

An introduction to trade and commodity finance

With examples from the trade in metals

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Preface

Beginning 2017 I got involved with Trade & Commodity Finance during a traineeship stint in London. A new world opened-up. I was fascinated by the sector's dynamic environment, international character and the stakes involved. To quickly gain knowledge, I searched for commodity finance books. Unfortunately, I could not find any comprehensive introductions. That is why I decided to take up the challenge to write such an introduction myself. As input, I used knowledge obtained by attending courses, reading materials, but most importantly, talking with Trade & Commodity Finance experts. That is how you really learn the tricks of the trade. Therefore, I am very grateful to the persons I had the pleasure of working with. I would like to thank Roy Oudshoorn, Maria Domanska and Eddie Chan for their feedback on (parts of) this writing and Steven de Vries Reilingh for the opportunities I got. Finally, I would like to thank my father Stephan de Jong for his support throughout the process.

At the moment of writing this preface, Trade & Commodity Finance has been in the media spotlights for a while. News articles are reporting about large fraud cases and various household names are exiting the commodity finance space. At the same time, the industry is progressing on the back of innovative and sustainable developments. Commodity types might change, just as the way they are being financed. Nevertheless, various basic principles will continue to apply. I hope that this book will help readers to get a proper understanding of the basics of Trade & Commodity Finance.

Introduction

What is Trade & Commodity Finance? That is the question people tend to ask when a commodity banker mentions to be active in this sector. Note that even within banking, Trade & Commodity Finance is quite a specialized business. It does not help that the main commodity players are not very visible for the public eye. Nevertheless, people use products that are related to commodities on a daily basis. Think about how many people make a stop at the gas station every day. Or the thousands of aluminium airplanes flying through the air at this moment. Not to forget about the billions of coffees annually consumed worldwide.

Few people question what the origins of these materials are. Natural resources are generally scarce in a sense that their reserves are limited, such as oil and bauxite. Moreover, natural resources only appear at specific places. For example, huge oil reserves can be found in the Middle East and massive bauxite mines in Australia. Agricultural commodities can only be grown at places where weather conditions and soil compositions allow for it. Take Brazil for example, where there are colossal coffee plantations. Common denominator for commodity rich regions is that the local commodity demand is generally limited compared to local production. This leads to a surplus. On the other hand, there are many regions that lack natural resources or the possibility to grow them. In case there is a substantial demand in these regions, this will lead to a local deficit.

The producers in region A (supply) and consumers in region B (demand) have to be matched. Moreover, there must be taken care of logistics. That is where the traders come in. This seems like a straightforward business model. Basically, it is. Although, trader's business models have become more and more sophisticated as we will see later on. Nevertheless, let us consider traders traditional box sliders for now. They purchase from party A, sell to party B and take care of the related transport. As you will understand, the added value of these type of trades is limited. A bauxite mine and refinery realises a decent margin for mining bauxite and transforming it into alumina. This also applies for the car producer that uses aluminium value-added products to fabricate cars. The trader only uses its network, logistical set-up and experience. As a matter of fact, the margins of pure traders are generally thin.

If margins are that thin, how do traders earn money? The answer is volume related. Instead of performing a couple of trades, they try to ramp up their operations. A little of little is a little. However, a little of a lot can be a lot right? By performing many trades of substantial sizes, traders are able to show impressive bottom-line results. Take for example an oil trade from Saudi Arabia to the United States. A vessel full of oil could easily carry a cargo value of USD 30mln. This could even be more, depending on the oil price. If the trader makes 1% per cargo, it earns USD 300,000. If it does not have one vessel, but ten of them heading to the US, the generated gross profit is already USD 3mln. However, this also implies that the trader needs USD 300mln cash to purchase the cargoes.

That is where the banks come in. Financing such trades out of equity is not only challenging considering the amounts involved, it is also inefficient. Therefore, sufficient access to bank lines is of vital importance for traders. Are banks willing to finance these traders? To answer this question, it is good to know that banks generally look at various factors when assessing a financing request. Two important indicators are the financial position of a party and the security that can be established. Both can be challenging with traders. Their financial positions are often far from flourishing at a first glance. Main reason is that their balance sheets are inflated due to the commodity volumes that are bought and sold. This leads to substantial inventory and receivables positions. Equity positions are generally limited compared with the balance sheet sizes, leading to low solvency ratios. These inventories and receivables are financed with debt, leading to high leverage. Cash flow projections neither provide any comfort, as nobody knows how commodity markets will behave in the future.

