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Capital Flight through Trade Mis-Invoicing in
Natural Resources: The Case of the Zambian Mines

By
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Bank of Zambia Working Paper Series

**Capital Flight through Trade Mis-Invoicing in Natural Resources: The Case of the
Zambian Mines**

By

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Abstract

The objective of this paper is to estimate the extent of external capital flows due to trade mis-invoicing in Zambia's mining sector for the period 1997 to 2018. The practice, which involves misreporting in the invoices of exports and imports remains a critical issue across the developing world. By its nature, capital flight has no universal definition and has no standard model to measure the amount of capital flight. Using bilateral trade data obtained from UNCOMTRADE we find that copper over-invoicing is the key export mis-invoicing while cobalt under-invoicing dominates the practice. The study also finds that the reported trade flow, nature and extent of trade mis-invoicing between Zambia and partner country significantly vary. The extent of resource movement through trade mis-invoicing in the period 1997 and 2016 ranges from US\$ 16.7 billion to over US\$ 19.7 billion. In addition, the precious minerals are more susceptible to resource outflows compared to copper and cobalt. The overall estimates suggest the need to strengthen the domestic mechanism for tracking the effective destination of Zambian exports to improve accountability of the trade flows. It is imperative to scrutinise and enforce strict monitoring for all mineral products exported to and from countries such as Switzerland, South Africa, United Arab Emirates, India and China identified as major sources of mis-invoicing. Detailed research is also necessary to understand the institutional mechanisms affecting mis-invoicing given the open nature of Zambia's trade regime.

JEL classification: F18

Key words: Trade mis-invoicing; Zambia; capital movement; trade

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1. Introduction

Capital flight is considered a problem for the developing countries as reflected in the rapid growth of literature on the matter. The concerns about its extent and implications have increased over time. Increased globalisation, cross-country linkages through trade, investment and debt, are factors that fuel capital flight among countries. This rise in capital flight is estimated to be larger for developing countries than developed ones (Barry, 2014). For example, capital flight and unrecorded outflows were estimated at 39% of GDP in Africa compared to 12% of GDP in other regions (Ndikumana et al., 2014; Henry, 2012). This problem is perverse among natural resource-rich countries and is mainly fuelled by trade mis-invoicing (Lemi, 2017; Yalta, 2010, Ndikumana and Boyce, 1998; Claessens and Naude, 1993).

Trade mis-invoicing is an illegal activity in which a trader mis-invoices exports or imports by over-invoicing or under-invoicing for attaining various malign objectives such as evasion of duties and taxes. The 2015 report by African Union and United Nations Economic Commission for Africa on illicit financial flows shows that 54 percent (the cumulative total US\$407 billion between 2001 and 2010) of Africa's illicit financial flows is through trade mis-invoicing. Karr and Devon (2014) pointed out that trade mis-invoicing out of the Global South is increasing at an average of 10 percent per annum. They further estimated a total of US\$946.7 billion to have been mis-invoiced out of Africa through trade in 2011. Using a panel of 40 Sub-Saharan (SSA) countries, Ndikumana (2008) estimated capital flight through import under-invoicing to be between US\$420 billion to US\$607 billion between 1970 and 2004.

Commonly, studies of capital flight in Africa have been conducted in a cross-country framework, lumping countries and products together to estimate trade discrepancies. This approach yields little insights on country and product level magnitudes and factor driving capital flight. While country level studies of capital flight are scarce, its measurements remain a matter of disagreement in literature as different approaches yield different estimates (Eggerstedt et al., 1995 and Ndikumana, 2010).

The focus of this study is to estimate the trade mis-invoicing as a possible channel of capital flight for Zambia's mining sector. The direct tax GDP ratio of mining is currently deemed very low at 1.4 percent of GDP despite many policy reforms. A large sum of revenue is lost on account of tax avoidance and evasion at times resulting in tax disputes². At the same time, most mines continue to declare losses even after several years of initial investments (Barry, 2014). This limits the state's ability to provide social services such as education and health.

Most of the available studies that capture Zambia such as Ndikumana and Boyce (2010, 2014); Ndikumana et al., (2018); and Kar and Spanjers (2015) examine trade mis-invoicing using an aggregate of all traded products in cross-country context over long periods of time.

² In 2018, For example, the Zambia Revenue Authority presented a mining giant First Quantum Limited with a US\$ 7.4 billion bill (which includes tax, penalties and interest costs) for alleged tax evasion (See World Bank, September 2018).

There is little detailed analysis of trade mis-invoicing of main individual primary commodities in Zambia. The only exception is the study by UNCTAD (2016) that looks at the case of the copper trade in Zambia. It examines trade mis-invoicing using copper and articles thereof as presented in SITC 682 (HS 74) after adjusting the FOB prices by a uniform factor of 1.1 commonly used in literature. However, the study excludes copper concentrates and ores under SITC 2831 (or HS 26) in the analysis. This paper incorporates these previously omitted sections in UNCTAD (2016) and tests for trade mis-invoicing at CIF values of and 10 percent to account for potential variation in trade costs across regions as in Lemi (2016). The study also documents trade mis-invoicing of cobalt and precious minerals, the key products that have previously received limited attention in literature for the period 1997 and 2018. The regions and countries with peculiar mis-invoicing practices are identified to inform potential targets of policy reforms to curb the ever-increasing capital flight.

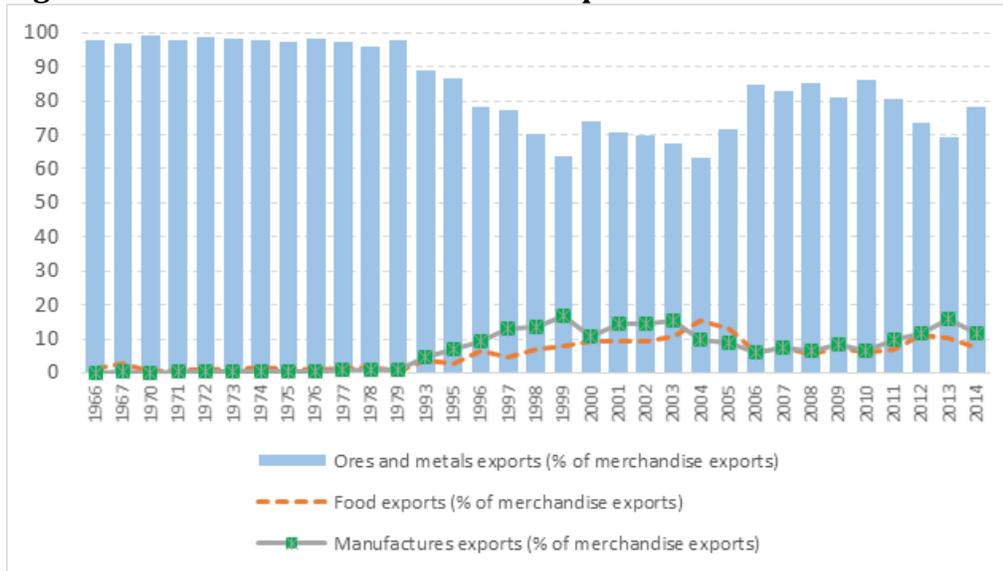
The remaining part of the paper is structured as follows: Section 2 provides an overview of Zambia's mining sector. Literature review of the relevant available studies are given in Section 3. Section 4 presents the theoretical framework of trade mis-invoicing, the description of data and data sources. Section 5 presents the results. The final section, which is Section 6, concludes and highlights some of the key policy implications to minimise capital flight due to trade mis-invoicing in Zambia.

2. Overview of the Mining Industry in Zambia

This section outlines the overview of the contribution of the mining sector to the economy and how the ownership structure has evolved overtime. The performance of Zambia's economy has been closely linked to the performance of the mining sector since independence. The mining sector's output share in GDP declined from 40 percent in 1965 to 14 percent between 1980 and 1990, and 10 to 12 percent between 2000 and 2015 (World Bank, 2018). Despite the decline in the share of mining in GDP, the mineral exports remain the major source of Zambia's foreign exchange. Figure 1 shows that the sector accounts for over 76 percent of the total foreign exchange. The copper economy remains the key stimulant of economic growth and performance through public and private sector demand and sector competitiveness.

An evolution of Zambia's mining sector and ownership structure since independence is discussed in Mudenda et al., (2019). The evolution of the sector is summarised as follows: firstly, the mines were privately owned prior to independence in 1964 and nationalised in 1969 following the Matero reforms. However, the sector became unprofitable during the 1980s due to falling copper prices and poor general economic performance that resulted in low re-investment and productivity of the sector. The private sector players were minority shareholders until the privatisation of the mines in the late 1990s and early 2000s.

Figure 1: Trend in the Share of Metal Exports 1966 To 2014



Source: World Bank Development Indicators

Secondly, the privatisation of the mines in the late 1990s and early 2000s changed the ownership structure. The sector became predominantly private sector driven, with the government as a minority shareholder with at most 25 percent stake held through the Zambia Consolidated Copper Mines Investment Holding Limited (ZCCM-IH). Privatisation also changed the composition of private investors from predominantly Western countries to the inclusion of Asian investors mainly from India and China. The mining sector also has a large number of local and foreign small-scale miners, mainly involved in the extraction of precious minerals such as gold and emeralds. A large number of the small-scale miners are unregistered, creating a conducive environment for capital flight.

Thirdly, the privatisation of the mines attracted significant amounts of foreign direct investment, establishing large affiliates of multinational corporations with substantial financial and market power. The new investors in most cases signed development agreements with government, which gave them a range of incentives such as expatriation of profits, tax holidays and subsidised energy. Changes in the ownership structure gave MNCs a larger stake in the extraction of resources and potentially greater capacity to externalise capital. Some new entrants are involved in both production and processing of copper but also serve as buyers and traders in the copper value chain (Mudenda et al., 2019). This integration of production and purchase of own output provides a conduit through which resources can be externalised.

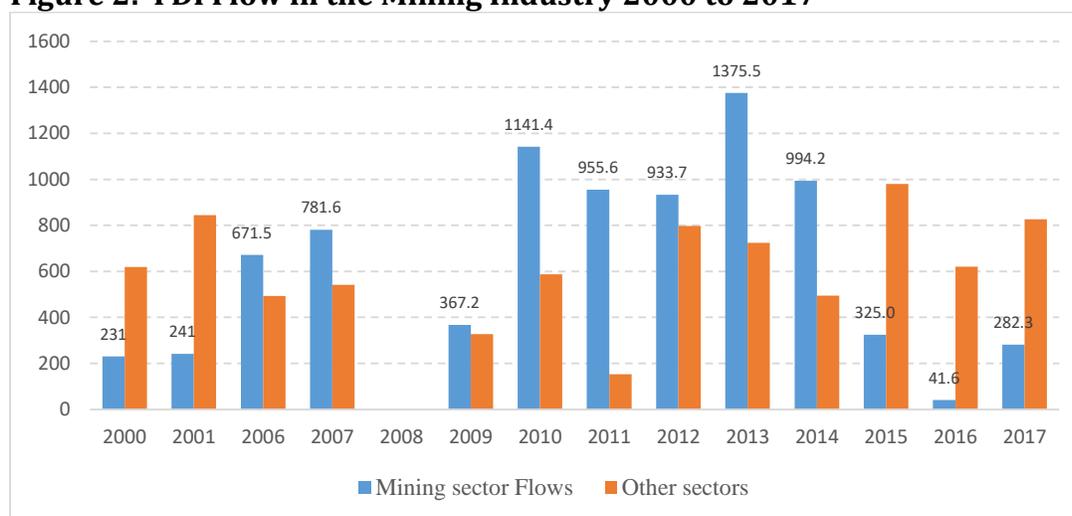
Table 1: Ownership of Large Mines after Privatisation

Mines	Investor	Year of Acquisition	Corporate Structure	Mining Assets
Kansashi Copper Gold Plc	First Quantum minerals Ltd (Canada 79.4%), ZCCM IH (20.6%)	2001	Listed on LSE, TSX	Kansashi
Konkola Copper Mines Plc	Vedanta Resources, India (79.4%), ZCCM IH (20.4%)	2004	Listed on LSE	Nchanga, Konkola, Nampundwe, Chililabombwe
Mopani Copper Mine Plc	Glencore International AG, (Switzerland (73.1%), First Quantum Minerals Ltd, Canada (16.9%), ZCCM IH (10%)	2000	Private Equity	Nkana, Mufulira
Luanshya Mines Chambishi Mines (NFC Africa Mining Co)	CNMC (85%), ZCCM IH (15%)	2009	Private Equity	Mulyanshi
Chambish Metals	CNMC (90%), ZCCM IH (10%)	1998	Private Equity	Chambishi Chambish Smelter, Slag Dumps
Lumwana Copper Project	CNMC (85%), ZCCM IH (15%)	2009	Private Equity	
Bwana Mkubwa	Equinox Minerals Ltd Canada/Australia (79.4%), ZCCM IH (15%)	1999	Listed ASX, TSX	Lumwana
Kagem Mining	First Quantum Minerals Ltd (Canada 79.4%), ZCCM IH (20.6%)	1997	Listed LUSE, TSX	SX-EW Plans
Grizzly Mining (GM)	Gemfields 75%, ZCCM IH 25%			
	100% Private	1999	NA	NA

Source: Mudenda et al., 2019

The privatisation of the mines in the late 1990s resulted in a rapid increase in investments in both old and new mines at the back of increasing copper prices. Figure 2 shows the flow of FDI in the country between 2000 and 2017. The mining sector has been the largest recipient of FDI in the country, accounting for an average at 49.4 percent of the total inflows between 2010 and 2017. The stock of FDI in the mining sector increased from US\$4.5 billion in 2006 to US\$12.84 billion (or 64.6 percent of the total FDI stock) in 2017.

