Chamber of Mines of Zambia

ICMM
International Council
on Mining & Metals

Report

Enhancing mining's contribution to the Zambian economy and society

Mining: Partnerships for Development
April 2014

Foreword

Commercial-scale mining has taken place in Zambia for around 100 years, and is confidently expected to continue for many years to come. Industry has gone from private ownership in the early years, through a period of nationalization, and most recently back into private hands.

As a result of the recent privatization, in excess of US$8 billion has been invested by the new owners. Some of this has been necessary to refurbish and modernize the infrastructure and operations of the 'legacy' mines on the Copperbelt, but most has been invested in new or expanded operations. This has been most noticeable in the Northwest Province, dubbed 'the New Copperbelt'. Resulting from this investment, annual finished production has risen from a low of 257,000 metric tonnes per annum to over 700,000 metric tonnes in 2013. The total is confidently predicted to rise to over 1 million metric tonnes in the next couple of years and towards 1.5 million metric tonnes within 5–10 years.
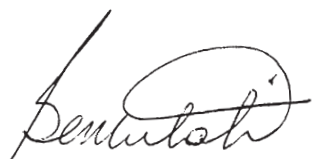
Official statistics demonstrate conclusively that the overall contribution to government revenues has steadily increased over recent years, as capital allowances from the new investments have expired.

The new investments have also resulted in an increase in employment opportunities, and a reduction in poverty levels, especially in the Copperbelt and Northwestern Provinces.

All the mining companies put a lot of effort and funding into their corporate social investment activities. This takes many forms, and some aremore effective than others. One strong recommendation from the study is that better liaison between the companies, and also with local government and the communities involved would be beneficial and enhance the overall effect of this investment.

The country has great exploration potential, not only for copper, but for other minerals as well. This is evidenced by the flurry of activity in most parts of the country and also the number of international companies engaged in prospecting activities. It is critical for the continuous inflow of foreign direct investment in the mining sector that the country retains an attractive and stable fiscal regime.

The Chamber wishes to take this opportunity to thank the ICMM and OPM teams for the professional and objective manner in which they have undertaken the research, data collection, analyses and the contents of this study. We believe it goes a long way towards the goal embodied in the title – "Enhancing mining's contribution to the Zambian economy and society".

Emmanuel B. Mutati
President, Chamber of Mines of Zambia

The number of mineral-driven countries is increasing but many of these countries have tended to underperform in terms of economic and social development outcomes. As such, resource-driven countries need a new model – one that captures the full potential shared value that mining investments can bring, and transforms this value into long-term broad-based development and prosperity.

Through the application of the Mining: Partnerships for Development (MPD) Toolkit, ICMM has helped members and others to achieve a broader understanding of the policies and practices that help or hinder host countries and communities to benefit from mining. We know that mining investments can and do drive economic growth and reduce poverty nationally and locally. However, the development benefits from mining are not automatic and companies alone cannot unlock these – governance is key and multi-stakeholder partnerships can help fill capacity gaps. Establishing a system of mineral governance that contributes most effectively to maximizing the sustainable longer-term benefits of mining for the host country is essential to achieving these benefits.

One example where mining's contribution could be enhanced through building collaborative solutions for Zambia is by maximizing local content. Economic diversification via capturing all viable upstream, downstream, side-stream and lateral linkages from the mining value chain is an important opportunity that is presented by large-scale mining investment, and one that is clearly highlighted in the African Mining Vision. Analysis in this report (see sections 4.1 and 7.2) indicates that a tripling of the proportion of inputs currently manufactured locally would add some US$160 million to local suppliers' turnover, of which between a third and half would be value added in Zambia. This would be significant at the local level and would result in more than 15,000 new jobs.

Along with the earlier studies, this report demonstrates that with the right conditions in place, mining makes a positive contribution to sustainable development. We hope that through reading this study others will be motivated to apply the toolkit in other mineral-rich countries.

R. Anthony Hodge
President, ICMM

Executive summary

About Mining: Partnerships for Development

ICMM's Mining: Partnerships for Development initiative focuses on enhancing mining's economic and social contribution. It supports the formal commitment made by ICMM member companies to actively support or help foster multi-stakeholder development-focused partnerships in countries where they are active.

Mining is economically critical for millions of the world's poorest people with some 50 countries being significantly dependent on mining. Yet mineral wealth does not always mean positive economic growth – the so-called "resource curse" theory.

In 2004, ICMM began the Resource Endowment initiative in collaboration with UNCTAD and the World Bank Group. It developed a substantial body of research on why some countries have avoided the "resource curse" and developed practical actions for companies, governments and civil society. It was overseen by an independent international advisory group including the Head of the UN Global Compact and a former Prime Minister of Senegal.

The Resource Endowment initiative showed that the "resource curse" is not inevitable. Mining investments can drive economic growth and reduce poverty nationally and locally. However, companies alone cannot unlock the development benefits from mining – governance is key and multi-stakeholder partnerships can help fill capacity gaps. The findings were based on the application of ICMM's *Resource Endowment Toolkit* (April 2006) in four countries – Chile, Ghana, Peru and Tanzania.

The toolkit has been now been revised, extended and re-published as the *Mining: Partnerships for Development Toolkit*. It responds to a clear need in different parts of the world for a more systematic and objective way to quantify and agree ways to enhance mining's economic and social contribution.

It is currently being applied in a number of countries and can be used by mine managers and those interested in promoting economic and social development (host governments, development agencies and development-focused NGOs).

For more information, visit www.icmm.com/mpd or email us at info@icmm.com.

About this report

The purpose of the report is to provide an independent, objective and comprehensive evidence base regarding mining's past, present and possible future contributions to the Zambian economy and society.

The report assesses the economic and social contributions of mining in Zambia, and explores how these might be enhanced. This report is the first independent study to look comprehensively at both the national and local aspects of mining's contribution to Zambia; it does this by presenting the findings of an application of the MPD Toolkit to Zambia commissioned by the International Council on Mining and Metals (ICMM). The work has been supported by the Chamber of Mines of Zambia, but has been conducted independently by Oxford Policy Management (OPM).

The report is presented in seven chapters:

- **Chapter 1:** Context: Zambian economy and society
- **Chapter 2:** Context: the mining industry in Zambia
- **Chapter 3:** Macroeconomic contributions of mining
- **Chapter 4:** Local-level contributions of mining
- **Chapter 5:** Mining provinces and districts: economic and social outcomes
- **Chapter 6:** Governance
- **Chapter 7:** Policy implications of the key findings.

Chapter 1: Context: Zambian economy and society

The Zambian economy has grown by between 5 and 7 per cent a year since 2004. The resurgence of mining investment and output, supported by a favourable world price for copper, has supported sustained economic growth. By 2011, Zambia was reclassified as a lower-middle-income country by the World Bank, a status it had lost in the 1980s.

Despite such economic progress, Zambia's social performance has been less impressive. Zambia remains one of the least developed countries in Africa, ranking 164 out of 187 countries on the Human Development Index (HDI). Poverty and inequality remain high, with almost two-thirds of people living below the international poverty line. The country's Gini coefficient (a measure of inequality) is one of the highest in Africa. Even in mining areas that have enjoyed good growth there is major disquiet about various aspects of mining's contribution to economic and social conditions.

Attempts to strengthen economic management and governance have had mixed results. On the Worldwide Governance Indicators (WGI), areas of governance such as political stability have improved but others such as regulatory quality have deteriorated. Zambia ranks almost last out of 100 countries on the Open Budget Index (OBI), indicating that citizens have little information available to hold government to account for the delivery of public services.

Governance arrangements in Zambia have contributed to this mixed performance. The political-administrative system remains highly centralized and power is exercised from the top down. Little fiscal decentralization has taken place and Zambia's direct funding to local authorities remains low compared to other countries in the region. This has resulted in district councils that are underfunded and lack capacity to deliver public services. In addition, public spending has largely been absorbed by recurrent expenditure rather than by investment.

Chapter 2: Context: the mining industry in Zambia

History of mine ownership in Zambia

Mining has taken place in Zambia for almost a century and remains the country's dominant industry. The ownership of mines has undergone a sequence of radical changes. Initially a private industry under the colonial administration, the mining industry was nationalized in the early 1970s, with the creation of the state-owned Zambian Consolidated Copper Mines (ZCCM). In addition to managing the portfolio of mining operations, ZCCM became responsible for the provision of a wide range of social services and public goods for mine workers and their communities.

The nationalization of the sector took place as copper prices entered a slump in the 1970s and 1980s. ZCCM was squeezed by falling income and the costs of expanding social responsibilities. A combination of low prices and lack of capital to invest resulted in production of copper falling to less than 40 per cent of that produced at the start of the period. ZCCM's operations became increasingly unprofitable.

To attract the foreign investment needed to recapitalize the mines, the industry was reprivatized in the late 1990s. The opening up of the sector to foreign investment, combined with a resurgence in copper prices shortly following privatization, supported a boom in new investment. This enabled mineral production to rebound to levels last seen in the early 1970s. Although the mines are now operated by private companies, ZCCM Investments Holdings (ZCCM-IH) maintains an equity stake of between 10 and 20 per cent in most large mines.

Mining sector administration and the fiscal regime

Bilateral development agreements (DAs) were entered into by the Zambian Government with each company at privatization. However, these were revoked in 2008 and all mining companies now operate under a common legislative framework. Mineral sector legislation and the fiscal regime have changed in recent years. The fiscal regime has been altered several times to increase some mineral taxes and royalties. This has increased commercial risks for mining companies in Zambia.

Zambia's mining sector today

The Copperbelt is the traditional centre for mining in Zambia, hosting most of Zambia's copper mines, including those formerly run by ZCCM. North-Western Province is referred to as the "New Copperbelt" as a result of the large mining investments that have taken place over the last decade.

This study focuses its local-level work on a sample of four mining operations in Zambia: Konkola Copper Mines (KCM) and Mopani Copper Mines (Mopani) from the Copperbelt, and FQM Kansanshi mine (Kansanshi) and Barrick Lumwana (Lumwana) mine from North-Western Province. This sample comprises the four largest mining companies in Zambia, which together account for 70 per cent of current copper production.

Zambia's older mines in the Copperbelt are characterized by high costs and low productivity. Challenges include high transportation costs, labour costs, input costs and electricity charges. This high-cost environment renders the mines – and the contributions they provide – vulnerable to changes in economic circumstances.

"This study focuses its local-level work on a sample of four mining operations in Zambia: Konkola Copper Mines and Mopani Copper Mines from the Copperbelt, and FQM Kansanshi mine and Barrick Lumwana mine from North-Western Province."

Chapter 3: Macroeconomic contributions of mining

Current macroeconomic contributions

Zambia is still highly dependent on mining as its major productive industry. Zambia broadly conforms to the inverted pyramid pattern of macroeconomic contributions seen in earlier applications of the MPD Toolkit in other countries – very high contributions in some macro areas (notably exports and investment) but progressively lower contributions in other areas such as government revenues, GDP and employment (see Figure 1).

Foreign direct investment (FDI)

Since the early 2000s, mining investment has boomed, with over US$10 billion in FDI since privatization. FDI flows have been dominated by mining: in 2011, new FDI into mining accounted for 86.2 per cent of total FDI.

Exports

Copper mining accounts for over 80 per cent of export earnings. This is a high share even in comparison to other mineral-driven countries. Many decades of official statements of intent and policies intended to diversify the economy have met with limited success.

Balance of payments

Within the overall balance of payments, copper export earnings are partly offset by foreign exchange outflows, including imports of specialized capital equipment, debt repayments and profit repatriations. Allegations exist of additional (illicit) outward payments through transfer mispricing, but there appears to be limited evidence for this (see Annex C). Even after accounting for these outflows, the overall impacts from mining on the balance of payments and foreign reserve position of Zambia are large and positive.

Figure 1: The national contributions of mining (2012)

	Typical share in low- and middle-income mineral-driven countries	Zambia
FOREIGN DIRECT INVESTMENT	60%–90%	86%
EXPORTS	30%–60%	80%
GOVERNMENT REVENUE	3%–20%	>25%
GROSS DOMESTIC PRODUCT	3%–10%	>12%
DIRECT EMPLOYMENT	1%	1.7%
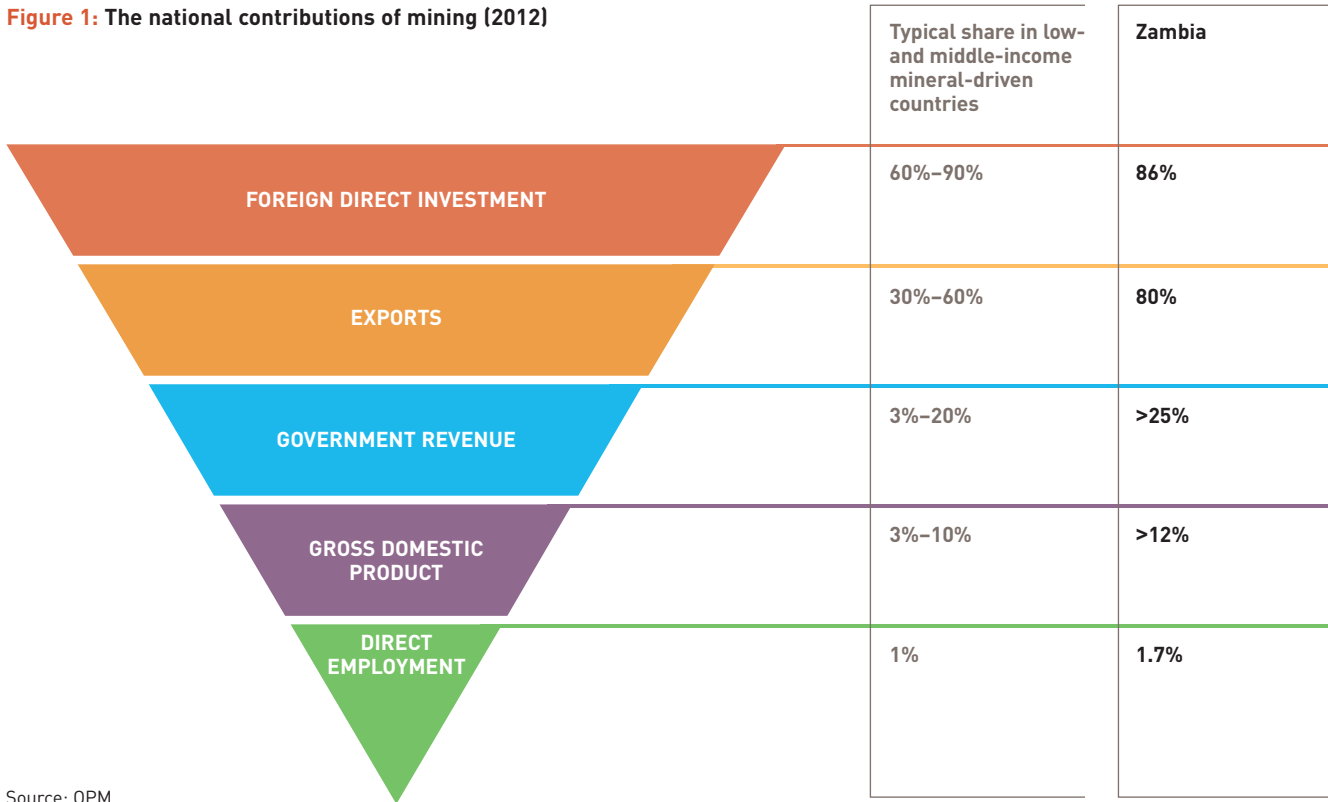
Source: OPM.

Government revenues

Government revenues collected from mining have increased sharply in recent years to over 30 per cent of total tax revenues, according to official Zambia Revenue Authority (ZRA) data. Government revenues from mining were low (around 16 per cent of total tax revenues) until around 2008 but subsequently increased sharply (see Table 1). The total level of tax collections from mining today is higher than that seen in most other mineral-driven countries.

GDP

The contribution of mining to GDP (national income) is less clear. Our unofficial estimate is that mining's contribution to Zambian GDP is at least 12 per cent. The official Central Statistical Office (CSO) data shows a divergence between constant and current price estimates of mining's contribution to GDP since 1994, which is the most recent base year for estimates of constant price GDP. This is a statistical aberration (see Annex G for a fuller explanation) that will be corrected once the CSO has finalized its work rebasing all the GDP numbers to a base year that uses 2010 prices.

Employment

The employment contribution of mining is the smallest of the direct macro contributions but still large in absolute terms. The absolute numbers of jobs in mining have increased substantially in response to higher levels of investment and production. The preliminary results of the national Labour Force Survey for 2012 (Central Statistical Office 2013a) show total formal employment in mining in 2012 of over 90,000. This represents about 1.7 per cent of the labour force, 8.3 per cent of total formal sector jobs and around 25 per cent of total private sector formal jobs in 2012.

Future prospects

Analysis of forward-looking data from the four mining companies to 2022 confirms that Zambia is in the midst of a mining investment boom. The four mining companies in our sample will have invested a further US$5.8 billion during 2011–14, after which the projected investment profile gradually falls.[1] This new investment is expected to increase production volumes from 600,000 metric tonnes in 2010 to 964,000 metric tonnes at the four mining companies by 2016.

Tax contributions from the mining sector are poised to increase. Total tax payments for these four mining companies are expected to more than double by 2016 to reach roughly US$1.7 billion (compared to US$686 million in 2010).

The investments in productive capacity are associated with significantly increased labour productivity – especially at the older mines in the Copperbelt. The average production per staff member at Mopani and KCM is projected to double, from 15 metric tonnes to 31 metric tonnes, over the period to 2022.

As the industry shifts to a higher-productivity cost structure, this is expected to result in a more highly skilled (and highly paid) labour force, with a lower number of total employees. Thus, the total wage bill will remain largely constant, preserving the opportunities from induced employment as these salaries are spent in the local economy. In addition, there is scope to increase opportunities for job creation through stronger economic linkages from mining.

Table 1: Mining taxes as a share of GDP (2008 and 2012)

Year	GDP (Kw billion)	Total taxes collected (Kw billion)	Mining taxes collected (Kw billion)	Mining taxes (% GDP)	Mining taxes (% total tax)
2008	54,839	9,670	1,541	2.81%	16%
2012	111,049	20,723	6,619	5.96%	32%

Source: ZRA.
Note: the Kwacha billion figures used are for un-rebased Kwacha.

1   This is in large part because these numbers only reflect currently approved investment spending – it is quite reasonable to assume that mines will continue to invest, unless there is a sharp deterioration in the business environment.

Chapter 4: Local-level contributions of mining

The report documents the contributions of the four mining companies (Konkola Copper Mines, Mopani Copper Mines, FQM Kansanshi and Barrick Lumwana) in their local areas in a number of dimensions. These contributions occur as a result of the commercial activities carried out by mining companies (eg employing and training people, and procurement of goods and services) as well as from the social investment activities mining companies undertake in surrounding communities.

Mining's impact on local development – mining companies' commercial activities

Employment

Mining has played a vital role in generating jobs in and around mining districts. Almost all (98–99 per cent) of the direct employees at the four mining companies are Zambian. Formal sector employment is higher in mining districts than the national average (dramatically so in the Copperbelt). Real monthly income per person has grown faster in the two mining provinces than the national average.

The indirect and induced jobs associated with mining are significant contributors to local welfare. Multiplier calculations indicate that "indirect" job creation (via spending on local supplies) and "induced" employment (through mining employees spending their relatively high average incomes) together increase the total employment attributable to mining by a factor of between two and four; that is, for each direct job with a mining company or an on-site contractor, two to four additional jobs are created elsewhere in the economy.

Human capital development

The four mining companies invest in technical training, managerial training, scholarships, and apprenticeships for employees and contractors, and indirectly support human capital development by providing support to trade schools. Such initiatives help to address labour force skills gaps. Data provided by three of the mining companies indicates that together they spent over US$5 million on training in 2012. Many of those who receive training or additional qualifications through these routes would not otherwise have had access to these skills or qualifications.

Local procurement

The four mining companies procure an estimated US$3 billion of goods and services each year. Almost all services are procured from Zambian businesses and provided by Zambian nationals. Although the majority of goods are procured from Zambian businesses, very few of these goods are actually manufactured in Zambia. Most are supplied by local agents or subsidiaries of foreign companies that import goods from elsewhere.[2]

The actual manufacturing part of the Zambian mining supply industry has faced declining competitiveness and is currently faced with high costs (for labour, inputs, taxes and land), difficult access to credit and high interest rates, which significantly reduces competitiveness.

Some mining companies have recently put supplier development programs in place and are devoting resources to the nurturing of local suppliers. However, there is a limit to what mining companies can do in the absence of a supportive regulatory environment that places emphasis on enhancing competitiveness and avoiding protectionism.

Mining's impact on local development – social investment

In 2012, the four mining companies spent just under US$70 million on social investment. More than 200 community development programs around mine sites were identified, and well over 80 per cent of these have been initiated or implemented by mining companies. The largest proportion of spending was on health (43 per cent), followed by infrastructure (24 per cent). However, the allocations across functional areas differ between provinces: North-Western Province mining companies spend the majority of their social investment on infrastructure, while in the Copperbelt the majority is spent on health. There are some mandatory obligations for those Copperbelt mining companies that took over pre-existing ZCCM "social assets"[3] at privatization. These mining companies are responsible for running several hospitals, schools and health clinics.

2 The government has reached similar conclusions in its own ongoing assessment of this problem (supported by the World Bank, the UK Department for International Development (DFID) and other donors).

3 This was the term used in DAs for health, education and other infrastructure that was to be transferred and operated by the privatized mines.

The level of social investment spending of mining companies in Zambia is high in comparison with other countries where the toolkit has been applied. Social investment contributions from mining companies in the Copperbelt are large, representing between 10 and 16 per cent of pre-tax profits, that is between five and eight times more than found in other toolkit case studies. However, as recent surveys have shown, there is nonetheless widespread mistrust and, in several cases, open hostility towards mining companies. This paradox is addressed in the report and some partial explanations are offered.

Focus group discussions, stakeholder interviews and company-level data indicate that there are a variety of responses to the various social investments that are provided. There is criticism of some approaches – especially narrow social investment approaches imposed in a non-consultative and ad hoc manner. The specific approaches to social investment planning and implementation can have important effects on both outcomes and community perceptions. Approaches that appear to have been more successful have three characteristics:

- Consultation and engagement: bottom-up approaches that consult and engage with communities and with local government have had the greatest chance of success.

- Holistic approaches: programs that aim to address a wider range of interlinked issues faced by communities have shown greater success.

- Programs that are aligned with government activities and implemented in partnership with a range of stakeholders (NGOs, government and communities) have been more effective than those carried out without such alignment.

"Social investment contributions from mining companies in the Copperbelt are large, representing between 10 and 16 per cent of pre-tax profits, that is between five and eight times more than found in other toolkit case studies."

Chapter 5: Mining provinces and districts: economic and social outcomes

Assessing trends in mining provinces and districts
There are large differences in the level of development between the Copperbelt and North-Western Province. The Copperbelt is the province with the best HDI score. By contrast, human development indicators for North-Western Province show that it remains one of the poorest and least developed parts of Zambia, even after several years of new mining investment. Despite the large and long-standing differences between the two provinces, both have experienced faster growth in real per capita income and larger reductions in poverty than the country as a whole in the period of copper's resurgence since 2000.

Differences can also be seen within mining districts of these two provinces. Copperbelt mining districts are characterized by relatively high levels of service delivery[4] and have economic indicators (eg levels of formal employment and urbanization) that have been well above the national average in Zambia for a long time. Solwezi in North-Western Province has seen significant advances in economic indicators since 1998, but remains a long way from comparable Copperbelt mining districts. Social indicators in Solwezi have largely followed the national trend.

Comparing performance in mining and non-mining districts
To identify the role of mining in the development of these mining districts, we compare socioeconomic outcomes in these districts to non-mining districts. We find that mining districts across the Copperbelt and North-Western Provinces perform better than non-mining districts when assessing economic outcomes, whereas social outcomes show fewer differences.

- Population growth has been distinctly higher in Solwezi than in non-mining districts in North-Western Province. Population growth in the Copperbelt mining districts has increased in recent years, following a decline in population in these districts between 1998 and 2006. Our findings are consistent with our observation in previous MPD case studies that mining investment triggers significant in-migration.

- Subjective poverty ratios (ie people's own perception of their poverty status relative to the society surrounding them) have decreased more rapidly in mining districts than in non-mining ones, across both provinces.

- Formal employment is higher in mining districts than non-mining districts, across both provinces.

4   For example, better access to water and electricity, higher net attendance rates at schools.

- Primary school net attendance[5] rates in non-mining districts have converged towards the higher levels previously seen in mining districts. However, secondary school net attendance remains higher in mining districts.

- Access to improved water sources shows similar levels and trends across mining and non-mining districts in North-Western Province; however, the level of access to water and electricity services continues to be much higher in the Copperbelt mining districts compared to non-mining districts.

- Infrastructure development (as measured by proximity to schools, hospitals and also financial institutions) continues to be slightly better in mining districts compared to non-mining districts in the Copperbelt. In North-Western Province, by contrast, mining and non-mining districts have similar levels and trends.

"The mining share of total taxes collected is now higher than most other mineral-driven countries, which was not the case as recently as 2008."

Chapter 6: Governance

Effective governance is critical to maximize the developmental outcomes from the mining companies' contributions to national and local economies. Zambia is, however, faced with several governance challenges.

The mining policy and regulatory framework
In contrast to Zambia's recently strong and stable performance in relation to macro policy, the mineral sector policy and regulatory framework has become less predictable in recent years. Since 2008, the mineral fiscal regime has been altered several times, tax and royalty rates have increased and new taxes have been introduced and subsequently dropped. Several new statutory instruments have been introduced, which have added further to the costs of operating in an already high-cost environment. It is possible to explain many of the recent changes by reference to the unsatisfactory nature of the pre-2008 fiscal and regulatory regime. Nonetheless, an unstable policy environment constitutes a threat to future investment, both by new and by existing investors, and therefore to the positive macroeconomic and local-level contributions that mining has supported.

Government agencies tasked with holding mining companies to account typically have mandates that reflect international best practice but suffer, to varying degrees, from a lack of depth in technical capabilities and resources to oversee a rapidly expanding mining sector. High levels of competence can be built and have been addressed in part by the ZRA through a variety of donor-supported programs. Mining companies and the Chamber of Mines could further support this process.

Collection of mineral revenues
With the recent changes to the mining fiscal regime, the ZRA is now able to collect a high proportion of all Zambia's taxes from the mining sector, representing a significantly increased share of GDP. The mining share of total taxes collected is now higher than most other mineral-driven countries, which was not the case as recently as 2008. Importantly, the Zambia Extractive Industries Transparency Initiative (ZEITI) process has strengthened transparency on revenue from mining. However, most current debates on this topic have not yet been much influenced by this important fact.

The tax collection process is increasingly efficient, in part reflecting donor support to build capacity in the ZRA. Contrary to public opinion, relatively little appears to be lost through transfer mispricing (see Annex C).

5   Net attendance refers to the share of children of primary school age attending primary school out of the total population in the official primary school age group.

Public Financial Management and expenditure

The enlarged mineral revenues of the recent past may offer new possibilities to leverage the infrastructure and social investments currently made by the mining sector with additional targeted public investments. However, at present Zambia's public expenditure track record is poor due to the lack of transparency on how roles and responsibility are divided between mining companies and government, weak capacity at all levels of government, and incomplete and unenforced decentralization reforms.

Challenges of expenditure management are particularly acute at the sub-national level, where funding for local authorities is centralized, unpredictable and largely non-transparent. The 2002 National Decentralization Policy has not been implemented effectively, and service delivery at district/sub-district levels is still provided predominantly through the various structures of central line ministries. Direct funding to local authorities in Zambia (less than 2 per cent of the total budget) is low compared with other countries. Most councils are underfunded and have little fiscal empowerment at this level to work collaboratively with the spending of mining companies. Local administrations have been unable to ramp up public service provision in the aftermath of privatization, to deal with fast-growing populations in North-Western Province, and to undertake the public service provision previously done by ZCCM on the Copperbelt and not formally taken over by the new mining companies.

Institutional arrangements for improved partnerships

The report identifies a need to articulate more clearly some institutional arrangements that could support partnership activities; these include:

- local communities empowered through consultation, both by companies and local government

- the social initiatives of mining companies, and those of other non-governmental players, to be designed and operated in line with the government's own national and local development objectives

- a greater degree of financial and technical capacity at these lower levels of government (as discussed above)

- an elimination of the ambiguities of the role of mining companies in delivering public goods and services

- a move towards some agreed minimum standards of performance in the identification, planning, implementation and evaluation of social investment programs.

Chapter 7: Policy implications of the key findings

Data

Both the government and the mining companies have recognized that the data on which they currently rely to guide policy decisions is not good enough.[6] Both must share responsibility: the government is at fault because it has not made sufficient effort to produce, verify and routinely publicize high-quality official data; the companies and the Chamber of Mines because they have often failed to correct erroneous figures when they appear in the press, and because they appear to have sometimes treated the public's need for information as a nuisance rather than a necessity.

Government and the Chamber of Mines have committed to work together on a single data template that provides consistency across the official data requirements of the sector – and the work of the ZRA's Mineral Value Chain Monitoring Project will be key. The objective is a single set of trusted, publicly available data.

Economic diversification

Sustained economic growth in Zambia is achieved via diversification of the economy away from dependence on mining. At the same time, sustaining growth entails deepening the economic contribution of mining, while addressing some of the challenges to competitiveness.

Growth and diversification will rely on avoiding exchange rate overvaluation and "Dutch disease" effects; and sustaining the investment in industry will develop improved capabilities in firms to produce increasingly sophisticated products competitively, and so create jobs. Even a marginal shift from imported to domestically produced goods as inputs to mining has the potential to support industrialization.

Mining sector support for growth and diversification will also work through supporting indirect and induced job creation, and through training and skills development. Although mining will never directly employ more than a relatively small minority, indirect and induced employment can be a highly significant source of income and employment. There are opportunities for skills development both at tertiary education level (possibly in collaboration with universities abroad) and at the skilled artisan level to address the skills deficit.

A competitive world-class mining industry

Several Copperbelt mines are high-cost, low productivity mines by world standards. The areas for policy that would support a competitive, world-class mining industry include actions that help tackle high costs and low productivity, levels of taxation, and greater stability in the regulatory environment for mining.

---

6   This recognition on the part of the industry was part of the concluding remarks at the June workshop, and on the part of government is reflected in the work of the ZRA Mineral Value Chain Monitoring Project.

Introduction and methodology

Zambia is now a high-tax mining country. The government could improve the attraction of Zambia as an investment destination by clarifying and consistently applying its regulatory regime across all operators, even without changes to fiscal rates. The elements of the tax regime that offer incentives which distort the fiscal system – resulting in suboptimal investment decisions and a failure to generate any significant government revenue – should be abolished. Both the tax on concentrate exports – now extended to exports of blister copper – and the variable profits tax fall in to this category (see Annex I).

The regulations relating to foreign exchange[7] lack any strong economic justification. They hurt Zambian mines directly, and they hurt actual and potential Zambian suppliers to the mining sector by raising the cost to mining companies of local procurement. The introduction of new requirements for reimbursement of VAT deviate dramatically from international practice and have the potential of undermining the viability of even relatively profitable mining companies for a relatively insignificant public revenue gain.

A systematic and in-depth assessment, in close consultation with the industry, of the various ad hoc measures introduced into the mining regulatory regime since 2008 could be a first step in stabilizing the regulatory environment.

In addition, mining companies could themselves do more by regarding the official agencies as partners in a common mission rather than as adversaries, for example through providing better quality and more relevant information and developing appropriate consultative forums: there are substantial economies of scale and scope to be obtained by adopting a more co-operative approach, orchestrated through the Chamber of Mines.

Social investment and partnerships
Mining companies spend large sums of money on social investment, but with mixed results. There is a large gap between the perceptions of local communities and mining companies about the value and significance of many community development programs in mining areas.

The mining industry could co-ordinate individual activities more closely with each other and with local government and across a broader range of partners with shared interests, such as development agencies or NGOs. There are areas where partnerships could be strengthened. These include through a more systematic evaluation and reporting of social investment impacts, and better co-ordination with government poverty reduction plans and initiatives.

This report presents the findings of a study undertaken by OPM for ICMM and the Chamber of Mines of Zambia. The study uses the MPD Toolkit to assess the contributions of copper mining to the Zambian economy and society, and identify the governance challenges in maximizing development outcomes from mining. It covers national-level macroeconomic contributions, as well as local-level economic and social contributions. The national-level work is based on government data for the entire sector. The local-level analysis focuses on Copperbelt and North-Western Provinces and is based on government data, stakeholder interviews and detailed data provided by the four largest copper mining companies (Konkola Copper Mines, Mopani Copper Mines, FQM Kansanshi and Barrick Lumwana) that together account for over 70 per cent of current copper production.

The main purpose of this report is to provide an independent, objective and comprehensive evidence base regarding mining's past, present and future contributions. Our intention is that this work helps inform debates about the role of mining in the Zambian economy – that until now have too often been conducted in the absence of a commonly accepted set of data. To promote more factually based policy debate on mining in Zambia, this report includes a comprehensive series of annexes. These constitute a detailed stocktake of some of the more contentious issues facing the sector.

The report also provides insights into possible new approaches to extending and deepening mining's economic and social contributions for the greater benefit of the Zambian people. The study is intended to support in-country government-led initiatives, including the ZRA Mineral Value Chain Monitoring Project, which is carrying out a detailed analysis that covers the entire mining sector.

Methodology
The methodology of the study follows the framework of the ICMM MPD Toolkit, which is comprehensive in its scope and inclusive in its reliance on a high level of in-country engagement. The study was conducted over a period of 10 months, from March 2013 to December 2013. The UK-based team members made three visits to Zambia and met a wide variety of stakeholders, including senior government officials, mining company representatives, donors and civil society organizations. The team also included a number of Zambian professionals. Macro-level data was provided by several government ministries, interviews were carried out with key informants from government and civil society, and focus group discussions were held with community members. Information was also collected from four mining companies (Mopani, KCM, Kansanshi and Lumwana) who provided company-specific data to the team for some aspects of the study. To engage with stakeholders and receive feedback on the findings of the study, two workshops were held: a smaller workshop in June with a select group of government and industry representatives and a larger multi-stakeholder workshop with over 150 participants in November.

7   Such as SI 33 and SI 78 of 2012, and SI 32 of 2013.

Data

The data used to complete the study is from a variety of sources. Relevant secondary sources are used throughout the study but some sections rely on information provided by government or mining companies:

- Section 3.1 is based on data from national government sources where available. This includes information provided by a number of government ministries, including in particular the Bank of Zambia (BoZ), the ZRA and the CSO.

- Section 3.2 consolidates individual projections provided by each of the four participating mining companies. The mining companies provided projections for varying end dates for production, revenue, operating and capital costs, community contributions and capital financing. The data presented in the report relies on extrapolations from 2017 in one case and extend to 2022. This information was provided through a template prepared by OPM and completed by the four participating mining companies.

- Section 4.1 is based on information provided by the four participating mining companies and is supplemented by information from secondary sources and a detailed multiplier analysis carried out by the team.

- Section 4.2 uses a number of sources. Quantitative and qualitative data on social investments was provided by the four participating mining companies. Additional primary information was obtained from interviews that were held with key informants from government and civil society and from focus group discussions that were held with community members from areas surrounding the mines. Secondary literature on community and government interactions with mining companies was also used to supplement this primary data.

- Chapter 5 is based on Zambia's Living Conditions Monitoring Surveys (LCMSs) from 1998, 2006 and 2010.

Limitations in scope

Although the study aimed to be as comprehensive as possible, there are several limitations in its scope forced by time and other constraints:

- The study focuses on large-scale copper mining. Copper is by far the most significant mineral mined in Zambia. The study does not include an assessment of artisanal and small-scale mining, nor other minerals or gemstones mined in Zambia.

- An analysis of the broad and complex subject of environmental impacts of mining is beyond the scope of the present analysis, and of the ICMM MPD Toolkit. Environmental management appears to have improved since the period immediately following privatization but the capacity to carry out environmental monitoring and enforcement remains weak.

- Definitive statements on the measured impact of social investments are difficult to make. This is partly due to a lack of monitoring and evaluation of these investments by the mining companies. Some programs have evaluation systems, but most had not been running long enough by the time this study was carried out for data to be available. Where available, this information has been used but had to be supplemented with additional primary and secondary sources of information.

- The governance assessment is not intended to be comprehensive. Instead, it focuses selectively on a number of the key governance challenges relevant to mining.

"The study focuses on large-scale copper mining. Copper is by far the most significant mineral mined in Zambia. The study does not include an assessment of artisanal and small-scale mining, nor other minerals or gemstones mined in Zambia."

Abbreviations

ASM
artisanal and small-scale mining

BoZ
Bank of Zambia

CDT
Community Development Toolkit (ICMM's)

CGE
computable general equilibrium

CIT
corporate income tax

CSO
Central Statistical Office

CSR
corporate social responsibility

CSSDP
Copperbelt SME Suppliers Development Program

DA
development agreement

DFID
Department for International Development

DRC
Democratic Republic of Congo

DSA
district situational analysis

EITI
Extractive Industries Transparency Initiative

EW
electrowinning

FDI
foreign direct investment

FQM
First Quantum Minerals

GFI
Global Financial Integrity

HDI
Human Development Index

ICMM
International Council on Mining and Metals

ICSG
International Copper Study Group

ICTD
International Centre for Tax and Development

ILO
International Labour Organization

IMF
International Monetary Fund

KCM
Konkola Copper Mines

LCD
Lumwana Contractor Development

LCMS
Living Conditions Monitoring Survey

LME
London Metal Exchange

LoA
letter of agreement

M&S
Mbuta and Sanyikosa

MDGs
Millennium Development Goals

MFNP
Ministry of Finance and National Planning

MPD
Mining: Partnerships for Development

NMCP
National Malaria Control Program

NORAD
Norwegian Agency for Development Cooperation

NWCCI
North Western Chamber of Commerce and Industry

OBI
Open Budget Index

OPM
Oxford Policy Management

PFM
public financial management

SAM
social accounting matrix

SEAT
Socio-Economic Assessment Toolbox

SME
small and medium enterprise

SNDP
Sixth National Development Plan

SX
solvent extraction

TFM
Tenke Fungurume mine

UNCTAD
United Nations Conference on Trade and Development

UNDP
United Nations Development Programme

USGS
US Geological Survey

WBMS
World Bureau of Metal Statistics

WGI
Worldwide Governance Indicators

ZCCM
Zambian Consolidated Copper Mines

ZCCM-IH
ZCCM Investments Holdings

ZEITI
Zambia Extractive Industries Transparency Initiative

ZEMA
Zambia Environmental Management Agency

ZRA
Zambia Revenue Authority

Context: Zambian economy and society

1

1. Context: Zambian economy and society

This chapter charts the recent economic, social and governance performance in Zambia, as well as outlining the country's governance framework, to provide context for the analysis of mining's economic contributions to national and local economies.

1.1 Economic performance

Following several decades of economic instability and low growth, the Zambian economy has since 1999 performed strongly on a range of economic indicators. Stable macroeconomic policy has contributed to maintaining an average real growth rate of 5.2 per cent between 2000 and 2010 (IMF 2012), which has since continued with an expected growth rate of 6.2 per cent in 2013 (IMF 2014). Between 2007 and 2011, inflation declined from 30 per cent to modest single digit levels with an inflation rate currently of 7.1 per cent through September 2013 (IMF 2014). Interest rates have also come down. The government's fiscal deficit remained under control at 3.2 per cent of GDP in 2012 but has increased to almost 8 per cent in 2013 (IMF 2014).

The improvements in macroeconomic performance over the past decade in part reflect the completion of the Highly Indebted Poor Countries debt reduction initiative in 2005 and improved revenue mobilization. Progress was such that by 2011 Zambia was reclassified as a lower-middle-income country by the World Bank, a status it had lost in the 1980s. Zambia's stable and more positive growth outlook was reflected in the high demand for Zambia's first issuance of international bonds in 2012 (raising US$750 million).

There is little doubt that the resurgence of mining investment and output, sustained in part by a favourable world price for copper, have been critical elements in Zambia's economic recovery (see Figure 2).

Figure 2: Copper prices and GDP per capita growth (1960–2012)
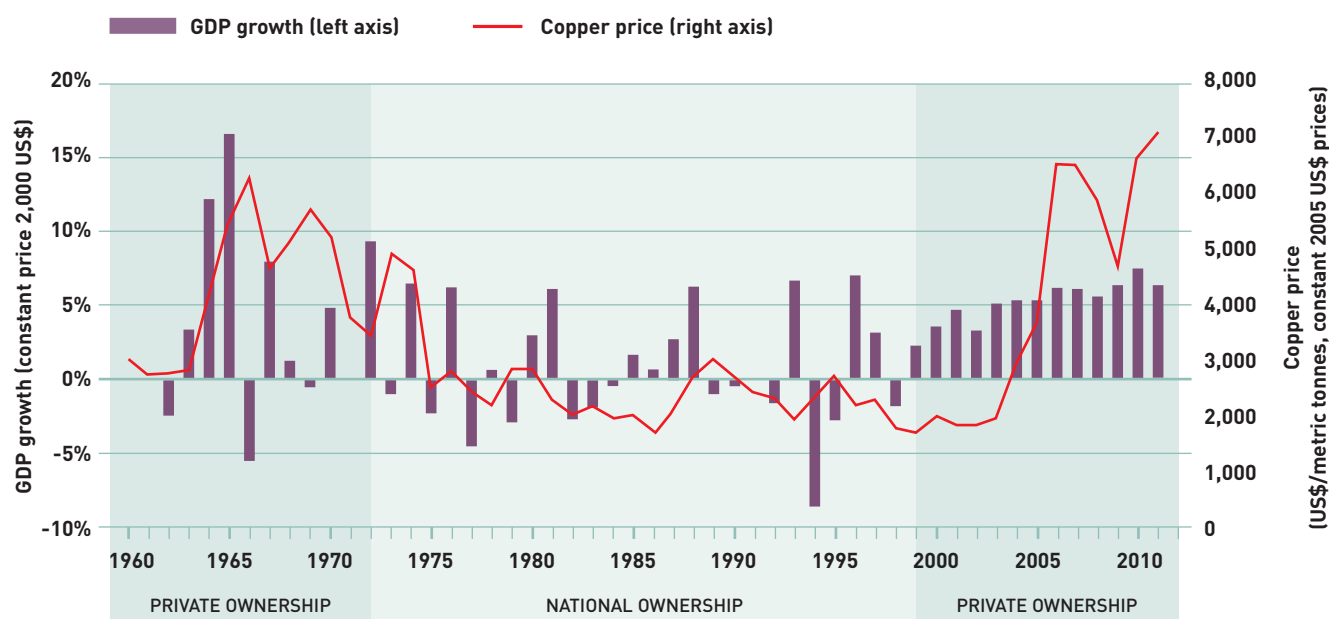
Source: World Bank Development Indicators.

Although recent large-scale investments have raised GDP and total incomes considerably, they have not – as yet – fundamentally transformed the structure of the economy. According to CSO data, manufacturing activity has fallen from around 11 per cent of GDP in the late 1990s to a historical low of 8.4 per cent in 2012. Other sectors that are ancillary to the mining industry have grown more rapidly, for example the construction sector (the share of which in current prices increased from 4.9 per cent of GDP in 2000 to 23 per cent in 2012). The export sector is even less diversified, with the mining and quarrying sector accounting for 80 per cent of total exports.

The high and increased reliance on copper exports renders the economy vulnerable to international shocks. This was illustrated by the financial crisis of 2008–09 when, over 10 months during 2008, copper prices fell from US$8,844 per metric tonne to US$3,060 per metric tonne (see Figure 2). Many mining companies could not obtain finance for debt repayments or investments, and several operations were put under care and maintenance. Suppliers were also affected as payment terms were extended and orders cancelled. Press reports suggest that up to a third of mining direct employees were made temporarily redundant, only returning to work after prices rebounded.

1.2 Social performance

Despite recent economic progress, Zambia remains one of the least developed countries in Africa. Nearly two-thirds of the population of around 13 million live below the international poverty line of US$1 per day.

The more developed provinces, such as the Copperbelt and Lusaka, record relatively lower levels of poverty (see Table 2). However, most provinces remain highly underdeveloped with poor infrastructure and low levels of economic activity. North-Western Province remains one of the poorest, most remote and least developed parts of Zambia.

In 2012, Zambia ranked 163 out of 187 on the HDI, a composite index of per capita income, life expectancy and educational attainment. The 2012 HDI score of 0.43 is below the average for sub-Saharan Africa, although Zambia's ranking has improved since 2007. Within Zambia, there are large variations. The Copperbelt had the highest HDI score in the whole country in 2008. By contrast, the HDI score for North-Western Province (where much of the recent mining investment is taking place) lies below the national average (see Figure 3).

Table 2: Poverty headcount ratios (national poverty line) (percentage of people)

	All poor (% people)		% point change	Extreme poor (% of people)		% point change
	2006	**2010**	**2006–10**	**2006**	**2010**	**2006–10**
National	62.5	60.5	-2.0	42.7	42.3	-0.4
Lusaka	24.7	24.4	-0.3	10.3	11.5	+1.2
Copperbelt	37.3	34.3	-3.0	19.5	18.3	-1.2
North-Western	70.7	67.0	-3.7	44.6	46.1	+1.5

Source: Central Statistical Office (2012a).

"Despite recent economic progress, Zambia remains one of the least developed countries in Africa."

Figure 3: HDI (2008)[8]
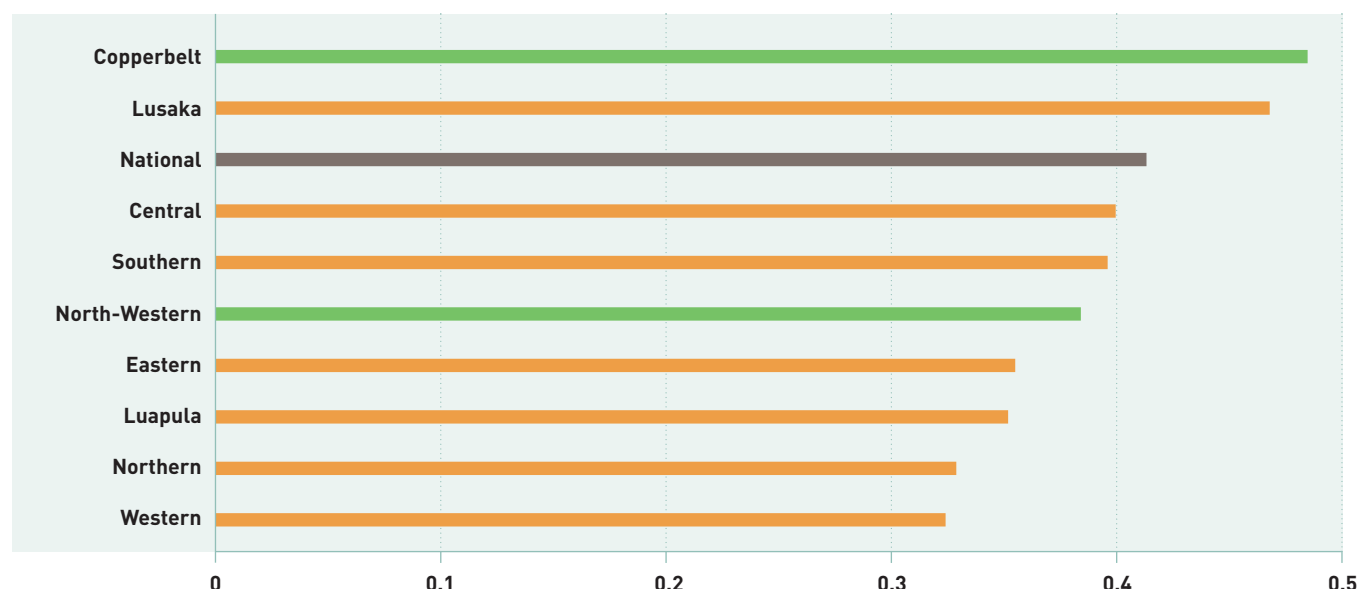
Source: UNDP (2011b).

Zambia has made progress towards some of its Millennium Development Goals (MDGs), including universal primary education, reducing child mortality and combating HIV/AIDS, but remains far from achieving its other targets (UNDP 2011a). The informal and subsistence economy remains large, employing 83 per cent of the working age population (CSO 2013a).

The challenges faced by Zambia in improving socioeconomic indicators reflect the legacies from economic mismanagement in the 1980s and the HIV/AIDS pandemic of recent decades. It also reflects the mismanagement of structural adjustment in the 1990s, when large parts of the public sector were dismantled through privatization. These reforms resulted in extended periods of high unemployment and reduced government services. They also precipitated the loss of some of the manufacturing capacity that had been built up in earlier years to supply mining activities. On the Copperbelt the changes were also visibly manifested through the removal of ZCCM as the key provider of social services.

The World Bank (2013) observes that the recent economic growth has had a limited impact on overall poverty reduction in Zambia, with most benefits accruing to people above the poverty line. Inequality has worsened in recent years, with the Gini coefficient increasing from 0.60 in 2006 to 0.65 in 2010 – the third highest in sub-Saharan Africa, after South Africa and Seychelles, according to the World Bank.[9]

"The challenges faced by Zambia in improving socioeconomic indicators reflect the legacies from economic mismanagement in the 1980s and the HIV/AIDS pandemic of recent decades."

8   This composite index covers life expectancy, mean years of adult education, expected years of schooling for children and GNI per capita (constant 2005 PPP US$). Note: this is calculated using the 2006 LCMS.

9   The Gini coefficient is a measure of inequality. It ranges from 0 to 1. A coefficient of 0 represents total equality in income distribution, while a coefficient of 1 represents total inequality.

Map of Zambia

Source: Based on map 3731, United Nations, www.un.org.

1.3 Governance performance

As found in previous ICMM country case studies, the quality of governance can influence – positively or negatively – the economic and social outcomes associated with mining activities. This section first discusses Zambia's performance on a set of international governance indicators, followed by a brief introduction to the country's political-administrative system.

1.3.1 Governance – measured by international indicators

A review of three international indicators of governance – the World Banks WGI, the Ibrahim Index of African Governance and the International Budget Partnership's OBI – illustrates Zambia's mixed performance in governance.

According to the World Bank's WGI, governance rankings have improved with respect to four of the six WGI indicators: Political Stability and the Absence of Violence, Voice and Accountability, Government Effectiveness and Control of Corruption. However, governance has deteriorated with respect to Regulatory Quality (Zambia ranks the second lowest in its peer group, after the Democratic Republic of Congo (DRC) and remains largely unchanged for the Rule of Law (falling from 127 to 129). Annex J shows these changes over the past decade in comparison to other sub-Saharan African countries.

Figure 4: Zambia's absolute scores on the WGI
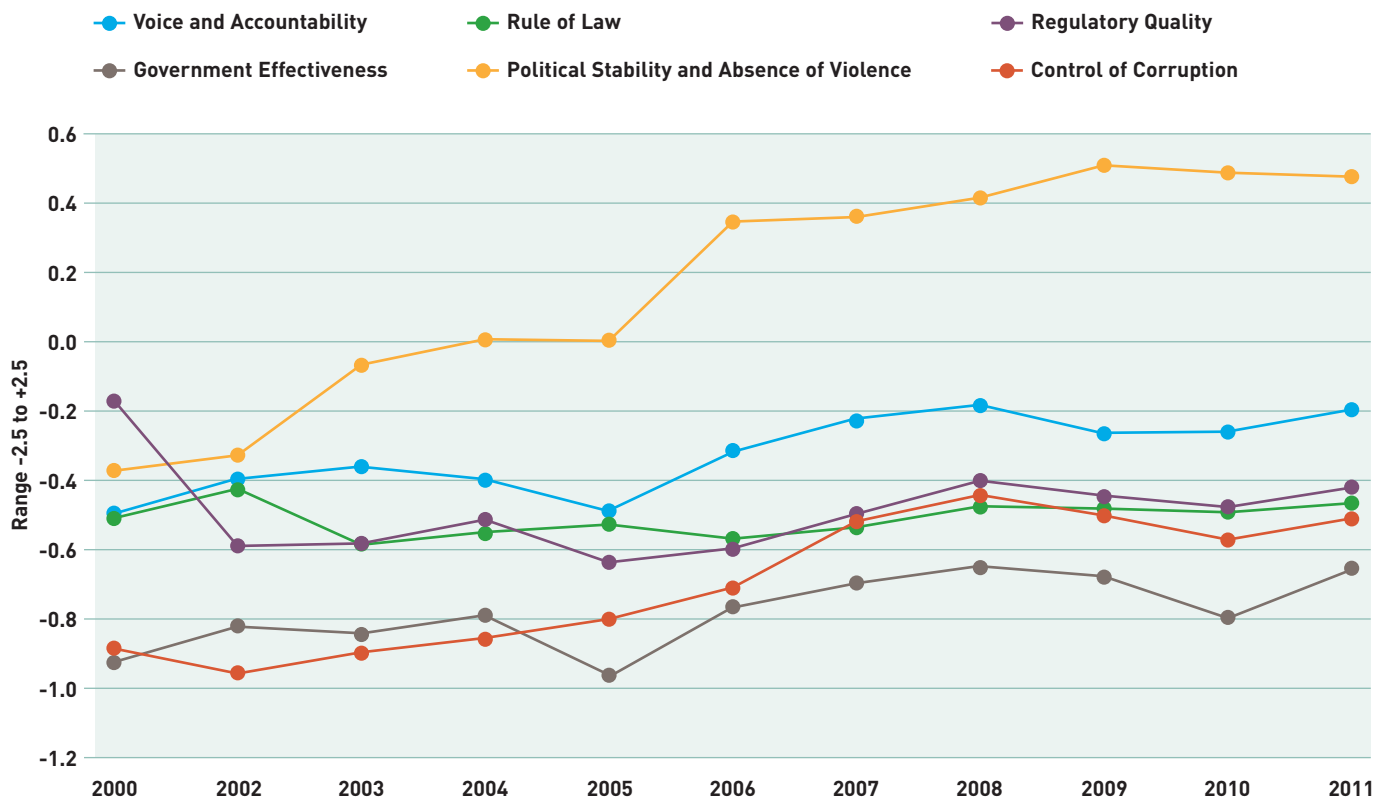
Source: World Bank WGI (2013).

Zambia's absolute performance on the WGI indicators highlights a significant improvement in Political Stability and Absence of Violence (see Figure 4). Zambia is notable for its ability to maintain social order and avoid public strife, not least in the context of three elections since 2000 (one of which followed the sudden death of President Mwanawasa). Positive developments have been less pronounced for four of the remaining five indicators, while one indicator (Regulatory Quality) has fallen in absolute terms.

Turning to the 2012 Ibrahim Index of African Governance (using 2011 data), Zambia performs relatively well, ranking 12th out of 52 African countries (see Table 3). Zambia's overall score improved somewhat, in particular driven by stronger performance in "Safety and Rule of Law" and "Human Development", yet it should be noted that Zambia's overall ranking also benefited from the falling scores of other countries, for example Kenya.

Zambia's performance is more disappointing in the OBI, where it ranks close to the bottom of 100 countries surveyed. Zambia is classified as providing "scant or no budget information", indicating that citizens have little information available to hold government to account for the delivery of services. Zambia's score has fallen dramatically since the OBI 2010 (the first year Zambia was included in the index), following the imposition of high fees for access to the executive's budget proposal and year-end report, which render this information unavailable to the public (International Budget Partnership 2012).

Table 3: Zambia's scores and rankings on the Ibrahim Index of African Governance, compared to other sub-Saharan African countries (2006 and 2011)

	Scores (100 = highest)			Rank (1 = highest)		
	2006	2011	change	2006	2011	change
Zambia	56.4	58.5	2.1	17	12	5
Botswana	76.4	77.2	0.9	2	3	-1
Tanzania	58.4	58.8	0.4	13	10	3
Ghana	64.2	66.3	2.0	8	7	1
Kenya	53.9	52.7	-1.2	20	25	-5
Congo, Democratic Rep	30.6	32.8	2.2	50	51	-1
South Africa	71.8	70.7	-1.1	5	5	0

Source: Ibrahim Governance Index 2012 (2013). The full methodology of the Ibrahim Index is available at www.moibrahimfoundation.org.

"Zambia is notable for its ability to maintain social order and avoid public strife, not least in the context of three elections since 2000."

