ZAMBIA

Country Economic Memorandum

UNLOCKING PRODUCTIVITY AND ECONOMIC TRANSFORMATION FOR BETTER JOBS

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This report was prepared by a team led by Albert Pijuan Sala (Senior Economist), Jorge Tudela Pye (Economist), and Paavo Eliste (Practice Manager). The team included Philip Schuler (Lead Economist), Joseph Simumba (Economist), Maria Gabriela Farfan (Senior Economist), Lyliana Gayoso (Consultant), Vanina Forget (Senior Agriculture Economist), Auckland N. Kuteya (Consultant), Brian Mulenga (Consultant), Ryan Kuo (Economist), Sophia Muradyan (Senior Private Sector Specialist), Soujanya Choda varapu (Senior Private Sector Specialist), and Namuchana Muyawa (Program Assistant). Chapter 3 of the CEM draws from a research collaboration with the Zambia Revenue Authority (ZRA). Fiona Hinchcliffe provided editorial support and Katarina Zeravica designed the report. The report was prepared under the overall guidance of Nathan M. Belete (Country Director, AECE1), Achim Fock (Country Manager, AEMZM), Abha Prasad (Practice Manager, EAEM1), Aghassi Mkrtchyan (Program Leader and Lead Economist, AECE1), and William Battaile (former Program Leader and Lead Country Economist, AECE1). The team would also like to acknowledge the comments from peer reviewers and colleagues Allen Dennis, Alex Sienaert, Dino Merotto, Ekaterina Vostroknutova, Hanane Ahmed, John Keyser, Nicolo Dalvit, Fausto Patino Pena, Isaku Endo, Ahmed Rostom, Andreas Eberhard, Shaun Mann, and Mohammad Farid Al Azim Bin Noruzi. The team also gratefully acknowledges the collaboration with the Government of the Republic of Zambia and development partners.

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ACRONYMS

AfCFTA	Africa Continental Free Trade Area
CEM	Country Economic Memorandum
CIT	Corporate income tax
DIS	Direct Input Support
DRC	Domestic resource cost (ratios)
DRC	Democratic Republic of Congo
ERB	Energy Regulation Board
FDI	Foreign direct investment
FISP	Farmer Input Subsidy Program
FRA	Food Reserve Agency
FTE	Full-time equivalent
GDP	Gross domestic product
GRZ	Government of the Republic of Zambia
Ha	Hectare
ICT	Information and communications technology
ILO	International Labour Organization
IPP	Independent power producer
LCMS	Living Conditions Monitoring Survey
LCU	Local Currency Units
LFC	Large commercial farm
LIC	Low-income country
LMIC	Lower-middle-income country
LP	Labor productivity
Mt	Million tons
NBFI	Non-bank financial institutions
PAYE	Pay as you earn
PPP	Purchasing power parity
SEZ	Special Economic Zone
SGR	Strategic Grain Reserve
SME	Small and medium-sized enterprise
SSA	Sub-Saharan Africa
TFP	Total factor productivity
UMIC	Upper-middle-income country
WDI	World Development Indicators
ZDA	Zambia Development Agency
ZMK	Zambian kwacha
ZRA	Zambia Revenue Authority

EXECUTIVE SUMMARY

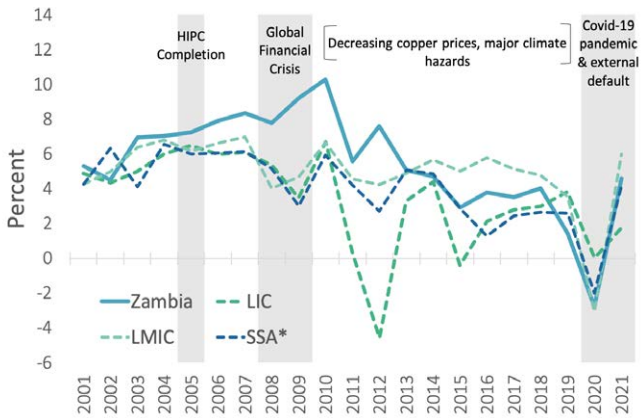
Zambia needs to increase productivity and accelerate economic transformation to achieve sustained and inclusive growth.

Zambia's debt resolution and ongoing reforms are expected to support macroeconomic stability and reignite private-sector investment. By October 2023, the Government of the Republic of Zambia (GRZ) reached an agreement with the Official Creditor's Committee (OCC) on debt restructuring under the G20 Common Framework and, by late March 2024, it was announced that a deal was reached with bondholders. As of the end of the first quarter of 2024, the Zambian authorities are in the final phase of debt negotiations involving the other private lenders. Since 2021, the GRZ has launched an ambitious reform program. It saw the primary balance improve by 6.6 percentage points in 2022, bringing it to a surplus and cutting inflation by half. The authorities have introduced measures to boost private investment and have rebalanced the composition of government spending.

But while the economy is recovering, structural issues persist; growth is neither sustained nor inclusive, failing to significantly reduce poverty or create enough good jobs. After experiencing a remarkable growth acceleration during the 2000s, Zambia's growth has waned. Short-lived growth drivers and a limited poverty response to economic growth challenge Zambia's prospects for achieving long-term inclusive growth. Between 1996 and 2015, a period which saw much of the growth, the number of poor increased by more than 2.5 million, with the rural population accounting for more than 95 percent of all new poor. By 2022, 60 percent (around 11.7 million) of the population were living below the poverty line. Most workers in Zambia are employed in subsistence agriculture and the informal services sector, where wages are low.

Zambia's remarkable GDP growth rates during the 2000s have not been sustained

Real GDP growth, Zambia, and selected country groups, 2001-2021



Source: World Development Indicators (WDI), World Bank. Note: HIPC = Heavily Indebted Poor Countries (HIPC) Initiative; LIC = low-income countries; LMIC = lower-middle-income countries; SSA = Sub-Saharan African countries (excluding high-income countries)

This Country Economic Memorandum (CEM) discusses two pathways that can support Zambia's productivity-enhancing economic transformation, generate better jobs, and deliver sustained and inclusive growth. Economies transform when more people join the labor force and find jobs, become more productive in them, or reallocate to more productive jobs. These factors cause average labor productivity to rise with labor incomes. But in Zambia, productivity has been on a declining trend, and only the capital-intensive mining sector has seen significant labor productivity increases.[1] Raising the productivity of agriculture is the first pathway for tackling Zambia's development challenges (Chapter 2). It has enormous potential to drive poverty reduction, but expensive and distortive support programs, coupled with increasing climate hazards, constrain productivity growth and dampen opportunities to diversify beyond maize. The second pathway involves Zambia making critical economy-wide reforms to unlock broad-based private sector productivity growth and increase its role in driving jobs and economic transformation (Chapter 3). Two background papers that take deep dives into these two themes are published alongside this report.

Following the World Bank CEM 2.0 analytical framework (World Bank, 2019d) and in close dialogue with the Zambian authorities, this CEM focuses on these two growth pathways, and complements other World Bank analytics and advisory products. The development of this report has involved close collaboration and engagement with the GRZ and multiple stakeholders right from the start.[2] This work complements other World Bank products, supporting the broader country program and dialogue. The forthcoming Zambia Public Expenditure Review (World Bank, 2024a) digs more deeply into the overall macro-fiscal framework and identifies ways to improve the country's fiscal space and increase the efficiency and effectiveness of public spending. The World Bank is also preparing a study to leverage the potential of Zambia's green minerals for economic growth and poverty reduction. In addition, the upcoming Country Private Sector Diagnostic delves into private sector opportunities in agribusiness, mining, renewable energy, tourism, and transport and logistics. The CEM also complements previous works and publications, including the Zambia Jobs Diagnostic (2017), the Systematic Country Diagnostic (2018), and the Zambia Urbanization Review (2022), among others.

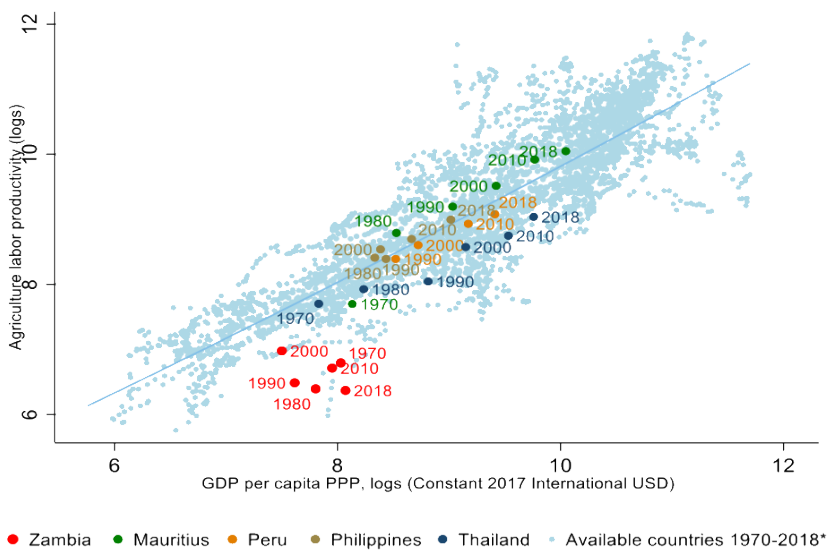
[1] Additional growth pathways and associated reforms are explored in complementary reports.
[2] The country team engaged in stakeholder consultations and presented the country scan to Zambian authorities in Lusaka in November 2022.

Zambian agriculture: high potential to drive poverty reduction and create better jobs

A poverty-reducing growth path for Zambia involves raising productivity in agriculture, which employs most Zambians but is severely exposed to climate change. Zambia has the natural capital for its agricultural sector to become an engine of economic growth and poverty alleviation. Yet the country's agricultural productivity is well below potential and on a downward trend. Most farmers in Zambia are smallholders, depend on maize and rainfall, and are seeing crop yields decline. Labor productivity in the sector has fallen by almost 50 percent over the last 20 years. Around 80 percent of the poor live in rural areas and rely primarily on farming, livestock, and other agricultural work; close to 60 percent of working Zambians are employed in agriculture. As most of the population depends on agriculture as a primary source of income, low productivity in the sector will inadvertently result in low aggregate incomes, limiting people's ability to break free from poverty. Inefficient and distortive public policies for the sector, increasing climate hazards and resource degradation, and limited diversification are hampering the sector's growth. Moreover, the evolution in food supply is not keeping up with the nutrition needs of the country's expanding population and changing consumption patterns.

Unlike Zambia, growth in most aspirational peer countries was accompanied by increases in labor productivity (value-added per worker)

Agriculture value-added per worker and GDP per capita PPP, Zambia and aspirational peers[3] (1970 – 2018)



Source: Authors' calculations based on Jobs Group, from GGDC/UNU-WIDER Economic Transformation Database (https://www.wider.unu.edu/database/etd-economic-transformation-database) and WBG Productivity Database (https://www.worldbank.org/en/research/publication/global-productivity)

[3] Zambia's structural and aspirational peers were selected through a data-led approach using World Bank available tools and conversations with the authorities. Structural peers include Angola, Botswana, Tanzania, and Zimbabwe, while aspirational peers include Mauritius, the Philippines, Peru, and Thailand.

This CEM makes the following recommendations for harnessing the potential embodied in Zambia's agricultural sector:

Reform the Farmer Input Subsidy Program (FISP) and Food Reserve Agency (FRA) to free up fiscal space for productive investments and to support diversification efforts. Analysis for this report confirms that supporting maize production through the FISP and FRA is the least socially efficient option for Zambia. The average smallholder who solely produces maize earns below the poverty threshold of US$2.15/day, even when supported by the FISP and FRA. Redirecting public spending on FISP and FRA to instead support productive investments in infrastructure, capacity building, innovation, and climate change adaptation is vital to reduce poverty and generate inclusive sectoral growth.

Invest in climate change adaptation and halt the degradation of environmental resources, starting with the soil. Agronomic solutions already identified by the GRZ need to be implemented rapidly and at scale. These include crop diversification, improved soil fertility management, liming, and agroforestry. Investing in resource-efficient irrigation is also paramount for adapting to climate change. Large commercial farms make about eight times higher profits during peak season when they irrigate their fields than farms which rely on rainfed production. Public-private partnerships could be used to cooperate with farming communities to invest in irrigation and to establish well-defined water user rights and fees. In addition, there is a need to continue to promote water-conserving tillage practices such as minimum tillage, cover crops, and residue retention to reduce water stress during dry periods.

Remove trade barriers and facilitate trade to increase the potential for agribusiness and commercial agriculture to grow. Zambia still suffers from multiple trade barriers including restrictions on the size of trucks that can transport maize, and export permits that expire after 30 days. Unexpected transport or administrative delays significantly increase business costs and decrease the competitiveness of Zambia's agricultural exports. In addition, building resilient, diversified, and productive farm production systems requires farm mechanization, transport infrastructure, and storage and processing facilities to access domestic and regional markets. Road and rail infrastructure is critical to connect high-potential farm regions to markets and to allow people and goods to circulate cost-effectively. Such investments would benefit traders, processors, and consumers as well as farmers.

Ensure a supportive business environment, including extension services, and build human capital to harness the potential of private sector-led agricultural growth, particularly for higher value-added crops, livestock, and aquaculture. The formal agricultural sector in Zambia has been seeing increasing productivity growth (Chapter 3). Supporting an enabling environment that catalyzes further private sector investment will be critical, particularly when production from high value-added crops, livestock, and aquaculture is growing. This will require enhancing education and training in modern technologies and practices for profitable and sustainable operations, access to finance and insurance, plant health protection and veterinary services, and early warning system – all of which are innovation-intensive. Building human capital, including knowledge and skills in modern and adaptive production practices, agri-entrepreneurship, and the capacity to innovate, will all help boost productivity in the sector.

New and growing private firms: the key to more and better jobs

Zambia needs to create over 10 million new jobs by 2050 to keep its labor force participation and employment rates from declining. Zambia's private sector must deliver quality jobs at scale to keep up with the expanding working-age population, contribute to economic transformation, and reduce poverty. Low-productivity informal employment accounts for three-quarters of jobs in Zambia (Zambia MLSS, 2022). Zambia's lower-productivity sectors, such as agriculture, account for the bulk of jobs, while high-productivity sectors tend to generate few jobs. Formal firms constitute a growing—but small—share of Zambia's economy and have big potential to offer more jobs and pay higher wages.[4]

This CEM explores the dynamics of formal firms and formal workers in Zambia to identify the drivers and barriers to firms' productivity and jobs growth. This CEM makes the following recommendations for empowering the private sector to increase productivity and boost high-quality employment:

Increase firms' access to finance. The financial sector needs to develop innovative and tailored financial products that meet firms' needs and offer them alternative funding sources. Financial infrastructure such as payment systems, credit reporting, and collateral registry systems need to be further used. This will necessitate enabling data usage within robust data governance and consumer protection frameworks. Scaling up and refining credit guarantee schemes for bank loans to small and medium enterprises (SMEs) would help reducing risks and correct market failures related to information asymmetries in credit risk assessment. Lenders could be encouraged to consider non-traditional forms of collateral, including movable assets, to target small firms. Accelerating the dismantling of arrears (e.g., FISP arrears and VAT refunds) would release much-needed liquidity. Alternative sources of private sector capital, such as venture capital and crowdfunding, can be explored, while the potential of leveraging digital technologies to reduce costs and expand formal financial sector outreach could be more fully exploited.

Boost firms' technology adoption, capabilities, and skills. GRZ should continue connecting local firms to value chains by linking them to lead firms, local affiliates of multinational enterprises, and special economic zones. Doing so would improve market access, facilitate technological transfers, and generate alternative sources of capital. GRZ could also prioritize policies to promote greater use of digital technologies, enable digital entrepreneurship, and leverage digital systems. Improving access to public procurement for the Zambian private sector, especially SMEs, can provide them with critical new markets, and help them to scale up their operations and capacity.

Improve the access to and quality of the electricity supply. GRZ should continue electricity reforms to crowd in private sector investment. Returning ZESCO to profitability and improving its creditworthiness are prerequisites for attracting private companies to the sector. Furthermore, Zambia needs to accelerate diversification into non-hydro renewable energy, leveraging its recent 30-year Integrated Resource Plan that, inter alia, charts the investments needed to meet the country's economic development objectives.

[4] For 2021, the CIT dataset covers over 5,000 firms, which collectively account for ZMK 329 billion in sales, and 118 billion in value added, equivalent to 27 percent of GDP.