Figure 2: FDI Flow in the Mining Industry 2000 to 2017



Source: Bank of Zambia and UNCTAD databases

In addition to lucrative prices after 2000, the FDI flows in the mining sector have partly been driven by the incentives such as tax holidays and subsidised energy. Despite these incentives, most mines have continued to report losses (Various ZCCM-IH Annual Reports). The sector’s contribution to the country’s revenue remains low at less than 1.4% of GDP in 2016. Over the past decade, only one major mine has consistently declared and paid dividends while the rest have not been consistent and tend to reinvest dividends, depriving the country of revenue.

Table 2: Sales Revenue, Profits and Declared Dividends for Selected Mines

	2008	2009	2011	2012	2013	2014	2015	2016	2017
Sales Revenue	4,528	2,260	2,977	2,763	5,304	5,166	4,343	3,489	3,658
Declared Profits	185.5	15	485.6	186.7	302.1	600.3	-676.7	- 447.8	287.2
Dividends (ZCCM-IH)	0	3.9	38.2	18.8	19.60	130.8	3.6	1.6	19.0
Debt Stock		2,904.	4,189.3	6,713.7	8,434.6	9,009.9	9,261.1	9,647.7	2,904

Source: various ZCCM IH annual reports

In 2008, for example, the selected mines reported sales of US\$4.53 billion and a profit of US\$185.5million. However, none of the mines paid dividends to ZCCM-IH as profits are invested or absorbed for debt service, a key factor that is related to capital flight (ZCCM-IH, 2008 annual report). The debate about the low contribution of mines to the national treasury has resulted in government changing the mining tax regimes over ten times by 2016in an attempt to extract some revenue from the sector. The balance remains elusive.

The obtaining environment which is private sector driven with an open capital and current account and increasingly new trading partners such as Glencore which not only trades commodities but also extract and acts as logistical enterprise (Leins, et al., 2019) provides a fertile ground illegal trade that requires detailed analysis.

3. Brief Overview of the Literature

This section presents an overview of the literature investigating trade mis-invoicing. One strand of the literature looks at the magnitudes of trade mis-invoicing while the other strand investigates its extent and motivation. This section presents the key literature focusing on international evidence followed by a section that gleans on the literature investigating trade mis-invoicing in Zambia.

3.1. International Evidence

Previous studies have investigated the issue of trade mis-invoicing mainly as a key component OF capital flight that remains a global problem. Several studies estimate trade mis-invoicing either as measure of capital flight (Classen and Naude, 1993, Tandon. and Rao, 2017; UNCTAD, 2016) or as an integral part of measuring capital flight (Ndikumana and Boyce 1998; Ajayi, 1997; Zhu, Li and Epstein, 2005; Ndikumana et al., 2018, Yalta and Demir, 2010). Most of the studies show that countries lose substantial amounts of the resources through trade mis-invoicing. For example, Yalta and Demir (2010) investigated Turkey's extent of trade mis-invoicing with its major trading partners for the period 1970 to 2007. They found that exports were under-invoiced while imports from China were over-invoiced. Jia (2014) showed an increasing trend of trade mis-invoicing estimated at US\$186 billion between 1988 and 2012. Similar evidence of large trade mis-invoicing has been highlighted by Fisman and Wei (2009) between Egypt and USA and Mahmood and Azhar (2001) for Pakistan and its 14 key trading partners who found that exporters over-invoiced exports by US\$ 2.4 billion over 10 years.

In the case of Africa, Ndikumana, Boyce and Ndiaye (2014) estimated that 33 African countries lost US\$82,861.1 million (at 2004 prices) representing 18.7% of total capital flight through trade mis-invoicing between 1970 to 2004. In another sample that included Zambia and 11 other African countries, Ndikumana and Boyce (2014) estimated the level of trade mis-invoicing of US\$309.2 billion for the period 1970 to 2010. In 2012, Ndikumana and Boyce (2014) also estimated trade mis-invoicing of US\$96.4 billion for the period 1970 to 2010 among four North African countries that included Tunisia, Algeria, Egypt and Morocco.

Other country studies also find large volumes of trade mis-invoicing. For example, Rustomjee (1991) estimated the extent of trade mis-invoicing for South Africa using the IMF direction of trade statistics for the period 1970 to 1988. They found that South Africa under invoiced its exports by an average of 21% and its imports by an average of 4%. Ndikumana and Boyce (2018) analysed the magnitudes of capital flight, adjusted for trade mis-invoicing for Angola, Cote d'Ivoire and South Africa during 1970 to 2015. They estimated the net trade mis-invoicing outflow at US\$409, 589 million for South Africa and inflow of US\$12,580.6 million for Cote D'Ivoire.

There are several motivations for trade mis-invoicing. UNCTAD (2016) organise these around three key reasons relating financial motives, exchange rate controls and administrative burdens. Traders strive to maximise profits through tax evasion. They do this by under-invoicing exports and imports to avoid paying high duties (Buehn and Ichler, 2010;

Hermes et al., (2002) Patnaik et al., 2012). This motive is likely to be prominent in countries with high trade barriers (such as customs duties) as found by Epaphra, (2015) and Fisman and Wei (2004). Trading firms also tend to over-invoice in situations where exports and imports are incentivised through export promotion schemes such as duty drawbacks to maximise profits (Epaphra, 2015; Lemi, 2017; Spanjers and Solomon 2017, Henry, 2016).

Traders are also motivated to incorrectly report trade values to minimise administrative burdens and corresponding transaction costs. In countries with many bureaucratic hurdles, including lengthy paperwork and delays in administrative authorisations, traders resort to corruption and under-invoicing to expedite clearance (Buehn and Ichler, 2010; Patnaik et al., 2012; and Berger and Nitsch, 2012). The scourge can be exacerbated by weak regulatory and enforcement rules (Ndikumana and Boyce, 2018).

Further, firms have an incentive to misreport in instances where a country has strict foreign exchange controls. In this case, trade mis-invoicing provides an opportunity for firms to acquire foreign exchange illegally. In addition, trade mis-invoicing is fuelled by fear of uncertainty caused by an interplay of macroeconomic and political instability (Collier et al., 200; UNCTAD, 2016).

3.2. Estimates of Trade Mis-invoicing in Zambia

There are few detailed analyses of capital flight that accounts for trade mis-invoicing from Zambia. Most of these studies are conducted in the multi-country studies with extracts of the Zambian estimates. Table 4 shows the extent of capital flight and trade mis-invoicing from Zambia as highlighted in various multi-country studies by among others Ndikumana et al., (2014); Boyce and Ndikumana (2001); Karl and Spanjers (2015); and Boyce and Ndikumana (2011).

The estimates by Boyce and Ndikumana (2001) show that Zambia lost about US\$10.6 billion (354 percent GDP) between 1970 and 1991 to capital flight. About 50 percent (US\$4.82) of this loss is explained by trade mis-invoicing. The extent of capital flight declined to 106.7 percent of GDP between 1970 and 2010 (Ndikumana et al., 2014). This decline can partially be explained by the large trade inflows of US\$7 billion during this period. In another study, Boyce and Ndikumana (2011) found an over-invoicing of exports amounting to US\$1891 million between 1970 and 2004. This represents some capital inflow through trade.

Karl and Spanjers (2015) estimated the capital flight from Zambia covering the period 2004 and 2013 and adjusted their estimates for trade mis-invoicing. They estimated the illicit capital outflow at US\$28,324 million dollars with a total trade mis-invoicing of US\$81,281 million. The trade mis-invoicing inflows exceeded the outflows by US\$24, 633 million that suggest that Zambia experienced capital inflows through trade during this period. This result is consistent with Ndikumana et al., 2014 who find trade-based inflows for the period 1970 to 2010. However, the results contrast the study by Boyce and Ndikumana (2001) that found trade based capital outflows.

Table 3: Estimates of Capital Flight in Zambia

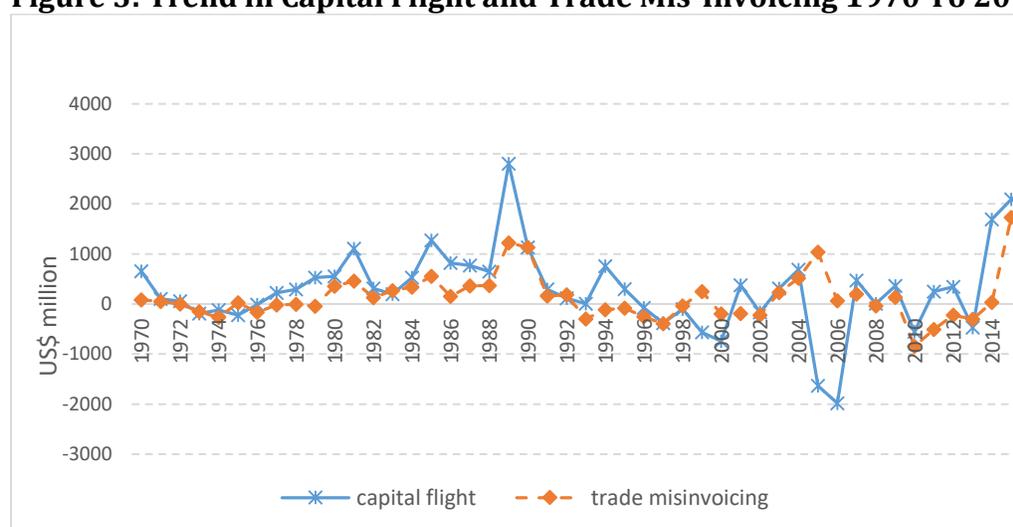
1970 -2010 ^α		1970-1991 ^γ		2004- 2013 ^χ		1970- 2004 ^ε	
Total capital flight (2004 US\$ Bn)	17.3	Total real capital flight	5,807.1	Illicit capital outflow	28,324.0	unadjusted Capital flight	9774.2
Total capital flight/GDP (%)	106.7%	Total capital flight/GDP (%)	354.9	Illicit capital	28,853.0	Trade mis-invoicing	-1891
Trade mis-invoicing	-7.0	Trade mis-invoicing	4,816.3	Trade mis-invoicing inflows	52,957.0	Capital flight adjusted for trade	7884.2
Export mis-invoicing	13.4	Export mis-invoicing	1,123.9	Trade mis-invoicing outflows	28,324.0	Remittances	-1885
Import mis-invoicing	6.5	Import mis-invoicing	3,692.4	Total trade mis-invoicing	81,281.0	Total adjusted capital flight	9769.5
Residual	22.6	Real capital flight adjusted for trade	10,623.5	Illicit hot money outflows	529.0		

Source: Compiled from various authors: α –Ndikumana et al., (2014); γ -Boyce J and L Ndikumana (2001); χ -Karl and Spanjers (2015); ε - Boyce J. and Ndikumana, L. (2011);

Figure 3 shows the trend in total capital flight that accounts for trade mis-invoicing for the period 1970 to 2014 by Ndikumana and Boyce (2018) using the balance of payment residual approach. The trend shows that Zambia experienced relatively large and systematic increase in total capital outflows during the import-substitution period 1970 and reached a peak of US\$1121.9 million in 1990. Capital flight, thereafter, fluctuated around a relatively low and stable level up to 2004 when fluctuations became large. The period between 1990 and 2004 is the transition period from public ownership to private ownership. The pattern of the trade mis-invoicing closely follows that of capital flight. The trend shows that trade mis-invoicing fluctuated, with the country recording outflows between 1970 and 1992. Most of the years between 1992 and 2002 experienced trade inflows while outflows were recorded in the period 2003 and 2006, partially fuelled by the high subsidies and export promotion schemes.

A major weakness of these studies is the level of product aggregation used in the analysis and the time periods covered. The time aggregations cover a long period that comprises periods of total government control of all key sectors of the economy and exchange rates (1970 to 1991) and a period of liberal capital and current accounts (1992 to 2014) that may provide different incentives for capital movements. In addition, the estimates are made on all products, which makes it difficult to identify products responsible for the mis-invoicing. The exception is UNCTAD (2016) which among others examines the case of copper trade mis-invoicing from Zambia and Chile. Contrary to the large resource inflows reported for Chile, the report found large export outflows from Zambia.

Figure 3: Trend in Capital Flight and Trade Mis-Invoicing 1970 To 2014



Source: Ndikumana et al., 2018

Two sub-products of copper, namely, the copper ores and concentrates SITC (283) and copper products in the non-ferrous (SITC 682) were used to compute trade mis-invoicing from Chile while only the latter is used for Zambia. The study assumed uniform CIF of 10 percent. This study thought using the standard method expands the results in three ways. First, by including the SITC 283 subsector assumed away by UNCTAD 2016.