1.3.2 Political-administrative system

Since 1991, Zambia's political system has operated as a multiparty democracy with an elected president and elected members of the National Assembly.[10] Power is concentrated in the presidency, which heads both the government and the civil service. The executive comprises three main administrative tiers (see Figure 5):
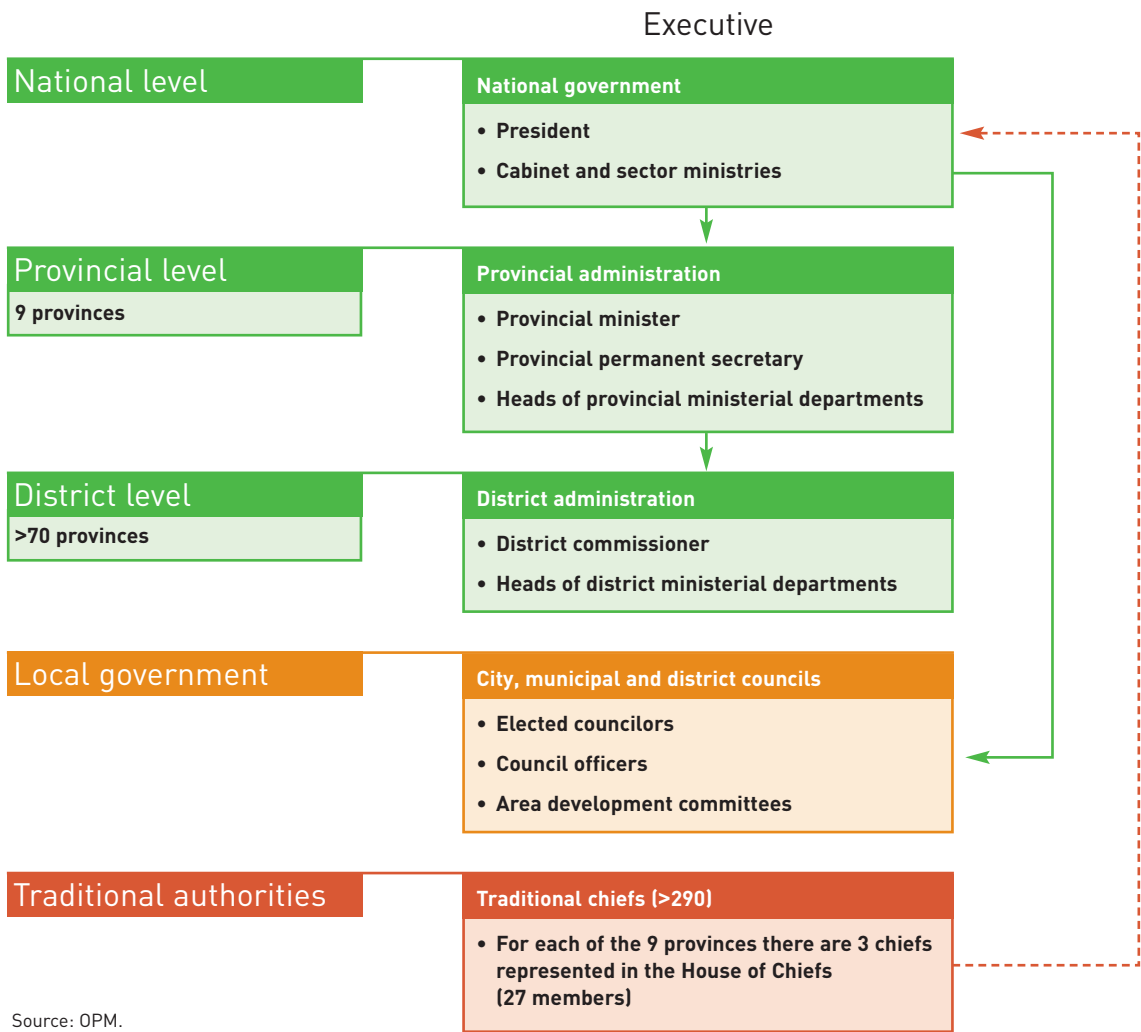
- The first tier is the national level, which comprises the directly elected president, the Cabinet and 19 sector ministries.

- The second tier comprises nine provinces, each headed by a provincial minister appointed by the president.

- The third tier comprises some 70 plus districts, each headed by a district commissioner who manages the district heads of ministerial departments.

Below these are two additional tiers.

- The (formal) fourth tier comprises local governments and was reintroduced through legislation in the early 1990s. These authorities comprise over 70 councils with locally elected councillors supported by council officers.

- The fifth (more informal) tier of government comprises traditional authorities headed by traditional chiefs. A "House of Chiefs" serves as an advisory body to the executive on matters related to custom and tradition.

Figure 5: Zambia's five tiers of executive power

Executive

National level

National government
- President
- Cabinet and sector ministries

Provincial level

9 provinces

Provincial administration
- Provincial minister
- Provincial permanent secretary
- Heads of provincial ministerial departments

District level

>70 provinces

District administration
- District commissioner
- Heads of district ministerial departments

Local government

City, municipal and district councils
- Elected councilors
- Council officers
- Area development committees

Traditional authorities

Traditional chiefs (>290)
- For each of the 9 provinces there are 3 chiefs represented in the House of Chiefs (27 members)

Source: OPM.

10 Most recently, President Sata, representing the Patriotic Front, has been elected to lead the country after a long period of rule by the Movement for Multi-party Democracy.

Public spending in recent years has been largely absorbed by recurrent expenditure rather than by investment. Expenditures on large public transfer schemes such as the public pension fund, government subsidy programs (maize subsidies and the fertilizer program) and a higher-than-planned increase in basic salaries (2012 and 2013) have continued to limit the fiscal space for growth-inducing investments such as infrastructure, productive sector expansion and basic social services such as health and education.

At the national level, the government uses the Sixth National Development Plan (SNDP) as a medium-term policy framework to guide the country's development, including poverty reduction.[11] At the sub-national level, every district is required to put together a district situational analysis (DSA) to outline the district's key characteristics and challenges. On the basis of this information district councils are tasked with developing a district development and poverty reduction strategy to set out priority areas for spending, as well as annual development plans to guide the implementation of specific activities. Implementation of these plans is supposed to be monitored through a district information system.

Although a National Decentralization Policy was approved in 2002 to de-concentrate decision making and devolve service delivery to local authorities, little fiscal decentralization has taken place in practice. As a result, local government agencies remain weak. They often struggle to implement their mandated roles (including public service provision as well as managing local development planning as described above) and to co-ordinate and complement the activities of large mining companies (see Chapter 6).

In practice, therefore, the delivery of public goods and services in Zambia remains highly centralized. The budget does not show expenditure by urban or rural areas, but rather by line ministry, which means it is difficult to track where money is spent. However, public expenditure reviews generally find a bias in favour of urban and against rural areas in functional areas such as education and public works (eg water and sanitation and road projects) (Sida 2012). As a result, there are large service provision inequalities between urban and rural areas of the country.

"Although a National Decentralization Policy was approved in 2002 to de-concentrate decision making and devolve service delivery to local authorities, little fiscal decentralization has taken place in practice."

11 The SNDP outlines the government's medium-term development objectives for 2011–15. It focuses on strategies, policies and programs to realize broad-based pro-poor growth in Zambia (Government of the Republic of Zambia 2011.

Context: Zambian economy and society

Figure 6 shows the channels through which the delivery of public goods and services in Zambia takes place on the basis of the mainly centrally collected revenue. The first channel is via the three main tiers of the executive – national, provincial and down to the district level.[12]

The second channel is via the Ministry of Local Government and Housing's transfers to local government authorities and to traditional authorities. Section 6.3.2 describes some of the recent trends that have been seen in relation to those expenditures.

Figure 6: The channels for revenue collection and public expenditure, mapped against the various tiers of executive power
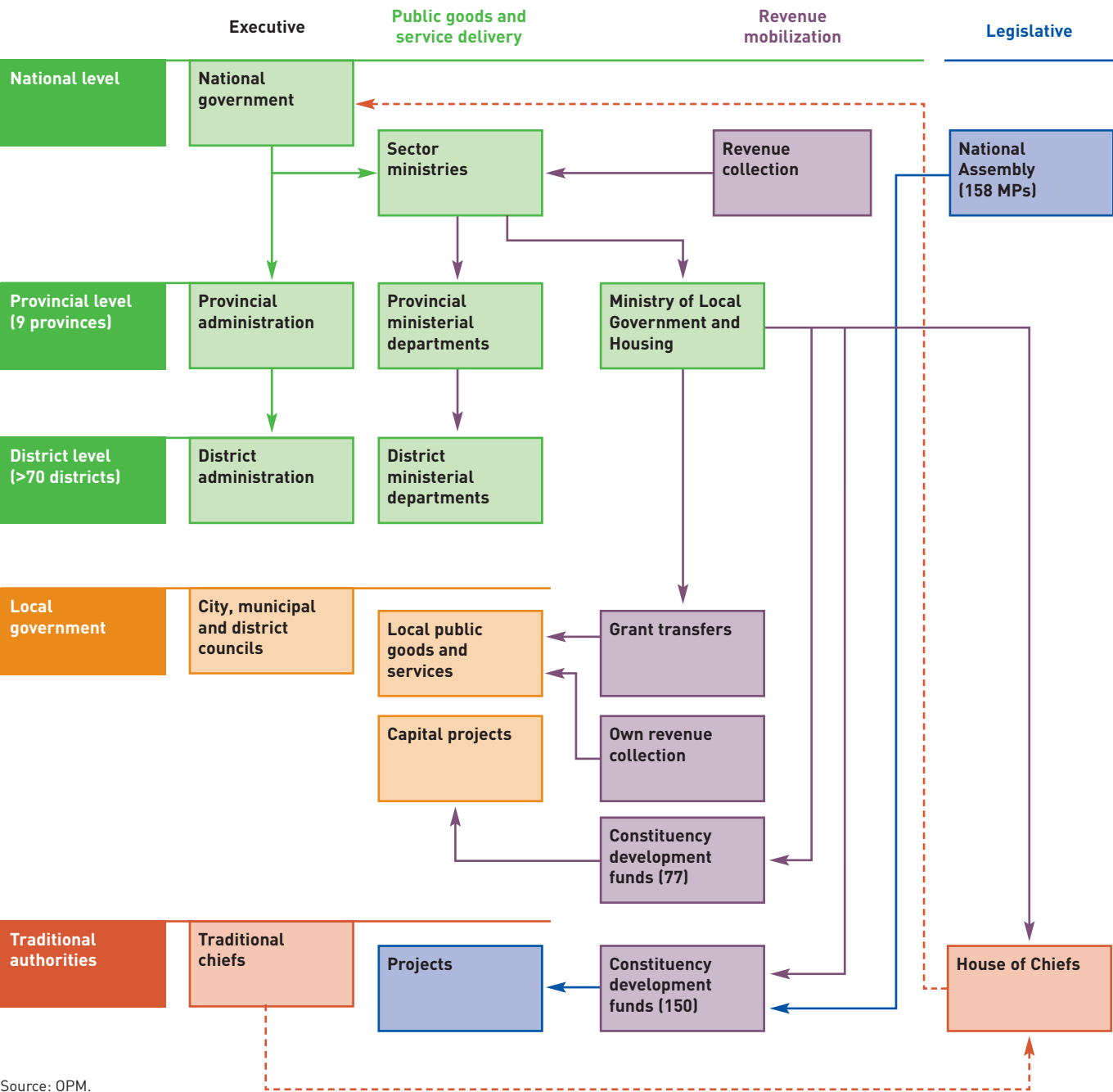
Source: OPM.

12 The provincial and district administrations are technically administrative wings of the central government at the sub-national level. The provincial administration presently consists of a provincial minister (who is equivalent to a deputy minister) and a provincial permanent secretary. With respect to district councils, these operate under the Local Government Act of 1991 as amended. They are charged with the responsibility of delivering specific services on behalf of the central government.

Context: the mining industry in Zambia

2

2. Context: the mining industry in Zambia

This chapter includes three main parts:

- **The first section discusses the history of mining in Zambia, the changes in ownership that have taken place since mining began in the 1920s and the present governance framework. It also traces common perceptions of the sector throughout the history of mining in Zambia.**

- **The second section presents an overview of the post-privatization mining sector, including the four mining companies that provided data for some aspects of the study.**

- **The third section includes a discussion of the competitiveness challenges faced by the mines.**

2.1 History and governance of the mining sector

2.1.1 History of mine ownership and governance

Mining has taken place in Zambia for almost a century. Large copper deposits were discovered near the border of the DRC in the 1920s in what is now known as Copperbelt Province. The first commercial mine, owned and operated by the Roan Selection Trust and Anglo American, was established in 1928 in Luanshya. Since then, additional large copper mines have been established in Copperbelt Province and more recently in North-Western Province, with several smaller copper mines also having been set up in the rest of the country. Mining of other mineral deposits as well as gemstones has taken place in other regions of the country but at a smaller scale.

The ownership of large-scale mines has undergone a number of changes since the colonial period. Table 4 presents the main stages, including the evolution in the roles and objectives of mining operators and the state, followed by a discussion of the three main stages.

Table 4: Zambia's mineral sector regime eras and associated roles and responsibilities

Regime era	Ownership	Role of ownership	Role of the state	Provision of public goods and services – in mining areas	Funding of public goods and service provision – in mining areas
Pre-1964 – colonial era – mining operations commenced in 1920s	Concessions to private enterprises, owned by foreign shareholder(s)	To exploit natural resources and manage territory, with endorsement from colonial administration	No sovereignty	Provided by concession holder – reasonably good provision	By concession holder directly – created long-term dependency
From independence until early 1990s	National mining company (ZCCM) eventually created to operate the sector, owned by the state	To exploit natural resources to support directly the pursuit of government objectives	Sovereign state – running the economy	Provided by state-owned operator (ZCCM) – initially reasonably good provision, then deterioration	By operator directly – unsustainably financed
From mid-1990s until to date	Concessions to private enterprises, owned by foreign shareholders, with ZCMM holding minority shares	To use resource rights to exploit natural resources, and comply with duties associated with the granting of these rights	Sovereign state – legislating and regulating the sector, and enforcing legislation and regulation	In practice, expectation of provision by concession holder	Legacy expectation is for concession holder to fund directly
Taking stock	Ownership structure has changed over time	Role of ownership has changed over time	Role of the state has changed over time	Persistent expectation across three different mineral regime eras	

Source: OPM.

Private ownership (1920s–1960s)

During colonial rule (and for several years after independence), all mines were owned and operated by foreign-owned private enterprises. Although the industry was private, mining companies provided a large number of public goods and services to communities surrounding their operations and effectively took on government service provision roles. They often provided good-quality infrastructure, such as housing and schools, and attended directly to the social needs of these communities, including the provision of health care. By independence in 1964, the country had become the third-largest producer of copper globally and Copperbelt Province had started to develop into a dynamic urban and industrial region.

Nationalization (1970s–early 1990s)

After independence, in line with the political trend among newly independent African states, Zambia nationalized its mining sector in the early 1970s as part of the Mulungushi Reforms. The gradual process of nationalization eventually led to the creation of ZCCM, the state-owned mining company. ZCCM was tasked with running the sector and was also responsible for the provision of social services and public goods for mine workers and their communities. However, the nationalization of the sector was unfortunately timed: copper prices entered a protracted slump in the 1970s and 1980s. Higher oil prices during the 1970s made imported equipment (necessary to maintain mining production) more expensive.[13] The combination of higher costs and lower prices, together with the many social responsibilities that ZCCM had been tasked with, led to it making large losses. Lack of capital to invest in maintaining the mines led to falling production: during the period of nationalization, production fell to less than 40 per cent of the amount of copper produced at the start of the period. President Kaunda's government needed to borrow heavily in order to compensate for the shortfalls in government revenue, and by the late 1990s Zambia was one of the most heavily indebted countries in the world.

Privatization (mid-1990s–present)

After the return to multiparty democracy in 1991, Zambia embarked on a structural adjustment program that led to the reprivatization of the mining industry, in which ZCCM's assets were split into several "packages" of mining operations. The structural adjustment program involved extensive reforms to the role of the state in the economy, including the removal of subsidies, liberalizing of the foreign exchange regime and broad-sweeping privatization. By 1997, 224 state-owned enterprises – out of a portfolio of 275 – had been privatized (Larmer 2005). Privatization of the mines proved more difficult, as copper prices remained at historical lows. At the same time, the imperative of finding buyers was great as the failure to recapitalize loss-making mines would

have resulted in sharply rising unemployment on the Copperbelt. To incentivize investment, the government offered "mineral development agreements" (known in Zambia as DAs), including stabilization clauses and various fiscal and operating incentives. This led to a boom in new investment, enabling mineral production to rebound to levels last seen in the early 1970s. A new entity – ZCCM-IH – was created to hold minority equity stakes (10–20 per cent) in the privatized mines, and to act as a trust fund for the management of environmental liabilities not taken on by the incoming investors.

The DAs agreed with the concessionaires of individual mining companies at privatization were provided under the 1995 Mines and Minerals Act. They sought to address any legal and regulatory issues that the country's general and sector legal framework did not cater for, but which were important for investors. DAs were therefore designed to stabilize tax rates and other forms of regulation, including through requirements that government compensate the new owners for any changes to regulation that would have an adverse impact on the mining companies' financial position.

The agreements also set out which "social assets" (eg schools and hospitals that were previously managed by ZCCM) were to be transferred to the privatized mines. In the Copperbelt, mining companies agreed to continue running several hospitals, health clinics and schools. All other responsibilities (such as general municipal services and the running of the education and health facilities that the mining companies did not take over) were handed over to local government.

The DAs were all the result of individual bilateral negotiations between the government and the individual mining companies such as KCM, Mopani, Kansanshi and Chambishi. Although they contained some overlapping and common elements, they also involved significant differences as a result of the bargaining undertaken in the separate negotiations (Haglund 2010).[14] Moreover, the DAs were closely held documents not available for scrutiny by the public until "leaked" in 2006. This approach discouraged a more uniform and transparent approach to mineral sector governance, and potentially undermined the relevance of the Chamber of Mines as an industry representative body.

A new act – the Mines and Minerals Development Act of 2008 – was introduced in 2008. The DAs were revoked and a common legislative framework was established for mining. For the industry, however, the 2008 Act introduced a period of policy volatility and increased commercial risks – as discussed in more detail in Chapter 6.

---

13 Transport costs also rose after the main transport route through Zimbabwe (then Southern Rhodesia) was closed following Zimbabwe's Unilateral Declaration of Independence and the resulting international sanctions.

14 For example, the length of stability periods varied, as did royalty rates, tax rates and the degree of exemptions from customs and excise duties.

2.1.2 Mining sector administration

Zambia's current constitution (1991, with 1996 amendments) is silent on the ownership of minerals. The Mines and Minerals Development Act of 2008, however, defines that all rights of ownership in, searching for, mining and disposing of minerals located anywhere in the republic are vested in the president on behalf of the republic. Resource developers can acquire limited rights from the director of geological survey, who can grant several types of licence.[15]

The ministry responsible for the sector is the Ministry of Mines, Energy and Water Development. Within this ministry, three directors are responsible for administering the provisions of the Mines and Minerals Development Act of 2008. The director of mines has overall responsibility for the supervision and regulation of the act, the director of mines safety is responsible for all safety matters, and the director of geological survey is responsible for mineral licences. The act also set up two cadastre offices – one at the central level (to process applications for mining rights) and one at the provincial level (to forward applications to the central office). The Zambia Environmental Management Agency (ZEMA – formerly the Environmental Council of Zambia) is responsible for monitoring and enforcing compliance with environmental legislation. ZEMA is responsible for approving the environmental impact studies that mining companies are required to submit on proposed mining operations. The ZRA is responsible for tax collection from the industry and also carries out financial audits of the sector.

ZCCM-IH appears to play a role as an informal oversight body, as the organization has insight into board-level decision making in mining companies where it has shareholdings. Findings from extensive fieldwork by Haglund (2010) suggest that ZCCM-IH sees its priorities as maintaining the government's interest and influence in privatized mines, and more recently as a driver of private sector growth overall: over time, ZCCM-IH has broadened its remit to investing in other mines (eg coal mines) and input sectors (eg Ndola Lime) and has recently set up an exploration company.

In terms of its formal governance, ZCCM-IH formally reports to the Ministry of Finance (the majority shareholder in ZCCM-IH), with the Secretary to the Treasury sitting on the ZCCM-IH Board.[16] The policy direction of ZCCM is set by a board of directors made up of representatives from the Ministry of Finance; the Ministry of Mines, Energy and Water Development; the BoZ; and the private sector.

There has to our knowledge never been a thorough assessment of the effectiveness of ZCCM-IH's role, yet dividends captured by ZCCM-IH are becoming increasingly significant. Greater scrutiny of how these funds are used – in particular given ZCCM-IH's moves to expand its remit into other areas of mining and ancillary services[17] – should be a short-term policy objective. Some donors have long argued that ZCCM-IH should adhere to its originally stated objective, which was to eventually list on the Lusaka Stock Exchange and offer its shares to the Zambian public.

As several commentators at the November 2013 workshop mentioned, the administrative capacity of some of the relevant public agencies has struggled to keep up with the fast-growing sector – at both the national and sub-national levels. Funding for the agencies regulating the sector has not been commensurate with the growth in mining operations, and these agencies have also experienced difficulties in retaining skilled geologists and engineers, not least because of the high demand (and rising salaries) from the industry itself. Local government authorities have struggled to take on the new responsibilities acquired at privatization and gain the funding required for the delivery of public municipal services (eg waste management, road and market maintenance, electricity and water supplies).

Zambia's dual legal system – which recognizes both customary and statutory law for the ownership of land and housing – poses additional challenges. It necessitates different approaches to managing surface impacts depending on where mining operations are located. Where land rights are "customary" – and this applies to most land outside urban centres – land allocation has depended on the support of local chiefs (African Economic Outlook 2012). Because customary land titles do not confer "formal" property rights, this has presented a challenge for formal private sector investments in most rural areas. The Copperbelt is exceptional in that much of the land is statutory, and for which mining concessions have been granted. In contrast, in North-Western Province mineral resources are mostly located under customary-owned land.

---

15 Prospecting licences (for large-scale mining), large-scale mining licences, large-scale gemstone licences, prospecting permits (for small-scale mining), small-scale mining licences and small-scale gemstone licences by way of an administrative procedure.

16 The Government of Zambia has a shareholding of 87.6 per cent in ZCCM-IH with the remaining 12.4 per cent of shares held by private investors.

17 ZCCM-IH has recently launched an exploration company called Mawe that will – among other things – aim to increase local content in mining.

2.1.3 Mining fiscal regime

The mining sector's fiscal regime has undergone several changes during recent years (see Table 5). Royalty rates increased from variable levels as low as 0.6 per cent in 2006 to 3 per cent in 2007 and then increased again to 6 per cent in 2012. The corporate income tax (CIT) rate was increased from 25 per cent to 30 per cent in 2007 and withholding tax of 15 per cent was introduced on the income of foreign subcontractors and interest in 2008. A variable profits tax and windfall profit tax (which was subsequently repealed) were also introduced in 2008. As the financial crisis of 2008–09 caused a sharp fall in commodity prices, the timing of the policies announced to increase the fiscal take was unfortunate. The windfall profit tax introduced in 2008 was repealed after it was deemed to introduce inconsistencies. Renewed calls for its reintroduction were prompted as prices rebounded. Further changes were announced in October 2012, including reducing capital allowances from 100 per cent to 25 per cent – that is, capital expenditure has to be written off over a period of four years rather than in one year – and the introduction of a new property transfer tax.

The changes introduced to the mining tax regime have largely been in response to perceptions that the sector's contributions to government revenue have been too low. Indeed, the revenue collected from mines following privatization was minimal due in part to favourable tax concessions granted at privatization (IMF 2010b) but also to low levels of initial profitability. However, tax revenue from the sector has increased substantially since 2009 and is now high compared to other mineral-driven countries (see Chapter 3).

Table 5: **Changes to the mineral fiscal regime in Zambia (2006–12)**

	2006	2007	2008	2009	2012
Royalty	0.6%	3%	3%	3%	6%
CIT	25%	30%	30%	30%	30%
Variable profits tax	No	No	Yes	Yes	Yes
Hedging activity considered part of the mining business	Yes	Yes	No	Yes	No
Windfall profit tax	No	No	Yes	No	No
Capital expenditure allowance	100% for all capital expenditure	100% for all capital expenditure	100% for prospecting and exploratory work, 25% for other capital expenditure	100% for all capital expenditure	25% for all capital expenditure
Loss carry forward	10 years	10 years	10 years	10 years	10 years
Custom duties	Exports are zero rated	Exports are zero rated	15% for unprocessed copper concentrate	15% for unprocessed copper concentrate	10% for unprocessed copper concentrate
Withholding taxes (non-treaty rate):					
On income of foreign subcontractors and interest	0%	0%	15%	15%	15%
On dividends and payments to residents	0%	0%	0%	0%	0%

Source: IMF 2012.

2.2 Zambia's mining sector today

This section first presents an overview of Zambia's copper mining sector and the four mining companies that participated in specific aspects of the study, followed by a discussion of the competitiveness-related challenges facing the sector.

2.2.1 Overview of the sector and participating mining companies

Zambia's large-scale copper mines are mainly located in Copperbelt Province and North-Western Province. The Copperbelt is the traditional centre for mining in Zambia, hosting the large copper mines that were previously run by ZCCM. Along with the capital Lusaka, the Copperbelt is the most developed and urbanized of Zambia's provinces. North-Western Province is referred to as the "New Copperbelt" as a result of the large mining investments that have taken place over the last decade. The province is largely rural with limited infrastructure and is the most sparsely populated of Zambia's nine provinces. Solwezi is the capital of the province and is also the district in which mining activity currently takes place. At the time of the current study, there were two large operating mines in the region, with several other projects at various stages of development.

The study focuses its local-level work on Copperbelt and North-Western Provinces. It uses government data, information from key informants and data provided by the four largest mining companies in Zambia: Konkola Copper Mines and Mopani Copper Mines from the Copperbelt and FQM Kansanshi and Barrick Lumwana from North-Western Province. These four mining companies were chosen as they account for over 70 per cent of current copper production in Zambia.

Table 6 gives an overview of the mining sector, with the four mining companies shown in bold. Figure 7 shows the geographic location of these mining companies, followed by a short description of each.

"Along with the capital Lusaka, the Copperbelt is the most developed and urbanized of Zambia's provinces. North-Western Province is referred to as the "New Copperbelt" as a result of the large mining investments that have taken place over the last decade."

Table 6: Overview of Zambia's copper mining sector   Source: United States Geological Survey 2012 and company data on Lubambe.

Mining company	Owner	Type of operation	Location of main facilities	Annual capacity (metric tonnes)
Lumwana Mining Company	**Barrick, 100%**	**Ore and concentrate**	**Lumwana mine (Malundwe pit)**	**20,000,000 ore**
Kansanshi Mining	**First Quantum Minerals, 79.4%, and ZCCM-IH, 20.6%**	**Ore and concentrate**	**Kansanshi mine, north of Solwezi**	**12,000,000 sulphide ore, 8,400,000 mixed ore, 6,100,000 oxide ore**
		Metal	**Kansanshi high-pressure leach and solvent extraction-electrowinning plant**	**250,000 copper cathode**
Konkola Copper Mines	**Vedanta Resources, 79.4%, and ZCCM-IH, 20.6%**	**Ore and concentrate**	**Chingola open pit A and Nchanga open pit, Chingola**	**4,500,000 ore**
			Nchanga underground mine, Chingola	**2,800,000 ore**
			Konkola mine, Chililabombwe	**2,400,000 ore**
			Fitwaola open pit, Chingola	**n/a**
			Tailings dams reprocessing, Chingola	**n/a**
		Metal	**Tailings leach plant at Chingola**	**80,000 copper cathode**
			Nchanga copper smelter, Chingola	**311,000 copper anode (blister copper), 3,000 copper-cobalt alloy**
			Nkana copper refinery, Kitwe	**300,000 copper cathode**
Mopani Copper Mines	**Glencore International AG, 73.1%, First Quantum Minerals, 16.9% and ZCCM-IH, 10%**	**Ore and concentrate**	**Nkana mine, including various underground and open pit operations**	**5,500,000 ore**
			Mufulira mine	**2,500,000 ore**
		Metal	**Mufulira *in situ* leach and solvent extraction-electrowinning plant**	**17,000 copper cathode**
			Mufulira (Isasmelt) smelter	**200,000 copper anode**
			Mufulira refinery	**275,000 copper cathode**
			Nkana solvent extraction plant	**15,000 copper cathode**
			Nkana cobalt plant	**2,400 cobalt metal**
First Quantum Mining and Operations	First Quantum Minerals, 100%	Metal	Bwana Mkubwa solvent extraction-electrowinning plant, near Ndola	52,000 copper cathode
CNMC Luanshya Copper Mines	NFC Africa Mining, 100%	Ore and concentrate	Baluba underground mine	1,800,000 ore
NFC Africa Mining	China Nonferrous Metal Mining (Group) Company, 85% and ZCCM-IH, 15%	Ore and concentrate	Chambishi mine	800,000 ore
Chambishi Copper Smelting Company	China Nonferrous Metal Mining (Group) Company, 60% and Yunnan Copper Industry (Group), 40%	Metal	Chambishi copper smelter	150,000 copper anode (blister copper)
Sino-Metals Leach Zambia	China Nonferrous Metals Mining (Group) Company, Sino-Africa Mining Investments, NFC Africa Mining and China Hainan Construction Company	Metal	Chambishi	8,000 copper cathode
Chibuluma Mines	Metorex, 85%, and ZCCM-IH, 15%	Ore and concentrate	Chibuluma South mine, 12 kilometres west of Kitwe	600,000 ore
Sable Zinc Kabwe	Metorex, 100%	Metal	Sable copper leach and electrowinning plant at Kabwe	14,000 copper cathode, 600 cobalt carbonate
Albidon	Jinchuan Group Resources Holdings	Ore and concentrate	Munali nickel mine in Mazabuka, about 60 kilometres south of Lusaka	about 1,200,000 ore
Chambishi Metals	Eurasian Natural Resources Corporation, 90% and ZCCM-IH, 10%	Metal	Chambishi cobalt plant	27,000 copper cathode, 3,400 cobalt metal
Lubambe Copper Mine	African Rainbow Minerals, 40%, VALE SA, 40% and ZCCM-IH, 20%	Ore and concentrate	Lubambe underground mine, north of Chililabombwe	2,500,000 ore (commenced operations in latter half of 2012 and ramping up towards full production)

Context: the mining industry in Zambia

Figure 7: Map of the four mining companies

Mining companies

1 Barrick Lumwana
2 FQM Kansanshi
3 Konkola Copper Mines
4 Mopani Copper Mines

Barrick Lumwana (Lumwana)

The Lumwana copper mine is located 100km to the west of Solwezi town in a rural area that was sparsely populated but has experienced high levels of in-migration. The mine lies within three chiefdoms – mostly within Mukumbi but the mine also borders Mumena and Matebo. It is owned and operated by Lumwana Mining Company, wholly owned by the Canadian mining company Barrick, the world's largest gold producer. Barrick acquired the mine from Equinox Minerals in 2011. Unlike the other three mines, there is no government ownership in Lumwana through ZCCM-IH as the previously held shares by ZCCM-IH in Equinox were sold.

The mine has two open pits and produces a sulphide concentrate that is sold to Zambian smelters. The ore also contains uranium, but this is not extracted at present. 262,000 metric tonnes of copper were produced in 2012. In May 2013, Lumwana had 1,827 direct employees on its payroll and 3,947 contractors.

FQM Kansanshi (Kansanshi)

The Kansanshi mine is located 10km north of Solwezi town. It is 79.4 per cent owned by First Quantum Minerals, a Canadian company headquartered in Vancouver, British Columbia. The remaining 20.6 per cent is owned by ZCCM-IH.

Although commercial exploration and limited commercial mining activity has taken place at Kansanshi since the 1970s, the mine only began large-scale production in 2005 and has since gone through several expansions. In 2012, production was 261,351 metric tonnes of copper and 136,056 ounces of gold, but an expansion project currently under way will bring capacity to 400,000 metric tonnes of copper in the next few years.

Mining is carried out in two open pits. Sulphide ore is turned into a concentrate, while oxide ore is treated through a solvent extraction and electrowinning (SX/EW) process to produce cathode copper. The sulphide concentrate is at present sold to smelters in Zambia, while copper cathodes are exported.

The mine is building a smelter with a capacity of 300,000 metric tonnes of copper, to procss the sulphide concentrate from Kansanshi. The sulphur will be recovered and converted to sulphuric acid to be used in the leaching of the oxide ore. First Quantum is also developing the Sentinel mining project in North-Western Province, which is to be opened in mid-2014. In 2012, Kansanshi had 2,124 direct employees and 10,084 contractors.

Konkola Copper Mines (KCM)

The operations that now constitute KCM were acquired by Anglo American through privatization in 2000 but were sold back to the state in 2002. Vedanta Resources, a London-listed diversified metals and mining company with the bulk of its operations in India, bought the operations in 2004. Vedanta currently holds 79.4 per cent of the ordinary shares of KCM, with the remaining 20.6 per cent held by ZCCM-IH. From 2005 to 2012, KCM invested about US$2.6 billion, including a new smelter and a sulphuric acid plant, as well as developing the Konkola Deep Mining Project, which will allow mining down to 1,500 metres depth and extend the life of the mine by 30 years.

KCM operates four main mines: Nchanga open pit, Nchanga underground, the Konkola underground operations (all in the Copperbelt) and the Nampundwe pyrite underground mine and concentrator (in Central Province). The company operates a smelter at Nchanga and a refinery at Nkana. In 2012, KCM produced 138,720 metric tonnes of copper cathodes from its own mines and a further 61,043 metric tonnes through custom smelting for other companies. It also produced 1,052 metric tonnes of cobalt. KCM employed 8,371 people directly in 2012, and some 15,138 contractors – reflecting several ongoing investment projects.

Mopani Copper Mines (Mopani)

Mopani is 73.1 per cent owned by Glencore Xstrata, a mining and commodity trading company,[18] 16.9 per cent by First Quantum, a Canadian mining company, and 10 per cent by ZCCM-IH. The operations were acquired by Glencore in 2000 through privatization. The company invested some US$2.3 billion between 2000 and 2012, including new smelter facilities and acid plants.

Mopani's operations at Mufulira include an underground mine and leaching operations, as well as a smelter (built in 2006) and a refinery. At Nkana mine (in Kitwe), in operation since 1932, the company operates four underground shafts and several small open pits. Mopani produced 98,970 metric tonnes of copper from its own mines in 2012. In addition, 18,834 metric tonnes were produced from purchased material and 69,294 metric tonnes were toll smelted. Mopani produced 69 metric tonnes of cobalt from its own ores in 2012 and 165 metric tonnes from purchased material. In December 2012, Mopani employed 8,475 people directly and had 8,708 contract workers.

2.3 Competitiveness challenges facing the sector

The costs of production in Zambian copper mines are high from an international perspective. Underlying the high costs are high transport costs, and relatively high costs for labour and energy. The older mines in the Copperbelt are among the world's most expensive to operate because they are underground, have a complicated geology and very low productivity. They have also had to make major investments following privatization to bring the mines up to acceptable technical and environmental standards, compensating for several years of low investment by ZCCM. Figure 8 shows the cash costs[19] of different copper mines around the world.

Given the high costs, relatively minor changes in economic circumstances or prices could jeopardize continued operations and risk large retrenchments.[20] Policy should therefore be designed to address those categories of cost that are critical to the international competitiveness of the industry. The subsections below discuss the most relevant "cash" operating costs in the Zambian context.

2.3.1 Transport costs

Zambia is a land locked country, so both imported and exported products must be transported long distances.[21] Fuel prices are high, and transport options are limited. Mining companies mostly use road transport, as rail networks are perceived as costly, unreliable and slow (Engman 2009).[22]

According to mining companies, road transport costs from the Copperbelt to any of the ports that can be used vary from US$120 per metric tonne for Beira to US$165 for Durban. Although more proximate ports such as Beira have lower costs for land transport, this is offset by higher costs for sea freight due to less frequently used and accessible ports, such that the total cost from smelter to customer port comes to the same for, for example, Beira and Durban, at US$190–200 per metric tonne, including insurance, handling and port charges. These costs also reflect the need for trucks to travel in convoy with security and only travel by day because of the risk of theft.[23]

Figure 8: Cash costs in world copper mines, 2011
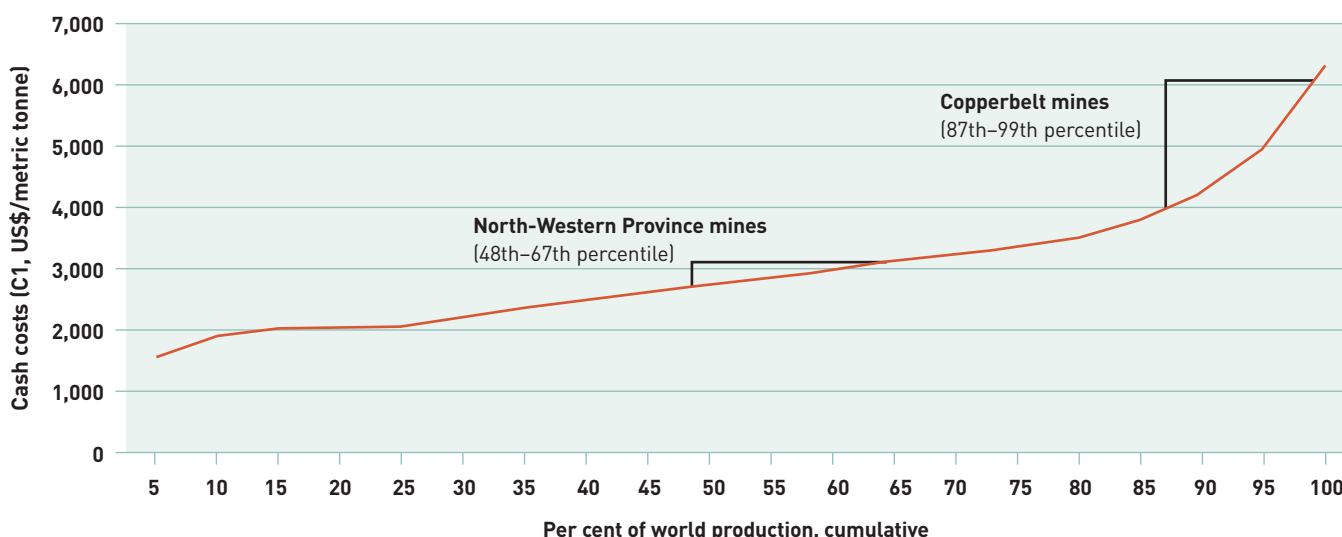

Source: Raw Materials Group.

---

19 Direct cash costs (C1) include the costs of mining, milling and concentrating; on-site administration and general expenses; property taxes; metal concentrate treatment charges; and freight and marketing costs less the net value of by-product credits. An alternative measure is C3 "fully allocated costs", which also includes depreciation, royalties, exploration and evaluation expenses, administration expenses and non-routine charges. Given the difficulty of making international comparisons of some of these elements, the focus here is on C1 cash costs.

20 In May 2013, it was reported in the press that KCM planned to cut 2,000 jobs. In a statement, the company said: "With the depression in the copper price, KCM needs to make business changes to remain economically viable" (Creamer Media's *Mining Weekly*, 24 May 2013).

21 The two main ports used are distant: 1,800km to Dar es Salaam, Tanzania and 2,600km to Durban, South Africa. Other less-used alternatives are Beira in Mozambique and Walvis Bay in Namibia.

22 This is mostly due to a lack of investment – in the 1960s and 1970s all 700,000 metric tonnes of copper produced at the time were transported by rail. The rail monopoly came to an end after privatization, and most copper has been transported by road since the 1990s as trucking became more competitive and reliable than rail.

23 One company also noted that competition for transport from mining companies in the DRC has driven up trucking costs.

Figure 9: Productivity, copper production/employee (direct and contractors)

Metric tonnes per employee/year
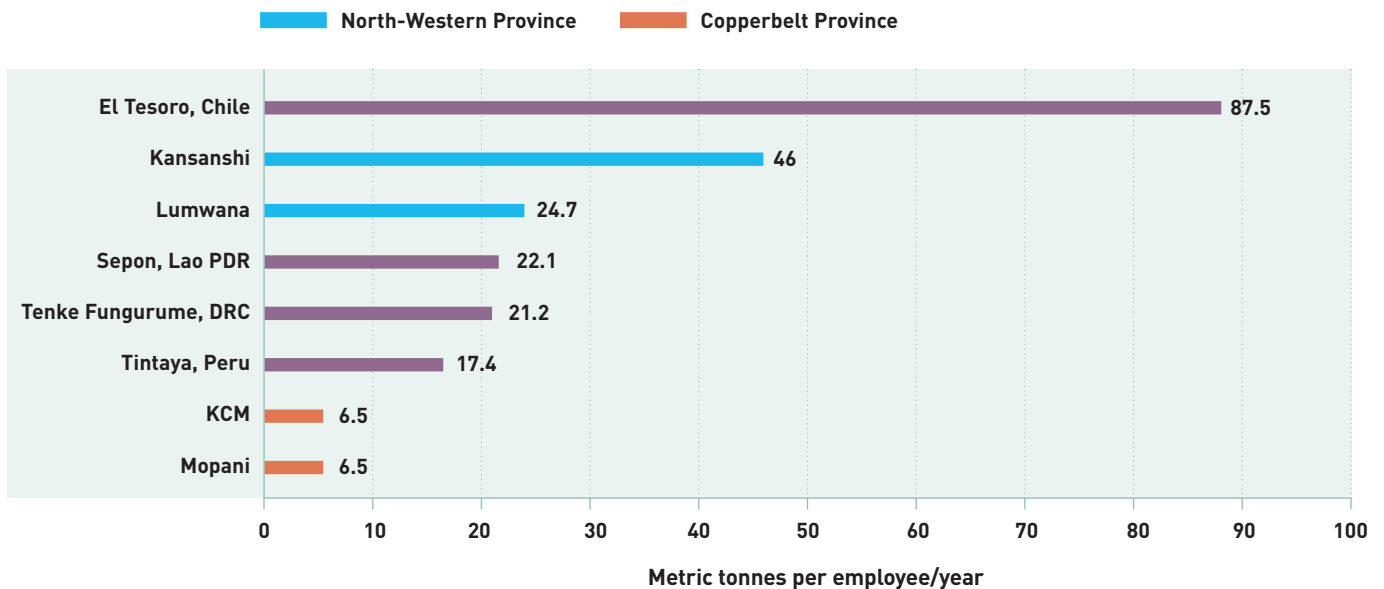
Source: Company data.

The transport cost for imported inputs is about double that of exports per metric tonne because of the unfavourable ratio between volume and weight. The cost of transporting copper as concentrate is almost three times as high.[24] The high transport costs are the main reason that the copper industry has been vertically integrated from early in its history.

"The older mines in the Copperbelt are among the world's most expensive to operate because they are underground, have a complicated geology and very low productivity."

2.3.2 Labour costs

Production per employee in the two Copperbelt mining companies is well below the global industry average of similar-sized mines – partly reflecting the underground nature of the older operations (see Figure 9). The two largest mines in the Copperbelt produce roughly 6.5 metric tonnes of copper per annum per employee. To put this in context, Tenke Fungurume mine (TFM) across the border in the DRC produces 21.2 metric tonnes per employee, and the El Tesoro mine in Chile produces 87.5 metric tonnes per employee per year.

Low productivity per worker does not necessarily imply high costs if salaries are correspondingly lower, yet salaries in Zambia are typically comparable across countries with higher-productivity mines.

Among the four mining companies under study, the lowest monthly salary was US$619.80 and the median salary was about US$800.[25] At the TFM in neighbouring DRC, the median salary is about US$400 excluding allowances.[26] In South Africa, the entry-level wage is reported to be 5,000 rand (excluding allowances), or US$512.[27]

24 The cost of transporting concentrate is higher than that of cathodes – about three times as high per metric tonne of contained copper – meaning that the total transport cost, if government permission to export could be obtained and the concentrate export tax were abolished, would correspond to 10–15 per cent of the realized price at current prices.

25 To put this in context, the minimum wage in Zambia is US$128.

26 Communication from TFM.

27 Creamer Media's *Mining Weekly*, 10 July 2013.

Figure 10: Number of direct employees and average salaries (2006–12)

—— Employees (left axis) ▮ Annual wage costs per employee (right axis)

Source: Company data (the North-Western Province graph refers only to Kansanshi).

Figure 10 illustrates that average salaries are higher in the more highly mechanized North-Western Province mines, and average salaries increase over time as the mines become more highly mechanized. This latter trend appears to be particularly important in the Copperbelt, where the average remuneration has increased relatively quickly at the same time as the number of employees has fallen.

In conclusion, while salary costs appear to be high in the Zambian mining industry seen in a regional African perspective, this challenge is more pronounced for the older mines in the Copperbelt (where labour costs represent around 30 per cent of operating costs) compared to North-Western Province (where Kansanshi's labour costs are below 10 per cent of operating costs).

Over time, there has been an increase in investment to raise productivity in the mines. This has resulted in fewer employees in Copperbelt mines but with higher average salaries. Based on the forward-looking analysis in Section 3.2, this trend is likely to continue in the medium term.

2.3.3 Purchased inputs

Zambia has a limited manufacturing base to supply the mining sector, and the competitiveness of local small and medium enterprises (SMEs) has fallen due to real appreciation of the kwacha over recent years (see Figure 14). As a result, most of the material inputs are imported (often through local agents) and have to be transported long distances (see also Section 4.1.3). According to the mining companies, equipment suppliers also charge higher prices in Africa, in general, and in Zambia, in particular, than elsewhere.

Over time, if costs in local manufacturing could be brought down, the establishment of a local manufacturing presence could ease some of the cost pressures for the mining industry and contribute to local employment. In the short run, most inputs will continue to be manufactured abroad, but government can directly and indirectly influence the cost of mining inputs. However, recent policies regarding foreign exchange appear to have the unintended consequence of increasing costs for firms. It also negates efforts by mining companies to develop local suppliers and enhance the mining sector's contribution to employment and economic diversification (see Section 4.1.3).

Box 1: The impact of Statutory Instruments (SIs) 33 and 78 of 2012, and 32 of 2013

To promote the government's objective of reinforcing the use of the kwacha in domestic transactions, SI 33 (2012) forbids the use of foreign currencies in transactions between parties domiciled in Zambia. SI 33 requires that transactions between Zambian entities must be carried out in kwacha. This means Zambian mining suppliers of imported inputs have to invoice mining companies in kwacha while their payments to their suppliers are made in foreign currency.

Complying with SI 33 of 2012 has had several unintended consequences:

• For mining companies, converting sales proceeds in USD in kwacha to pay for supplies constitutes an unnecessary transaction cost that, according to all the mining companies contacted, adds about 4 per cent to the mining companies' costs. Moreover, where contracts include long-term pricing commitments, the currency risk also has to be borne by production costs. Since SI 78 of 2012 forbids foreign exchange hedging or, indeed, all reference to foreign currencies in contracts, significant cost is attached to dealing with this risk.

• Mining companies could avoid these costs by buying directly from foreign suppliers (in which case invoices can be submitted in the foreign currency), but this would take business away from Zambian trading companies. Thus far, the mining companies have not resorted to this.

• Currency controls also make it more difficult to attract qualified expatriate staff for specialized positions since most such staff insist on being paid in foreign currencies.

• Finally, equipment suppliers that use Zambia as a regional supply centre are now said to be considering moving elsewhere, since the regulations reduce the viability of their operations.

The more recent introduction of monitoring of foreign exchange transactions through SI 32 of 2013 has potentially even more serious unintended consequences for the mining sector. While the regulation requires the use of letters of credit, the Zambian banking system has little experience of such transactions, which are in any case not used by Zambian mining companies, who prefer faster and more flexible payment procedures. Accordingly, long delays and large costs can be expected, making both exports and imports more cumbersome and costly, again raising the cost to Zambian copper producers.

Another recent change should probably be interpreted as being motivated by similar concerns as the statutory instruments. The ZRA has recently started enforcing a regulation that was put in place in 2007 (but previously never enforced) that requires exporters to obtain documents from the revenue authority in the destination country proving that the copper has indeed arrived there before the ZRA will release any VAT refunds. The consequences to mining companies are potentially very serious. Although the VAT will eventually be refunded, the exporters will have to finance the extra capital requirements. This could easily wipe out any profits. The measure goes much beyond standard international practice, which is to release VAT refunds as soon as possible, subject to normal administrative procedures. By way of comparison, the EU (where such a measure would be much less onerous on intra-EU exporters because of shorter transport distances and faster-moving tax authorities, and which certainly has a problem with VAT fraud) tax authorities have stopped well short of anything resembling the ZRA measure. Instead, exporters are required to include the VAT number of the buyer on their invoices, thereby facilitating controls based on analysis of past performance. It is difficult to understand why Zambian authorities would want to impede exports in the way described, particularly since the fiscal gain is minimal when you take into account the fact that the additional financing cost will be deducted from the income taxable for CIT purposes.

"In most countries electricity providers follow a practice of large discounts to very large users. The Zambian copper industry does not appear to benefit from any such tariff discounts."

2.3.4 Energy costs

Energy costs, in particular electricity tariffs, have attracted much attention and controversy in recent years. The cost of energy for mines on the Copperbelt – which are supplied by Copperbelt Electricity Corporation – has more than doubled since 2004, from around 3.3 US cents/kWh to about 7.3 US cents/kWh. Mines in North-Western Province are supplied by Zambia Electricity Supply Corporation and pay on average just over 9 cents/kWh.

By way of comparison, the average price for industrial consumers in the United States in 2012 was 6.7 cents/kWh (United States Energy Information Administration 2013). In the EU, the average price was considerably higher at 12.7 US cents/kWh (Eurostat 2012), but this tariff is applied to medium-size consumers – in most countries electricity providers follow a practice of large discounts to very large users. The Zambian copper industry does not appear to benefit from any such tariff discounts.

Context: the mining industry in Zambia

Rates are structured around two elements – "maximum demand" and a rate per kWh actually used – both of which have increased by more than 30 per cent in 2008 and 2011. As electricity accounts for 10–15 per cent of operating costs at the integrated mines (with smelters), it is clear that the power tariff increases over the last few years have had a significant impact on production costs and competitiveness.

The lack of reliable power supply is potentially of even greater significance in terms of costs. Power cuts can have disastrous consequences for mining companies such as KCM that depend on power to pump water from deep underground mines.[28] Variations in voltage have also led to significant production losses and damaged equipment at the mines.

The organization of power distribution in the Copperbelt with a private company, Copperbelt Electricity Corporation (which is majority owned by the also private Zambian Energy Corporation), holding a monopoly on power distribution may influence power tariffs in unintended ways. Most countries try to either avoid according monopolies in power distribution to private companies or, if opening up the field to several companies is impossible, regulate tariffs very strictly. This does not appear to be the case in Zambia.

"As electricity accounts for 10–15 per cent of operating costs at the integrated mines (with smelters), it is clear that the power tariff increases over the last few years have had a significant impact on production costs and competitiveness."

28 In 2008, Zambia had a power outage that lasted three days. Five years later, KCM is still trying to remove the excess water that accumulated in the mine over the course of those three days and it will take another three years before the water level will be back to where it was before the power outage. Meanwhile, KCM has invested US$75 million in a backup diesel generator.

Macroeconomic contributions of mining

3

3. Macroeconomic contributions of mining

This chapter presents past, present and future contributions from mining. It first discusses mine production and macroeconomic contributions to date, from the industry as a whole. Second, it explores the possible macroeconomic contributions that the sector is likely to make in the next few years, by collating projections to 2022 from the four mining companies (ie KCM, Mopani, Kansanshi and Lumwana).

3.1 Macroeconomic contributions to date

This section presents the contributions to date from the copper mining sector. It finds that these contributions are high in an international context, and have become more so over time – highlighting the lack of diversification in Zambia's economy. Publicly available data on the mining sector is scarce, and ambiguities exist in relation to, for example, production and GDP data. Addressing these data gaps emerged as a clear priority during the breakout sessions of the November 2013 workshop. The section discusses the reasons for such ambiguities and possible ways of addressing them.

The section covers the following macro-level mining sector contributions:

- production
- exports and balance of payments
- investment and FDI
- national income (GDP)
- government revenues
- employment.

Figure 11: Zambia copper production and share of global market (1963–2011)
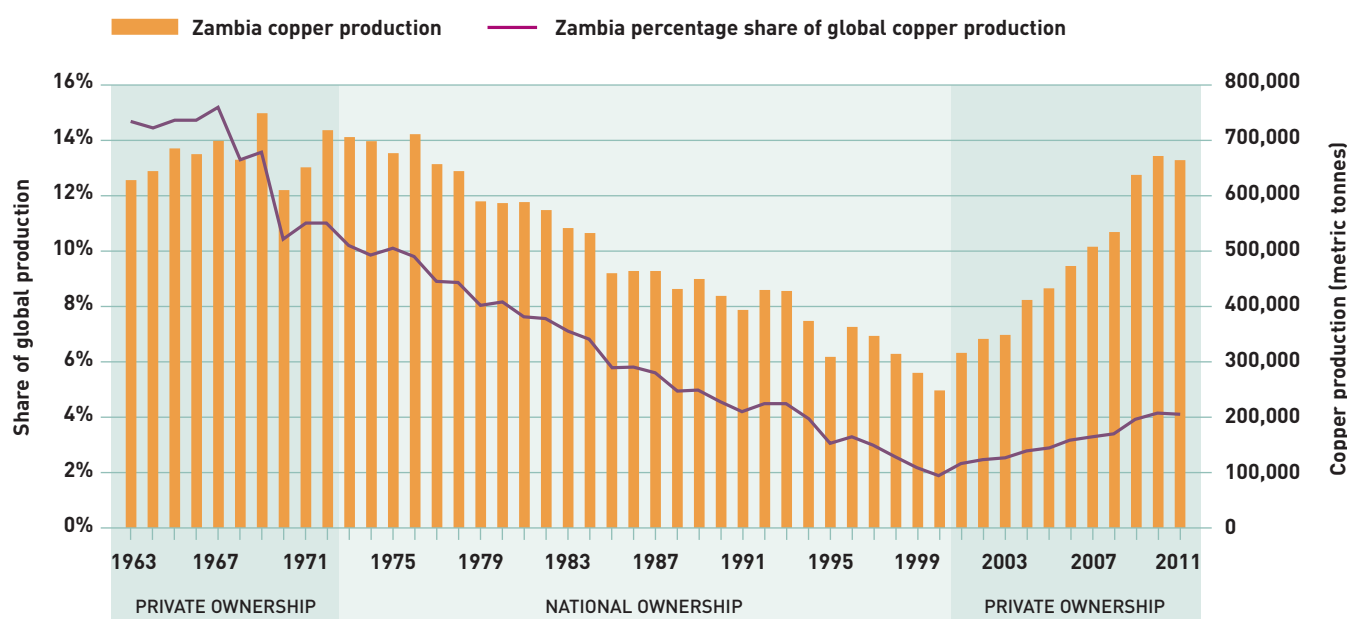
Source: International Copper Study Group (ICSG) from 1996 onwards (*Copper Bulletin* March 2012 and April 2013; *Yearbook* 2006; *Statistical Yearbook* 2008), US Geological Survey annual mineral reports 1963–95.

Box 2: The 2012 Wood Mackenzie report on copper production in Zambia

Research carried out by Wood Mackenzie in 2012 shows that the statistics published regularly by the BoZ, based on data collected by the Ministry of Mines, are considerably at odds with estimates produced by other reporting agencies.

Table 7, which is reproduced from that Wood Mackenzie report, summarizes these discrepancies. It illustrates the differences in 2011 between the BoZ data (sourced from the fortnightly statistics from the BoZ website but originating from the Ministry of Mines)[29] and the numbers reported by the ICSG,[30] the World Bureau of Metal Statistics (WBMS), the US Geological Survey (USGS, *Mineral commodity summaries 2012*) and the estimates from Wood Mackenzie's own mining consulting team.[31]

Wood Mackenzie's report explains these large differences by referring to a combination of:

- **the technical complexities of the copper mining and processing operations that can result in genuine confusions about how to aggregate the outputs from the different elements of the production chain**

- **significant quantities of intermediates (concentrates and black copper) and cathodes from the DRC that pass through Zambia and may be partly misclassified as having been produced within Zambia**

- **some mining companies seeming to report insufficient or confusing information about their output and often aggregating intermediate production with finished product data.**

Table 7: Zambian Copper Production in 2011

2011 (kt Cu)	Mine Contained	Mine Commercial	Smelter	Refinery	Other
BoZ	–	–	–	–	881
ICSG	667	–	511	515	–
USGS	715	–	–	–	–
WBMS	784	–	384	696	–
Wood McKenzie	672	659	496	522	–

Source: BoZ, ICSG, USGS, WBMS and Wood Mackenzie.

3.1.1 Mining production

Zambia's copper production fell from around 700,000 metric tonnes at independence to less than 250,000 metric tonnes by 2000 (see Figure 11). Although production volumes have recovered strongly since privatization, and Zambia remains a big player in global supply, its market share has not recovered to the levels seen in the 1970s.

Reliable data on production volumes is a critical input into any assessment of macro contributions from mining, yet some ambiguities exist around what constitutes the "right" numbers. Research carried out by Wood Mackenzie (2012) suggests that the data published by the BoZ overstates production figures. Production figures published by the

International Copper Study Group (ICSG) – an intergovernmental body of which Zambia is a member and which is recognized as the premier source of copper market data – are also lower than those of the BoZ, by around 200,000 metric tonnes/year (see Box 2).

The lack of authoritative and definitive domestic data on production reflects a broader problem of capacity weaknesses – in this case, of inadequate statistical and analytical capacities both in the Chamber of Mines and in various government departments and agencies.[32] These discrepancies in the Zambian numbers are being resolved through the work of the ZRA Mineral Value Chain Monitoring Project constituted earlier in 2013 (see Box 3).

29 It is understood that the data is collected using Form 39A that has been in use for many years. Both the CSO and the Chamber of Mines believe that this reporting form could be significantly improved and that this could help to eliminate at least some of the ambiguities about the mine production data.

