economic growth/health.

A proposal is not just about recording the journey of the research; it is additionally about reflection, which may convey new thoughts to the creators mind. Confronting challenges and conferring loads of time is just reasonable if one adores the theme. It required a lot of exertion from the writer to stay concentrated on alternate subjects from college while the primary meetings were at that point running and researchers were giving over concerning material to peruse and to examine. Be that as it may, with a serious time administration, focus and heaps of duty and satisfaction by achieving the objectives the researcher was able to finish the master proposal. At last the enormous breakthrough to have achieved the last objective gave fulfilment and pride to the researcher.

While researching on the theory the analyst found his unknown capabilities and enhanced the proficiency when leading investigative work with better time-administration. Moreover the researcher discovered that it's more efficient to listen and stay calm in a meeting and have seconds of silence, which offers time to reflect and contrast the contentions from different specialists. The next chapter manages the self-impression of the researcher amid the most recent year as a Master of administration student at the Dublin Business School in Ireland.

6.2 REFLECTION ON LEARNING BACKGROUND

Experiential learning is an intense approach to address an individual's development and potential. It is versatile for individual style, inclinations, qualities and course. Considering it is more probable than customary endorsed preparing or educating to deliver constructive passionate impacts, quite certainty, self-regard, and a feeling of individual esteem and reason.

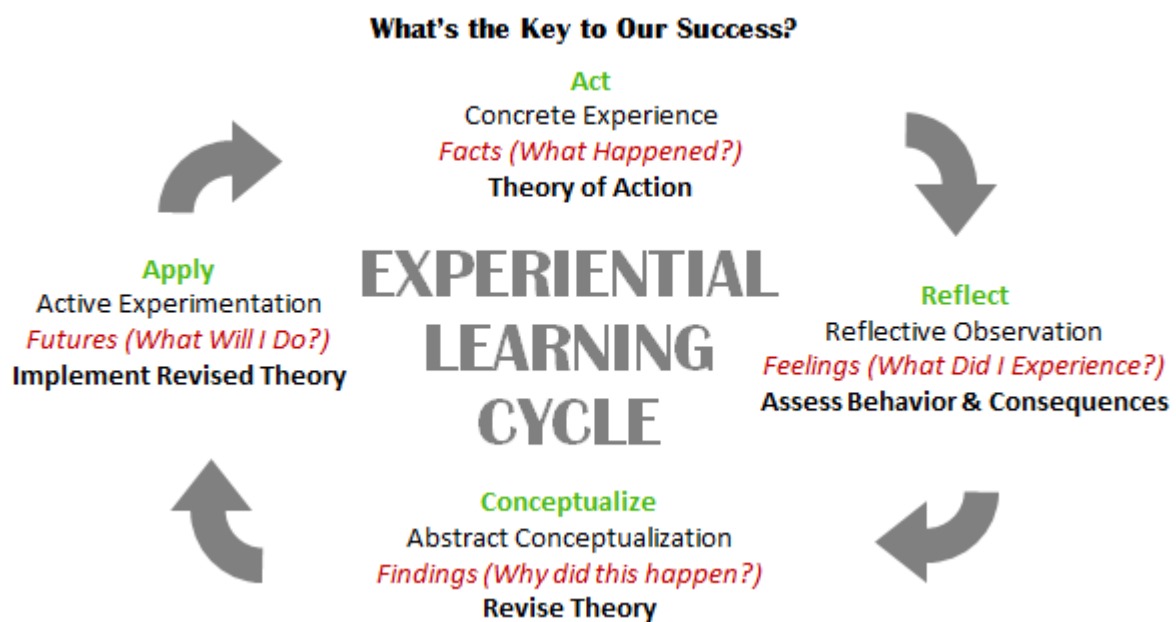


Figure 6.1 The Experimental Learning Cycle, Kolb 2005

There are a few basic parts of the learning in process seen from the experiential point of view. The first step is of adaption and learning. Second is that information is consistently made and reproduced, it is a change procedure. Third, experience is changed in both target and subjective structures in the learning procedure. In conclusion, keeping in mind the end goal to comprehend learning, we should first comprehend the way of information.