Second, the results are expanded to cover regional level analysis, other trading partners and mineral products including emeralds and gold. The paper also estimates trade mis-invoicing by summing the export and import mis-invoicing. Finally, Lemi (2016) argues that the estimated CIF value of 10 percent may overestimate the extent of mis-invoicing. Following this approach, the extent of mis-invoicing is tested for different estimates of the cost of insurance and freight values. In particular, 5 and 10 percent are used for the aggregate sample minerals. As a standard estimate of CIF, the 10 percent is used for the rest of the estimations.

4. Methodology: Estimating Trade Mis-invoicing

This section presents the framework and the data (and its sources) used to estimate trade mis-invoicing. The framework is presented first followed by the description of the data and its sources.

Trade mis-invoicing occurs if the true value of exports or imports deviates from the amount of exports or imports businesses report to the authorities. The standard estimation technique to measuring trade mis-invoicing compares exports of one country to imports of its trading partner (Patnaik et al., 2012, Qureshi and Mahmood, 2015; UNCTAD, 2016, Lemi, 2016). In this framework, the observed exports from Country A to Country B, accounting for freight, costs and insurance (c.i.f) should match the observed imports of Country B from Country A. If the exports from Country A to B (c.i.f) are less than the claimed imports of

Country B from A, then the difference can be attributed to export under-invoicing by Country A, or import over-invoicing by Country B.

In comparing exports and imports of trading partners as a means of measuring trade mis-invoicing, three distinct levels can be used. The first is for all trading partners taken together, the second is all products taken together while the last is country to individual partner at product level. To measure mis-invoicing, this study's take is supported by several authors including de Boyrie et al., (2007), Yalta and Demi, 2010, Kwaramba et al., 2016 and UNCTAD , 2016 and is computed based on mirror accounts on both the export and import side of trading partners shown by the equations below.

4.1. Trade Mis-invoicing by Partner for All Ores and Metals

In the first step, we compute the export discrepancies with the trading partners for all ores and minerals as follows:

$$Xmis_{zt} = M_{jt} - (1 + \gamma).X_{zt} \quad 1$$

where X_{zt} is exports of good as reported by Country z (Zambia) to trading partner j as reported in Zambia's data at time t , M_{jt} refers to imports from Zambia as reported by the trading partner j as recorded by partner j . The γ represents the cost of freight and insurance. The variable $Xmis_{zt}$ measures Zambia's export mis-invoicing. A positive sign on export mis-invoicing ($Xmis > 0$) indicates the existence of export under-invoicing which indicates capital outflows while a negative value ($Xmis < 0$) indicates over-invoicing of exports or capital inflow into the host economy.

The import mis-invoicing at trading partner level is computed as follows:

$$Mmis_{zt} = M_{zt} - (1 + \gamma).X_{jt} \quad 2$$

In this equation, $Mmis_{zt}$ import mis-invoicing for Zambia at time t , M_{zt} is imports reported by Zambia from partner j as recorded in partner country, X_{zt} is exports reported by trading partner. The variable $Mmis$ (import mis-invoicing) measures the discrepancy in Zambian imports. A positive value (i.e. $Mmis > 0$) indicates import over-invoicing while a negative value shows import under-invoicing. That is, if official figures on Zambia's imports are greater than the exports reported by partner countries, then traders engage in import over-invoicing.

Total trade mis-invoicing TM is obtained as a summation of export mis-invoicing and import mis-invoicing expressed as:

$$TM_{zt} = Xmis_{zt} + Mmis_{zt} \quad 3$$

A positive TM value implies net underrecording in trade statistics and an outflow of capital while negative value reflect reduction in capital flight. Trade mis-invoicing due to undeclared

or undocumented resources transfers in official statistics deprives authorities in host economies of the control of the critical financial resources. Thus, the total unaccounted-for resources, following Yalta and Demi (2010) comprise the summation of the absolute trade values of mis-invoicing is calculated as:

$$|TM| = |Xmis_{zt}| + |Mmis_{zt}| \quad 4$$

The estimates from Equations 3 and 4 are reported in selected computations in this study. It is worth noting that not all discrepancies in trade data is due to trade mis-invoicing. Factors such as misclassification of products across tariff lines, incorrect identification of sources or destination countries and valuation of products at different prices can dirve the wedge (Yalta and Demis, 2010). However, such discrepancies should sum up to zero using Equation 3.

4.2.Product-Trading Partner Level Estimations

The product-partner level export mis-invoicing is computed as follows:

$$Xmis_{zjkt} = M_{zjkt} - (1 + \gamma) \cdot X_{zjkt} \quad 5$$

where $Xmis_{zjit}$ is export mis-invoicing of Zambia (z) from trading partner j of product k at time t while the other variables are as defined in Equation 1. A positive value ($Xmis_{zjkt} > 0$) represents unrecorded capital outflows through the trading of good k . A negative indicates export over-invoicing resulting in capital inflow.

The import mis-invoicing at product level is calculated by adjusting Equation 2 as follows:

$$Mmis_{zjkt} = M_{zjkt} - (1 + \gamma) \cdot X_{zjkt} \quad 6$$

where M_{zjkt} is the value of imports by Country j from Zambia (z) as reported by Country j . X_{zjkt} is the value of exports by Country j to Zambia as reported Country j . The interpretation of the signs on $Mmis_{zjkt}$ holds as in Equation 3.

4.3.Data Sources and Trends

This study estimates trade mis-invoicing using the United Nation's Conference on Trade and Development COMTRADE database, which records bilateral trade at disaggregated levels. This data is publicly available at <http://comtrade.un.org/data/>. The data is collected at the international standard Harmonised System at six-digit level for ease of product identification.³ The analysis is made for the period 1997 to 2018. However, 2016 is excluded from the analysis, as Zambia did not report its exports.

³ In particular, the analysis uses the HS -2603 and HS 74 that capture trade in copper ores and copper and articles, HS 71 and HS 2616 for cobalt and HS 2605 and HS 8105 for precious mineral that include gold and emeralds.

Ndikumana and Boyce (2018) observed that the Zambia's trade data in general exhibit extremely large export over-invoicing, where significantly larger exports are reported than what trading partners reported as imports. As such, they estimate trade mis-invoicing directly relative to the rest of the world using world exports to Zambia and world imports from Zambia. In this study, we use the data as reported by Zambia and its trading partners. Another study by UNCTAD (2016) examines export mis-invoicing while ignoring the import dimension, which may bias the estimates. Another data limitation is that, some countries provide inaccurate trade data while others do not report their national trade data to the international organisation.

Further, an accurate estimate of the cost of freight transport and insurance for Zambian imports and in destination markets is not readily available. In the absence of actual estimates for the CIF, the 10 percent rule of thumb is widely used in literature such as Yalta and Demi (2010); Ndikumana and Boyce (2018); and Qureshi and Mahmood (2015). In addition, we test the results for the 5 percent CIF as approximations as in Lemi (2016).

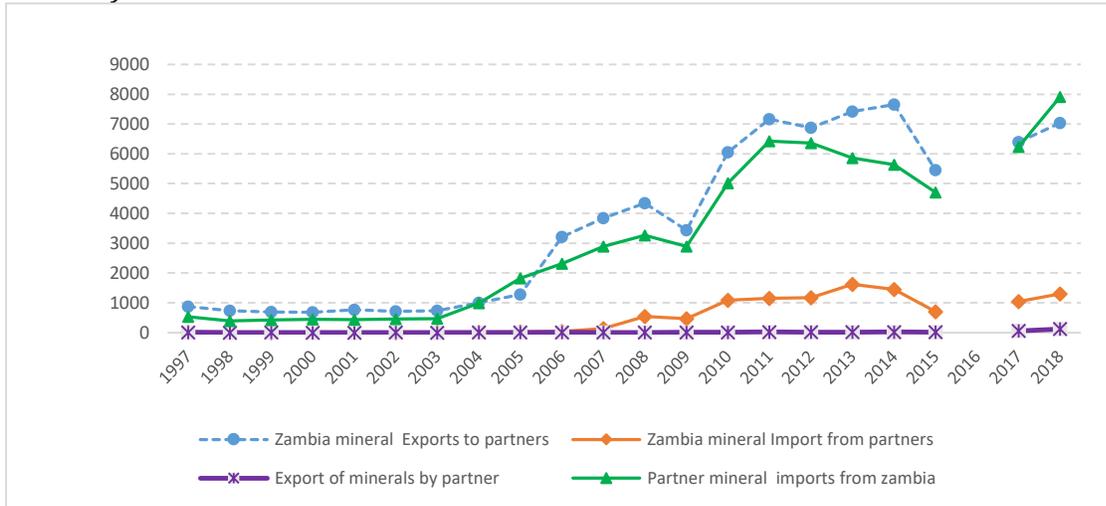
5. Results and Discussions

This section presents the estimates of capital movement from Zambia's ores and mineral sector and is divided into three subsections. The first subsection presents the results based on all ores and minerals trade by partner in Equations 1 to 4. The second subsection presents the calculations based on the products-partner trade mis-invoicing based on Equation 5 and 6. The latter subsection segments the analysis period 1997 to 2018 into 1997 to 2004 the privatisation period and 2006 to 2018, the post privatisation period.

Figure 4 compares trade flows that Zambia and its trading partners reported and vice versa, before getting into detailed analysis of trade mis-invoicing. Zambia's aggregate export of ores metals increased from US\$874.3 million in 1994 to a peak of US\$7.6 billion in 2014. The increase in exports of minerals accelerated after the privatisation period - between 2005 and 2018. The Figure reveals that on aggregate, Zambia reports more exports of its ores and metals than trading partners report. Zambia's trading partners reported more exports than Zambia's reported exports in 2004 and 2017. The period after 2005 shows that Zambia reported more exports than its trading partners reported.

Further, Zambia's import of ores and metals is very low. For example, in 2013, Zambia reported an import of US\$1.6 billion against its exports of US\$ 7.4 billion to its trading partners. For most of the years under review, Zambia reports more imports of ores and metals from trading partners than the partners reported.

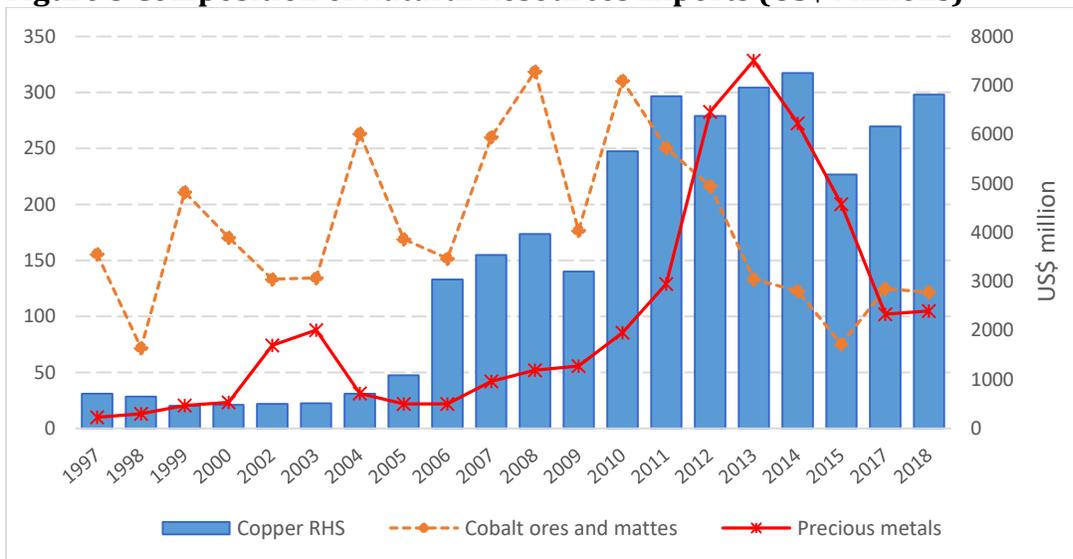
Figure 4: Trend in Total Trade Exports and Imports of Sampled Ores and Metals (US\$ Million)



Source: UNCOMTRADE data

The figure above shows the composition of the three groups of ores and mineral (copper, cobalt and precious metals) exports as reported by Zambia and its trading partners over the period 1997 to 2018. The country depends on copper exports that account for more than 75 percent of the total foreign exchange earnings. The copper exports grew from US\$705 million in 1997, to US\$6.8 billion in 2018, a marginal decline from a peak of US\$7.25 billion in 2014. The exports of cobalt increased from US\$13.7 million in 1997 to over US\$167 million in 2018. Similarly, the exports of precious minerals increased from US\$ 8.9 million to US\$143.49 million in 1997 and 2018 respectively.

Figure 5 Composition of Natural Resources Exports (US\$ Millions)



Source: UN COMTRADE data

5.1. Aggregate Ores and Metals Level of Trade Mis-Invoicing

The results in Table 4 below show Zambia's total trade broken down into two main categories of mis-invoicing of the sample ores and metals for all countries over time using the 5 and 10 percent CIF values in current prices. Table A1 in the appendix shows the same table with values in 2014 constant prices. The direction of trade mis-invoicing (sign) for the two trade cost estimates are similar. However, the magnitudes of mis-invoicing between the two estimates vary. Firstly, the aggregate trade mis-invoicing pattern shows that Zambia significantly overstated its exports in most of the years under review. The magnitude of the export over-invoicing increased after the privatisation of the mines in 2006 through 2018. Results in Table 4 show that the country could not account for over US\$16.7 to 19.66 billion (or US\$34 -39 billion of constant 2014 dollars) an annual average of US\$900 million to export over-invoicing, indicating reverse capital flight over the period 1997 to 2018. This capital inflow does not come through official channels to benefit the country but rather the involved traders, possibly to gain export subsidies.

