WHAT IS THE POTENTIAL FOR MORE COPPER FABRICATION IN ZAMBIA?

-JULY 2011-
CONTENTS

1 Introduction.............................................1
  1.1 Background.................................................1
  1.2 Industry Structure........................................2

2 What Constraints does the Industry Face?..................3
  2.1 Demand Side..................................................3
  2.2 Supply Side..................................................3

3 What is the Potential for Industry Growth and What Might the Impact be?..4

4 What Would it Take for the Industry to Grow?...............6

5 Summary.......................................................7

6 Notes.............................................................8

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INTRODUCTION

This note examines the potential for further growth of Zambia’s copper fabrication industry, what impact it would have in terms of jobs and prosperity, and what it would take to enhance the industry’s prospects.¹

1.1 Background

The copper fabrication industry lies between (i) the industry that produces copper (as a commodity metal from mined ores as well as from recycling), and (ii) the users of copper in finished products. It involves the fabrication of products such as wire rod, wire, low-voltage cable, and other copper-based semi-manufactures that are used in the production of electronic goods and in construction, for example.

The copper mining and copper fabrication industries are largely separate. Copper is clearly a major input into the copper fabrication industry. However, aside from this supply relationship, the copper mining & refining and copper fabrication industries are almost completely separate, with different drivers, competitive forces, structures, and economics.² The former produces a fungible commodity which can be sold anywhere and (in most cases) has a market of last resort in the metal exchanges, while the latter is highly dependent on customer demands and needs, stockholding patterns, and technical requirements. As a result of this difference in business models, few copper mining companies are involved in any process further downstream than the refining of copper to cathodes. In addition, copper mining is tied to where the natural resource is available; copper fabrication to where products that use copper are made. Whereas the main copper producing countries are Chile and Peru, the main copper fabricators are the major industrial countries such as China.

The Government and population of Zambia have, for many years, viewed copper fabrication as a potential opportunity for adding more value to the country’s copper. Many Zambians believe that copper mining can evolve into copper fabrication, thereby adding more value to the country’s copper and encouraging a broader manufacturing industry. They also believe that this development, if achieved, could become an important source of economic growth, jobs and diversification.

Zambia is not presently a major player in the global copper fabrication industry. Zambia’s copper-related exports are mainly cathode/blister copper, the standard forms of the internationally traded commodity. Zambia uses less than 5 percent of its copper output to produce fabricated products, and finished goods containing copper are mainly imported into Zambia.
1.2 Industry Structure

Zambia has a small copper fabrication industry that produces a narrow range of products for domestic use and for export to regional markets where it benefits from market proximity. However, these markets are small, and Zambia competes with the larger, more developed South African copper fabrication industry. Zambia’s fabrication industry is growing rapidly, but from a small base, led by ZAMEFA, a subsidiary of the US-based General Cable Corporation.

There are a limited number of companies engaged in copper processing in Zambia. At the first stage of copper processing, ZAMEFA (which produces wire rod, wire, cable, and a few other products) has a domestic, regional and international orientation; and the cast product foundry Non Ferrous Metals has a domestic orientation. At the next stage, the wire and cable manufacturer Kavino is largely domestically orientated. In the scrap metal business, Central African Recycling appears to be well organized to take advantage of opportunities as they arise. ZAMEFA has an evolving product portfolio mainly targeted to the needs of neighboring countries. However, by its reputation for quality and reliability, it has also been able to penetrate some more distant international markets such as India. The company benefits from its position in a large specialist multinational cable-making group with global sales outlets.

Figure 1: Copper Industry Value Chain
Although there is a longstanding desire to capture additional economic returns through the fabrication of copper products, the prospects – at least in the short- and medium-term – are not favorable. The viability of producing and selling copper and copper alloy semi-manufactures on a significant scale is constrained by a number of factors, both on the supply-side and the demand-side.

### 2.1 Supply-side

While copper is a major input into the copper fabrication industry, there is little competitive advantage from sourcing copper inputs locally. The price of copper is set by international commodity exchanges and varies little throughout the world. Hence, even though Zambia is an important copper producer, a fabricator based in Zambia is unlikely to have much cost advantage in buying copper over, say, one based in China. The maximum cost advantage a local fabricator could gain is the cost of shipping the cathode copper to the fabricator in China. However, that saving is likely to be offset entirely by the Zambian fabricator having to ship the same weight of (fabricated) copper to China, where it will be used to manufacture the final product.

Copper fabrication requires other raw materials, many of which are not available in Zambia. As a general rule, the industry prefers to use scrap, provided that there is a supply of acceptable quality, and 37 percent of copper used is derived from scrap metal. However, Zambia lacks sufficient quantities of scrap to sustain a major copper fabrication industry. In addition, many copper products are copper alloys and Zambia produces only a few of the other metals required (e.g. nickel). The need to import other metals (particularly zinc to make brass) to a land-locked country such as Zambia is a source of comparative disadvantage.