30 The ICSG is an intergovernmental body of which Zambia is a member. Its data reflects reports from its member governments, adjusted through a method of consolidation by its Statistical Committee.

31 The first of these reflects the conventional methodology for deriving copper mine output, that is, the copper content of concentrates produced plus SX/EW copper. The second reflects commercial mine production after allowing for domestic smelting and refining losses and is a closer representation of net saleable metal produced by Zambian copper mines.

32 The absence of any production data on the websites of either the ministry or the chamber is but one manifestation of this.

Box 3: ZRA Mineral Value Chain Monitoring Project

The Mineral Value Chain Monitoring Project was set up by the ZRA in early 2013. The team is headed by Pius Maambo (a former operations and corporate planning director at ZCCM) and includes three additional experts: Dr Sixtus Mulenga (a mining geologist consultant), Dr Silane Mwenechanya (a metallurgist) and Urbano Mutati (former ZCCM general manager). The project is responsible for carrying out an independent assessment and verification of the levels of production in the entire mining industry in Zambia and for reviewing, developing and implementing a mechanism for monitoring the exports of these minerals. Currently, the ZRA does not have a reliable mineral production database, which limits its ability to monitor the industry and verify company data provided for tax and royalty payments. The project represents a first step in addressing this constraint by setting up a reliable system for the ZRA to use in monitoring Zambia's mineral value chain from production to export. The project has been working closely with private companies in the mining sector in Zambia over the course of 2013 and is expected to produce the initial results of its work late in 2013 or early in 2014.

"The rapid growth in export earnings since 2002 has been dominated by non-ferrous metals (especially copper) and reflects a combination of higher international copper prices and higher production fuelled by large investments into the privatized mining sector."

3.1.2 Exports and balance of payments

Zambia had the second-highest levels of "mineral export dependence" anywhere in the world in 2010.[33] Based on UNCTAD data, around 80 per cent of total exports of US$9 billion in that year were accounted for by mineral exports (US$7.2 billion in total). This represented a huge increase from the pre-privatization years of the 1990s (see Figure 12). The rapid growth in export earnings since 2002 has been dominated by non-ferrous metals (especially copper) and reflects a combination of higher international copper prices and higher production fuelled by large investments into the privatized mining sector. Other exports such as precious metals have also seen high growth rates but from a much smaller base (see also Annex A).

The large foreign exchange contributions coming from export earnings are offset in three main ways:

Payments to foreign providers of the ores (eg from the DRC) and other imported inputs that are used in various aspects of Zambian mining
By 2011, such imports by the mines represented almost 20 per cent of total imports as shown in Figure 13. After adjusting for these outgoings of foreign exchange, Zambia's net export earnings from minerals are still the equivalent of almost 70 per cent of the country's total exports (gross).

Imports of capital equipment (capex)
These have been large in recent years: imports of machinery and transport equipment into Zambia rose from less than US$300 million in 1995 to a peak of US$2 billion by 2011. Such imports have exceeded US$1 billion per annum in all years since 2005. Importantly, the impact of these capital goods imports on the country's balance of payments has been largely neutral, as payments for equipment on the current account are matched closely by a capital account inflow (through a mix of equity, retained profits and debt financing) to finance the new investment.
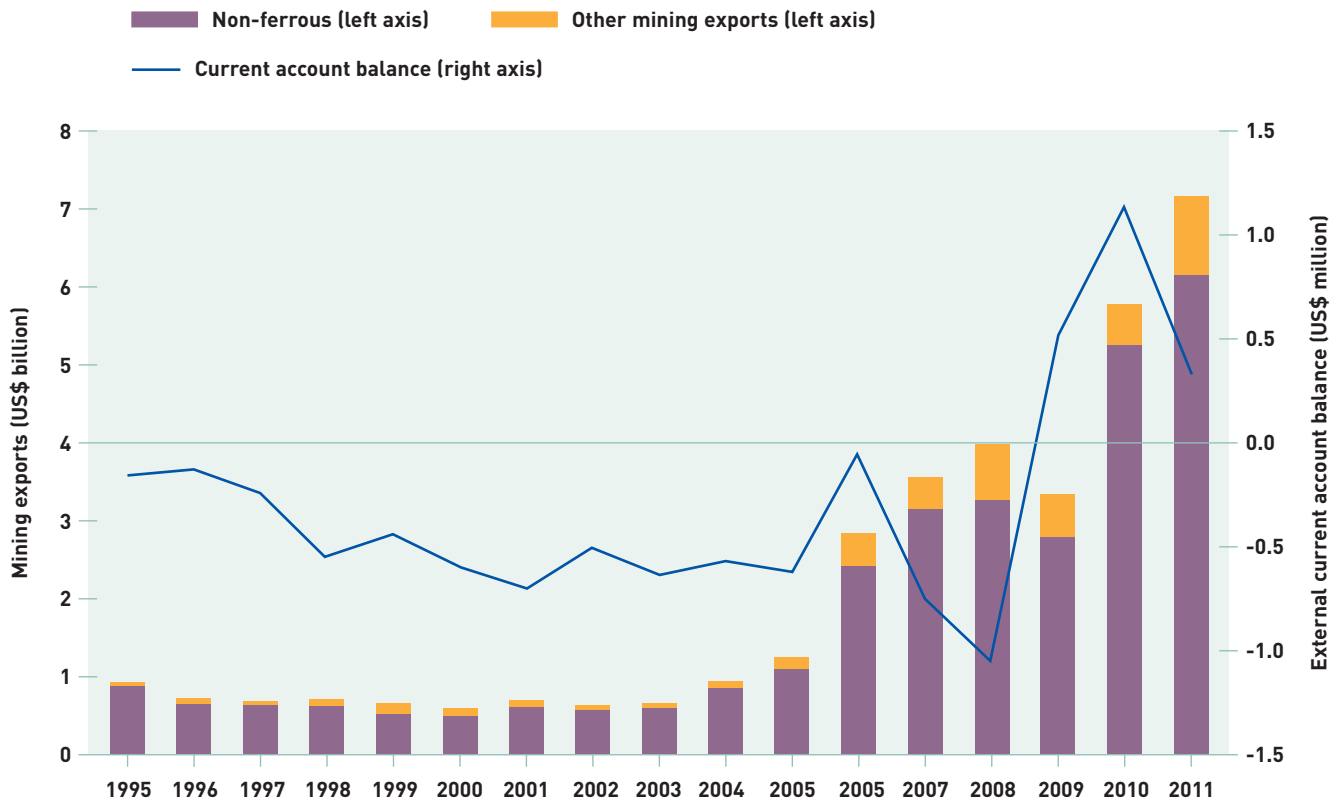
Profit repatriation and debt service
These offset the balance of payments inflows from mining. BoZ data confirms that Zambia's external trade surplus (currently around US$2.7 billion) is currently offset by external (outward) transfers[34] of circa US$1.5 billion annually.[35] These payments could well represent wholly legitimate payments of debt interest on past international borrowings linked to the large mining investments and the associated capital inflows made since 2000.

33 See also ICMM 2012b.

34 Such as payments of debt service and dividends.

35 This is the figure shown for both 2011 (estimate) and 2012 (projection) in Table 6 of the IMF Article IV report of 2012 (IMF 2012).

Figure 12: Zambia's mineral exports and balance of payments (1995–2011)

Legend:
- Non-ferrous (left axis)
- Other mining exports (left axis)
- Current account balance (right axis)

Source: UNCTADstats.

Figure 13: Imports of mineral products processed in Zambian facilities (1995–2011)

Legend:
- Mineral imports (% of total imports)
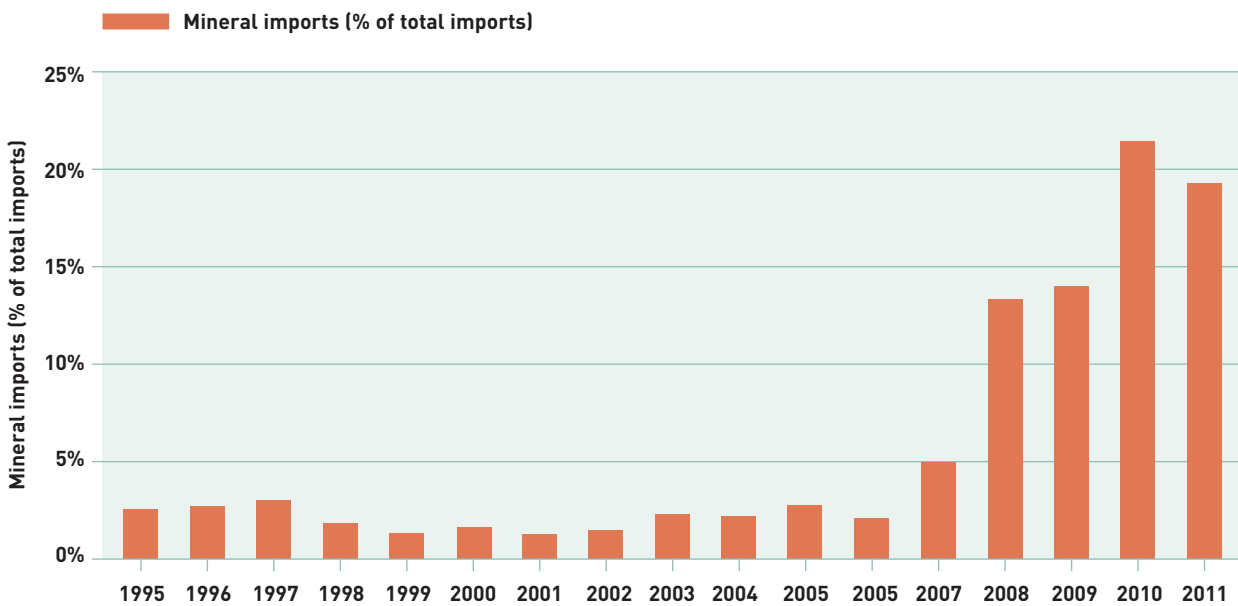
Source: UNCTADstats. Includes non-ferrous metal imports (SITC 68); other ores and metals (SITC 27 plus 28); and a small amount of imports of pearls, precious stones and non-monetary gold for further processing in Zambia (SITC 667 plus 971).

Macroeconomic contributions of mining

Even after recognizing the out-payments of about US$1.5 billion per annum, the current account balance of payments (see Figure 12) is much stronger now than it was at the turn of the millennium. The increased net contributions from mining also explain Zambia's current high level of international reserves (exceeding three months' imports).

There have been allegations from international NGOs and think tanks that additional – illicit – transfers by mining companies could amount to over US$500 million per annum on average.[36] Independent forensic audits are under way to try to establish the presence and possible magnitudes of such illicit flows.

It is not within the scope of this study to comment on the outcomes of the ongoing investigations. However, based on the data available to us, including the preliminary – and publicly available – leaked results of the Mopani audit and our understanding of the trading patterns of the different Zambian mining companies, some detailed comments on the specific issue of transfer mispricing are provided in Annex C, which also reviews the main NGO and academic literature underpinning these allegations. That annex should be read as a critical element of this report: it does not support the claim that large-scale transfer mispricing illegalities exist.

The recent boom in mining exports does, however, appear to be associated with the emergence of "Dutch disease", whereby inflows of currency and increased domestic demand push up prices, leading to falling competitiveness among domestic firms. The prevailing opinion of the BoZ seems to be that the nominal exchange rate has not appreciated as much as might have been expected given a long period of high copper prices through 2008. However, a comparison of nominal and real exchange rates points to substantial real exchange rate appreciation (see Figure 14). This appreciating real exchange rate reflects in turn high inflation differentials between Zambia and the global economy, negatively impacting the competitiveness of domestic Zambian mining suppliers and producers in non-mineral export sectors. To the extent that this tendency is confirmed, it will inevitably impact adversely on the prospects for rebuilding the manufacturing capacities of Zambia necessary to increase the levels of local procurement, and ultimately diversify the economy.

Figure 14: Nominal and real exchange rates (2004–12)
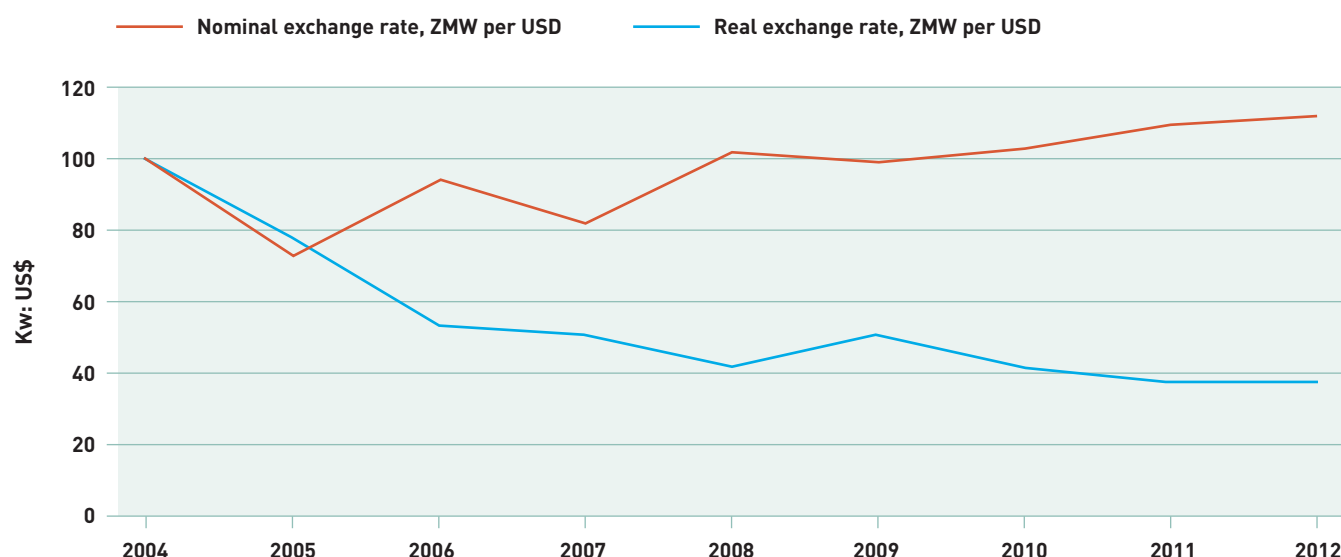
Source: OPM's calculations based on data from World Bank World Development Indicators and International Monetary Fund (IMF) World Economic Outlook database.

---

36 The estimated illicit flows provided by Global Financial Integrity range from zero to over US$1.3 billion (Global Financial Integrity 2012). A senior government official has recently been quoted as using an even more alarming figure for illicit payments by Zambian mines – US$2billion per annum. See Punabantu 2012.
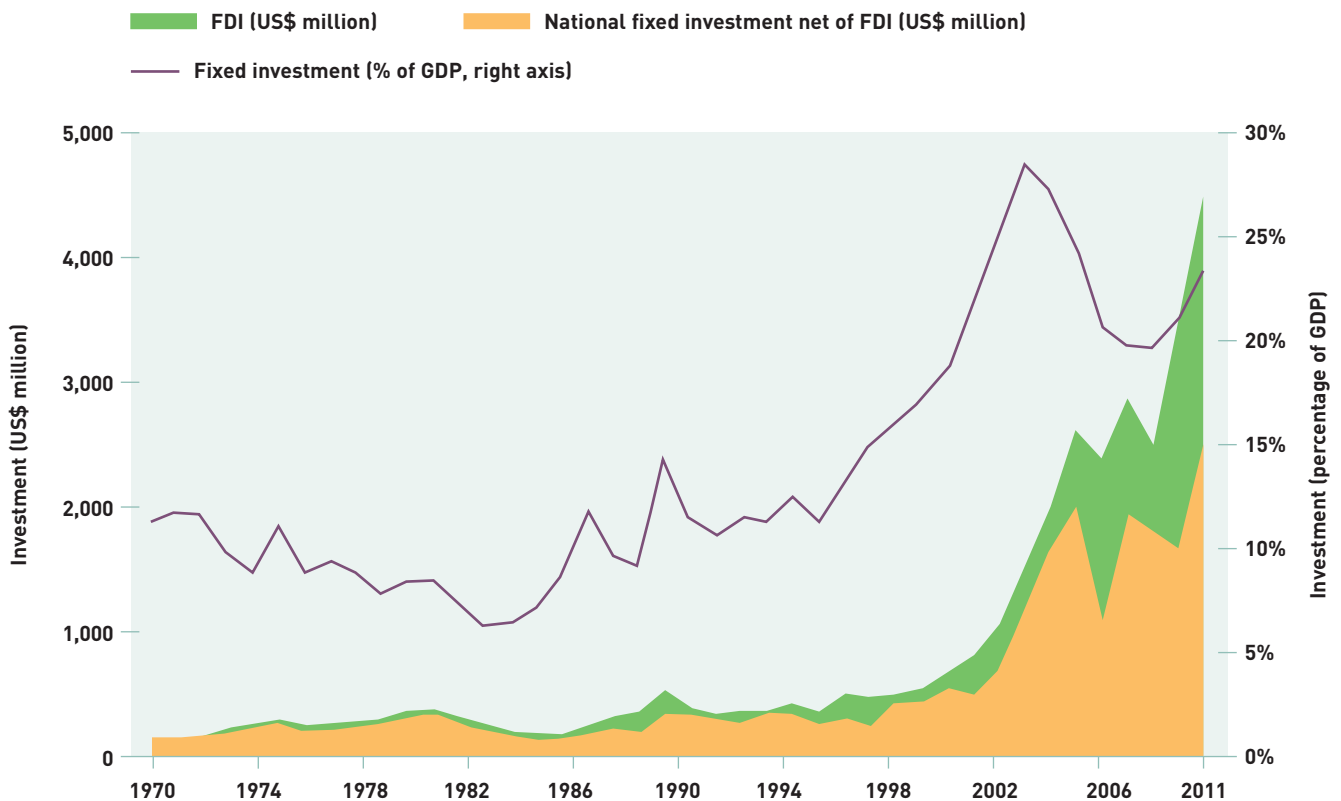
3.1.3 Investment and FDI

The national investment rate has risen sharply since the late 1990s, driven by increased FDI. Mining investments have dominated total FDI (see Figure 15). From the early 1970s through to the mid-1990s, the share of total investment in Zambia's GDP remained low in absolute terms but also more or less flat in relative terms (around 8–12 per cent of GDP). This situation changed after privatization, when the investment share of GDP rose rapidly to over 25 per cent of GDP by the mid-2000s as mining companies recapitalized operations in order to take advantage of higher mineral prices (see Figure 15).

This period from the end of the 1990s was associated with a significant rise in Zambia's ability to attract FDI. Total FDI increased from around US$90–200 million from 1970 through to the end of the 1990s, to over US$600 million annually by 2006, and rising to almost US$2 billion by 2011 (see Figure 15).

FDI flows have been dominated by mining. To illustrate, in 2011 new FDI into mining accounted for 86.2 per cent of total FDI (Zambia Development Agency). Cumulatively, since the privatization of the mining sector, FDI in mining has amounted to around US$10 billion,[37] equivalent to almost 70 per cent of Zambia's total FDI stock.

Figure 15: Mining's contribution to capital investment and FDI (1970–2011)

Source: UN Statistical Office and UNCTAD.

### 3.1.4 National income (GDP)

The ambiguities about the true levels of Zambia's mineral production are manifest in even greater uncertainty regarding the mineral sector's contribution to the main national income aggregates such as GDP. This leads to significant and confusing differences in various public statements about the size and contribution of the industry.[38] The technical problems here relate mainly to the seriously out-of-date base year and weights for the national income calculations (1994) made by the CSO – a problem that should be corrected once the results of the 2010 economic census are processed.

According to official CSO data, there has been a steady divergence between the constant and current price estimates of mining's contribution to GDP (see Figure 16). Over that 18-year period (1994–2012), the size of mining's contributions appears to have declined markedly despite the evident growth of mining's significance in all the other dimensions we have considered. Because of these counterintuitive trends in the official data, non-official reports have abandoned the use of the official data.[39]

The authors' view is that the GDP contribution of mining is notably higher than the 8 per cent (constant prices) and 2.6 per cent (current prices) reported by the CSO for 2012. This view is supported by research by Mbuta (2006) using CSO data, which shows that back in the late 1960s and through the mid-1970s mining was contributing well over 30 per cent of total Zambian GDP in current price terms. It is inconceivable that the contribution by 2012 at the end of sustained boom in the industry could have fallen as far as is suggested in Figure 16; it is much more likely that the data is incorrect.

An accurate understanding of mining's contribution to GDP matters hugely, as it represents – by definition – the total incomes produced by the mining sector, mainly comprising labour incomes (wages and salaries) and profits (operational surplus before tax and depreciation charges). In the process of preparing this report, we have made some effort to examine the root causes of the statistical problem and also to provide some alternative unofficial estimates. This work is reported in Annex G and suggests that mining's share of GDP is likely to be at least 12 per cent even in current prices. This compares to the existing official estimates of less than 4 per cent, and is included for reference in Figure 16.

Figure 16: Official estimates of the mining sector's contribution to GDP (1994–2012)
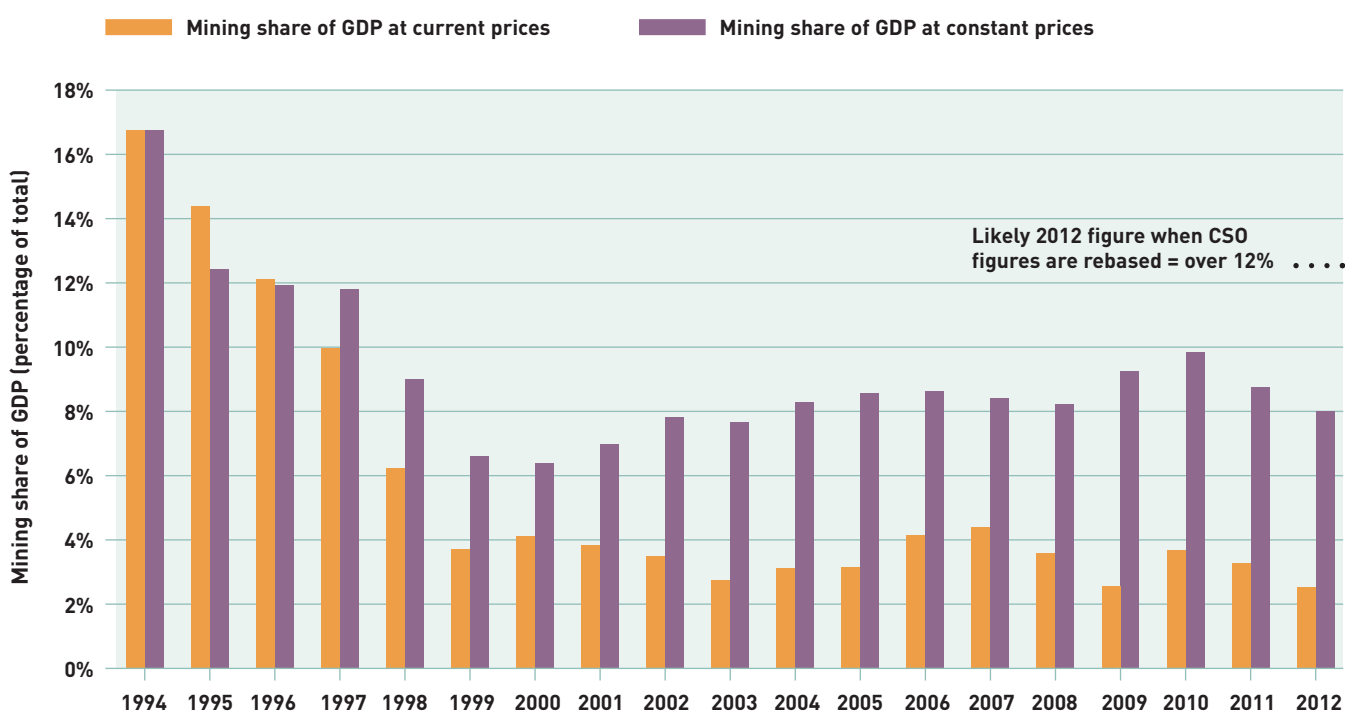
Source: CSO – data provided to OPM team.

---

38 Some of these sources show significantly larger percentage GDP contributions from mining than do the CSO data. For example, former president Rupiah Banda stated in 2010 that the GDP contribution of mining was already over 11 per cent but needed to increase to 20 per cent. This contrasted with the Vision 2030 document just a few years earlier that had anticipated the GDP share of mining declining to less than 3 per cent by 2030 as the economy diversified.

39 For example, World Bank 2011 (p iii) suggests a 15–18 per cent contribution to GDP.

### 3.1.5 Government revenues

Government revenues from mining have increased sharply since 2006. In 2012, mining taxes (including pay-as-you-earn (PAYE) employee taxes) and royalties were over 30 per cent of total government tax collections (representing around 5.9 per cent of GDP). If PAYE taxes are excluded, mining taxes still represent more than 25 per cent of all tax revenues. Taxes collected by the ZRA (providing the same detail as the 2010 Extractive Industries Transparency Initiative (EITI) report (ZEITI 2013) are shown in Figure 17. There are three main observations:

- Prior to 2008, the tax take from the mineral sector was very low (at less than Kw 1,000 million per annum – rebased).

- Even the low tax take from mining achieved by 2004 was 10 times the level in 1999 (Kw 224 million in 2004 versus only Kw 22 million in 1999).

- After 2008, the tax take from mining has increased rapidly (to reach Kw 6.619 billion by 2012).[40]

The increase in tax payments over a short period reflects the expiration of capital allowances (see Box 4 and Section 2.1.3) on the first wave of new investments after privatization, increased mining production and higher fiscal rates implemented since 2008. Moreover, recent reforms including the establishment of a large taxpayers' office in the ZRA will have increased the efficiency of tax collection.

The relative contribution that mining makes to government revenue is high by comparison with other mining countries.[41] Figure 18 shows the average government receipts from natural resources for a large number of mineral-driven countries. In terms of mining-revenue countries, Zambian Government receipts from the mining sector in 2012 outperform all mining-revenue countries other than Botswana.

Figure 17: **Mineral taxes collected by the ZRA (1995–2012), new Kw millions**

Source: ZRA.
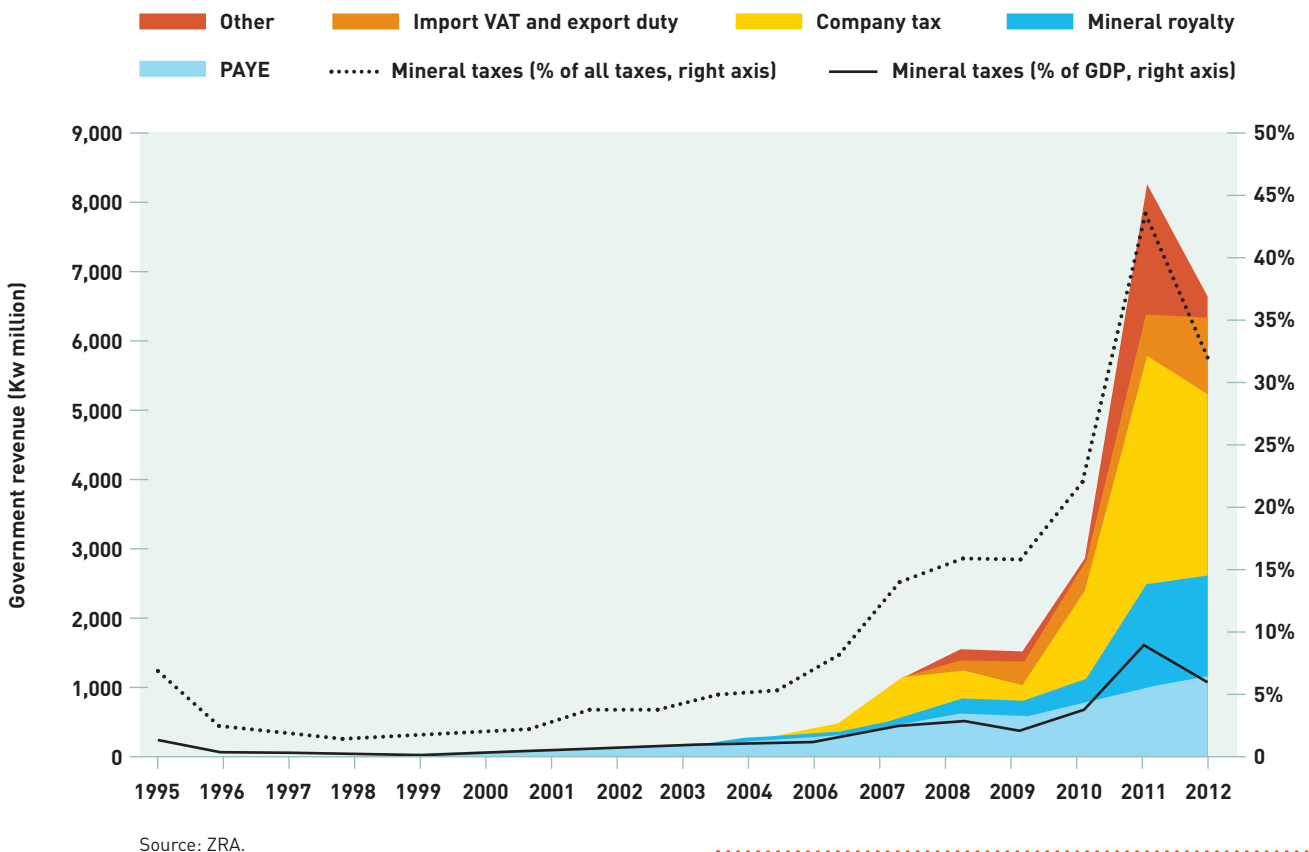
40 Note that the peak in tax receipts in 2011 reflects a large one-off payment of Kw 1,752 billion in tax arrears, mainly for the windfall profits tax, from previous years.

41 These contributions, although based on only partial data, nevertheless compare favourably with mining's contribution to total tax revenue as seen in other ICMM MPD Toolkit country case studies: Ghana (around 10 per cent of total taxes in 2007), Tanzania (3–4 per cent in 2007), Chile (15 per cent in 2007), Peru (5 per cent in 2007), Lao PDR (12 per cent in 2011) and Brazil (3 per cent in 2011).

Macroeconomic contributions of mining

The mining sector's contribution to Zambia's fiscal revenues is a controversial topic. Challenges include allegations of non-compliance (eg via transfer mispricing – see also Annex C) and concerns that the system of mineral taxation lacks sufficient checks to ensure that Zambia collects the revenues it is due (eg Conrad 2012).

Some aspects of the present tax system, such as the tax on concentrate exports, now extended to exports of blister copper, could also be questioned from the point of view of economic efficiency
(see Annex I).

Figure 18: International comparisons of mineral taxes

Average government receipts from natural resources 2000–11 (percentage of total government revenue)

Source: Daniel 2012 and ZRA data for Zambia 2012.

Box 4: Capital allowances in mining

It is standard accounting practice to distribute the cost of acquiring equipment over several years. The reason for this is that if the equipment is used over a long period, its cost should not be counted against the revenues of only one year. Tax authorities around the world generally follow the same practice, requiring the cost of equipment to be deducted against revenues over several years, corresponding roughly to the life of the piece of equipment. Such deductions are called "capital allowances" and are thus not allowances in the sense of something being given away by tax authorities to companies. Rather, they reflect the fact that the acquisition of equipment and turnkey projects to construct a mine are costs that companies can offset against income.

In the case of mining (and often as a general principle), many jurisdictions allow companies to deduct the cost of equipment over a shorter period than the equipment's productive life (see Table 8). This is called "accelerated depreciation". This practice does not affect the total amount of tax that is paid over the life of the mine, but it means that less tax is paid in earlier years and more in later years. Table 8 gives an overview of capital allowances in a sample of mining countries.

Table 8: Mining sector capital allowances in selected countries

Country	Period over which depreciation is permitted	Source
Peru	3% straight line for mine building and processing building. 20% straight line for mine equipment and processing equipment	Otto et al 2006
Kazakhstan	25% declining balance method	Investkz.com 2009
Chile	Three-year straight line	PricewaterhouseCoopers 2005
Zambia	25% per year (four-year straight line)	–
South Africa	Accelerated depreciation available	Mineral and Petroleum Resources Royalty Bill 2008
Mexico	One-time accelerated depreciation for new assets is allowed	Deloitte 2009
Australia	100% in first year	Deloitte 2010

"Many jurisdictions allow companies to deduct the cost of equipment over a shorter period than the equipment's productive life. This practice does not affect the total amount of tax that is paid over the life of the mine, but it means that less tax is paid in earlier years and more in later years."

Macroeconomic contributions of mining

3.1.6 Employment

The formal mining sector has never been a dominant employer of labour in Zambia at the national level. Even in the peak years of the 1970s, employment numbers in the large-scale mines represented only a small share of total nationwide employment.[42] Thereafter, direct employment (defined as people on the company's payroll and long-term contractors operating on the mine site) declined, especially in the post-Kaunda years after 1991 as ZCCM's fortunes waned. In 1991, the mining sector was estimated to employ 64,000 workers,[43] which was already lower than in the years of peak production. During the 1990s, as ZCCM prepared for privatization, employment fell further to around 22,000 (Fraser 2011).

Following privatization, direct employment numbers recovered strongly. Numbers reported in the sixth five-year plan[44] indicate a recovery of direct job numbers in mining to 46,706 by 2009 as the new private operations expanded (Government of Zambia 2011, p 124). Preliminary results of the Labour Force Survey for 2012 show an even larger increase, estimating aggregate employment in mining in 2012 of 90,000 (representing 1.7 per cent of total economy-wide employment).[45] In that same year, total formal-sector employment – in the public and private sectors – was 894,175 jobs (representing 16.6 per cent of total economy-wide employment).[46] Of this total, mining accounted for 74,254 jobs or 8.3 per cent of the total formal employment, and 25 per cent of total private sector formal employment.

According to Table 10 of the 2012 Labour Force Survey, only the sectors of Education (141,672 formal jobs), Agriculture (87,927 formal jobs) and Manufacturing (77,408 formal jobs) now directly employ more workers than mining. Although mining only accounts for 1.7 per cent of total nationwide employment, other country case studies have found a similar percentage contribution. The following points are worth highlighting:

- Mining is increasingly important as a source of direct jobs in the formal economy and especially in the private sector.

- In the two main mining provinces of Zambia, the percentage contribution of mining to total employment is obviously very much higher than the percentages shown above.

- Large-scale mining jobs are mostly well paid and increasingly skill-intensive.

Moreover, indirect employment, in firms supplying services and goods to the mining industry, adds a considerable number of employment opportunities that may not be captured under the heading of "mining" in national statistics (see Box 5).

"Although mining only accounts for 1.7 per cent of total nationwide employment, other country case studies have found a similar percentage contribution."

42 A significant number of Zambians work in informal artisanal mining, although the exact numbers of such workers are difficult to establish. Table 10 of the 2012 Labour Force Survey identifies a total of 4.5 million informal workers nationally in 2012 (defined as jobs not providing any entitlement to pensions, gratuities or social security; paid leave; and in establishments with five or fewer employees) as compared to 5.4 million employed persons in total. Of these, 15,749 informal jobs were in the mining sector. Table 13 of the same survey raises the numbers in informal mining current employment to 26,137 persons and reduces the numbers formally employed commensurately. Since much of informal mining is occasional or seasonal, the numbers are difficult to estimate and may be higher (Central Statistical Office 2013a).

43 Nyirenda and Shikwe 2003.

44 Government of Zambia 2011.

45 Table 6 in the Labour Force Survey 2012 (Central Statistical Office 2013a).

46 Table 7 in the Labour Force Survey 2012 (Central Statistical Office 2013a).

Box 5: Using employment multipliers to calculate indirect and induced employment

Employment multipliers are often large in mineral-driven countries, comprising both "indirect" employment effects (created as mines procure supplies from local enterprises) and the "induced" effects (as employees of both the mines and their suppliers spend their wages and salaries and so create additional demands and jobs in other supplying industries). Within the total of the multiplier effects, the induced employment is the often-forgotten part of the impact, but probably the most important from the point of view of overall poverty reduction in the Zambian case.

A recent World Bank study on Zambia based mainly on the Kansanshi mine estimated total employment, including direct, indirect and induced, at more than 300,000 in 2010; this implies an employment multiplier of more than five (McMahan and Tracy 2012). The total number of jobs is likely to have increased further since then as direct mining employment has risen. Our own independent estimates of output and income multipliers (reported in detail in Annex H) support the finding of a significant employment multiplier effect. These results suggest that mining – concentrated as it is in a limited number of districts – has an undoubtedly positive impact on income and employment in mining regions. Even with disappointing levels of local procurement of goods (not services), induced employment boosts total job numbers considerably, a result that has important implications for the type of economic development and growth that can be pursued in mining areas. In particular, important stimuli to local economic diversification and growth could result from a more efficient channelling of the large income increases in mining areas to investments in agriculture and SME development. Such investments could lead to sustainable production increases that would reduce local dependence on mining. For this to happen, efforts are needed to support skills development, raise the capacity of financial intermediaries, improve commercial infrastructure and reduce barriers to trade, including regulatory ones.

The recent growth of the mining sector has been rapid and the anticipated continuation of this trend (see Section 3.2.1) should provide the basis for a rising percentage of secure (non-vulnerable) labour market opportunities for many years to come. However, opportunities to broaden the base of the pyramid in Figure 1 by increasing indirect and induced employment are contingent on a range of institutional reforms and new modalities, including more ambitious local development planning, and partnerships of various types between mining companies, actual and prospective suppliers and the relevant agencies of government.

3.2 Future macroeconomic contributions of mining

This section presents – for the first time – a picture of future macroeconomic contributions from Zambia's mining sector, using forward-looking data provided by four of Zambia's largest mining companies (see Annex D for more details on the data and assumptions used).[47] These mining companies (Mopani, KCM, Kansanshi and Lumwana) together represented over 70 per cent of the total copper mined in Zambia in 2011 (Wood Mackenzie 2012), and around 80 per cent of tax payments in 2010 (ZEITI 2013).

The analysis extends beyond government revenues to illustrate the life cycle profile of other contributions, including mining production and sales, investment and procurement, taxes and employment. By illustrating the evolution of these contributions over time, the aim of this analysis is to inform policy decisions that maximize mining's economic and social contributions.

It should be noted that the projections include what the four mining companies presently plan for production, investment, government revenue and employment. The projections are based on investment spending that is presently authorized and exclude any additional capital spending that is likely to be authorized in the future. The projections therefore show the minimum expected contributions of the four mining companies until 2022. Moreover, the numbers presented are not forecasts, but rather illustrate the possibilities for a sample of the Zambian mining industry. In addition, data projections are based on the assumption that international and policy conditions remain broadly as they are now.

The work currently being carried out by the ZRA Mineral Value Chain Monitoring Project (see Box 3) constitutes a similar exercise but covers the entire mining sector. The outcome of this work will be an important complement to the present life cycle analysis, and will provide a more complete picture of the future evolution of the mining sector in Zambia.

47 To date, the literature on fiscal and other economic contributions from the Zambian mining sector has focused on historical data (see Lundstøl, Raballand and Nyirongo 2013).

3.2.1 Mining production and copper sales

The projections of production show an overall increase in total production for the four mining companies from around 600,000 metric tonnes in 2010 to over 750,000 metric tonnes in 2022.[48] Over time, production initially increases to a peak in 2016 (of 964,000 metric tonnes) and then gradually declines until 2022 (to 756,000 metric tonnes) (see Figure 19). To put these figures in context, the total production of the industry in 2010 was 678,000 metric tonnes (Wood Mackenzie 2012).

The decline in production after 2016 reflects both genuine reductions in production but also some of the data limitations of the life cycle analysis: the four mining companies have projects at varying stages of planning, the production from which has not yet been included in life-of-mine models. This means that production could be higher than that indicated in Figure 19.

The data shows that the mines in North-Western Province are already making a significant contribution to total mining production and are likely to grow in prominence over time (see Figure 19). The combined production of the two largest North-Western Province mining companies is higher than that of the two largest Copperbelt mining companies throughout the projections. The fall in production in the latter half of the projection period is more pronounced for the Copperbelt mining companies.

Figure 19: Historical and projected mine production volumes (2010–22)
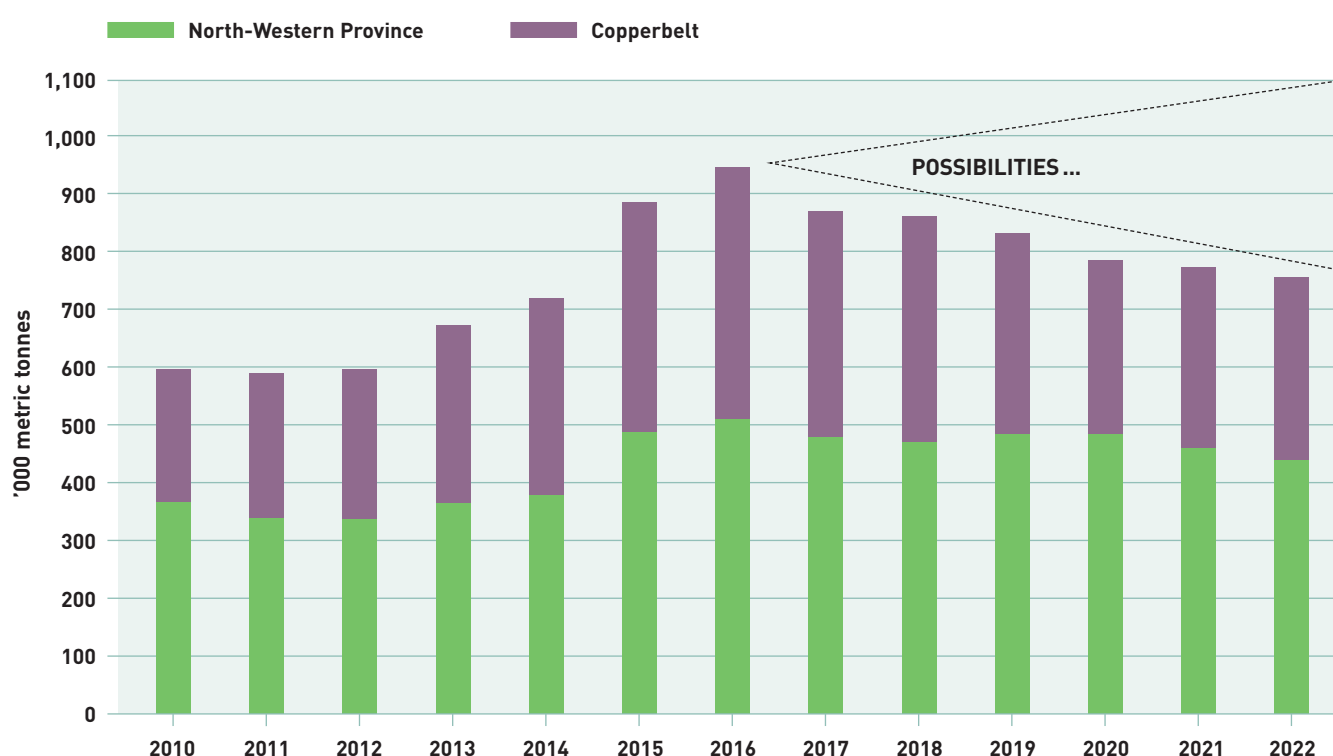
Source: OPM's calculations.

Sales follow a similar trajectory.[49] Total sales increase over time from US$4.2 billion in 2010 to US$5.8 billion in 2022. Sales peak in 2016 at US$7.4 billion, followed by a gradual decline (see Figure 20). The composition of sales also changes over time, with finished copper increasing both in absolute terms and relative to concentrates. This is largely a result of Kansanshi's investment in a smelter that will increase its finished copper sales. The trajectory of both production and sales illustrates the need for ongoing investment in sustaining capex for the sector so as to be able to maintain current levels.

As most of the copper produced in Zambia is exported, the projections for sales constitute a rough approximation of the four mining companies' contributions to export earnings.[50]

"The trajectory of both production and sales illustrates the need for ongoing investment in sustaining capex for the sector so as to be able to maintain current levels."

Figure 20: Historical and projected sales (2010–22)
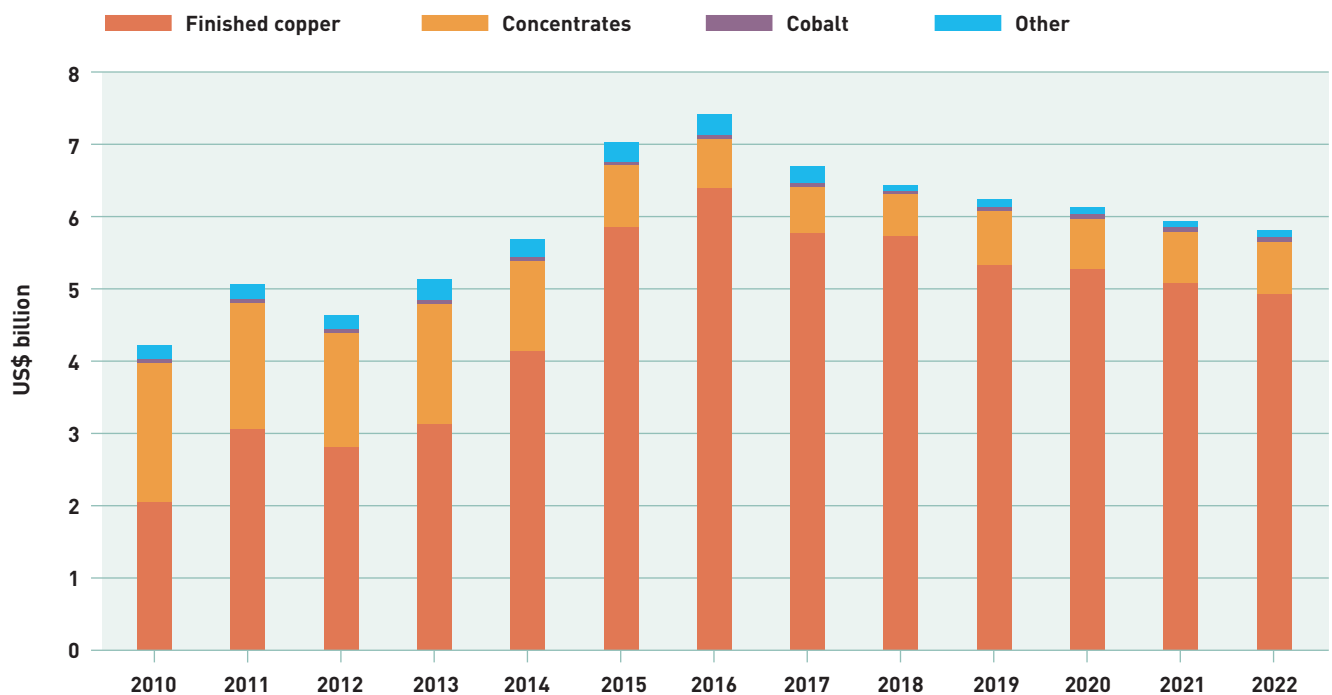
Source: OPM's calculations.

49 Assuming a projection in real terms, and assuming a broadly constant copper price.

50 This is only an approximation, since the concentrates produced by Lumwana are refined elsewhere in Zambia before exporting.

3.2.2 Capital and operating costs

Analysis of projections for capex and opex confirm that the Zambian mining sector is in the midst of a period of expansion (see Figure 21).

- Capex is concentrated around 2011–14, during which a total of US$5.8 billion is being invested. Most of this relates to developing new projects, but a significant share is also spent on sustaining capex to maintain production in existing projects. Beginning in 2015, projections show a fall in capex – reflecting the fact that data obtained from mining companies does not include sustaining capex for the entire projection period.

- Non-labour opex rises over the period, almost doubling from US$1.2 billion in 2010 to US$2.3 billion in 2016, after which it stabilizes at around US$2 billion per year. This reflects the increased costs of running new operations.

- Wages and labour costs remain largely unchanged over the projection period, at around US$500 million per year. These costs gradually increase to US$581 million in 2016, after which they fall back to US$497 million by 2022. This trend reflects the increased mechanization of the sector, which leads to higher wages but a lower number of employees.

Figure 21: Historical and projected capex and opex (2010–22)
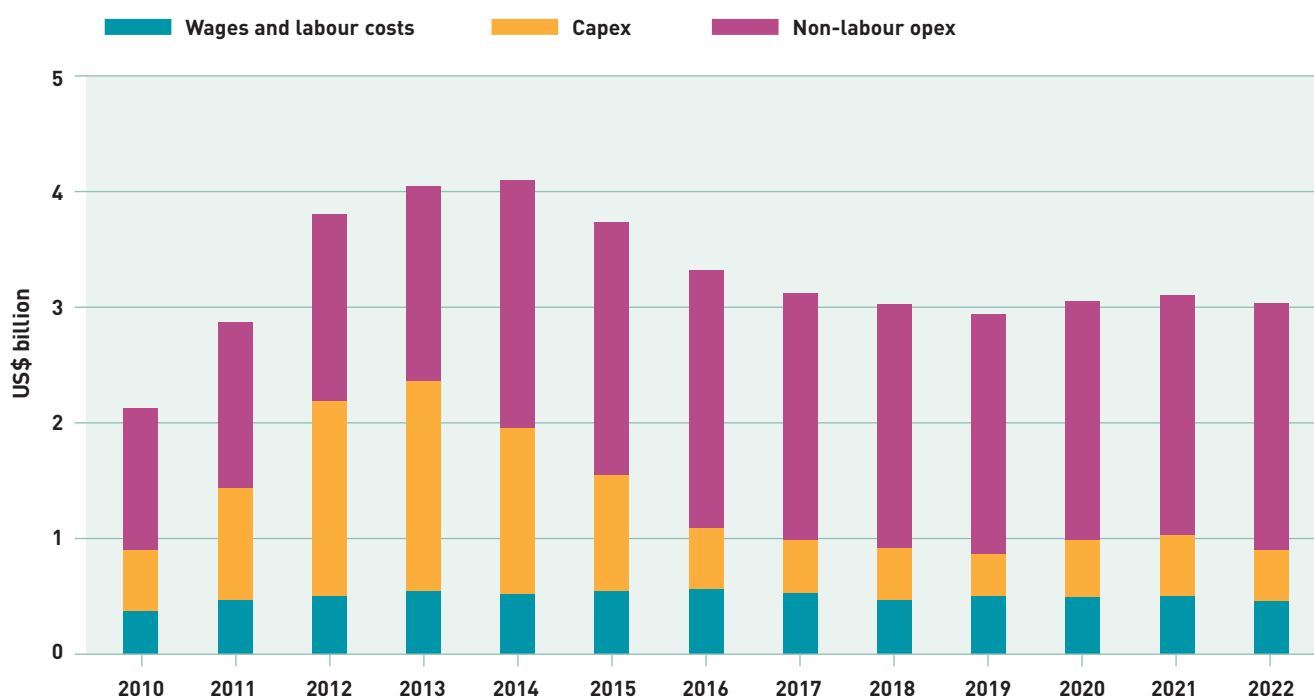
Source: OPM's calculations.

3.2.3 Government revenues

Significant further increases in government tax and royalty receipts are likely if present arrangements continue. Large increases from corporation tax in particular can be expected as capital allowances expire. Total tax payments for the four companies were US$686 million in 2010, and are expected to more than double by 2016 to reach US$1.7 billion (see Figure 22). Over the period 2013–22, average annual government revenues are projected at US$1.3 billion.

Overall, the company-specific data is broadly consistent with ZRA data on tax contributions from the mining sector. Data from the four companies indicates taxes of US$1,049 million in 2012, which represents around 80 per cent of the ZRA's figure for mining sector tax receipts in 2012 (at Kw 6,619 billion, roughly US$1.27 billion at current exchange rates).[51]

- Royalty payments are projected to increase by 67 per cent from US$252 million in 2012 to US$420 million by 2016, reflecting the introduction of a 6 per cent royalty in 2012 and a gradual increase in production and sales.

- CIT increases significantly during the early years of the projections, more than doubling from US$402 million in 2010 to US$982 million by 2016. During the early years of projections, CIT is low because mining companies have invested heavily and will consequently be entitled to depreciation allowances that will reduce taxable profit. It should be noted that, since royalties are deducted from taxable income for CIT purposes, the increase in royalty rates in 2012 led to lower CIT. Moreover, this also means that one company accounts for the bulk of the CIT paid.

- PAYE (linked to employee salaries) remains broadly constant throughout the projections, despite the increase in production – as explained by the gradual increase in labour productivity, especially at older mines.

**Figure 22: Historical and projected tax revenues (2010–22)**
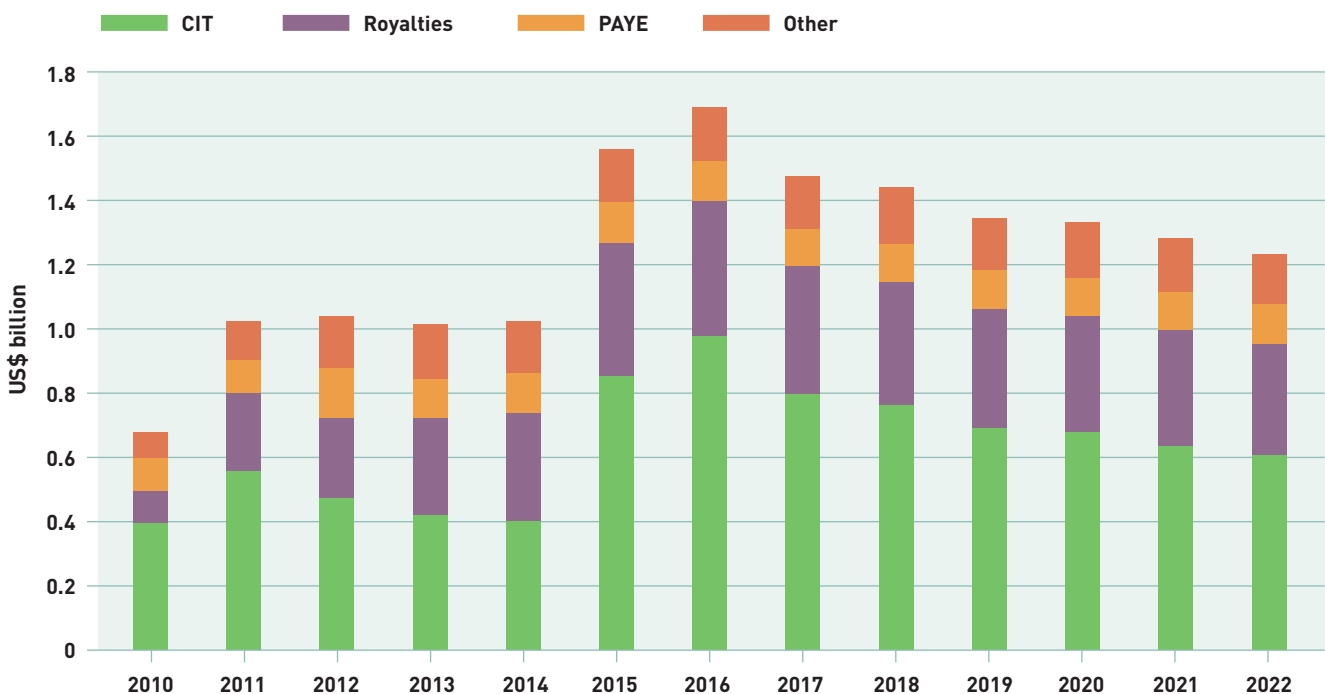
Source: OPM's calculations.

---

51 It should be noted that there are some difficulties in reconciling company-level data and ZRA figures due to timing differences and varying reporting of accruals vs actual payments.

Macroeconomic contributions of mining

A holistic perspective across sales, costs and tax payments illustrates that – in an expanding mining sector – large production volumes and sales do not necessarily imply that mining companies singly or as a group are generating positive net (after-tax) cash flows. During the period of rapid expansion, the cash generated by the business after allowing for tax payments was, on average, negative for the mining companies during 2012 and 2013 (see Figure 23). Some of this will be covered by increased borrowing from capital markets or through internal financing (retained earnings or injections from parent companies). During the latter years of the forecast, the net impact of the operations is positive on a post-tax cash basis, and part of this surplus will be used to pay down debt that was incurred to finance investments.

"During the period of rapid expansion, the cash generated by the business after allowing for tax payments was, on average, negative for the mining companies during 2012 and 2013."