Secondly, contrary to the common findings in literature, the import trend of the aggregate ores and trade indicates an over-invoicing pattern both at 10 and 5 percent CIF values. The import mis-invoicing for the period 1997 to 2018 stood at US\$10.4 billion (US\$11.1 billion constant 2014 dollars). The absolute trade mis-invoicing ranged between US\$27.12 billion, at 5 percent CIF, to 30.1 billion at 10 percent CIF mainly driven by the export over-invoicing in both estimates. This result is consistent with the findings by the literature on Zambia examining total trade mis-invoicing such as Boyce and Ndikumana (2011) and Karl and Spanjers (2015). Similar results have also been found for other countries such as Chile (UNCTAD, 2016), Zimbabwe (Kwaramba et al., 2016) and Ethiopia (Lemi, 2016). Overall, export mis-invoicing takes the largest share of total mis-invoicing. This is expected given that Zambia's economy depends on the export of minerals and ores.

Table 4: Export, Import and Total Trade Mis-Invoicing US\$ Million (Estimated At 5% & 10%) 1997 -2018

All countries	Exports		Imports		Trade mis-invoicing			
	Diff. Exports (10%)	Diff. Exports (5%)	(10%)	Diff. Imports (5%)	Net Diff Trade (10%)	Net Diff Trade (5%)	Absolute Diff Trade (10%)	Absolute Diff Trade (5%)
Year								
1997	-427.6	-383.9	7.5	8.1	-420.1	-375.7	435.1	392.0
1998	-418.6	-381.9	13.1	13.1	-405.5	-368.8	431.7	395.0
1999	-329.4	-294.9	-5.4	-5.1	-334.8	-300.0	334.8	300.0
2000	-295.1	-261.2	11.6	11.7	-283.5	-249.6	306.6	272.9
2001	-411.1	-372.6	2.2	2.3	-408.9	-370.2	413.4	374.9
2002	-329.0	-293.5	-3.5	-3.2	-332.5	-296.7	332.5	296.7
2003	-342.4	-305.7	11.8	11.9	-330.6	-293.8	354.2	317.6
2004	-117.3	-67.1	12.8	13.0	-104.5	-54.1	130.2	80.1
2005	421.0	484.7	16.2	16.5	437.2	501.3	437.2	501.3
2006	-1,218.0	-1,057.5	25.1	25.7	-1,192.9	-1,031.8	1,243.1	1,083.2
2007	-1,327.7	-1,135.8	131.6	132.0	-1,196.1	-1,003.8	1,459.3	1,267.7
2008	-1,505.8	-1,288.9	531.3	531.7	-974.5	-757.2	2,037.2	1,820.6
2009	-888.2	-716.5	454.5	455.2	-433.7	-261.3	1,342.8	1,171.7
2010	-1,645.1	-1,342.4	1,072.8	1,073.4	-572.3	-269.0	2,717.9	2,415.9
2011	-1,448.9	-1,091.1	1,128.7	1,130.0	-320.2	38.9	2,577.7	2,221.0
2012	-1,205.0	-861.0	1,148.4	1,149.2	-56.6	288.2	2,353.4	2,010.3
2013	-2,298.0	-1,927.1	1,602.1	1,602.8	-695.8	-324.3	3,900.1	3,530.0
2014	-2,779.3	-2,396.8	1,423.0	1,424.0	-1356.3	-972.8	4,202.4	3,820.9
2015	-1,294.9	-1,022.2	685.7	686.5	-609.3	-335.6	1,980.6	1,708.7
2017	-795.1	-475.6	978.6	981.5	183.5	506.0	1,773.6	1,457.1
2018	164.6	516.4	1,162.8	1,168.9	1,327.4	1,685.3	1,327.4	1,685.3
Net TM	-18,490.9	-14,674.5	10,411.0	10,429.4	-8,079.9	-4,245.2	30,090.9	27,122.7
Absolute MT	19,662.06	16,676.66	10,428.82	10,446.0	11,975.9	10,284.4	30,090.9	27,122.68

Source: UNCOMTRADE database

5.2.Trading Partner-Aggregate Ores and Metals Level Result

Trade mis-invoicing at aggregate level gives the major components and direction of trade mis-invoicing. However, it does not give us a clear picture of the pattern of trade driving the various components of mis-invoicing with key trading partners and how these have evolved before and after the privatisation of the mines. Table 5 provides the estimated total trade mis-invoicing broken down by the main trading partners at 10 percent CIF. These sampled countries account for over 80 percent of the export destinations of Zambia's ores and metals when analysed from both the importer and exporter records. Of key interest, is the aggregation of the exports to Switzerland as reported by Zambia into the EU group. This is aimed at minimising the estimated mis-invoicing as no imports are reported in Switzerland.

The remaining exports are aggregated and reported within the regions using Equation 3, which sums the differences in imports and exports.

Table 5: Total Trade Mis-Invoicing Using Ores and Metals Data (10% CIF) (US\$ 'Million)

Country	1997 - 2004				2005 to 2018			
	Export Diff	Import Diff	Net Diff. Trade	Absolute Diff. Trade	Export Diff	Import Diff	Net Diff. Trade	Absolute Diff. Trade
Belgium	-201.68	-0.89	-202.57	202.57	232.12	0.09	232.21	232.21
China	326.84	0.31	327.15	327.15	9931.35	-13.71	9917.64	9,945.06
Egypt	-0.23	0.00	-0.23	0.23	1423.16	-3.60	1419.56	1426.76
France	32.61	-0.06	32.55	32.66	-52.72	-0.01	-52.73	52.73
Germany	52.60	-0.26	52.34	52.87	179.03	1.51	180.54	180.54
India	10.80	-3.49	7.31	14.30	2729.15	-21.87	2707.28	2751.02
Italy	73.15	-0.04	73.12	73.19	2138.26	-0.28	2137.98	2138.54
Japan	452.81	0.05	452.86	452.86	400.47	0.22	400.70	400.70
Korea, Rep.	190.65	-0.03	190.62	190.68	4063.99	-0.20	4063.78	4064.19
Namibia	-2.60	-0.04	-2.65	2.65	1902.50	-8.58	1893.92	1911.09
Singapore	-29.96	-0.01	-29.97	29.97	-1952.32	5.88	-1946.44	1958.20
South Africa	-762.75	15.03	-747.73	777.78	-3114.62	41.57	-3073.05	3156.19
Thailand	213.46	0.03	213.49	213.49	585.39	-18.26	567.13	603.65
United Arab Emirates	-138.16	1.95	-136.21	140.10	5124.93	17.36	5142.29	5142.29
United Kingdom	2,522.98	5.00	-2517.98	2527.99	-1447.83	-82.44	-1530.27	1530.27
United States	151.48	-0.13	151.35	151.60	596.28	0.18	596.46	596.46
Zimbabwe	-12.99	0.31	-12.67	13.30	653.58	0.52	654.11	654.11
Botswana	14.00	-0.48	13.52	14.48	-38.12	-4.96	-43.08	43.08
Kenya	-11.02	0.00	-11.01	11.02	-111.25	0.18	-111.08	111.43
Tanzania	-342.41	0.01	-342.40	342.42	-161.99	-4.75	-166.74	166.74
Sub-Saharan Africa	-8.26	33.52	25.26	41.78	-172.95	10434.88	10261.93	10607.82
Europe & Central Asia	-720.15	0.36	-719.78	720.51	-42712.46	-14.30	-42726.76	42726.76
East Asia & Pacific	89.78	0.11	89.90	89.90	457.43	6.40	463.82	463.82
Middle East & North Africa	-256.12	-0.29	-256.41	256.41	-575.70	-18.50	-594.19	594.19
Others	-69.18	-0.25	-69.42	69.42	-679.44	8.73	-670.70	688.17
Net	3470.32	50.73	3419.59	3521.04	20601.74	10326.06	10275.68	30927.80
Absolute	6670.15	61.44	6678.50	6731.59	81014.91	10662.53	91468.24	91677.44

Source: UNCOMTRADE database

The results in Table 5 above show differences in trade mis-invoicing across countries and the two sub-periods under analysis. In particular, China, Japan, Korea Republic, Thailand and the United States recorded positive trade mis-invoicing or export under-invoicing. The estimate dominated by export mis-invoicing in the period 1997 to 2004 suggesting that these countries served as the main conduit of natural resources-based capital flight from Zambia. Japan recorded the highest net capital flight of US\$ 452.86 million followed by China at US\$327.15 million during this period.

On the other hand, the United Kingdom, Singapore, South Africa and Tanzania recorded significant negative trade over-invoicing approximately US\$3.98 billion and US\$6.549 billion in the first and second periods respectively. These countries are the main sources of the reverse capital flight into Zambia during the two periods. The United Kingdom, which served as a main mineral marketing centre for Zambia accounts for the highest (63 percent or US\$ 2.52 billion) illegal capital inflows which that do not come through official channels. Further, the results show a significant shift in Zambia's export destinations from the United Kingdom and South Africa to China, India, the United Arab Emirates, Namibia, Korea Republic and Egypt in the period, 2005 to 2018. These countries recorded over US\$28. 89 billion or an annual average of US\$2.2 billion. Most of these countries recorded significant positive mis-invoicing. The capital flight through China and India might be explained by their increased investment in the country's natural resources complemented by economic growth in these countries. This is especially true in the post privatisation period.

5.3.Trading Partner-Product Level Results

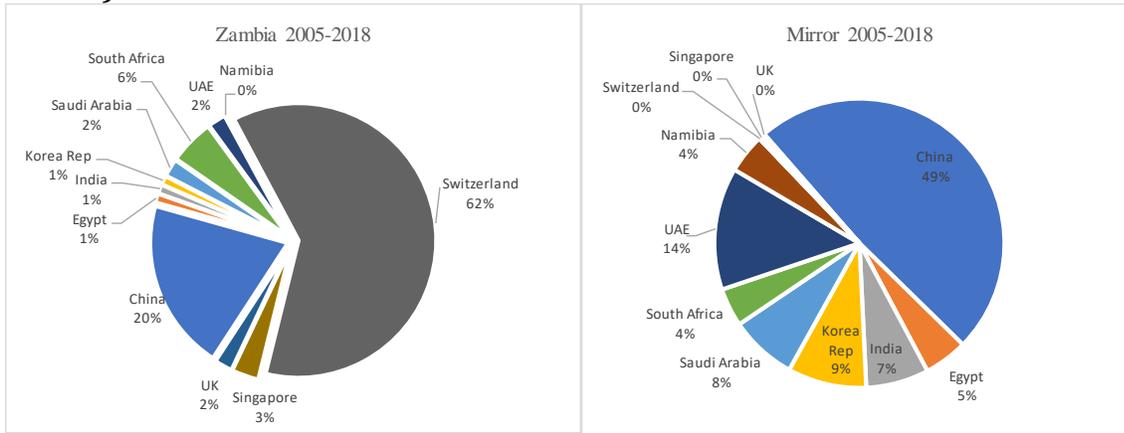
The estimation of trade mis-invoicing using aggregated products masks the individual commodities and countries involved in trade mis-invoicing. The challenge limits the extent to which countries can design targeted policies to address the problem of capital flight prevalent in trade mis-invoicing. The next such subsection disaggregates minerals into broad categories starting with copper ores and articles thereof. This category is followed by cobalt while pearls and precious metals are analysed in the last sub-section.

5.4.Copper Mis-invoicing

As eluded to earlier, copper remains the major export commodity accounting for over three-quarters of Zambia's exchange earnings. The main destinations of copper as reported by Zambia and partner countries are presented in Figure 6. The destinations vary across the two sources. Some countries reporting Zambian imports are not reported in Zambia's trade. For example, some Countries like Italy, Singapore, Belgium and German report receiving some Zambian copper whereas the Zambian records do no show exports to these countries. On the other hand, Zambian data shows that 62 percent of copper was exported to Switzerland, while the Switzerland records show negligible imports from Zambia. Further, as Table 6 shows, the first period saw a surge in exports to the United Kingdom, which was then replaced by Switzerland as a major export destination after privatisation.

The following observations can be made from Figure 6. First, copper exports are heavily concentrated in a few markets. The Zambian data shows that the top five countries accounted for 90percent of the total copper exports between 2005 and 2018. The key major markets being Switzerland (62percent), China (20.7percent) and South Africa (6percent). The mirror statistics show that 7 countries namely, China, United Arab Emirates, Korean Republic, India and Saud Arabia received 72percent of the Zambian copper exports. Clearly, these statistics reveal substantial discrepancies in the key destinations of copper exports depending on the reporter, which also indicates the possibility of trade mis-invoicing.