What about security? What kind of assets does a trader need to trade? A mobile phone, some computers and an office to run operations. That is mostly it. Generally, there is no valuable real estate where banks can establish a mortgage on. So where do they rely on when providing traders with their desired working capital facilities? Comfort is derived from monitoring, controlling and securing the financed commodities and receivables. That is also why Trade & Commodity Finance is a specialized business. To properly monitor, control and secure moving cargoes, you need to understand trade and commodity specifics. Not to mention the various security aspects. Moreover, commodity finance tends to have a self-liquidating character. That means repayments are made from the sales proceeds

of financed material. This is a distinctive element compared to other types of financing, which provides additional comfort to the banks.

Besides providing the necessary liquidity, banks play another vital role within commodity trade: they offer trust. Suppliers and buyers that have never concluded transactions before might not trust each other. Especially if both have a poor financial standing. Without trust, the supplier would not be comfortable with delivering commodities before receiving payment. The buyer would not be comfortable with paying before having received delivery. This could lead to a stalemate with the consequence that no trade will be executed. Later in this writing we will see how banks can help parties to overcome this trust issue with the help of trade finance instruments.

Basically, there are three types of commodities: agricultural, energy and metal commodities. Each type has its own dynamics. The goal of this writing is to provide the reader with a basic understanding of various aspects of Trade & Commodity Finance. The topic is highlighted from the perspective of one commodity type. This should make the story more coherent and better readable. As the subtitle already revealed, the focus of this book will be on metal commodities. Perhaps similar editions will be written from an agricultural and/or energy perspective in the future. As will be explained in more details soon, metals appear in different forms and qualities. In this writing the word 'metal' refers to metal in a refined form, unless stated otherwise. Furthermore, this book is written from a banking perspective. Banks and lenders are used interchangeably in the text. Be aware that the text includes technical language. Therefore, an index has been inserted that states the pages where the explanation of certain words and abbreviations can be found.

This book is categorized in five sections. The first section is about commodities and trade and includes two chapters. The first chapter will explain what commodities are and elaborate on the different metal types. The second chapter addresses the metal value chain. The second section is about traders and includes three chapters. In the third chapter we will investigate various trading risks. We will dive into the business models of traders in chapter four. The last chapter of the trader's section is about hedging. It provides an understanding of how hedging works. We will learn that hedging mitigates risks and can be a margin driver as well. Section three is about industry specifics. Chapter six provides information on pricing, where chapter seven introduces the London Metal Exchange ("LME") as exchanges have an instrumental role within Trade & Commodity Finance. Chapter eight addresses the Incoterms and the transfer of ownership of commodities. The Incoterms provide standards for international transactions. That brings us to section four. This section is about banking and includes four chapters. The ninth chapter will explain how to secure commodities. Furthermore, it will provide details on monitoring and control. Chapter ten describes how banks can protect themselves from losing money. The two remaining chapters (eleven and twelve) of the banking section will provide information on various financing structures and trade finance instruments. The last section is about financial reporting. Chapter thirteen will give some guidance on financial analyses. The last chapter (fourteen) is about accounting. All-in-all the content should provide the reader with a proper introduction to the fascinating field of Trade & Commodity Finance.

Part I.

Commodities and trade

As this book is an introduction to Trade & Commodity Finance, we will start from scratch. Therefore, the first section is about commodities and trade. We will start with the history of trade. Next, there will be briefly elaborated on various commodity aspects to get familiar with them. With the emphasis on 'briefly', as you can write several books about this topic. There will be explained what commodities are and more specifically metal commodities. This section will also touch upon value chains. To understand metal commodity trade, it is essential to have a grasp of the metal value chain. It clarifies the role of traders, just as price mechanisms for instance. These subjects combined should provide a good basis for the remainder of this writing.