**Figure 23: Net position of sales, costs and tax payments (2010–22)**
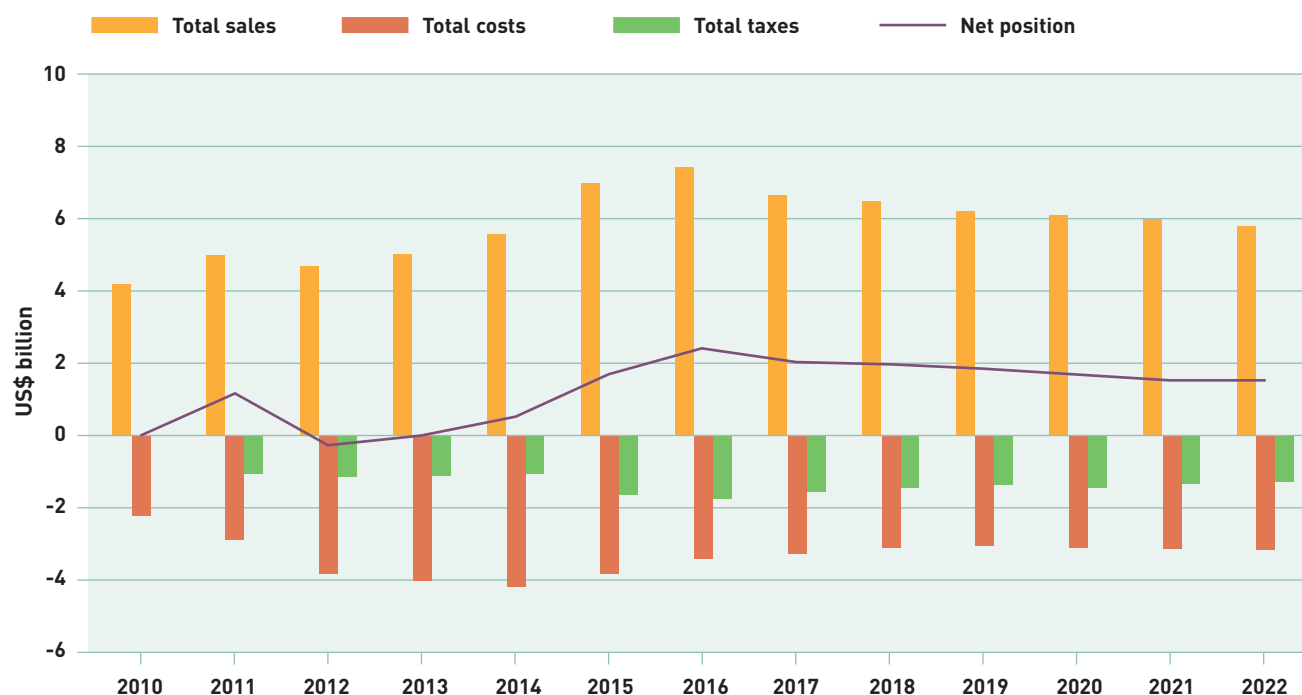
Source: OPM's calculations.

3.2.4 Employment

Direct employment (staff and contractors) is projected to fall by almost 12 per cent during the period under study, from 42,000 in 2010 to 37,000 in 2022 (see Figure 24). The reduction in total direct employment, despite the significant increase in production, is due to the gradual modernization of Zambia's older mines through productivity-improving investments (mostly in the Copperbelt).

- The number of direct employees (staff and contractors) for the four mining companies peaks in 2012 at around 56,000, representing around 62 per cent of the 90,000 employees in mining cited by the Zambian Labour Force Survey of 2012. The relatively lower share of the four mining companies in total sector employment may be due to the Labour Force Survey including employees in firms that are providing ancillary mining services, which are not captured as either staff or contractor employment among the mining companies.

- The number of national direct employees (staff only) gradually falls during the projection period, from 20,000 in 2010 to 16,000 in 2022. This reflects the increase in labour productivity as some of Zambia's oldest mines restructure their operations to increase productivity, including through the closure of older and poorly performing operations.

- The high number of contractors in 2012–15 reflects the peak in capex during these years. For example, Kansanshi is investing significant amounts in a new smelter project and KCM is modernizing some of its processing facilities. As the current investment boom comes to an end, the total number of contractors reverts to levels of the early period (roughly 20,000 for the four mining companies).

- The number of expatriate staff at the four mining companies remains small as a percentage of total employment and constant in absolute terms, at around 500 individuals.

**Figure 24:** Historical and projected direct employees

Source: OPM's calculations.

Macroeconomic contributions of mining
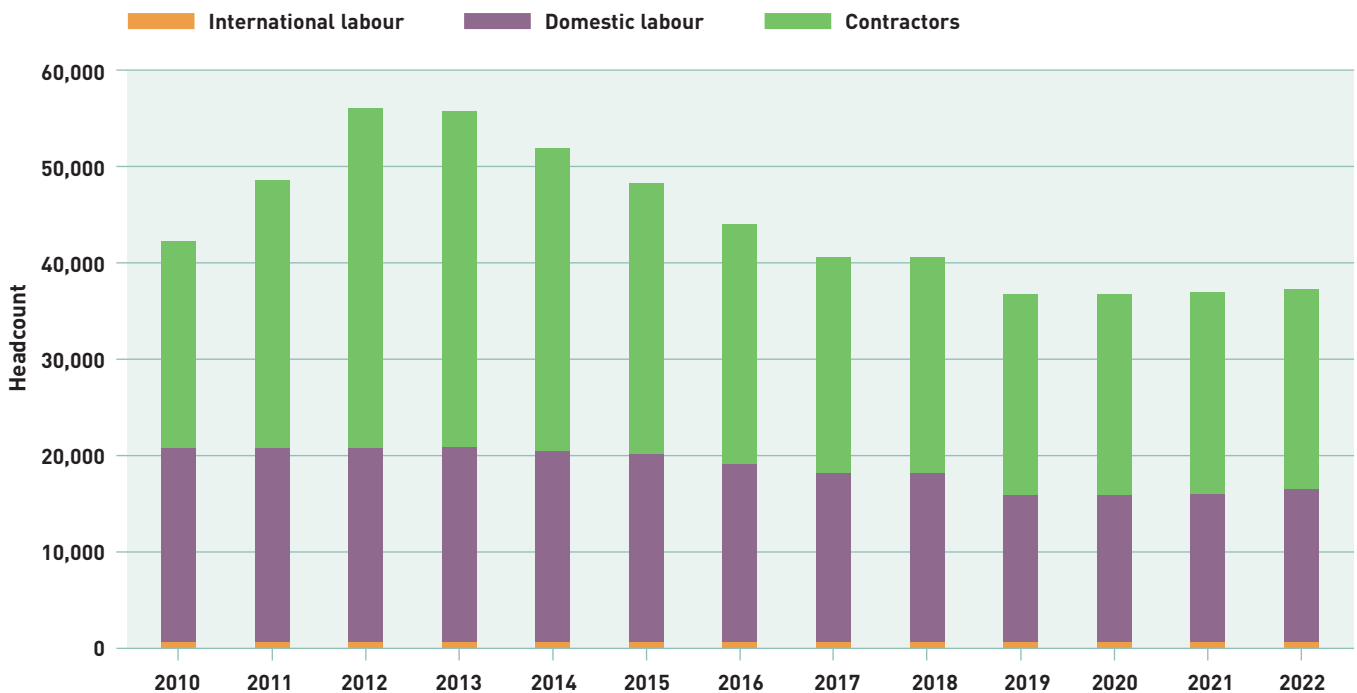
The Copperbelt and North-Western Province mines differ in terms of the labour intensity of their operations. As Figure 25 illustrates, domestic staff numbers are significantly lower in the more modern mining operations in North-Western Province.

The number of contractor employees is lower as well, although the difference narrows towards the end of the period after completion of planned investments. The differences are partly explained by the fact that the two Copperbelt mining companies have proportionately more people in downstream activities.

Figure 25: Direct employees and contractors in Copperbelt and North-Western Provinces (2010–22)
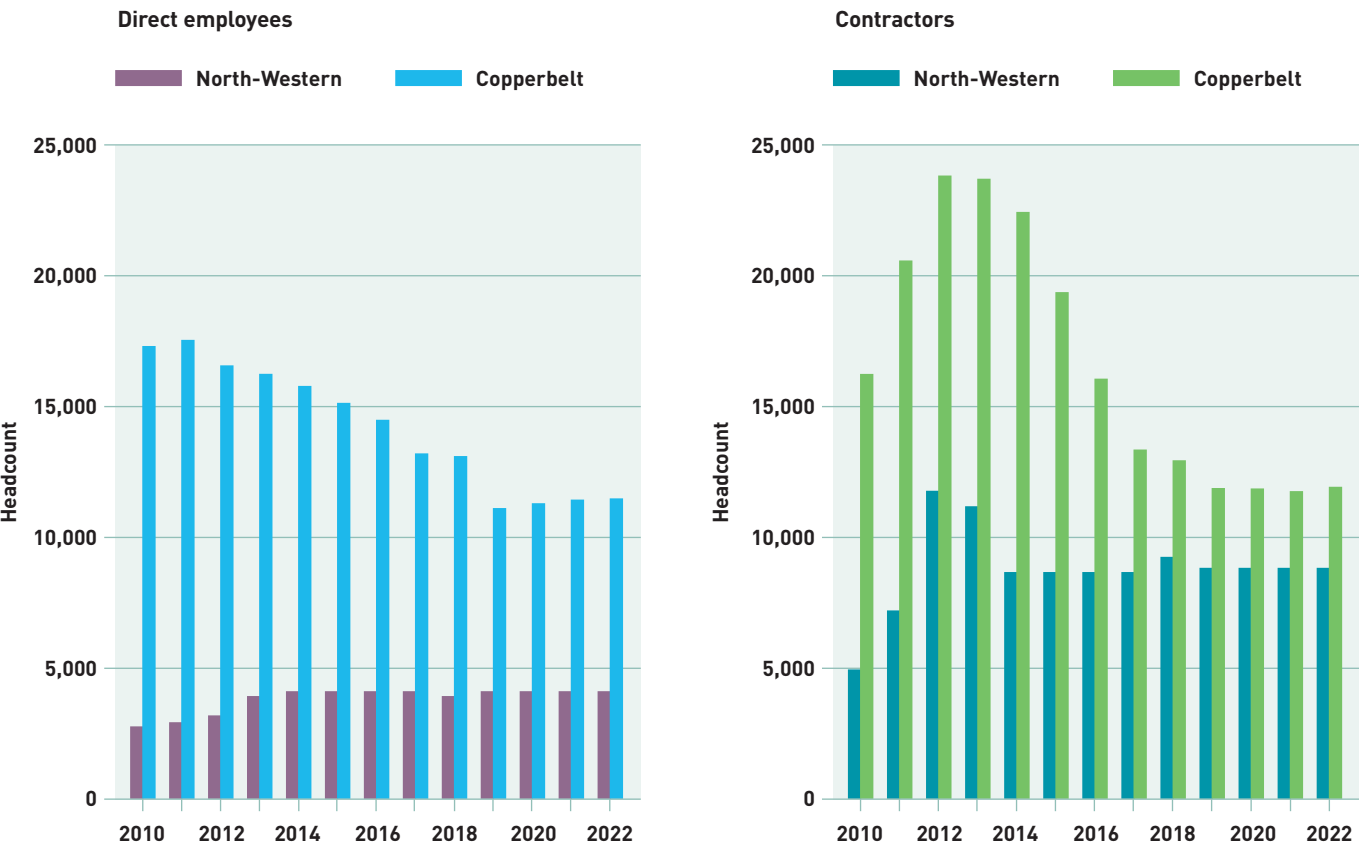
Source: OPM's calculations.

"The opportunities from induced employment remain significant, as the value of salaries spent in the local economy is largely unchanged."

The projected mining sector employment trends reflect gradual improvements in labour productivity. As Figure 26 illustrates, the average labour productivity (production volumes per direct employee – including staff members and contractors) in the Copperbelt mining companies gradually increases over time, but remains significantly below labour productivity at North-Western Province mining companies.

The share of contractors in total mining direct employment is particularly high during periods of heavy investment. Variations across the mining companies in the share of contractors in total direct employment also reflect historical design choices and differences in business strategy – for example, Kansanshi outsources several services (eg maintenance) that are undertaken in-house by other companies (see Figure 27). In addition, mining activities are more easily outsourced than those relating to smelting and refining, which are relatively more important in the Copperbelt mines.

The projections for higher production and sales are associated with an increase in labour productivity. This is particularly the case at Mopani and KCM, two of Zambia's oldest mines. For these mining companies (on average) the volume of copper per staff employee is projected to increase from 7 metric tonnes/direct employee to 15 metric tonnes/direct employee. As a result of the shift to higher-productivity production processes, the average salaries for workers are also increasing. This is particularly the case on the Copperbelt, where salaries per staff employee are projected to increase by 63 per cent from 2010 to 2022.

Thus, while the total number of direct employees falls over the projection period, average salaries for direct employees increase over time. As a result, the combined wage bill for the four mining companies is expected to remain largely constant (averaging US$538 million per year during 2012 to 2022). This means that the opportunities from induced employment remain significant, as the value of salaries spent in the local economy is largely unchanged. This finding indicates that the focus on creating jobs around the mining sector itself must come from leveraging mining sector linkages, in particular in the supply chain.
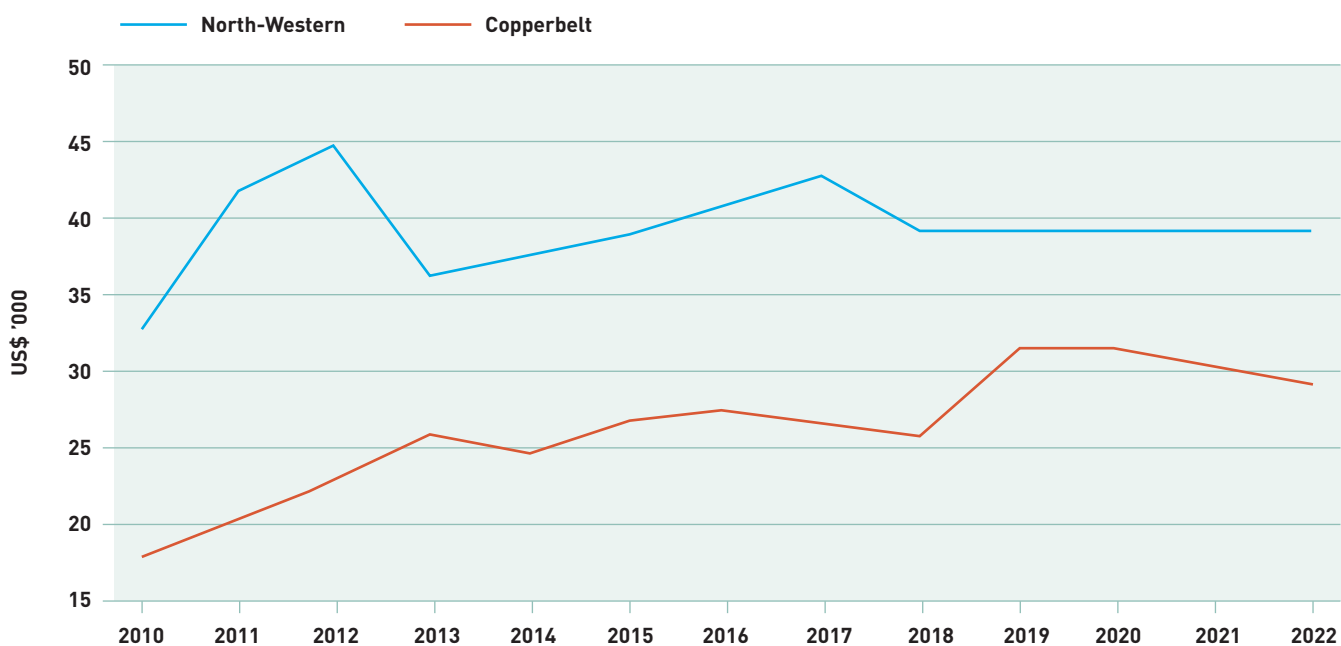
Figure 26: **Labour productivity (2010–22)**
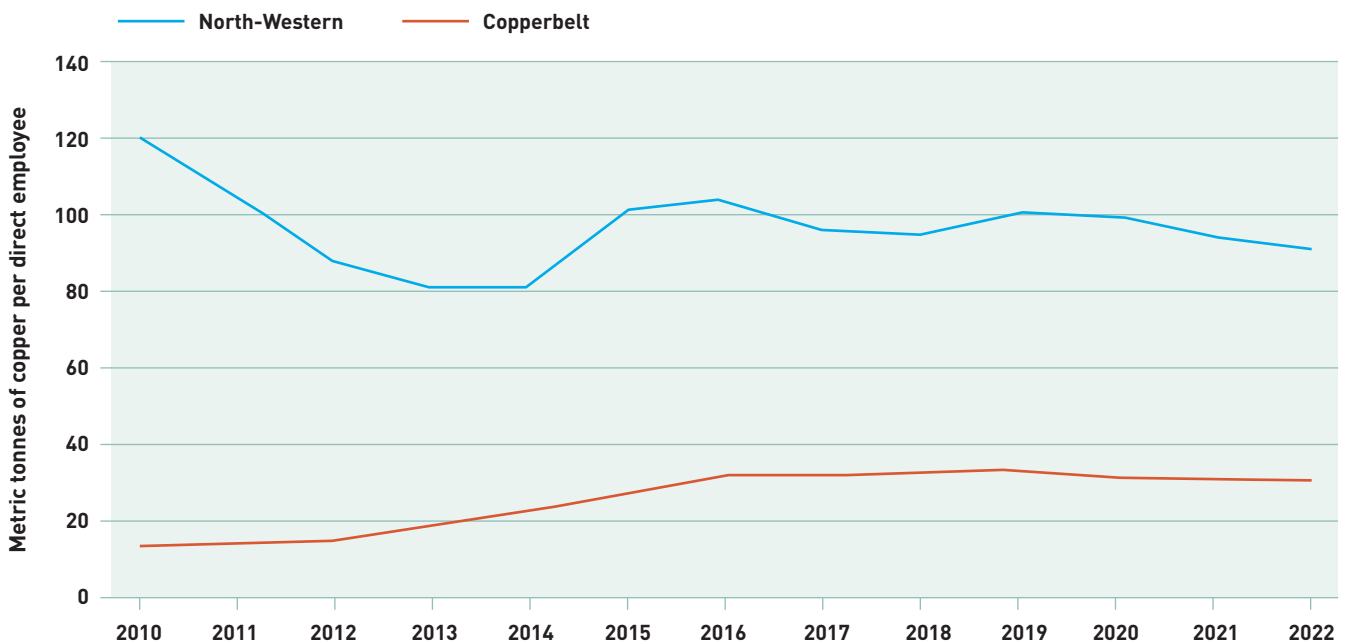
Source: OPM's calculations.

Figure 27: **Contractor employees as share of total direct employees (2010–22)**
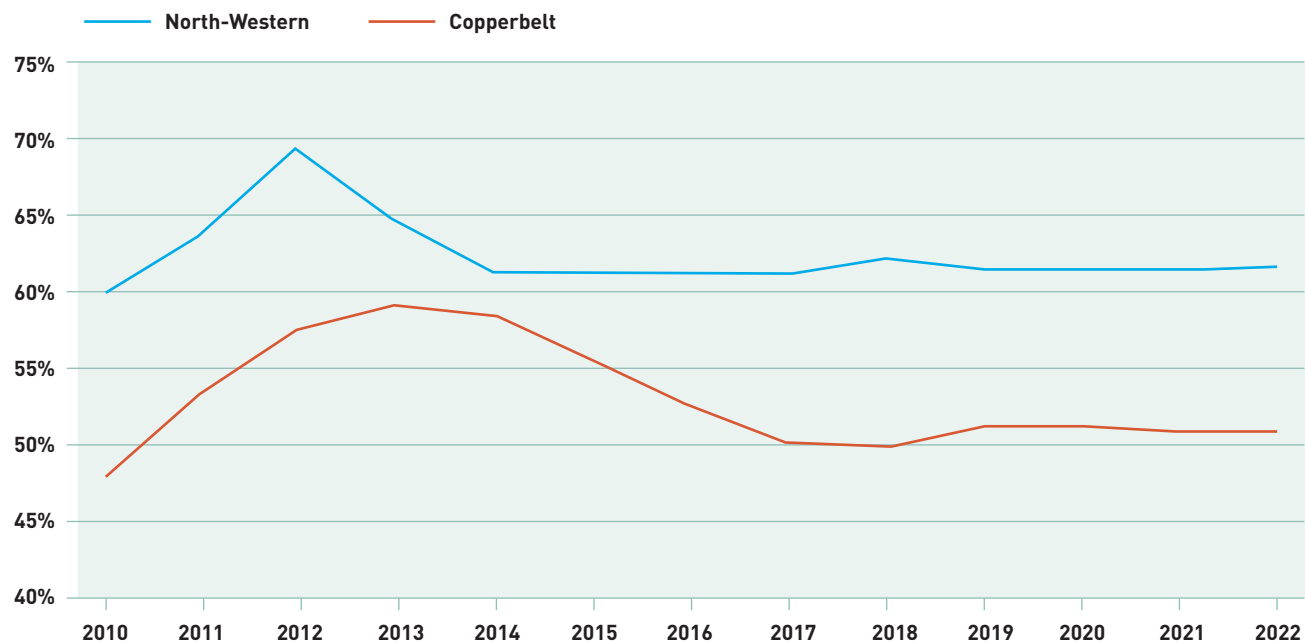
Source: OPM's calculations.

Figure 28: **Annual wage cost per staff employee (2010–22)**

Source: OPM's calculations.

Image courtesy of Chibuluma Mines Plc

Local-level contributions of mining

4

4. Local-level contributions of mining

In common with other countries, the large macro contributions of mining cannot be expected to translate automatically into benefits felt at the local level.

This chapter discusses the local-level contributions of the four mining companies and their development partners. First, it outlines the contributions that result from the commercial activities undertaken by the four mining companies, followed by a discussion of the contributions made through the mining companies' social investments.

A critical underlying proposition from the ICMM MPD Toolkit is that mining companies alone cannot do everything necessary to ensure their activities contribute to positive economic and social development outcomes. Previous ICMM country case studies have shown that such outcomes are more likely to arise where mining companies engage in a wide range of partnerships with different layers of government, civil society and donors.

Throughout this chapter examples of partnerships are used to illustrate innovative ways in which the mining companies are working with others to address development challenges across the six MPD themes:

• poverty reduction

• revenue management

• regional development planning

• local content

• social investment

• dispute resolution.

4.1 Mining's impact on local economic development: mining companies' commercial activities

This section focuses on the impacts that mining companies have on local populations, purely through their commercial activities such as direct employment, skills development and procurement of goods and services. All of these effects occur in any mining operation but the size of the contribution that they make to economic development in local areas depends to a large extent on the modalities used.

4.1.1 Employment

Mining companies make contributions to local economic development by creating direct, indirect and induced employment.

In both the Copperbelt and North-Western Provinces, the mines are by far the most important formal sector employers. Direct mining employment (including staff and contractors) at the four mining companies has increased in recent years (see Figure 29), reflecting increased capital investment and production.

Figure 29: Direct employment for the four mining companies (2008–13)
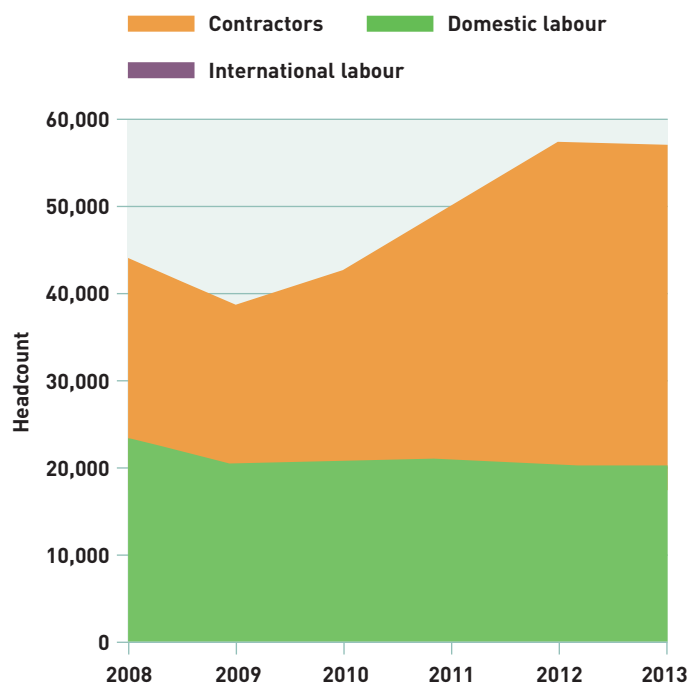
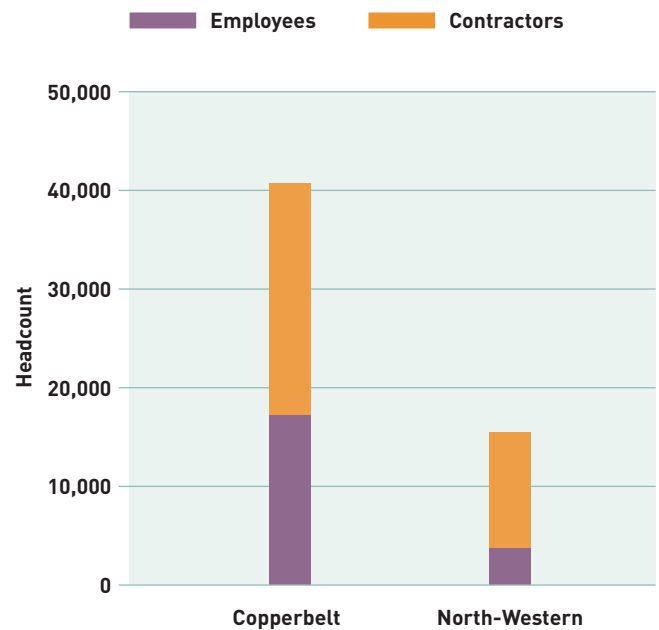
Source: OPM's calculations.

In total, the four mining companies generated 56,300 direct jobs in 2012. Over two-thirds of these jobs were generated by the Copperbelt mining companies (40,600 people), of which 16,800 were direct employees and 23,800 contractors. The remaining third were generated by the North-Western Province mining companies (15,600 jobs). Mining companies in North-Western Province employ a higher percentage of contractors (78 per cent of direct employment) than the Copperbelt mining companies (59 per cent) (see Figure 30). Together these jobs accounted for almost 80 per cent of the 74,254 formal mining sector employees in the country (Central Statistical Office 2013a, Table 10).

While many more direct job opportunities from mining are generated on the Copperbelt, the province is also more dependent on mining relative to North-Western Province. This reflects the characteristics of the Copperbelt labour market, which features the highest proportion of formal sector employment across Zambia's provinces (at 35.8 per cent) and the highest levels of unemployment. It also has by far the highest proportion of people in formal agricultural employment. People in the Copperbelt are more dependent on wage labour and have less easy recourse to informal sector and agricultural activities in economic downturns. North-Western Province, by contrast, resembles the rest of the country in most features of its labour market.

An important characteristic of the Zambian mining industry is that expatriates represent a very small proportion of both direct and indirect employment, at around 1–2 per cent of all employees in Zambian mining companies. This is similar to findings in Chile (where expatriate employment makes up 1 per cent of employment) but very low in comparison to other ICMM MPD Toolkit case study countries (see Figure 31).

"An important characteristic of the Zambian mining industry is that expatriates represent a very small proportion of both direct and indirect employment, at around 1–2 per cent of all employees in Zambian mining companies."

Figure 30: Direct employment by province for the four mining companies (2012)

Source: OPM's calculations.

Figure 31: Expatriate employment in previous ICMM MPD Toolkit case studies (percentage of labour force)
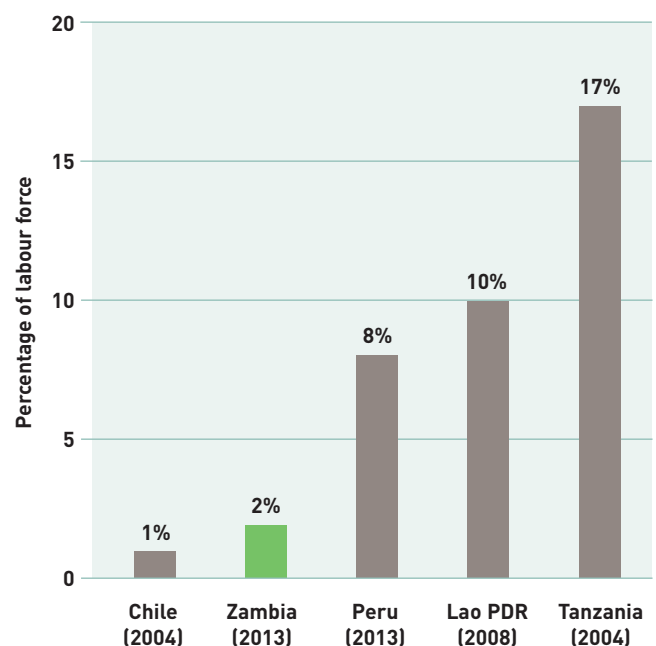
Source: ICMM MPD country case studies.

**Indirect and induced employment**

Beyond direct employment, mining companies generate indirect and induced employment:

- Indirect employment includes people employed by suppliers to the mining companies working off-site.[52]

- Induced employment includes those who are employed as a result of direct and indirect employees spending their wages locally.

Figure 32 shows the direct, indirect and induced employment created in the two provinces by the four mining companies, with the underlying calculations explained in Annex H.[53] According to this assessment, the four mining companies generated about 150,000 direct, indirect and induced job opportunities, and mining-related employment accounts for 16 per cent of all employment (formal and informal) in the Copperbelt and 15 per cent in North-Western Province.

Induced employment is estimated to account for as many employment opportunities as direct and indirect employment put together.[54] Yet induced employment is often overlooked in policy debates, partly because it may not be easily identifiable and/or linked to mining, and also because a large part of it is likely to be in the informal sector. However, it represents a substantial contribution to local incomes, particularly among the poor, and a potential base for diversified economic development, especially in agriculture.

Figure 32: Direct, indirect and induced employment at the four mining companies (2012)
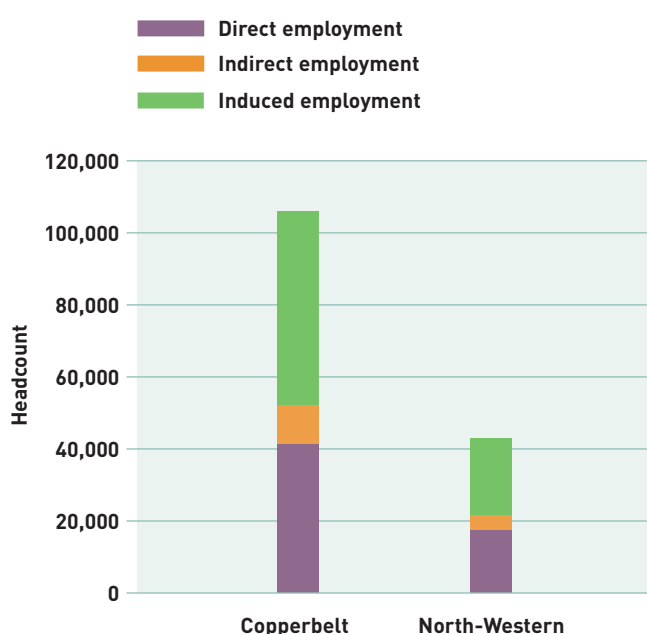
Source: Company data and OPM's calculations.

4.1.2 Training and human capital development

Mining companies in Zambia contribute to local economic development through the training they provide to direct employees and contractors. Such investments in human capital – through formal training activities as well as "learning on the job" – create a direct benefit for mining companies but also have positive externalities for the country as a whole. Many of these skills developed are transferable and can be passed on to others and applied in other sectors, thereby promoting diversification away from (finite) mining industries.

As almost all employees at the participating mining companies are Zambian nationals, most of the training provided directly contributes towards human capital development in Zambia. Many of those who receive training in their mine jobs would not otherwise have had access to such training and would have been less skilled as a result. This is particularly important in the context of the low overall educational attainment in the country.

Training at the four mining companies includes a mix of in-house and outsourced training, which means that the training spend does not accurately reflect the totality of investments in human capital development. However, the data provided by three of the mining companies indicates that together they spent around US$5 million on outsourced training in 2012. The spend on training in recent years, in absolute terms and as a share of total labour costs, has increased.

52 Since the definition of direct employment used in the toolkit includes employees of contractors who work on-site, it differs somewhat from the definition that is sometimes used where those employed by contractors count as indirectly employed irrespective of whether they are on-site or not. The authors of the toolkit have decided that since contractor employees on-site often carry out tasks that could just as well have been performed by mining employees, they should count as being directly employed.

53 The activities of the mining companies have also led to indirect and induced employment elsewhere in the country. In particular, a significant employment effect occurs in the public sector (see McMahon and Tracy 2012). Because of the very large estimation problems, however, these effects have not been included here.

54 It should be noted that although the estimate may appear high, it takes into account only "first order" effects; that is, it does not include the people employed as a result of the "induced employees'" spending. A comprehensive estimate would require an input–output table.

The four companies adopt slightly different approaches to training and skills development. Kansanshi focuses on technical and safety training and prefers to use external training providers. Mopani prefers to provide most of its training in-house, but provides a mix of technical and managerial training. KCM adopts a mixed approach, providing technical and managerial training using external and in-house training services. Lumwana is still in the process of setting up a formalized training system but currently focuses largely on in-house safety training.

The following are examples of contributions to skills development.

Scholarships for further education

Kansanshi, Mopani and KCM provide scholarships for further education. Kansanshi currently sponsors 33 employees for further study in a variety of disciplines ranging from diplomas in specific technical areas to graduate and post-graduate qualifications. The majority study at Zambian institutions[55] but some study outside of Zambia.[56] Mopani actively identifies promising high school and university students for sponsorship in technical and post-graduate qualifications. Scholarships are provided in a variety of disciplines[57] and are given on condition that the person receiving the scholarship works for Mopani for a period of time upon completion of their studies. KCM scholarships are wide-ranging and distributed across employees,[58] dependants of employees[59] and promising students at KCM trust schools. Some scholarships are provided to people who are not connected to the mine in any way, such as high performers at local public universities.[60] Currently, KCM sponsors 52 Zambians, most of whom study in Zambia, India or Namibia.

On-the-job training, apprenticeships and secondments

All participating mining companies provide on-the-job training for new and experienced employees on a needs basis. Kansanshi and Mopani offer attachments for students from Zambian educational institutions and also run graduate development programs[61] for promising graduates. KCM offers a foreign group exchange program (through their Global Leadership Program) whereby graduates are offered secondments to other Vedanta operations for periods of between 6 and 12 months.

Technical and managerial training

All mining companies offer technical training to employees but differ in how the training is delivered. At KCM, technical training is provided through satellite technical training schools,[62] through courses at Kitwe Trade School[63] and by technical training officers located in each of its departments. Kansanshi provides technical training internally through each department as well as through external providers, and Mopani and Lumwana provide most of their training in-house. Most mining companies also offer managerial training for employees in supervisory or managerial positions. This is done either through in-house courses (Kansanshi and Mopani) or through structured leadership development programs and the sponsorship of MBAs (KCM). KCM also provides training for surgeons working at the mine hospitals and pays for the same training to be provided to surgeons working at government hospitals.

Support for trade schools

Several mining companies provide support for technical trade schools, either directly (eg KCM runs Kitwe Trade School and Kansanshi runs the Solwezi Technical Training Institute in partnership with the government, and Mopani plans to open a new trade school in 2014) or indirectly (eg Mopani pays higher fees for employees attending training at trade schools and thereby subsidizes non-mine students).

In addition to the training provided for direct employees, several mining companies actively invest in the skills of those they employ as contractors, thus making a further contribution to human capital development in Zambia (see Box 7).

> "Some scholarships are provided to people who are not connected to the mine in any way, such as high performers at local public universities."

---

55 Including at the Solwezi Technical Training Institute, which Kansanshi runs in partnership with the government.

56 South Africa, the UK and Australia.

57 Including geology, engineering and administration.

58 Scholarships are provided for mining, engineering and business studies as well as in specialist training for medical staff at health facilities.

59 Who are sponsored to study engineering courses at local public universities.

60 Who are given scholarships for study in engineering subjects.

61 In which recent graduates are rotated through different areas of the company with the intention of preparing them for eventual managerial positions.

62 Nchanga Underground Mining Training School, Open Pit Mining Training School and Konkola Mining Training School.

63 Which KCM runs and is open to the public.

4.1.3 Procurement of local goods and services

History and overview of mining sector procurement

Although the majority of goods are procured from Zambian companies, many of these goods are imported by local agents who then supply the goods to the mining companies; thus, very few of the goods procured by the mining sector are actually manufactured in Zambia. In contrast, most of the services needed by mining companies are procured from Zambian businesses and provided by Zambian nationals.

The history of the sector helps explain the current levels of local procurement found at the four mining companies. During the period until 1997, when ZCCM operated the mines in the Copperbelt, a policy of local procurement was strictly adhered to. This policy, combined with strict foreign exchange controls and measures to protect domestic industry, led to the establishment of a significant manufacturing sector and a relatively diversified local economy. However, in the 1990s, two things happened to change this:

• ZCCM's management challenges combined with a decline in the copper price from the 1980s led to poor supply chain management and eventually to deterioration in suppliers' capabilities, as well as considerable rent seeking by local suppliers – thereby contributing to ZCCM's loss of profitability (Fessehaie 2012).

• Protectionist policies were dismantled, and domestic manufacturers struggled to remain competitive. After privatization, new mine owners introduced higher standards in their procurement that many local suppliers failed to meet, in particular when competing on similar terms with international producers.

Despite these challenges, some supplier firms have survived and the Copperbelt's local economy remains more diversified than other provinces outside of Lusaka. Data aggregated from the four mining companies and available third-party studies (eg Kasanga 2012) indicate that services are procured mainly from Zambian companies, but that goods are mainly imported (see Figure 33).[64] Total procurement from the four mining companies is estimated to be US$3.0 billion, US$1.6 billion of which goes towards services and US$1.4 billion towards goods.

Since almost all services are provided on-site, local suppliers have a considerable advantage and account for a very high proportion of procurement: we estimate that close to 100 per cent of services are procured from Zambian companies, where most of the value added remains in Zambia.

In terms of goods, although the mining companies report very high figures for "domestic" procurement (around 80 per cent), much of this (we estimate 95 per cent) represents goods that are not manufactured in Zambia. Extrapolating from data from the four mining companies, the total industry procurement of goods is likely to be around US$1.75 billion annually, of which 5 per cent (or US$87 million) represents locally manufactured goods.

Figure 33: Mining company procurement (2012)
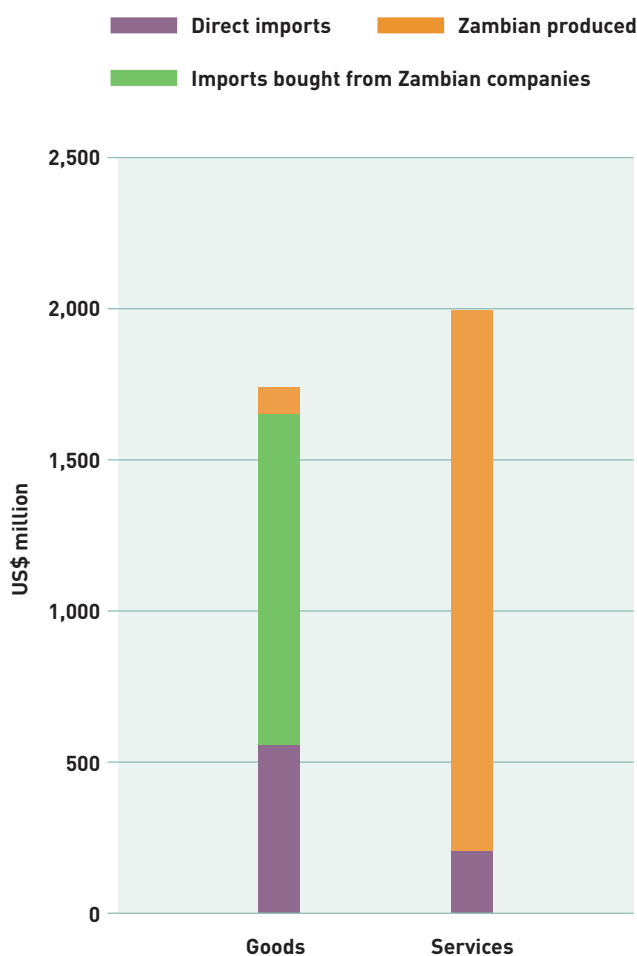
Source: Company data, OPM's calculations and Kasanga 2012.

---

64 It should be noted that no official statistics exist and that definitions differ among mining companies. The numbers constitute a best effort based on information available to the authors.

The strengthening of backward linkages with local suppliers – to promote a higher portion of local content in inputs and services – represents a promising way of increasing the positive impact of mining on the local economy. Importantly, such linkages are more likely to lead to positive development benefits than raising the degree of processing of output (downstream or forward linkages, see Box 6). Such linkages have been assessed in detail in earlier studies and seem to have much less positive prospects, given the distance to markets for manufactured or semi-manufactured products – where the ability to meet customers' demands speedily, flexibly and at competitive prices is absolutely necessary (see "Efforts needed to strengthen backward linkages" in subsection below).[65]

Box 6: Challenges of forward linkages in the copper sector

Previous studies using the ICMM toolkit have found that backward linkages offer considerably more scope for generation of income and employment, and can be strengthened more easily, than forward linkages. The Zambian mining and metals industry is vertically integrated up to refined copper, mainly because transport costs make it uneconomic in most cases to export copper concentrates.

Going beyond refined copper would, however, be difficult. According to the ICSG,[66] total sub-Saharan African usage of refined copper is 82,000 metric tonnes, mainly in South Africa and Zimbabwe. The Raw Materials Group has a slightly higher estimate of 129,000 metric tonnes, including 18,000 metric tonnes in Zambia (data from Raw Materials data). While African economies, including Zambia, certainly use some semimanufactured copper products such as tubes or wire, their usage is usually too small to allow the establishment of a plant producing such products for the local market.

Attempting to produce for exports would also result in large competitiveness problems. Customers demand short delivery times and an extended product range, both of which would be difficult to achieve in Zambia. Moreover, even under the most favourable circumstances, domestic demand for processing beyond refined copper would only ever cover a very small portion of Zambian copper output. For instance, if Zambia were to achieve the same copper usage per capita as South Korea (14.6kg), which has the world's highest usage per capita, less than a third of Zambian copper output would be needed.

Challenges facing Zambian suppliers

However, the objective of increasing local procurement is hampered by a range of cost and non-cost competitiveness challenges facing Zambian SMEs seeking to enter the mining sector supply chain. The many obstacles facing potential Zambian suppliers featured strongly during discussions at the November 2013 workshop.

With respect to cost competitiveness, Zambian suppliers of inputs and equipment face high production costs relative to competing foreign suppliers, eliminating most or all of their locational advantage. Some of these cost challenges include:

- The real kwacha exchange rate appreciated substantially during the copper price boom and has remained high since (see Figure 14).

- The statutory instruments regulating foreign exchange have substantially damaged the competitive position of Zambian suppliers to the mining industry, making it relatively cheaper for mining companies to buy from overseas suppliers (see Box 1).

- CITs are higher in Zambia than in neighbouring countries (30–35 per cent as compared to 15 per cent in Botswana (manufacturing companies), 18 per cent in Namibia (manufacturing companies) and 0–28 per cent in South Africa (small business corporations, depending on turnover).[67]

- Difficulties in accessing credit, particularly since the introduction of a cap on interest rates, have made many ineligible for the scarcer bank credit since the higher rates reflected the higher risks for banks of lending to these businesses. The cap has resulted in banks making fewer such loans.

- There are high costs of credit, where the typical cost of credit for a manufacturing enterprise is 30–40 per cent.

- High costs and limited supply of skilled labour.

- High costs of power.

The above factors increase risks for suppliers, who would therefore prefer to have purchase orders before they invest. Mining companies, on the other hand, would want businesses to show preparedness before they place an order. Some mining companies are attempting to alleviate this issue: one of them follows a practice whereby it will give a small contract to a supplier that has capacity but no equipment, introduce the supplier to financiers (eg a bank) and structure the payment so that the bank gets payment back first (ie the mining company pays the bank and the bank pays the supplier).

---

65 See, for example, Payton 2010.

66 ICSG (2013).

67 DeLoitte 2010/11.

Local-level contributions of mining

Figure 34: Buyers' and suppliers' views on local supply chain performance
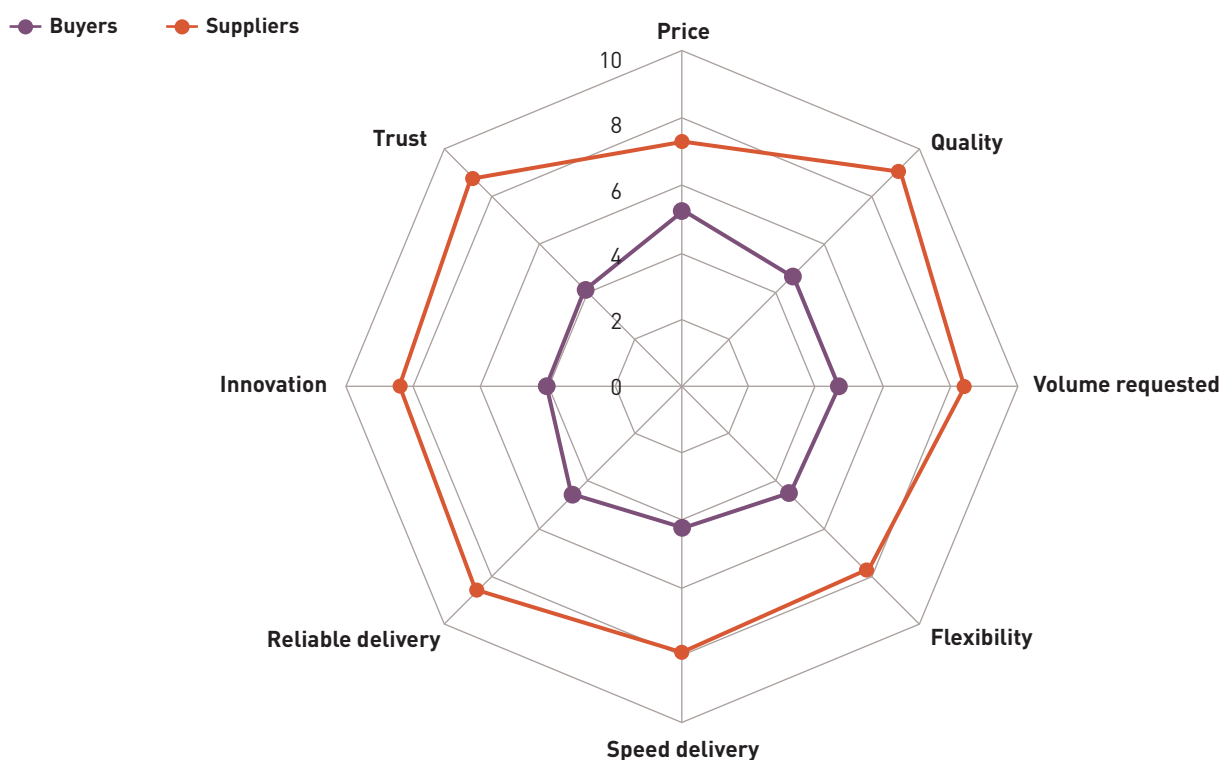
Source: Fessehaie 2011.

Local suppliers also experience difficulties with non-cost competitiveness. Many local suppliers are unable to meet the strict requirements of modern supply chain management practices, including requirements relating to quality, flexibility, and reliability and speed of delivery. A study by Fessehaie (2011) illustrates the extent to which supplier capabilities are seen as inadequate by Zambia's mining sector (see Figure 34). These capability deficits are partly shaped by the availability of skills, which some stakeholders are concerned will worsen once people who received their basic training from ZCCM retire.

Efforts needed to strengthen backward linkages

These challenges need to be addressed through collaborative efforts that involve industry, government and development partners.

Industry can support and nurture suppliers with potential, and is indeed already doing so. Although mining companies were slow to engage with suppliers following privatization, many have now initiated supplier support and upgrading programs that attempt to address the capability gaps of local businesses by providing management skills, access to finance, enhanced computer literacy, and an understanding of the mine's procurement processes and requirements:

- Kansanshi formalized its policy on supplier development in 2011. The company focuses on training (in tendering, cost estimation, contract management and construction site quality control) for potential suppliers, some of which is done with the North Western Chamber of Commerce and Industry (NWCCI). It also advertises supply and service contracts through the NWCCI to encourage local businesses to tender for contracts.

- Mopani provides ad hoc training for SMEs through workshops and employs a staff member who helps suppliers with tendering and marketing.

- KCM set up a "local economic development unit" in early 2012, to build on its existing manufacturing support program. The mine assesses possible suppliers and plans to target several businesses that are believed to have potential and to supply them with long-term contracts.

- Lumwana is in the early stages of piloting a systematic approach to supplier development through its LCD program, which aims to provide financial and technical assistance to potential suppliers (see Box 7).

Cross-industry initiatives have included the International Finance Corporation-supported Copperbelt SME Suppliers Development Program (CSSDP) from 2007 to 2010. The program included interventions both for SMEs and for mining companies. SMEs were trained to comply with industry standards, procurement procedures of participating mines were simplified and partnerships between SMEs and mining companies were encouraged. The program's impact was, however, limited by the low absorption capacity and limited provision of meaningful access to finance – one of the key challenges cited by SMEs (Fessehaie 2012).

A more recent public–private initiative – the Zambian Mining Local Content Initiative – was launched in July 2012 by the World Bank and the International Finance Corporation in collaboration with the mining industry, government agencies, and Zambian manufacturing and SME associations. At the time of writing, this initiative was undertaking further scoping studies.

In tandem with such initiatives, the Zambian Government must lead on improving the enabling environment for business, for instance by removing counterproductive constraints on foreign exchange and facilitating access to land and electricity. Although Zambia has made some progress in strengthening the enabling environment for business, it still ranks below several other African countries, including Botswana, South Africa and Ghana, on the World Bank's ease of doing business ranking and its position in this ranking has deteriorated in recent years.

Finally, while the gains from increasing the local content of the goods procured by the mining industry are important, they also have to be put in perspective. A tripling of the proportion of inputs manufactured locally to about 15 per cent of total goods procurement (probably what could realistically be achieved in the medium term) would add some US$160 million to local suppliers' turnover, of which between a third and half would be value added in Zambia. While this would certainly be significant at the local level and would result in more than 10,000 new direct jobs, it is an order of magnitude less than the amounts paid by the mining companies in taxes.

Box 7: Mining partnership: Lumwana Contractor Development (LCD) program

Lumwana is in the early phases of piloting a systematic approach to supplier development through its LCD program, which focusses on procuring products that can be produced in Zambia. The initiative gives preference to sourcing from suppliers in the three surrounding chiefdoms, then the rest of North-Western Province and finally the rest of Zambia. It aims to close the capacity gaps of local suppliers through the use of external partners who will provide both training and financial support.

The program will facilitate access to finance for SMEs that have capacity but lack access to equipment. Would-be suppliers will be given a small contract and be introduced to financiers. Their chosen financiers (GroFin) will offer lower interest rates than other financial institutions (thus addressing one of the key constraints faced by SMEs) and will also offer technical support to small businesses.

A number of departments within Lumwana will be involved: the supply chain team will help identify opportunities, the sustainability team will assess capacity gaps and speak to partnership brokers to deliver capacity building and end-users (generally those in engineering departments) will be involved in the final decision-making process.

Lumwana also plans to set up business incubators to provide a standard suite of training and access to computer facilities for local businesses. The program has been designed with a good understanding of the many constraints faced by local businesses and attempts to address these problems simultaneously. GroFin is able to provide both the technical and financial assistance that businesses need and Lumwana is able to reduce the level of risk that GroFin faces by giving new businesses secure contracts that ensure they will be able to pay back any loans they receive.

"Although mining companies were slow to engage with suppliers following privatization, many have now initiated supplier support and upgrading programs."

<table>
<tr><td>

Box 8: Community development toolkits

One framework for community development around mining is ICMM's Community Development Toolkit (CDT). The CDT offers detailed guidance to its users about good practice in five specific aspects of community relations:

- relationships – arrangements for identifying appropriate stakeholders, assessing their likely interest in the mining project, developing arrangements for consultation, etc

- planning – the processes of determining what the company hopes to contribute to the community, how it will resource that contribution, the methods of engaging and empowering the local stakeholders and internalizing their own priorities, etc

- assessment – the definition of a baseline assessment for the communities affected, identifying the likely impacts of the project on that baseline (both negative and positive) and determining how best to manage these impacts through the life of the mine

- management – the establishment of organizational arrangements for the ongoing management of the community–company interface, including arrangements such as community development agreements, formal company management and recording systems, community action plans and resettlement agreements

- monitoring and evaluation – the choice of indicators against which to monitor and evaluate progress, and the definition of a "goal attainment scaling system" to help in the transparent presentation of the results of monitoring and evaluation to a broad audience, including many with no deep understanding of formal statistical systems.

An approach with similar objectives is the Socio-Economic Assessment Toolbox (SEAT) of Anglo American, which is acknowledged to be the leader among the various mining company-specific frameworks that are known to the authors. It is now in its third and expanded edition and is publicly available. The SEAT provides a comprehensive set of approaches to monitoring and engaging with communities, including profiling the mining operation and its likely impacts *ex ante*, developing approaches for engagement with communities, developing specific arrangements for managing interaction with communities, monitoring and assessing actual impacts (during implementation and *ex post*), and reporting and sharing results with all stakeholders.

In 2013, ICMM published a report on *Approaches to understanding development outcomes from mining* (ICMM 2013) illustrating the methods available to measure human and social development contributions and the applicability of these methods for use in the mining and metals industry.

</td></tr>
</table>

4.2 Mining's impact of local development: social investment

This section discusses the social investments undertaken by the mining companies. The social investments do not form part of the commercial activities undertaken by mining companies but are instead aimed at making a positive contribution to communities surrounding the mine and include investments in infrastructure, health, education, business development and support for alternative livelihoods, as well as endeavours to support local government to cope with the influx of people into the area.

There is a growing body of evidence regarding best practice in community engagement and delivery of social investment (see Box 8). Many of the principles they embody are highlighted in the examples that follow.

4.2.1 The size and composition of social investments

A common perception among mining communities on the Copperbelt is that the private mining companies that entered the sector following privatization have provided insufficient social investment to support local communities. This appears to reflect in part the relative reduction in benefits that the inhabitants of the Copperbelt receive today in comparison to the pre-privatization period during when ZCCM provided high levels of social assistance.[68] In contrast, sentiment in communities in North-Western Province (where no historical precedent was set by ZCCM) tends to be more positive about the economic and social contributions mining has brought to the area, although even there some negative perceptions remain.

The social investments of mining companies in Zambia are relatively high compared to other countries studied using the MPD Toolkit. This is particularly true for the "legacy mines" on the Copperbelt which took over some (though not all) of ZCCM's former responsibilities with respect to employees as part of their DAs. Figure 35 benchmarks mining companies' social investment contributions in North-Western and Copperbelt Provinces in comparison to other countries in which the toolkit has been carried out. While social investment contributions in North-Western Province mining companies are similar to those found in other toolkit case studies (around 1–2 per cent of pre-tax profits), contributions from Copperbelt mining companies are significantly larger: between 10 and 16 per cent of pre-tax profits. This is between five and eight times that found in other case study countries.

---

68 Including free health services; subsidies for school fees, electricity and water; funeral assistance for dependants; supplies of staple foods; and the provision of a variety of municipal services.

Figure 35: Benchmarks for social investments as a percentage of pre-tax profits (2012)

|	Other toolkit countries	Mines in Zambia	
		North-Western	Copperbelt
Social investments as % of pre-tax profits	1–2%	1–2%	10–16%

Source: Company data and ICMM country case studies.

A recent survey carried out by the International Labour Organization (ILO) found that of more than 200 identified community development programs around mine sites well over 80 per cent are implemented by mining companies (Mondoloka 2013). This indicates that social investment contributions are high not only in relation to company profits but also that the vast majority of community development initiatives in mining areas are carried out by the mining companies themselves.

In 2012, the four mining companies spent just under US$70 million on social investments, equivalent to 0.3 per cent of Zambia's GDP.[69] As Figure 36 shows, the two Copperbelt mining companies together make up 78 per cent of all social investments made by the four mining companies. This reflects the responsibilities the former took on – at privatization – for running hospitals (both mining companies run two large hospitals each), several health clinics (between seven and eight each) and several schools (two primary and two secondary schools each). The running of education and health facilities is unusual for commercial mining companies and the costs of running these facilities, particularly the hospitals, increase mining companies' total social investment spending, and staff numbers, significantly.

The priorities for social investment differ across the Copperbelt and North-Western Province, in part due to differences between the communities. The Copperbelt is an established urban area with relatively good infrastructure but high levels of unemployment, high levels of HIV and a population with high expectations of the mining companies. By contrast, North-Western Province has limited infrastructure and was predominantly rural and sparsely populated before the arrival of the mines. The introduction of mining to the province has brought with it an influx of people to surrounding areas, which has put the already limited infrastructure under further pressure and brought with it new challenges such as the possibility of increased levels of HIV.

"The running of education and health facilities is unusual for commercial mining companies and the costs of running these facilities, particularly the hospitals, increase mining companies' total social investment spending, and staff numbers, significantly."