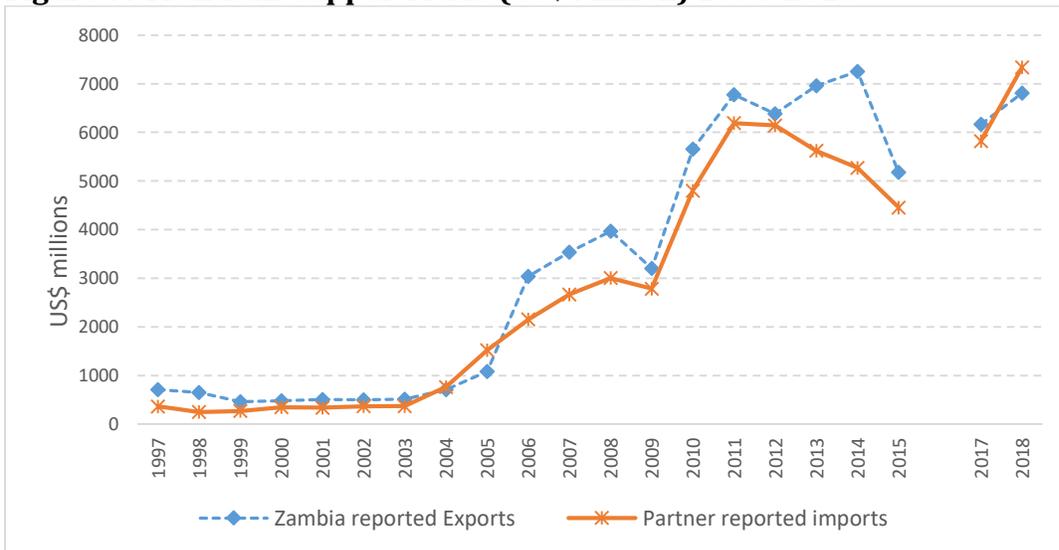
Figure 6: Direction of Zambia's Copper Exports: Direct and Mirror Statistic (US\$ Million)



Source: UNCOMTRADE Database

Figure 7 gives the trend in copper trade as reported by Zambia and its trading partners. The pattern suggests an increasing discrepancy in copper trade, with Zambia reporting higher exports than its partners.

Figure 7: Trends in Copper Trade (US\$ Million) 1997-2018



Source: UNCOMTRADE database

Although Switzerland is identified as the largest market (60 percent of total copper exports) in the Zambian data, the mirror accounts have an insignificant amount of less than 1 percent of the total copper flows with varied ranking of the other top destinations. These discrepancies in reporting between importing and exporting countries are the major indicators of the potential trade mis-invoicing.

Table 6 below provides the estimated copper trade mis-invoicing by partner country broken down into export and import mis-invoicing. In addition to the periodic estimates, some

components of total mis-invoicing are presented for selected years. The computations are segmented into two periods, one for 1997-2004, representing the privatisation period and 2005 to 2018, the post-privatisation period. Table shows that trade mis-invoicing is mainly driven by export mis-invoicing rather than import mis-invoicing. With the exception of South Africa, import mis-invoicing was mainly negative suggesting that imports are key channels through which capital is brought into the country. The positive import mis-invoicing of US\$ 9 million and over US\$23 million in the first and second periods respectively indicate capital flight as importers overstate the actual value of their imports from South Africa.

Using Equation 4, the results show that a total of US\$ 4320.3 million and US\$70 504.7 million in the periods 1997 to 2004 and 2005 to 2018 was trade through illegal means respectively. This is mainly attributed to export mis-invoicing. The highest component of export mis-invoicing is estimated to be over-invoicing. The net total capital flight stood at US\$3,277.6 million in the period 1997 to 2004 and US\$25,370.9 million in the period 2005 and 2018 indicating reverse capital in the period 2006 to 2018, all the other destinations show significant levels of export under-invoicing associated with capital flight. The trading partners with the largest negative export mis-invoicing or capital inflows during the first period were the United Kingdom (US\$ 2219 million), South Africa (US\$509.5 million) followed by Switzerland (US\$355.9) and Tanzania (US\$ 342 million). The structure shifted during the second period from the UK to Switzerland as the largest source of inflows amounting to US\$41, 955.9 million. The other sources include Singapore (US\$1894 million) and South Africa (US\$1481.4 million) which is Zambia's main source of non-traditional imports and investments in the region. Evidence of excessive exports against imports has been established in countries like Chile (UNCTAD 2016) Zimbabwe (Kwaramba 2018) and total trade for Zambia (Ndikumana and Boyce (2011) and for some trading countries with Zambia (UNCTAD, 2016).

The under-invoicing of exports, associated with capital flight stood at an average of US\$77 million per annum- in the period 1997 to 2004. This increased to an average of US\$1.77 billion per annum between 2005 and 2018. The countries with the highest capital outflows are China (US\$9.86 billion), the United Arab Emirates (US\$5.35 billion), India (US\$2.3 billion), Korea Republic and Egypt. This implies that these countries are gateways facilitating capital flight from Zambia.

Table 6: Export Mis-invoicing (Xmis), Import Mis-invoicing (Mmis) and Total Mis-invoicing (TMisv) of Copper for Key Trading Partners (US\$ Million) 1997-2018

Countries		1997-2004	2005	2006	2007	2008	2009	2010	2011	2013	2015	2017	2018	2005-2018
China	Xmis	266.5	189.1	-70.7	159.3	154.2	740.3	1003.9	1075.8	502.6	519.1	1442.7	2552.5	9860.7
	Mmis	0.1	0.0	-0.2	-0.3	-0.9	0.0	0.0	-1.9	1.6	0.4	-0.1	0.6	3.2
	TMISV	266.6	189.1	-70.9	159.1	153.3	740.2	1003.9	1073.9	504.2	519.5	1442.6	2553.1	9863.9
Egypt, Arab Rep.	Xmis	0.0	0.0	-174.7	-255.1	175.7	69.4	159.6	345.4	158.6	115.5	171.3	262.4	1423.2
	Mmis	0.0	0.0	-174.7	-255.1	175.7	69.3	159.4	342.8	158.9	115.7	171.3	262.4	1419.5
	TMISV	0.0	0.0	-174.7	-255.1	175.7	69.3	159.4	342.8	158.9	115.7	171.3	262.4	1419.5
India	Xmis	77.7	5.2	-58.9	20.5	107.4	95.7	30.4	91.4	131.7	365.5	703.4	532.8	2384.1
	Mmis	-0.6	-0.4	0.0	0.2	-0.2	-0.1	1.5	1.5	-2.9	-0.3	-0.8	-1.6	-5.3
	TMISV	77.1	4.8	-58.9	20.7	107.2	95.7	31.9	93.0	128.8	365.2	702.6	531.2	2378.8
Japan	Xmis	200.1	14.9	5.0	39.2	9.0	-0.1	-5.8	11.4	-56.3	-88.1	100.6	98.5	43.4
	Mmis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	-0.1
	TMISV	200.2	14.9	5.0	39.2	9.2	-0.1	-5.8	11.3	-56.3	-88.1	100.6	98.5	43.6
Korea, Rep.	Xmis	178.9	248.8	386.2	500.4	216.8	273.9	347.5	499.5	263.5	317.1	172.4	86.3	4007.6
	Mmis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	-0.1
	TMISV	178.9	248.8	386.2	500.4	216.8	273.9	347.5	499.5	263.5	317.0	172.4	86.3	4007.5
Singapore	Xmis	-30.4	5.1	1.9	-0.5	-0.1	7.3	55.1	23.4	-20.6	-515.4	-479.8	-699.3	-1894.6
	Mmis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	0.0	-0.1
	TMISV	-30.4	5.1	1.9	-0.5	-0.1	7.3	55.1	23.4	-20.5	-515.4	-479.8	-699.3	-1894.6
South Africa	Xmis	-519.1	-147.6	-116.8	-202.3	-227.1	-79.3	-180.3	-214.3	-110.0	-117.0	-13.4	-66.1	-1504.6
	Mmis	9.7	0.1	4.3	6.4	2.4	-0.6	-1.0	1.6	0.6	-1.6	0.3	0.4	23.1
	TMISV	-509.5	-147.5	-112.5	-195.9	-224.8	-79.9	-181.3	-212.7	-109.4	-118.6	-13.2	-65.7	-1481.4
Switzerland	Xmis	-355.9	-484.9	-1576.6	-2051.1	-2635.1	-2124.3	-3869.3	-4699.1	-4249.6	-3307.1	-3866.1	-4121.3	-41955.9
	Mmis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	TMISV	-355.9	-484.9	-1576.6	-2050.6	-2635.1	-2124.3	-3869.3	-4699.1	-4249.6	-3307.1	-3866.1	-4121.3	-41955.5
Tanzania	Xmis	-342.0	-88.6	-2.4	4.8	3.4	-1.1	1.4	-34.0	-1.9	-11.4	-14.9	-19.3	-159.4
	Mmis	0.0	-4.1	0.0	0.0	0.0	0.0	-0.1	0.3	-0.9	0.0	0.0	-79.3	-84.4
	TMISV	-342.0	-92.7	-2.4	4.8	3.4	-1.1	1.3	-33.7	-2.8	-11.4	-14.9	-98.6	-243.7
United Arab Emirates	Xmis	-93.5	0.0	0.0	0.0	58.6	25.0	382.7	1025.0	724.8	686.4	249.8	152.7	5338.8
	Mmis	0.0	0.0	0.0	0.0	58.7	25.0	382.7	1025.1	724.9	702.7	249.8	153.1	5356.2
	TMISV	-92.6	0.0	0.0	0.0	58.7	25.0	382.7	1025.1	724.9	702.7	249.8	153.1	5356.2
United Kingdom	Xmis	-2219.8	-228.1	-16.7	3.8	-96.7	-72.6	-97.2	-344.6	-118.3	-16.7	-57.5	-179.3	-1621.7
	Mmis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	TMISV	-2213.8	-228.1	-16.5	3.8	-96.7	-72.6	-97.3	-344.6	-118.2	-16.7	-57.6	-179.5	-1621.8
Net mis-invoicing all countries		-3277.6	-602.3	1775.4	2017.0	2456.2	1134.8	2341.2	2421.1	2799.9	2056.4	1596.8	1539.5	-25370.9
Net Excluding Switzerland		-2412.2	30.1	-86.3	229.6	403.7	1069.4	1709.4	2490.8	1559.1	1369.3	2282.5	2647.4	18066.0
Absolute mis-invoicing		4320.3	6	2449.2	3277.0	3681.8	3501.0	6147.6	8371.9	6423.1	6176.8	7279.6	8855.0	70504.7

The regional level analysis in Table A2 in the Appendix show that Zambia reported substantial capital outflows through all the regions the European market that shows export under -invoicing in this period. For example, Zambia lost US\$35887 million through the Middle East and Norther Africa and US\$10 730 through other SSA countries.

The dominance of the European market as sources of inflows can be attributed to Switzerland, which, as a trading hub, does not report any imports from Zambia despite reported exports in the mirror data. The country serves as a gateway to facilitate capital flight through transit trade often shipped to third country bonded warehouses. For example, copper bought by a Swiss firm such as Glencore and shipped to a third country may be reported as export to Switzerland. The third country, such as South Africa may report it as an import when the Swiss firm may supply part of that copper to China and sell the rest of it from a bonded warehouse in South Africa (Dobler and Kesselring, 2019). As Table 6 indicates, excluding Switzerland from the computation of capital reverses the flows from resource inflows to resource out flows of US\$18,066 million between 2005 and 2018.

Further, a number of factors might be used to explain reverse capital flight mis-invoicing. Zambian exporters benefit from various export subsidies including duty drawback schemes and reimbursement of value added taxes for imported raw material used in the production of the export and are reimbursable on showing export. There are no export duties on minerals. This incentivises exporters to over-invoicing exports to benefit from the export-based subsidy schemes. This is consistent with findings in Pakistan (Qureshi and Mahmood, 2015).

The results also reveal increase in mis-invoicing during the post mines privatisation period, suggesting the increased mis-invoicing of copper trade are largely controlled by multinational firms. This supports the finding by Kwaramba et al., (2016) which attribute trade mis-invoicing to foreign ownership of key mining firms in Zimbabwe. Finally, the export for mis-invoicing may be exacerbated by the national pricing policy. Tax authorities value the copper exports based on the prevailing London Metal exchange prices for top grade copper. However, traders sell copper based on contracts and quality of copper, whose realised prices may be lower than what prevails at the LME for various grades. The differences in the pricing mechanism could partially explain the observed resource inflows into the country.