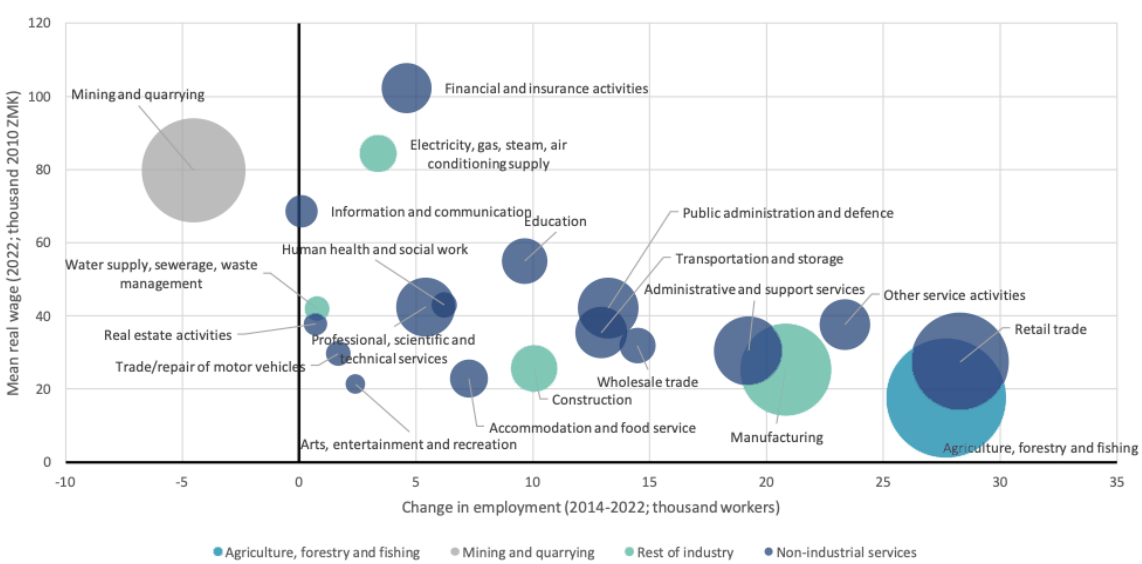
Streamline the regulatory and business environment. Critical short-term reforms include rolling out the e-Registry of business licenses to local authorities to improve the predictability, transparency, and efficiency of government procedures; and introducing risk-based regulation to reduce the burden on lower-risk businesses and scarce government resources by focusing resources on higher-risk firms and topics. These interventions would ease the cost of doing business in Zambia and make it more attractive as an investment destination, while also reducing competitive distortions between formal and informal firms. Other steps include introducing trade facilitation and logistics measures to improve the business environment for trade and improving the business environment for foreign investors.

Support firms to become resilient to climate change. Specific policy measures to promote private sector adaptation include: (i) supporting Zambian businesses to develop bankable projects on climate change adaptation and mitigation, focusing on climate-sensitive sectors such as agriculture, water, and energy; (ii) increasing targeted domestic credit for bankable projects on climate change adaptation and mitigation; and (iii) harnessing impact investment towards the circular economy and in enterprises in the renewable energy and clean-tech sectors.

Build institutional capacity. Greater government implementation capacity is needed for private sector policy and programming to address cross-cutting constraints to productivity and wage growth. The government's information systems could also be expanded with key data for analysis and decision making. In addition, the government could explore new systems to improve data collection and processing and establish a centralized data bank for access by diverse government and external stakeholders.

Most new formal jobs are in the lowest-paying sectors, while higher-paying sectors create few new jobs

Change in formal employment, mean real wage, and total formal employment, 2014-2022



Source: World Bank and ZRA staff analysis based on PAYE database
Note: Bubble size corresponds to 2022 formal employment by ISIC 1-digit subsector, ISIC; International Standard Industry Classification

MAIN POLICY RECOMMENDATIONS

Unleashing agricultural productivity

Policy Problem	Short-Term Actions	Medium-Term Actions
Inefficient and ineffective agricultural support programs prevent productivity growth, hinder crop diversification, and discourage much-needed productivity-enhancing investment	Reallocate FISP and FRA expenditures towards productive investment in infrastructure (e.g., transport, storage, processing), capacity building, innovation, climate change adaptation, irrigation, crop diversification, extension services, and plant health protection and veterinary services	
	Improve the targeting of FISP to avoid "ghost" beneficiaries	Limit the role of FRA to that of a strategic food reserve (with a 300 kMt ceiling)
	Accelerate the switch of FISP to the e-voucher system	
Multiple trade barriers increase the cost of doing business, crowd out private actors, and decrease the competitiveness of Zambian agricultural exports	Maintain an open trade regime for agricultural commodities	Improve market information by developing an independent agricultural information system
	Facilitate trade by alleviating technical barriers and roadblocks, such as extending export permits	Improve predictability and transparency surrounding agricultural trade disruptions
Overreliance on rainfed production by smallholder farmers exposes the sector to climate variability	Incentivize water harvesting and low-cost, energy and water-saving technologies for water use and management	Develop public-private partnerships models to cooperate with farming communities to invest in irrigation with well-defined water user rights and fees
Inappropriate fertilizer use is causing severe soil degradation	Accelerate farmers' access to a wider range of fertilizers and soil-supplements (lime) and soil testing	Support a more holistic approach to soil health, as well as sustainable and diversified agricultural production
Lack of extension services and adequate skills are holding back better jobs in the agri-food system and the formal agricultural sector	Increase support and spending on research, innovation, training, and capacity building	Accelerate the digitalization of agricultural services in Zambia (extension services, market information, access to finance)

Raising the productivity of firms and workers

Policy Problem	Short-Term Actions	Medium-Term Actions
Macroeconomic imbalances caused by weak fiscal discipline and excessive borrowing affect the business environment[5]	Raise capital spending efficiency, improve the allocation of public resources, strengthen budgetary and public sector institutions (including SOEs), and boost fiscal revenues	
Lack of access to finance for the private sector due to crowding out by government borrowing, low risk tolerance of financial intermediaries, and bank-centric financial system	Accelerate dismantling of government arrears	Collaborate with financial institutions and intermediaries to develop new products (including fintech solutions) responding to the financing needs of the private sector (e.g., moveable collateral, crowdfunding)
	Scale up and refine credit guarantee schemes for bank loans to SMEs	
	Identify and address gaps in financial infrastructure (e.g., via improvements in the credit information system)	
Inadequate technology adoption, capabilities, and skills at the firm level	Facilitate development of domestic and international market linkages through targeted technical and financial support	Strengthen capacity to protect consumers' data, and promote digital infrastructure
	Implement programs to promote firm-level uptake of digital solutions (e.g., digital sandboxes)	Modernize identification system to promote use of digital ID
	Enable digital entrepreneurship through regulatory sandboxes and startup ecosystem support	Reform education and training system to emphasize digital skills
		Tailor public procurement processes (e.g., forms) to SME needs and capabilities

[5]An in-depth analysis and policies to strengthen the country's macro-fiscal framework is being prepared alongside this report (World Bank, 2024a. Zambia Public Expenditure Review).

Policy Problem	Short-Term Actions	Medium-Term Actions
Poor access to and quality of electricity supply	Implement dedicated regulation for system planning	Strengthen Energy Regulation Board budgetary and human resources
	Develop and communicate specific investment plans to the private sector	Accelerate investment in non-hydro renewables
	Strengthen open access regulations	
	Gradually adopt cost-reflecting tariff while targeting support for vulnerable households	
Burdensome legal and regulatory environment for formal firms and distortions vis-à-vis informal sector	Roll out e-Registry of licenses to local authorities	Adopt risk-based regulatory approaches
	Improve trade facilitation and logistics (e.g., product standards harmonization and awareness-building), with special focus on AfCFTA	Build government institutional capacity to implement, monitor, and evaluate business regulatory reform processes
	Strengthen ZDA and GRZ capacity in end-to-end investment promotion and investment agreements (including AfCFTA); streamline foreign investment processes	
Economic volatility due to climate change impacts, including floods and droughts	Strengthen and clarify national strategic framework for climate change adaptation and mitigation	Collaborate with investors (including impact investors) and financial sector to develop green financing products (including blended finance)
	Provide technical support to businesses for developing bankable projects centered on climate change adaptation/mitigation	

CHAPTER 1

REFOCUSING ZAMBIA'S GROWTH MODEL[6]

1.1 INTRODUCTION

Zambia recorded remarkable economic growth rates during the 2000s, which translated into significant increases in income per capita. From independence in 1964 until the end of the 1990s, Zambia's growth performance was marked by continuous shocks and policy changes that brought only modest achievements and economic volatility (World Bank, 2004). However, between 2001 and 2010, Zambia experienced a remarkable growth acceleration, mostly driven by the mining sector. Real gross domestic product (GDP) grew at an average rate of 7.7 percent per year, surpassing most of its peers and country group averages (Figure 1).[7] In 2005, Zambia reached the completion point under the Heavily Indebted Poor Countries (HIPC) Initiative, triggering over US$3.9 billion in debt relief and further supporting the decade's robust growth (IMF, 2005). In 1994, Zambia's GDP per capita was only 64 percent of its level at independence (US$1,211); in 2011 it surpassed it, reaching US$1,223 (constant 2015 US$).

[6] This chapter was led by Jorge Tudela Pye with contributions from Maria Gabriela Farfan, Lyliana Gayoso, Albert Pijuan, Philip Schuler, and Joseph Simumba.

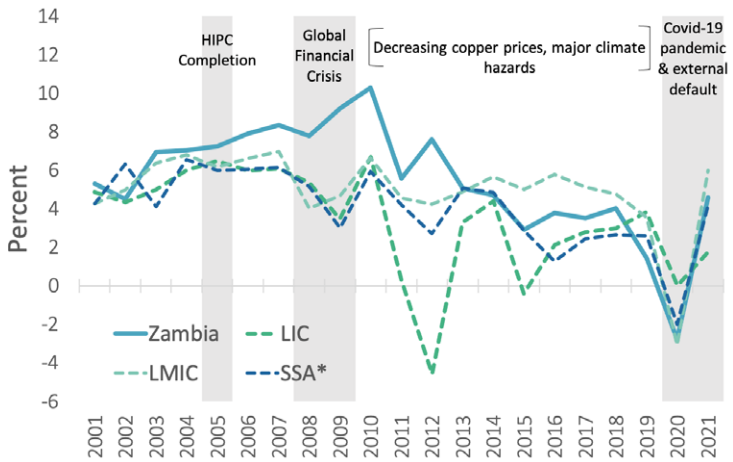
[7] Structural and aspirational peers were selected through a data-led approach using World Bank available tools and conversations with the authorities. Structural peers include Angola, Botswana, Tanzania, and Zimbabwe, while aspirational peers include Mauritius, the Philippines, Peru, and Thailand.

However, the economy was not resilient, and growth could not be sustained, leading it to backslide during the 2010s. Between 2011 and 2019, before the COVID-19 pandemic, real GDP growth slowed to 4.1 percent per year and to 0.9 percent in per capita terms.[8] A combination of domestic and external shocks – including climate, and severe fiscal and external imbalances – continuously hindered Zambia's growth prospects throughout the decade. Although the economy maintained positive per capita growth until 2014, growth had already weakened. In 2015, GDP per capita fell by 0.3 percent, the first contraction since 1998. The country experienced one of the most severe setbacks in GDP per capita growth compared to the previous decade. With the exception of Angola, Zambia's average per capita growth was the lowest of its peers and below the lower middle-income country (LMIC) average (Figure 2).

The COVID-19 pandemic hit an economy that was already struggling, triggering a recession and leading to the external debt default in 2020. A decade of unsustainable macroeconomic policies and falling copper prices caused external debt to jump from 6.7 percent of GDP in 2011 to 66.4 percent in 2019. The global pandemic disrupted economic activity and increased the financial pressure as the Government of the Republic of Zambia (GRZ) worked to contain the spread of the disease and support firms and households. With the economy already facing severe macroeconomic vulnerabilities, Zambia experienced its first recession in 20 years, with real GDP contracting by 2.8 percent (5.6 percent per capita) in 2020. In November that year, Zambia defaulted on its Eurobond payments and suspended servicing most of its external debt. The succession of economic shocks and growth setbacks saw Zambians' living standards deteriorate.[9]

Zambia experienced remarkable GDP growth rates during the 2000s...

Figure 1. Real GDP growth, Zambia and selected country groups, 2001-2021

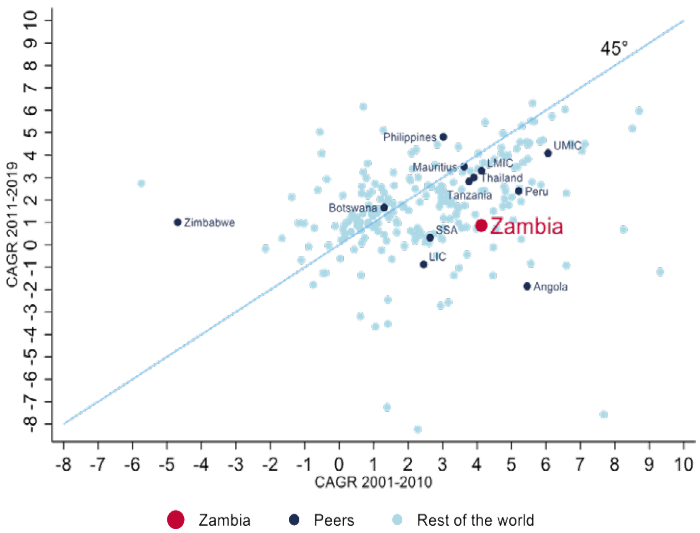


Source: World Development Indicators (WDI), World Bank
Note: HIPC = Heavily Indebted Poor Countries (HIPC) Initiative; LIC = low-income countries; LMIC = lower-middle-income countries; SSA = Sub-Saharan African countries excluding high-income countries

[8] The period of analysis was determined through structural breaks analysis, following Bai & Perron (2003). By using real GDP growth rates for the pre-COVID period (2001-2019), an AR(1) regression structure, and the number of breaks set to one, 2010 was identified as the break year (Figure 1).
[9] Average monthly earnings in 2021 were 24 percent lower than in 2017, 36 percent lower among rural workers and 19 percent lower among urban workers (ZamStats, 2022).

...but the expansion was not sustained

Figure 2. Real GDP per capita growth by decade (2001-2019)



Source: World Development Indicators (WDI), World Bank. CAGR = Compound annual growth rate; LIC = low-income countries; LMIC = lower-middle-income countries; SSA = Sub-Saharan African countries excluding high-income countries; UMIC = upper-middle-income countries

While today the economy is recovering, structural issues persist as growth has not been inclusive, failing to reduce poverty or create enough good jobs. The country's recent debt resolution and ambitious reforms under the current administration are expected to ignite private sector investment and support macroeconomic stability. However, disappointing job creation trends and a limited poverty response to economic growth in the past question Zambia's prospects for achieving sustained and inclusive growth. Between 1996 and 2015, during most of the growth period, the number of poor increased by more than 2.5 million, with the rural population accounting for more than 95 percent of all new poor.[10] Urban households improved their living standards more than their rural peers, but the highest income earners accumulated most of the largest gains, increasing inequality. Poverty rates have risen further since then; by 2022, 60 percent of Zambians were living below the poverty line, up from 54.4 percent in 2015. Most workers in Zambia are employed in subsistence agriculture and the informal services sector, where wages are low.

Zambia must increase productivity and accelerate economic transformation to generate better jobs, and deliver sustained and inclusive growth. The following subsections dissect Zambia's growth and macroeconomic performance over the last 20 years, identifying key drivers and constraints to economic growth. They also discuss the need to raise productivity and accelerate economic transformation to create better jobs.

[10] World Bank estimates using ZamStats. Given comparability constraints between the surveys analyzed, these numbers should be taken as an estimate.

1.2 FROM A MINING BOOM TO FISCAL GLOOM: ZAMBIA'S SHIFTING DRIVERS OF GROWTH

Remarkable economic growth faltered as the commodity boom ended and growth drivers lacked resilience

A robust expansion in mining accelerated economic growth during the 2000s, but it was weighed down by the collapse in copper prices in the following decade. The mining sector expanded by more than five times and contributed to around one-fifth of total value-added growth between 2001 and 2010 (Figure 3). Copper export volumes expanded consistently throughout the decade, even during the global financial crisis, and nearly tripled in size – from 296,838 metric tons in 2001 to 829,750 metric tons in 2010. At the same time, copper prices quadrupled between 2001 and 2007 and supported rising export volumes that peaked in 2014, even after copper prices had already begun to decline. By 2016, prices had fallen by 41.3 percent from their 2011 levels (Figure 4). As a result, between 2011 and 2019, the mining sector contributed less than 5 percent to total value-added growth.

As terms of trade deteriorated and growth rates fell, the drivers of growth shifted, with retail, government-related services, and construction taking a more critical role. Services grew from contributing less than 60 percent of value-added growth between 2001 and 2010 to over 75 percent between 2011 and 2019. Government-related services, including public administration and defense, education, and health, accounted for over one-third of services growth during the 2010s, followed by wholesale and retail trade. Meanwhile, the "rest of industry" sector, which includes manufacturing, construction, and utilities, consistently explained one-fifth of the growth contributions. Construction was the most significant contributor within the industry sector during the 2010s and the third largest contributor across all sectors after services, explaining around 12 percent of total value-added growth.