### 2.2 Demand-side

Local and regional demand will not support a substantial copper fabrication industry in Zambia in the short- or medium-term. The major source of demand for copper products is the manufacturing industry (e.g. the manufacture of electronic goods uses copper products as an input). However, sub-Saharan Africa’s manufacturing base is small, resulting in a limited regional demand for copper semi-manufactures. Sub-Saharan Africa accounts for less than 1 percent of global consumption of the principal semi-manufactures. The majority of this demand comes from South Africa, which is largely self-sufficient. Regional demand is expected to remain limited until significant growth occurs in the region’s broader manufacturing industry. In Zambia itself, the market is even smaller: Zambia’s usage of refined copper is less than 0.2 percent of the global total.

Zambia cannot access long-distance markets for fabricated products competitively. Zambian competitiveness in copper semi-manufactures or copper products (e.g. low-voltage cables) on the international market outside Africa (such as India and East Asia, where there is strong local production capacity) is likely to be hampered by logistical difficulties (particularly border delays and long lead times) in servicing these markets reliably.
Given the above constraints, the potential for copper fabrication in Zambia is, in the short- to medium-term, modest. In addition, copper fabrication may not be able to provide the benefits of jobs and prosperity that the country is looking for.

It is unlikely that significant new demand for fabricated copper products will emerge domestically or regionally in the near term. Domestic demand will remain limited because of Zambia’s lack of competitiveness in manufacturing generally. Regional markets are growing, but from a small base, and South Africa is a formidable competitor. Hence, current market prospects do not justify a significant expansion of Zambia’s copper fabrication capacity (an industry in which proximity to market is key).

There may be scope for marginal expansions to existing capacity. The limited number of users of copper semi-manufactures in Zambia may wish to source products locally in order to reduce their dependence on imports (which are subject to slow border clearance). Local entrepreneurs might also cater to small, local needs on an artisanal scale. Greater use of copper products in the construction industry (i.e. copper pipes for plumbing) in Zambia and the region could also help build domestic demand for copper products. But together these will not amount to a substantial market. Even these opportunities could be limited if the need is for products which require input of scrap and other metals rather than pure copper.

Copper fabrication may not be an ideal source of economic diversification as it cannot shield Zambia’s economy from copper price fluctuations. The fabrication of copper is subject to the same market cycle that determines the demand for, and price of, refined copper. Hence, increased fabrication of copper would not help to shield the Zambian economy from its vulnerability to cyclical fluctuations in the price of copper.

Expansion in copper fabrication would generate a small number of jobs. Copper fabrication is a capital-intensive industry and even with the modest industry growth mentioned above, the impact on local employment would be limited. At present, total employment in copper fabrication in Zambia is estimated at less than 1,000. A continuous-cast wire rod mill with a throughput of 100-300 thousand tonnes per annum, operating around the clock, may require a team of less than 100 to undertake operations, maintenance, sales and administration.
Margins in copper fabrication are lower than in copper mining/refining, and even world-leading fabricators do not earn high margins. The scale of profit margins in copper fabrication is altogether different from mining, as are the risks. Compared with mining, copper fabrication requires modest capital investment (though not compared with other manufacturing industries). But the margins are slim, compared not only with the total value of the metal throughput (requiring significant working capital), but also as a proportion of production cost. Even world-leading companies do not earn high margins. The slim margins on offer can be illustrated by looking at the profitability of the world-leading cable company, Nexans, in 2008 (a relatively good year for the company). In that year, the gross profit margin was 14 percent and the operating margin 6 percent. Such modest margins show that even manufacturers of copper products with strong reputations, able to produce a range of specialist products, do not earn high margins.

Zambia is not alone in lacking a major copper fabrication industry despite the local availability of copper. The world’s largest copper producer, Chile, has also not developed into a major fabricator on a global scale (see Box 1).

Box 1: The Case of Chile

Chile produces 34 percent of the world’s copper and 17 percent of the world’s refined copper, but only 1 percent of the world’s fabricated copper products. Yet, rather than investing heavily in fabrication, Chile has capitalized on its resource base by establishing a competitive mining industry, ensuring the benefits of copper are channeled to the population, and encouraging diversification in industries with growth potential (e.g. horticulture, fisheries and tourism). Chile’s fabrication meets the needs of local industry and infrastructure, and little more.

Zambia and Chile have some important similarities, including:

- Small populations, hence limited local demand (16m in Chile and 12m in Zambia);
- Lack of a large manufacturing sector; and
- Economies centered on natural resources (but more non-mineral diversification in Chile).