Figure 36: Social investment expenditure by mine in 2012

Mopani US$30m **43%**

KCM US$24m **35%**

Kansanshi US$13m **19%**

Lumwana US$2m **3%**
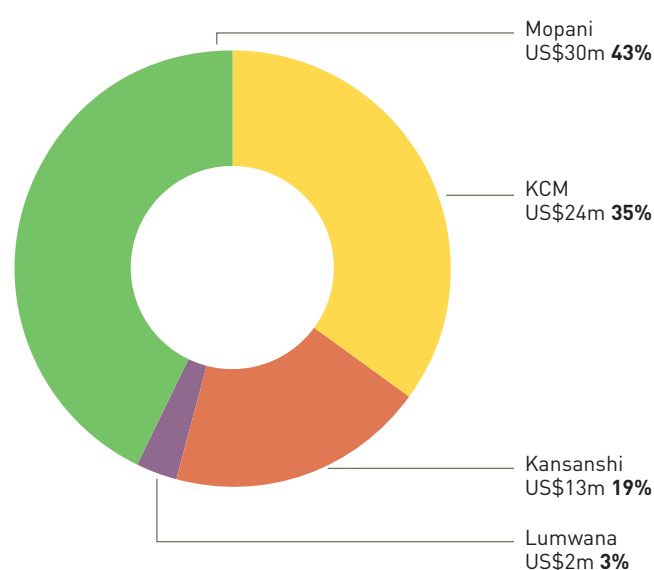
Source: Company data.

69 According to the World Bank's World Development Indicators, Zambia's GDP in 2012 was US$20.7 billion.

Local-level contributions of mining

4.2.2 Approaches to social investment

Social investments made by mining companies are voluntary – aside from some legacy obligations for Copperbelt mines – as the Minerals and Mining Development Act of 2008 does not set out requirements for mandatory investments. Although the DAs were repealed in 2008, KCM and Mopani have both continued to run, and in some cases have expanded, the health and educational facilities for which they are responsible under the previous system.

The mining companies plan and implement social investment in different ways (see Annex E for a more detailed discussion):

- Lumwana and KCM generally adopt a proactive consultative bottom-up approach to social investment and follow an established process for planning and implementing projects. They consult both with communities (through community liaison officers) and with local government when determining what and how investments will be made. They also use existing government survey data to assess the needs of communities and carry out their own monitoring (through baseline and follow-up surveys) of surrounding communities and of projects themselves. Implementation is typically carried out in partnership with others, including local government, civil society organizations and community members.

- Mopani spends more than the other mining companies in absolute terms, but adopts a more top-down and ad hoc approach to social investment. While some engagement takes place with communities through corporate affairs officers, the company tends to respond to community requests rather than engaging proactively with community members. There are some examples of joint implementation but most projects are implemented alone with limited monitoring and evaluation.

- Kansanshi falls somewhere between the other two approaches. While traditionally top-down, it is increasingly engaging with communities. Kansanshi is starting to monitor projects more systematically (including through the use of regular surveys) while remaining fairly reactive and ad hoc in its responses. The mine still relies heavily on input from traditional chiefs who are not always accountable to communities. A growing number of projects are implemented in partnership with others.

As noted above, mining companies in Zambia make large contributions towards social investments. While communities acknowledge some of the positive contributions that these have made, perceptions of the mines remain largely negative. Recent surveys have shown that there is widespread mistrust and, in several cases, open hostility towards the mines (Mondoloka 2013). This is partly because positive contributions are offset by concerns over the negative impacts of mining on surrounding communities, such as pollution and resettlement. But many of the problems stem from the approach taken to social investments, which could be improved upon.

No clear framework exists within which social investment programs can be planned and implemented. Programs are therefore often ad hoc and not co-ordinated with developmental activities carried out by other stakeholders in the same region (including those of other mining companies). Effective consultation and communication through formalized structures can be lacking and has contributed to the high levels of mistrust. The importance of improved consultation and communication was emphasized by many of the participants at the November 2013 workshop (see Annex A). In addition, little systematic information on the impact of social investments is collected, which limits the potential to learn from and improve upon existing investments. While some mining companies have made greater attempts to consult and communicate with surrounding communities and to co-ordinate and measure their programs, the continued negative perceptions in most surrounding communities indicates that all mining companies could improve upon their approaches to ensure that large social investment spends translate into benefits felt by surrounding communities.

"Positive contributions are offset by concerns over the negative impacts of mining on surrounding communities, such as pollution and resettlement. But many of the problems stem from the approach taken to social investments, which could be improved upon."

4.2.3 Spending and programs across functional areas

Figure 37 shows the distribution of the aggregate social investment spend across key functional areas for the four mining companies in 2012. The largest proportion went towards health initiatives (43 per cent at US$30 million), followed by infrastructure (24 per cent at US$17 million). Together these two categories made up two-thirds of total expenditure.
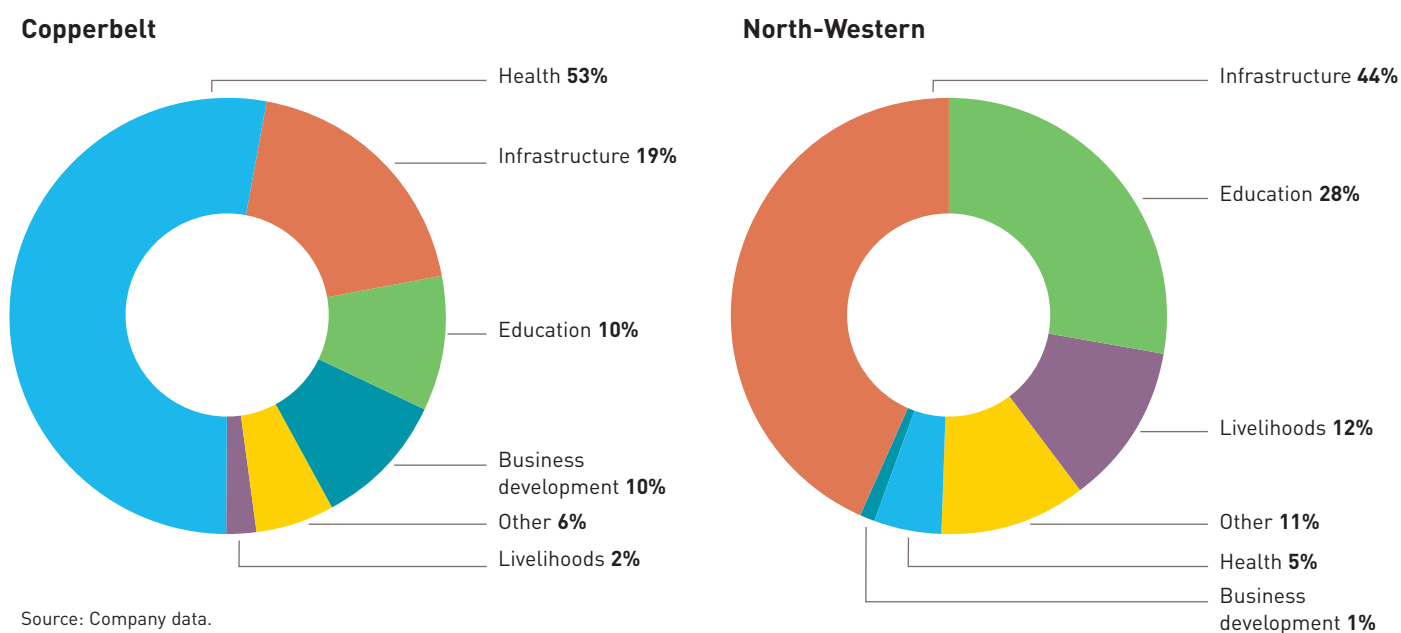
Figure 38 shows the distribution of social investment spend across the Copperbelt and North-Western Province mining companies.

Figure 37: **Social investments by all four mining companies across functional areas (2012)**

US$ million
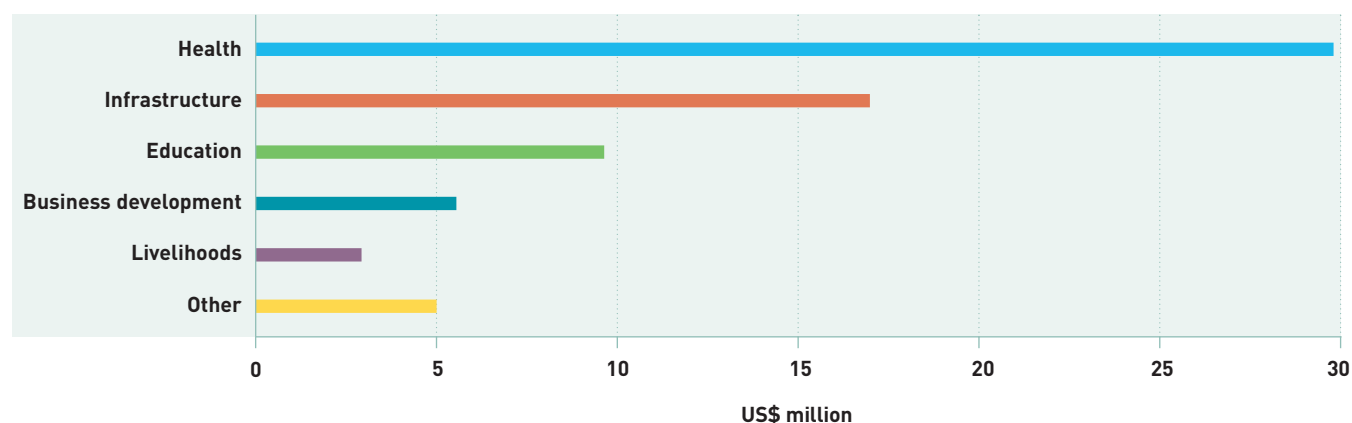
Source: Company data. Note "Other" represents areas such as donations and compensation for resettlement.

Figure 38: **Composition of social investments in the two provinces (2012)**

Copperbelt

Health **53%**

Infrastructure **19%**

Education **10%**

Business development **10%**

Other **6%**

Livelihoods **2%**

Source: Company data.

North-Western

Infrastructure **44%**

Education **28%**

Livelihoods **12%**

Other **11%**

Health **5%**

Business development **1%**

Local-level contributions of mining

The two mining companies in North-Western Province spent around US$15 million on social investments in 2012. Infrastructure constitutes the largest percentage of total social investments (44 per cent) for both mining companies, followed by education (28 per cent). This is unsurprising given the underdeveloped nature of infrastructure (including school infrastructure) and poor quality of education in the province, along with challenges brought about by the rapidly growing populations near the mines (see Box 9 and Box 10).

The area surrounding Lumwana mine was predominantly rural, sparsely populated and had very little infrastructure (one main road, no telecommunications infrastructure, no power and limited schooling and health facilities) before the mine was developed. Since mining activities commenced, the province has experienced high levels of in-migration, particularly into areas surrounding the mines. The population of the chiefdom closest to Lumwana mine, Mukumbi, almost tripled between 2000 and 2007 (to 19,412) and is likely to have increased further since then. This has put pressure on the already limited health and educational facilities in the area.

The high levels of in-migration have also put pressure on the existing public services in Solwezi town, near Kansanshi, while those in surrounding areas face problems with access to water, poor road infrastructure, and inadequate health and education facilities (particularly high schools).

The mining companies in North-Western Province are engaged in a variety of infrastructure development initiatives, often working with government, private or non-profit actors (see Box 9 and Box 10).

The two mining companies in Copperbelt Province spent around US$55 million on social investments in 2012. The majority of this was spent on health (53 per cent). This is largely due to the high costs of running hospitals and health clinics. The second-largest component of expenditure related to infrastructure – particularly on the upgrading of existing infrastructure.

In terms of health facilities, Mopani runs two ISO-certified hospitals,[70] seven township clinics[71] and several workplace clinics. KCM runs two hospitals[72] and eight clinics. These health facilities are available free to employees and dependants but are also available to the general public at a subsidized fee. The hospitals are considered to be some of the best in the southern African region and provide better services than government hospitals are currently able to provide.

> **Box 9: Mining partnership: responsive financing of infrastructure**
>
> **In response to the infrastructural challenges in their regions, Kansanshi and Lumwana have each set up a trust fund for infrastructural investment.**
>
> **Lumwana has set up the Lumwana Development Trust Fund. It operates on a 75/25 principle whereby Lumwana contributes 75 per cent towards the cost of a project and local communities contribute 25 per cent in-kind (such as in the form of bricks, stones and sand). Projects are identified by a committee consisting of mine management, local government and local chiefs. Local chiefs and local government make the final decision about which projects to take forward and are responsible for supervising and monitoring projects, while Lumwana is responsible for contributing towards and running the fund. Over US$800,000 was spent through the trust fund in 2012, on educational facilities (schools and staff housing), health facilities, agricultural services, roads and market infrastructure.**
>
> **Kansanshi has set up a non-profit organization called the Kansanshi Foundation to channel investments. The initiative was initially considered "top-down", but since 2014 has become more consultative. Chiefs now play a key role in identifying infrastructure needs and submit requests for infrastructural improvements to the foundation on behalf of the community. Kansanshi allocates a discretionary budget to the foundation every year (just under US$1.5 million in 2012).**

> **Box 10: Mining partnership: addressing health and education infrastructure deficits**
>
> **High levels of in-migration have put huge strain on the limited existing health and education facilities in North-Western province. For example, the primary catchment population of the Solwezi General Hospital has increased from 200,000 people in 2000 to over 700,000 in 2010 (LCMS 2010). Kansanshi has responded by investing US$2.2 million over five years in upgrading the Solwezi General Hospital.**
>
> **Those living in the three chiefdoms surrounding the Lumwana mine have always had limited access to health facilities. The issue is particularly severe in these chiefdoms, where the total number of students in schools increased by 21 per cent over three years. The Lumwana Development Trust Fund has funded the construction of several education and health facilities, as well as staff housing, in the three chiefdoms near Lumwana mine and several facilities have been connected to electricity.**
>
> **However, the demands are large and challenges remain. Although Lumwana's program has brought down the pupil–teacher ratios in the area (from 1:63 to 1:53), the severity of the shortages and the growth in student numbers mean that the ratios remain high and pass rates low even after these additional investments have been made.**

70 Wusakile Mine Hospital and Malcolm Watson Hospital.

71 Four in Mufulira and three in Nkana.

72 Nchanga South Hospital in Chingola and the Konkola Mine Hospital in Chililabombwe.

Box 11: Mining partnership: a co-ordinated approach to combating HIV/AIDS

The implementation of HIV programs by these mining companies – across both the Copperbelt and North-Western Province – is carried out in partnership with an established NGO (the Comprehensive HIV/AIDS Management Program) and by working closely with the Ministry of Health, within a single co-ordinating framework. The government provides the overall operating framework and helps set priorities, the private sector commits financial and human resources towards implementation, and the non-profit sector is able to draw on its detailed understanding of communities and approaches to successful implementation.

Within this framework, Kansanshi supports a mobile health unit that provides HIV and malaria services to surrounding communities who have traditionally been discouraged from seeking medical treatment as a result of the transport costs involved in accessing facilities.

Lumwana focuses mostly on HIV mitigation (as currently HIV levels in the area are low) through awareness raising, education campaigns, training for counsellors and community health volunteers, and the formation of support groups. They also facilitate networking with rural health centres through monthly co-ordination meetings for various stakeholders working on HIV in the area.

Recent surveys have indicated that the HIV programs are having a positive impact in the Copperbelt and North-Western Province. Initial results from an HIV prevalence survey carried out by KCM in 2012 have indicated that prevalence has decreased and is now lower than national prevalence rates. This is a significant improvement as HIV prevalence has traditionally been higher in the Copperbelt than the national average. Lumwana's surveys of HIV in surrounding areas have shown a decrease in HIV prevalence along with other encouraging signs such as increased demand for voluntary counselling and testing services and increased condom use.

In terms of educational facilities, Mopani and KCM each became responsible for two primary schools at the time of privatization but both have extended these facilities to include secondary schools. Currently, each mine runs four schools (two primary and two secondary schools), providing education to around 3,600 students. The schools are open to the public (around half the students are not dependants of mine employees) and charge user fees that are heavily subsidized by the mining companies. They are considered well resourced with well-maintained facilities[73] and have low pupil–teacher ratios.[74] The quality of education provided at mine schools is reflected in the 100 per cent pass rates and the long waiting lists for entrance into the schools.

In addition to these initiatives that would normally be considered to be public services, the mining companies are involved in co-ordinated multi-stakeholder initiatives to address the two main public health challenges in the region: HIV/AIDS (Box 11) and malaria (Box 12).

"The schools are open to the public (around half the students are not dependants of mine employees) and charge user fees that are heavily subsidized by the mining companies."

73 Such as swimming pools and computer labs.

74 A maximum of 30 students per teacher.

Box 12: Mining partnership: a regional approach to malaria control

Since 2000, Mopani and KCM have been implementing malaria control programs that have reduced the incidence of malaria in the areas surrounding the mines. As a result of the success of these programs, the government replicated some of the interventions used by KCM and Mopani as part of the National Malaria Control Program (NMCP). Around half of the districts in Zambia are implementing the national program at present. All four mining companies currently implement malaria initiatives that are aligned with the NMCP. They all link into the one co-ordinating mechanism, one implementation plan and one monitoring plan and therefore operate within an established framework. This ensures that their efforts are aligned with each other and that information is collected on a systematic basis. The HIV initiatives run by the mining companies are also aligned with national health policy.

The anti-malaria initiatives are largely preventative and include indoor residual spraying of tens of thousands of households (mostly those of non-mine employees), drainage clearing and the distribution of insecticide-treated nets. These activities have shown measurable successes. KCM has reduced the prevalence of malaria in and around its operations by 80 per cent (from 113 per 1,000 in 2000 to below 20 in 2010). Mopani has seen a similar decline in the disease from around 145 per 1,000 in 2002 to 13 per 1,000 in 2011 (see Figure 39). The incidence rate of malaria in areas in which Mopani operates is significantly lower than the rest of the Copperbelt, which still has rates of around 250 per 1,000 in 2011.

Figure 39: Malaria incidence rates in the Mopani and KCM project sites in comparison to the rest of the Copperbelt (1999–2011)
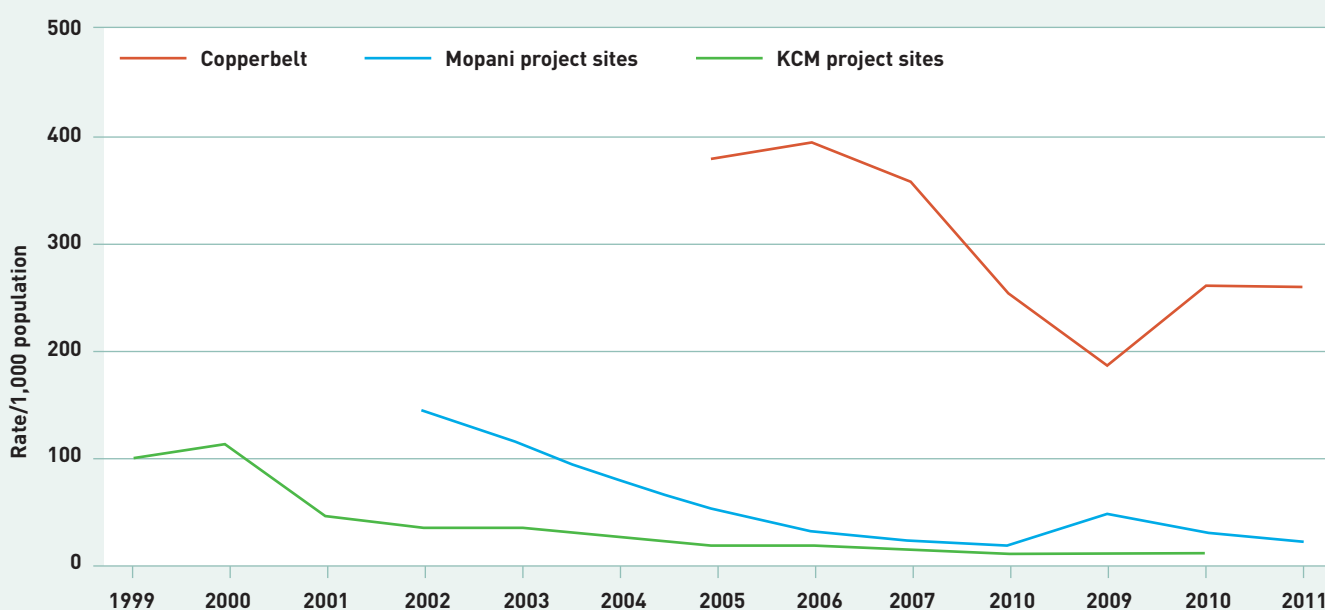
Source: Mopani and KCM.

"As a result of the success of these programs, the government replicated some of the interventions used by KCM and Mopani as part of the National Malaria Control Program."

Several of the health and education initiatives take a holistic approach to addressing development challenges (see Box 13).

In terms of livelihood programs, Lumwana, Kansanshi and KCM have a number of livelihoods programs in place, in partnership with local NGOs. Many of these focus on supporting and scaling up farming activities in surrounding communities, while others are aimed at developing non-agricultural skills. Examples include:

- Kansanshi has used funding from the Kansanshi Foundation to support projects in fish farming, beekeeping, vegetable and poultry farming and, more recently, conservation farming.

- Lumwana and KCM both run a number of programs focused on promoting agricultural activities and dairy farming.

- Kansanshi, KCM and Lumwana provide training and technical assistance as well as agricultural inputs to farmers.

- Kansanshi and Lumwana support access to finance for farmers, either directly by providing loans or indirectly through support to micro-finance institutions.

- Lumwana helps farmers connect to markets, and sources the majority of its fruit and vegetables from surrounding communities (see Box 14).

- KCM supports several non-agricultural livelihoods projects, including through the provision of childcare facilities for market traders and support for a tailoring and design co-operative for widows (through which KCM sources some of its industrial garments).

Lastly, although the mining companies on the Copperbelt also invest in infrastructure, this is mostly focused on maintaining existing services. For example:

- Mopani has invested in road upgrades to the Kitwe ring road and Sabina-Mufulira road, the construction of classrooms and ablution facilities at schools, rehabilitation of sports stadiums and police stations, sanitation upgrades to replace communal toilets in the Wusakile township,[75] and the installation of a domestic water pipeline in Kankoyo. Mopani also supplies power and water to three schools in the area.

- KCM has made investments in water and sanitation infrastructure for government schools, road construction in Chingola,[76] road and street lighting repairs, upgrades to sports infrastructure and the sinking of boreholes for rural communities in Chingola.

Box 13: Mining partnership: a holistic approach – KCM's early childhood care, education and development project

The early childhood care, education and development project takes a holistic approach to addressing one of the major challenges faced by market traders who operate in KCM's surrounding areas while also addressing the educational and nutritional needs of traders' young children. Market traders at Lubengele market in Chililabombwe and Chiwempala market in Chingola found that their ability to trade was limited by a lack of available childcare for their pre-school-age children. The project was set up to fill this gap in childcare. In addition to providing childcare facilities, the project also ensures that the children are provided with early childhood education and nutritional support, and are linked to health campaigns run by the mine. Currently, 360 vulnerable pre-school children whose parents or guardians work as market traders are provided with support through the project. The project benefits the children who now have access to early learning but has additional benefits in terms of improving the livelihoods of the traders (who are able to earn more money) and the children's health, education and nutrition.

Box 14: Mining partnership: connecting farmers to markets – Lumwana's Agri-Food Innovators program

One of Lumwana's larger initiatives is the Agri-Foods Innovators program, for which Lumwana has set up a revolving fund. This program promotes the use of small-scale irrigation systems to support agricultural activities to take place throughout the year and not only on a seasonal basis. It aims to promote agriculture as a business rather than at a subsistence level. An NGO (Microfin) implements the project (by providing training and loans to farmers) and the Zambian Cultural Research Institute carries out high-value crop research and provides subsidized seeds to the initiative. The technical interventions have improved agricultural yields but the program goes a step further by ensuring that farmers have a ready market for their produce. The mine buys all of its fruit and vegetables from farmers in the surrounding areas.

The combination of improved agricultural practices, access to training and finance, and the linkages to a market for the produce has shown positive results, with several farmers expanding their operations and opening business bank accounts. iDE, formerly International Development Enterprises, has recently become involved in the project with funding from the EU. This involvement seeks to scale up the activities, including a target of reaching 3,500 farmers in Solwezi (including 1,000 in the area surrounding Lumwana).

75 Where 1,667 units were installed.

76 In partnership with government.

4.2.4 Lessons learned from social investment approaches

The findings from focus group discussions, stakeholder interviews and company-level data indicate that the approach to social investment matters. There is criticism of some approaches – especially, narrow social investment approaches imposed in a non-consultative and ad hoc manner. The specific approaches to social investment planning and implementation can have important effects on both outcomes and community perceptions. Three things appear to be particularly important:

Consultation and engagement
Bottom-up approaches that consult and engage with communities and with local government have the greatest chance of success. The high levels of community engagement and proactive efforts of both KCM and Lumwana have led to the implementation of a range of projects that address many of the genuine needs in surrounding communities, including those who are most vulnerable. Surveys conducted by Lumwana indicated that 83 per cent of households in surrounding chiefdoms agreed that Lumwana's programs are directly addressing pressing social needs in the community. Where projects have been implemented without adequate consultation, communities have expressed frustration with them not meeting their needs and in some cases have actively sabotaged them.[77]

Holistic approaches
Programs that aim to address a holistic set of community issues show greater success. KCM's innovative livelihoods programs expand on approaches common to other mining companies' programs (eg seed and fertilizer distribution, training, etc) by addressing the childcare constraints faced by traders in markets. This has allowed traders to earn more income and has also ensured that children are educated and connected to government health programs. Lumwana also takes a holistic approach to business development by addressing a variety of constraints that businesses face (access to finance, access to business facilities and capacity-building support).

Alignment and partnership with government and NGOs
Programs that are aligned with government activities and implemented in partnership with a range of stakeholders (NGOs, government, communities and international development agencies) are more effective than those carried out independently. This is consistent with findings from previous toolkit implementations (eg the health investments undertaken by mining companies that have been aligned with government health policies and systems and implemented by capable NGOs). Activities undertaken through the Lumwana Development Trust Fund have also been effective in partnering with government (who are involved in decision making, supervision and monitoring) and with local communities (who take an active role by contributing to projects in-kind), which has resulted in high levels of buy-in from communities.

"Where projects have been implemented without adequate consultation, communities have expressed frustration with them not meeting their needs and in some cases have actively sabotaged them."

---

77 This has been documented in other surveys carried out in mining communities and was also raised in focus group discussions carried out as part of the toolkit work.

Image courtesy of Chibuluma Mines Plc

Mining provinces and districts: economic and social outcomes

5

5. Mining provinces and districts: economic and social outcomes

This chapter investigates the socioeconomic performance of mining regions and districts. It aims to contribute to a more informed debate about whether the large contributions of mining seen at the national level are effectively translated into economic and social development for local communities.

This chapter uses Zambia's LCMS from 1998, 2006 and 2010 as a basis for analyzing how living standards have changed over time. LCMS questionnaire results provide information on a broad range of economic and social indicators and outcomes. This data is supplemented by standard international indicators of economic and social performance. Annex F provides additional details on the data and methodology used.

The analysis focuses on selected key indicators to cover important areas of economic development (income, urbanization, population growth, employment, unemployment and poverty) and also social development (such as education, access to social services and infrastructure).

This chapter is structured as follows:

- socioeconomic trends in the two copper mining provinces

- trends over time in mining districts

- comparison of outcomes in mining and non-mining districts.

5.1 Mining provinces and districts: economic and social outcomes

This subsection provides a broad comparison between Zambia's two copper mining provinces as well as the economic and social developments that took place between 1998 and 2010.

There are large differences between Copperbelt Province and North-Western Province. The Copperbelt is a developed region and had the highest HDI score in the whole country in 2008. North Western Province remains one of the poorest and least developed parts of Zambia in spite of the very large new mining investments that it has seen.

The Copperbelt has a larger population (of around 1.95 million people) than North-Western Province (which has just over 750,000 people) in 2010 (see Table 9). It is a highly urbanized area – and increasingly so in recent years – with 79 per cent of the population living in urban areas in 2010. By contrast, in the same year, only 36 per cent of the overall Zambian population lived in urban areas. North-Western Province remains predominantly rural with only 20 per cent living in urban areas (see Figure 40).

Figure 40: Urbanization ratios in the Copperbelt and North-Western Province, 2010
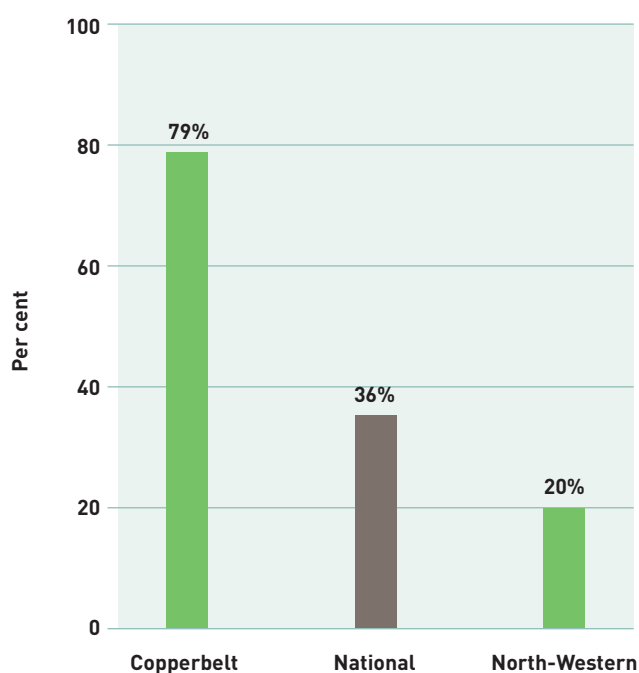
Source: LCMS 1998 and 2010.

Table 9: Population and population growth rates across mining provinces[78]

	1998	2006	2010	Annual population growth		
				1998–2006	2006–10	1998–2010
National	9,031,5592	11,713,585	13,063,688	3.30	2.76	3.12
Copperbelt	1,794,642	1,782,668	1,956,473	-0.08	2.35	0.72
North-Western	548,660	709,203	758,046	3.26	1.68	2.73

Source: LCMS 1998, 2006 and 2010.

During the period under study, population growth and increases in urbanization have been consistently higher in North-Western Province compared to the Copperbelt. Since 1998, the urban population in North-Western Province has almost doubled.

Since 2006, real per capita monthly income has grown faster in the two mining provinces than the national average (see Figure 41). The Copperbelt experienced high levels of real per capita monthly income growth and by 2010 had reached levels similar to those achieved in Lusaka. North-Western Province experienced even higher rates of income growth over the period, at 24 per cent per annum.

Trends in subjective poverty (households' own evaluation of their poverty status) showed almost identical levels in 1998 across provinces, but larger reductions since then in the Copperbelt and North-Western Province compared to the national average (see Figure 42). At the national level, 85 per cent of Zambians described themselves as poor in 2010. The percentages were lower in both North-Western Province (82 per cent) and in the Copperbelt (77 per cent).

The data suggests, then, that the resurgence of mining has brought significant income gains and poverty reduction to the two mining provinces. However, at the same time, this data is consistent with the observation that the mineral boom period has not addressed directly the high levels of extreme poverty across the country.

Figure 41: Provincial real monthly per capita income (in '000 kwacha, 2010 prices)[79]
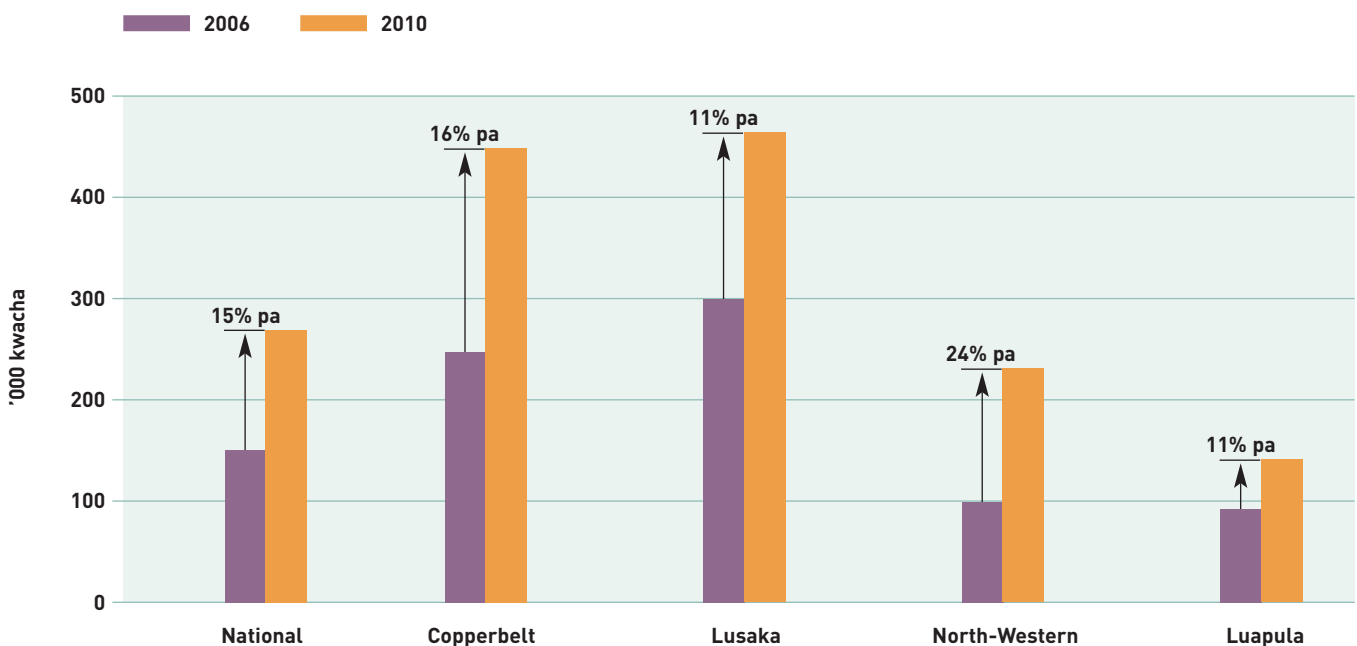
Source: Central Statistical Office (2012a).

78 The weighted sum of the total number of household members (household size) is supposed to give a fairly good and accurate estimate of the current population in a particular domain such as district, province, rural/urban and national level, which this survey was designed for (LCMS 2010).

79 Income is reported in 2010 prices, using the consumer price index as a deflator. The mean per capita monthly household income is defined by the total household income divided by the number of persons in the household (Central Statistical Office 2012a). A comparable indicator is not available in the LCMS 1998 report (LCMS 1998).

Figure 42: Changes in self-assessed (subjective) poverty levels between 1998 and 2010 at provincial level
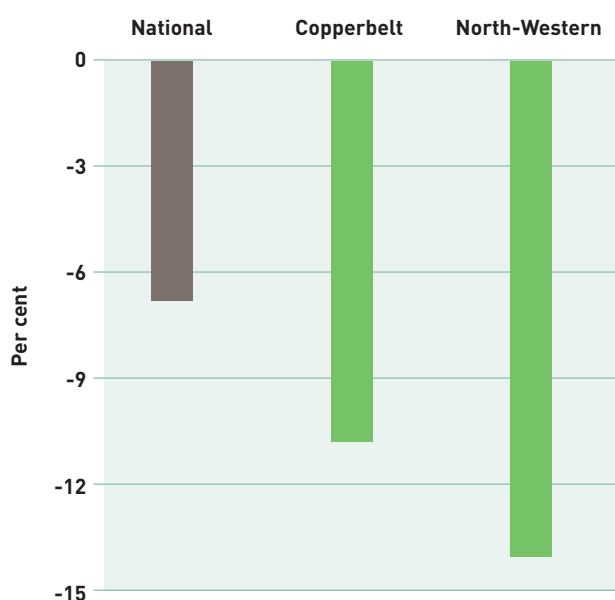
Source: LCMS 1998 and 2010.

"Between 1998 and 2010, the formal sector (defined here as the proportion of the labour force in wage employment) in the majority of Copperbelt mining districts continued to be roughly double the national share."

5.2 Trends over time in mining districts

This section focuses on the trajectory of socioeconomic outcomes in mining districts, where the impacts of mining companies' social investments are likely to be most pronounced. The districts covered are those where large-scale mining is taking place, that is, Chililabombwe, Chingola, Kitwe, Mufulira, Kalulushi and Luanshya (Copperbelt) and Solwezi (North-Western Province).

In discussing the performance over time of these districts, it should be noted that even at district level, there are variations. For example, Solwezi district covers a very large area that contains parts immediately affected by mining and areas that are remote from it. This section discusses the following indicators:

• employment

• population

• health and education services.

5.2.1 Employment

Between 1998 and 2010, the formal sector (defined here as the proportion of the labour force in wage employment) in the majority of Copperbelt mining districts continued to be roughly double the national share. In Solwezi, formal employment has also increased rapidly, and in 2010 reached 20 per cent, or three percentage points above the national figure.

Unemployment rates are higher and more volatile across Copperbelt mining districts compared to the national average. For example, in Kitwe unemployment fell from 43 per cent in 1998 to 30 per cent in 2010, while it increased in Luanshya from 20 per cent to 35 per cent in the same period. At the national level, unemployment stayed constant at around 12–13 per cent in all three survey years.

Over time, formal sector employment has developed into new sectors, such as construction work, and a larger share of people in employment received on-the-job benefits – at 12–13 per cent in 2010 compared to less than 1 per cent in 1998. This move away from agriculture has generated larger unemployment rates, although they still remain similar to national figures.

Figure 43: Net secondary school attendance rates
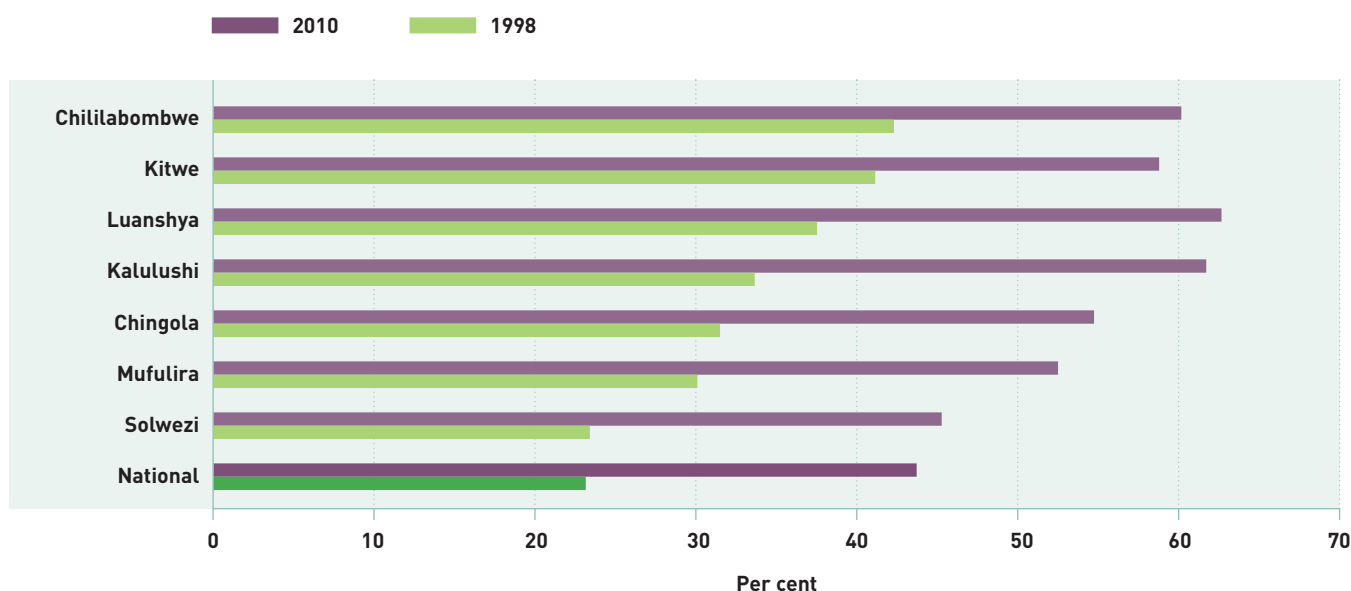
Source: LCMS 1998 and 2010.

5.2.2 Population

With mining well established in the Copperbelt, the urban share of the population was already high in 1998 (around 73 per cent); however, it continued to increase in four out of six districts from 1998 to 2010, while the share of the urban population at the national level stagnated.

Population growth in North-Western Province has been strong in the last decade and a half, averaging 3.3 per cent per annum. In parallel, Solwezi's urban population has expanded quickly; the district's urbanization ratio has doubled since 1998 to 38 per cent in 2010, a higher level than the national average.

5.2.3 Health and education services

Education and health indicators in Solwezi district have largely followed the national trend. Despite some improvements in absolute terms, most such services still reach a smaller share of the population in Solwezi than in other parts of the country.[80] In Solwezi:

• Primary school net attendance has not changed since 1998; hence in 2010 it was not higher than the national level (79 per cent).

• Secondary school net attendance has followed the national trend (see Figure 43). In 1998, one-quarter of children attended secondary school, while in 2010 this had increased to just below half of all children of secondary school age.

• Health service delivery (ie consultation rates) has seen a similar development to the country as whole.

• Access to inadequate water and electricity continue to be well below the national coverage despite a significant change in access to electricity from 3 per cent in 1998 to 16 per cent in 2010.

Copperbelt mining districts, on the other hand, are characterized by high (above national average), but rather stagnant, performance in many social indicators (see Annex F).

• Net school attendance rates and most service delivery continue to be well above the national level. In most mining districts, net attendance in primary school has been above the national 2010 level since 1998. In 2010, they were between 8 and 20 percentage points above the national average.

• Health service delivery (ie consultation rates) has increased significantly in the majority of mining districts, similar to the national average; however, delivery of adequate water services and electricity continues to reach a much larger share in Copperbelt mining districts than nationally in Zambia.

80 The sample size for Solwezi district is small for a range of indicators. It is therefore not possible to state whether the change observed is significant. The small sample creates variances that are too large to conclude that one year's average is in fact larger than another average observed in a later survey.

5.3 Comparison of outcomes in mining and non-mining districts

This section compares the performance of mining and non-mining districts within each province. Such comparisons provide the best assessment of whether the presence of mining has contributed to enhanced socioeconomic outcomes.

It should be noted that, based on existing data, it is not possible to identity a counterfactual (ie what the "mining" district would have looked like had the mining not taken place). Therefore, a fully rigorous impact evaluation is not possible. Instead, this analysis should be regarded as an initial logical approach to exploring broad differences across mining districts, as well as between mining and non-mining districts (see Annex F for more details on methodology).

This section discusses the following socioeconomic indicators:

- population
- subjective poverty
- employment
- education
- infrastructure (sanitation and electricity)
- access to social and financial services.

"Although all districts experienced significant improvements in poverty reductions, in mining areas the reduction was double the percentage point figure in non-mining districts."

5.3.1 Population

Population growth has been distinctly higher in Solwezi (the only mining district in North-Western Province) than in non-mining districts in North-Western Province – consistent with the observation in previous MPD case studies that new mining investment tends to triggers significant in-migration.

Despite the new mining boom, however, the same is not observed in the Copperbelt; following a decline in mining district populations between 1998 and 2006, population growth in mining and non-mining areas was similar between 2006 and 2010.

5.3.2 Subjective poverty

Subjective poverty ratios (ie people's own perception of their poverty status relative to the society surrounding them) have fallen more rapidly in mining districts compared to non-mining districts, across both provinces (see Figure 44). The local population in mining districts feel less poor than those living in non-mining districts. In 1998, subjective poverty ratios were above 90 per cent across mining and non-mining districts in both provinces. In 2010, this had changed dramatically. Although all districts experienced significant improvements in poverty reductions, in mining areas the reduction was double the percentage point figure in non-mining districts (see Table 17, Annex F).

Figure 44: Changes in self-assessed (subjective) poverty levels between 1998 and 2010 at district level
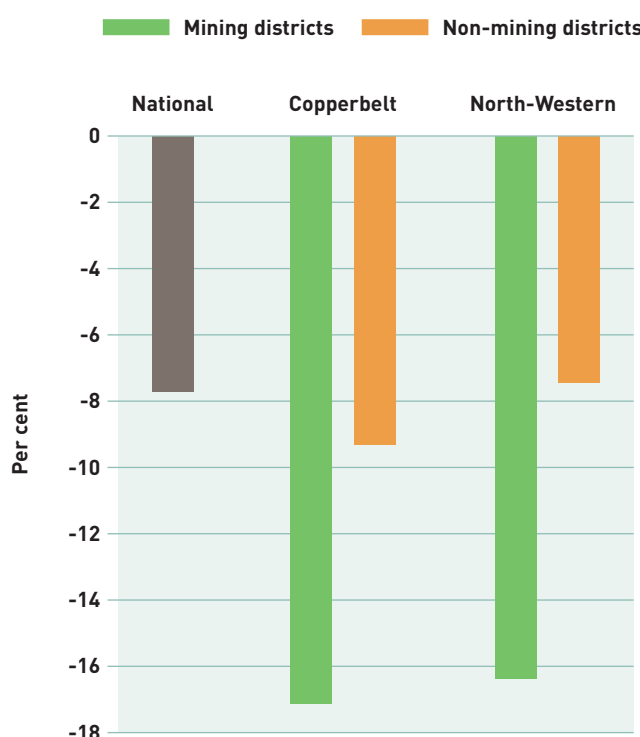
Source: LCMS 1998 and 2010.

Figure 45: The closing gap in primary education (net attendance rates) (1998–2010)

Copperbelt mining districts
Copperbelt non-mining districts

North-Western mining districts
North-Western non-mining districts
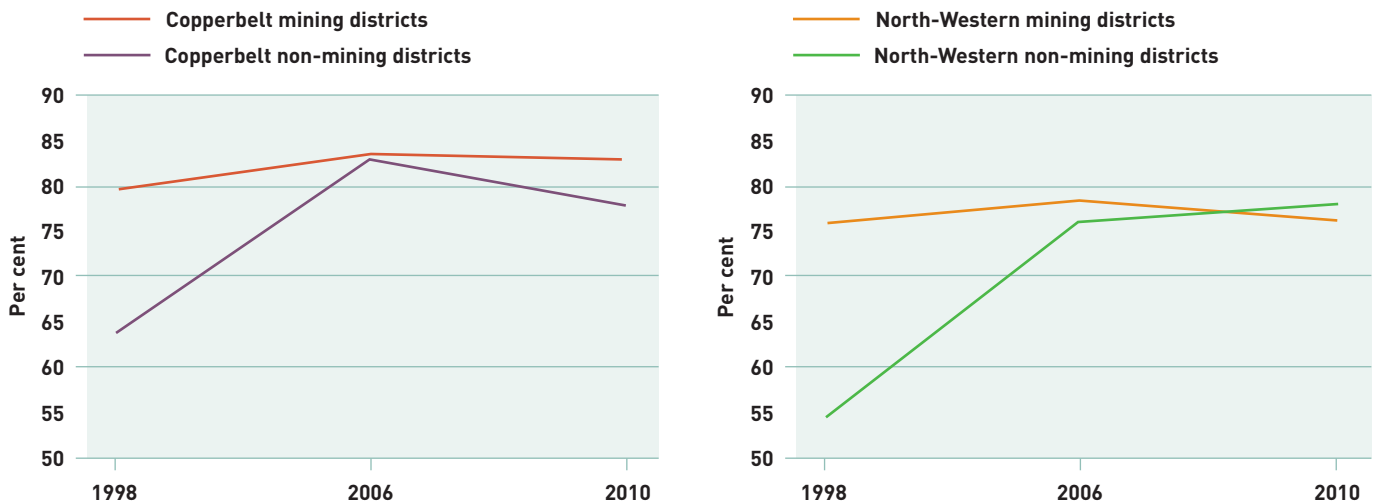
Source: LCMS 1998, 2006 and 2010.

5.3.3 Employment

Mining districts also enjoy higher levels of formal employment in the labour force than do non-mining districts in both the Copperbelt and North-Western Province.

• Starting at a similar level (around 6 per cent in 1998), by 2010 this indicator had increased by 14 percentage points in North-Western Province mining districts – non-mining districts saw an increase of four percentage points (see Table 18, Annex F).

• In the Copperbelt, formal employment was already above the national average for mining and non-mining districts in 1998. Despite stagnation in the share of formal employment in the Copperbelt mining districts, formal employment is still larger compared to non-mining districts (see Table 18, Annex F).

5.3.4 Education

For both the Copperbelt and North-Western Provinces, primary school net attendance rates in non-mining districts have converged on the higher levels previously seen in mining districts (see Figure 45). However, secondary school net attendance remains higher in mining districts. In the Copperbelt, 1998 secondary school net attendance was 16 percentage points higher in mining districts; in 2010, it had fallen to seven percentage points. In North-Western Province, the gap in primary school net attendance has also closed.

With respect to secondary school education, mining districts in North-Western Province managed to increase net attendance rates more quickly than non-mining areas. After starting at a similar level in 1998, Solwezi's secondary school net attendance rate was 45 per cent compared to 36 per cent in non-mining areas in 2010 (see Table 19, Annex F).

"With respect to secondary school education, mining districts in North-Western Province managed to increase net attendance rates more quickly than non-mining areas."

Figure 46: **Access to electricity (1998–2010)**
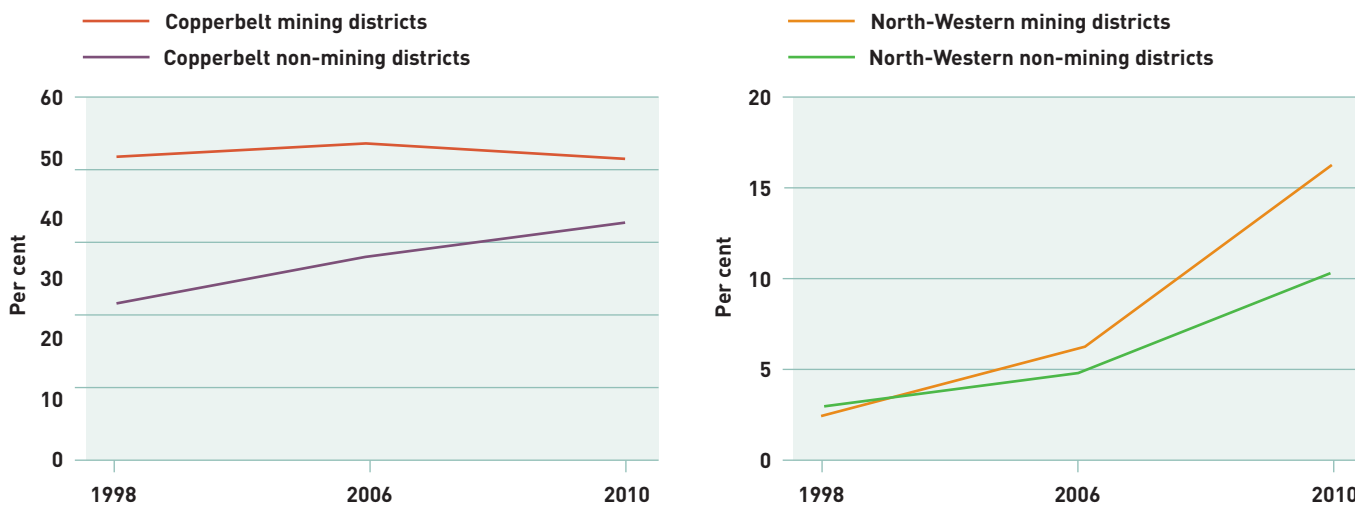
Source: LCMS 1998, 2006 and 2010.

5.3.5 Infrastructure (sanitation and electricity)

Access to improved water sources shows similar levels and trends across mining and non-mining districts in North-Western Province and continues to be below the national average. In the Copperbelt, access to improved water sources has remained unchanged in mining (around 80 per cent) and non-mining districts (around 65–70 per cent).

The previously extremely low levels of access to electricity in 1998 (3 per cent) across North-Western Province improved significantly throughout the period of observation – albeit slightly quicker in Solwezi (see Figure 46).

The situation is different in the Copperbelt. In 1998, half of the population living in mining districts had access to electricity, twice the share of non-mining areas. Over time, access to electricity stagnated in the mining areas, while improvements were made in non-mining areas (a 13 percentage point increase in access to electricity from 1998 to 2010).

5.3.6 Access to social and financial services

Access to social and financial services (as measured by proximity to schools, hospitals and also financial institutions) continues to be slightly better in mining districts compared to non-mining districts in the Copperbelt. In the Copperbelt, the mining districts have a larger share of the population who live within a 5km radius of a hospital, bank, secondary school or food market than in non-mining areas across all survey years. However, apart from banking facilities, the difference in proximity to these facilities is not statistically significant.

In North-Western Province, on the other hand, mining and non-mining districts have a similar level of access to services, and improvements (mostly experienced between 1998 and 2006) are of similar character. Apart from bank facilities, 75 per cent of those living in all mining and non-mining districts in both provinces live in relatively close proximity to key infrastructure in 2006 and 2010.

"In the Copperbelt, access to improved water sources has remained unchanged in mining and non-mining districts."

Governance

6

6. Governance

This chapter examines governance arrangements for managing natural resources. It seeks to describe the critical governance challenges facing the Zambian mining sector, with key messages and recommendations discussed in the following chapter. By laying out the evidence and the verifiable facts about mining's contribution, the aim is to reset expectations about what might realistically be expected of mining companies and how the institutional roles and responsibilities of these mining companies and the parallel roles and responsibilities of government at all levels might be reset for the future health of the economy.

Effective governance of the sector is critical in order to maximize the development outcomes from the mining companies' contributions to national and local economies. It requires appropriate policies and capacities across a range of regulatory, administrative and oversight government functions. It also requires certain changes in organizations outside government, including the mining companies themselves and the Chamber of Mines. This framework can be envisaged as a resource governance "decision chain" (see Figure 47). The distinguishing feature of this approach is that effective governance is needed at each stage in the chain to capture the full benefits of mineral resources.

This chapter discusses the following governance challenges, broadly following the logic of the resource governance decision chain:

- mining policy and the regulatory framework (discovery and then production)

- collection of mineral revenues (revenue)

- public financial management (PFM) and public expenditure – both the effective use of revenues and the capturing of the benefits of mining more generally (investment and human development)

- cutting across these three areas, any new institutional structure (defining roles, responsibilities and methods) that could usefully give attention to the arrangements that might be put in place to encourage new, and extend existing, partnership arrangements between the mining companies, various arms of government and other players such as NGOs and donor agencies.

6.1 The mining policy and regulatory framework

6.1.1 Challenges of growing policy volatility

While Zambia's fiscal and monetary policies have supported commendable macroeconomic stability for much of the past decade, mineral sector policy, and the regulatory framework within which investments are made, have both been increasingly unpredictable. An unstable policy environment constitutes a threat to future investment in the sector, both by new and by existing investors, and therefore to the positive macroeconomic and local-level contributions that mining has supported.

The 2008 Act took the necessary step of establishing uniform rules and regulations, with minimum company-specific discretionary exemptions, and this has been largely welcomed. In the process, that same act repealed the DAs that had driven the initial privatization settlements with individual companies. There was considerable justification for this move and not least in the wide variations in tax and other treatments accorded to different mining companies. Unfortunately, this transition was handled with little consultation with the mining sector – despite earlier commitments by the then-president to engage in such consultations and the legally binding nature of the contracts. It also heralded a period of considerable uncertainty for the industry, characterized by further top-down changes in the rules under which the mining companies need to operate. That situation has continued through the change of government to the present time.

Top-down changes have included several alterations in key tax and royalty rates, while new taxes have been introduced and then subsequently dropped. Several new statutory instruments have been introduced that have added further to the costs of operating in an already high-cost environment (see Chapter 2).

In this process, any real sense of vision for the future Zambian mining industry seems to have been lost. Several Zambian contributors to the November 2013 workshop argued strenuously that Zambian decision makers need to state explicitly and unequivocally that mining is the core of the economy's long-term future. Of course, policies should focus on building a new and more substantial and diversified industrial base for Zambia, but this is most likely to be achieved by actively using the catalytic force of the large mining investments that have been seen since 2000.

Figure 47: The mineral value chain

Discovery   Production   Revenue   Investment   Human development

Source: Oxford Policy Management (2013).

6.1.2 Regulatory capacity challenges

In terms of the ongoing management of the sector, various government agencies – including ZRA, ZEMA and ZCCM–IH – are tasked with holding mining companies to account in performing their duties as well as granting them rights. However, while these agencies have mandates that reflect best practice, they often suffer from weak technical capabilities and the resources needed to effectively oversee a rapidly expanding mining sector. Regulatory agencies often struggle to attract and retain sufficiently qualified staff who can command much higher salaries in the mining sectors. The Chamber of Mines has also been relatively ineffective by comparison with chambers in similar countries – perhaps due to the fact that prior to 2008 the DAs encouraged too many bilateral governance arrangements rather than industry-wide co-operation. There is also an inherent fatalism expressed by some stakeholders – a view that the large multinationals will always have some advantage over the regulator. This view is unnecessary: high levels of regulatory capabilities can be built. These matters are being addressed in part by the ZRA through a variety of donor-supported programs. Mining companies and the Chamber of Mines could further support this process (see Chapter 7).