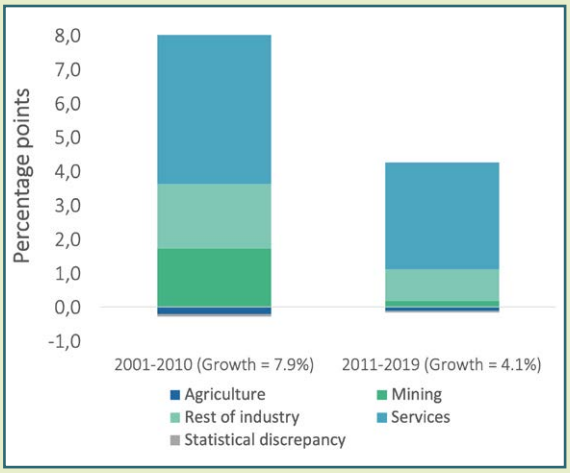
Climate hazards have increasingly affected agriculture, inhibiting growth in the last two decades. Total agricultural value-added declined at an average annual rate of 1.1 percent between 2001 and 2019, dragging down GDP growth. During this period, the frequency and intensity of extreme weather conditions increased, with more frequent floods, rising temperatures, and droughts affecting both crop and livestock production. Sectoral output reflects farmers' reliance on rainfed irrigation and strongly correlates with overall rainfall, showing declining and volatile trends, particularly in the 2010s (Figure 5).[11]

Demand-side contributions to growth confirm structural shifts between decades, from exports and private consumption to investment and government spending. During the 2000s, exports and household consumption accounted for most of GDP expenditure growth (Figure 6). However, the end of the copper boom reconfigured Zambia's growth drivers, with increased contributions from government services and public investment. Household consumption contributions to GDP fell sharply, as did exports, while contributions from government consumption and investment rose substantially. At the same time, imports continued to grow along with investment, fueled by the expansion of the construction and government sectors.

[11] Chapter 2 discusses agricultural production and climate variability in more detail.

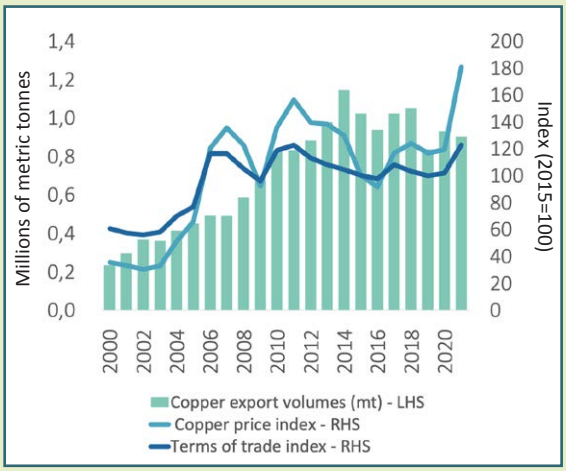
The end of the commodity boom brought a sharp decline in the mining sector's contributions to growth...

Figure 3. Contributions to real value-added growth by major sector



Source: ZamStats, own calculations*

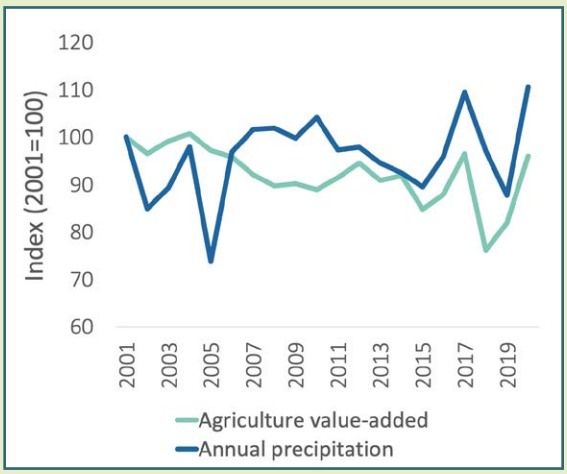
Figure 4. Copper export volumes, copper price index and terms of trade index (2015 = 100)



Source: Bank of Zambia Balance of Payment Statistics. https://www.boz.zm/statistics.htm; and UNCTAD Statistics. https://unctadstat.unctad.org/datacentre/

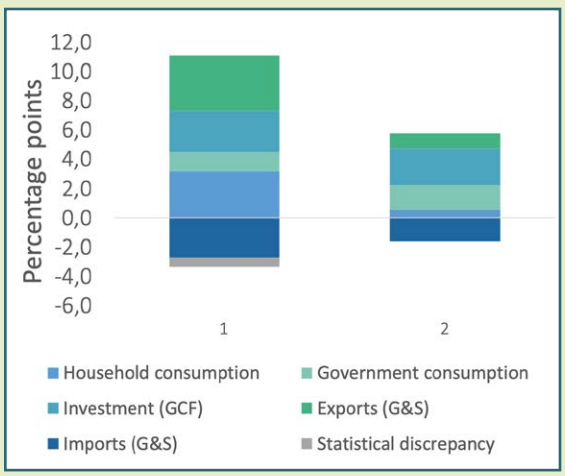
...which led to a shift of growth drivers between decades

Figure 5. Agriculture value-added and annual precipitation index (2001=100)



Source: ZamStats and World Bank

Figure 6. Contributions to real GDP growth by expenditure category and decade



Source: United Nations, National Accounts Statistics, * https://unstats.un.org/unsd/snaama/CountryProfile
GCF = Gross capital formation; G&S = Goods and services

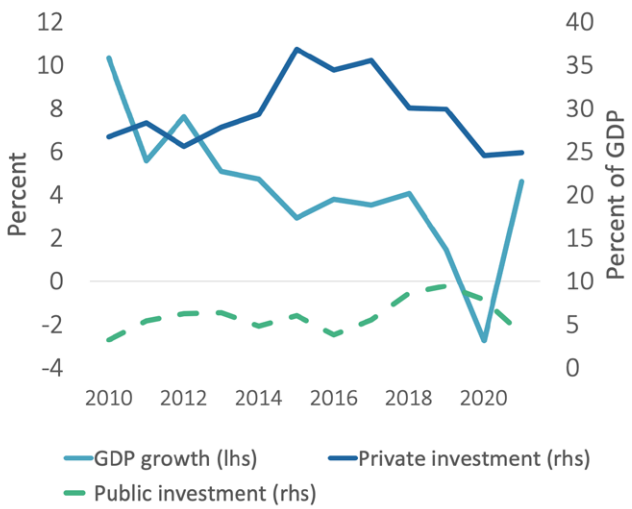
*Note: The decomposition is an approximation and individual growth rates may not add up to the total growth rate. Sectoral and expenditure growth rates are weighted by their average share in total value-added or GDP during the period.

Inefficient public investment and widening fiscal deficits did little to support economic growth, leading to the 2020 external debt default

Investment and public consumption rose rapidly in the 2010s, driven by an ambitious infrastructure development agenda. Zambia set out an ambitious public infrastructure plan to support its efforts to diversify the economy and become a regional transport hub by the end of the 2020s (e.g., in the Seventh National Development Plan, 2017-2021). The country invested in new infrastructure projects in energy, roads, rail, and airports, fueling investment spending and public consumption. While private investment as a share of GDP peaked in 2015 and fell thereafter, public investment as a share of GDP expanded throughout the decade, nearly doubling between 2010 and 2013 and multiplying by over 2.5 times between 2016 and 2019 (Figure 7). Real government consumption growth averaged 12.1 annually between 2011 and 2019.

GDP growth fell despite increased public investment

Figure 7. Real GDP growth (percent), public and private investment (percent of GDP), 2010-2021

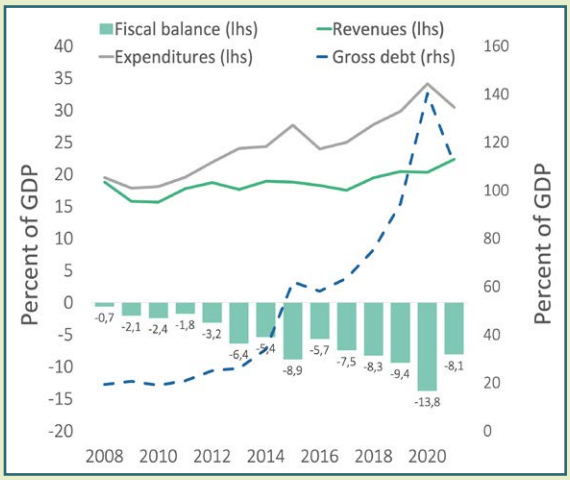


Source: IMF (2023) and World Bank estimates

Rather than deliver economic growth, the public investment boom widened the fiscal deficit and elevated debt burdens. While government revenues remained relatively constant throughout the 2010s (as a share of GDP), expenditures rose rapidly, and the fiscal deficit increased from -1.8 percent of GDP in 2011 to -9.4 percent in 2019 (Figure 8). Capital spending largely contributed to the growing deficit, rising from 3.4 percent of GDP in 2011 to 9.4 percent in 2019 (Figure 9). However, public investment was ineffective at catalyzing economic activity, and the collapse of copper prices, low export volumes, climate hazards, and the high import content of public spending exacerbated the economic slowdown. Weak spending commitment controls opened large gaps between budgeted and fiscal outturns, aggravating fiscal imbalances. As a result, the government's debt burden swelled from 20.8 percent of GDP in 2011 to 94.4 percent in 2019. Increasing interest payments continuously eroded fiscal space (Figure 10), leaving little room for social spending or for containing the effects of increasing climate hazards.

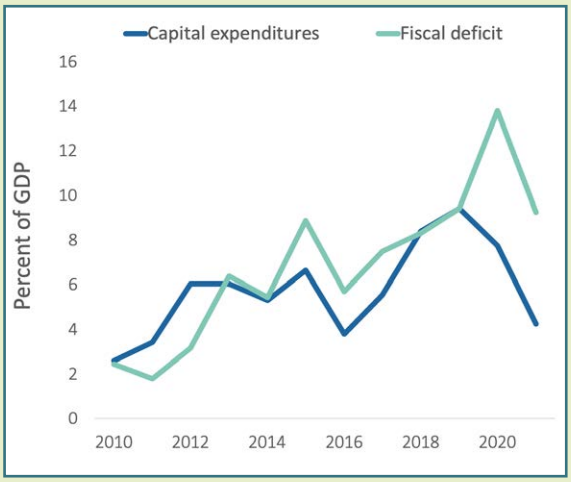
Expansionary fiscal policies to support public investment contributed to growing fiscal deficits and debt accumulation

Figure 8. Government fiscal accounts, 2008-2021



Source: IMF World Economic Outlooks

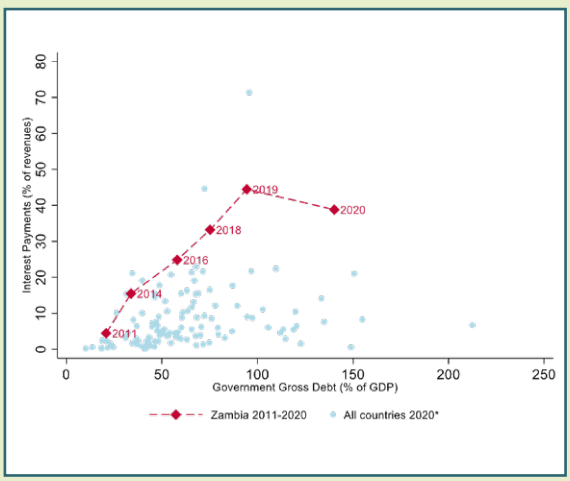
Figure 9. Capital expenditure and fiscal deficit, 2010-2021



Source: World Bank Macro-Fiscal Model (MFMOD) and IMF World Economic Outlooks

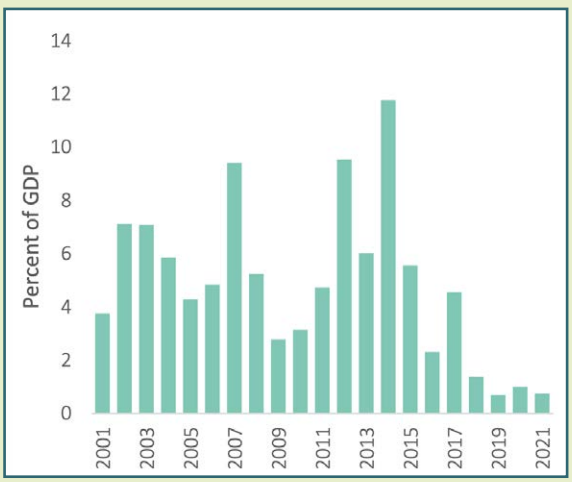
As interest payments and debt burden expanded to unsustainable levels, foreign investment inflows plummeted

Figure 10. Interest payments (% of revenues) and government gross debt (% of GDP), 2020



Source: World Bank World Development Indicators and IMF World Economic Outlooks
Note: Global sample of 110 countries with available data for 2020.

Figure 11. Net foreign direct investment, 2001-2021



Source: Author calculations based on Bank of Zambia (2023a). Balance of Payment Statistics. https://www.boz.zm/statistics.htm

*Note: The decomposition is an approximation and individual growth rates may not add up to the total growth rate. Sectoral and expenditure growth rates are weighted by their average share in total value-added or GDP during the period.

Macroeconomic imbalances mounted as capital inflows weakened during the second half of the 2010s, triggering the 2020 external debt default when the COVID-19 pandemic hit. The collapse of copper prices, increasing non-oil imports for public investment projects, and rising interest payments on public debt also deteriorated Zambia's external accounts, especially from the mid-2010s onwards. Net foreign direct investment (FDI) inflows fell sharply by the end of the 2010s, reaching less than 1 percent of GDP in 2020 (Figure 11). The COVID-19 pandemic severely hit an already struggling economy, and, in November 2020, Zambia defaulted on its Eurobonds, requesting a debt treatment under the G20 Common Framework in early 2021.[12]

1.3 NOTHING NEW UNDER THE SUN: LIMITATIONS OF ZAMBIA'S CURRENT MODEL FOR ACHIEVING SUSTAINED AND INCLUSIVE GROWTH

Zambia's growth drivers could not be sustained as its mining is low value added and highly vulnerable to external shocks, and public investment plummeted when public finances worsened. Favorable terms of trade and the expansion of copper production during the 2000s brought increasing domestic absorption, imports, and capital inflows that supported economic growth. As the copper boom ended, growth drivers shifted, and public investment took a more important role, with only timid effects on economic growth. Beyond metals, Zambia's exports are limited, and there has been little progress in generating additional and more sophisticated products that can maintain growth when commodity prices are unfavorable (Figure 12 and Figure 13). Excessive spending and borrowing, and weak public financial management practices, generated fiscal and external imbalances that proved unsustainable, leading to the external debt default.

While copper exports supported economic growth, Zambia's export basket remains limited, with little progress to diversify into more sophisticated products

Figure 12. Export basket composition by HS1 subcategory, 2001-2019

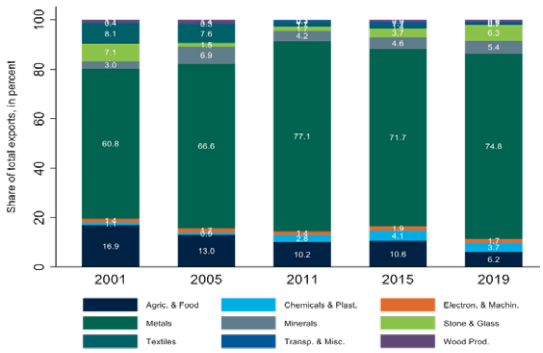
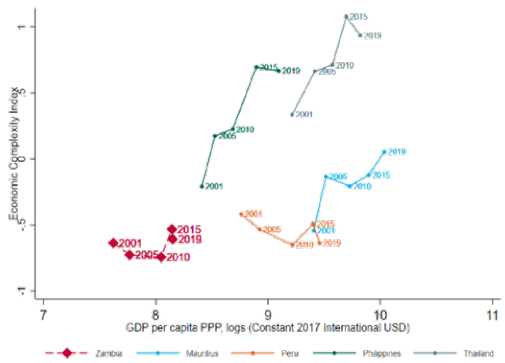


Figure 13. Economic complexity index and GDP per capita PPP, Zambia and peers, 2001-2019



Source: Authors' calculations based on Harvard University ***Atlas of Economic Complexity***, https://atlas.cid.harvard.edu/
Notes: HS1 = Harmonized System Classification; PPP = purchasing power parity

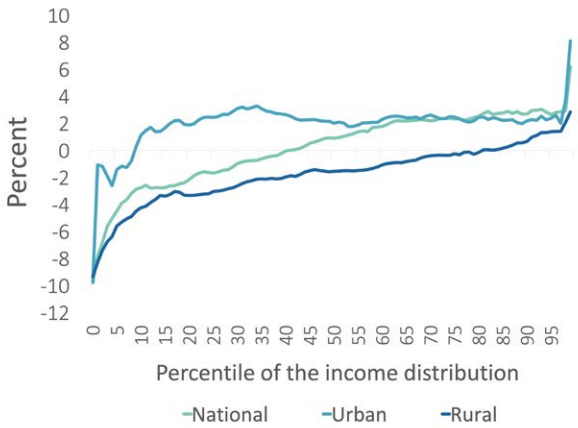
[12] An in-depth analysis and policies to strengthen the country's macro-fiscal framework are being prepared alongside this report: World Bank (2024a). Zambia Public Expenditure Review (forthcoming).