Chapter 1.

Commodities

A brief history of commodity trade

Where and how did global commodity trade start? Around 5,000 years ago, regions were already trading with each other. Salt, amber and copper are examples of traded materials in that period. Historical trade was driven by similar fundamentals that apply today. Basically, product surpluses were bartered against product deficits. When a region had plenty of vegetables, but no access to timber, it tried to barter vegetables for timber. Take the ancient civilization of Mesopotamia for example. It was in the region which we nowadays know as South-east Iraq. Mesopotamia was fertile because the Euphrates and the Tigris streamed through this area. This made irrigation possible. As such, a wide variety of agricultural products was being cultivated. Moreover, the region was rich in fish, dairy and meat. On the contrary, Mesopotamia lacked metal ores. To deal with this, the Mesopotamians started to initiate caravans. These caravans traded Mesopotamian agricultural products for materials the region had a shortage of.

Where caravans were first organized on a one-off basis, they organically developed into steady trade routes. An example of an ancient trade route is the Amber Road. This trade route originated 3,000 BC and was used to transport amber from the Baltics to the Mediterranean Sea. The material even reached Egypt. Another famous trade route is the Silk Route, which was used for trade

between China and the Roman Empire around 200 BC. As the name already reveals, it was initially primarily used for silk trading. The invention of wheels and sails stimulated the creation of new trade routes. The development of global trade went hand in hand with the appearance of marketplaces. Around 3,000 BC buyers and sellers already gathered at central squares or bazaars to trade materials. After a while, some marketplaces gradually became more regulated to improve consumers' confidence. An example of such a regulated exchange was the Royal Exchange in London, which was founded in the sixteenth century. As we will see in the chapter 'An introduction to the LME', the LME has its origin in this Royal Exchange.

With the development of commodity trade, the need for financing and financing instruments increased as well. Mainly for practical reasons. It was for example too dangerous for traders to travel with valuable goods (like gold) that were used to purchase commodities. After all, these goods could be easily stolen during a trader's journey. In this regard, it might not be surprising that a Babylonian promissory note was found which can be dated back 5,000 years ago. Moreover, the Code of Hammurabi (1754 BC) recorded interest-bearing loans. Also in early Greece and the Roman Empire loans were issued. Ancient India started to use a type of bill of exchange around 200 BC. Banking in a form that we would recognize today dates back to the Middle Ages. The first banks were merchant banks established to finance grain. The Medici Bank in Italy was already issuing letters of credit ("LCs") at the end of the fourteenth century. Some provisions in those LCs are similar to the conditions in LCs that are used in modern trade. Reason for the emergence of these banks and financing instruments was to facilitate trade. It is interesting to realize that the trade instruments

that will be touched upon later in this writing, find their origins in ancient trade.

Commodities

A book about commodity trade should contain a definition of commodities. According to Wikipedia a commodity is an economic good that has full or substantial fungibility, meaning that the market treats instances of the good as equivalent, or nearly so, with no regard to who produced them. This is in principle not incorrect; however, the definition could be expanded a bit. First, commodities are uniform and indeed fungible. There should not be too many different qualities. Secondly, commodities tend to be traded in large quantities. This means that transactions generally have a substantial size. Thirdly, the pricing needs to be transparent. Preferably a commodity is traded on an exchange. Fourthly, the supply and demand of the commodity needs to be significant.

Copper for example is considered a commodity. Why? There are few different grades of copper. To be called first class copper (Cu-CATH-1), material should contain 99.35% copper content. Lower grades of copper should at least contain a minimum copper content of 94-96%. This implies that, although there are several grades, copper is considered a uniform material. Moreover, copper is traded in large quantities. A refined copper transaction of 100 metric tonne ("MT") is considered small. To get a bit of a feeling with this number: it takes at least four trucks to transport this amount of material. With a market price of USD 6,000 per MT, the transaction would be worth USD 600,000. As copper futures are traded at several exchanges, the copper price is very transparent. This is because the exchanges are