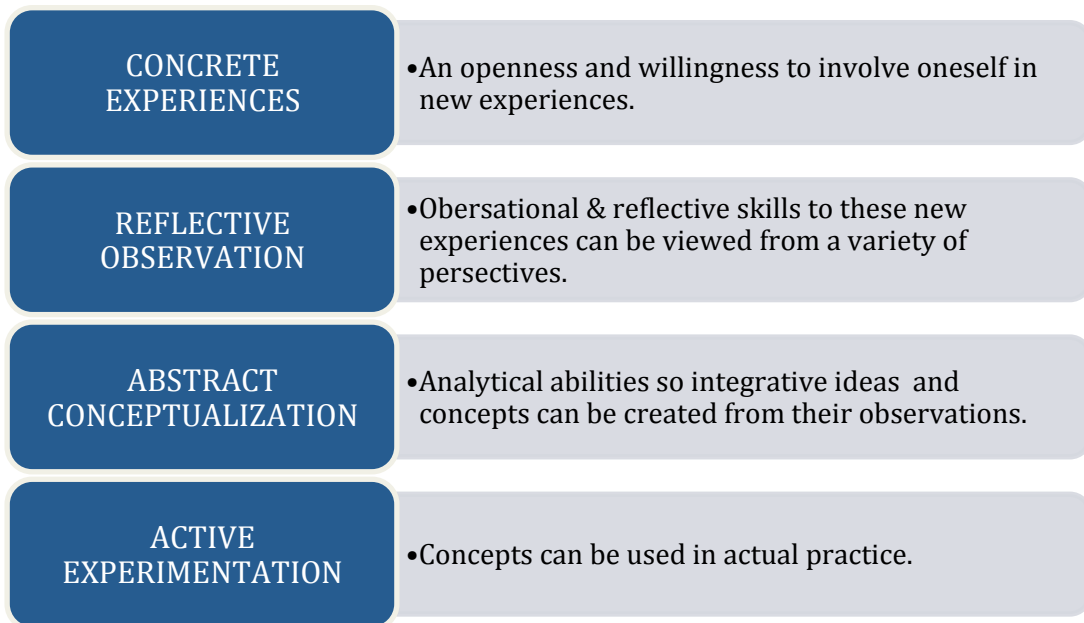


Figure 6.2 Four stages mentioned by Kolb

All the above mentioned four stages are required after Kolb to understand an impeccable learning process. This can be likewise seen at the researcher's theory. In the beginning there was an article in the daily paper about copper, which was then trailed by perusing articles, watching recordings and talking to specialists, prompting a review and speculations then being utilized to test the theory.

6.3 DEVELOPMENT OF LEARNING AND PERFORMANCE

The researcher's learning and performance development didn't start with this dissertation. It all started from one year back when he came to Dublin, Ireland. The first challenge faced by the researcher is to adopt the culture of Ireland as the researcher is from another part of the world. It took time for the researcher to adapt the culture and weather of Ireland. The second challenge in front of the researcher was to understand the finance as he is doing his masters in it, but the problem is that the researcher initially didn't know anything about finance or management as he was from a science background. In the beginning, it was not easy for the researcher but because of the support of Teachers the researcher started understanding finance and management within no time.

The third challenge faced by the researcher was to adapt the study culture of DBS which is totally different than the study culture known to the researcher. But as the time passed

researcher get to used to it of this culture and start liking it because it is much better than the study culture of his home country. All the module helps the researcher to understand the depth of MBA and gave good knowldege of subjects which helps him to do this dissertaion.

As the researcher has chosen the copper industry at a larger scale, being an important factor for the growth of economy. The performance is measured by the primary and secondary research. As primary research the researcher has used interviews with the individuals who work in the copper industry. The researcher takes a note of the expert's reviews working with the industry. By the help of experience and logical statistics of the industry research the researcher performs the analysis.

Hence, the ability to generalise the expert's views on the copper growth the researcher gives analytical results that improvise the capabilities of performing with perfection in the journey of thesis.

Secondary research also plays an important role in the thesis as the old data analysis gives the researcher an idea to understand the industry and get the important factors that can be used. The researcher is now able to give an ethical analysis that can be used in the thesis. The compared copper price with global economic growth as well as other metals can be used as important factors that is analysed by the researcher.

Learning is a consistent procedure with numerous difficulties in an industry that is quite covered up and obscure by people in general. Distinctive individuals from various foundations were expected to show signs of improvement in this field; hence better places were gone by, which made the researcher contrast the diverse contentions and clarifications with the same inquiries and coax conclusions out of the investigative research.

Information through knowledge was increased through the participation in class additionally by going over the material, seeking online or in the library for more points of interest and more realities and picking the right material at last for the assignments and exams.

The more the researcher took in the more places he went to and the more diverse individuals he became more acquainted with, everything including new learning, which got reflected and broke down alone or with companions in the breaks and the nights.

6.4 PLANNING AND PREPARATION

Giving it a rough structure the researcher could deliver questions for the meetings and interviews in time. As the main interview was taken from Zambia effectively, the strategy paid off and affirmed afresh that he was in good shape. The interviews were taken by the researcher with finance manager, project manager and a trader. This gave off successfully as two were emailed back and one held over a telephone call. This wasn't an easy process to get to as it's a vital part of the thesis. For the proposal the researcher made a detailed structure of the work with parts and sub-chapters with set day by day objectives. Every due date was met and enough time was accessible for editing.