Economic growth in the last 20 years had a weak impact on poverty reduction and amplified inequality

The gains from the past growth hardly permeated to Zambian households, especially in rural areas.[13] Average household expenditure per adult equivalent grew throughout the 2000s and the first half of the 2010s, driven first by mining and then services and construction-led growth. Nevertheless, consumption growth was predominantly urban, with only modest increases for the rural population. Between 2006 and 2010, when Zambia experienced its fastest economic growth rates, expenditure per adult grew by less than 1 percent among the rural population. For most urban households, expenditure per adult grew twice as fast on average and at a significantly higher rate for the top quintile of the urban expenditure distribution (World Bank, 2012).[14] The 2010-2015 period offered even less favorable dynamics for the rural population. The rural growth-incidence curve became highly unequal during these years, and negative for the bottom 80 percent of the expenditure distribution (Figure 14).[15,16]

Rural areas hardly benefited from economic growth

Figure 14. Growth-incidence curves for national, urban, and rural populations, 2010-2015



Source: Own calculations from 2010 and 2015 Living Conditions Monitoring Survey (LCMS)

With the benefits of economic growth concentrated at the top of the distribution, inequality worsened. The Gini coefficient, a measure of inequality, increased and has remained above 50 since 2004. As of 2015, Zambia had the fifth-highest Gini coefficient in the world. Inequality also rose within groups; whereas in 1996, urban households at the 90th percentile of the income distribution spent 6.5 times more on average than households at the 10th percentile, this gap increased to 9.3 times in 2015 (in per-adult equivalent terms). Within the rural population, consumption inequality remained lower; however, it has increased substantially during the latest period of analysis (2010-2015). High welfare inequality may constitute a barrier to poverty reduction, as lower initial inequality implies greater responsiveness of poverty to economic growth (World Bank, 2012).

[13] The expenditure and poverty analysis in this section draws on three periods for which comparable estimates are available: 1996-2006, 2006-2010, and 2010-2015. Inferences for alternative intervals are not feasible due to changes in questionnaire design or poverty methodology across rounds.
[14] Expenditure per adult equivalent grew by 2 percent for the 10th through the 80th percentiles.
[15] A growth-incidence curve captures the annualized growth rate of per capita income for every percentile of the income distribution between two points in time.
[16] The Systematic Country Diagnostics for Zambia (World Bank, 2018b) performs a similar analysis and reaches analogous conclusions.

The lack of inclusive growth resulted in weak poverty reduction. Whereas the national incidence of poverty fell between 1996 and 2015, the number of poor increased by around 2.5 million, 95 percent of whom live in rural areas.[17] The responsiveness of poverty to economic growth (growth-poverty elasticities) was low and even fell when the country's GDP grew at high rates (Figure 15). Behind this is the negligible impact of growth on rural poverty (Figure 16). With urban poverty consistently more responsive to economic growth than rural poverty, rural/urban disparities only accentuated over time. In 1996, the incidence of poverty in rural areas was double that of urban areas, but by 2015 it was over three times higher. The situation has worsened in recent years, with the national incidence of poverty increasing to 60 percent by 2022 amidst weak macroeconomic performance and the succession of negative shocks. Currently, around 11.7 million Zambians live below the poverty line, 80 percent of whom live in rural areas.[18]

Economic growth had little impact on poverty reduction, especially in rural areas

Figure 15. Growth-poverty elasticity (absolute terms) and average GDP per capita growth

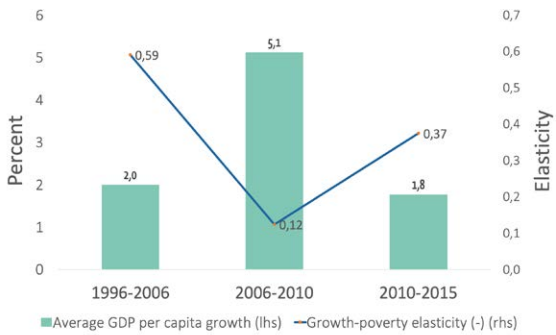
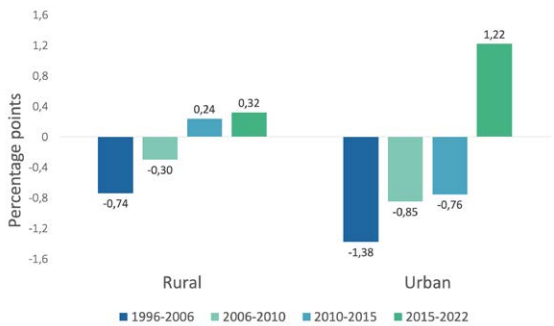


Figure 16. Average percentage point change in poverty incidence per year



Sources: Central Statistical Office (n.d.), World Bank (2012) and Zambia Statistical Agency (2023)

While employment has expanded across sectors, productivity outside the capital-intensive mining sector has grown little over the last 20 years

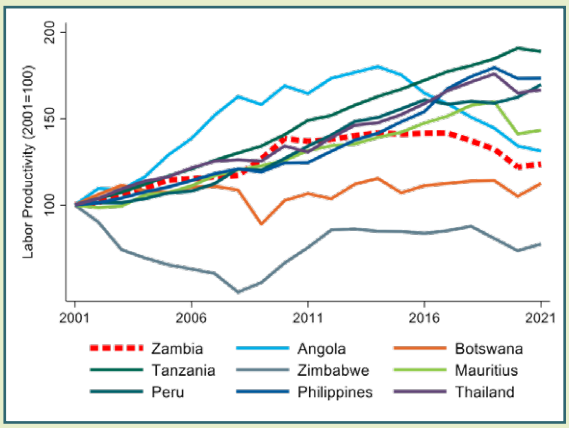
Productivity has been on a declining trend, limiting its contribution to economic growth. Productivity is essential for sustained economic growth and explains most per capita income differences across countries.[19] However, in Zambia, labor productivity and total factor productivity (TFP) have grown little over the last 20 years (Figure 17 and Figure 18).[20] The growth acceleration seen in the 2000s came with 3.7 percent annual increases in GDP per worker. The end of the growth period saw labor productivity stagnating and subsequently declining. Adjusting the Solow growth decomposition in per-worker terms (Annex 1) shows that labor productivity growth was positive for less than half of the years between 2011 and 2019, despite positive capital per-worker contributions driven by the investment boom (Figure 19).

[17] World Bank estimates using ZamStats. Given comparability constraints between the surveys analyzed, these numbers should be taken as an estimate.
[18] Rural poverty reached 78.8 percent in 2022, while urban poverty 31.9 percent.
[19] Among others, see: Hsieh & Klenow (2009), Syverson (2011), Caselli (2016), Dieppe (2021), Kim & Loayza (2019), and Calderon (2022).
[20] Labor productivity is a broader measure of productivity that captures the value output per worker or per worker hours, including other non-labor inputs such as human and physical capital (capital deepening) and TFP. TFP is the residual output after accounting for all other contributing factors to growth and captures the efficiency of combining these inputs in the productive process (technical change). Annex 1 contains further detail.

In those same years, GDP per worker fell at an average annual rate of 0.4 percent. TFP growth followed a similar pattern—while positively contributing to labor productivity growth during the 2000s and having the second highest growth of peers, it dropped significantly during the 2010s. [21,22]

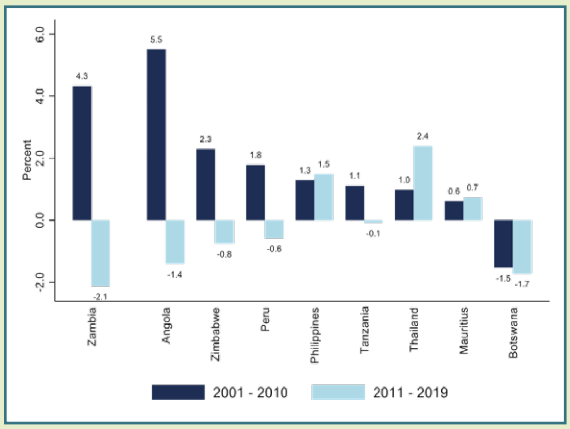
Labor productivity and TFP grew little during the last two decades despite the commodity boom and increased public investment

Figure 17. GDP per worker index (2001-2021)



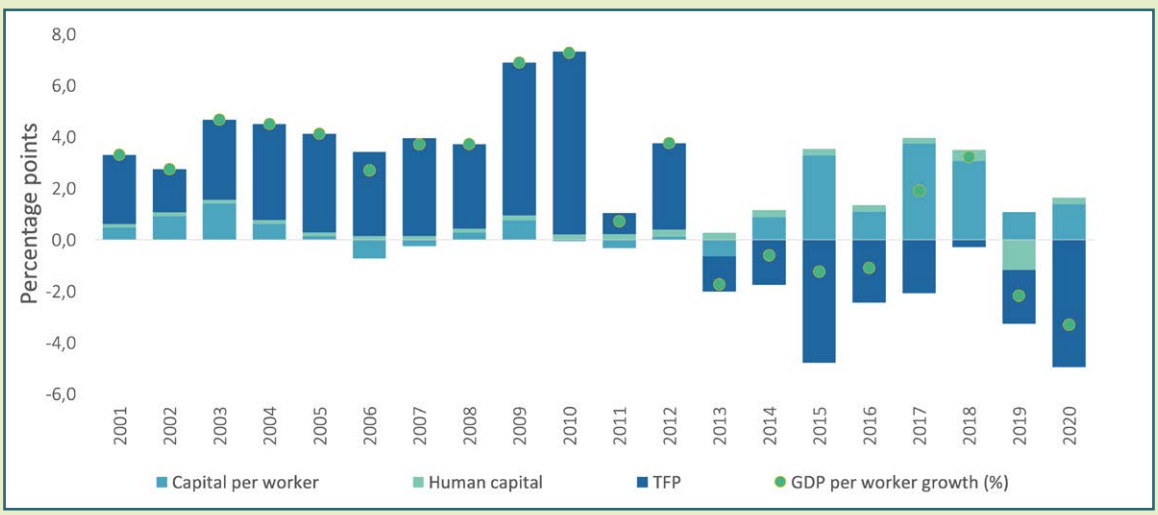
Source: International Labour Organization (estimates, Nov. 2022; https://ilostat.ilo.org/data/) and World Bank ***World Development Indicators***, own calculations
Note: Labor productivity is calculated by dividing constant (2015) GDP by total number of workers.

Figure 18. Total factor productivity growth, Zambia and peers (2001-2019)



Source: University of Groningen (2021) Penn World Tables 10.01. https://www.rug.nl/ggdc/productivity/pwt/pwt-releases/pwt100?lang=en

Figure 19. Solow decomposition in per-worker terms, Zambia, 2001-2020



Source: The Conference Board (2022), https://www.conference-board.org/data/economydatabase. World Bank staff estimates

[21] TFP is calculated as the standard Solow residual: growth in output minus weighted input's growth. Zambia's TFP is highly correlated with the terms of trade. Following Basu & Fernald (2001), Hsieh & Klenow (2009), and Hamilton et al. (2019), aggregate TFP might not fully capture technical efficiency or technology as described by Solow (1957). Thus, results should be interpreted with caution.
[22] Data from Penn World Tables 10.01 (PWT) are used to compare TFP between different countries.

Employment has grown across sectors, mostly in agriculture and services, but only the mining sector has seen significant labor productivity increases.[23] International Labor Organization (ILO) estimates suggest that total employment grew at an average rate of 4.3 per year between 2001 and 2019 and continued to expand after the global pandemic. In the same period, employment in agriculture almost doubled, and tripled in services, with these sectors accounting for almost 90 percent of all new jobs (Figure 20). Yet this increase in labor inputs did not lead to significant output growth in any sector other than the capital-intensive mining sector. Labor productivity in agriculture (value-added per worker) has fallen by almost 50 percent, and by more than 25 percent in the rest of the industry sector (construction, manufacturing, and utilities) over the last 20 years. In services, labor productivity has grown by less than 2 percent. Where new jobs have been created, these are in the low-productive sectors of the economy, with widening productivity gaps between sectors (Figure 21).

Cross-sector reallocation of workers contributed to productivity growth, but within-sector gains were limited

Modest improvements in labor productivity came primarily from employment shifts across sectors, mostly out of agriculture and into services, contributing to economic growth. As the share of employment in agriculture decreased by more than 10 percentage points between 2001 and 2019, new workers joined services and, to a lesser extent, the rest of the industry sector, contributing positively to labor productivity growth (Figure 22 and Figure 23). This movement of workers between lower and higher productivity sectors was growth-enhancing (de Vries, Timmer, and de Vries, 2015). This is a common feature in low-income countries, where reallocation explains the majority of labor productivity growth. However, it does not hold for middle-income countries (Merotto et al., 2018). Inter-sectoral productivity contributions were more robust during the 2010s and drove almost all productivity gains, coinciding with the services and construction-led boom experienced by the Zambian economy.

Within-sector productivity gains were negligible in all sectors. Productivity gains within sectors are explained by capital accumulation, technological change, or a reduction in resource misallocation (of capital or labor) (McMillan and Rodrik, 2011). In Zambia between 2001 and 2019, the within sector component of labor productivity contributed negatively to growth, with almost 0.6 percentage points of the decline attributable to agriculture (Figure 23). Although only a few countries in SSA see both inter-sectoral and within-sector productivity gains when employment grows as strongly as in Zambia (above 3 percent), the strong declines in the within-sector component observed in the country are less common (Merotto, 2017; Merotto et al., 2018). The end of the commodity boom and consumption-led growth during the 2010s further slowed within-sector labor productivity growth, especially in services as workers moved into the sector, and subtracted 1.35 percentage points from total labor productivity growth.

[23] ILO-modelled estimates (November 2022) are used in this section to describe employment dynamics and to calculate yearly productivity trends at the sectoral level. Methodological changes have applied since the 2017 Labour Force Surveys (following ILO ICLS-19), where employment indicators include only those engaged in market production activities. ILO-modelled estimates follow the ILO's previous employment definition (ICLS-13) in which non-market activities (such as production for own consumption) are included, thus capturing a greater segment of the agriculture sector. Differences in total employment in the remaining sectors are minor, and therefore our conclusions do not change.

Whereas employment grew across sectors, only the capital-intensive mining sector saw significant labor productivity growth

Figure 20. Employment, millions (2001-2021)

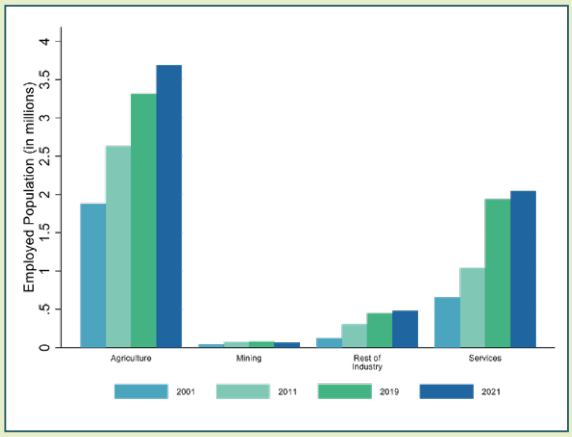
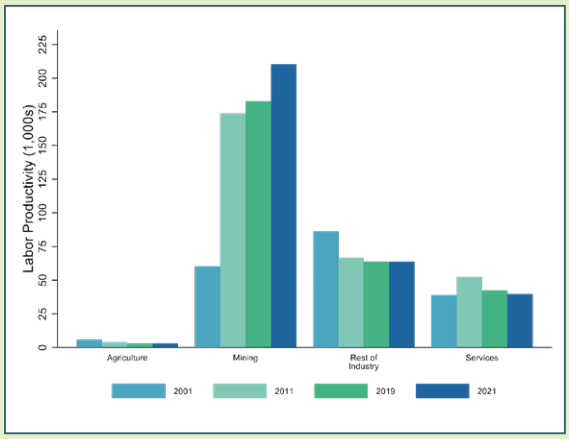


Figure 21. Value-added per worker by sector, real local currency units ('000) (2001-2021)



The movement of workers from agriculture to the rest of the economy contributed to labor productivity growth but there were few within-sector gains

Figure 22. Employment shares by major sector (2001-2021)

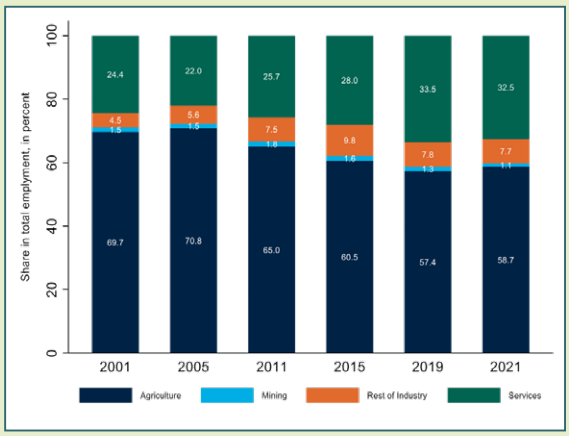
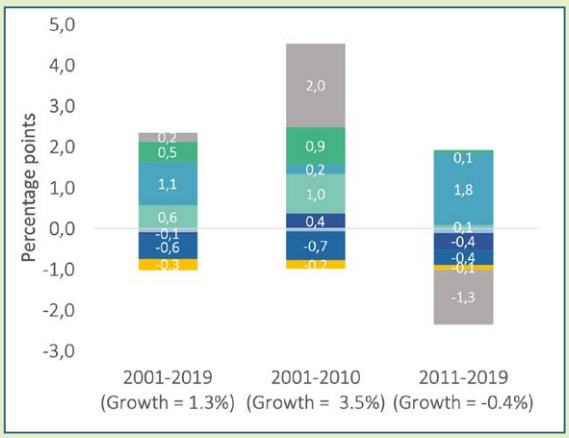


Figure 23. Value-added per worker growth decomposition, in percentage points (2001-2019)



Sources: Own calculations based on ILO Modelled Projections (Nov. 2022; https://ilostat.ilo.org/data/) and ZamStats
Note: For further details on the methodology used to decompose value-added per worker, please see McMillan and Rodrik (2011) and de Vries, Timmer, and de Vries (2015).