stating the copper price every second of the day. Finally, there is a substantial copper supply and demand. To give you an idea: in 2016 37mln Copper A Grade lots were traded on the LME. Note that a copper lot is 25MT. At a market price of USD 6,000, this represents a value of USD 5,550bln. Most of these contracts are settled financially instead of physically. We will come back on this later. Also realize that other exchanges are not considered in this figure yet. Therefore, copper can easily be classified as frequently traded. It is also good to get a sense of physical production and consumption, as the LME mainly involves paper trading as we will see later. In 2018 24,100,000MT of refined copper was produced and 24,500,000MT of refined copper was consumed according to the International Copper Study Group. At a market price of USD 6,000, this represents amounts of respectively USD 144.6bln and 147bln. In conclusion, it is undisputed that copper is considered a commodity.

However, there are also less straightforward examples. Take chromium for example. When chromium is electroplated over another metal, it is better known as chrome. The material is considered an important element for the stainless-steel industry. Chromium tends to be traded in large quantities. Moreover, the total mining output of chromium is estimated at 36,000,000MT in 2018. Note that this involves ores of which the actual chrome content is much less. Still, it make sense to consider it a commodity given the quantities involved. However, there is a variety of different chromium grades and the material is not exchange traded. Therefore, it also makes sense not to consider it a commodity. This example indicates that it is not always obvious when a specific material can be labelled as a commodity. In this writing we will mainly focus on base metals

Chapter 2.

Value chains

The value chain model was developed by Michael E. Porter. He introduced it in his book 'Competitive Advantage: Creating and Sustaining Superior Performance' (1985). A value chain is defined as a chain of value-added activities. Products move from chain to chain and gain value at each stage. The model is used to define the added value of companies. In other words, it is an indicator of what off-takers are willing to pay for a product or service. Besides the value-added activities, margins are generated within the value chain. The value-added activities are the building blocks where a company creates a product or service with. The margin is the difference between the price off-takers are willing to pay and the costs of producing the product or service. To understand the metal sectors, it is helpful to understand their value chains. First, we will look at the value chain for metals in general. Next, we will dive into the copper value chain as an example.

The metal value chain

When simplifying the metal value chain, it consists out of three or five stages, depending on how you look at it. The chain starts with a mine that extracts ore from the earth and transforms it into concentrates. These concentrates are sold to traders that sell them to refiners or smelters. Concentrates are modified into products like cathodes, ingots and billets, which are also known as refined metals. Subsequently the material is sold to traders that sell to

manufacturers. The manufacturers use the refined products as input in their production processes. They produce end-products that are sold to consumers. So, if traders are not taken into account in the value chain, it consists of miners, refiners, smelters and manufacturers. Technically refining relates to a material's purification process. Smelting involves the chemical change of a material realized by the use of heat. However, in this writing refiners and smelters are used interchangeable. To keep it simple, as it is not the goal to assess metal production processes in too much detail. A schematic overview of the chain can be found below. Another distinction that is frequently used is the one between upstream and downstream activities. Upstream involves the extraction of raw materials and the processing into concentrates. Downstream involves the refining and manufacturing of concentrates into end-products.



It differs per value chain stage how much margin is earned. As you will understand, the added value of a trader is less than the added value of a miner, refiner or manufacturer. After all, the latter are transforming material, where traders mainly move material. Therefore, the margin that is realized by traders is generally small compared with mining, refining or manufacturing margins. Now we will have a closer look into each metal value chain stage.

Mining

There are different forms of mining, being underground and surface mining. Most metal ores are mined via surface mining nowadays. With underground mining it is necessary to create shafts into the earth. This is not the case with surface mining. With this mining type it is sufficient to remove some surface earth layers like vegetation and dirt to reach the ore layer. Mines used for surface mining are called open-pit mines. The mining process starts by breaking ore with explosives, to be able to quarry and transport the material. After the explosion excavators load the ores into trucks, after which the material is transported to a plant. A plant could be located at the mining site. However, it is also possible that the ores are shipped out before being treated. In a plant the ores are crushed, milled and/or grinded to realize size reductions. Depending on the type of material, the ores are further treated to accumulate the relevant metal elements from the rocks. The output of these processes are metal concentrates. Concentrates form the input for the second metal value chain stage, which is refining.