Chile’s experience suggests that pinning hope for economic diversification on the copper fabrication industry, or even manufacturing as whole, is not necessarily the most appropriate course of action for a major copper producer.
The most effective way to encourage Zambia’s copper fabrication industry is to have a more competitive domestic manufacturing industry. While not a short-term solution, encouraging a competitive manufacturing industry in Zambia (and thereby building local demand for fabricated products) could be the most effective way of developing a larger copper fabrication industry. This requires improving the competitiveness of manufacturing in Zambia that, like copper fabrication itself, is disadvantaged by constraints such as unreliable access to electric power; uncertain international logistics for sourcing inputs and reaching customers; low access to and high cost of long-term finance; and low labor productivity and skills levels. Greater use of copper products in the construction industry (i.e. copper pipes for plumbing) in Zambia and the region would also help to create demand. Of course, highly competitive industries in South Africa in particular, and perhaps in India, China and elsewhere, will be prepared to seize any market opportunities that arise.
The local availability of copper does not provide Zambia with much of a comparative advantage in copper fabrication. In an industry in which proximity to consumer markets is the key driver, domestic and regional demand for copper products would need to grow significantly before anything beyond a marginal expansion in Zambia’s copper fabrication industry would make sense, and such market growth will take time. Promoting a competitive domestic manufacturing industry is the most effective way to encourage copper fabrication in Zambia.
The analytical work undertaken as part of the Jobs and Prosperity: Building Zambia’s Competitiveness Program covered two dimensions of Zambia’s copper industry: mining and fabrication. Although both sectors rely on the same natural resource, the drivers of and constraints to competitiveness differ between them, and they have different prospects for growth in Zambia. Therefore, copper mining and copper fabrication are dealt with in separate notes.

While many copper mining companies are involved in the refining of copper to cathode stage, few are involved in any process further downstream. Wire rod is an exception, being made by some copper refiners in industrialized countries, and by wire and cable manufactures - primarily for their own internal use. For refiners in industrialized countries, it is relatively easy to add a wire rod mill adjacent to the refinery in order to capture more value-added to the cathode and to benefit from economies of scale.

The production of semi-manufactures.

Scrap is preferable to cathode for two reasons: (i) it is cheaper than refined metal, hence increasing the fabrication margin and profit; and (ii) in making copper alloy products, using alloy scrap provides a ready mix of the alloying metals.

Excluding the South Africa market, the total open market for all copper and copper alloy semi-manufactures in sub-Saharan Africa can be estimated at about 10 kilo-tonnes per year.

South Africa-based fabricators are clearly in a better position to service customers within their own country, as well as in export markets outside Africa. To overcome the transport disadvantage in terms of time and cost, Zambian firms have to offer a clear product advantage to potential export customers.

Examples of potential users of copper products in Zambia include the growing construction industry and El Sewedy, which manufactures electrical transformers.

For example, in 2008, a leading European rod producer indicated a profit of 12.2 percent of costs for a large cap cast copper rotors rod mill and 49.6 percent for an oxygen-free high conductivity rod mill. This compared to a margin of 84.5 percent for cathode production from copper ore (solvent extraction and electro-winning, First Quantum).
What is the Potential for More Copper Fabrication in Zambia?

Many Zambians believe that copper mining can evolve into copper fabrication, thereby adding more value to the country’s copper, encouraging a broader manufacturing industry, and becoming an important source of economic growth, jobs and diversification.

While the vision of a productive copper fabrication industry has persisted for years, there are a number of constraints, on both the demand and supply sides, that render it unlikely. The feasibility of Zambia producing and selling copper and copper alloy semi-manufactures on a significant scale is limited. In addition, an expanded copper fabrication industry may not offer all of the socio-economic benefits that the Government and population had hoped for.

In the short- to medium-term the prospects for industry growth are limited. While longer-term prospects are more favorable, realizing them would require action to facilitate the development of a competitive domestic manufacturing industry more broadly. In other words, a robust manufacturing industry is a key ingredient to a larger, more competitive copper fabrication industry (as opposed to the view of many, that copper fabrication could jump-start a broader manufacturing industry).

This note examines what – realistically – is the potential for further growth of Zambia’s copper fabrication industry, what impact it would have in terms of jobs and prosperity, and what it would take to enhance the industry’s prospects. It provides a summary of the analysis contained in a forthcoming World Bank report: What is the Potential for More Copper Fabrication in Zambia?

This note and the detailed report from which it is drawn were produced under the Jobs and Prosperity: Building Zambia’s Competitiveness Program, a joint venture between the Government of Zambia, the Zambian private sector, civil society and cooperating partners. For more information on the issues raised in this note, or for a copy of the main report, please see www.worldbank.org/zambia or contact Mr. Jumbe Ngoma, Communications Officer, World Bank - Zambia Country Office, jngoma@worldbank.org.