"**Effective collection of mineral revenues is particularly critical in Zambia, since the government's efforts to raise domestic resources from sources other than mining revenue have proved relatively unsuccessful.**"

6.2 Collection of mineral revenues

Once minerals are monetized, the revenues due to the state have to be collected through the revenue collection framework. Effective collection of mineral revenues is particularly critical in Zambia, since the government's efforts to raise domestic resources from sources other than mining revenue have proved relatively unsuccessful, with overall revenue targets in 2013 again being missed.[81]

In the year immediately following the introduction of the 2008 regime, there was widespread disappointment with the actual collection of mining taxes under the new regime (especially in 2008 and 2009 when the ZRA collections rose to only Kw 1.5 billion as against a pre-reform figure of Kw 1.1 billion in 2007). The mood in policymaking seems to have been heavily influenced by this disappointing tax take immediately following the 2008 reforms (and seen in particular by the revocation of the windfall tax after just one year).[82]

A partial explanation for low revenue collection in 2008/09 comes via recognition of disputes around the new regime that delayed some tax payments by some mining companies, and the fall in copper production during the financial crisis when many operations were temporarily put on hold. Significantly, in 2011 there was a huge payment of back taxes by mining companies of Kw 1.75 billion. If some of this had actually been collected in 2009, then the post-reform picture would have looked more positive much more quickly.

As a result of recent changes to the mining fiscal regime, and the unwinding of capital allowances for some of the new companies, Zambia now receives a high proportion of its taxes from the mineral sector in comparison to other mineral-driven countries (see Figure 18). In 2012, it contributed well over 30 per cent of total taxes. Only Botswana among African mining economies collects a larger share of its total tax revenues from mining. However, the debates around taxation do not seem to have been much influenced by this impressive fact, which is confirmed by ZRA data that shows the actual mineral tax collections in both 2011 and 2012 have grown strongly.[83] Much comment is still based on 2008–09 outcomes.

81 A more extended discussion on this point is beyond the scope of this study. However, recent IMF reports on Zambia (eg IMF 2014) explain the issue more fully.

82 A number of external publications also give emphasis to this same point: for example, Simpasa et al 2013 and Oxfam 2009.

83 This is a criticism that can also be levied at some recent international publications on the topic. The 2013 United Nations Development Programme (UNDP) study, for example, provides a reasonably up-to-date graphic that shows the big rise in mineral tax revenues after 2009 (Figure 1) but then juxtaposes this on an out-of-date IMF graphic (Figure 3) from which the UNDP draws the erroneous conclusion that "This figure shows that, compared with other resource-rich countries, Zambia seems to diverge from the trend, with extremely low revenue generation relative to its export dependence, even when comparing with other low-income copper producers" (Simpasa et al 2013). This statement is no longer valid given the ZRA data for 2011 and 2012.

Today's tax collection level reflects increased production and sales, as well as the gradually strengthened revenue collection framework. For example, several donors, led by the Norwegian Agency for Development Cooperation (NORAD) and the International Monetary Fund (IMF), are providing support to the ZRA in setting up a large taxpayers unit. As regards the question of tax leakage, transfer mispricing and other non-compliance, the secondary evidence reviewed in Annex C suggests that if any revenue is lost due to transfer mispricing it seems to be negligible. One of the most recent and detailed studies shows that Zambia is unusual in African terms in this regard (see Boyce and Ndikumana 2012).

Recent revenue performance is also evidence that the administration of the tax regime in Zambia is relatively effective. Yet challenges do remain due to, for example, the confusion that arises from using different bases for taxation and the risk of inadvertently taxing imported concentrates, which would eliminate a source of income to smelters.[84] At present Zambia has no stabilization scheme or futures fund (such as those established by other mineral-rich African countries such as Botswana or Nigeria, and other copper-rich countries such as Chile) to help manage revenue volatility, if and when copper prices fall.

The government could improve the attraction of Zambia as an investment destination by clarifying and consistently applying its regulatory regime across all operators, even without changes to fiscal rates. For example, applying royalties at the point of extraction (rather than along the production chain) would improve fairness and potentially increase the level of revenue collected. It would also avoid confusion over the royalty treatment of imported concentrates.

6.3 Public financial management and expenditure management

6.3.1 The potential and challenges of public investment

Effective PFM and expenditure management are critical to transforming revenue from natural resources into broad-based sustainable economic and social development. The areas of spending that have broader externality benefits for the economy as a whole include, above all, infrastructure and education:

- All mining projects need good infrastructure, such as roads, rail, water and power. These assets can also contribute to broader development as they make access available to others at a low marginal cost to the industry. The potential for positive externalities is particularly great where several projects are in close proximity, or along a common transport route to export markets. For example, government policies of regional planning and co-investment in infrastructure can enhance these benefits by encouraging appropriate clusters of development to be built around mining as the catalyst, and by including the mining companies as partners in the planning process.

- Government spending on education and skills development initiatives that are in line with mining companies' current and projected demands can have broad benefits by increasing the level of skills in the labour market as a whole.

However, Zambia has a relatively poor public expenditure track record and to date has done little to develop and promote the idea of investment clusters around the dominant mining activity. Several factors have contributed to this, including:

- There has been a lack of transparency regarding how roles and responsibility are divided between mining companies and government. At privatization the new mining companies inherited some formal legacy obligations from ZCCM but the extent to which such "social assets" were transferred was unclear to all but a few due to the secretive nature of the DAs. As a result, the default position among communities was to expect that mining companies would carry on providing public services as in the past.

- There has been a lack of capacity at all levels of government. The increase in responsibilities of local authorities at privatization, and during the subsequent mining boom, was not matched by any comparable increase in financial, institutional and administrative capacity at local and national government agencies. The outcome has been an institutional vacuum in which disputes easily proliferate, and where reasonable people

---

84 Other areas that would benefit from clarification include application of ring-fencing, treatment of gains and losses from trade in licences, and foreign exchange requirements.

with genuine interests cannot get the hard evidence to determine and verify the positions of the parties involved.[85]

• There have been incomplete and unenforced decentralization reforms. The government's 2002 National Decentralization Policy (officially launched in 2004) set out greater responsibilities for local government in delivery of public goods and services, yet progress in turning this policy into practice has been slow.

6.3.2 Sub-national public financial management

Challenges of expenditure management are particularly acute at the sub-national level, where funding for local authorities is centralized, unpredictable and largely non-transparent. The international experience on this matter is clear. Local democratic systems work best when local government authorities have known and reliable financial resources that they are seen to be spending in ways that are transparent and for which they are accountable to local civil society. The present Zambian system falls well short of good practice relative to this criterion. It would appear that very little mineral revenue makes it back to the areas immediately surrounding the mine.[86] As a result, the mining companies have frequently had to step in to provide critical health, education and other infrastructure (see Chapter 4).

Public expenditure through the main centralized channels described in Chapter 1 surpasses by far those expenditures determined and delivered at the local government level either via locally raised taxes or via transfers from central to local governments.[87] Service delivery at district/subdistrict level is still provided predominantly through the various structures of central line ministries (eg in the health sector through the district health boards and the district health management teams) rather than through a committed devolution to autonomous, democratically elected, fiscally empowered and locally accountable local authorities (as is enshrined in the spirit of the National Decentralization Policy). The direct funding to local authorities in Zambia (less than 2 per cent of the total budget) is low compared with countries such as Ghana (4 per cent), Tanzania (12 per cent) and Uganda (14 per cent).[88]

The system has often manifested qualitative as well as quantitative weakness, with limited funds actually reaching recipients. Transfers have also historically been ad hoc in nature, preventing local authorities from effectively budgeting and planning their investments. Donors have sought to support the decentralization process, yet challenges remain (see Box 15).

Box 15: Donor support to enhancing sub-national government funding

In 2007, during the development of the Fifth National Development Plan, the World Bank assisted in developing a new intergovernmental fiscal architecture to support the implementation of the National Decentralization Policy, based on three grant schemes:

• a one-time district restructuring grant aimed to be a means of financial restructuring for all 55 district councils by clearing their retrenchment, retirement and other debts – the 2007 and 2008 budgets allocated Kw 25 billion in support of this but this was subsequently reduced to Kw 20 billion in 2009

• an annual formula-driven recurrent grant with minimal conditionality, to replace the previous ad hoc general purpose grants – this grant intended to achieve greater horizontal and vertical equity by helping to close the fiscal gap facing local authorities

• an annual conditional formula-driven capital grant intended to provide resources for projects included in local authority district development plans, prepared through a participatory process.

The three grants – implemented in 2007 – appear to not have been applied as originally intended. Draft operational manuals were prepared in early 2007 for local authorities to access these three new grants but these were neither circulated to nor have they been much used by local authorities. The disbursement of the recurrent grant was not used for the stated equalization since each qualifying council received the same amount of block grant regardless of its poverty status. The capital grant was also not disbursed based on identified district plans as intended.[89]

---

85 One aspect of this vacuum is that there seem to be no mutually recognized channels to debate and resolve disputes. This has led to a situation where disputes are traced erroneously and unhelpfully to the circumstances of the past. For example, it seems common to trace disputes to allegedly unfair DAs as their basic cause, without this route having offered any lasting route to a resolution that would allow the country and the industry to move forward.

86 For example, although Lumwana pays land rates to local authorities, these go to Solwezi and little of the money goes towards funding service provision in the immediate surrounding areas of the mine.

87 An example of this is the Fertilizer Support Program executed through the District Agricultural Coordinator's Office under the Ministry of Agriculture. This scheme alone received Kw 435 billion in 2009, which is about four times the value of central government's transfers to all local authorities.

88 For example, in 2009 the Kw 177.5 billion that was allocated to the three grants to local authorities, to grants in lieu of rates and to the Constituency Development Fund accounted for only 1.16 per cent of the total 2009 central government budget of Kw 15,279 billion (or only about 0.3 per cent of the 2009 GDP).

89 For example, the capital grant for 2009 was earmarked, in full, for Lusaka drainage. For 2010, Kw 10 billion of the grant was allocated to Lusaka City Council to continue its drainage project and Kw 1 billion each to the 12 new district councils so that they could have minimum facilities to perform their functions.

Governance

During 2010, the Zambian Government introduced a formula-based grant system, with the dual aim of making local government funding more predictable and transparent, and allowing government to better track the usage of grants by councils. Data was not available to assess whether this reform initiative has functioned as intended.

In spite of further reforms in the more recent budget years, it would seem that the low absolute size as well as volatility of transfers still prevents local authorities from dealing effectively with anything like the full gamut of public service demands (and indeed the statutory obligations under the 1991 Act) in mining areas. For example:

• Local administrations have been unable to ramp up the quantum of public service provision in the aftermath of privatization to deal with fast-growing populations in North-Western Province, and to undertake public service provision previously undertaken by ZCCM on the Copperbelt.

• The lack of predictable funding has resulted in local authorities having a weak fiscal position, further undermining their ability to collect and manage revenue. This is evidenced by the build-up of aggregate non-collected revenue in the typical council. As a result, most councils are underfunded and some struggle to even pay their administrative staff on a regular basis.

6.3.3 Local government capacity

Local authorities face a huge challenge in mining regions yet suffer from weak capacity to deliver services. Co-ordinated support would help address two of the areas where there is currently limited evidence of partnership: regional development planning and revenue management. A commitment to a collaborative action (involving government, mining companies, donors and NGOs), if combined with some progress on a substantial decentralization of spending powers, could be a potent force to address widespread dissatisfaction with the visible local impacts of mining investments.

In addition, there are a set of policies that could help strengthen sub-national government capacity. These include:

• granting expanded local tax-raising powers to local authorities to ensure they have a reasonable and reliable source of finance independent of central government discretion

• implementation of a formula-based system of transparent and accountable central-to-local government transfers that addresses both the horizontal and vertical inequalities between and within areas of Zambia

• assigning some part of the revenue that is collected centrally from mining companies for use in initiating or contributing actively to local social and infrastructure projects – though this would need to be balanced with equity considerations in redistributing the revenue benefits of mining to the non-mining provinces of Zambia

• moving away from discretionary and ad hoc grants to a greater share of funding through automatic processes (own revenues plus formula-based transfers)

• continued efforts by government, donors and industry to upgrade the non-financial capacities of local authorities. Their graduation to a system of increased own resources could be made conditional on them attaining minimal standards of good performance in areas such as budgeting, reporting and planning.

"Co-ordinated support would help address two of the areas where there is currently limited evidence of partnership: regional development planning and revenue management."

6.4 Institutional arrangements for improved multi-stakeholder partnerships

There are some obvious messages about governance reforms emerging from the analysis of the subsections above – several of which are already receiving attention from government and some donors. In addition, there is a perceived need to articulate more clearly what the institutional arrangements to support various partnership activities involving mining companies might be. The analysis in Chapter 4 above has shown several examples of where the Zambian mining companies are already actively working in partnership with others to achieve particular objectives. A recent ILO initiative[90] and report has identified no less than 283 community development programs of which the majority were initiated and/or implemented by mining companies (80 per cent, with others initiated by government (11 per cent) and international partners (3 per cent). The issue is not whether such partnerships can or should exist but rather whether there are better arrangements for encouraging, improving and managing them. The remaining paragraphs set out some possible ideas.

First, there is clearly a need to empower local communities more substantively in the conduct of partnerships and programs involving mining companies. This is also the diagnosis of the recent ILO report. What is termed by the ILO report the "hit and run" style of the corporate and social responsibility (CSR ie social investment) initiatives of some mining companies cannot achieve such empowerment.[91] However, there are already good practice models operating in Zambia. One example is the Lumwana Development Trust Fund (see Box 9). Here the core principle is one of community members solving community problems using community resources – including skills and local firms – to the fullest extent possible.[92] There would be great merit in ensuring that such a principle becomes more firmly ensconced as one of the agreed guiding principles for partnerships across all mine sites. It is not the role of government policy to enforce this, but government policy could certainly do more to publicize and actively encourage such arrangements as a part of its policy towards mining (see Box 16).

Second, there would be merit in a more explicit recognition of what may seem to be an obvious point. This is that the initiatives of mining companies, and those of other non-governmental players (such as international agencies), will work much better if they are designed and operated in line with the government's own national and local development objectives, policies and strategies. Many partnership arrangements described in earlier chapters are already aligned in this manner. But there remains a tendency for others to be ad hoc and poorly aligned. This can easily lead to non-sustainability (eg schools with inadequate numbers of teachers in the longer term). Mining companies and government agencies both have a role here to help improve the current situation. This requires, above all, a willingness and capacity to communicate more actively with each other – in a climate of greater community empowerment – about objectives, programs and policies so as to find sustainable solutions (and limit ad hoc solutions) to perceived local problems.

> **Box 16: Frameworks for partnership: the example of Vale in Brazil**
>
> A good practice example of frameworks for partnership is the approach employed by Brazil's major mining corporation – Vale – which embodies the principle of voluntarism backed by some official rules. The voluntary element in the process of developing community programs in this Brazilian model involves an in-depth diagnostic phase (organized by the mining company) followed by the extensive consultation process with both local (in this case municipal) governments and also with the federal government to ensure that programs align with whatever the higher levels of government are themselves planning. The eventual product of this process is a formal letter of agreement (LoA) signed with the local municipalities containing details of agreed programs for the medium term. Within this, there will be a number of formal conditions (*condiciantes*) that once agreed sit alongside the formal legal conditions of the mine's licence as additional legal obligations, which if breached can result in the suspension of the mining licence or various other sanctions. But the key point in all this is that the nature and content of the LoAs emanates from the deep consultative process at the local level and with local authorities.[93]

---

90 Abner Bright, high-level meeting on tripartite arrangements for mining held in Lusaka on 28 November 2013 (Mondoloka 2013).

91 The ILO report argues that "CSR interventions are generally conceived and implemented without visible consultation with the community, local authorities, relevant line ministries of Government, and other stakeholders. They also tend to be disjointed and one-off in nature without any form of monitoring and evaluation. The result is that possible synergies between interventions are not adequately captured and scale economies are not created which undermines the sustainability of the interventions while fuelling perceptions in the community that corporate CSR by mining companies is merely a 'window dressing' exercise" (Mondoloka 2013).

92 This idea is already firmly embedded in the CDT developed by ICMM. This states: "By supporting communities to develop themselves in a sustainable manner, a mining and metals company is simultaneously helping its own business to succeed. Mining operations and their community development programs should be viewed as a mutually beneficial partnership process to achieve sustainability" (ICMM 2012a, p 17).

93 In cases where the LoAs themselves have been rather weak in various aspects of their own capacities, the "condiciantes" have sometimes included actions and expenditures supported by the mines themselves to build improved capacity (eg for budgeting or for developing coherent investment projects for federal government financing).

Governance

Third, none of this will work as well as it might unless the empowerment at local and community level is matched by a greater degree of financial and technical capacity at these lower levels of government. Consultative procedures require appropriate people from the local communities and government to commit time and effort and this will often have financial implications. This speaks to the point earlier in this chapter about the need to more actively address the issues of fiscal decentralization and the associated need to strengthen the commitment to build improved administrative capacity at the local level. Of course, arrangements whereby the mining companies themselves help to build some of the capacities currently lacking can help – but this can only be a short term solution. If the perceived paternalism[94] of the present arrangements is to be reduced, then local governments will need to have resources and capabilities of their own so as to contribute seriously and actively to any programs and partnerships that are proposed. Without these improvements in financial and technical capacities, "empowerment" could become an empty slogan.

Fourth, more effective partnership arrangements will be facilitated by the elimination of the current deep-seated ambiguities about the roles and responsibilities that apply to mining companies on the one hand and the local and community organizations on the other. As explained earlier, the current situation is one in which there is a huge gulf between the *de jure* responsibilities of local governments (as defined, for example, in the 1991 Local Government Act) and in the settlements made with mining companies at the time of privatization, and the *de facto* responsibilities that people in local communities believe and perceive to apply. These ambiguities could fairly easily be eliminated if there is a will to do so. Once that is done, the conversations and communication around partnerships between government (at various levels) should proceed much more amicably and effectively.

Finally, as mining companies increasingly recognize the benefits of coherent partnership arrangements with better-empowered local communities, there will be merit in also defining some minimum standard model of good business practice about how these arrangements might best be organized. This need not interfere with the substantive detail of whatever emerges from the community consultations. But a robust approach would need to at least include things such as a coherent definition of agreed objectives, the definition of the instruments – financial and others – that would be employed to achieve objectives, an agreed timescale, an agreed set of indicators to help monitor progress, and some periodic external evaluation process to help with mid-course corrections and other possible improvements to the initial ideas.

"As mining companies increasingly recognize the benefits of coherent partnership arrangements with better-empowered local communities, there will be merit in also defining some minimum standard model of good business practice about how these arrangements might best be organized."

---

94   The ILO report speaks eloquently about the deeply embedded paternalism that some perceive in the present arrangements linking mining companies and local communities.

Policy implications of the key findings

7

7. Policy implications of the key findings

Having provided a basis in fact for debate on mining in Zambia, this chapter discusses the policy implications of the main findings from this report, and provides some recommendations for policymakers, mining companies and other stakeholders with an interest in ensuring that the contributions from Zambia's natural resources are used to catalyze broad-based, sustainable social and economic development.

Zambia is highly dependent on mining as its major productive industry – in the dimensions of foreign exchange earnings, formal sector employment, government revenues and investment. Without mining, Zambian incomes and its economy overall would today be measurably smaller. Mineral dependence has increased during the post-privatization period, and this leaves Zambia vulnerable to unfavourable trends in world commodity prices. Much as diversification away from mining is vital for sustained development, and reduced risks, a world-class competitive mining industry remains central to Zambia's economic prospects: it provides the foundational driver for diversified growth and development. This reality needs to be central to the ongoing discussions about policies for the sector.

The main priorities for action set out in this chapter are:

- better data
- sustained economic diversification, with more local content
- action for a more competitive, world-class mining sector
- more co-ordinated social investment and partnerships by mining companies.

7.1 Data

Both the government and the mining companies have recognized that the data on which they currently rely to guide policy decisions is not of good quality.[95] Both must share responsibility: the government is at fault because it has not made sufficient effort to produce, verify and routinely publicize high-quality official data; the companies and the Chamber of Mines because they have often failed to correct erroneous figures when they appear in the press and because they appear to have sometimes treated the public's need for information as a nuisance rather than a necessity.

Weak data poorly disseminated has allowed the spread of views with little basis in fact, and so contributed to the unnecessary polarization of national debate. Given that most macroeconomic data is available but not easily accessible, a consistent set of quality data (eg on mining production and processing, pricing, and tax payments) is urgently needed.

To give a pointed example: in 2012, revenue from the mining sector was 6 per cent of GDP and 32 per cent of tax revenue, which represents a significant increase since 2008 (see Table 1). This data is, at best, imperfectly recognized, and this leads to policy decisions that are ill-informed.

A single data template that makes for consistency across official data requirements of the sector, which is at the same time quicker and easier for mining companies to complete and return, is one key element. Government and the Chamber of Mines have committed to work on this – and the current work of the ZRA's Mineral Value Chain Monitoring Project is key. The ultimate objective is a single set of publicly available data, accompanied by a guide to support consistent interpretation.

The ZEITI process has strengthened transparency on revenue from mining. Extending this process, which has credibility in Zambia, could lead to improvement in mutual trust between government, industry and civil society. It will be of considerable influence if the Cabinet were presented with an authoritative update on the status of tax payments using ZRA data, and the ZRA published data more regularly. There is also a potentially more dynamic role for ZCCM-IH in realizing national objectives for mining.

---

95 This recognition on the part of the industry was part of the concluding remarks at the June workshop, and on the part of government is reflected in the work of the ZRA Mineral Value Chain Monitoring Project.

There is also a need to strengthen the Chamber of Mines. Any new initiatives championed by the chamber will be most successful where these functions are clearly defined and funded. The chamber could potentially play a number of useful roles:

• active engagement with relevant government agencies on improved mining-level data by working with the suggestions that will emanate from the ZRA mining value-added project

• the production of a regular – possibly half-yearly – Zambia mining bulletin describing trends and emerging issues for the industry for dissemination to the wider public.

"A healthy, globally competitive, mining industry will be an important part of the economic and social development of Zambia because it delivers a large part of export earnings and government revenue today, and so provides the foundation for economic growth and development in Zambia."

7.2 Economic diversification

Sustained economic growth in Zambia will lead to a diversification of the economy away from dependence on mining. At the same time, a healthy, globally competitive, mining industry will be an important part of the economic and social development of Zambia because it delivers a large part of export earnings and government revenue today, and so provides the foundation for economic growth and development in Zambia. Sustaining growth therefore means deepening the economic contribution of mining, while at the same time addressing some of the challenges to competitiveness. This section first looks at diversification and local content, and then reviews some of the challenges of competitiveness.

7.2.1 Industrialization and local content

At the macroeconomic level, economic diversification depends on private investment in a range of competitive industries, which will in part depend on avoiding exchange rate overvaluation and "Dutch disease" effects. This entails ensuring that fiscal and monetary policy avoid exchange rate overvaluation of the exchange rate and sustain macroeconomic sustainability.

Investment in industry will develop improved capabilities in firms to produce increasingly sophisticated products competitively, and so create jobs.[96] The goods that go into the mining sector are mostly imported. A shift, even if marginal, would support increased demand for domestically produced goods.

Some mining companies have recently put supplier development programs in place and are devoting resources to the nurturing of local suppliers. However, there is a limit to what the mining companies can do on their own without a regulatory environment for private investment in suppliers that enhances their competitiveness. In addition, there have been numerous supply chain initiatives. Those that focus on developing firm capabilities to add value in Zambia are to be preferred over regulations that often have unintended consequences. There are several elements in the SME investment climate that represent barriers to growth, principally leading to high costs, in particular for finance, electricity, land and labour.

The gains to be made by increasing the local content of the goods procured by the mining industry might only be modest in direct terms – even a tripling of the proportion of goods procured and manufactured locally would just add about US$160 million to local suppliers' turnover, of which between

---

96 The recent Enterprise Map of Zambia highlighted some of the industrial firms that may be poised for growth.

a third and half would be value added in Zambia, corresponding to more than 15,000 new jobs. However, when viewed as part of a broad policy thrust for the development of firm capabilities, it would be a significant component of efforts to support Zambia's economic growth and development, with stronger indirect and induced effects on diversification.

Although mining will never directly employ more than a relatively small minority of the population, indirect and induced employment can be a highly significant source of income and employment gains. Effective supply chain initiatives could provide stronger indirect employment linkages.

There are opportunities for skills development both at tertiary education level (possibly in collaboration with universities abroad) and at the skilled artisan level to address the skills deficit. These are "sustainable skills" that contribute both to the mining industry and to a future more diversified economy.

However, for these multiplier effects catalyzed by mining to be truly effective as an engine of development, there is a need for radically strengthened local government capacity. This improved capacity can enable new opportunities opened up by the presence of mining to be more rapidly identified and more fully responded to by local communities working in partnership with the mining companies (discussed further below).

"The areas for policy that would support a competitive, world-class mining industry include actions that help tackle high costs and low productivity, levels of taxation and greater stability in the regulatory environment for mining."

7.2.2 A competitive world-class mining industry

The areas for policy that would support a competitive, world-class mining industry include actions that help tackle high costs and low productivity, levels of taxation and greater stability in the regulatory environment for mining.

The competitive position of some copper mines in Zambia, particularly the older mines in the Copperbelt, is more fragile than has been generally recognized. Several Copperbelt mines are high-cost, low-productivity mines by world standards. A significant downturn in copper prices could potentially threaten the existence of some of those mines. Companies that have made investments in older mines expect to improve labour productivity. Even though this may reduce the demand for some workers, it will enhance the sustainability of the mines affected and also raise average levels of wages.

In relation to taxes, Zambia is now a high-tax mining country that has recently entered a period with much increased government revenues from the industry. The Zambian tax system is reasonably efficient despite low capacity, and very little is lost to leakage. Contrary to popular opinion, if any revenue is lost due to transfer pricing, it seems to be negligible based on comparisons of Zambian exports and trading partner countries' imports from Zambia as well as on an analysis of the facts in one particular case (see Annex C).

The government could improve the attraction of Zambia as an investment destination by clarifying and consistently applying its regulatory regime across all operators, even without changes to fiscal rates. For example, applying royalties at the point of extraction (rather than along the production chain) would improve fairness. Elements of the tax regime that distort incentives, resulting in suboptimal investment decisions, and that do not generate any significant revenue should be abolished. Both the tax on concentrate exports and the variable profits tax fall in to this category (see Annex I).

The regulations relating to foreign exchange[97] lack any strong economic justification. They have a direct detrimental effect on Zambian mines, but, more seriously given the government's own objectives to increase local procurement in support of industrialization and economic diversification, they adversely impact actual and potential Zambian suppliers to the mining sector by raising the cost to mining companies of local procurement.

---

97   Such as SI 33 and 78 of 2012, and SI 32 of 2013.

> ## "Mining companies could themselves do more by regarding the official agencies as partners in a common mission rather than as adversaries. They could, for example, support them with better-quality and more relevant information."

A systematic and in-depth assessment, in close consultation with the industry, of the various ad hoc measures introduced into the mining regulatory regime since 2008 could be a first step in stabilizing the regulatory environment. First, it could reduce the perceived uncertainty arising from changed regulations, and signal to the industry that Zambia is serious about promoting the mining sector. Second, it would simplify regulation of the sector. Third, it would provide an opportunity to reassess those regulations that appear to have had unintended consequences.

In addition, mining companies could themselves do more by regarding the official agencies as partners in a common mission rather than as adversaries. They could, for example, support them with better-quality and more relevant information, and co-ordinate their informational provision more coherently by using the Chamber of Mines more actively. Exchange or internship programs could be established whereby skills upgrading of government officials is provided in order to build regulatory capacity, as MMG has done at its Sepon mine in Lao PDR (ICMM 2011).

Appropriate consultative forums might also be established to co-ordinate and share information about specific technical aspects of the industry (eg training and skills). Admittedly, mining companies are in competition with each other in some areas where they cannot be expected to share much information, but in other areas – especially in the delivery of skills development or social investment programs – there are substantial economies of scale and scope to be obtained by adopting a more co-operative approach, orchestrated through the Chamber of Mines. One role for the chamber could be the collation of information on future expected needs for skilled or semi-skilled workers, which could support the development of government training and education programs as well as the co-ordination of mining companies' own training needs.

7.3 Social investment and partnerships

Mining companies spend large sums of money on social investment, but with mixed results. There is a large gap between the perceptions of local communities and mining companies about the value and significance of many community development programs in mining areas.

The mining industry could co-ordinate individual activities more closely with each other and with local government and across a broader range of partners with shared interests, such as development agencies or NGOs. A number of donors provide support in several of the functional areas that mining companies support (such as health, education and infrastructure), yet there are relatively few examples of mine-level initiatives linking with donor activities in these areas.

Better co-ordination requires sufficient capacity to engage on the part of local government, which has historically suffered from weak capacity and underfunding. Measures that would support the capacity of local government include an ability to raise revenue and rely on transfers from central government, and initiatives to strengthen local government institutions in minimum standards of budgeting reporting and planning – additional resources could be made conditional on performance in such areas.

7.3.1 Partnership opportunities

The study identified a range of areas where the mining industry, government and others are already engaged in significant partnerships to strengthen development outcomes from mining.[98] There are also areas where such partnerships could be strengthened:

More systematic evaluation and reporting of social investment impacts
Although some social investment partnerships have shown measurable success, many of these initiatives lack systematic performance monitoring against a baseline of data (taken prior to the initiative's commencement), which prevents a more rigorous impact evaluation. Mining companies and their development partners could ensure that social investments are monitored more actively through regular surveys, compared against a baseline assessment and reported on to stakeholders. Such efforts could be linked to each district government's own poverty reduction and surveying mandate.

98   Some of the institutional dimensions of partnerships are discussed in Chapter 6.

Policy implications of the key findings

Co-ordination with government poverty reduction plans and initiatives

At the national-level the government uses the SNDP as a medium-term strategy for poverty reduction. The district-level development and poverty reduction strategies could be a useful framework for mining companies and other stakeholders when planning, implementing and monitoring their own social investment activities. However, they are rarely produced or implemented fully because of a lack of finances and other capacity; there is potential scope for industry support for the establishment of a district situational analysis and maintenance of the district information system.

"Mining companies and their development partners could ensure that social investments are monitored more actively through regular surveys, compared against a baseline assessment and reported on to stakeholders."

References

References

ActionAid (2013).
Sweet nothings: the human cost of a British sugar giant avoiding taxes in southern Africa.
www.actionaid.org/sites/files/actionaid/sweet_nothings.pdf.

African Economic Outlook (2012).
Zambia 2012.
AfDB, OECD, UNDP, UNECA. Available online.

Allison, D, Smart, R, and Kelly, V (2009).
Engaging the private sector in the HIV response – three case studies from Zambia. Strengthening the Aids Response Zambia.

Baldwin, K (2013).
Why vote with the chief? Political connections and public goods provision in Zambia.
American Journal of Political Science, 57(4), 794–809.

Bertelsmann Stiftung's Transformation Index (2012).
Zambia country report. Gütersloh.

Bloomberg (2012).
Zambia says tax avoidance led by miners costs $2 billion a year. 25 November.
www.bloomberg.com/news/2012-11-25/zambia-says-tax-avoidance-led-by-miners-costs-2-billion-a-year.html.

Boyce, J K, and Ndikumana, L (2012).
Capital flight from sub-Saharan African countries: updated estimates, 1970–2010.
Political Economy Research Institute, University of Massachusetts, Amherst, October.

Bulmer-Thomas, V (1982).
Input–output analysis in developing countries: sources, methods and applications.
New York, Wiley.

Central Statistical Office (2012a).
Living Conditions Monitoring Survey report 2006 and 2010.
Living Conditions Monitoring Branch, Central Statistical Office, Lusaka, Zambia.

Central Statistical Office (2012b).
The Monthly, 108(March).

Central Statistical Office (2013a).
Preliminary results of the 2012 Labour Force Survey.
Central Statistical Office, Lusaka, Zambia.

Central Statistical Office (2013b).
Excel data file provided to the toolkit team.

Central Statistical Office, Central Board of Health (Zambia) and ORC Macro (2003).
Zambia Demographic and Health Survey 2001–2002.
Calverton, Md, Central Statistical Office, Central Board of Health and ORC Macro.

Central Statistical Office, Ministry of Health, Tropical Diseases Research Centre and University of Zambia (2009).
Zambia Demographic and Health Survey 2007.
Calverton, Md, Central Statistical Office and Macro International.

Chanda, E, Kamuliwo, M, Steketee, R W, Macdonald, M B, Babaniyi, O, and Mukonka, V M (2013).
An overview of the malaria control programme in Zambia.
ISRN Preventive Medicine, 2013.

Cheeseman, N, Ford, R, and Simutanyi, N (2012).
Is there a 'populist threat' in Zambia?
Oxpo working paper.

Chikuba, Z, Syacumpi, M, and Thurlow, J (2013).
A 2007 social accounting matrix (SAM) for Zambia.
Institute for Policy Analysis and Research, Lusaka, Zambia, and International Food Policy Research Institute, Washington DC.

Chiwele, D (2009).
Public expenditure reviews in Zambia: a review of literature.
Draft, July. The Zambia Budget Tracking Project, Lusaka, RuralNet Associates.

Codelco (2011).
Memoria de 2010.
www.codelco.com.

Commonwealth Local Government Forum.
The local government system in Zambia.
www.clgf.org.uk/userfiles/1/files/Zambia%20local%20government%20profile%202011-12.pdf.

Conrad, R F (2012).
Zambia's mineral fiscal regime.
International Growth Centre, Working Paper 12/0653.
Available online.

Daniel, P (2012).
Fiscal regimes for extractive industries – design and assessment.
IMF, Natural Resource Charter Workshop, 6 December.

Deloitte (2009).
International tax and business guide: Mexico.
www.deloitte.com.mx/documents/mx(es-mx)doingbussinessinMex.pdf

Deloitte (2010).
International tax and business guide: Australia.

Deloitte (2010/11).
Guide to key fiscal information: southern Africa.
www.deloitte.com/assets/Dcom-
Namibia/Local%20Assets/Documents/Guide%20to%20Key%20Fiscal
%20Info%202010%202011%20May%202011.pdf

DiJohn, J, (2010).
State resilience against the odds: an analytical narrative on
the construction and maintenance of political order in
Zambia since 1960.
Working paper, Crisis States Research Centre/LSE Destin.

Engman, M (2009).
The role of trade and transport issues in the competitiveness
of Zambia's copper industry. Draft.

Eurostat (2012).
Electricity prices for industrial consumers.

Fessehaie, J (2011).
Development and knowledge intensification in industries
upstream of Zambia's copper mining sector. Making the Most
of Commodities Programme Discussion Paper 3.

Fessehaie, J (2012).
What determines the breadth and depth of Zambia's
backward linkages to copper mining? The role of public
policy and value chain dynamics.
Resources Policy, 37 (4), 443–51.

Fitch Ratings (2013).
Zambia: full rating report. Sovereigns Africa.

Fraser, A (2011).
Introduction: boom and bust on the Zambian Copperbelt.
In A Fraser and M Larmer (eds), *Zambia, mining and
neo-liberalism: boom and bust on the globalized Copperbelt*.
New York, Palgrave Macmillan.

Global Financial Integrity (2012).
Illicit financial flows from developing countries: 2001–2010.
Available online.

Government of the Republic of Zambia (2005).
*Zambia public financial management performance report
and performance indicators: Pemfa programme evaluation.*
Lusaka, Government of the Republic of Zambia.

Government of the Republic of Zambia (2008).
*Zambia public financial management performance report
and performance indicators: 2008 assessment and update
report.*
Lusaka, Government of the Republic of Zambia.

Government of the Republic of Zambia (2011).
Sixth National Development Plan 2011–2015.
Available online.

Grant Thornton and Econ Pöyry (2010)
Pilot audit report – Mopani Copper Mines plc.

GTZ (2010).
Facts and figures: support to decentralisation
implementation (SDI) programme.

Haglund, D (2010).
Policy evolution and organisational learning in Zambia's
mining sector.
PhD dissertation, University of Bath.

ICMM (2011).
*Utilizing mining and mineral resources to foster sustainable
development of the Lao PDR.*
Mining: Partnerships for Development, April.
Available online.

ICMM (2012a).
Community Development Toolkit.
Available online.

ICMM (2012b).
*The role of mining in national economies: mining's
contribution to sustainable development.*
InBrief October. Available online.

ICMM (2013).
*Approaches to understanding development outcomes
from mining.*
Social and Economic Development, July. Available online.

IMF (2010a).
*Regional economic outlook. Sub-Saharan Africa: back to
high growth?*
Washington DC, IMF.

IMF (2010b).
*Zambia: 2009 Article IV consultation, third review under the
three-year arrangement under the poverty and reduction and
growth facility, and request for modification of performance
criteria.*
IMF Country Report 10/17, January. Available online.

IMF (2012).
Zambia: 2012 Article IV consultation.
IMF Country Report 12/200, July. Available online.

References

IMF (2014).
Zambia: 2013 Article IV consultation.
IMF Country Report 14/5, January. Available online.

International Budget Partnership (2012).
Open Budget Survey 2012.
Available online.

International Fund for Agricultural Development (2013).
Rural poverty in Zambia. Rural Poverty Portal.
www.ruralpovertyportal.org/country/home/tags/zambia.

Investkz.com (2009).
Mining tax thaw. *Kazakhstan*, 1.
http://investkz.com/en/journals/60/515.html.

Kangwa, J (2001).
Sustainable development in Zambia: experiences and
ways forward.

Kasanga, J (2012).
Leveraging Zambia's industrialization with growth of copper
mining investments: strategy for expanding local
manufacturing capacities to supply the Zambian mining
industry. Zambian Mining Local Content Initiative discussion
paper.

Kaufmann, D, Kraay, A, and Mastruzzi, M (2010).
The Worldwide Governance Indicators: methodology and
analytical issues. World Bank Policy Research Working
Paper 5430. Available online.

Land, B (2010).
Resource rent taxes: a reappraisal. In P Daniel, M Keen and C
McPherson (eds), *The taxation of petroleum and minerals:
principles, problems and practice*.
Abingdon, Oxon, Routledge.

Larmer, M (2005).
Reaction and resistance to neo-liberalism in Zambia.
Review of African Political Economy, 103, 29–45.

LCMS (1998).
Living Conditions Monitoring Survey 1998
(data, questionnaire and report). Central Statistical Office,
Lusaka, Zambia.

LCMS (2006).
Living Conditions Monitoring Survey 2006
(data, questionnaire and report). Central Statistical Office,
Lusaka, Zambia.

LCMS (2010).
Living Conditions Monitoring Survey 2010
(data, questionnaire and report). Central Statistical Office,
Lusaka, Zambia.

LSE, Business-Community Synergies, CRS and University of
Leeds (2011).
*Seeking benefits and avoiding conflicts: a community-
company assessment of copper mining in Solwezi, Zambia.*

Lundstøl, O, Raballand, G, and Nyirongo, F (2013).
Low government revenue from the mining sector in
Zambia and Tanzania: fiscal design, technical capacity
or political will?
ICTD Working Paper 9.

Mbuta, W S (2006).
Mining sector performance in 2006: a re-assessment.
Chamber of Mines of Zambia.

McKinsey Global Institute (2012).
Africa at work: job creation and inclusive growth.

McMahon, G, and Tracy, B (2012).
Firm and sector level mining benefits in Zambia.
Draft paper, SEGOM, World Bank, 29 May.

MetalMiner (2009).
Power costs in the production of primary aluminum.
26 February.
**http://agmetalminer.com/2009/02/26/power-costs-the-production-
primary-aluminum/.**

MFNP (2006).
Economic report 2006. Republic of Zambia.

MFNP (2009).
Economic report 2009.
Ministry of Finance and National Planning (MFNP),
Republic of Zambia.

Miller, R E, and Blair, P D (2009).
Input–output analysis: foundations and extensions.
Cambridge and New York, Cambridge University Press.

Mineral and Petroleum Resources Royalty Bill (2008).
Minister of Finance, Department of Treasury, Republic of
South Africa.

Mondoloka, A (2013).
Job and wealth creation impact of mining community
development programmes in Zambia. ILO.

Nyirenda, E J, and Shikwe, A (2003).
Zambia trade union country report.
Lusaka, Zambia, Friedrich-Ebert-Stiftung.
Available online.

OECD Watch (2011).
Tax evasion in Zambia: five NGOs file an OECD complaint
against Glencore International AG and First Quantum
Minerals for violation of OECD guidelines. 12 April.
http://oecdwatch.org/news-en/tax-evasion-in-zambia.

Otto, J, et al (2006).
Mining royalties: a global study of their impact on investors, government, and civil society.
Washington DC, World Bank.

Oxfam (2009).
A copper-bottomed crisis? The impact of the global meltdown on zambia, Oxfam International discussion document, December.

Oxford Policy Management (2013).
Extractive industries development and the role of donors.
DFID Extractive Industries Topic Guide, September.

Payton, S (2010).
Adding value to Zambian copper: challenges and opportunities in copper fabricating. Presentation for the Jobs, Prosperity and Competitiveness Project.

PEFA (2008).
Assessing the impact of the PEFA framework. Volume II: Country impact notes.

PricewaterhouseCoopers (2005).
Mining taxation in Chile and in the region: a comparative analysis, p 8.

Punabantu, D (2012).
Zambia's forex crisis.
Economic Review, June.

Robinson, S (1989).
Multisectoral models. Chapter 18 in H Chenery and T N Srinavasan (eds), *Handbook of development economics*.
New York, North-Holland.

Rockefeller Foundation, Hanshep, DFID (2013).
A Mining Health Initiative case study: First Quantum Mining Limited, Zambia: lessons in government engagement.

Sanyikosa, R (2013)
Study to establish the contribution of the mining sector to GDP in Zambia. Chamber of Mines of Zambia.

Shah, M K (2012).
The informal sector in Zambia: can it disappear? Should it disappear? International Growth Centre, Working Paper 12/0425.
Available online.

Sida (2012).
Between high expectations and reality: an evaluation of budget support in Zambia (2005–2010). Synthesis report prepared by A de kemp, J Faust and S Leiderer.

Simpasa, A, Hailu, D, Levine, S, and Tibana, J R (2013).
Capturing mineral revenues in Zambia: past trends and future prospects. UNDP discussion paper, August.
Available online.

Simutanyi, N (2008).
Copper mining in Zambia: the developmental legacy of privatisation. Institute for Security Studies.

UNCTAD (2005).
Trade and development report, 2005.
Geneva.

UNDP (2011a).
Zambia Millennium Development Goals progress report 2011.
Available online.

UNDP (2011b).
Zambia human development report 2011: service delivery for sustainable development.
http://planipolis.iiep.unesco.org/upload/Zambia/Zambia_NHDR_2011_en.pdf

United Nations Statistics Division.
National Accounts. Main Aggregates Database.
Available online.

United States Energy Information Administration (2013).
Independent statistics and analysis.
www.eia.gov/electricity/data.cfm.

United States Geological Survey (2012).
2011 minerals yearbook: Zambia.
Available online.

Van Alstine, J, and Afionis, S (2013).
Community and company capacity: the challenge of resource-led development in Zambia's 'New Copperbelt'.
Community Development Journal, 48(3), 360–76.

Wood Mackenzie (2012).
Zambian copper production analysis. A special report for Canada-EU Mining Council. 25 October.

World Bank (2011).
Zambia: what would it take for Zambia's copper mining industry to achieve its potential? Report no 62378-ZM.
Finance and Private Sector Development Unit, Africa Region.

World Bank (2012).
Zambia economic brief: recent economic developments and the state of basic human opportunities for children.
www.worldbank.org/en/news/feature/2012/12/19/zambia-economic-brief-recent-economic-developments-and-the-state-of-basic-human-opportunities-for-children.

References

World Bank (2013).
*Country partnership strategy for the Republic of Zambia for
the period FY13-FY16*.
Prepared by the International Development Association,
International Finance Corporation and Multilateral
Investment Guarantee Agency. Report no 75089-ZM,
15 February.

World Health Organization (2013).
Global Database on Child Growth and Malnutrition.
www.who.int/nutgrowthdb/about/introduction/en/index2.html.

Zambia Revenue Authority (2011).
Annual report 2010.

Zambia Revenue Authority (2014).
2014 Budget: overview of tax changes.

ZEITI (2013).
Final reconciliation report. Hart Nurse (United Kingdom).

Annexes

A
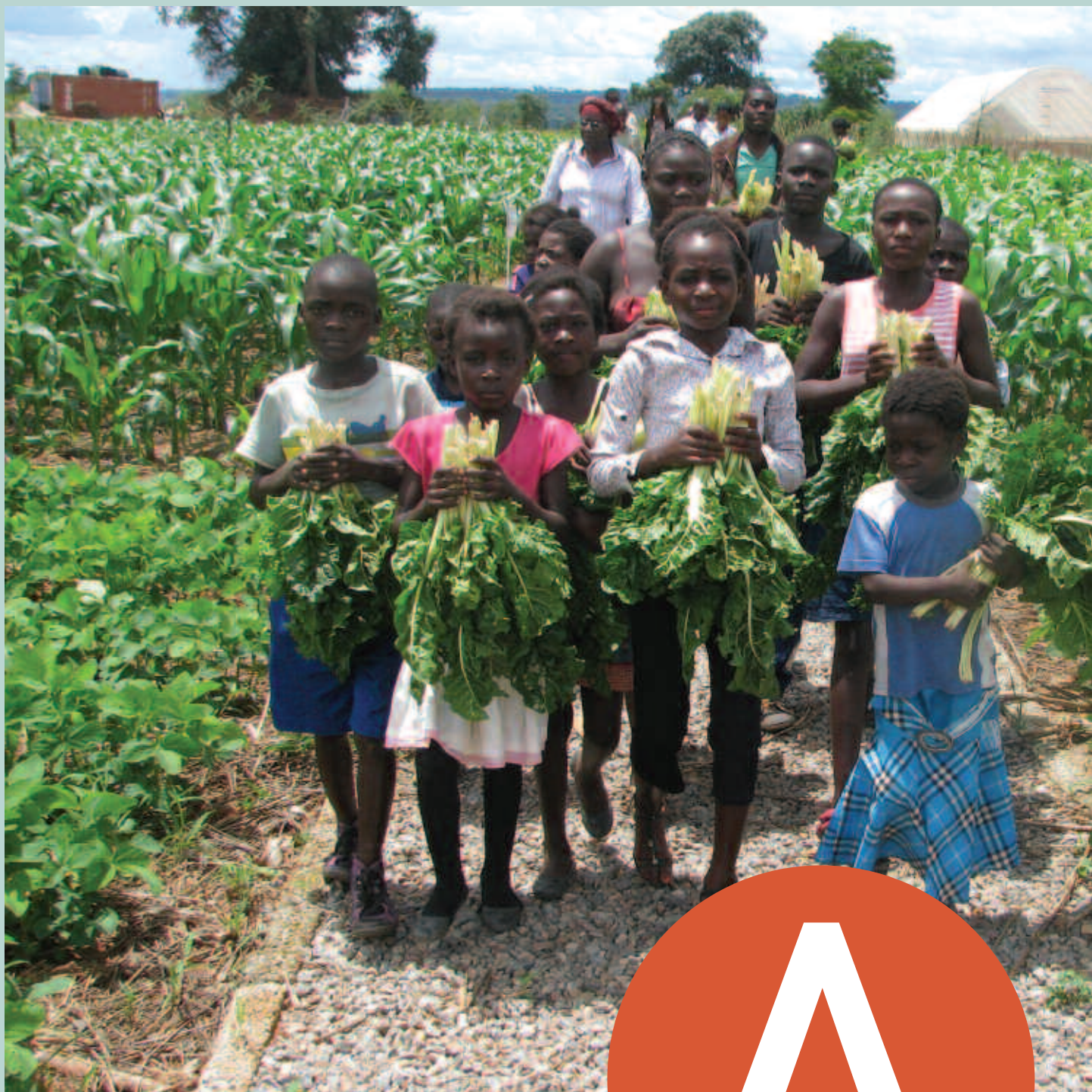
Annex A
Workshop details

November workshop program

Time	Title	Presenter/Moderator
8.30am	**Registration and coffee**	
9am	**Welcoming remarks**	Mr Emmanuel Mutati, President, Chamber of Mines of Zambia
	Opening of the workshop	Hon Christopher Yaluma, Minister of Mines, Energy and Water Development
	Keynote address	Hon Dr Guy Scott, Vice President of the Republic of Zambia
	Introduction and overview	Mr Aidan Davy, Deputy President, ICMM
9:45am	**Presentation of findings from the study**	
	1. Macroeconomic impacts of mining	Professor Alan Roe, Oxford Policy Management
10:15am	**Coffee**	
10:30am	2. Employment and local economic development	Professor Olle Östensson, Oxford Policy Management
	3. Social investments by mining companies	Dr Mark Henstridge, Oxford Policy Management
	Panel discussion, with comments from the floor	Panel: Mr Pius Maambo, Dr Sixtus Mulenga, Mr Danny Callow, Mr Saviour Mwambwa, Chief Mumena
12:45pm	**Lunch**	
1:45pm	**Breakout sessions**	
	1: Macroeconomic issues	Discussion facilitated by Professor Oliver Saasa
	2: Local economic development and employment	Discussion facilitated by Dr John Kasanga
	3: Social investments	Discussion facilitated by Ms Pamela Chisanga and Ms Chuma Kabaghe
3:15pm	**Coffee**	
3:45pm	**Feedback from breakout sessions**	Breakout Session Chairs, facilitated by Dr Sixtus Mulenga
4:45pm	**Closing remarks, and final thoughts from panellists**	Hon Christopher Yaluma, Minister of Mines, Energy and Water Development, Mr Pius Maambo and Mr Emmanuel Mutati
5pm	**Close**	

Workshop overview

The purpose of the workshop was to serve as a forum to discuss and debate the initial findings from the study, and discuss and identify practical opportunities for multi-stakeholder collaboration – where mining companies, government, international organizations and civil society could work together to improve the social and economic outcomes from mining in Zambia. The workshop was attended by over 150 people, representing a broad cross-section of government, industry, civil society and donors.

Following welcoming remarks from Mr Emmanuel Mutati (President of the Chamber of Mines of Zambia), the workshop was formally opened by the Honourable Christopher Yaluma (Minister of Mines, Energy and Water Development) with a keynote address delivered by His Honour Dr Guy Scott (Vice President of the Republic of Zambia). Aidan Davy (Deputy President of ICMM) gave an introduction and Alan Roe, Olle Östensson and Mark Henstridge (OPM) presented the draft findings of the study. This was followed in the afternoon by breakout sessions, where participants split into three groups to exchange ideas and discuss the practical steps that could be taken to strengthen partnerships for development in the Zambian mining sector.

Breakout session discussions

The breakout sessions focused on three areas: macroeconomic issues, local economic development and employment, and social investments.

Summary of workshop discussions on macroeconomic issues

There were several comments from participants about the longer-term needs and strategy of the economy. It was expressed strongly by one that Zambia will remain a mining country in the longer term and that mining should start to be seen as an engine for diversification. Another noted that today the policy approach to this problem was too reactive and not sufficiently based on thoughtful planning ahead. Zambia was probably missing out on additional FDI because of this – the FDI record of the recent past was strong but an even better record could have been achieved. There followed a number of comments on the types of industries that might be more actively encouraged and the example of Chile was mentioned – a mining country that had achieved significant and broad diversification into a wide range of manufactures.

There were several comments on data. It was noted that the EITI program had struggled with the Zambian production data, which was clearly problematic and in need of correction. Active support was expressed to the work of the ZRA Mining Value Chain Monitoring Project. However, it was noted by one member of that project that the project itself had been a response to a lack of mainstream capacity in government. That weakness must be corrected longer term so as to provide a sustainable ongoing basis for delivering sound data about mining. A CSO representative noted that the rebasing of the GDP numbers to a new base year of 2010 was expected to be completed by mid-December 2013. Others expressed scepticism about the reliability of the information provided by the mining companies and one person alleged that this was motivated by tax avoidance. However, others responded that in the absence of reliable data it was difficult to know whether particular sources of data were or were not reliable. The chair commented: "If we do not have good data, how can we reliably accuse anyone of cheating?" The 32 per cent mining tax contribution to total tax revenues was questioned by another participant, but another participant responded that this number comes from official ZRA data. However, there was a broad consensus in the meeting that the improvement of the data relating to the mining sector was a clear priority.

That last point from the discussion was the main focus of the report-back by the chairman of the group to the plenary session. It was emphasized that the approach to data and other information should be to build on the good work being done by the Mineral Value Chain Monitoring Project. However, at the same time it was important to strengthen Zambia's overall capacity to receive and understand the information and then to develop firm policies based on strong evidence and analysis rather than on rumour and assumption. That work must aim also to articulate a clear vision for the future of the economy based on minerals but showing how the mineral core could be used more actively to build a much more diversified industrial base. This future must be designed to be far more equitable than now, which means that the trickle-down effects from mining must somehow be reinforced by explicit government policies: for example, for skills training and by the encouragement of more enterprises to supply the mining sector. Mining in turn ought not to be thought of narrowly as the copper mining industry: other minerals are present in Zambia in significant amounts and ought to become an increasingly significant part of the future thinking. Finally, transparency in all this was vital. The EITI provides a good example but this example can be built on to make all major issues relating to mining much more open to free and active debate.

Summary of workshop discussions on local economic development and employment

Most of the discussion focused on local content. It was generally agreed that potential suppliers of goods to the Zambian mining industry faced nearly impossible obstacles in trying to achieve competitiveness, given the high costs for labour, land, inputs, taxes and, most importantly, credit. Effectively, only established and well-funded companies or those that had access to some kind of subsidized funding could hope to compete successfully. Many of the obstacles could in principle be removed or at least made less burdensome through government action. Most evident of these were the statutory instruments on foreign exchange that served only as an income guarantee for banks. A representative for the BoZ argued that the costs incurred as a result of the instruments should be seen as a normal part of the supply chain, but other participants felt that there was a distinct difference between costs that were directly imposed by government and those that were not.

The mining supply industry's problems were also due in large measure to a growing skills gap. At present, both the mining industry and its suppliers depend heavily on staff trained by ZCCM in the 1980s and 1990s. These employees would, however, soon retire and there was a shortage of skilled people to replace them. The investment by mining companies in trade schools was cited as a symptom of the school system's failure in preparing students for jobs in mining and should be seen as an indication of the importance of the emerging skills shortage.

On the positive side, it was noted that the growth of the mining industry in the DRC provided an opportunity for the Zambian mining supply industry to expand. This required financing, however. It was also noted that recently initiated programs by the Ministry of Labour should be seen as welcome attempts to start dealing with the skills problem.

Summary of workshop discussions on social investments

Most of the discussion revolved around a tractable definition of "social investment". In the Copperbelt, there is a legacy of expectations for spending by mining companies on public service provision that does not always match formal obligations inherited from ZCCM. So what constitutes "social investment" in the Copperbelt is different from that in North-Western Province. On the other hand, there was also the view that it is not the role of a mining company to deliver goods and services that are the formal responsibility of government.

A second substantial area of discussion was the scope for effective and purposefully structured consultation. The point was well made that relationships rely on sustained and effective communication.

Finally, a third area of discussion was the opportunity provided by international frameworks, including those from ICMM, for guiding community engagement. In addition, the ISO 26000 guideline has been gazetted, and the Zambia Institute of Directors can actively disseminate the standard and "domesticate" it.

Some pointers for ways forward included a strong role for the Chamber of Mines to work to both support and convene engagement and improved transparency, and hence trust building. In combination with the Institute of Directors as champions of ISO 26000, and central government empowering and financing local government capacity for engagement and communication – including with district development and poverty reduction strategies and district situational analyses – there is an opportunity to create a framework for stronger co-operation between stakeholders that should significantly improve the impact of mining companies' social investment activities.

Annex B
Understanding the copper value chain

Sources of Zambia's copper exports

Zambia's exports of unwrought copper are produced by treating ore extracted in Zambia, and to a lesser extent concentrates imported from the DRC. Copper exports as registered in some statistics also include some copper, in the form of concentrates or metal, produced in the DRC and transported through Zambia on its way to ports. Based on UNCTADstat data, such "transit copper" amounted to about
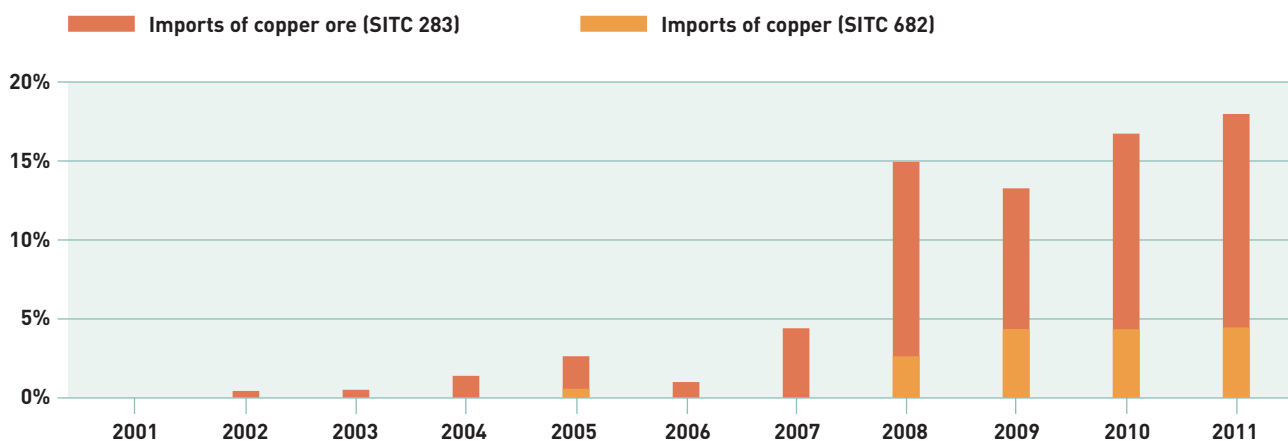
5 per cent of the value of total exported cathodes in 2011 (see Figure 48). As copper production in the DRC has grown, so has the value of copper transited through Zambia (see Figure 49). To the extent that such "transit copper" is classified as exports from Zambia, it will overstate the actual production of copper within Zambia. This is a part of the confusion over actual levels of copper production recently analyzed in depth by Wood Mackenzie consultants (2012) – see also Section 3.1.1.