1.4 TRANSFORMING HOW ZAMBIA GROWS

Zambia needs to increase productivity and accelerate economic transformation to achieve sustained and inclusive growth

For sustained and inclusive growth, Zambia needs to increase its stagnant productivity levels. Productivity has been falling in the last decade, and only the capital-intensive mining sector has seen significant labor productivity improvements. To unlock its potential, the country needs to strengthen its ability to transform current and increasing factors of production into more goods and services that deliver higher living standards to its citizens. In other words, Zambia needs to increase its low levels of productivity, as productivity is a key driver of economic growth. The productivity gap between SSA and high-income countries reflects the large productivity differences across sectors and production units (farms or firms), with vast inefficiencies in the allocation of capital and labor (Calderon, 2022).

Economic transformation is needed in Zambia to create better jobs that lift its citizens out of poverty, improving living standards. Economies transform when more people join the labor force and find jobs, become more productive at them, or reallocate to more productive jobs. As a result, average labor productivity rises with labor incomes. Structural change—the reallocation of employment and capital across agriculture, manufacturing, and services—is a critical feature that accompanies modern economic growth (Kuznets, 1973; Herrendorf, Rogerson, and Valentinyi, 2013; Comin, Lashkari, and Mestieri 2021). At the same time, economies transform and grow faster when workers move along several dimensions: from rural to urban, from low-skilled to higher-skilled occupations, and from small, capital-thin firms to more complex capital-intensive firms and waged jobs. Accelerating economic transformation by resolving development traps will induce sustained economic growth while concurrently reducing poverty (World Bank, 2024b).

With its young and increasingly educated population, Zambia has an opportunity to benefit from the demographic dividend if labor productivity rises and better-paying jobs are created. Over 45 percent of Zambia's population is under 15, and as population growth rates continue to moderate, the share of the working-age population is expected to increase (ZamStats, 2022, and Jobs Group Diagnostic Tools).[24] Dependency ratios fell from 95.9 percent to 87.2 percent between 2001 and 2019, and this trend is projected to continue. Meanwhile, the labor force is becoming more educated, with increasing shares of secondary and post-secondary educational attainment for both males and females (Merotto, 2017). For Zambia to benefit from this demographic dividend, it needs to raise productivity and accelerate economic transformation, creating better-paying jobs for its growing youth population.

[24] See: https://datatopics.worldbank.org/jobsdiagnostics/jobs-tools.html

This CEM outlines two pathways that can support Zambia's productivity-enhancing economic transformation, generate better jobs, and deliver sustained and inclusive growth. Agriculture, discussed in Chapter 2, is the first pathway, and is at the core of Zambia's development challenge. It has huge potential to drive poverty reduction, but expensive and inefficient support programs, coupled with increasing climate hazards, are constraining its productivity growth. Current support programs can be refocused toward key infrastructure, extension services, and climate change adaptation practices while promoting crop diversification and exports. The agri-business sector and commercial agriculture are seeing increasing production in other high value-added crops and products, including livestock and aquaculture, with potential to expand and generate better jobs. The second pathway – the subject of Chapter 3 – involves Zambia making critical economy-wide reforms to unlock broad-based private sector productivity growth and increase its role in driving jobs and economic transformation. This will include expanding access to financial services and electricity, enabling digital transformation, and improving the business environment, among others. Additional growth pathways and associated reforms, such as addressing the country's fiscal and macroeconomic vulnerabilities and its critical role in the global energy transition (Box 2), are explored in complementary reports.[25]

Removing productivity constraints on farms and in firms will allow Zambia to grow and reduce poverty

First, a poverty-reducing growth path for Zambia involves raising productivity in the agricultural sector, which employs most Zambians and is severely exposed to climate change. Zambia's strikingly low and declining agricultural productivity levels do not reflect either regional or global trends (Figure 24, Figure 25, and Box 1). Around 80 percent of Zambia's poor live in rural areas and rely largely on farming, livestock, and other agricultural work to earn a living; close to 60 percent of working Zambians are employed in agriculture. The fact that the number of poor increased in rural areas during the 2000s even while Zambia was experiencing remarkable economic growth is directly related to the low and decreasing productivity of its farmers, particularly the smallholders who make up most of the sector (Norman et al., 2017). Increasing productivity would allow farmers to move away from maize-centric subsistence production and hedge against climate variability. Farmers would be able to devote their time to higher-yielding tasks within the sector, including other high value-added crops, livestock, aquaculture, and commercial agriculture or move to other more productive sectors. This would allow them to diversify their income sources and potentially earn better wages (Chinzara, et al., 2018). This growth pathway is discussed in Chapter 2.

[25] An in-depth analysis of the country's macro-fiscal framework and policies to strengthen it is being conducted alongside this report (World Bank, 2024a. Zambia Public Expenditure Review), while the World Bank is also preparing a study to leverage Zambia's green minerals potential for economic growth and poverty reduction.

Zambia's agricultural productivity is increasingly falling behind peers and the rest of the world

Figure 24. Real value-added per worker in agriculture, Zambia and peers (logs – constant 2017 international US$), 2001-2018

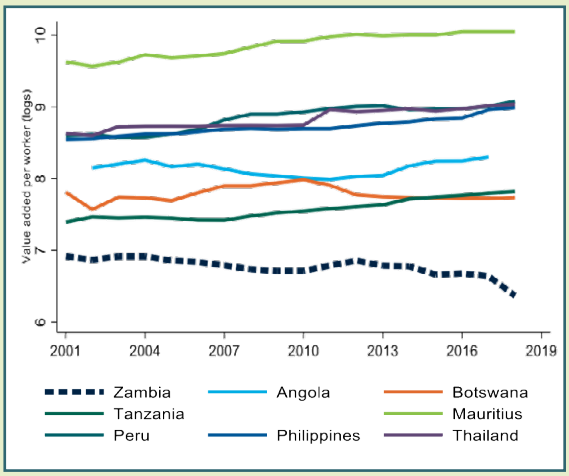
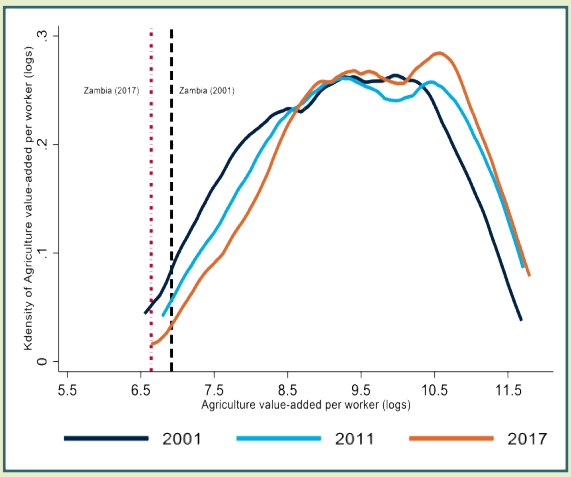


*Figure 25. Real value-added per worker in agriculture (Kernel distribution, logs)**



Source: Authors' calculations based on Jobs Group, from GGDC/UNU-WIDER Economic Transformation Database (https://www.wider.unu.edu/database/etd-economic-transformation-database) and WBG Productivity Database (https://www.worldbank.org/en/research/publication/global-productivity)
Note: Based on a sample of 102 countries available in the database.

BOX 1: Productivity growth and structural change in agriculture

Agriculture employs around 50 percent of the workforce in sub-Saharan Africa (World Bank, 2023b). The sector is key for explaining the growth performance of many countries in the region, and the productivity gap between low- and high-income countries.[26] If most of the population depends on agriculture as a primary source of income, low productivity levels in the sector will inadvertently result in low aggregate incomes (Calderon, 2022; Gollin, 2021).

Agriculture plays a fundamental role in supporting modern economic growth. Early works by economists Arthur Lewis and Theodore Schultz point to the fundamental role of the agricultural sector in supporting modern economic growth, which accelerates either through the movement of workers to more productive off-farm jobs and occupations, or through increasing within-sector productivity by providing farmers with new technology or skills that increase their capabilities (Gollin, 2021; Lundahl, 1987). Among others, spatial frictions, technology, institutions, openness to trade, skills, and the physical and economic characteristics of different crops remain important determinants of agricultural productivity and its support or not to economic transformation (Gollin, 2021). Resource misallocation (of capital, labor, and land) plays a key role in this process, particularly when policies and institutions create market distortions that hold low-income countries back from reaching efficiency benchmarks (Calderon, 2022). Adverse weather shocks, including droughts, floods, and rising temperatures, are also important in decreasing average productivity and sectoral reallocations (Zeufack et al., 2021).

Countries that grow experience parallel increases in labor productivity in agriculture and a reallocation of labor to more productive sectors (industry or services). The structural change trajectory of many developing countries differs from developed economies in terms of their industrialization patterns —a process known as "premature deindustrialization"; see Rodrik (2016). However, there is a clear association between income growth, labor productivity, and labor shares in agriculture—countries that grow experience, in parallel, an increase in labor productivity in agriculture and a reallocation of labor to more productive sectors (industry or services). Moreover, low and lower-middle income countries that see positive contributions of the *within-sector* component of labor productivity in agriculture grow faster (Merotto et al., 2018), increasing their potential to reduce poverty.

However, Zambia's income per capita levels, labor productivity, and labor shares in agriculture have seen little change since the 1970s. Figure 26 and Figure 27 illustrate these trends by showing these relationships between Zambia and aspirational peer countries. Unlike Zambia, most aspirational peer countries saw parallel increases in labor productivity and decreasing labor shares in agriculture as they grew. The potential of Zambia's agricultural sector to contribute to growth, poverty reduction, and increased incomes is enormous. The country will only maximize it by finding the right combination of policy strategies that solve country-specific binding constraints.

[26] Caselli (2004) finds that cross-country variations of labor productivity in agriculture between low- and high-income countries are much larger than in the non-agricultural sector, and thus are a major driver of income differences.

Figure 26. Agriculture value-added per worker and GDP per capita PPP, Zambia and aspirational peers

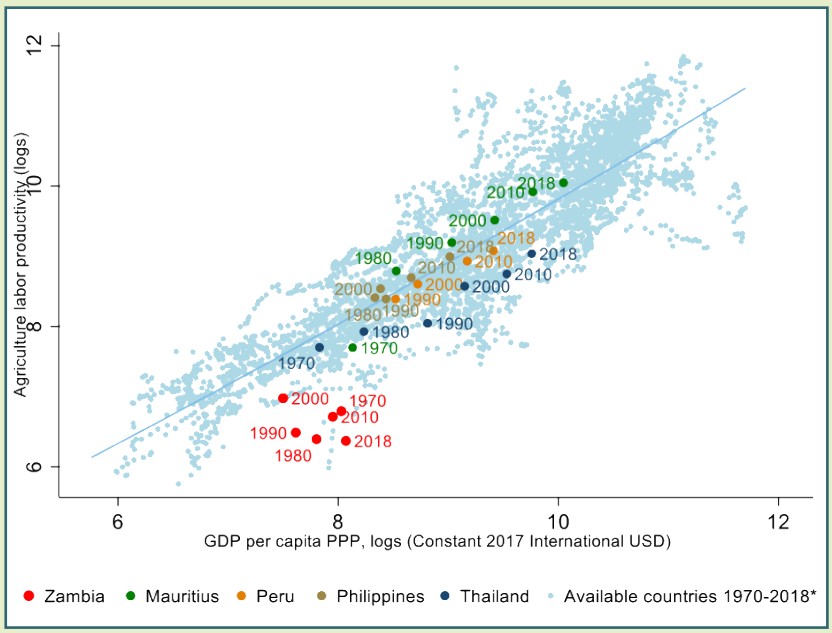
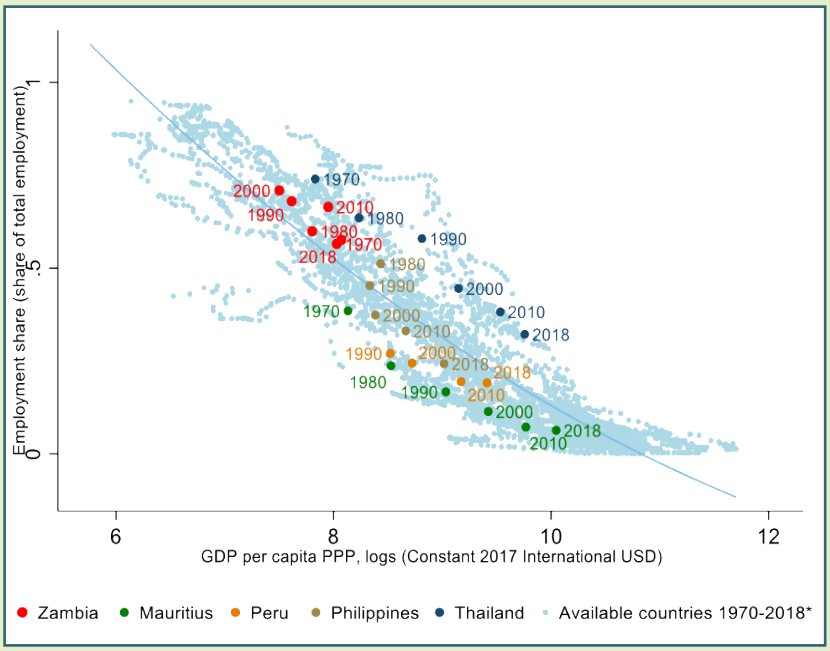


Figure 27. Employment shares in agriculture and GDP per capita PPP, Zambia, and aspirational peers

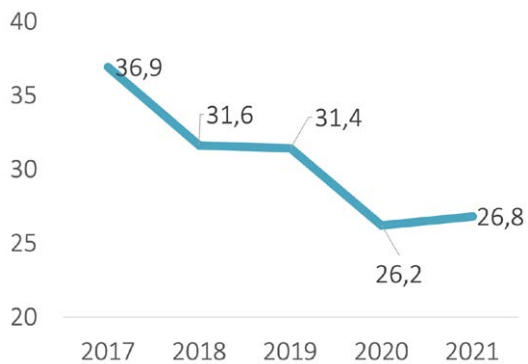


Source: Authors' calculations based on Jobs Group, from GGDC/UNU-WIDER Economic Transformation Database (https://www.wider.unu.edu/database/etd-economic-transformation-database) and WBG Productivity Database (https://www.worldbank.org/en/research/publication/global-productivity)

Second, Zambia's new and existing firms in labor-intensive sectors need to rise and become more productive to create better jobs. The country has been urbanizing,[27] and while services jobs have increased, the lack of enough good paying jobs is holding back Zambia's growth potential and its ability to maximize gains from economic transformation. Employment shifts from agriculture to the rest of the economy were mostly to the informal sector, and urban off-farm jobs are still predominantly informal and concentrated in low-productivity services (Figure 28).[28] Overall, opportunities in private sector formal firms are limited. Most businesses in Zambia are small and informal, while most waged jobs are in a few large, formal firms with higher labor productivity, and which have the potential to pay better wages (Merotto, 2017). Wage employment grew little in the last 20 years, from 18 percent of employment in 2001 to 23 percent in 2021, and it varies substantially across sectors, locations, and levels of education. Moreover, almost two-thirds of Zambian workers are employed in low-skilled occupations.[29] Even for high-skilled workers, private firms have few good jobs—the public sector employs over half of tertiary educated workers (Merotto, 2017).[30] The highest wage premiums in the formal sector are paid in public sector jobs and capital-intensive sectors with limited capacity to absorb labor and create enough opportunities for working Zambians (World Bank, 2022e). The country must prioritize strategies for new and existing firms in labor-intensive sectors to increase and become more productive, creating more and better jobs for the growing working-age population. Furthermore, enhancing supply chains will also become critical for the agricultural sector to increase the poverty reduction potential of economic growth. This growth pathway is explored in Chapter 3.

The share of formal employment has been declining over the years

Figure 28. Formal employment (percent)



Source: ZamStat, Labour Force Survey, 2017-2021

[27] Both the WDI and census data confirm that Zambia rapidly urbanized during the 2000s. Nevertheless, while WDI data sees the share of the urban population increasing throughout the 2010s, from 39 percent to 46 percent between 2010 and 2022, the recently published 2022 census sees little increase in urbanization rates, from 39.5 to 40.0 percent over the same period.

[28] It is primarily the youth who have transited out of agriculture into the rest of the economy, migrating to urban areas for jobs (Merotto, 2017). Commerce, which accounts for the highest share of employment in urban areas, does not exhibit a significant wage premium relative to agricultural jobs (World Bank, 2022d).

[29] Around 63.3 percent of Zambian workers were employed in low-skilled occupations (ISCO-9) in 2021, from 79.1 percent in 2001. The share of medium-skilled occupations (ISCO 4,5,7, and 8) represented 26 percent of employment and grew from 14 percent in 2001, reflecting the shift of employment out of agriculture to, primarily, services. Finally, the share of high-skilled occupations (ISCO 1,2 and 3) represents the rest of employment (10.3 percent), and grew from 6.4 percent in 2001. Source: ILO Estimates (Nov. 2022).

[30] Levels of education in Zambia are an important determinant of employment status and job quality; over 90 percent of workers with tertiary degrees or higher are employed in the formal sector, while this is true for only 10 percent of workers with primary or lower education (World Bank 2022a).