6.5 PSYCHOLOGY

Basically the researcher was just having a conversation with a personal who works in the copper industry. The researcher grew very much informed about the copper industry and that caught the attention of the researcher to persuade to do thesis on the topic. To add to the thrill of learning from the industry, the researcher was keen to understand what has been done for the growth of copper economically. The researcher prepared interviews based on the conversation with the personal. Further verifying the knowledge the researcher interviewed two more personals working with the industry. This gave the researcher shocking reactions and that gave weight to the thesis.

The journey of the thesis was inspiration for the researcher being an interviewer for world's growing business that is copper industries. Gaining insights from different people and business methods was a positive point for the researcher in the long run.

During his Masters the researcher had considerable opportunity to talk to companions and schoolmates as well as to the teachers. Keeping in mind the end

goal to see every subject enquiries were fundamental. This additionally demonstrated the educators where more data was crucial and kept them destined for success for the readiness of the preparations for exams. Concentrating on is not just about the evaluations it's likewise about meeting distinctive individuals with various foundations that may respond in another approach to answers or adages. DBS offers a great multicultural spot to become acquainted with new individuals with various religions and convictions. Watching them is one side however conversing with them is another progression for a general picture that may demonstrate legitimately when meeting other individuals with comparative foundations/backgrounds later on.

6.6 SCOPE OF FUTURE APPLICATION FOR LEARNING

The journey throughout the time gave the researcher new inputs and extended his frame of reference. New possibilities were found that became enormous. Further thoughts emerged amid the project to take the following scholastic objectives in thought, which weren't an issue before.

The analyst not just cherished the greater part of the classes and the training he got amid the courses additionally the additional time he went through with the Master theory the more enthusiastic he got to know about copper world. He will bring this with his achievement is additionally taking into account what you want to do, in the event that you do it by heart it will be great and simpler to achieve your objectives. One will see then work as a leisure activity and invest a great deal of free energy for it. This builds effectiveness as well as extends the learning knowledge.

As writing was constrained the work not just delivered new discoveries with the quantitative work additionally contrasted it and subjective contentions from the diverse specialists. Their experiences were shifting and gave more inputs than anticipated. The information of the analyst increased through the expert program, his lone ranger program shaped an immaculate blend keeping in mind the end goal to concoct a research, which will be of huge worth to the budgetary and copper industry.

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Appendix

Appendix A: Security Clearance

**Dublin Business School
Company Security Clearance**

Name: _____

Student Number: _____

Dissertation Title: _____

Company Security Clearance

Please initial as appropriate

We agree that the student(s) may undertake a dissertation of the nature indicated above and that he/she/they will be given access to appropriate information sources within our Organisation.

We agree that copies of the finished project will be made available for assessment by staff of Dublin Business School and External examiners

Company Name: _____

Signed: _____

Position: _____

Date: _____

Note to Student:

Please keep the original signed copy of this form and ensure a copy is included in the Dissertation Appendices.

Appendix B: Interviews

Interview 1

Participants Name: Hanuman Singh Rao

Company Name: Mopani Copper Mines Plc, Zambia

Position: Project Administration Manager

Work Experience in Copper Industry: 8 years

**1. Is Copper (excluding oil) the world's most important commodity? YES/NO
(Why)**

Yes, the Copper is best conductor of electricity and for this simple reason it has been the power transmission industry all across the world. Electricity is undoubtedly the most important thing in the human life thus the copper.

2. What industries are particularly sensitive to Copper prices?

Almost all industries are sensitive to copper because of its usage, but Electrical/Electronics (power transmission) and telecommunication industries are most sensitive to copper along with automobile industry.

3. What countries (economies) are particularly sensitive to Copper prices?

Mostly Developing countries are sensitive to copper prices. China has been the biggest end user of copper due to their world's biggest manufacturing units of electrical cables etc. India is also sensitive to copper price, as they are second biggest manufacturer of copper product as well as user. Copper Producing countries (economies) like Chile, Zambia are also sensitive to copper prices because copper plays an important role in their economy.

4. Has Dr. Copper been an effective leading indicator of world economic growth?

Yes, copper has been still the leading indicator of economic growth.

5. Will Dr. Copper continues to be a leading indicator of world economic growth?

We can see like that Economic growth is depends on the development of the nations. As the development increases the demand of copper will also increases, as there is no substitute of copper when it comes to electricity and heat conductor. So, Yes copper will continues to be a leading indicator of world economic growth.

6. Are production levels (demand) for Copper a better indicator than its price?

The price thumb rule for any commodity is demand and supply. For the basic reason copper production level are definitely the price indicators but at the same time copper has been used for stocking and borrowing in China. The copper stocking rate and borrowing for industrial manufacturing in China can also be the second leading indicator of copper price.