Figure 48: **Exports, imports and production of copper in Zambia (2011)**
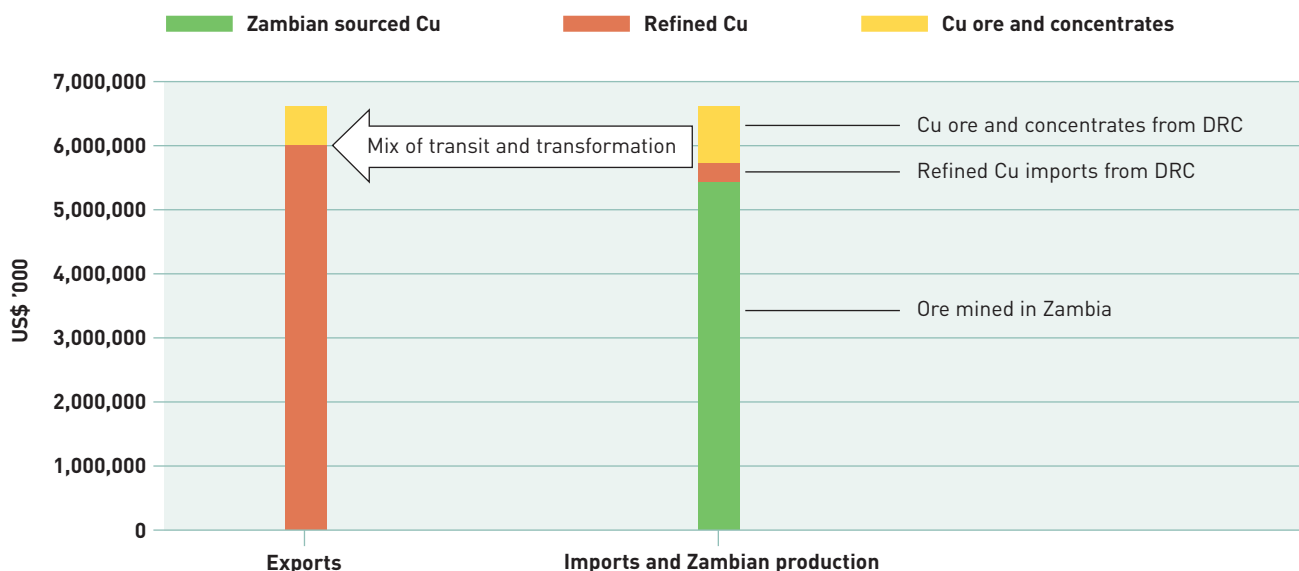
Source: UNCTADstat. For "Refined Cu" we use SITC 682 (Copper). For "Cu ore and concentrates" we use SITC 283 (copper ores and concentrates; copper mattes, cement copper). Note the assumption that all refined copper is exported.

Figure 49: **Imports of copper as share of total Zambia copper exports (2001–11)**

Source: UNCTADstat.

Copper extraction and processing

Material containing copper is extracted through the mining of oxide or sulphide ore, and through the treatment of waste (tailings) from previous operations. It typically involves some combination of the following processes:

Concentration

Sulphide ore is concentrated through a process of crushing followed by flotation. The resulting concentrate typically contains 25–35 per cent copper.

Blister

Production of blister copper involves the smelting of sulphide copper concentrates (whereby the iron and sulphur are removed). The resulting metal – blister copper containing around 98–99 per cent copper – is then cast usually into anodes. Some blister is exported directly, but most is refined further within the country.

Refinery stage

In the refining stage, the blister copper anodes are processed electrolytically to remove impurities. The output of this process is electrorefined (ER) cathode (99.99 per cent copper, which is internationally known as London Metal Exchange (LME) grade).

These three processes represent the traditional steps in the production of high-quality copper from sulphide ores. For oxide ores, a different route is required:

SX/EW

Oxide ore is crushed and leached with diluted sulphuric acid, resulting in a solution that is then purified and concentrated by solvent extraction (SX). This purified solution is suitable for electrowinning (EW) in which high-grade copper is recovered electrolytically in the form of cathodes (99.99 per cent, ie LME-grade copper).

Broadly similar techniques are used to extract copper from waste (tailings) where circumstances make this economically viable.

Figure 50 illustrates the process using 2011 data. The processing of ore into finished copper is less than 100 per cent efficient: throughout all these processes there are some losses of copper.[99] In the final column, the difference between total mined/imported ore and finished copper available for export is categorized as "processing losses and tailings". In this example, exports are higher than normal processing losses (around 4–5 per cent) would entail, likely due to drawdowns on processing stocks.

Figure 50: **Copper value chain 2011, production volumes in '000 metric tonnes**[100]
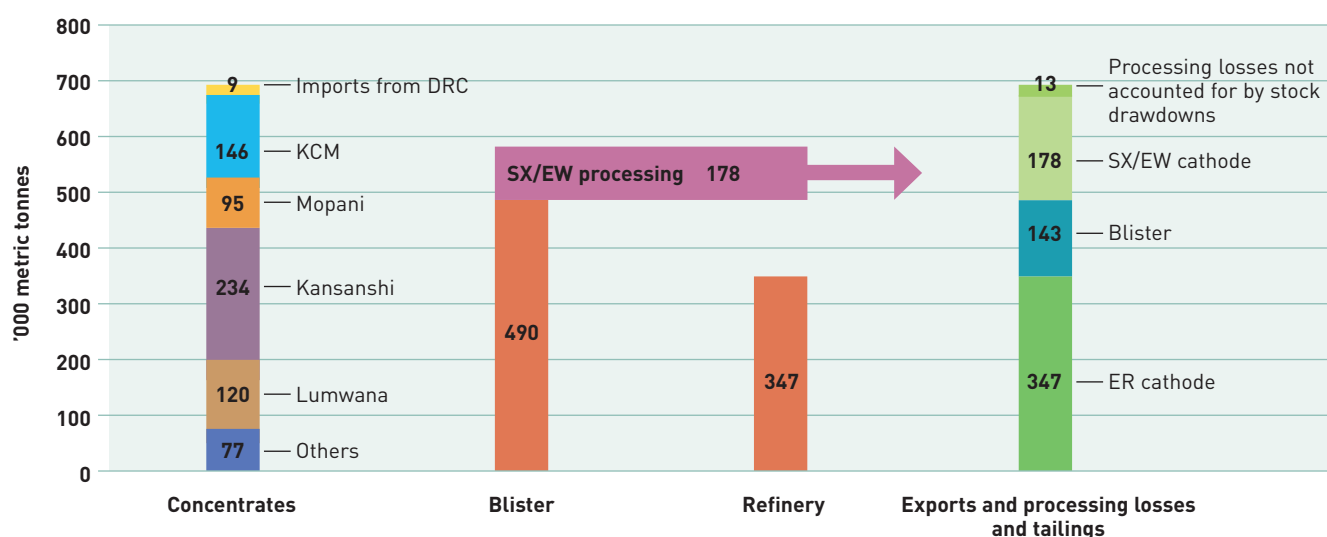
Source: Company data and OPM's calculations.

---

99 Recoveries from ore to concentrates are typically in the range 90–95 per cent, from concentrates to blister or anode copper 95–98 per cent, and minor losses when moving from smelted to refined copper.

100 Source: Wood Mackenzie 2012. For production volumes (concentrates), Wood Mackenzie (2012) estimates total availability of mined copper concentrates as 672,000 metric tonnes contained copper in 2011. This figure excludes ore that is imported and then processed or re-exported. According to UNCTADstat data, the value of imported copper ore and concentrates in 2011 was US$871 million (to be compared to exports of US$6.6 billion). Most of this copper only transited through Zambia, but about 9 metric tonnes contained copper was processed in Zambian smelters (included in the final export categories). For export volumes, the data on blister, SX/EW, ER cathodes and waste volumes is from Wood Mackenzie (2012). The analysis excludes changes in stockpiling.

Annex C
Transfer mispricing in the Zambian copper industry

"Transfer pricing" refers to the setting of prices for transactions between different divisions within an enterprise for profit and tax calculation purposes. In principle, a transfer price should be the same as that charged to an independent, arms-length customer. We use the term "transfer mispricing" to refer to illegal activities, such as charging excessive management fees to understate profits.

Some mining companies in Zambia have been alleged to avoid a part of their tax liabilities to government by using various transfer mispricing arrangements. Such allegations have been made frequently in the local and international media[101] and by some NGOs.[102] Allegations have been taken seriously and the government has responded by commissioning special forensic audits, financed by the Norwegian development assistance agency NORAD.

It is well beyond the scope of this present report to even attempt to substitute our own analysis for that of the ongoing work of the forensic auditors. However, since neither the special forensic audit reports nor the reports of other government audits have yet been published, our own report would not be complete without some comment on this high-profile issue.[103] Indeed, in the absence to date of any reliable public information, there is widespread speculation – much of it misleading – about the audit results.

Furthermore, the specific and narrow issue of transfer mispricing has become conflated in some of the public discussion with broader issues of the alleged under-taxation of mining activities: a topic that is discussed more fully elsewhere in this present report. So, for example, a 2012 report by the NGO Global Financial Integrity (GFI) concluded that there were illicit financial transfers out of Zambia of the order of US$550 million per annum (2001–10). The GFI report employed a methodology based on a World Bank approach that relies on the standard components of the balance of payments identity to calculate a residual discrepancy that can be associated with illicit outward flows.[104] There are three main reasons why the dramatic figures that emerge from this approach (such as the US$550 million for Zambia) cannot legitimately and safely be linked to the transfer mispricing allegations in the mining sector.[105]

A statistical discrepancy in the balance of payments numbers can arise from many different causes, only a few of which need have any link at all to mining activities.

It is impossible to separate out that part of the statistical discrepancy that may be linked to various forms of illicit transfers (by all perpetrators) from that part caused by cumulating errors in the estimation of the components that together contribute to the statistical residual.

Third, it is of course possible that illicit transfers account for part or all of the discrepancy but that a significant part or most of it takes place within sectors other than mining.[106]

Another study,[107] using a methodology that yields more detailed information, throws some additional light on the Zambian experience and is probably of more use in assessing the existence of transfer mispricing. In particular, in addition to using the same residual method as the GFI report, the authors also make separate estimates for mis-invoicing of exports and imports and for unreported remittances. The authors estimate total capital flight from Zambia during the 40-year period from 1970 to 2010 at US$17.3 billion. Unfortunately, the results from that study[108] only provide estimates of mis-invoicing for the entire 40-year period from 1970. Nevertheless, it is noteworthy that their estimate for mis-invoicing of Zambian exports is strongly negative, to the tune of US$13.5 billion. This suggests that too much appears to have been invoiced and paid for exports rather than too little,[109] while imports are estimated to have been over-invoiced by US$6 billion (Boyce and Ndikumana 2012, Table A.4). Thus, that study fails to support the argument that under-invoicing of exports has been an important component of capital flight from Zambia. The same study also reports data on total capital flight for individual years. In the case of Zambia, the total was large (between US$1.5 and 2 billion) and positive in the years from 2004 to 2006, close to zero in 2007, but large (from US$1.8 to 2.4 billion) and negative from 2008 (Boyce and Ndikumana 2012, Table A.5). The study strongly suggests that it was very unlikely that under-invoicing of exports was significant after 2006, that is after the ramping up of copper production.

---

101 Bloomberg 2012.

102 OECD Watch 2011.

103 This is possibly due in part to a shortage of capacity at the ZRA, illustrated also by the delay in VAT audits that now extends to one year according to one mining company.

104 In its basic form this is interpreted as saying that the recorded (and therefore legal) private capital flows in the balance of payments plus net errors and omissions must equal the negative of the sum of the current account balance, net equity flows, changes in foreign reserves and the changes in external debt. Any discrepancy can be interpreted as an illicit flow.

105 A senior government official has recently been quoted as using an even more alarming figure for tax evasion by mining companies – US$2 billion per annum. See Punabantu 2012.

106 The sugar industry has been criticized for allegedly avoiding taxes. See ActionAid 2013.

107 Boyce and Ndikumana 2012.

108 These results tally closely with the GFI results as regards the total residual in the balance of payments.

109 The reason for this unexpected result is probably that the study uses the same estimate (10 per cent of total value) for transport costs for all countries and commodities. In the case of copper, transport costs are a much lower portion, which explains most of the unexpected negative result. However, the data certainly does not support any claims of under-invoicing.

Similarly, a 2013 study by the International Centre for Tax and Development (ICTD) based much of its work on average tax collections in the period 1998 to 2011.[110] By also comparing with Botswana and Chile over the same period, it found that the tax take was very low in both Tanzania and Zambia. Once again the "lost revenue" can be and was expressed as an alarmingly high dollar figure (US$316 million a year on average over the 14-year period reviewed in the paper). However, this study did not recognize the point that the mining industries of both Tanzania and Zambia were recovering from a state of complete demoralization after 1998, and that much of the new investment seen in those two countries only started to produce significant output (and so tax revenues) quite late in the period studied. Hence, the comparison across countries of annual average tax collections is questionable since in Botswana the mining resurgence began in 1976 and so was fully mature by 1998. Moreover, it needs to be recalled that a large part of the taxes collected from the mining industry depends on profits. It is doubtful whether a comparison between the taxes levied on the highly profitable diamond mining industry in Botswana and those paid by the relatively high-cost copper mining industry in Zambia (see Figure 8) provides a meaningful measure of the effectiveness of tax regimes.

Similar comments can be made about an even more recent study by the UNDP.[111] That study provides a good summary of some of the events surrounding the use of DAs as a part of the privatization process, and of the content of the DAs themselves. It then goes on to develop a counterfactual model of the potential fiscal revenues that might have been collected in the period from 1997 to 2012 assuming an earlier introduction of higher rates of taxes and royalty. For the whole of that period, the authors estimate that the annual average revenue share actually achieved was 1.8 per cent of GDP. However, in the counterfactual experiment, it is estimated that 5.5 per cent of GDP could have been achieved with higher rates, implying that the forgone revenue was equal to 3.7 per cent of GDP.

The usefulness of this type of conclusion – that is, that the 2008 reforms could have been introduced much earlier with large benefits for government revenues – depends completely on the quality of the counterfactual used in the analysis. The counterfactual used by the authors assumes that the government could have applied a 6 per cent royalty rate and a 30 per cent corporate tax rate from early in the period (instead of these rates being delayed until the 2008 reforms). The counterfactual also assumes that all other matters remained "constant" (as they were). The validity of such an approach is at the very least debatable. In the early years of the privatization period, copper prices were unattractive and mining assets were seriously impaired. Billions of dollars of investment were needed to build production to anything like the levels that have now been attained. It seems inconceivable that the investment surge in

mining would have evolved in the impressive manner that it did if the levels of royalty and tax payments had been set at the levels proposed by the counterfactual. Indeed, the rates of tax and royalty might have been set higher but the base to which they would have been applied would have likely been much reduced as a consequence. It is also very unlikely given the demoralized state of the assets that were acquired at privatization that few if any of the new private mines would have been paying any corporation tax at all during the first few years. With the (higher) royalty tax of 6 per cent being deductible for corporate tax purposes (the standard international practice), the counterfactual levels of royalty payments would have likely delayed the earnings of taxable profits for several more years – even with the actual tax regime most companies were not required to pay corporation tax until quite recently.

So, although this type of study (both the ICTD and the UNDP studies) and the numbers they generate have some obvious interest from an academic/historical point of view, they do not speak with real authority to the current policy debate. Indeed, they may be harmful to that debate. The evidence of this present report is that tax and royalty collections from mining have now (2012) risen to levels that are high in comparison to other mineral-driven countries. Even if there were errors in policies in the past that caused tax collections to be comparatively low, such errors cannot now be revisited and corrected. The only way to attempt to do so would be by increasing current levels of tax and royalty rates on a sector that currently makes large contributions to overall tax revenues. It is highly unlikely that this would be good advice.

As regards Chile, the comparison is distorted also by the fact that the Chilean tax take is dominated by income – including dividends – from the state-owned company Codelco, which is under a special tax regime. During the period 1999 to 2004, Codelco accounted for 79.9 per cent of the government revenues from copper mining, while its share of production was 38 per cent.[112] While the share of Codelco in total government revenue from mining has diminished as private companies have ramped up production and exhausted their accelerated depreciation facilities, government income has still been inflated by Codelco's very high payments.[113] From 2005 to 2011, during the copper price boom, Codelco paid an average of 95 per cent of its profits before taxes in dividends and taxes.[114] Such rates of contribution, while impressive, can hardly be used as realistic benchmarks for Zambia. Once again, the dramatic and highly publicized numbers say little or nothing about the transfer mispricing problem.

110 Lundstøl, Raballand and Nyirongo 2013.

111 Simpasa et al 2013.

112 UNCTAD 2005, pp 124–125.

113 Codelco habitually includes a comparison in its annual report showing how much less it would have paid in taxes had it been under the same tax regime as the private mining companies.

114 Codelco 2011.

Illegal or unacceptable transfer mispricing activities

Transfer mispricing can take many forms, including:

- under-invoicing of sales to related parties

- over-invoicing of inputs purchased from related parties

- loan guarantees (excessive charging)

- management fees (excessive charging)

- service provisioning (excessive charging)

- leasing (excessive charging)

- trade in equipment (under-invoicing of sales or over-invoicing of purchases).

The under-invoicing of sales is the method that is best understood and most often referred to. With a commodity such as copper, where prices are public and transparent, it is also the method that should be the easiest to detect, even by tax authorities such as the ZRA that are still building their capacity to detect abuses. Our own mine-by-mine information indicates that of the four mining companies that constitute the focus of this report, three have zero or negligible sales to related companies. By definition then, the under-invoicing of their sales is unlikely to occur. By contrast, the fourth company, Mopani, sells its entire output to its parent company, Glencore.

The Mopani forensic audit

An interim report on the forensic audit of Mopani has been leaked into the public domain without authorization.[115] However, assuming that this leaked report is authentic,[116] we can note that the auditors have raised questions mainly over one issue – the pricing of Mopani's copper sales.[117] Three points are raised:

- a difference between the prices realized by Mopani and the LME average price

- a difference in total incomes from copper sales between Mopani's figures and a modelling exercise

- the calculation of the transport costs involved in the offtake contract – the contract that governs the sale of Mopani's output to Glencore.

As regards the first point, the auditors note that there was "a widening gap in realized price relative to LME prices" and provide an illustrative graph, which appears to prove the point. However, for reasons that we cannot explain, particularly as the audit report is dated to 2010, the graph shows developments only up to the first quarter of 2007. Figure 51 shows what the situation looks like if the entire period 2000–11 is included (note that the first part of the graph, up to 2007 is identical to the graph in the audit report). It is clear from this revised graph that the deviations from the LME price do not appear to be systematic.

In this context, the auditors also state that "the hedging pattern of Mopani is more equal to moving taxable income out of the country than true hedging". It is difficult to evaluate the substance of this remark since the report does not provide any details, which is perhaps understandable for an interim report that was not intended to become public. However, what seems to be meant is that Mopani hedged its sales by buying contracts allowing it to fix futures sales when the price was still in the early stages of a price rise. Since over the period studied there were only two instances of rising prices (see Figure 51), it appears somewhat daring to draw conclusions from such scant evidence. Moreover, while it is easy with hindsight to see when an optimal hedge should have been made, companies hedge precisely because they are not gifted with perfect foresight and want to secure at least a "satisfactory price". It is also somewhat surprising that the auditors do not qualify their statements about the hedging patterns of a company wanting to avoid taxes by adding that, in order for the purported scheme to work, the hedge has to be made with a related company that can make the profit corresponding to the hedger's loss. It should be easy to establish from the records whether Mopani's hedges were in fact made with related companies or not.

115 Grant Thornton and Econ Pöyry 2010.

116 The fact that the report has officially not been released unfortunately makes it more difficult to dispute misunderstandings or misrepresentations of what the report says. For instance, according to a recent UNDP report: "The company was selling copper to its parent company Glencore at a quarter of the official price quoted at the London Metal Exchange" (Simpasa et al 2013, p 10). As seen from Figure 51 the statement does not have any basis in fact or in the audit report.

117 The auditors also express doubts over cost increases and refer to cost indices used for comparison. However, since we have no information about the indices used, we are unable to comment on this point, which is in any case not related to transfer mispricing.

Figure 51: Mopani realized copper prices and LME annual average prices (2000–11)
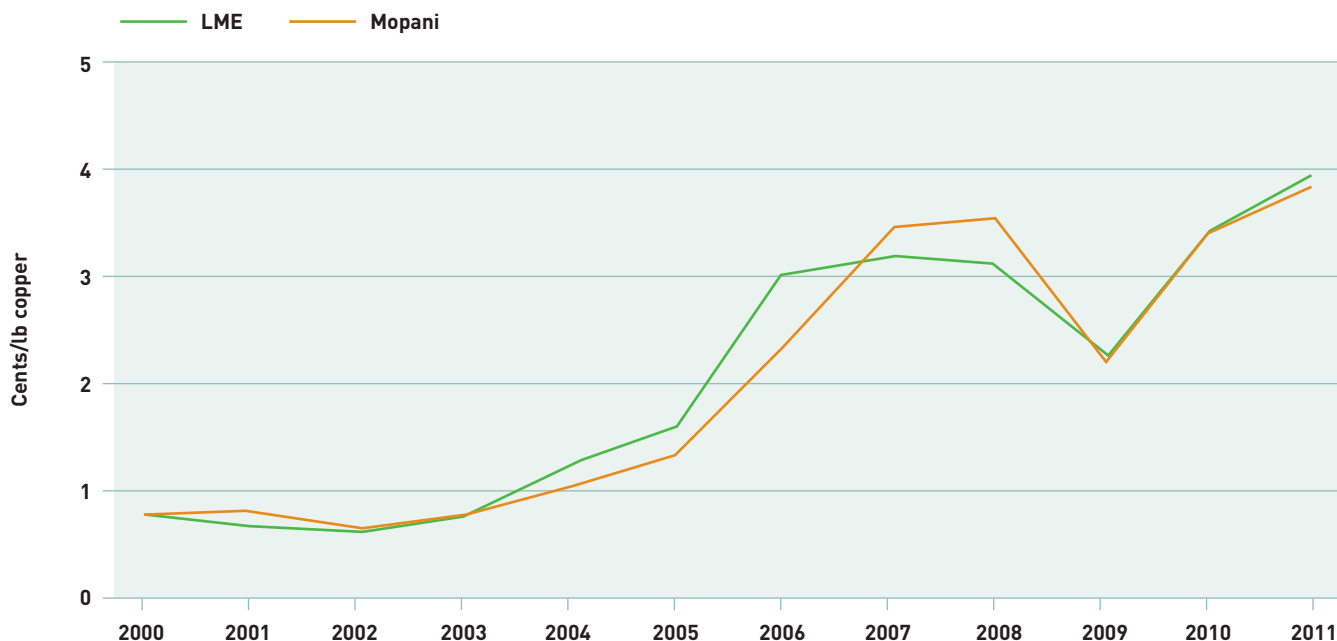
Source: Mopani, UNCTAD commodity price bulletin.

The auditors also found a significant difference between declared revenues from copper sales and revenues according to a model. It is difficult to determine what the reasons are for the differences without having access to the specific model. However, from looking at the figures, a possible explanation appears to be that the auditors have included toll-treated material in their model. The years for which the discrepancies are largest coincide with the years when toll smelting was most important. This was the case particularly for 2008, where the auditors identify a "shortfall" of more than US$382 million, despite Mopani's realized prices being higher than the average LME price (see Figure 51).

Finally, the auditors question the calculation of the transport costs involved in the off-take contract. Specifically, they characterize the situation as one in which Mopani is being overcharged for freight. This would be consistent with transfer mispricing occurring. However, the auditors' query

of the existing Mopani practice may arise in part from the specific conditions under which the Mopani metals are traded and it should be fairly easy for the ZRA to establish whether or not an abuse has in fact occurred.[118] Furthermore, the maximum impact of the arrangement criticized by the auditors would be on the order of 0.1 per cent of sales revenue, and so nowhere near high enough to add up to the dramatic multimillion dollar figures that are cited in some of the NGO and media reports referred to above. The Mopani auditors also failed to note that the arrangement that they questioned had other elements, particularly concerning payment conditions, that had a more than offsetting positive impact on Mopani's taxable profits.

As regards the other potential types of possible transfer mispricing, management fees in the Zambian copper producers interviewed for this report vary from zero to US$20 million and these amounts have reportedly not been questioned or been argued to be excessive relative to industry standards. Other types of transfer mispricing should be easily identifiable. However, according to the mining companies with whom we have had contact, no other questions have been raised. It is therefore a reasonable conclusion that any instances of transfer mispricing have been relatively much less significant than some media reports suggest and that these practices – if they do occur – have not substantially affected the taxes paid by the companies. By 2011 and 2012, as is noted elsewhere in this report, these tax payments relative to total government revenue were high relative to the levels seen in international comparator countries.

118 The auditors noted that Mopani sold copper to Glencore at the LME price minus a "realization charge" that represented transport and marketing (Glencore takes possession of the copper outside Mopani's factory gates). The auditors questioned that the charge was calculated on the basis that all copper went to Rotterdam, while in fact some of it went to other destinations, some of which were further away. This of itself is not surprising, in view of the fact that Glencore is a trading company that juggles cargoes continuously in order to maximize revenues. So, for example, a cargo might very well be planned to go to one place, but then later switched to another while shipping is underway. In fact, most of the Mopani copper probably went to China: from Dar es Salaam the sea voyage to Shanghai takes the same time as to Rotterdam. Accordingly, any overcharging of Mopani would have been minimal, particularly since the ocean freight costs US$15–20 per metric tonne and represents only a small part of the total transport costs for copper, including the very high land transport charges.

Annex D
Data notes for Section 3.2 – the future macroeconomic impacts of mining

The analysis is based on data provided by four mining companies (Kansanshi, Mopani, KCM and Lumwana). Data was requested through a template prepared by OPM, but provided by the mining companies in different formats, for different periods of length, and including somewhat different assumptions on prices (see Table 10). Some of the data was incomplete; for example, financing costs (equity and debt drawdowns and repayments) were not provided by all mining companies, thus precluding a broader assessment of balance of payment impacts. As such, the findings of this analysis should be seen as a first step towards establishing a common understanding of likely future impacts in the sector, to be refined in subsequent work.

A distinction is made between the forecast data provided by the mining companies and the projections compiled by OPM for various categories of contributions. This distinction is made to reflect the various assumptions that have been made in order to standardize and aggregate data from the financial forecasts provided by the mining companies (set out in more detail below).

The values of projected data categories are presented in real terms. Using real rather than nominal values for projections excludes inflationary impacts on prices and gives a better picture of changes that occur throughout the life cycle of mining projects as they move between investment and production stages. Historical data (2010–12) is in nominal terms.

Mining production

The analysis of production volumes focuses on the production of copper, the dominant mineral in Zambia's mining sector. It focuses on copper production at the cathode stage, since cathodes are the form in which copper is sold to export markets. To avoid double counting, we report production of finished copper from each mine where the copper ore was extracted by the mine, toll smelted/refined by other Zambian mining companies or imported, and exclude production of cathodes from concentrates produced by other mining companies in Zambia.[119] For Lumwana, which produces concentrates, we estimate the copper content of these concentrates using data provided by the company. The analysis of production volumes excludes cobalt and other minerals due to data limitations.[120]

Table 10: Data description

Mining company	Years covered by template	Price assumptions for LME-grade copper
Kansanshi	2008–17	US$6,600–8,000/metric tonnes
Mopani	2001–22	US$7,500–8,000/metric tonnes
KCM	2006–40	US$7,500/metric tonnes
Lumwana	2013–39	Not specified (assumed US$7,500)

119 To illustrate, when concentrates produced by Kansanshi are sent to Mopani's Mufulira smelter to be converted to cathodes under a tolling arrangement, we include this under Kansanshi production rather than Mopani production.

120 For cobalt, beyond 2012 only one company (KCM) provided forecasts for cobalt production. Mopani is currently investing US$27 million in facilities for leaching purchased oxide concentrates to recover cobalt from 2014 onwards, but this production was not included in the forecasts provided. Other mineral production by Zambia's mines, including gold and pyrite, are also excluded as the volumes of these are small in relation to copper (they are, however, included in the subsequent sales/exports analysis).

For some of the mining companies, data was provided in a format that required assumptions to be made before aggregating across the four mining companies. Where such assumptions were made, they are set out in Table 11.

Sales

Zambia's mining sector produces copper in various forms, as well as other minerals and metals. The projections distinguish between sales proceeds from finished copper, copper concentrates, cobalt and other revenue streams (eg gold, pyrite, sulphuric acid, fees from toll treatment, etc).

To avoid double counting, projections exclude the value of cathodes produced from toll-treated concentrates originating elsewhere in Zambia, but include cathodes produced from purchased imports of ores and concentrates. Marketing and "realization" costs are also deducted. The resulting "net sales" better reflect the net contribution to the balance of payments from exports of copper, assuming that marketing costs are paid to international logistics providers.

In some cases, assumptions were made to extend company forecasts to the format and time period required for the OPM projections. For mining companies where such assumptions were needed, they are specified in Table 12.

Table 11: **Production: assumptions required to generate OPM projections**

Mining company	Comments
Kansanshi	**Produces copper in cathodes through SX/EW processing, as well as through tolling agreements of sulphide concentrates. From 2015 onwards, sulphide concentrates will be processed in a smelter currently under construction. Detailed forecasts provided to 2017. Based on interviews with mining officers, we assume that production is 400,000 metric tonnes copper content during 2017 to 2020, before falling to 350,000 metric tonnes by 2022.**
Mopani	**Produces cathodes mainly from own ore, and to a lesser degree third-party ore. In 2012, around 70 per cent of third-party concentrates was imported from the DRC, and the projections assume that all third-party ore comes from the DRC. Copper produced on behalf of other firms through tolling agreements is excluded.**
KCM	**Produces copper in the form of cathodes and copper-cobalt alloys. Some of these are produced from "purchased concentrates". Historical data from the company indicates that the majority of these purchases have been sourced from Kansanshi and Lumwana, and we therefore exclude them from the analysis.**
Lumwana	**Produces concentrates that are processed within Zambia. Copper content in concentrate production estimated by deducting smelting and transportation costs from total revenues, and assuming LME copper price of US$7,000.**

Table 12: **Sales: assumptions required to generate OPM projections**

Mining company	Comments
Kansanshi	**Sales data only provided until 2017. Copper sales for 2018 to 2022 are projected based on estimated volumes (see Table 11) and the average price over forecast years (2013–17) provided by the company (US$7,412/metric tonnes).**
Mopani	**Marketing costs of "concentrate and metal purchases" are assumed to relate to copper concentrates.**

Capital and operating costs

Data on investment in capital expenditure (capex) includes spending on heavy machinery and equipment, as well as installations of processing facilities, needed to expand the production in a mine. A distinction can be made between investment capex, used to develop new mineral deposits, and sustaining capex, used to extend the economic life of deposits currently mined. The mining companies do not split out investment and sustaining capex, and therefore projections combine these into one line item.

Data on procurement of operating expenditures (opex) – including both fixed and variable costs – is disaggregated into wages (including all salary costs) and non-labour opex. It should be noted that wages relate to staff costs only, and exclude the value of salaries generated through payments to contractors (these are captured in the non-labour opex category). For mining companies that operate with a greater degree of outsourcing, such as Kansanshi, this means that the data provided in the company's financial accounts understates the mine's contributions to jobs and salaries.

The format of data on opex varied across participating mining companies, preventing aggregation other than at the level of total opex (split into wages and non-labour opex).

The data varied mainly in terms of the cost categories used. In addition, one company's forecasts are by functional area rather than product/service category.

In some cases, assumptions were made to extend company forecasts to the format and time period required for the OPM projections. For mining companies where such assumptions were needed, they are specified in Table 13.

Government revenues

The mining sector generates various revenue streams for government, most significantly royalties, CIT and PAYE. In addition, mining companies pay other taxes, including local government (property) taxes, withholding taxes, and fees relating to licences and permits. For mining companies with government shareholdings through ZCCM-IH, payments are also made in the form of dividends or price participation arrangements. However, data on dividends was only provided by one company, so these flows are excluded from the analysis.

In some cases, assumptions were made to extend company forecasts to the format and time period required for the OPM projections. For mining companies where such assumptions were needed, they are specified in Table 14.

Table 13: Capex and opex: assumptions required to generate OPM projections

Mining company	Comment
Kansanshi	Capex data only provided to 2017. We assume capex in 2018 to 2022 is constant at the 2017 level.
	Wages data provided to 2017. We assume wages per staff remain constant throughout 2018 to 2022 at the average level of the preceding five years.
	Non-labour opex provided to 2017. We assume non-labour opex remains unchanged throughout 2018 to 2022.
Mopani	Total wage bill for staff only available until 2012. Projections to 2022 assume that wages as a share of revenues (net of marketing costs) stays at the average level of the last five years of historical data (2008–12).

Table 14: Government revenues: assumptions required to generate OPM projections

Mining company	Comment
Kansanshi	For Kansanshi, detailed data was provided until 2017. For 2018 to 2022, our projections assume that taxes are proportionate to sales. We use five-year averages of, for example, CIT as percentage of sales to project CIT and other tax line items.
	Data for 2011 included the backdated taxes.
Mopani	Forecasts provided for CIT and royalties but not other taxes. For import duties, we assume these are proportional to opex and capex. For PAYE and any other taxes, we use historical data and assume this is proportional to total taxes for projection years.
KCM	CIT data not forecast by the company, so estimated by OPM using KCM financial data.

Annex D
Data notes for Section 3.2 – the future macroeconomic impacts of mining

Employment

Projections focus on "direct" employees, distinguishing between international staff, national staff and contractor staff. The former two categories represent employees on mining companies' payrolls, while contractor staff are paid for by the companies providing contract services (meaning that salaries are captured under non-labour operating expenditure).

The companies include Mopani and KCM, two of Zambia's oldest operating mines. These Copperbelt-based mining companies operate with a high cost structure, as much of the infrastructure remains from before privatization. These operations are upgrading to increase productivity, often through more capital-intensive methods, leading to more qualified but fewer jobs.

In some cases, assumptions were made to extend company forecasts to the format and time period required for the OPM projections. For mining companies where such assumptions were needed, they are specified in Table 15.

Table 15: **Employees: assumptions required to generate OPM projections**

Mining company	Comments
Kansanshi	**Projections provided by company until 2017. We use moving five-year averages to project employee numbers for 2018 to 2022.**
Mopani	**Forecasts provided for staff but not contractors. The number of contractors is assumed to be proportional to operating and capital expenditure for the projection period 2013–22. We assume that the ratio of international to domestic staff at Mopani in 2012 stays constant between 2013 and 2022.**

Annex E
Company-specific approaches to social investment

KCM

KCM uses a proactive and consultative approach when determining what social investments to make in surrounding communities. Some programs are carried out for legacy reasons (as communities have an expectation that these will continue) but others are set up in response to new requests from the community. Of these programs, those that show positive results in evaluations are scaled up and those that are unsuccessful are discontinued. Communities are able to provide inputs through a number of channels. KCM has a team of six community liaison officers who carry out focus group discussions with community members to determine their needs. It also has a multi-stakeholder committee (set up by the district commissioner) and provides an email address and toll-free number to community members to allow them to provide individual inputs. Where possible, it tries to run programs in partnership with communities and use NGOs to implement programs. The budget for social investments is not defined at any particular level; instead, the substance is settled first and then the budget is finalized later.

Mopani

Mopani has recently established a community projects committee and a special community/social projects investment guide to guide social investment decisions, but largely adopts a top-down approach to social investments. Previously, Mopani would respond in an ad hoc way to requests from the community but the new process will recommend projects for funding from a pool of letters and requests received from the community. Mopani consults with communities through its corporate affairs officers at each mine site but beneficiaries of social investment projects are only involved in projects after they have been approved. The social investment team are allocated a budget each year and have to ensure that the programs they fund fit into this budget.

Lumwana

Lumwana has two formalized platforms for stakeholder engagement. The Land Use and Planning Development Committee determines where projects selected through the Lumwana Development Trust will be carried out. The committee is chaired by the permanent secretary from the provincial administration and quarterly meetings are held. A number of stakeholders are included in the committee: the three chiefs from the area and members of the royal establishment (5–6 people for each chief), members of the provincial planning and housing unit, sector heads (eg the Permanent Secretary of Health, Education, etc), the district commissioner, and representatives from the local municipality (town clerk, planner, engineers, financial directors, etc). Lumwana also has three community liaison committees (one per chiefdom) that hold monthly walk-in meetings that are open to members of the public. These are well attended by community members and NGOs but participation depends on the issues at the time. Communities are involved in the implementation of most of the projects carried out through the Lumwana Development Trust Fund as they are expected to contribute 25 per cent in-kind towards infrastructure projects.

Kansanshi

Kansanshi traditionally adopted a reactive and top-down approach to social investments with minimal community engagement. Since 2011, it has started to move towards more consultation and engagement. The mine predominantly engages with the community through chiefs who submit requests for infrastructure projects that are carried out as part of the Kansanshi Foundation's activities. Board members at Kansanshi then determine which projects go ahead and which do not. Little community consultation takes place for non-infrastructure-related investments but quarterly stakeholder meetings (with chiefs, NGOs and government representatives) are held for the programs once these are in implementation. Kansanshi has also started to provide communities and NGOs with information on its social investment activities by making monthly reports publicly available. A formal grievance mechanism was established in 2010 whereby community members are able to submit forms to community liaison officers who deal with the grievances.

Table 16: Summary of social investment approaches by the four mining companies

		Copperbelt		North-Western	
		KCM	**Mopani**	**Lumwana**	**Kansanshi**
Why projects are undertaken		1. Legacy reasons 2. Needs identified by communities 3. Successful past projects	1. Community requests 2. Legacy reasons	1. Needs identified by communities	1. Community requests 2. Mine safety
Approach	**Proactive or reactive**	Proactive	Reactive	Proactive	Reactive
	Top-down or bottom-up	Bottom-up	Top-down	Bottom-up	Traditionally top-down but increasingly bottom-up
	Specified approach or ad hoc	Specified approach	Specified approach recently established but formerly ad hoc	Specified approach	Ad hoc
	Defined budget	No	Yes	No	Yes
	Foundation/trust fund established	No	No	Yes	Yes
Consultation	**Communities**	Yes – focus group discussions with community liaison officers	No	Yes – community liaison officers	No
	Local government	Yes – multi-stakeholder committee	Yes	Yes – Land Use and Planning Development Committee	Yes – traditional chiefs
Partnerships for implementation	**Communities**	Yes – community leaders	No	Yes – contribute 25% in-kind	No
	Local government	Yes	No	Yes	Yes
	CSOs	Yes – projects mostly implemented by NGOs	No	Yes – projects mostly implemented by NGOs	Yes

Annex F
Additional details for Chapter 5 – Mining provinces and districts: economic and social outcomes

This annex presents the methodology related to the assessment of economic and social outcomes in mining and non-mining districts in Zambia's two mining regions. We present in more detail the scope and limitations of the analysis presented in Chapter 5.

Methodology

A rigorous impact evaluation is outside the scope of this study. To understand what improvements or benefits are generated by mining activities, we need to establish the counterfactual situation (ie how would the development have evolved in mining districts had mining activities not taken place?). The counterfactual enables us to cancel out changes in economic and social outcomes that are generated by activities not related to mining. To perform a rigorous impact evaluation we would have to collect primary survey date, which is outside the scope of this study.

However, descriptive analysis provides a satisfactory tool to assess the development of economic and social outcomes. We assess average development outcomes across the provinces' mining districts as well as compare groups of mining and non-mining districts within provinces. This allows us to assess the development both across time and across levels in individual years. With the access to household- and individual-level survey data we are able to establish whether the difference in trend or level is in fact statistically significant.

When assessing the relative performance of mining districts, our goal is to generate a comparison as similar as possible apart from mining. Geographic proximity is likely to make external factors more similar and present the best comparison group available to us:

- In North-Western Province, we have data collected before the start of mining activities, and thus almost a "true" baseline. The late start of mining in North-Western Province improves the suitability of non-mining districts as proxy for the counterfactual outcome. The first data observations from 1998 are prior to the start of mining activities in Solwezi: the two large-scale mines operating in Solwezi district in North-Western Province (the only district with mining activity in the province) did not have construction or production in 1998.[121] All districts in North-Western Province were largely similar in 1998.

- The situation in the Copperbelt is very different, as mining has been present in that region for almost a century. In this context, we assess whether the mining districts have in fact seen human development outcomes above non-mining areas and if the gap continues to widen. Also, the comparison of districts within the same province increases the similarity of their overall social and economic

characteristics, as well as the external factors affecting their development. The HIV/AIDS epidemic hit the population in the Copperbelt hard – in 2007, the prevalence of HIV/AIDS had decreased to 14 per cent at a national level, but remained high at 22 per cent in the Copperbelt (Central Statistical Office et al 2003, 2009). By comparing districts within the Copperbelt that on average suffer from high HIV/AIDS prevalence rates, the development in social and economic outcomes will, to a larger extent, be affected to the same degree by the negative impacts of HIV/AIDS.

After consultation with the Zambia Chamber of Mines and our national experts, we have made the mining and non-mining district groupings. The selection of districts is based on the listing of currently active large-scale mining licences and our knowledge of the mining activity in the Copperbelt and North-Western Province. Thus, we assess the contribution of large-scale mining and not the contribution of artisanal and small-scale mining (ASM). Copperbelt mining districts are Chililabombwe, Chingola, Kitwe, Mufulira, Kalulushi and Luanshya. The only mining district in North-Western Province is Solwezi.

Data

Zambia's LCMSs from 1998, 2006 and 2010 provide the basis for our analysis. Since the early 1990s, a number of LCMSs have been carried out in Zambia; however, the survey methodology adopted is not compatible across them all. This analysis is therefore based on three LCMSs carried out during the last 15 years. LCMS questionnaires cover a broad range of economic and social outcomes – this analysis focuses on selected key indicators to cover important areas of economic and human development.

District-level analysis is possible, but small sample sizes increase the uncertainty (ie the variance) of the estimates. Hence, it becomes more difficult to find statistically significant differences. The survey design provides reliable estimates at the district and provincial levels (LCMS 1998, 2010), and from a statistical point of view a sample size of 30 observations (15 for a dummy variable) is sufficient. However, small sample sizes inevitably increase the uncertainty of an estimate.

There are some data limitations that need to be mentioned. We have not been able to analyze the development of incomes, monetary poverty and inequality in detail based on the data available to us. Instead, we analyze indicators related to self-assessed poverty (subjective poverty). Also, apart from reporting regional poverty levels, we analyze a number of indicators related to poverty. Furthermore, as was mentioned above, the questionnaires administered are not fully compatible across survey years, which limit the analysis in some areas.

---

121 First Quantum got their licence to the Kansanshi mine in Solwezi in 2001, started construction in 2003 and production in 2005. Barrick acquired the Lumwana mine from Equinox Minerals in 2011, but Equinox had not begun construction in 1998.

Additional details for Chapter 5 – Mining provinces and districts: economic and social outcomes

Additional data tables

Table 17: Self-assessed poverty ratio:[122] **mining and non-mining districts (very poor and moderately poor)**

		1998	2006	2010	Percentage point change			Percentage point difference level between mining and non-mining areas		
					1998–2006	2006–10	1998–2010	1998	2006	2010
National		93.08	90.14	85.27	-2.94***	-4.87***	-7.81***	–	–	–
Copperbelt	Mining	91.37	85.35	74.25	-6.03***	-11.10***	-17.12***	0.54	2.33	-7.26
	Non-mining	90.83	83.02	81.51	-7.82***	-1.51	-9.32*	–	–	–
North-Western	Mining	92.36	88.9	76.01	-3.47	-12.88**	-16.35***	-0.17	-3.28	-9.02***
	Non-mining	92.54	92.17	85.03	-0.36	-7.14**	-7.51**	–	–	–

Source: LCMS 1998, 2006 and 2010.
Notes: Asterisks (*) indicate that the change experienced between survey years is statistically significant: *** = 99%, ** = 95%, *=90%.

Table 18: In wage employment (% of labour force)[123]

		1998	2006	2010	Percentage point change			Percentage point difference level between mining and non-mining areas		
					1998–2006	2006–10	1998–2010	1998	2006	2010
National		16.18	14.75	16.48	-1.43	1.73*	0.29	–	–	–
Copperbelt	Mining	35.57	32.42	33.59	-3.15	1.16	-1.99	11.43***	9.28***	9.59**
	Non-mining	24.14	23.14	23.99	-1	0.85	-0.15	–	–	–
North-Western	Mining	6	15	20.12	8.99*	5.12	14.11***	0.17	9.79***	10.71***
	Non-mining	5.84	5.2	9.41	-0.63	4.20**	3.57*	–	–	–

Source: LCMS 1998, 2006 and 2010.
Notes: Asterisks (*) indicate that the change experienced between survey years is statistically significant: *** = 99%, ** = 95%, *=90%.

Table 19: Secondary school net attendance[124]

		1998	2006	2010	Percentage point change			Percentage point difference level between mining and non-mining areas		
					1998–2006	2006–10	1998–2010	1998	2006	2010
National		23.25	37.01	43.86	13.77***	6.84***	20.61***	–	–	–
Copperbelt	Mining	36.72	59.51	58.27	22.79***	-1.24	21.55***	15.73***	12.94***	6.96
	Non-mining	20.99	46.56	51.31	25.57***	4.75	30.32***	–	–	–
North-Western	Mining	23.41	41.38	45.27	17.97	3.89	21.86	-1.77	10.95*	9.39
	Non-mining	25.18	30.43	35.88	5.25	5.45	10.7	–	–	–

Source: LCMS 1998, 2006 and 2010.
Notes: Asterisks (*) indicate that the change experienced between survey years is statistically significant: *** = 99%, ** = 95%, *=90%.

122 Self-assessed poverty is the household's subjective analysis of their poverty status. Households that have indicated that they feel moderately or severely impoverished have been categorized as poor.

123 In the ILO's definitions of economic activity and the labour force (LCMS 2010), non-wage employment includes running a business, farming, forestry, fishing, piecework and unpaid workers. People not employed are excluded from the sample for this table.

124 The net attendance ratio is defined by the UNESCO Institute for Statistics as enrolment of the official age group for a given level of education expressed as a percentage of the corresponding population. In Zambia, the secondary school age is 14–18.

Annex G
Problems in the estimation of the contribution of the mining sector to Zambia GDP[125]

Introduction

The first objective of this annex is to comment on the attempts to estimate the contribution of the mining sector to the GDP of Zambia, primarily referring to two specialist papers prepared for the Chamber of Mines by Mbuta (2006) and Sanyikosa (2013) that addressed that problem directly.[126] The second objective is to suggest an alternative method of estimation in the absence of rebasing of the national accounts using the 2010 economic census results, and going forward as and when the rebasing to 2010 has been achieved. Both papers spend time trying to explain some basic concepts but in the process also introduce a few misconceptions.[127] Here we ignore these basics and simply concentrate on how best to estimate the contribution (level) of mining in total GDP – the share would then follow as a simple consequence.

The authors rightly point out that the existing estimates rely on dated census, survey and benchmark data, although new census-based estimates appear to be imminent.[128] So long as we need to rely on these very dated databases, together with proxies and some allied indicators, we must recognize that the resulting estimates are likely to be unreliable.

GDP is essentially the same as total value added in production, which in turn essentially comprises employee compensation (mainly wages and salaries) plus operating surplus (ie "profits" generated).[129] Thus, while it might be tempting to use employment data (or similar) as a proxy to index up GDP over time from a baseline estimate, this approach would fail to account for year-on-year variations in the operating surplus (which in turn could be affected by factors such as variations in the world price of copper and other minerals) or in the impact of changes in technology that might also affect the proportion of income accruing to profits. Thus, it is probably best to rely on output, sales, exports and price data as the relevant basic indicator components, as suggested by both Mbuta and Sanyikosa, rather than using any input proxies such as employment.

Initial observations gleaned from country reports as well as these two papers suggest that there is a significant mismatch between the apparent small contribution of mining to GDP (officially in 2012, less than 3 per cent) and the recognized importance of mining in the economy – both in terms of the total exports of Zambia and the dominant fiscal contribution of this sector (as shown in the main text of Chapter 3). This is especially true in light of the very substantial increases in copper production and prices since 2000.

The situation is further complicated by the nature of "copper output" and the repeated reference to the "output of the mining sector" in the papers by Mbuta and Sanyikosa. A recent report by Wood Mackenzie (2012) underlines the fact that copper production operations in Zambia are complex.

Most mined copper output is processed, at least to a degree, and copper exports include exports of mined, smelted and refined copper, while some copper feedstock is imported for processing. As a result, even the task of computing the value of "production/output" is not straightforward. This matter is discussed more fully below.

Existing GDP estimates

The various estimates reported by Mbuta and Sanyikosa (M&S hereafter), and the basis for deriving them, are not entirely clear, so we first summarize these estimates as succinctly as possible in Table 20, Table 21 and Table 22. Some notes are added in bold italics. The estimates added in italics are not taken directly from M&S but are straightforward derivations based on information provided in M&S: they do not rely on any new data.

The estimates in M&S all start from the year 1994, when the benchmark data set for the national accounts was last established. The year 1994 is also used for rebasing constant price estimates for all subsequent years. So, in that year, the current price and constant price estimates of GDP are identical. The key statistic thereafter used to produce the official GDP estimates for mining is the value added/gross output (VA/GO) ratio (0.57).

---

125 Compiled by Dr Jeffery Round, University of Warwick.

126 It is fair to note that Sanyikosa essentially reiterates and updates Mbuta, adding relatively little by way of substantively new material.

127 For example, both authors explain at length why a percentage change in the level of sectoral GDP over time might differ from the percentage change in its share of the total. This is basic arithmetic and we do not here repeat their detailed explanation of the point.

128 There is an indication in both papers that revised GDP estimates would be available by mid-2013 but at the time of publication, they were not yet available.

129 Note that the aggregate of gross national income (GNI) (which is frequently used alongside GDP) is GDP plus net income received from abroad.

The estimates discussed by M&S are provided only for a sub-set of years – 1994, 2000 and 2006. More recent official estimates are of course published in annual reports by the CSO and various other government agencies (eg MFNP 2009 etc), and the most recent official CSO estimates through 2012 have now been supplied to us on an informal basis. For the year 2006 and all more recent years, three estimation methods have been suggested and compared by M&S:

Method A: "official" estimates[130]
These appear to largely rely on a method of indexing baseline VA by an index of GO (ie copper output). This is suggested by applying a simple index of output from 2000 to 2006 to GDP in 2000.

Method B: benchmark ratio method
This applies the 1994 VA/GO ratio (0.57) to (real) gross output estimates to derive real GDP in 2006.

Method C: current prices method
This estimates the current price net output per metric tonne (ie net of intermediate consumption), multiplying up by the export (sales) volume, then deflating back to constant prices. The aim here seems to be to factor in the (increasing) operating surplus generated during the years when world copper prices escalated.

All three methods have some clear and fairly obvious deficiencies:

Method A essentially assumes a constant VA/GO ratio, taking no account of possible increases in operating surplus at times when copper prices rise rapidly (as they did through much of the decade of the 2000s), which might then change the VA/GO ratio.

Method B also relies on a *constant* VA/GO ratio – the ratio of 0.57 established for the year 1994. However, from evidence presented by M&S (eg Botswana data) this ratio is likely to vary over time, so, as with Method A, it is likely to be unreliable. Clearly, Method B ought to give the same results as Method A. For some years, such as 2006, it seems not to. However, we know very little about alternative estimates of GDP in the year 2000. The official mining GDP for that year does seem low but we need to remember that copper production had been falling sharply through to 2000 and since 1994.

Method C assumes a constant (in value) level of intermediate consumption per metric tonne of output (ie US$871 per metric tonne, as also quoted in 1994 estimates). At the very least this should be recast in current prices for the ensuing calculation, which is all in current prices. Thus, the calculation by M&S appears to be incorrect: there seems to be a fundamental conceptual error. However, if we try to correct this by applying the output price index to inputs as a crude inflation factor, then the resulting "current price" intermediate consumption would exceed the (current price) value of output. Hence, it does not seem straightforward to make a correction. If one could find a more suitable price index for intermediate inputs, then this method might be improved.[131]

Table 20: A summary of alternative estimates of GDP for 1994

GDP Mining (Kw bn, 1994 constant prices)	GDP (market prices) Total (Kw bn, 1994 constant prices)	Method of estimation	Notes	Source
372	*2,240.1*	A	Official estimates for 1994 at the 1994 benchmark	Sanyikosa 2013, p 9 and Central Statistical Office 2013
16.7			*% of total*	

Source: Mbuta 2006, Central Statistical Office 2013 and Sanyikosa 2013.
Notes: benchmark ratio for value added/gross output in mining: 0.57. An independent source (United Nations Statistics Division) suggests GDP was Kw 2,056 billion, so the mining share of the total would have been 18.1 per cent; the official total GDP figure as shown indicates a lower percentage share (16.7 per cent).

130 Our understanding from the two papers is that this is indeed the core of the approach used by the CSO to produce the official estimates. However, this has not yet been confirmed with the CSO specialists.

131 Note that the correct application of Method C is called the method of "double deflation", and is well known to national income accountants.

Problems in the estimation of the contribution of the mining sector to Zambia GDP

Table 21: A summary of alternative estimates of GDP for 2000

GDP Mining (Kw bn, 1994 constant prices)	GDP (market prices) Total (Kw bn, 1994 constant prices)	Method of estimation	Notes	Source
160.4	2,499	A	This together with Table 20 suggests a fall in mining GDP between 1994 and 2000	Sanyikosa 2013, p 5
6.3			*% of total*	

Source: Mbuta 2006, Central Statistical Office 2013 and Sanyikosa 2013.
Notes: Copper output = 515,000 metric tonnes; average copper price = US$6,019 per metric tonne.

Table 22: A summary of alternative estimates of GDP for 2006

GDP Mining (Kw bn, 1994 constant prices)	GDP (market prices) Total (Kw bn, 1994 constant prices)	Method of estimation	Notes	Source
302.8	3,337.6	A	*Mbuta (2006, p 18) suggests that this estimate was simply derived by applying an index of copper output to 1994 VA*	**MFNP 2006, Table 2.2**
9.1	3,356.1	A	*% of total*	
286.2 *8.5*			**Official CSO estimates** *% of total*	**Central Statistical Office 2013**
678	*3,712.8*	C	Current prices method *Assumes intermediate consumption per metric tonne (in real terms) has not changed since 1994. This implies a resulting VA/GO ratio of 0.85 in 2006 – which seems high*	**Mbuta 2006, p 17**
18.3			*% of total*	
455	*3,489.8*	B	Benchmark ratio method *Assumes the VA/GO ratio of 0.57 as in 1994*	**Mbuta 2006, p 15**
13			*% of total*	

Source: Mbuta 2006, MFNP 2006, Central Statistical Office 2013 and Sanyikosa 2013.
Notes: Copper output = 515,000 metric tonnes; average copper price = US$6,019 per metric tonne.

Problems in the estimation of the contribution of the mining sector to Zambia GDP

Official estimates of mining's share of GDP

In Table 23, we assemble published (ie official) estimates of the share of mining in total GDP (at market prices) for all recent years.

The most significant point to note from Table 23 is that the mining share of GDP at current prices is much lower than the corresponding share at constant (1994) prices. As can be seen, the share at constant prices for 2007 onwards is estimated to be between 8 per cent and 10 per cent as against a range of less than 3 per cent to slightly over 4 per cent for the current price estimates. The MFNP and ZRA data as used in their own official reporting show broadly consistent estimates. Some of these seem to favour the higher constant price estimates over the lower current price estimates but the reasons for this are not clear. The UN data includes the share of utilities in GDP. However, MFNP reports suggest that the "Utilities" share of GDP in current prices had been broadly constant between 2007 and 2009 at between 2.7 per cent and 2.9 per cent. Allowing for this, the current price estimates reported by the United Nations Statistics Division would seem to be broadly in line with the (lower) current price share estimates for mining in the CSO

and MFNP reports. Thus, in very broad terms, and based on the official estimates of GDP, one can conclude that the share of mining in GDP in current prices is officially acknowledged to typically be less than half of what it is in constant prices. This discrepancy has proven to be very confusing to politicians and others who need to use this data in order to make practical points about the role of mining. As things stand, it matters enormously whether they (and we) place more trust on the constant or the current price estimates.