BOX 2: The global energy transition could help drive Zambia's economic transformation

The global transition to low-carbon energy is creating vast opportunities for countries to use their natural wealth for economic development. The low-carbon energy transition will be mineral-intensive. The ongoing electrification of transport, decarbonization of industrial processes, and clean-energy technologies for generation, transmission, and storage are increasing the demand for the minerals needed for the global energy transition, with over 3 billion tons of expected demand of minerals and metals for solar, wind, and geothermal energy by 2050. This creates opportunities for countries to insert themselves into global energy value chains, which will help to increase exports, economic growth, and poverty reduction (Cust and Zeufack, 2023).

While this report does not cover Zambia's role in the energy transition, it could be an additional pathway to support sustained and inclusive growth. Zambia has substantial untapped natural wealth with value-addition potential. The country has vast amounts of energy transition minerals, including one of the highest-grade copper deposits globally and 2 percent of the global share of copper reserves. It also holds deposits of cobalt, nickel, and manganese. Moreover, Zambia is well-positioned to become an energy export hub in Southern Africa through the Southern Africa Power Pool. It has abundant renewable energy resources and the potential to diversify its energy mix, particularly solar and wind (World Bank, 2018c; World Bank, 2019a).

To capitalize on this potential, Zambia must overcome significant sector-specific and economy-wide constraints. The mining sector faces several challenges that are hindering its competitiveness, including aging mines, high transport costs, and new taxes. For example, transport costs add up to 40 percent to the cost of mining products because of costly access to ports, which include Beira, Dar es Salaam, Durban, Lobito, and Walvis Bay (Cust and Zeufack, 2023). Regarding its energy sector, less than half of the population has access to electricity, and even where there is access, the quality of the service is low. Currently, hydropower accounts for over 80 percent of the installed power generation capacity, making the country vulnerable to climate hazards. State-owned ZESCO owns about 75 percent of the generation capacity and most of the transmission and distribution assets in the country. Continuous financial difficulties and poor coordination between government and private sector players have limited new investments (UNCTAD, 2022).

ANNEX 1. GROWTH ACCOUNTING – GROWTH, LABOR PRODUCTIVITY, AND TOTAL FACTOR PRODUCTIVITY DECOMPOSITION

We performed a growth decomposition of Zambia's economic growth over the last two decades, adjusted to per worker terms to reflect contributions to labor productivity growth. Starting with a Cobb-Douglas production function:

$$Y = AK^{\alpha}(hL)^{1-\alpha}$$

$$\frac{Y}{L} = \frac{AK^{\alpha}(hL)^{1-\alpha}}{L} = A\left(\frac{K}{L}\right)^{\alpha} h^{1-\alpha}$$

$$y = Ak^{\alpha}h^{1-\alpha}$$

Where y is output per worker, A is total factor productivity or Solow residual, k is a measure of capital per worker, h is a measure of labor quality or human capital, and α is the capital share, $\alpha > 0$.

We totally differentiate the equation and divide by output per worker to obtain the corresponding growth rates of each component:

$$dy = \frac{\partial y}{\partial A}dA + \frac{\partial y}{\partial k}dk + \frac{\partial y}{\partial h}dh$$

$$dy = k^{\alpha}h^{1-\alpha}dA + \alpha Ak^{\alpha-1}h^{1-\alpha}dk + (1-\alpha)Ak^{\alpha}h^{-\alpha}dh$$

$$\frac{dy}{y} = \frac{dA}{A} + \alpha\frac{dk}{k} + (1-\alpha)\frac{dh}{h}$$

$$\hat{y} = \widehat{TFPG} + \alpha\hat{k} + (1-\alpha)\hat{h}$$

As observed, output per worker growth is explained by TFP, capital deepening (capital per worker), and a human capital component (labor quality).

We use data from The Conference Board (Total Economy Database) and calculate TFP Growth ($\widehat{TFPG}$) as the residual, assuming average capital shares for the whole period (48 percent):

$$\boldsymbol{\widehat{TFPG} = \hat{y} - \alpha\hat{k} - (1-\alpha)\hat{h}}$$

CHAPTER 2
UNLEASHING AGRICULTURAL PRODUCTIVITY[31]

Main messages

1. **A poverty-reducing growth path for Zambia involves raising agricultural productivity, as the sector employs most of the poor and faces rocketing and evolving domestic and regional food demand.** Agriculture in Zambia is characterized by maize-centric production with little private sector participation, contributing to malnutrition, low resilience, and low farm profitability. Total value-added in the agriculture, forestry, and fishing sector saw *zero growth* between 2001 and 2022, in contrast to all of Zambia's peer countries.

2. **Zambia's agricultural productivity is well below its potential and is declining.** Crop yields are either stagnant or decreasing, despite widespread and increasing use of fertilizers and improved seeds. In addition, labor productivity has fallen by almost 50 percent since the early 2000s. As yields of major crops decline and the rural population rises, raising smallholder production largely depends on farmland expansion and deforestation, putting pressure on biodiversity. Inappropriate fertilizer use is accelerating soil degradation, while rainfed production systems waste water and energy.

3. **Climate change is ramping up the frequency and intensity of extreme weather events**—2015, 2018 and 2020/21 were marked by extreme droughts, while in early 2023, Zambia was hit by the worst flooding in 50 years. As a result, agricultural growth is becoming more volatile, and production is increasingly correlated with rainfall.

[31] This chapter was led by Vanina Forget with contributions from Auckland Kuteya, Brian Mulenga, John Keyser, and Paavo Eliste.

4. **Inefficient and distortive public policies coupled with increasing climate hazards are at the core of Zambia's agricultural sector productivity stagnation**. About 80 percent of Zambia's agricultural budget is spent on the Farmer Input Subsidy Program (FISP), with most of the remainder going to its Food Reserve Agency (FRA), both mainly supporting maize. Their high fiscal cost, poor implementation, and the distorted incentives they create all constrain the government's capacity to drive productivity growth, create better jobs for farmers and reduce poverty. The sector is far from diversified and policy uncertainty dissuades the private sector from fully participating. Analysis for this report confirms that the social efficiency of FRA- and FISP-supported farms is much lower than for farms that are not supported. Smallholders who solely rely on maize as an income source will find it difficult to escape poverty. Meanwhile, trade disruptions and export barriers further disincentivize private sector investment in agricultural production and processing, crowding out agribusiness and the large-scale farm development which could create better paying jobs.

5. **To unlock its agricultural potential and support a growing agribusiness and commercial agriculture ecosystem, Zambia must redirect the FISP and FRA budgets towards diversification, key infrastructure, extension services, and climate change adaptation practices.** Diversifying away from maize into higher value crops (e.g., sunflower or soyabeans) and climate resilient crops, more nutritious products (e.g. vegetables), and livestock and aquaculture value chains would provide a more stable pathway to increase incomes. Investing in resource-efficient irrigation is paramount for adapting to climate change, while alleviating trade barriers and facilitating exports would boost private sector participation in labor-intensive agricultural firms with the potential to create better jobs for farmers and support poverty

2.1 ZAMBIAN AGRICULTURE: HIGH UNREALIZED POTENTIAL AND DECLINING PRODUCTIVITY

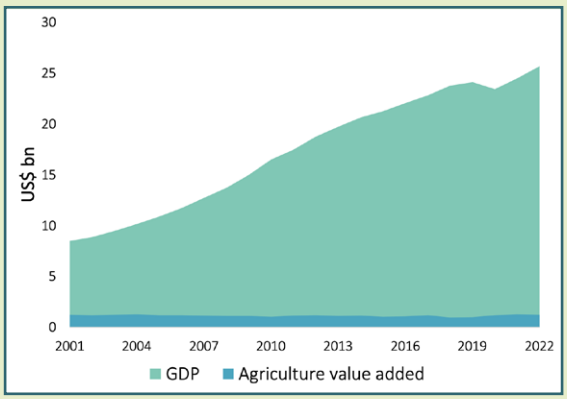
Despite huge potential, Zambia's agricultural sector has contributed little to growth and poverty reduction

Zambia has the natural capital for its agricultural sector to become an engine of economic growth and poverty alleviation. Compared to other countries in the region, Zambia has a favorable climate for agricultural production, abundant water resources, and fertile land. While it has only 1.6 percent of SSA's population (in 2020), it has 2.1 percent of its renewable freshwater and 3.1 percent of its land resources. Less than 30 percent of its potential arable land is cultivated (GYGA, 2023). Despite being landlocked, Zambia's geographic position gives it cross-border trade opportunities with eight countries, especially the Democratic Republic of Congo, which has traditionally been a significant importer of agricultural products. Due to its labor-intensive nature and potential for forward and backward linkages, the sector has a key role to play in improving wages and job creation both upstream and downstream. The Government of the Republic of Zambia (GRZ) has highlighted it as a priority sector in its Vision 2030 (GRZ, 2006) and its Eighth National Development Plan (GRZ, 2022).

While most Zambian workers are employed in agriculture, the sector has not grown in the last 20 years or significantly supported poverty reduction. Close to 60 percent of working Zambians are employed in agriculture (World Bank, 2023a; Nawiko et al., 2022; GRZ, 2023). Despite rising economic growth during the 2000s, which continued until the mid-2010s, poverty in rural areas increased, and between 1996 and 2022, the number of rural poor rose by around 4.76 million.[32] At the same time, total value-added in agriculture, forestry, and fishing remained stagnant between 2001 and 2022, and has shown a highly volatile trend since beginning of the 2010s. Zambia is the only country amongst its peers that has not seen GDP and value-added in agriculture grow in parallel (Figure 29 and Figure 30). The sector's contribution to GDP fell from 15.5 percent in 2001 to 3.4 percent in 2022, also in contrast to most of its peers (Figure 31).

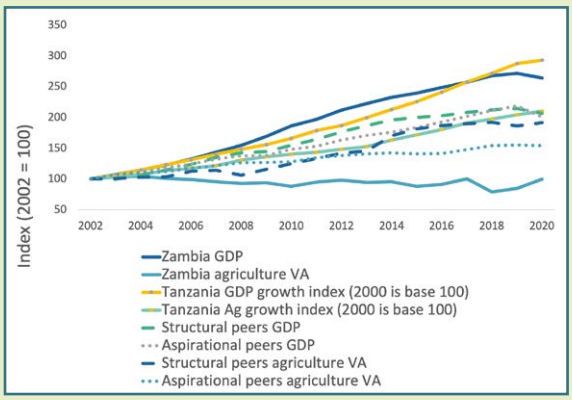
Zambia's agriculture value added has seen zero growth over the last 20 years, in contrast with peer countries

Figure 29. Zambian GDP and agriculture value added (constant 2015 billion US$)



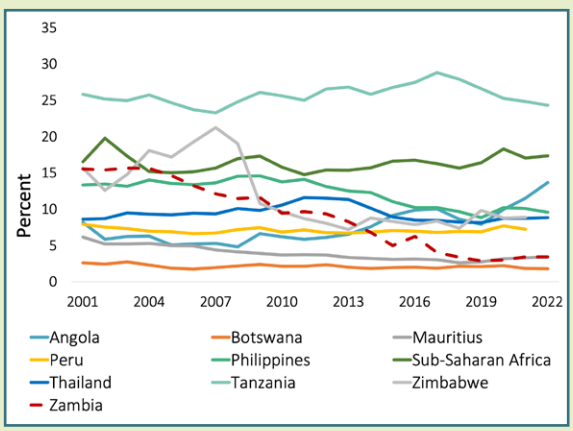
Source: World Bank *World Development Indicators*

Figure 30. GDP and value added in agriculture index, Zambia, and peer country averages (base 2002=100)



Source: World Bank *World Development Indicators*
Note: structural peers = Angola, Botswana, Tanzania, Zimbabwe; aspirational peers = Mauritius, Phillippines, Peru, Thailand.

Figure 31. Agriculture value added as a share of GDP



Source: World Bank *World Development Indicators*

[32] World Bank estimates using ZamStats. Given comparability constraints between the surveys analyzed, these numbers should be taken as an estimate.

Crop production showed minimal growth in the 2010s, but subsectors such as poultry and aquaculture have been rapidly expanding. The value of maize production, the most widely-produced crop in Zambia, decreased by 28 percent between 2010 and 2019, though it has recently started to recover (Figure 32). Consumed as *Nshima*, maize remains the main staple for a wide majority of Zambians. Supported by growing demand for feed and vegetable oil, soybean and sunflower production value has more than tripled since 2010. The growth of the poultry industry, supported by multinational investments, sustains the soybean subsector, with production almost tripling since 2010, as has aquaculture production.

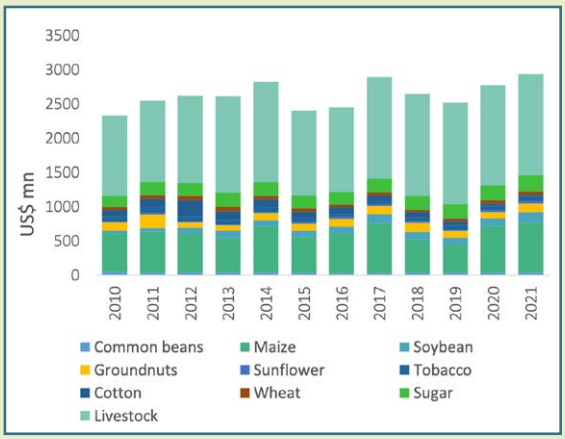
However, the evolution in food supply is not keeping up with the nutrition needs of the country's expanding population and changing consumption patterns. Food demand is expected to triple between 2015 and 2030, with neighboring countries also showing similar trends (World Bank, 2018b). Traditional diets remain starch-heavy and mostly vegetarian (with less than 10 percent of energy coming from animal-based foods for women and children in rural areas). However, like most SSA countries, Zambia is experiencing a shift in food consumption patterns toward more processed products, vegetable oils and horticulture, driven by economic growth and urbanization. But as supply is unable to meet demand, available calories per capita contracted from 1996 to 2015. National food price data show that while the overall cost of food has decreased, nutrient-rich foods such as fruits, vegetables, and animal-based products have become relatively more expensive compared to staple foods over time, contributing to raising food insecurity and malnutrition (Harris et al., 2019). The recent food inflation spike in 2022-2023 has further worsened these trends, with prices increasing by 13.4 percent between September 2022 and 2023.

As a result, in 2019, Zambia switched from being a long-term food exporter to a net food importer Agricultural exports are concentrated on a few commodities, many of which have little value added and are dominated by maize. In 2012, when agricultural exports peaked, maize, cotton, and sugar represented 72 percent of all agriculture and food exports. Since then, their exported value has declined, with significant informal maize flows towards DRC, Malawi, and Tanzania. In 2019, the country became a net food importer after years of having a positive agriculture trade balance (Figure 33). An upward trend in agriculture and food exports has been observed since 2019 (+28 percent in 2021), with a more diversified portfolio than earlier in the decade. [33]

[33] In 2021, maize, cotton, and sugar were down to 28 percent of exported value, with beverages, tobacco, dairy and meat products, sunflowers, fruit, and vegetables (fresh or processed) on the rise. Edible oil (mostly palm oil) largely dominates agricultural and food imports (between 54 percent and 74 percent since 2010, data FAO Stat), yet Zambia would have the potential to produce its own (oilseed based).

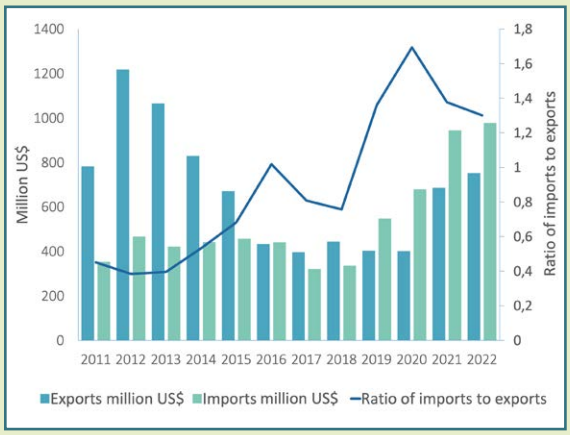
Production stagnated and the agricultural trade balance consistently fell during the 2010s

Figure 32. Value of agricultural production (2014/2016 constant US$)



Source: FAOStat (https://www.fao.org/faostat/en/)

Figure 33. Agricultural trade balance



Source: ZamStats (https://www.zamstats.gov.zm/)

Removing barriers to productivity growth in agriculture is vital to increase farmers' incomes and reduce poverty

Increasing productivity in agriculture is a core development challenge if Zambia is to achieve sustained growth. Most peer countries, and the world, have seen average labor productivity increases in the sector in the last 20 years (Figure 34, as well as Figure 25). However, in Zambia crop yields have stagnated or decreased over the past decade. Soybean yields average 0.8 M/ha and maize 1.8 Mt/ha, well below the yields obtained by aspirational peers (Figure 35). While maize yields still rank among the highest in the African Southern and Eastern region, they represent a fraction of their agroecological potential.[34] Measured as real value added per worker, agricultural productivity has decreased by almost 50 percent over the past two decades. As most of the population depends on agriculture, low levels and little productivity growth in the sector translate into low aggregate incomes.