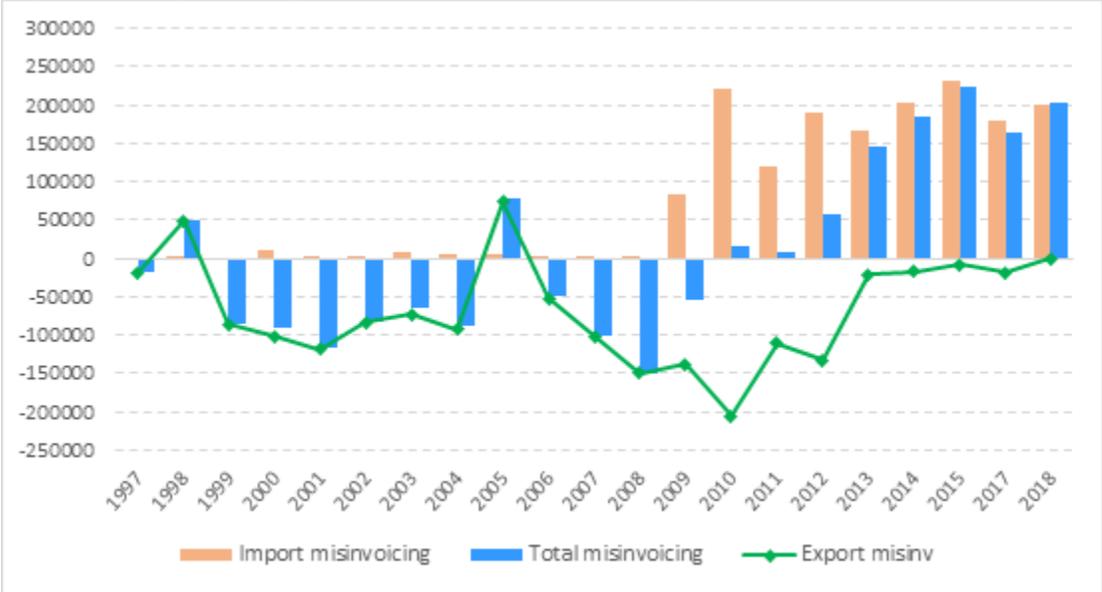
5.5.Cobalt Mis-invoicing

Cobalt is one of Zambia's traditional exports. Figure 8 shows the trend in the main components of cobalt trade mis-invoicing. In the period 1997 to 2004, Zambia recorded significant net capital inflow estimated at US\$1.69 billion, an average of US\$212 million per annum. The bulk of the capital inflow was driven by export mis-invoicing. However, this pattern changed after privatisation when the country recorded significant capital out flows estimated at US\$268.46 million or US\$20.65 million per annum. The capital flight is dominated by import over-invoicing implying that traders use imports to externalise resources from the country.

The net capital outflow of US\$268 million is a residue of the inflows. Table 7 presents the country-wise trade mis-invoicing. It shows that South Africa accounts for the bulk of the reverse or reduction in capital flight, that is, the reported exports by Zambia, far exceed the reported value of imports by South Africa. Between 2005 and 2018, Zambia recorded a significant amount of resource inflows, amounting to US\$666.8 million from South Africa. One of the reasons for this phenomenon is that South Africa serves as logistical and trading hub for a number of firms trading in commodities such as Trafigura and Glencore. The commodities that are reported as destined for South Africa could be stored in bonded warehouses for onward distribution to other countries.

The other European and the Middle East Countries sub-groups are also associated with excess exports over imports. The mis-invoicing in the case of Europe is driven by significant amounts of cobalt recorded in the German, Italy, Belgium-Luxembourg and French databases that are not reported in the Zambian database. The identification of these countries as destinations is surprising considering the fact cobalt is an important ingredient in key machinery and vehicles made in these countries.

Figure 8: Export, Import and Total Mis-invoicing of Cobalt 1997-2018



Source: UNCOMTRADE database

In the period 2005 to 2018, positive trade mis-invoicing, albeit with variation across years, was reported for Japan (US\$ 350.5 million), United States of America (US\$208.8 million), China, and India. These countries are used as conduits of capital flight from Zambia.

Table 7: Export Mis-invoicing (Xmis), Import Mis-invoicing (Mmis) and Total Mis-invoicing (TMisv) of Cobalt for Key Trading Partners (US\$ 000) 1997-2018

		1997-2004	2005	2008	2009	2010	2013	2015	2017	2018	2005-2018
China	Xmis	63545.14	-5708.66	8644.26	-24975.68	-46486.72	7584.71	22262.34	49198.55	35236.75	70642.93
India	Xmis	1623.29	610.76	2287.89	3335.41	-2522.99	262.27	0.00	330.00	121.57	12756.31
Japan	Xmis	253570.51	8065.93	22390.03	6975.50	40388.79	20961.71	25136.58	31917.07	33093.11	350479.05
Netherlands	Xmis	-105779.60	-21475.36	-68475.13	-620.40	-1933.37	13397.45	8007.83	6138.60	2665.63	-49368.18
South Africa	Xmis	-187575.77	-2161.84	-2600.67	-50333.74	-92428.38	-49015.13	-79979.84	-39901.82	-52630.05	-672202.64
	Mmis	5219.39	0.29	-0.05	9.71	166.01	-20.66	-66.16	5724.24	-18.40	5328.26
	TMISV	-182356.38	-2161.55	-2600.72	-50324.03	-92262.36	-49035.78	-80046.00	-34177.58	-52648.45	-666874.38
United Kingdom	Xmis	-298042.29	16.50	0.00	1306.20	3097.50	-0.09	0.00	0.00	0.00	10909.12
	Mmis	9.85	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	51.06
	TMISV	-298032.44	16.50	0.00	1306.20	3097.50	-0.09	0.00	0.00	0.00	10960.17
United States	Xmis	164400.58	17100.09	10085.81	5116.02	18243.95	15245.82	7987.55	14736.13	-1008.05	208841.49
	Mmis	0.71	0.48	1.27	-2.97	-5.40	2.04	0.00	0.00	0.00	3.9
	TMISV	164401.29	17100.57	10087.08	5113.05	18238.56	15247.86	7987.55	14736.13	-1008.05	208845.34
East Asia & Pacific	Xmis	-649474.59	7874.89	23168.92	2866.79	2276.76	686.85	8454.98	8321.34	16349.44	97173.34
Europe & Central Asia	Xmis	-702321.18	-120094.9	-170815.35	-121793.27	-173377.8	-43113.26	-44107.66	-41044.00	-20935.80	-1163950.8
Mid. East & N. Africa	Xmis	-28586.03	-99.60	0.00	-4627.27	-0.04	-34392.10	-2829.49	-94969.18	-58903.23	-474724.31
Sub-Sahara Africa	Xmis	2518.95	147570.51	-81.55	-3044.42	-143.96	0.00	-15.00	0.00	57.29	140360.82
	Mmis	23077.47	4763.55	914.73	84689.09	220071.62	167388.16	232410.49	175011.15	201451.85	1603452.42
	TMISV	25596.41	152334.06	833.18	81644.67	219927.66	167388.16	232395.49	175011.15	201509.14	1743813.24
Others	Xmis	-54634.35	-3452.06	-20323.83	2202.94	2028.81	1342.31	703.76	1732.10	528.73	-6321.13
Net trade mis-invoicing		-1697504.74	178419.25	-194885.19	-101950.21	-30935.11	100350.73	178016.56	111469.95	156084.52	268464.15
Absolute mis-invoicing		1883013.57	478738.45	306587.04	306010.84	600456.51	352773.71	423539.70	449302.36	406755.76	4899144.65

Source: UNCOMTRADE database

5.6. Precious Metals Ores and Concentrates

Zambia's precious minerals sector has a large number of small-scale miners with over 142 issued licences for gemstone mining in 2015 in addition to unregistered ones. Most of the auctions are made abroad and the sector is loosely organised with limited market for informal miners. This provides a fertile ground for capital flight as most of the small sale miners may sell their minerals through informal markets.

Table 8 shows total trade mis-invoicing while Table A3 in the Appendix shows its various components by trading partner. The overall results suggest that while exports were on average over-invoiced during the period 1997 to 2004, trade under-invoicing dominated during the post privatisation era. This suggests that during the latter period, the country recorded capital outflows in the precious minerals sector during this period. The bulk of the capital flight was through German, India, Israel, Korea Republic USA, UK, and the United Arab Emirates. The Highest amount of capital was channelled through India (US\$ 315.65 million) UAE (US\$261 million) USA (US\$238.5 million) among others.

Table 8: Total Trade Mis-Invoicing of Precious Minerals and Gold (US\$ 000)

	1997-2004	2005-2018
Belgium	-3272.6	-15129.1
China	-3153.6	-765.0
Germany	-298.2	25,348.0
Hong Kong, China	-38801.3	18,436.3
India	-71422.2	315,655.3
Israel	-3205.1	6,726.1
Korea, Rep.	-577.3	49,388.9
South Africa	-55986.9	-938,052.9
Switzerland	-14933.5	-77,075.0
United Arab Emirates	-15386.2	261,506.7
United Kingdom	-6170.5	160,511.9
United States	6602.1	238,469.4
Asia	-22732.5	-26764.0
Europe & Central Asia	-9015.6	75751.6
Sub-Sahara	-5402.4	-96433.7
Middle East and North Africa	-685.0	956.1
Others	-2680.8	-11852.3

Source: Compiled by author from UNCTAD database

The country recorded some export over-invoicing to South Africa with a cumulative total of US\$938.05 million and Belgium (US\$15.0 million) in the period 2006 to 2018. This suggests that Zambian exporters may be bringing in unrecorded capital from these countries. This peculiarity of Zambian exports to South Africa requires attention. Most of the precious metals exports are not recorded in the South African database.

6. Conclusion and Policy Implications

The aim of this paper was to document the extent of capital flight through trade mis-invoicing in Zambia's mining sector. The study set to re-examine the extent of capital flight through trade mis-invoicing in Zambia's minerals trade data. Unlike the studies by UNCTAD (2016) that focused on copper industry using world reported data and Ndikumana (2018) who examines the economy wide capital flight, this study also estimated values of mis-invoicing for precious minerals and cobalt that have potential to grow Zambia's export base alongside the copper sector. A number of observations can be made from this study.

The estimates show that trade mis-invoicing costed Zambia up to US\$ 34 billion 2014 constant dollar between 2005 and 2018. This translates to an annual average of US\$900 million dollars per annum through trade mis-invoicing. The mis-invoicing is dominated by export over-invoicing, which though represents capital inflows, deprives the treasury the much-needed resources. Second, the estimates show significant heterogeneity in the extent and nature of trade mis-invoicing by region or country and product. In particular, the trade in copper shows excessive export over-invoicing to the UK, Switzerland and South Africa and export under-invoicing to Asia, (in particular China and India) and Middle East and North Africa (Egypt and United Arab Emirates). However, the cobalt export suggests high levels of export -under-invoicing to the EU and Japan and over-invoicing to South Africa.

The over-invoicing of exports to South Africa is significant and drives the net effect for Cobalt and precious minerals. This peculiar position of South Africa requires a detailed analysis to understand the key drivers of this phenomenon. Like Switzerland, South Africa could be serving as a logistical and trading hub for exports to third party countries that are not recorded in the Zambian database. This begs the need for the country to understand the destination of its exports in order to devise policy options to mitigate capital flight. It is essential for the country to improve the accuracy of its trade data reporting to ascertain the actual destinations of the mineral exports. This is essential for the country to ascertain the true value of its exports.

Further, the misreporting indicating a net inflow of resources in the country may be driven by the obtaining incentive structure of the duty drawbacks and VAT refund. One strategy for Zambia is to minimise these incentives to prevent misreporting of trade flows. In particular, export rebates may be granted to achieve export promotion of NTEs and ensure that verified invoices from trading partners are presented before tax reimbursement.

Secondly, the country may need to harmonise its export valuations, to use the realised prices rather than the LME prices currently being used. The differences in the realised and evaluation prices may contribute to the observed mis-invoicing.

Other observations are that most mines over-invoice their exports, do not declare dividends in preference to re-investing profits to expand operations or pay debt and misreport the value of their capital goods. These elements, in addition to macroeconomic and policy uncertainty, could explain the observed trade mis-invoicing. These relationships require further investigations. Finally, the extent of capital flight in nominal terms increased after

privatisation of the mines. This suggests that private ownership plays an important role in explaining capital flight in Zambia. It is essential to identify and take punitive actions against top mis-invoicers.

Bibliography

Arezki, R., Rota-Graziosi, J. and L. W. Senbet (2014) *Natural resources and capital flight: a role for policy*. AERC Working paper

Barry F. (2014) *Capital Flight, Safe Havens and Secrecy Jurisdictions** African Economic Research Consortium, Working paper

de Boyrie, M. E., Nelson, J. A., & Pak, S. J. (2007). *Capital movement through trade mis-invoicing: the case of Africa*. Journal of Financial Crime, 14(4), 474-489.

Bhagwati, J.; A. Krueger; and C. Wibulswasdi. 1974. "Capital Flight from LDC's: A Statistical Analysis." In *Illegal Transactions in International Trade*, ed. Gerald Epstein, pp. 148-154. Amsterdam: North Holland.

Bhagwati, Jagdish N. (1964) 'On the Under-invoicing of Imports,' Bulletin of the Oxford University Institute of Statistics

Boyce, J. K. and Ndikumana, L. (2014). *Strategies for addressing capital flight*. In S. I. Ajayi and L. Ndikumana (Eds.), *Capital Flight from Africa: Causes, Effects and Policy Issues*. Oxford: Oxford University Press

Boyce, J. K. and Ndikumana, L. (2012). *Capital Flight from Sub-Saharan African Countries: Updates 1970-2010*. PERI Research Report. Amherst, MA: Political Economy Research Institute.