Conceptually, it is certainly preferable and advisable to calculate GDP shares in current prices rather than in constant prices. Constant price GDP estimates are useful when measuring real changes over time (in both sectoral GDP and total GDP), but they are far less useful for measuring shares (or changes in shares). If we accept this conceptual point, then the estimates shown above (in current prices) indicate that when the official CSO estimates are used then mining makes a surprisingly small contribution to GDP (currently only about 2.6 per cent). This is not credible. Given the obviously large magnitudes and importance of mining to the economy in all other respects (see the main text of this report), this suggests that the GDP estimates of the mining sector are seriously unreliable.

Table 23: Estimates of share of mining in the total GDP for Zambia (GDP at market prices)

	1994	2007	2008	2009	2010	2011	2012
CSO[1] (current prices)	16.7%	4.4%	3.6%	2.6%	3.7%	3.4%	2.6%
CSO (constant prices)	16.7%	8.5%	8.2%	9.3%	9.9%	8.8%	8.0%
Economic report 2009[2] (constant 1994 prices)	–	9.1%	8.8%	9.9%	–	–	–
Economic report 2009[3] (current prices)	–	4.7%	4.3%	2.7%	–	–	–
ZRA 2010 annual report[4] (constant prices?)	–	–	–	9.3%	9.9%	–	–
United Nations Statistical Division Zambia[5] *Mining + Utilities* (current prices)	21.7%	7.5%	6.5%	5.1%	7.1%	7.3%	–

Sources:
1 Central Statistical Office 2013b, data supplied to the OPM team.
2 MFNP 2009, Table 2.3.
3 MFNP 2009, Table 2.4.
4 Zambia Revenue Authority 2011, Table 1.
5 United Nations Statistics Division, National Accounts for Zambia database.
   Note: Data is available for "Mining plus Manufacturing plus Utilities" and for "Manufacturing" only.)

Note: The estimates from the Ministry of Finance and National Planning (MFNP) and the ZRA are broadly consistent with those published by the CSO, as one might expect. The slight variations are probably due to revisions in the official estimates and/or to the agencies relying on preliminary estimates.

Measuring copper output

M&S refer throughout their reports to "the output of copper", which is usually expressed in terms of metric tonnes on an annual basis. This concept seems straightforward enough but in reality is easy to misinterpret. Indeed, the Wood Mackenzie (2012) report explains that the "output of copper" is a good deal more complicated than M&S describe and most commentators assume. Most of the production of ore (ie concentrate) is also processed in Zambia, but of this processed material a significant quantity of smelted (ie blister) copper is exported for further processing, whereas only a proportion of it is refined in Zambia. However a "considerable" tonnage of refined copper cathodes is also produced by SX/EW, thus "by-passing" the smelter stage (Wood Mackenzie 2012, p 3). Another complication is that some copper feedstock is imported from the DRC, some of which is processed and refined by domestic companies along with domestic supply (see Annex B).

The complexity of different types of copper output, with some output being used as intermediate inputs to other production processes further along the value chain, leads to a strong possibility that there may be some double counting in the existing estimates of copper production – a conclusion suggested by the Wood Mackenzie analysis – leading in turn to errors in estimates of the value added in the mining sector.

This problem, coupled with the dramatic changes in the sector since 1994 (the base year for most estimates of sectoral GDP) in both the production of copper and the world price of copper, means that there are significant difficulties in deriving estimates of GDP for this sector – especially if the estimates are based on a year as far back as 1994.

There are two possible ways of estimating copper output. The first is to aggregate the value of all types of output across all producers in Zambia. The second approach is to use trade data based on the assumption that all, or most, copper produced is also exported. Note that copper exports include both refined copper and copper ore, although only a small proportion (by value) of copper exports is of copper ore. An adjustment has to be made for copper imports, including both copper ore and intermediates.

Table 24 shows the summary data on copper exports and imports for selected years. The full sequence of these export and import data from 1995 through to 2011 clearly correlates closely with the series on copper production (see Chapter 3 for the sources and the detail). Specifically, net exports in current prices dipped to a minimum in 1994–95, but have then climbed consistently and significantly since then.

What we now propose in the final section of this annex is to attempt to use these estimates of net exports of copper as a crude proxy for copper output, and as the basis for providing some alternative estimates of GDP.

Table 24: Zambia net exports of copper (US$ '000, current prices) for selected years

	1995	1999	2000	2006	2007	2008	2009	2010	2011
Exports of copper (SITC 682)	804,660	400,680	428,576	2,339,568	3,028,645	3,155,747	2,779,092	5,142,154	5,973,425
Exports of copper ore (SITC 283)	5,155	17,493	14,386	335,620	309,930	563,083	296,548	172,288	599,452
Gross exports of copper	809,814	418,173	442,962	2,675,188	3,338,575	3,718,829	3,075,641	5,314,442	6,572,877
Imports of copper (SITC 682)	512	447	608	3,620	5,034	112,838	135,908	246,947	304,298
Imports of copper ore (SITC 283)	8,881	4,699	20	26,400	142,215	459,045	274,053	632,583	871,100
Gross imports of copper	9,393	5,146	628	30,020	147,249	571,883	409,961	879,530	1,175,397
Net exports of copper	800,421	413,027	442,334	2,645,168	3,191,326	3,146,947	2,665,680	4,434,912	5,397,480

Sources: UNCTADstat.

An alternative set of estimates of the contribution of mining to the GDP in Zambia

Table 25 sets out some highly tentative estimates of the GDP of mining (metals only). If we take the estimates of net exports of "copper" as a measure of the gross output of this sector, then the next step is to derive the value added, by netting out the cost of intermediate inputs. As noted earlier, the ratio of VA/GO is likely to vary over time, partly because of changes in technology and partly because operating surplus (profits) will vary with year-on-year changes in international prices. However, and in the absence of alternative estimates, a baseline estimate of 0.57 has been applied (this is the estimate derived from the 1994 national accounts and which M&S indicate has been used in subsequent national accounts estimates).

The fourth row of Table 25 shows the implied value-added estimates for the mining sector (in current US$ thousands). Finally, converting back into local currency (billions of kwacha) using annual average exchange rates, we obtain an alternative set of estimates of the GDP of mining for selected years. The sixth and final row of Table 25 shows the "official" CSO estimates for 2007–11. We can see that the net export-based estimates are about three times higher.

Clearly, these alternative and crude estimates depend crucially on the choice of the baseline VA/GO ratio. The ratio of 0.57 seems high. Pending the results of the 2010 economic census, which will provide a new and firm estimate, it is possible to arbitrarily vary this ratio by reducing it by, say, 10 or 20 percentage points (ie 0.47 or 0.37) in order to provide us with a range of alternative estimates of the mining contribution to GDP.

In progressing from alternative estimates of sectoral GDP to sectoral shares, there is an issue as to whether any of the estimated increase (suggested by our own calculations) should also be added to the total GDP, or whether total GDP should be fixed. If we choose the latter, then by implication all other sectoral contributions to GDP would be reduced accordingly. However, if total GDP is increased commensurately with the estimated increase in mining GDP, then the share of the mining contribution to total GDP would be less than if total GDP is fixed. Specifically, with fixed total for GDP, and based on the estimates derived in Table 25, the share of mining in total GDP would have been in the order of 13.0 per cent and 12.4 per cent in 2008 and 2009 respectively even in current prices. We suggest that these are upper-bound estimates, although they do not seem to be unreasonably high relative to the importance of mining in the economy.

In deriving these estimates of the share of mining's contribution to total GDP, we have limited ourselves to estimates in current prices. We consider it would be very difficult indeed to derive constant price estimates and, arguably, they would be less useful.

Table 25: Estimates of GDP in mining (copper) based on net exports of copper for selected years

	1995	1999	2000	2006	2007	2008	2009	2010	2011
Net exports of copper (US$ '000)	800,421	413,027	442,334	2,645,168	3,191,326	3,146,947	2,665,680	4,434,912	5,397,480
Exchange rate ZMK/US$	813.0	2,617.6	3,035.4	3,559.3	3,971.9	3,743.8	5,036.1	4,807.2	4,868.8
VA/GO ratio (0.57)	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57	0.57
VA (US$ '000)	456,240	235,425	252,130	1,507,746	1,819,056	1,793,760	1,519,438	2,527,900	3,076,564
VA (ZMK billion) at current prices	370.9	616.2	765.3	5,366.5	7,225.1	6,715.5	7,652.0	12,152.1	14,979.2
GDP of metals mining (CSO official)	432.9	281.3	416.1	1,612.5	2,037.2	1,998.9	1,682.1	2,837.8	3,144.1

Sources: OPM's calculations. Based on MFNP 2009, Table 2.3, Central Statistical Office 2012, tables on pages 10 and 11, and Central Statistical Office 2013.

Addendum – final observations on the GDP estimates overall

Sanyikosa (2013, p 2) comments on the "disconnect" (ie disparity) between the (small) contribution of mining to GDP (3.8 per cent) and the (large) contribution of this sector to government revenues via taxes (26.1 per cent), based on the World Bank's *Zambia economic brief* (2010). Of course, such a disparity could conceptually occur – there is nothing especially unusual about a disparity between value added and tax generation when there is no VAT regime operating. However, one could add to this the observation that many reports on Zambia remark on the recent rapid economic growth that is being driven by the expansion in copper production (ie new mining activities). This implies that the sector is probably a much higher contributor to GDP than it would seem to be from existing official estimates. Hence, mining GDP (and therefore total GDP) is probably significantly underestimated. We suggest that the alternative estimates presented above might be more in line with the "true" figure.

It would seem to us that the official CSO estimates of mining GDP (Method A) are simply derived by indexing up according to the annual change in copper output. Estimates for the year 2000 are a puzzle, but if we take these as given, then the official estimates for 2006 do seem to tally with that benchmark.

Estimates based on Method B ought to be the same as Method A. They are not, principally we think because there are some unexplained factors affecting the official estimates for the year 2000 and noting that the official estimates for 2006 are directly linked to those for the year 2000. Method C has some virtues but it has not been applied correctly by M&S. It is necessary to obtain some price indices (eg index of unit costs) to make the necessary correction. A correct application will probably lower the estimate for 2006, which would then make it more in line with the estimate produced by Method B. However, it would seem that all three methods reviewed by M&S are reliant on gross output data that are inherently unreliable. The "net export" approach might offer a viable alternative.

Once the economic census results become available then, depending on their scope and detail, it should be possible to improve significantly on the approaches suggested above.

Annex H
Multipliers from Zambian mining: output, incomes and indirect employment

Introduction

The huge new investments in mining in Zambia the past decade and the associated major increase in mining output have had a variety of direct effects on output, incomes and employment and these effects are assessed in the main report. However, the direct effects are significantly magnified by a variety of multiplier effects that this annex examines in detail. In the case of both output and incomes it has been possible to estimate the Zambian multipliers using standard input-output (I-O) analysis. However, the data available to us has precluded the extension of that I-O analysis to estimate the corresponding employment multipliers. Hence, employment multipliers have been calculated using a somewhat more ad hoc approach. Consequently, the results and especially the comparisons across the two methodologies need to be interpreted with care.

At the construction stage of mining projects, there will be a need for large-scale imports of specialized equipment. But there will also be a major "direct" impact on the local construction sector itself, and on key raw material and services suppliers as well as on local labour markets. Similarly, at the operating stage of any project, the initial direct effects will work through to also impact on suppliers of inputs of both goods and services to the project as well as on labour markets. These "direct" effects in turn are likely to precipitate further second- and third-round effects that spread through the Zambian economy. These effects are usually collectively referred to as "multiplier effects" because the total effects on economic activity (in the dimensions of output, incomes and employment) are likely to be a multiple of the initial direct effects in these various dimensions. While it is very difficult to estimate the full range of multiplier effects, there are well-known techniques for estimating the likely magnitudes and extent of some of these.

The particular multiplier effects that are most commonly measured by analysts are twofold. First, there are the multiplier effects due to the interdependencies between production sectors. These are the inter-industry or I-O effects that arise because any extra demand for domestically produced goods or services from the mining projects will lead to an increase in the demand for raw materials, services and various processed inputs that, in turn, trigger increased supply/production from the industries supplying these inputs.[132] The second group of multiplier effects are those arising from the increase in incomes (wages and salaries) paid to employed labour. Here, the subsequent spending by households of those incomes leads to a further stimulus to output and income. This second group of effects are the Keynesian multiplier effects. It is usual to refer to the

multiplier effects due to the production/(I-O) linkages as "indirect effects" and those due to the spending of labour incomes as "induced effects".

Impact analysis and I-O multipliers

Based on detailed estimates of spending during the construction/investment and operating phases of mining projects, four separate categories of project direct expenditures can be identified:

1. direct spending on domestically produced goods and services (albeit some of which use imported raw materials)

2. wages and salaries paid to Zambian labour (national and local)

3. other domestic expenditures by mines (eg taxes, permits, etc)

4. payments abroad, mainly in the form of direct imports of goods and services and wages and salaries to foreign workers.

Spending on items 1 and 2 will directly augment Zambian GDP whereas spending on items 3 and 4 will not do so. Moreover, spending on 1 and 2 is likely to precipitate further "knock-on" effects of the types described above within Zambia. The extra demands from 1 will lead to additional requirements for raw materials, manufactured inputs and services and hence the need for more output from the Zambian producers of these items: these are the "indirect" effects. Also, the extra incomes from item 2 will be spent, at least in part, on Zambian products, thus inducing a further increase in outputs and incomes: these are the "induced" effects.

A standard I-O model captures the inter-industry multipliers and hence what we have termed the "direct" and the "indirect" impacts. The principal assumptions underlying the model are that the base year coefficients describing the input structure reflect the inherent technical input requirements of the different sectors, and that there is excess capacity in domestic production and an excess supply of labour. One particularly advantageous feature is that the model can be calibrated with just a single set of base year data (ie the I-O table). In many I-O analyses, the inter-industry structure is augmented by household income and expenditure coefficients so as to capture the income-generating and spending behaviour of households within the model and so the "induced" effects also. In the standard jargon used by I-O analysts, "Type 1" multipliers capture the indirect effects but not the induced effects. The addition of the induced effects via household spending generates the so-called "Type 2" multipliers. I-O analysts view the Type 2 model as providing a reasonable overall approximation of the economy-wide multiplier effects. This is the approach we adopt here.

---

132 In Zambia, in recent years, local suppliers have been very significant in terms of the supply of services to mining projects but have been less prominent in terms of the supply of manufactured inputs (where the agents of foreign suppliers have been more significant). Nonetheless, the services of those local agents are clearly part of the local supply chain and so they too create incomes and employment.

Zambian output and income multipliers

A reasonably recent social accounting matrix (SAM) incorporating an I-O table for Zambia for 2007 has been constructed by Chikuba, Syakumpi and Thurlow (2013). This shows a snapshot of economy-wide transactions that extends beyond the production linkages of the I-O. Specifically, it also includes a supply and use table, data on income transfers between institutions, disaggregated tax payments and a disaggregation of the household sector. We have used this to derive a full I-O table to show intermediate transactions between Zambian industries (ie sectors), payments for imports from the rest of the world, value-added payments (compensation of employees, operating surplus – including mixed income) and net direct and indirect taxes, separately identified by institution and sector. We note that the Zambia SAM has a high level of integrity. It is understood that the Zambia SAM was estimated by Chikuba, Syakumpi and Thurlow (2013) from a substantial body of primary source data, and is therefore not simply an update of earlier SAMs.

The I-O table that we have derived distinguishes 16 different production sectors including mining as one sector,[133] seven factors of production (of which six are categories of labour) and four household groups. The results of the multiplier analysis are shown below at the full level of 16 production

sectors but with the factor and household accounts being aggregated into just one single household sector for summary purposes. Summary results are shown in Table 26 and Table 27. The computation of the multipliers is fully explained in the addendum. Computation of the coefficient matrices that form the basis of the computations have been derived from the I-O table without modification or adjustment.

The results – output and income multipliers
Table 26 shows the output multipliers for each of the 16 sectors. These should be interpreted as follows. A one unit expansion in the output of any one sector (eg mining) leads to extra demands for output from that sector and from most other sectors, due to the direct and indirect demands for inputs (and outputs). Summing the gross output requirements across all affected sectors yields the Type 1 multipliers. So, for example, the Type 1 multiplier for mining – showing the total (gross) output response across all sectors due to a unit expansion of demand for mining output – is 2.20. The Type 2 multipliers also incorporate the extra induced effects of income and spending by households, and so must be larger than the Type 1 multipliers. For mining, the Type 2 multiplier is 3.10. The results suggest that any one unit (eg a kwacha) increase in mining activity will increase total gross output in the economy by 3.1.units (kwacha).

Table 26: Type 1 and Type 2 output multipliers by sector

Number	Sector	Type 1 multipliers	Type 2 multipliers
1	Agriculture, food crops	1.70	3.38
2	Agriculture, export crops	1.71	3.10
3	Livestock, forestry and fishing	1.77	3.25
4	Mining	2.20	3.10
5	Food processing	2.29	3.34
6	Textiles, clothing	1.87	2.58
7	Wood, paper	2.15	3.06
8	Chemicals, petroleum	2.08	2.83
9	Other manufacturing	2.34	3.37
10	Construction	1.66	2.69
11	Utilities	1.86	2.90
12	Trade, hotels	1.68	3.02
13	Transport, communication	1.46	2.26
14	Other services	1.64	2.63
15	Government administration	1.51	3.22
16	Education and health	1.50	3.22

Source: Own calculations derived from Chikuba, Syacumpi and Thurlow (2013).

133 Unfortunately, the source material does not permit the separation of mining extraction from mining processing.

Clearly, the significance of this first set of results needs to be viewed in light of the actual increase in output that the sector has experienced. We know that in the period since 2000 there has been a dramatic increase in total mining output and exports. Given the assumptions of the I-O model, the economic structure of the economy seems capable of multiplying this large stimulus by a factor of more than three in gross output terms. Whether this has indeed happened is qualified by the likelihood that the amount of excess capacity in the indirectly affected non-mining sectors is less than fully elastic (thereby breaching one of the key I-O assumptions). This being the case, the multiplied output expansion would have been somewhat lower than 3.1 times the initial stimulus from mining.[134]

Table 27 shows the summary results in respect of household income effects, culminating in estimates of Type 1 and Type 2 income multipliers. Column 2 shows the direct household income generated by a one unit expansion of output in each sector. So, for example, the direct household income generated by one extra unit of mining output is 0.05; this is considerably lower than in several other sectors. In the case of agriculture (food crops), for example, the direct income generated is 0.43 and for education and health the coefficients are even higher at 0.57. These results are not surprising. Given that agriculture is labour intensive and mining is capital intensive, one would expect a larger direct income effect from a unit expansion of agriculture if it is achieved.[135] Column 3 adds in the income generation due to the indirect effects of the income generated by a unit output expansion of output of each sector. Column 4 presents similar results for the direct plus indirect plus induced effects of a unit expansion of output.

Table 27: Type 1 and Type 2 income multipliers: total responses of a unit increase in output of each sector

Number	COLUMN 1 Sector	COLUMN 2 Direct income coeffs	COLUMN 3 Direct+indirect coeffs	COLUMN 4 Direct+indirect +induced coeffs	COLUMN 5 Type 1 multipliers	COLUMN 6 Type 2 multipliers
1	Agriculture, food crops	0.43	0.63	1.03	1.49	2.42
2	Agriculture, export crops	0.34	0.54	0.86	1.57	2.53
3	Livestock, forestry and fishing	0.35	0.59	0.93	1.68	2.66
4	Mining	0.05	0.36	0.56	7.93	12.47
5	Food processing	0.06	0.42	0.66	7.04	11.19
6	Textiles, clothing	0.06	0.29	0.45	4.47	7.05
7	Wood, paper	0.04	0.37	0.58	8.24	12.98
8	Chemicals, petroleum	0.03	0.30	0.47	9.96	15.63
9	Other manufacturing	0.01	0.41	0.65	29.52	46.33
10	Construction	0.26	0.41	0.65	1.57	2.47
11	Utilities	0.17	0.42	0.66	2.43	3.80
12	Trade, hotels	0.37	0.54	0.85	1.45	2.28
13	Transport, communication	0.24	0.33	0.51	1.35	2.11
14	Other services	0.26	0.40	0.63	1.56	2.44
15	Government administration	0.57	0.70	1.09	1.23	1.93
16	Education and health	0.57	0.70	1.10	1.27	1.91

Source: Own calculations derived from Chikuba, Syacumpi and Thurlow 2013.

134 It can be noted that there is considerable variation between the multiplier values across the different sectors. In terms of Type 1 multipliers, mining has the third highest multiplier, but when the induced effects are added, some other sectors show higher Type 2 multipliers for one single unit of direct expansion and mining drops to seventh place in the rankings. But once again the sheer scale of the mining sector's expansion in the past decade needs to be factored in; it has produced many more units of direct expansion than most other productive sectors.

135 If sectors such as agriculture and education could have expanded at the same rapid rates as mining enjoyed in the past decade, then they would have had a dominant impact on the overall economic performance of the economy. However, of course, in reality they did not.

The income effects shown in columns 2, 3 and 4 show marked variation across sectors of the economy. Mining, being capital intensive, generates only a small amount of direct income (0.05) from each unit of output. By contrast, agriculture (food crops and export crops), health, education and trade generate much larger direct effects because they are much more labour intensive. However, when indirect income effects are also taken into account, the income generated by a unit expansion of mining rises substantially to 0.36. The column 3 results show that there is less intersectoral variation in the income generated once account is taken of the indirect effects. When the induced income effects are also included (as in column 4), there is a similarly lower level of variation in the amounts of income generated across different sectors. A unit expansion of mining suggests that the total income effects could amount to 0.56.

In order to capture the scale of the increases in income due to, first, the indirect effects and, second, the induced effects, the final two columns show the Type 1 and Type 2 income multipliers. These are simply defined as the ratio of direct plus indirect income effects (column 3) expressed as a ratio of direct income (column 2) for Type 1 income multipliers; and column 4 as a ratio of column 2 for Type 2 income multipliers. These multipliers show even more clearly the varying extent to which secondary effects contribute to the total income effects that any one sector can produce. Mining is shown to have high Type 1 and Type 2 multipliers (7.9 and 12.5 respectively) compared with, say, agriculture (food crops) – 1.5 and 2.4, respectively. Manufacturing generally and "other manufacturing" in particular have very high Type 1 and Type 2 multipliers (29.5 and 46.3, respectively). These results are explained partly by the fact that these sectors depend on very high inputs of trade and transport services, which then generate strong secondary effects.

Once again the caveat needs to be added that the results depend on the availability of enough excess capacity in the supplying sectors to accommodate the levels of indirect and induced demands that the modelling suggests. It is unlikely in practice in the period from 2000 to 2012 that mining will have generated income multipliers as high as the 7.9 (Type 1) and 12.5 (Type 2) that the results indicate. However, even if the actual outcome represents a slight dilution of these high multipliers, when combined with the stellar growth rate of direct incomes produced by mining in that period, they confirm how strategically important mining has been to the overall growth of incomes (GDP) that the country has achieved during that period. Manufacturing has the same or even better potential in terms of its multiplier effects but has largely failed in recent years to achieve the direct output expansion needed to trigger those multiplier gains for incomes.

Zambian employment multipliers

The data available to us from the I-O table does not permit any detailed calculation of the relationships between sectoral output and the employment levels (in terms of numbers of persons) for different types of labour (eg skilled versus unskilled) in each sector. Hence, the use of the I-O methodology to include a calculation of employment multipliers has not been possible. Instead, a more limited ad hoc approach has been used based in part on previous work on Zambia by McMahon, Tracy and others for the World Bank.[136] That previous work was based on data from just one Zambian mine – that at Kanshanshi. It suggested that employment multipliers for the mining sector as a whole are of the order of 1.85 (Type 1) and 5.25 (Type 2).[137] We have complemented this earlier work by calculating the likely indirect and induced employment from mining on the basis of the data provided by the four large mining companies participating in the present study: two in the Copperbelt and two in North-Western Province.

Indirect employment
In both mining provinces, the mining companies are easily the most important employers of direct labour. The four mining companies participating in the present study together had a total of 56,200 employees in 2012 (including contractors). Accordingly, they accounted for most of the 74,254 formal mining sector employees in the country (Central Statistical Office 2013a, Table 10). Most of these employees, or 40,600 people (of which 16,800 were mining companies' employees and 23,800 contractors), were employed in the Copperbelt, while 15,600 were employed in North-Western Province (of which 3,500 were mining companies' employees and 12,100 contractors).

No data exists to enable us to directly estimate indirect employment, that is, the additional persons employed by suppliers to the mining companies. That number, however, is likely to be quite small for several reasons. Above all, almost all employees of firms supplying services to mining companies are counted as "directly" employed, since services tend to be carried out on-site, particularly services such as security, construction and catering, which dominate the services supply to the mining companies we have studied. Accordingly, we make a conservative estimate that the number of off-site service employees in the Copperbelt is merely 5 per cent of the on-site contractor employment. This suggests 1,200 indirectly employed in the Copperbelt. In North-Western Province, we have some data on employment with contractors that provide a basis for an estimate of 2,000 indirectly employed.

136 McMahon and Tracy 2012.

137 Numbers deduced from the data in Table 4.6 of their paper.

Annex H
Multipliers from Zambian mining: output, incomes and indirect employment

In the case of the suppliers of goods/commodities, we estimate that 5 per cent of the total goods procurement of the four mining companies of US$780 million in the Copperbelt and US$600 million in North-Western Province consists of locally manufactured products,[138] amounting to local supplies of US$39 million in the Copperbelt and US$30 million in North-Western Province. It is further assumed that 30 per cent of these totals constitutes wages and salaries. Assuming further that average wages in these supplying companies are half of the median wage in the mining companies, or about US$5,000 per year,[139] the number of indirect employees in goods supplying companies amounts to 4,200 persons. Of this total, almost all are likely to be in the Copperbelt, where the core of mine-supplying firms is well established. To date, as we understand it, far fewer firms have set up business in North-Western Province to supply the much newer mining activity there. So we further assume, for the sake of simplicity, that all of the supplying firms are located in the Copperbelt.

To this number of indirect jobs has to be added the employees in those businesses and other institutions that are supported as part of the social investment programs of the mining companies. We estimate that 60 per cent of social spending is used to pay wages and salaries and, again, that the average annual salary is US$5,000. Social spending in the Copperbelt was US$54.4 million in 2012, corresponding, under these assumptions, to 6,500 employees, while in North-Western Province it was US$26.2 million, for 3,100 employees. Adding together these components, the total number of indirect employees made possible by the spending of the four mining companies thus comes to 15,700, of which 11,900 are in the Copperbelt and 3,800 in North-Western Province (see Table 28). This implies a significant but nonetheless a smaller Type 1 employment multiplier than that suggested by the McMahon and Tracy results: a difference largely explained by our treatment of much contract labour as "direct employment".

In order to calculate the additional induced employment, it is necessary to make an assumption about the proportion of wages that are spent on locally available goods and services by the employees of the mining companies. The World Bank study (McMahon and Tracy 2012) used household consumption surveys to arrive at an average share of 43 per cent of wages of Kansanshi employees going to consumption of domestically produced goods and services. We use this same share for the mining company employees of our four mining companies and we assume that this entire share is locally produced. While this may seem a strong assumption, in fact a very large portion of income is likely to be spent on locally produced goods and services, particularly the latter. Furthermore, it seems likely that any overestimation of spending resulting from this assumption will be offset by conservative assumptions on other points. For other categories of employees – those involved as indirect employment – it seems appropriate to apply a slightly higher share. Specifically for these workers, 55 per cent is assumed to be spent on locally produced goods and services since their incomes are lower and they are therefore likely to pay proportionately less tax, save less and spend less on imported goods. We also assume that 50 per cent of spending goes to the wages and salaries of the supplying firms or individuals, due to the fact that rent and other services probably account for a relatively high portion of spending. However, in recognition of the fact that a high proportion of the firms/individuals engaged in providing these goods and services are in the informal sector, we assume an average annual salary of only US$2,500.

Table 28, Table 29 and Table 30 together present the results of these various calculations. They suggest an employment multiplier of 2.63 for the two provinces taken as a whole. In the Copperbelt the multiplier is 2.60 and in North-Western Province it is slightly higher at 2.71. But in both provinces the comparison with data in the 2012 Labour Force Survey confirms the dominant contribution of the mining sector to total provincial employment – especially formal employment. In all cases, it is the induced employment effects that dominate the multiplier results. In the case of North-Western Province, our results suggest that mining employment (direct, indirect and induced) accounts for almost all employment in the formal sector.

---

138 This assumption corresponds to numbers cited in Kasanga 2012.

139 The assumed wage is relatively high, but given the level of qualifications necessary it is assumed that the majority of the employees concerned are formally employed and earn more than the minimum wage.

Multipliers from Zambian mining: output, incomes and indirect employment

Table 28: Mining-related employment in the Copperbelt and North-Western Province

Type of employment	Copperbelt	North-Western	Total
Direct employment, mining companies	16,800	3,500	20,300
Direct employment, contractors	23,800	12,100	35,900
Indirect employment, service providers	1,200	2,000	3,200
Indirect employment, goods providers	4,200	–	4,200
Indirect employment, social spending	6,500	3,100	9,600
Induced employment	53,000	21,500	74,500
Total	105,500	42,200	147,700
Of which indirect and induced	64,900	26,600	91,500
Implied multiplier	2.60	2.71	2.63
Total as share of total employment	15.9%	14.8%	

Source: Company data and OPM's calculations.

Table 29: Calculation of induced employment in the Copperbelt

	Employees	Salary US$ '000	Total salaries US$ '000	Share to consumption	Consumption	Labour share	Employment
Mining companies			386,072	0.43	166,011	83,005	33,202
Contractors	23,800	5	119,000	0.55	65,450	32,725	13,090
Goods suppliers	4,200	5	21,000	0.55	11,550	5,775	2,310
Service suppliers	1,200	5	6,000	0.55	3,300	1,650	660
Social investment	6,500	5	32,500	0.55	17,875	8,938	3,575
Total							52,837

Source: Company data and OPM's calculations.

Table 30: Calculation of induced employment in North-Western Province

	Employees	Salary US$ '000	Total salaries US$ '000	Share to consumption	Consumption	Labour share	Employment
Mining companies			141,010	0.43	60,634	30,317	12,127
Contractors	12,100	5	60,500	0.55	33,275	16,638	6,655
Goods suppliers	–	–	–	–	–	–	–
Service suppliers	600	5	3,000	0.55	1,650	825	330
Social investment	3,100	5	15,500	0.55	8,525	4,263	1,705
Total							20,817

Source: Company data and OPM's calculations.

Addendum

Type 1 output multipliers

I-O analysis is a well-established methodology for deriving various kinds of multipliers and has been extensively used in impact analysis (Bulmer-Thomas 1982; Miller and Blair 2009). The essence of the I-O model is to set out and formalize the nature of the economic interdependence (ie linkages) between production sectors.

Specifically, the main idea is that to produce a unit output of any good or service, the sector in question requires inputs of labour and capital (ie factors generating value added) and raw material and other manufactured inputs (ie intermediate inputs). These various inputs may be imported or domestically produced. If they are domestically produced, then this will generate further demands and hence further output requirements by other domestic sectors, leading to yet more income generation. In turn, these outputs will generate more input requirements, and so on. The I-O model is therefore a method of calculating the total direct and indirect effects of an initial stimulus.

The main basis of the I-O model is to assume there is a simple linear relationship between inputs and outputs, at least as a good approximation. More precisely, the assumption is that input requirements per unit of output are technologically fixed: this is the so-called "fixed coefficients" assumption. However, these technologies may well vary across sectors. Thus, for example, the input requirements per unit output of agricultural sectors will be fixed and will be different from those of manufacturing sectors or services. Injections will therefore generate different levels of direct and indirect response depending on in which sectors the injections originate. The fixed I-O coefficient assumption is usually considered to be a good first approximation, especially if there is a reasonable disaggregation of production sectors.

The I-O model generates a set of multipliers. By using the fixed coefficient assumption the total direct and indirect output response of all domestic sectors that arises as a result of any exogenous impact (ie the initial demand stimulus) can be calculated. The results are multipliers in the sense that the total output response of each sector must be at least as large as the initial impact. So, the results of the model show the likely effect of a unit increase in the demand for the output of sector j (eg manufacturing) on the output requirements of other sectors (eg services). Thus, the likely total effect on manufacturing would be to boost its output by more than one unit due to possible indirect effects (ie the need to supply raw material inputs to other sectors) that feed back on to manufacturing. The likely effect on services would be positive even though the initial impact on services may be zero – due to the indirect demand for services. Clearly, the size of these multipliers is entirely dependent on the degree of interdependence between sectors.

The I-O model described is an open static model. This means that the responses that are being modelled are confined to the production responses at this stage, thereby excluding the possible spending responses of workers and owners of capital who might spend income and boost activity levels further. It also excludes dynamic responses, so there is no indication of how long it might take for the multiplier effects to work through the system or whether the output responses might require (and hence precipitate) further investment (ie fixed capital formation). The aim of the I-O model is to capture an important part, though not necessarily the totality, of the economy-wide impact of the project.

The I-O model calculations generate a set of sectoral gross output multipliers. Formally, if A is the matrix of I-O coefficients (input requirements per unit of output), then the resulting gross output multipliers can be represented by the matrix M where $M = (I - A)^{-1}$.

In Figure 52, the i,jth element of M (say m_{ij}) shows the gross output response of sector i arising from a unit expansion (ie the initial stimulus) of sector j.

Figure 52: I-O multiplier matrix M
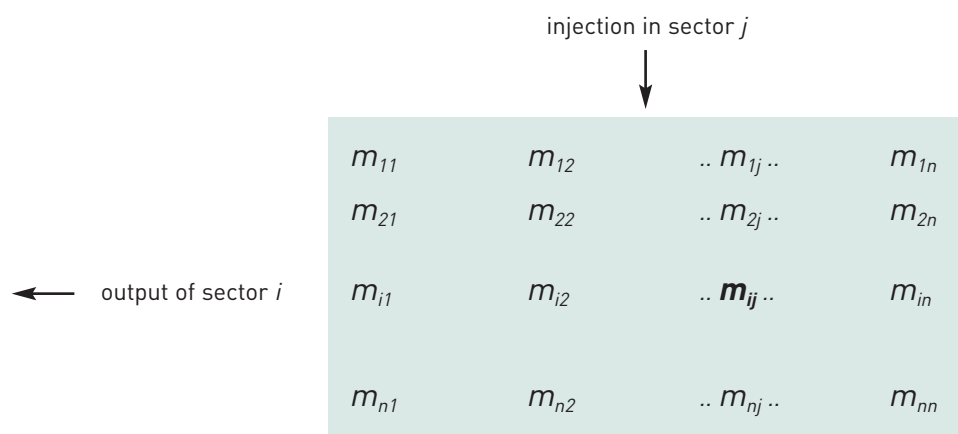
injection in sector j

output of sector i

$$
\begin{matrix}
m_{11} & m_{12} & .. m_{1j} .. & m_{1n} \\
m_{21} & m_{22} & .. m_{2j} .. & m_{2n} \\
m_{i1} & m_{i2} & .. \mathbf{m_{ij}} .. & m_{in} \\
m_{n1} & m_{n2} & .. m_{nj} .. & m_{nn}
\end{matrix}
$$

In the case of a specific project, where expenditures may be spread across a range of inputs from different sectors, the full relationship between an injection of project expenditures X – as demands for goods and services from domestic sectors – and the total outputs Y necessary to deliver X, is:

$$Y = (I – A)^{-1} X = MX$$

where both X and Y are n-element vectors, representing demands and outputs respectively for each of the n sectors.

As noted, the I-O model captures only the responses that are due to the interdependence between production sectors. All other economic responses are treated exogenously (ie determined separately from the model and not by the model itself). The output responses that are calculated on the basis of the I-O model are called "Type 1" multipliers.

Type 2 output multipliers
If the incomes generated directly and indirectly by the project lead to further spending on domestically produced goods and services, then this leads to more stimulus to economic activity and this may further enlarge the multiplier effects. Therefore, there is an additional multiplier, often referred to as the Keynesian multiplier, that captures the relationship between the initial domestic income generated by an investment project and the subsequent income induced by household spending on domestically produced goods and services (ie goods and services produced in Zambia).

The size of the multiplier is dependent on the marginal propensity to consume (ie the share of additional income that is spent on consumption) and, correspondingly, on the size of the leakages – leakages being that part of income not spent on domestic goods and services. In the case of the Keynesian multiplier, leakages would include spending on imported goods, saving and taxes. This is because the latter would not necessarily lead to further spending on domestic goods and hence would not generate additional income.

A set of multipliers that take account of the income and expenditure behaviour of households can be obtained and these are called "Type 2" multipliers. Effectively, Type 2 multipliers combine Type 1 I-O multipliers with Keynesian multipliers. Type 2 multipliers take into account not only the direct and indirect effects due to production linkages but also the induced effects due to the increase in household income and the associated changes in household spending on domestic products. Most analysts prefer to compute Type 2 multipliers as they account for more of the likely consequential effects of project expenditures.

Type 2 multipliers are obtained by adding a row and column to the I-O coefficient matrix. The row coefficients show the household income generated per unit of output of each sector. This household income is usually defined by employment income (ie employee compensation plus mixed income). The column coefficients show the household expenditures per unit of household income (ie the propensities to spend). Note that the enlarged effects from the Type 2 multipliers arise in so far as households spend their extra incomes on domestically produced goods and services. All spending on imports, savings and taxes is treated as leakage, as they are not income-generating expenditures.

The multiplier matrix for Type 2 multipliers is obtained similar to the I-O multipliers, although the matrix A (and, in consequence, so is M) is enlarged by one row and one column now that households are an endogenous "sector".

Figure 53: Type 2 multiplier matrix _M_
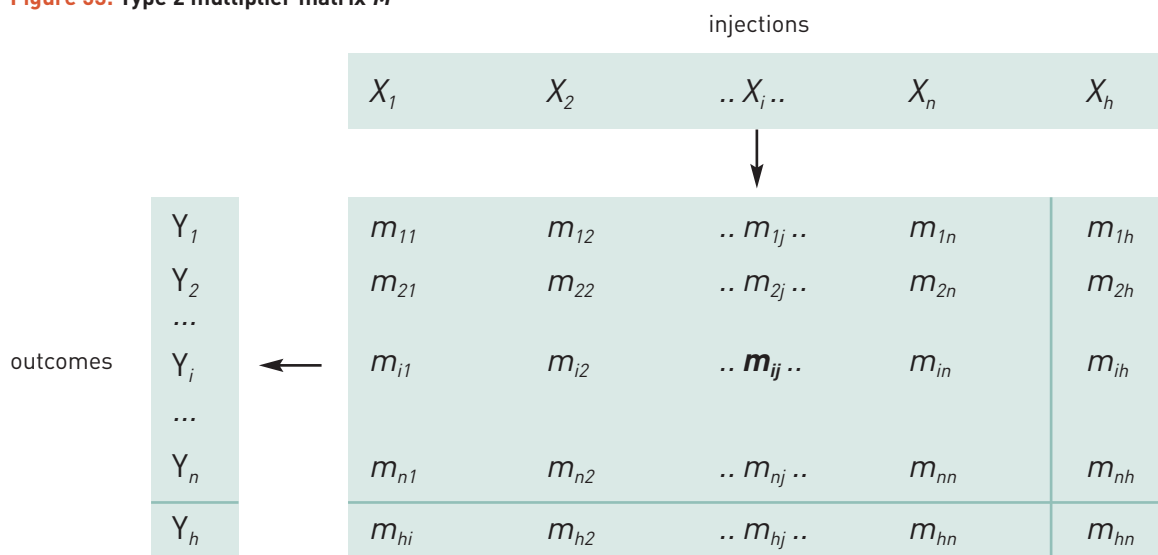
Injecting a set of expenditures X into the multiplier effectively means feeding elements of X down the columns of M. The outcomes are in terms of elements of Y – summing the total effects along the rows of the resulting matrix.

Thus, for example:

$$Y_i = m_{i1}X_1 + m_{i2}X_2 + \ldots + m_{ij}X_j + \ldots + m_{in}X_n + m_{ih}X_h$$

where, for example

$m_{i2}X_2$ = total output requirements of sector i due to a project expenditure on goods and services from domestic sector 2, taking into account both the indirect and induced multiplier effects of further outputs and incomes generated.

$m_{ih}X_n$ = total output requirements of sector i due to a project expenditure on labour (wages and mixed incomes paid to Zambian workers), taking into account both the indirect and induced multiplier effects of further outputs and incomes generated.

Other kinds of multipliers
The discussion above has focused on Type 1 and Type 2 output multipliers (ie the impact on economic output of an increase in, say, construction expenditure). However, it is usually possible to calculate a range of other multipliers – in particular, income and employment multipliers as well as output multipliers. So, in terms of the vectors on expenditures X and outputs Y, an output multiplier would be to take the ratio of Y to X: that is, to express the total direct and indirect impact on output Y as a ratio of the initial output requirements X.

An income multiplier would be to express total income generated as a proportion of the initial income generated from the project. Finally, an employment multiplier would express the total employment generated (ie from all new economic activity) as a ratio of the initial employment in the project. There are several variants of these multipliers; for example, sometimes they are shown sectorally as well as in aggregate.

The output and income multipliers can easily be defined and represented using Figure 52 as the basis. Take X_P to be either the total expenditure on domestically produced goods and services, or as an expenditure on a particular product P, and similarly for Y_P.

Output multipliers are Y_P / X_P

or total output requirements (direct, indirect and induced) as a ratio of direct project demands.

Income multipliers are Y_h / X_h

or total income generated (direct, indirect and induced) as a ratio of direct project wage costs.

Caveats in interpreting the I-O multiplier results
Notwithstanding their simplicity, transparency and widespread use, I-O multipliers have significant limitations that need to be borne in mind when assessing results of the type described in this annex. In particular:

- The existing input structure might not accurately reflect incremental inputs necessary to meet the project demands. Input technologies might change, or changes in relative prices may also lead to substitutions between inputs.

- There may be supply constraints in some domestic sectors or in the availability of certain kinds of labour. If so, then the multiplier effects obtained will be overestimates.

While Type 2 multipliers may be considered a good first approximation, the secondary and economy-wide effects are likely to be much more extensive and complex. Attempts to establish a better approximation have led some modellers to develop much more sophisticated models (such as computable general equilibrium (CGE) models) that embrace more behavioural responses and market behaviour. These models are not necessarily any better; they do require more data, invoke many assumptions and are certainly less transparent. In some respects, the I-O model can be considered as a particular variant of a CGE model. That is, it is a "limiting case", reflecting a particular set of macroeconomic and microeconomic "closures". It is not, therefore, a substantially different kind of model (Robinson 1989).

If either of the I-O assumptions are not valid, then the Type 2 results may overestimate the economy-wide responses. On the other hand, the fact that only limited endogenous behaviour is incorporated in the I-O model means that the model is likely to underestimate the total impact of the project. So, the net conclusion is that the I-O (Type 2) model may well deliver a first approximation to the total direct, indirect and induced effects of the project.

Annex I
Note on the concentrate export tax and the variable profit tax

Some of the taxes levied under the Zambian mining tax regime appear to have been introduced without due consideration for the consequences either for the commercial viability of the mines or the impact on government tax revenue. This is the case in particular for the export tax on copper concentrates and the variable profit tax.

Export tax on concentrates

At 10 per cent of the sales value, the export tax on concentrates amounts to about US$700 per metric tonne of contained copper at present prices. The cost of smelting concentrate in Zambia is US$70–75 per metric tonne of concentrate, while the cost of transporting the concentrate from the mine to an overseas smelter is about US$200 per metric tonne depending on the route taken. Table 31 shows the net revenue accruing to the miner in three cases (note that the smelting charge is deducted from the sales price if concentrate is exported):

• exporting concentrate without the export tax

• exporting concentrate with the tax

• smelting the concentrate in Zambia and exporting blister.

As seen from Table 31, it is to the miner's advantage to process the copper even in the absence of the export tax, simply because the cost of transporting concentrate is more than three times as high as that of transporting blister copper. The smelting charge has to be paid in any case and it does not matter to the miner if it is paid to a smelter in Zambia or overseas. If the mine is vertically integrated and has its own smelter, the smelting charge is represented by the costs of smelting, which, given very low margins in copper smelting, are equivalent to the smelting charge.[141]

It can be concluded that no mining company would plan to export concentrate if it is at all possible to smelt it. Consequently, the export tax is not needed to influence mining companies' behaviour in this regard. However, the tax serves as a deterrent to investors who for one reason or another are not in a position to smelt concentrates. This could happen, for instance, if a mine is too small to justify the construction of a smelter and there is no spare capacity in existing smelters. At present, it appears that the capacity of Zambian smelters is fully utilized. If a mine produces concentrate that for mineralogical reasons cannot be smelted in existing smelters, the mining company would also be obliged to export concentrates. This could be the case, for instance, if the concentrate contains impurities such as arsenic that are difficult to handle in most smelters. At present, most such mining projects will not be economically feasible in Zambia. This represents a loss of potential production, which could be easily avoided by abolishing the tax, which in any case does not influence companies' decision making in the way intended.

It may be asked if the conclusions would hold if circumstances, particularly the level of the smelting charge, were to change. Such changes are of course always possible, but smelting charges have trended downwards for a long time due to persistent overcapacity at the smelting stage. There are two structural reasons for the tendency towards overcapacity. First, when a mine is eventually depleted, the smelter that may have been built to process its ore can usually be kept in operation and cover its running costs since the capital investment will have been paid back. There exists several such smelters in the world. Second, several governments have introduced legislation similar to the Zambian export taxes, leading to overinvestment in smelting capacity and downward pressure on smelting charges. Finally, although the possibility of a return to higher smelter charges sometime in the future cannot be excluded, it would probably only take place in a context of a massive increase in demand caused by a world economic upturn, in which case transport costs would be likely to rise as well, offsetting the effect of an increase in smelter charges.

Table 31: Net revenues from exporting copper concentrate or blister copper, US$/metric tonne contained copper[140]

	Exporting copper concentrate without tax US$/metric tonne	Exporting copper concentrate with tax US$/metric tonne	Smelting copper concentrate in Zambia and exporting blister copperCopper US$/metric tonne
Copper price	6,767	6,767	7,000
Smelting charges			233
Transport cost	667	667	200
Export tax		700	
Net revenue	6,100	5,400	6,567

Source: Company data and OPM's calculations.

140 The smelting charge is assumed to be US$70 per metric tonne of concentrate and the concentrate is assumed to hold 30 per cent copper.

141 It could be noted that since fuel and depreciation of capital equipment, both of which are almost exclusively imported in Zambia, constitute the main cost elements in copper smelting, the impact of the tax on domestic value added may very well be negative in some cases.

Recently, the government has proposed to introduce an export duty on "semi-processed metals and base metals" at the rate of 10 per cent.[142] The Chamber of Mines interprets this to mean that exports of blister copper will be taxed. The reasoning behind the tax is very difficult to understand. Copper producers normally refine blister copper and if they do not do so, it is for a good commercial reason. Since copper refining is a very energy-demanding process, the cost and availability of power is crucial to the investment decision. The high cost and unreliability of power supplies in Zambia would weigh heavily on such a decision by the only copper producer that does not at present refine its smelted copper. Accordingly, the tax jeopardizes the viability of that company, which would be faced with two alternatives: trying to export blister copper with revenues reduced by 10 per cent, or undertaking a very risky investment that could undermine the company's viability. The reasons advanced for the new tax – "this measure is intended to encourage local value addition and create employment"[143] – do not stand up to scrutiny, since first, copper refining is an extremely capital-intensive operation that generates very little employment and second, the extra product value is limited, less than US$200 per metric tonne. Since most of it is accounted for by electricity and capital equipment, the actual value added is minimal and in any case, electricity is in short supply in the country and could probably be used more productively elsewhere.

Variable profit tax

The variable profit tax is levied when the margin, expressed as sales over total costs (or possibly operating costs, it is not clear from the information available), exceeds a certain trigger value (currently 8 per cent). Thus, it could be seen as a type of excess profit tax. However, of the few countries that have introduced any kind of excess profits tax, most have preferred a classical resource rent tax, which does not change incentives or influence the allocation of capital. A resource rent tax is usually levied on the rent, defined as the excess of revenue over necessary compensation to production factors (capital and labour). It enters into operation once the capital invested has been paid back with a threshold rate of return. The threshold rate can be set at different levels. One way of establishing the rate is to link it to the government's long-term borrowing rate, which usually can be assumed to incorporate country risk. Since the variable profit tax is at present levied without any reference to return on capital, it tends to discriminate against capital-intensive projects. Since in any case it generates little or no revenue, it is difficult to see what purpose is served by retaining a potentially distortive tax.

142 Zambia Revenue Authority 2014, point 3.2.3.

143 Ibid.

Annex J
WGI performance

Figure 54 presents Zambia's performance on the World Bank's WGI, in comparison with a group of regional comparator countries.

Figure 54: Zambia rankings on WGI (2011 ranking in brackets, change in ranking over last 10 years on *x* axis)

Voice and Accountability
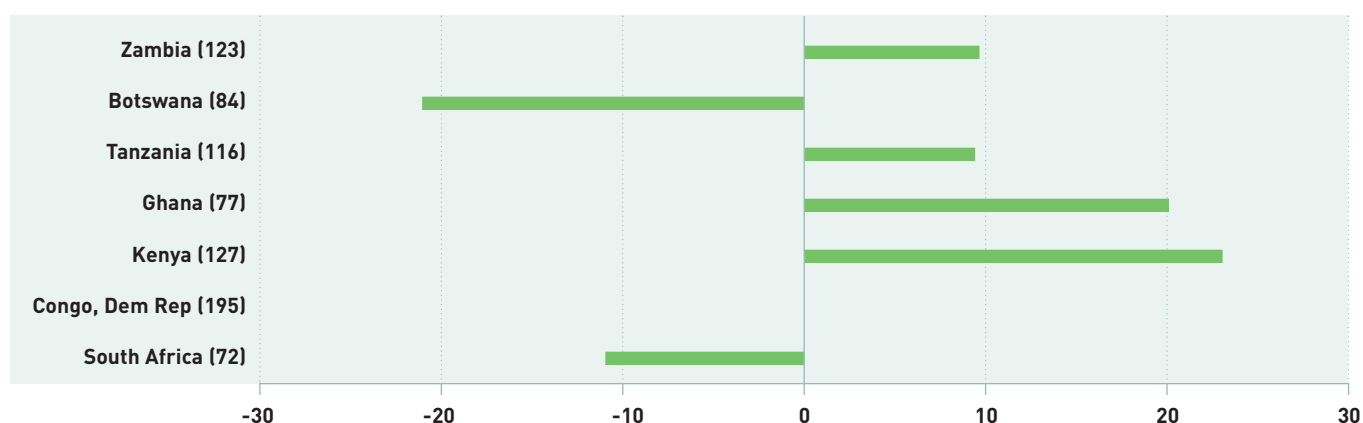
Source: World Bank WGI (2013).

Political Stability and Absence of Violence

Source: World Bank WGI (2013).

Figure 54: Zambia rankings on WGI (2011 ranking in brackets, change in ranking over last 10 years on *x* axis) *continued*

Government Effectivness
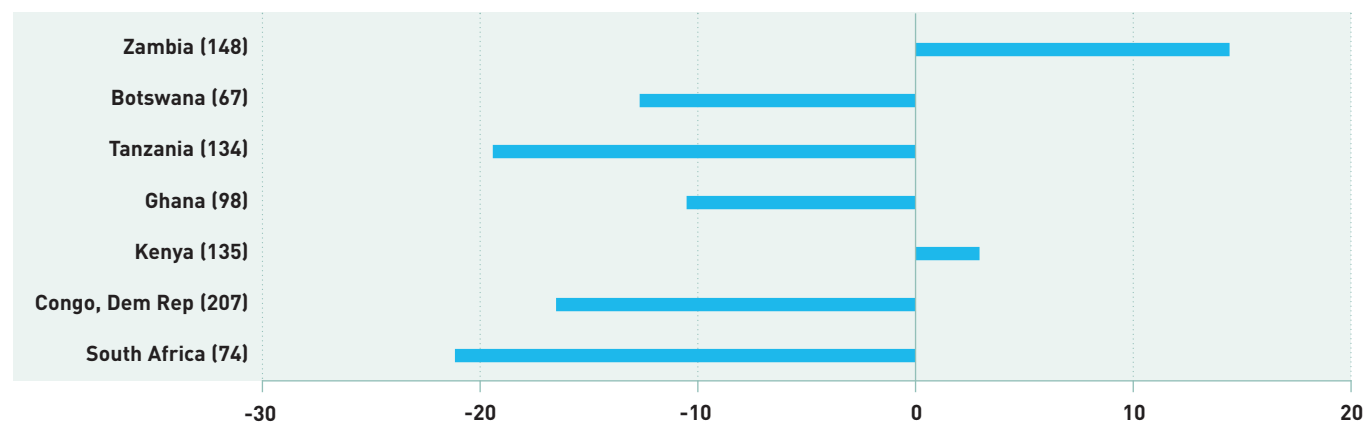
Source: World Bank WGI (2013).

Regulatory Quality
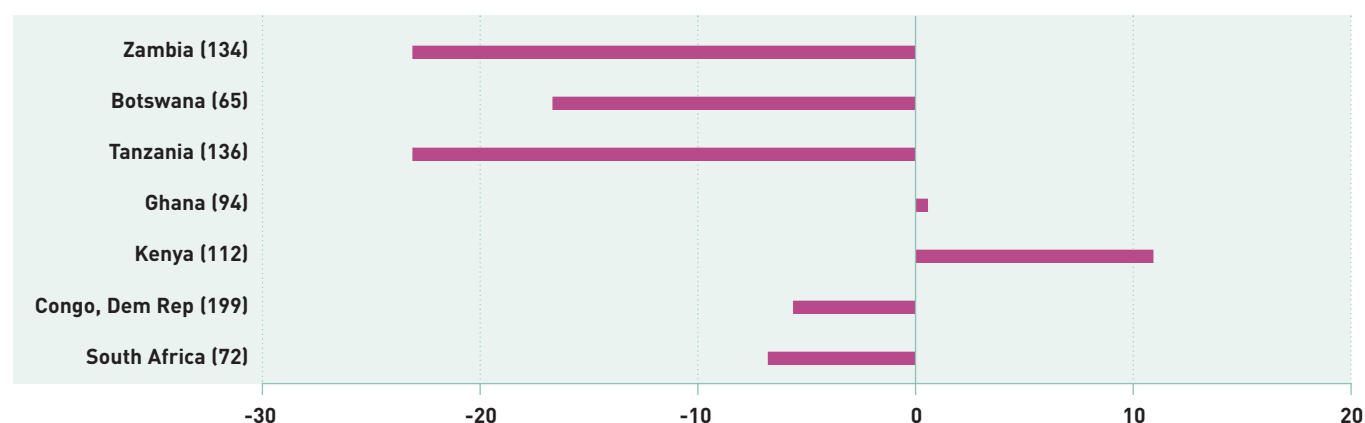
Source: World Bank WGI (2013).

Rule of Law
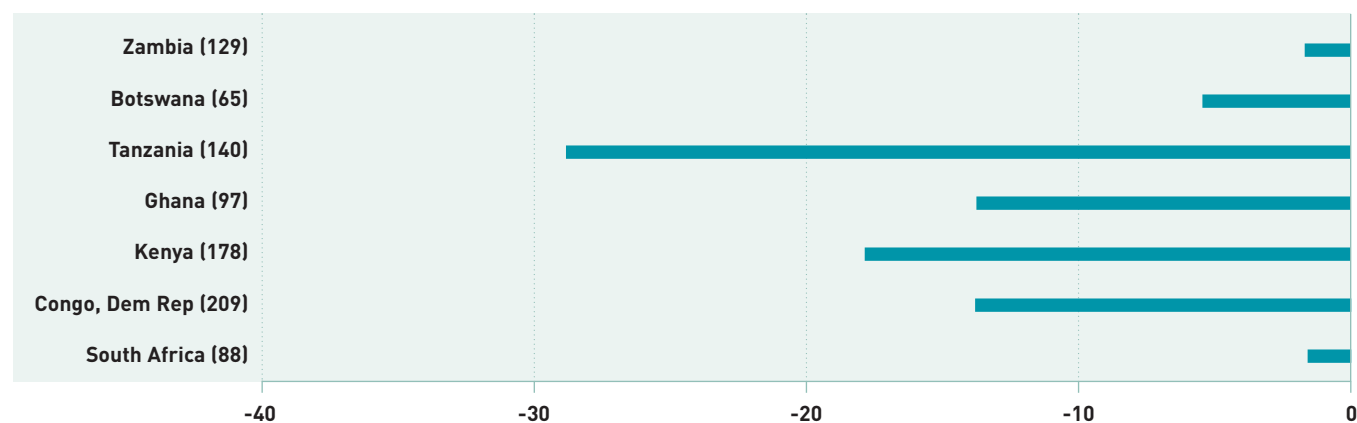
Source: World Bank WGI (2013).

Figure 54: Zambia rankings on WGI (2011 ranking in brackets, change in ranking over last 10 years on *x* axis) *continued*

Control of Corruption

Source: World Bank WGI (2013).

Acknowledgements

ICMM

The International Council on Mining and Metals (ICMM) was established in 2001 to improve sustainable development performance in the mining and metals industry. Today, it brings together many of the world's largest mining and metals companies as well as national and regional mining associations and global commodity associations. Our vision is one of leading companies working together and with others to strengthen the contribution of mining, minerals and metals to sustainable development.