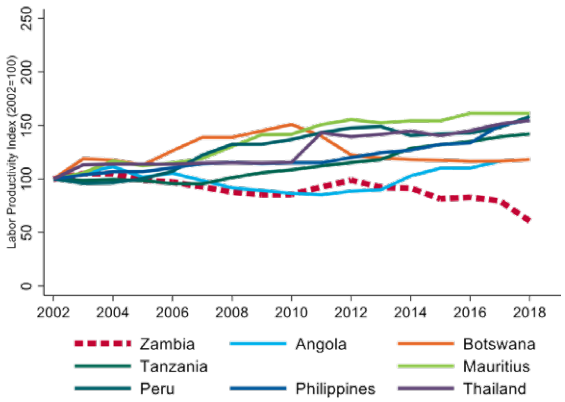
As 55 percent of women earn their livelihoods in the agricultural sector (compared to 45 percent of men), improving income at the farm level is a crucial lever for women's inclusiveness and empowerment in Zambia. Recent data crucially overlooks the agricultural gender gaps in Zambia, even though women constitute 64 percent of the rural population and about 80 percent of food producers (FAO 2018b). Studies of neighboring countries estimate that the gender agricultural productivity gap ranges from 23 percent in Tanzania to 66 percent in Niger (World Bank, 2020a). In Zambia, less than one percent of women farmers have access to a cultivation instrument like a seeder or weeder, and they use significantly less inputs (FAO, 2018b). They are also less likely than men to be paid for their labor, a factor underscored by social norms that uphold men as household providers, promote early marriage (one third of women are married before age 18) and prescribe disproportionate care responsibilities to women (UNDP, 2019). Addressing barriers to women's

[34] The potential of rainfed maize yields is estimated at 10.2 Mt/ha by the Yield Gap Atlas (2023) and between 8 to 15 Mt/ha by Silva et al. (2023).

greater agricultural productivity has the potential to move women into more lucrative production. In turn, this can generate spillover benefits in terms of increased income and food security for households (UN Women et al., 2015).

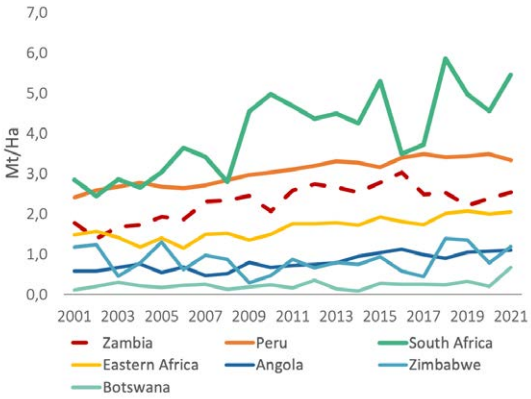
Zambia's agricultural labor productivity is falling behind peers as yields remain stagnant

*Figure 34. Agriculture real value-added per worker Index (2002=100)**



Source: Jobs Group, from GGDC/UNU-WIDER Economic Transformation Database and WBG Productivity Database
Note: 2002 was chosen as a basis to include additional peer countries.

Figure 35. Maize yields, Zambia, and peer countries (Mt/ha)

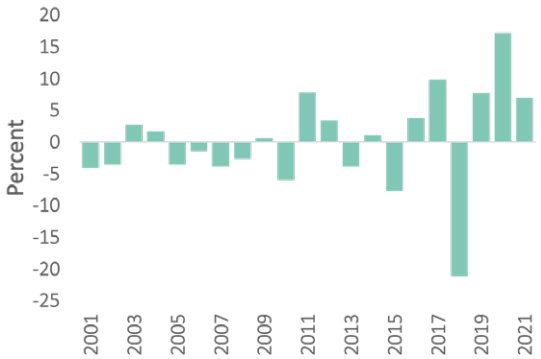


FAOStat (https://www.fao.org/faostat/en/), MoA and ZamStats (https://www.zamstats.gov.zm/) ZamStats (https://www.zamstats.gov.zm/)

Inefficient and distortive public policies coupled with increasing climate hazards explain most of the productivity stagnation. The high fiscal cost, poor implementation, and distorted incentives resulting from public policies undermine the government's capacity to drive productivity growth and support the creation of better jobs for farmers. The sector remains far from diversified, while policy uncertainty dissuades the private sector from getting involved. Increasing climate variability and limited adaptation support also hold back the sector's potential. With only 5.6 percent of its irrigable land irrigated (GRZ, 2013), agricultural production in Zambia is highly dependent on rainfall. Precipitation is historically volatile in the country as it is controlled by the passage of the Inter-Tropical Conversion Zone and El Niño/Southern Oscillation. Climate change aggravates the frequency and intensity of extreme weather events (GRZ, 2020): 2015, 2018 and, 2020/21 were marked by severe droughts, while in early 2023, Zambia was hit by its worst flooding in 50 years. As a result, agricultural growth is becoming more volatile and production more correlated with rainfall (Figure 36 and Figure 37).

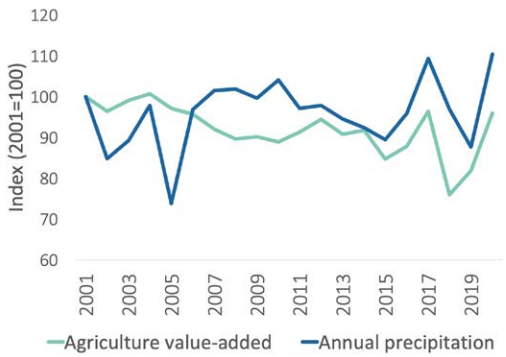
Agricultural output is becoming more volatile and correlates with rainfall variability

Figure 36. Agriculture value-added growth rates



Source: World Bank *World Development Indicators*

Figure 37. Agriculture value-added and annual precipitation index (2001=100)



Source: ZamStats (https://www.zamstats.gov.zm/) and World Bank Climate Change Knowledge Portal (https://climateknowledgeportal.worldbank.org/download-data)

This deep dive unpacks the constraints to agricultural productivity growth in Zambia, underscoring the detrimental effect of the current policy mix. The next section details the productive structure of the Zambian agriculture sector and uses an agronomic lens to analyze what is stymying its growth at field level. Section 2.3 demonstrates how productivity constraints are primarily linked to Zambia's inefficient and distortive public policies. The final section discusses strategies to unlock the agricultural potential of the country and enable the sector to support sustained and inclusive economic growth.

2.2 AGRONOMIC CAUSES OF DECLINING AGRICULTURAL PRODUCTIVITY

Most farmers in Zambia are smallholders, depend on maize, and are seeing crop yields decline

Agricultural production in Zambia is atomized and remains maize centric, despite increasing opportunities in other value chains. There are 1.65 million farms, with an average cultivated land area of 5.6 ha, primarily rainfed. Ninety percent of farmers are smallholders who cultivate less than 5 ha using hand-based tools. Maize – the main staple – dominates domestic production, representing 50 percent of the total area planted, and with 96 percent produced by smallholders (MoA and ZamStats, 2023). This cereal is paramount for food security and smallholder income, and is thus highly politically sensitive (World Bank, 2022b). The sector also encompasses other crops, including soya beans (14 percent of the area planted), groundnuts (10 percent), sunflower (7 percent), cassava (6 percent), sugar (1.7 percent) and tobacco (1.7 percent) (MFNP, 2023). In addition, 72 percent of agricultural households are engaged in the livestock and aquaculture subsector (GRZ, 2019), which serves most farmers as insurance for crop failure (PRMC, 2021) and contributes 42 percent of the agricultural GDP and 3.2 percent of the national GDP.

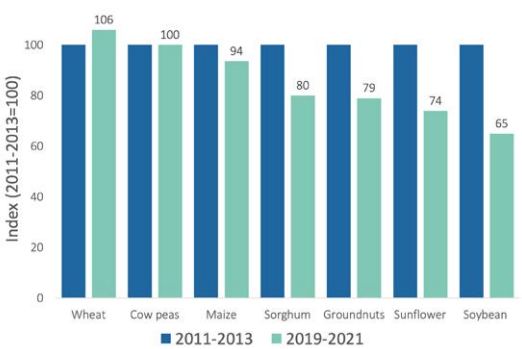
The overreliance on maize directly contributes to poverty. Maize dependence has three direct consequences for rural poverty and poverty alleviation: (i) it contributes to high malnutrition rates (Box 3); (ii) it reduces crop and climate resilience, as varied crops diversify economic risk and improve the agroecosystem's capacity to cope with pests and climate shocks (Heumesser and Kray, 2019); and (iii) it reduces incomes and farm profitability, as maize provides little revenue or profit (Mzyece et al., 2023; Mwanamwenge and Cook, 2019; FAO, 2018a).

BOX 3: Food security, malnutrition, and agricultural diversification in Zambia

Over 1.35 million Zambians experienced severe food insecurity between July and September 2022. Increasing food prices and climate shocks are amongst the main drivers of increasing food insecurity in Zambia. Food security rests on four simultaneous dimensions: (i) food availability; (ii) economic and physical access; (iii) food utilization; and (iv) stability of these three dimensions over time (FAO, 2009). Producing enough calories is not enough. Despite producing a maize trade surplus for several consecutive years, Zambia has a high degree of food insecurity, with 35 percent of children under five affected by stunting (ZamStats, MoH and ICF, 2019). At the same time, 24 percent of adult Zambians are either overweight or obese (MoH, 2017). Malnutrition in Zambia is driven by monotonous and deficient diets, with 63 percent of total dietary energy derived from cereals, predominantly maize (Mwanamwenge and Harris, 2017; Mwanamwenge and Cook 2019; Harris, et al., 2019). While households' overall purchasing power increased for some foods over the period 1996-2015, the cost of diversifying consumption away from maize has become greater, with key nutrient-rich foods (e.g., fruit, legumes, eggs) becoming more expensive (Harris, et al., 2019).

There are three ways in which agricultural diversification can improve food security and nutrition (Mwanamwenge and Cook): (i) diversified production can increase the nutrients available to a household; (ii) income can be increased through selling high-value produced crops; and (iii) empowering women can strengthen the income pathway to nutrition. There is also increasing academic consensus that diversified agricultural systems are more resilient to climate change (Arslan, et al., 2018; Heumesser and Kray, 2019; FAO, 2018a).

Figure 38. Crop yields average by period (2011-2013 = 100)

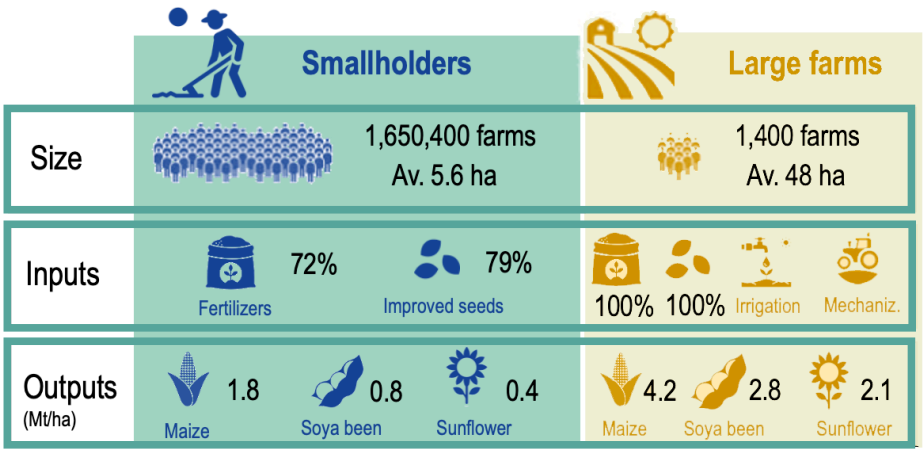


Source: FAOStats (https://www.fao.org/faostat/en/)

The productivity of critical crops is well below potential and on a concerning downward trend. As described above for maize, on average yields in Zambia compare relatively well to regional peers for most crops, but remain very low compared to aspirational peers or their estimated potential. What is more worrisome is their more recent downward trend (Figure 38). Yields of soybeans, sunflower, and groundnuts have contracted the most, while cow pea yields have stagnated. Maize yields ramped up from 1.38 Mt/ha in 2010 to 3 Mt/ha in 2014 but have since declined to 1.8 Mt/ha in 2022 (see also Figure 35).

Yields are not low everywhere in Zambia — large-scale farms achieve better performance and more diversified production. Large-scale farmers in Zambia are defined as those cultivating more than 20 hectares. They form a rather homogenous group, mostly concentrated in the Lusaka, Central, and Copperbelt provinces. Unlike smallholders, who use hand-held tools, their farm operations are mechanized, and their production is diversified and oriented toward both domestic and export markets. Maize is mostly produced to feed their livestock (ITA, 2022; Chikowa 2021;). On average, their yields are two to three times higher than smallholder farmers. They remain marginal in the Zambian landscape, cultivating about 0.7 percent of all farmed area (Figure 39). While developing these farms should be encouraged by an enabling environment, public incentives need to focus on small to mid-size farms, which have the largest potential for job creation and poverty alleviation at scale.

Figure 39. Key characteristics of smallholders and large farms in Zambia



Definition: MoA defines three broad groups of farmers in Zambia based on cultivated land size: small-scale (<5ha), medium-scale (0-20 ha) and large-scale (>20 ha). The first two are collectively referred to as "smallholder farmers", which is the categorization used in this chapter.

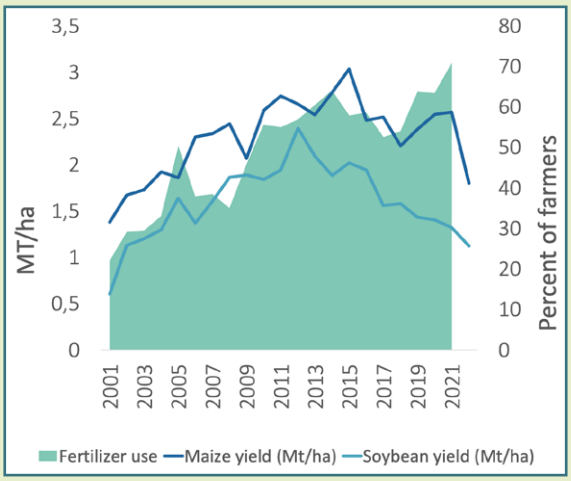
Source: Authors, based on MoA and ZamStats (2022) (https://www.zamstats.gov.zm/)

Increasing farm inputs have failed to improve productivity and are degrading the soil

Crop yields have declined in Zambia despite widespread and increasing use of farm inputs, including fertilizers and improved seeds. A striking 72 percent of smallholders apply fertilizer and 79 percent use certified seeds (Figure 40 and Figure 41). Large-scale farmers also use both in rising numbers. Overall, Zambia has one the highest rates of consumption in the region (Figure 42). As a comparison, in Tanzania, only 23 percent of farms use inorganic fertilizer and 24 percent of the cultivated area was farmed with improved seed varieties (World Bank and FAO, 2022). At an average of 186 kg/ha, fertilizer use by smallholders in Zambia is over three times higher than the 2006 Africa Union's Abuja Fertilizer Declaration target of 50 kg of fertilizer per hectare of cropland. These levels of inputs explain why Zambia's yields are higher than those of its regional peers (Figure 43) in line with the Green Revolution promises. However, the concerning decline in crop yields shows that increasing inputs is not able to sustain high yields.