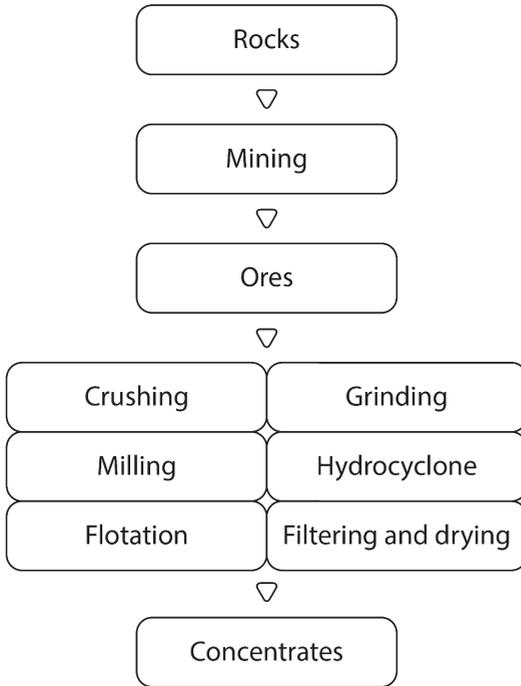
The copper value chain

So far, we have seen what a value chain is and how the metal value chain looks like. Now it is time to combine this information by examining the value chain of a specific metal: copper. Generally, the copper value chain stages are as follows: ore is dug out of the ground and processed into concentrates. The concentrates are further treated into refined products like cathodes. Next, the cathodes are manufactured into other shapes like wires, bars and tubes. These are subsequently processed into end-products that are sold to end-consumers. We will now look closer into these different stages to explore in more detail how copper transforms along the value chain.

The copper value chain starts with rocks that contain copper content (ores). The first goal of the mining process is to get the rocks out of the ground. Note that the ores in the rocks often contain less than 1% of copper. The second goal is to transform the mined material into concentrates. These have a higher copper concentration. There are several ores that contain copper elements. Examples are chalcopyrite, digenite and chrysocolla. The amount of copper content depends on the specific ore. Even within an ore category, the grades of copper content vary widely. Mining projects are generally deployed at places where there are sufficient copper ores that can be extracted in an economically viable manner. There are many variables that determine the attractiveness of mining copper ore. Chalcopyrite generally contains less copper content than most other copper ores. However, this type of ore is generally easy to mine and available on a large scale. Therefore, it might be more attractive to mine chalcopyrite over other ores. Furthermore, the strip ratio plays a role in making mining decisions. This ratio indicates which amount

of waste needs to be processed to extract a tonnage of ores. When the strip ratio is 2:1, this means that one tonnage of ore will require the stripping of two tonnes of rocks.

Once the ores are mined, they are generally transported to a processing plant. There the ores are put in large crushers to realize size reductions. Next, the smaller pieces are put in a grinding mill in which the material's size is further reduced. Sometimes the ores are put in another crusher that crushes at a higher speed. At this stage, the ores have already significantly reduced in size. However, we are not there yet. The material is often put in a ball mill as well. Again, for size reduction purposes. The reduction is realized by the weight of balls that rotate in the mill. Subsequently the ores are put in a hydrocyclone. This machine separates different elements of the ores by centrifugal forces. The substance with relatively high copper content is put in flotation cells. These cells separate molecules that attract water or acids from molecules that do not. When the high copper content material leaves the flotation machine, it is being filtered and dried. What is left are copper concentrates that contain between 25 and 35% of copper content. The next figure provides a schematic overview of the copper mining and processing process.



The concentrates are purchased by traders. They sell the material to refiners and generally take care of the logistics as well. The concentrates are used as input in the refining process. Note that there are different copper refining processes. The most common ones are hydrometallurgy and pyrometallurgy. Both lead to the same copper purity. Hydrometallurgy is used for oxide ores, where pyrometallurgy is used for sulfide concentrates. As the hydrometallurgical process starts with ores, that means the mining and processing stage is a bit different as previously described. It does for example not involve flotation. The difference between oxides and sulfides is that sulfides contain sulfur and oxides contain oxygen. Sulfur evolves due to geological processes, where oxygen results from biological