Boyce J. K. and L. Ndikumana, 2001. "Is Africa a Net Creditor? New Estimates of Capital Flight from Severely Indebted Sub-Saharan African Countries, 1970-1996". Journal of Development Studies, 38 (2); 27-56.

Buehn, A., & Eichler, S. (2011). *Trade mis-invoicing: The dark side of world trade*. *The World Economy*, 34(8), 1263-1287

Chang, Kevin P.H. and Robert E. Cumby (1991) 'Capital Flight in Sub-Saharan African Countries,' in Ishrat Husain and John Underwood, eds., *African External Finance in the 1990s*. Washington, DC.: World Bank, 162-187.

Collier Paul, Anke Hoeffler and Catherine Pattilo. 2001. *Flight capital as a portfolio choice*, Washington DC: World Bank, Development Research Group and International Monetary Fund

Fisman, R., & Wei, S. J. (2009). *The smuggling of art, and the art of smuggling: Uncovering the illicit trade in cultural property and antiques*. American Economic Journal: Applied Economics, 1(3), 82-96.

Hermes, Niels and Robert Lensink (1992) 'The Magnitude and Determinants of Capital

Flight: The Case for Six Sub-Saharan African Countries, De Economist 140(4), 515-530.

Jha, R., & Nguyen, T. (2014). *Trade misinvoicing and macroeconomic outcomes in India* (Working Paper No. 31). Canberra: Centre for Applied Macroeconomics Analysis.

Kar, D. and LeBlanc (2013) *Illicit Financial Flows from Developing Countries: 2002-2011*, Washington DC: Global Financial Integrity.

Kar, D., & Spanjers, J. (2015). *Illicit Financial Flows from Developing Countries: 2004-2013*. Global Financial Integrity

Kwaramba M., N. Mahonye and L. Mandishara (2016) *Capital flight and trade mis-invoicing in Zimbabwe*, African development review, Vol. 28, pp 50 -64

Leins, S., Kesselring, R., & Schulz, Y. (2019). *Valueworks: effects of financialization along the copper value chain*. SNIS Working Papers.

Lemi A. (2017) *Catch me if you can: Trade mis-invoicing and capital flight from Ethiopia*, mimeo.

Ljungberg, D. and C. Friedel (2014), '*Does Natural Resource Abundance Cause Capital Flight?*', Stockholm School of Economics Working Paper

Mahmood, Z. (2013). *Reverse capital flight to Pakistan: Analysis of evidence*. *Pakistan Development Review*, 52(1), 1-15.

Mudenda D., M Bulawayo and M. C. Ndulo (2019) *The Financialization of Commodity Markets: The Case of Copper in Zambia* (Mimeo)

Murinde, Victor, Niels Hermes, and Robert Lensink (1996) '*Comparative Aspects of the Magnitude and Determinants of Capital Flight in Six Sub-Saharan African Countries,*' *Saving and Development* XX(1), 61-78.

Ndikumana, L.; Mare (2016): *Capital flight and foreign direct investment in Africa: An investigation of the role of natural resource endowment*, WIDER Working Paper, No. 2016/58, ISBN 978-92-9256-101-7, The United Nations University World Institute for Development Economics Research (UNU-WIDER), Helsinki

Ndikumana, L., J. K. Boyce and A. S. Ndiaye (2015), '*Capital Flight from Africa: Measurement and Drivers,*' in S. I. Ajayi and. Ndikumana (eds.), *Capital Flight from Africa: Causes, Effects and Policy Issues*, Oxford University Press, Oxford.

Ndikumana, L. and Boyce, J. K. (2011b). *Capital Flight from sub-Saharan African Countries: Linkages with External Borrowing and Policy Options*. *International Review of Applied Economics* Vol. 25: No 2, PP 149 — 170

Ndikumana, L., & Boyce, J. K. (2003). *Public debts and private assets: explaining capital flight from Sub-Saharan African countries*. *World Development*, 31(1), 107-130.

Ndikumana L., J. K. Boyce and A. S. Ndiaye (2014) *Capital Flight: Measurement and Drivers*, in Ajayi, S. I. and L. Ndikumana (Eds.) (2014) *Capital Flight from Africa: Causes, Effects and Policy Issues*. Oxford: Oxford University Press

Patnaik, I., A. Shah and A. S. Gupta (2012), '*Determinants of Trade Mis-invoicing*', *Open Economies Review*, Vol. 23, No. 5, pp. 891–910

Qureshu T. M. and Z. Mahmood (2015) *The size of trade mis-invoicing in Pakistan*, MPRA accessed on <https://mpra.ub.uni-muenchen.de/65801/>.

UNCTAD 2016 *Trade Mis-invoicing In Primary Commodities in Developing Countries: The cases of Chile, Côte d'Ivoire, Nigeria, South Africa and Zambia*, Geneva.

UNDP. (2011). *illicit financial flows from the Least Developed Countries: 1990–2008*. New York: UNDP

Yalta A. Yasemin (2010), *Effect of Capital Flight on Investment: Evidence from Emerging Markets*, *Markets Finance & Trade*, Vol. 46, No. 6 (November–December 2010), pp.40-54

ZCCM Investments Holdings Plc (various) *Annual report and financial statements*, <https://www.zccm-ih.com.zm/>

Table A1: Export, Import and Total Trade mis-invoicing US\$ millions at constant 2014 prices (Estimate's at 5%, 10%)

All countries	Exports		Imports		Trade mis-invoicing			
	Diff. Exports (10%)	Diff. Exports (5%)	Diff. imports (10%)	Diff. imports (5%)	Net Diff. Trade (10%)	Net Diff. Trade (5%)	Absolut diff. trade (10%)	Absolut diff. trade (5%)
Year								
1997	-4,550.4	-4,085.2	80.0	86.5	-4,470.4	-3,998.7	4,630.4	4,171.7
1998	-3,810.7	-3,476.3	119.0	119.4	-3,691.7	-3,356.9	3,929.7	3,595.7
1999	-2,542.7	-2,276.6	-41.8	-39.5	-2,584.6	-2,316.1	2,584.6	2,316.1
2000	-1,717.6	-1,520.6	67.3	67.9	-1,650.3	-1,452.7	1,785.0	1,588.5
2001	-1,909.4	-1,730.4	10.4	10.8	-1,899.0	-1,719.6	1,919.9	1,741.3
2002	-1,279.8	-1,141.7	-13.6	-12.5	-1,293.4	-1,154.2	1,293.4	1,154.2
2003	-1,132.6	-1,011.1	39.1	39.4	-1,093.5	-971.7	1,171.7	1,050.5
2004	-324.1	-185.3	35.5	36.0	-288.6	-149.4	359.6	221.3
2005	997.2	1,148.1	38.3	39.2	1,035.5	1,187.3	1,035.5	1,187.3
2006	-2,518.6	-2,186.8	51.9	53.1	-2,466.8	-2,133.7	2,570.5	2,239.9
2007	-2,430.3	-2,079.0	240.8	241.5	-2,189.5	-1,837.4	2,671.2	2,320.5
2008	-2,491.3	-2,132.4	879.0	879.7	-1,612.2	-1,252.8	3,370.3	3,012.1
2009	-1,392.1	-1,122.9	712.4	713.4	-679.7	-409.5	2,104.5	1,836.3
2010	-2,262.6	-1,846.4	1,475.5	1,476.4	-787.1	-370.0	3,738.1	3,322.8
2011	-1,793.5	-1,350.5	1,397.2	1,398.7	-396.3	48.1	3,190.7	2,749.2
2012	-1,394.1	-996.2	1,328.6	1,329.6	-65.5	333.4	2,722.7	2,325.8
2013	-2,422.9	-2,031.9	1,689.3	1,690.0	-733.7	-341.9	4,112.2	3,721.9
2014	-2,779.3	-2,396.8	1,423.0	1,424.0	-1,356.3	-972.8	4,202.4	3,820.9
2015	-1,214.1	-958.3	642.8	643.6	-571.2	-314.7	1,856.9	1,602.0
2017	-595.6	-356.2	733.0	735.2	137.4	379.0	1,328.6	1,091.5
2018	112.7	353.8	796.7	800.9	909.4	1,154.7	909.4	1,154.7
Net TM	-37,451.9	-31,382.8	11,704.6	11,733.3	-25,747.3	-19,649.5	51,487.3	46,223.9
Absolute	39,672	34,387	11,815	11,837	29,912	25,855	51,487	46,224

Table A2: Export Mis-invoicing (Xmis), Import Mis-invoicing (Mmis) and Total Mis-invoicing (TMisv) of Selected Countries Copper (US\$ million) 1997-2018

		1997-2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2017	2018	2005-2018
Kenya	Xmis	-10.8	-2.8	-9.8	-1.8	0.3	-2.8	-2.5	-46.2	-12.6	-0.2	-16.0	-14.5	-0.9	-0.9	-110.7
	Mmis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	TMISV	-10.8	-2.8	-9.8	-1.8	0.3	-2.8	-2.5	-46.2	-12.6	-0.2	-16.0	-14.5	-0.9	-0.9	-110.7
Malaysia	Xmis	53.2	35.7	-42.9	-47.0	1.0	11.6	11.9	12.8	30.8	85.9	25.1	99.4	8.7	5.9	239.0
	Mmis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	TMISV	53.2	35.7	-42.9	-47.0	1.0	11.6	11.9	12.8	30.8	85.9	25.1	99.4	8.7	5.9	239.0
Thailand	Xmis	231.5	91.7	-39.7	-51.5	22.1	0.1	38.9	40.0	45.2	49.6	89.6	113.1	103.0	45.8	547.7
	Mmis	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	TMISV	231.5	91.7	-39.7	-51.5	22.1	0.1	38.9	40.0	45.2	49.6	89.6	113.1	103.0	45.8	547.7
Zimbabwe	Xmis	-14.2	495.1	11.5	3.8	0.6	2.0	5.2	4.9	8.5	-29.3	1.8	0.0	2.1	-2.1	504.2
	Mmis	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.3
	TMISV	-14.1	495.2	11.5	3.8	0.6	2.0	5.3	4.9	8.5	-29.3	1.8	0.1	2.1	-2.1	504.5
Europe & Cent Asia	Xmis	105.0	-12.1	254.0	302.2	263.6	85.9	-27.8	362.8	183.2	204.1	162.0	303.3	180.7	210.1	2471.9
	Mmis	0.6	0.1	-8.3	0.4	0.0	0.0	0.2	-1.9	-0.4	-0.2	-0.7	-0.1	-0.1	-0.2	-11.2
	TMISV	105.6	-11.9	245.7	302.5	263.6	85.9	-27.6	360.9	182.8	203.9	161.3	303.2	180.5	209.8	2460.6
Sub-Saharan Africa	Xmis	-4.9	-8.3	-18.8	-34.7	-7.1	26.5	63.7	54.1	92.5	119.2	-1.5	124.5	293.2	1124.4	1827.9
	Mmis	10.4	16.1	27.1	125.3	529.6	371.4	858.1	1014.1	951.4	1436.0	1217.4	426.8	852.6	1076.4	8902.4
	TMISV	5.5	7.9	8.4	90.6	522.6	397.9	921.8	1068.2	1043.9	1555.2	1215.9	551.3	1145.8	2200.8	10730.2
East Asia & Pacific	Xmis	-41.8	24.8	-17.8	3.3	32.5	11.2	33.5	25.7	41.7	41.4	-369.9	-273.1	-130.7	-114.5	-691.7
	Mmis	0.0	0.0	0.3	0.0	0.0	0.0	-0.1	0.0	1.8	0.0	3.1	2.0	0.1	0.1	7.4
	TMISV	-41.8	24.8	-17.4	3.3	32.5	11.2	33.4	25.7	43.6	41.4	-366.8	-271.1	-130.6	-114.4	-684.3
Middle East & North Africa	Xmis	398.7	158.7	236.2	255.0	482.2	128.6	446.2	464.3	354.5	193.9	257.3	295.2	190.8	124.1	3587.2
	Mmis	0.0	0.0	-0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.6	0.0	0.0	1.5
	TMISV	398.7	158.7	236.2	255.0	482.2	128.6	446.2	464.3	354.5	193.9	257.3	296.8	190.8	124.1	3588.7
Others	Xmis	198.1	29.7	64.1	128.6	79.6	67.1	185.9	39.0	147.7	82.1	83.3	160.8	-10.8	-138.9	918.1
	Mmis	0.2	-0.1	0.1	0.1	-0.2	0.0	0.1	0.0	0.0	0.0	0.0	9.6	0.0	0.1	9.8
	TMISV	198.4	29.6	64.2	128.7	79.5	67.1	186.0	39.0	147.7	82.1	83.3	170.3	-10.8	-138.9	927.9
Net		-2393.4	191.2	1276.9	-1284.4	1053.1	-444.7	-742.3	-465.8	143.3	-703.7	1564.6	-907.5	-119.9	784.4	-7444.6
Absolute		5337.9	2274.4	3082.8	4115.7	5085.6	4196.8	7812.2	10422.6	9373.3	8579.3	7897.5	9047.3	11,692.1	90,097.9	

Table A3: Export Mis-invoicing (Xmis), Import Mis-invoicing (Mmis) and Total Mis-invoicing (TMisv) of Selected Countries Precious Minerals (US\$ Mn) 1997-2018