Interview 2

Participant Name: Mr. Josh Diamond

Company Name: JB Commodities

Position: Trader

Work Experience in Copper Industry: 12 Years

1. Is Copper (excluding oil) the world's most important commodity? YES/NO (Why)

Most Important thing first look at all metals together you know they all have different roles. May be at one point of time copper was next to oil but many years ago not presently. As the prices has gone up and it became more expensive so there are many substitute came up made by us. As you only need copper for parts and for electricity and for as conductor. So you can say that copper is an important commodity as it is essential for electricity but I will not say that it is most important after oil as Consumption of iron and aluminum is much more that copper.

2. What industries are particularly sensitive to Copper prices?

Copper is an industrial metal it is used by almost every industry but I would say biggest consumption of copper is in electrical (Power Grid), housing as it used in pipes, wires etc. and automobile. The use of copper in automobile is increasing as automobile companies are focusing on hybrid or electric cars

3. What countries (economies) are particularly sensitive to Copper prices?

Every Country needs electricity and for electricity you need copper. But the Countries that are more sensitive to copper prices are Chile, Congo, and Zambia as the major portion of their economy is depend on Copper. Countries like China and USA are also sensitive to copper as they are the world largest consumer of copper. Developing countries like India are also sensitive to copper price, as demand of copper is more in developing countries

4. Has Dr. Copper been an effective leading indicator of world economic growth?

It is an effective indicator for some regions like China, Chile, and Zambia etc. as their economy can be seen through the production and consumption of copper. There are also other metals, which can be seen as effective indicator like iron ore, aluminum and nickel as the consumption of them is more than copper worldwide. But as far as concern about world gross detection copper is bit better than other metals.

5. Will Dr. Copper continues to be a leading indicator of world economic growth?

Like if we see present situation than the indicator title doesn't go with copper, as it is not doing well for few years. But the need of copper will not decrease in future I am sure that the demand of copper will rise in future as the technology develops because of its unique property of conducting electricity and heat. The economy of a country depends on the development and as far as development continues the demand of copper will continue to rise. I will not say that copper will continue to be leading indicator in future as we never know about the future but yes I can say that it will play an important role in the economic growth in future

6. Are production levels (demand) for Copper a better indicator than its price?

I think production levels means demand of copper is much better indicator than copper price as prices are easy to manipulate. It is not that at what price you are buying copper; to saw the growth of nations economy sees the consumption of copper by the particular country. For example you can see china the demand of copper in last decade in china grows a lot on the same side the growth of Chinese economy also rise. And recently the demand of copper decreases in china so as the Chinese economy.

Interview 3

Participants Name: Paul Lwiindi

Companies Name: Mopani Copper Mines Plc, Zambia

Position: Finance Manager

Work Experience in Copper Industry: 3 Yrs

1. Is Copper (excluding oil) the world's most important commodity? Yes/No (Why)

Yes you can say that, as it is a major component in most of the things. No other metal is as good as copper when it comes to conducting electricity and today almost every thing runs on electricity. So we can see copper as an important commodity.

2. What industries are particularly sensitive to Copper prices?

Today Copper has lots of uses. It is used in lots of industries. But Electronics, Defense, Mining, Transport are the industry which are affected by the copper prices as these industries uses a major portion of overall copper production.

3. What countries (economies) are particularly sensitive to Copper prices?

All the major copper producer as well as major consumers such as the USA and China are sensitive to copper prices. Developing countries are also sensitive to copper prices. As the demand of copper is more in the developing countries.

4. Has Dr. Copper been an effective leading indicator of world economic growth?

It can be see as an economic indicator because the economy of a nation is based on the development in the country and copper plays an important role in development. If we see the history than copper is very effective leading indicator. It always tells about the economic health of the nation as the demand of copper is still growing in the country than we can see it as positive for the economy.

5. Will Dr. Copper continues to be a leading indicator of world economic growth?

Copper has been going from a bad phase from last 2 years and global economy is

doing well and because of that many market analyst thinks that copper is no longer an indicator of economic health. But my opinion is little different from them, as the usage of copper will never decrease. It is playing an important role in infrastructure development and in technology also. So in future also we can continue to see copper as a leading indicator. Until or unless in future if we find the substitute of copper

6. Are production levels (demand) for Copper a better indicator than its price?

Don't necessarily think production and demand are quite the same thing. Mining and metals is generally cyclical and good times, capacity is increased and reduced in bad economic times. The capital-intensive nature of the industry means that it takes a while to add to capacity and similarly reduce capacity. Investment decisions should be tested more robustly for sensitivity to changes in pricing and other industry dynamics.

The future for copper is generally bright as there is currently no known substitute that is as efficient to produce and use.