		1997-2004	2005	2006	2008	2010	2011	2012	2013	2015	2017	2018	2005-2018
Belgium	Xmis	-2027.3	-2205.5	-2101.4	-2208.8	-2211.0	-2211.7	-2213.2	-1037.4	434.4	-2217.2	-2026.8	-15145.7
	Mmis	-1245.3	0.0	0.0	0.0	2.8	-1.2	10.0	12.8	0.0	-8.0	0.0	16.5
	TMISV	-3272.6	-2205.5	-2101.4	-2208.8	-2208.2	-2212.9	-2203.2	-1024.6	434.4	-2225.2	-2026.8	-15129.1
China	Xmis	-3244.8	-1805.1	-1187.8	-155.1	-80.1	90.2	-357.5	-1391.7	-902.4	2097.1	2351.2	-16.8
	Mmis	91.2	-10.7	-3.3	-106.9	-42.5	13.1	77.6	179.2	106.6	99.8	-187.6	-748.1
	TMISV	-3153.6	-1815.7	-1191.1	-262.0	-122.5	103.4	-279.8	-1212.5	-795.8	2196.8	2163.6	-765.0
Germany	Xmis	-89.8	68.9	10.9	-24.9	2971.3	991.9	2605.7	2573.2	2279.8	4832.7	6710.4	25028.7
	Mmis	-208.4	0.0	-4.4	0.0	0.5	7.7	11.8	202.3	-35.0	290.3	-10.4	319.3
	TMISV	-298.2	68.9	6.5	-24.9	2971.8	999.6	2617.5	2775.5	2244.8	5122.9	6700.1	25348.0
Hong Kong,	Xmis	-38958.7	1538.7	995.7	54.7	-1097.9	-640.1	158.6	-9816.2	6438.1	12836.6	7986.4	18433.6
	Mmis	157.4	0.6	-9.5	2.3	11.5	9.3	3.3	10.4	10.0	-75.8	15.7	2.7
	TMISV	-38801.3	1539.4	986.2	56.9	-1086.3	-630.8	161.9	-9805.8	6448.1	12760.8	8002.1	18436.3
India	Xmis	-68488.1	305.9	-5147.4	-9554.7	-1157.7	4137.6	-3315.5	-1442.6	21983.0	111185.4	200146.0	332317.7
	Mmis	-2934.1	-95.4	-395.1	-162.0	-595.9	-492.1	-4050.4	-150.4	-773.7	-7846.4	-290.5	-16662.4
	TMISV	-71422.2	210.5	-5542.5	-9716.7	-1753.6	3645.5	-7366.0	-1593.0	21209.3	103338.9	199855.5	315655.3
Israel	Xmis	-2519.8	777.2	1200.3	895.5	1420.3	820.4	2266.2	29.5	-467.9	-145.9	79.0	9004.0
	Mmis	-685.3	-227.7	0.0	-106.7	0.0	-78.1	0.0	0.0	1.2	-1085.4	0.0	-2277.9
	TMISV	-3205.1	549.5	1200.3	788.8	1420.3	742.3	2266.2	29.5	-466.7	-1231.4	79.0	6726.1
Korea, Rep.	Xmis	-516.1	-5.3	-80.1	-378.3	42.5	121.7	11.7	14.8	18959.0	10010.0	19682.5	49471.4
	Mmis	-61.2	0.0	0.0	-17.1	-15.2	-4.4	-2.5	0.0	-0.1	0.0	0.0	-82.5
	TMISV	-577.3	-5.3	-80.1	-395.3	27.2	117.3	9.2	14.8	18958.9	10010.0	19682.5	49388.9
South Africa	Xmis	-56069.8	-290.7	-79.0	-102.0	-48930.2	89417.9	-152100.2	179615.0	102310.9	104754.2	-103395.1	-937835.2
	Mmis	82.9	-69.2	72.1	-0.2	76.2	88.3	-4.4	-88.2	81.8	-153.2	-233.9	-217.7
	TMISV	-55986.9	-360.0	-6.9	-102.2	-48854.0	89329.6	-152104.6	179703.2	102229.1	104907.4	-103629.0	-938052.9
Switzerland	Xmis	-14921.6	-130.7	-135.8	20856.3	-2738.9	-30.8	2355.2	2450.9	-38631.7	7921.0	-4241.8	-77058.5
	Mmis	-11.9	0.2	-17.6	0.0	0.0	-26.6	0.1	-0.4	30.7	0.0	0.0	-16.5
	TMISV	-14933.5	-130.5	-153.4	20856.3	-2738.9	-57.4	2355.3	2450.5	-38601.0	7921.0	-4241.9	-77075.0
United Arab	Xmis	-16041.3	16446.0	24851.8	12047.9	18476.2	3078.2	15816.3	31949.5	29093.2	16290.3	60656.9	261545.3
	Mmis	655.2	16.2	13.2	23.4	-164.0	31.1	-17.0	-1.3	1.2	3.6	3.8	-38.6
	TMISV	-15386.2	16462.2	24865.1	12071.3	18312.2	3109.3	15799.3	31948.3	29094.4	16293.9	60660.6	261506.7
United Kingdom	Xmis	-5166.1	891.7	280.5	15490.2	91.2	20698.3	38641.5	21377.9	12221.2	1066.9	911.0	162931.2
	Mmis	-1004.4	80.8	-120.5	-122.3	-1054.9	-1998.5	202.5	-146.6	556.4	-8.1	155.0	-2419.3
	TMISV	-6170.5	972.6	160.0	15367.9	-963.8	18699.7	38844.0	21231.3	12777.7	1058.8	1066.0	160511.9
United States	Xmis	6916.4	267.8	879.9	3983.2	4904.3	6721.0	28756.4	17414.2	35548.6	44115.5	58824.6	238093.5
	Mmis	-314.3	1.6	8.8	10.0	-170.1	-15.7	-20.6	-11.1	0.4	13.0	380.3	375.9
	TMISV	6602.1	269.4	888.7	3993.1	4734.1	6705.3	28735.8	17403.1	35549.0	44128.5	59204.9	238469.4
Asia	Xmis	-22687.0	9.7	-11.7	-345.2	-40.4	15893.2	-32075.8	-33837.2	-36236.4	58739.8	54368.1	-27453.0

		1997-2004	2005	2006	2008	2010	2011	2012	2013	2015	2017	2018	2005-2018
	Mmis	-45.5	1.9	7.6	-5.5	21.4	14.2	-17.8	-29.9	-182.4	1473.4	-479.0	689.1
	TMISV	-22732.5	11.7	-4.1	-350.7	-19.0	15879.0	-32093.7	-33867.1	-36418.8	60213.1	53889.1	-26764.0
Europe & Central Asia	Xmis	-8953.5	0.4	117.7	2576.4	5673.0	8607.2	4187.8	6662.4	5302.0	17364.2	11581.9	78256.2
	Mmis	-62.1	-14.6	-13.0	-38.7	6.2	-38.0	-5.0	21.7	-1256.4	-1124.8	-39.9	-2504.7
	TMISV	-9015.6	-14.2	104.6	2537.7	5679.2	8569.2	4182.8	6684.1	4045.6	16239.4	11542.0	75751.6
Sub-Sahara	Xmis	-5568.2	2032.3	-32.3	-9.6	-40.5	-25.6	-58468.3	-30444.0	-87.2	-15.1	59.2	-92359.1
	Mmis	165.8	-128.0	-9.9	-27.6	-4191.9	89.0	34.0	45.4	66.7	73.4	-12.3	-4074.6
	TMISV	-5402.4	1904.3	-42.2	-37.2	-4232.3	63.5	-58434.3	-30398.6	-20.5	58.3	46.9	-96433.7
Mi East and N. Afr	Xmis	-697.6	-3.8	-0.6	-1.0	40.7	-0.2	88.2	252.4	313.1	-367.4	54.8	925.2
	Mmis	12.6	0.0	0.0	12.1	-0.6	-1.5	-5.3	-4.6	-2.3	-0.6	0.0	30.8
	TMISV	-685.0	-3.8	-0.6	11.1	40.1	-1.7	82.9	247.8	310.8	-368.0	54.8	956.1
Others	Xmis	-2392.3	-13.1	-672.5	-308.4	-26.3	13413.9	301.6	495.8	1117.0	224.3	843.9	-11795.9
	Mmis	-288.5	0.0	-9.2	-0.3	-16.2	0.0	0.0	-14.8	2.5	-4.1	2.3	-56.3
	TMISV	-2680.8	-13.1	-681.7	-308.6	-42.5	13413.9	301.7	481.0	1119.5	220.2	846.2	-11852.3
Net Mis-invoicing		-	-	-	-	-	-	-	-	-	-	-	-
		285922.7	18979.6	19393.5	620.9	-29922.6	79401.1	-156963.1	184144.7	-39891.3	183591.7	321897.8	5114.7

Table A4: Zambia Report of Copper Export Destinations

Partners	2002	2005	2008	2010	2015	2017	2018
Switzerland	5.4	40.7	60.4	62.2	58.0	57.0	55.0
China	0.0	1.3	6.2	22.9	19.1	20.7	17.9
South Africa	23.1	23.2	9.9	5.6	3.6	1.5	2.2
United Kingdom	59.8	19.7	2.2	1.9	0.3	1.0	2.4
United Arab Emirates	0.0	0.0	0.5	3.1	0.4	2.8	2.4
India	0.0	0.8	0.1	0.0	0.0	1.7	1.4
Tanzania	9.8	7.6	0.3	0.2	0.4	0.3	0.4
Hong Kong, China	0.1	0.1	0.0	0.0	1.9	2.2	1.9
Japan	0.0	0.0	0.0	0.1	1.6	0.5	0.4
Luxembourg	0.0	0.0	0.0	0.6	0.1	0.8	1.1
Kenya	0.7	1.0	0.5	0.4	0.3	0.2	0.2
Zimbabwe	0.6	0.2	0.0	0.0	0.0	0.0	0.1
Other African	0.2	0.9	9.9	1.1	0.7	0.2	0.2
European	0.0	4.3	1.2	0.6	0.0	0.0	0.0
Asian	0.0	0.0	4.7	0.4	9.8	7.5	9.8
Other	0.1	0.0	4.1	1.0	3.8	3.6	4.7
Total	100	100	100	100	100	100	100
Value (US\$' Mn)	502.8	1,083.2	3,967.3	5,656.1	5,179.8	6,163.8	6,809.4

Table 9: Mirror Statistics of Copper Export Destinations

Country	2002	2005	2008	2010	2015	2017
China	6.2	13.5	14.1	50.6	36.1	49.8
United Arab Emirates	0.0	0.0	2.7	12.0	15.9	7.6
Korea, Rep.	1.3	16.4	9.7	7.8	7.1	3.0
Saudi Arabia	44.1	10.5	21.0	8.6	5.6	1.4
India	0.0	1.0	3.7	0.6	8.2	14.3
Egypt, Arab Rep.	0.0	0.0	20.0	4.4	2.6	3.0
South Africa	6.4	8.5	6.9	3.5	2.0	1.5
Namibia	0.0	0.0	0.0	1.4	3.4	5.2
Italy	1.6	2.4	8.3	0.6	4.2	1.0
Thailand	21.7	6.0	4.4	0.9	3.1	0.0
Malaysia	3.9	2.4	0.4	0.2	2.2	0.2
Zimbabwe	0.0	32.8	0.0	0.1	0.0	0.0
Pakistan	0.0	1.4	1.7	0.5	1.2	0.3
Japan	12.0	1.0	0.3	0.0	0.0	2.4
Other	0.6	0.2	1.1	2.0	3.7	4.0

Country	2002	2005	2008	2010	2015	2017
Asian	0.1	2.0	2.3	3.9	3.3	3.8
Other African	1.3	0.7	0.8	0.6	0.2	0.3
European	0.4	0.2	2.0	0.4	2.7	3.1
Singapore	0.5	0.3	0.0	1.1	0.5	0.5
United Kingdom	0.0	0.5	0.0	0.4	0.0	0.2
Tanzania	0.0	0.1	0.5	0.2	0.2	0.1
Total	100	100	100	100	100	100
Total US\$ Million)	307.98	1,516.25	2,999.25	4,802.17	4,451.51	5,718.07

Figure A1 Destination of Zambian Minerals and Metals by Income Group



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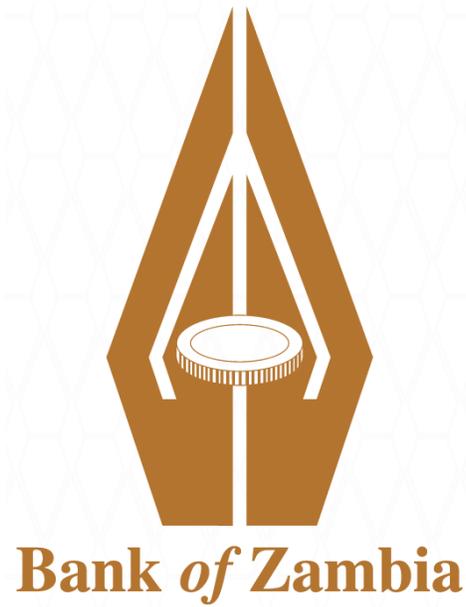
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