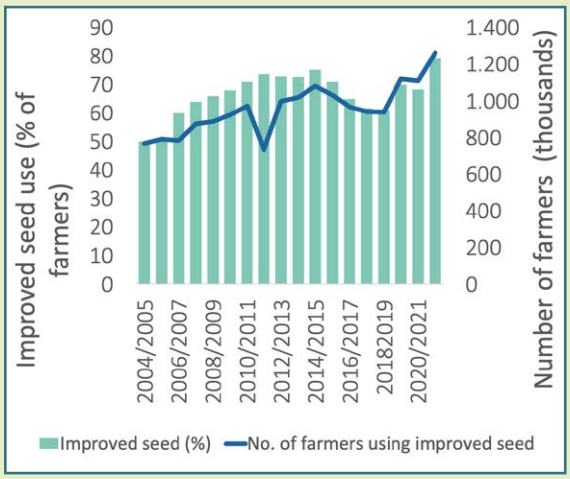
Yields of key crops are declining despite increasing numbers of farmers using fertilizers and improved seeds

Figure 40. Yields (Mt/ha, left axis) and fertilizer use (% of farmers, right axis)



Source: FAO Stat, MoA and ZamStats

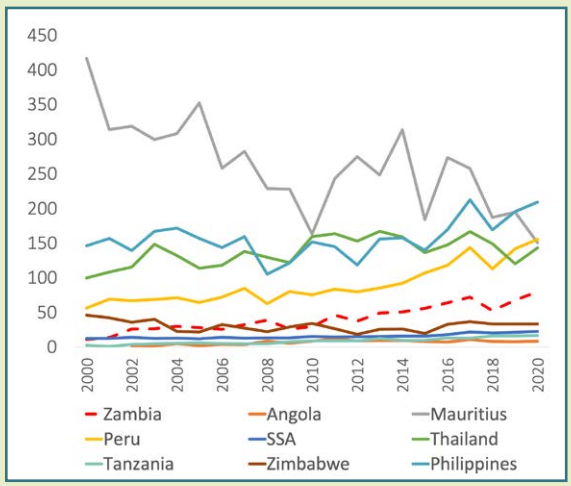
Figure 41. Certified improved seed use as % (left axis) and number (right) of farmers using improved seeds



Source: MoA and ZamStats

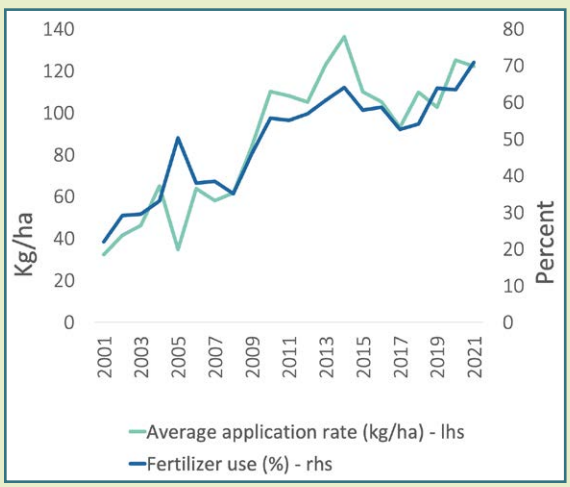
The numbers of farmers using fertilizer has increased, but consumption is lower than aspirational peers

Figure 42. Fertilizer consumption, Zambia, and peer countries (kg/ha)



Source: authors, data FAOStat

Figure 43. Fertilizer consumption: application rate (kg/ha) and share of farmers (ß) in Zambia



Source: authors, data FAOStat, MoA and ZamStats

Current fertilizer use is accelerating soil degradation, partly explaining why farm inputs are not increasing productivity. Large farms obtain two to three times the yields of smallholders but only apply on average 43 percent more fertilizer per hectare (Figure 39). In Zambia, fragile and acidic soils are being depleted due to inappropriate farming practices, including maize monocultures and inadequate types and quantities of inorganic fertilizer at the wrong time (Damania et al., 2023; Neina et al., 2022. An official blanket recommendation and FISP subsidy nationwide, regardless of soil type, has delivered excessive use of NPK (urea-nitrogen, phosphorus, and potassium), which increases soil acidity.[35] As a result, the average maize yield response (marginal yield obtained for every additional kilogram of fertilizer applied) ranges from zero to 7 kg of maize obtained per kilogram of fertilizer used (Burke et al., 2019). This phenomenon has been well documented in Malawi, where the soil fertilizer response rate dramatically decreased from 14.1 kg/kg over 1984-1995 to 2.1 kg/kg over 2014- 2018 (Burke et al., 2022).[36]

Zambia's agricultural performance and climate variability are increasingly linked, calling for widespread adaptation practices

Climate change demands adequate water management for agricultural growth. Smallholders are almost entirely dependent on rainfed production—only 1 percent of smallholder farmers irrigate field crops and about 15-17 percent irrigate fruit and vegetables (Hamududu and Ngoma, 2018). Irrigation methods are mostly rudimentary, with more than 80 percent using wells, streams, or rivers as water sources and buckets as the access and distribution technology. While this can work for subsistence horticulture, it implies massive water and energy waste for field crops like maize. Water-efficient and widespread irrigation is increasingly needed as climate change increases the frequency and intensity of drought in parts of the country. For instance, in 2015, Zambia experienced a drastic El Niño period that decreased rainfall by 30-50 percent, seeing maize yields plummet by 20 percent and smallholder incomes by 37 percent (Alfani et al. 2019).

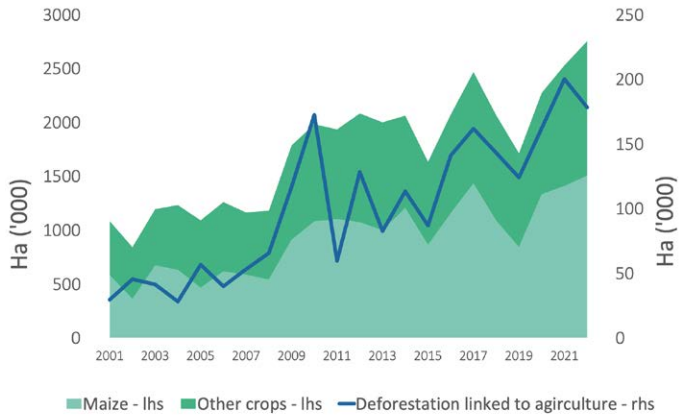
Vulnerability to climate change is hindering Zambia's agricultural potential, calling for the rapid upscaling of adaptation practices. Projections indicate that the rise of average temperatures, already observed at +1.3C between 1960 and 2000 in Zambia (GRZ, 2020), will further dampen agricultural production in the country, while rainfall evolution will vary across regions. Over the next 10 to 20 years, climate change-related losses for agriculture in Zambia are expected to amount to US$2.2–3.1 billion in a business-as-usual scenario (World Bank, 2018b). The risk of crop failure is highest in: (i) western and southern regions due to dry spells and heat stress; and (ii) northern regions due to flooding or waterlogging. Maize yields are projected to decline by 15 to 25 percent by 2050 (Siatwiinda et al., 2021; Mulungu et al., 2021).

[35] Farmers have obtained 200kg Compound D (10:20:10) and 200kg urea per hectare, applied throughout the country, regardless of soil type. The excessive use of NPK (urea-nitrogen, phosphorus, and potassium) increases soil acidity, particularly in northern parts of the country (Ichami et al., 2019; Sanchez, 2002). This implies that large quantities of NPK could be more effectively used.

[36] Soil quality issues can be addressed through techniques such as integrated soil fertility management, which combines inorganic and organic fertilizers with other nutrients and improved production practices (e.g. rotation with leguminous crops, climate-smart systems). For instance, lime application is an efficient way to reduce soil acidity.

Agricultural production growth is achieved by farmland expansion rather than by increasing productivity, contributing to deforestation

Figure 44. Area harvested (ha) per crop and deforestation linked to agriculture in Zambia (ha)



Source: authors, data FAOSTAT, MoA, ZamStats (2023) and GlobalForestWatch

As yields of major crops decline and the rural population increases, expanding production largely relies on farmland extension and deforestation, adding to pressures on biodiversity. To compensate for low land productivity and to accommodate a growing population of farmers, the farmed area has been expanding, accelerating deforestation (Mulenga et al., 2020; Ngoma et al., 2021; Figure 44). In 2022, the area harvested increased for most crops and reached 1.5 million hectares for maize, 424,000 hectares for soya beans, 295,000 hectares for groundnuts, and 218,000 hectares for sunflower. Based on a national representative survey of Zambian farm households, Ngoma et al (2021) found that one-fifth of their sample had expanded cropland between the 2016/2017 and 2017/2018 farming seasons. At the same time, deforestation linked to agriculture has continuously increased during the last decade, with cropland expansion by smallholders into forests representing about 60 percent of the estimated 250,000 ha of forests lost annually.

2.3 THE ROLE OF PUBLIC POLICIES AND INSTITUTIONS IN AGRICULTURAL STAGNATION

Ineffective and inefficient support programs have reduced the government's capacity to drive productivity growth in Zambia's agricultural sector

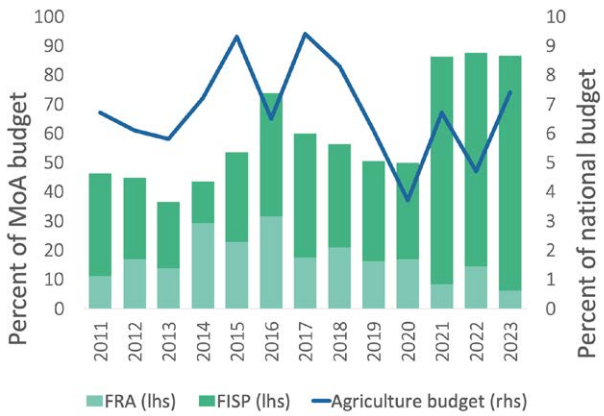
Since 2018, Zambia has allocated between 3.7 and 8.3 percent of its budget to agriculture (7.4 percent in 2023), focusing on support programs for maize production and marketing. Zambia benefits from increasing agricultural budgets recently (Figure 45), and the budget share is comfortably higher than for peers.[37] However, public spending in agriculture is heavily skewed towards the Farmer Input Subsidy Program (FISP) and the Food Reserve Agency (FRA), which primarily support maize production and marketing, respectively (Boxes 4 and 5). Yet only 0.6 percent of the national budget was allocated to the livestock, fishery and aquaculture subsector in 2023—despite the potential—compared to 3.8 percent allocated to FISP and FRA. In the last three years (2021, 2022, and 2023), total spending on the FISP and FRA has exceeded 80 percent of the total Ministry of Agriculture's budget (MoFNP 2021, 2022, 2023a; Figure 45).

[37] For example, Zimbabwe allocated 3.7 percent of its total budget to the sector in 2017 (data FAO-MAFAP), Tanzania 2.2 percent over 2017-2021 (World Bank and FAO, 2022), and Angola 0.6 percent over 2015-2019 (World Bank, 2021f).

The high fiscal cost of the FISP and FRA has reduced the government's capacity to invest in other agricultural programs that could drive productivity growth and climate change adaptation. The Second National Agricultural Policy (SNAP) acknowledges the need for improved extension services and investment in crop productivity, diversification, value addition and private sector participation. However, these areas are not supported by adequate public spending or sufficient legislation. With 90 percent of the agriculture budget allocated to FISP and FRA, funds have been insufficient to support crucial services and the infrastructure needed for agricultural growth, job creation and climate change adaptation. For example, it is essential to improve access to feeder roads, electricity, and irrigation; expand support for research and innovation; offer training and capacity building; build rural institutions; and improve market information and access to credit (Jayne and Sanchez, 2021; Goyal and Nash, 2017; Fuglie, 2012). As just one example, in the last five years (2018-2022) Zambia allocated only 2.9 percent of its agricultural budget to irrigation.

The agricultural budget is generous but skewed toward inefficient input subsidies

Figure 45. Percent allocation of agriculture budget to FISP and FRA, 2011 – 2023



Source: MoFNP and MoA

Input subsidies (under the FISP) represent about 80 percent of public spending on agriculture. Zambia has a long history of input subsidies (Box 4), which aim to reduce costs for farmers and increase production, incomes, and national food security. The government subsidizes the distribution of bags of fertilizer and improved seeds to produce maize (smallholder farmers contribute to 5 percent of their cost), and more recently, soya beans and groundnuts. Fertilizer is procured centrally by the government and implemented through the Direct Input Support (DIS) system (Box 4). In practice, the FISP is managed by different structures at national, provincial and district levels, with a network of stakeholders that include agro-dealers, suppliers, cooperating partners, and service providers. FISP allocation rocketed up in 2021 (Figure 45) in a context of high international fertilizer prices and an election year. In 2021, 2022 and 2023, FISP alone accounted for more than 80 percent of the total Ministry of Agriculture (MoA) budget (MoFNP 2021, 2022, 2023a).

Despite its increasing fiscal costs, the FISP has failed to significantly support agricultural productivity growth or alleviate poverty. The FISP explains the impressive levels of fertilizer and certified seeds used by smallholders discussed above. However, these have not translated into sustained increases in crop yields or poverty reduction (see Chapter 1). A major reason is that FISP uses a blanket fertilizer application recommendation across the country, without accounting for agroecological variations. Given the low response rate of Zambian soil to fertilizers (see Section 2.2), the effectiveness of public spending through FISP is very low. In addition, the FISP has crowded out private sector investment in upstream segments of the agricultural production chain (input production, supply, and distribution), with damaging impacts on long-term agricultural growth and productivity.

Numerous implementation challenges further hamper the FISP's effectiveness. The FISP has inefficiencies at multiple levels, including high administrative costs, poor targeting, inequality in the quantity of inputs allocated to beneficiaries, and late or non-delivery of inputs (World Bank, 2021c). Namonje-Kapenbwa and Chapoto (2016) showed that late delivery of FISP inputs resulted in maize yields being about 5 percent lower than in households that acquired fertilizer from commercial channels. Namonje-Kapembwa et al. (2017) estimated that lost maize production due to fertilizer delivery delays equated to 21 percent of the FISP budget in the 2010/2011 farming season.

The challenges and shortcomings of the FISP reflect those consistently faced globally with input subsidies. In the wake of the Green Revolution in Asia, many SSA countries have implemented input support programs over the past 40 decades, subsidizing improved seeds and inorganic fertilizers to accelerate the diffusion of technologies and adoption of inputs. Meta-analyses of the literature find mixed evidence on their impact in the region. On average, they have increased production, although at the cost of efficiency and a high fiscal burden and with low success in facilitating long-term technology adoption. Their benefits also tend to accrue to wealthier households rather than poorer ones, even when they are intended to target the latter. Finally, input subsidy programs might also come with unintended environmental consequences. They are estimated to have been responsible for 17 percent of all nitrogen pollution in recent years and in Africa contribute to soil acidification, which reduces agricultural productivity (Damania et al., 2023).

BOX 4: Zambia's Farm Input Support Program

Zambia's Farm Input Support Program (FISP) was created in 2009 to expand the previous fertilizer support program. It went from 200,000 beneficiaries in 2008 to 500,000 in 2009. From 2008 to 2011, Zambia recorded its highest increases in maize production, ramping up output from 1.2 million Mt to over 3 million Mt.

To increase FISP efficiency, in 2015/16 Zambia piloted an e-voucher system and rolled it out countrywide in 2017, although it was later discontinued. Implementing the e-voucher system has the potential to reduce administrative and logistical costs, creating fiscal space for the GRZ to invest in research, extension, and irrigation. It gives farmers flexibility in selecting inputs and crops and making financing available to them, potentially increasing engagements with private agro-dealers. At the same time, it encourages farmers to diversify into more climate-resilient crops and move away from maize-centric subsistence production that puts pressure on biodiversity, ultimately creating more jobs and reducing poverty. In 2015/16, through the piloting of the e-voucher system, the GRZ successfully raised private sector involvement in input distribution, reduced fiscal expenditures on input subsidies, and contributed to agricultural diversification as farmers were able to choose from a range of inputs. However, use of vouchers was discontinued in 2018 because of ICT difficulties in remote localities. It was replaced with the Direct Input Support (DIS) system, with central procurement carried out by the government.

Currently, the GRZ is engaged in reforms to improve the FISP, including the re-introduction of the e-voucher system. Current measures also include developing a biometric farmer registry, aimed at improving targeting and avoiding "ghost" beneficiaries.[38] At the end of 2022, the authorities approved a second attempt to introduce e-vouchers. This involves an action plan to migrate FISP to a system that electronically delivers a voucher that farmers can use to procure inputs of their choice from the market,

[38] During 2022, the GRZ issued instructions to clean up the database of FISP beneficiaries and completed a biometric registration process of all farmers participating in the FISP.

starting with regions which have adequate 3/4G network coverage. It has also issued a handbook with transparent rules for targeting beneficiaries, network access requirements, and principles for private sector participation. However, implementation is slow. A national soil mapping exercise is also being undertaken to improve soil fertility management, including the use of soil amendments such as lime.

Interventions by the FRA in maize markets crowd out private sector investment, damaging trade (World Bank, 2021c). Initially set up as a strategic grain reserve (SGR), the FRA has become the dominant player in the maize market in Zambia, at an increasingly high fiscal cost (Box 5). More recently, the agency has started purchasing soya beans. The SGR size is set at 500,000 Mt of maize per annum, well above the 300,000-350,000 Mt that would be within the required emergency needs range (Kuteya and Samboko, 2018; Harman and Chapoto, 2017; World Bank, 2021c). Without a legally binding limit on the reserve size, the FRA regularly bypasses its target ceiling. In the 2014/2015, 2020/21 and 2021/2022 marketing seasons, about 1.0 million Mt, 0.95 million Mt and 0.8 million Mt respectively were purchased. Purchases often occur above market prices, crowding out private traders (Figure 46 and Figure 47). Several large international and local market players recently stopped their maize market operations or left the country because of FRA's ad hoc market participation and inconsistent trade policies.

BOX 5: The Food Reserve Agency: From strategic grain reserve to dominant maize market player in Zambia

The FRA was formed in 1995 in Zambia to hold buffer stocks, reduce price volatility and provide liquidity in the maize market during the initial years of market liberalization. In 2005, the agency was enabled to participate in the marketing and trade of designated agricultural commodities. Further amendments were made in 2020 to further expand its mandate to: (i) manage the national SGR to ensure a reliable supply of staples to meet local shortfalls and food emergencies caused by natural disasters; (ii) provide market access to smallholder farmers; and (iii) manage public agricultural storage facilities. While it mostly intervenes in maize, FRA is also increasingly purchasing soya beans.

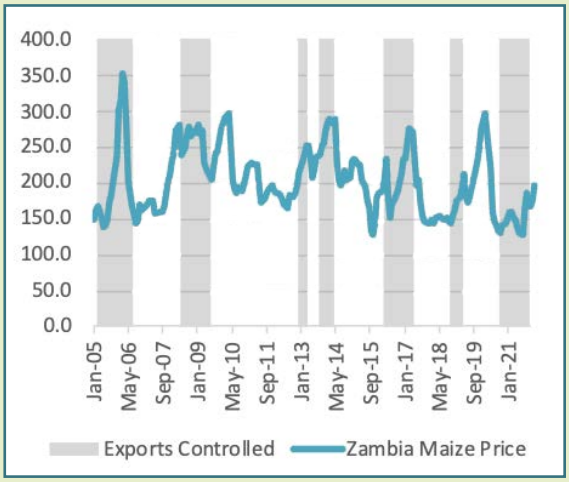
The FRA's interventions are distortive and discourage private sector participation. A World Bank report, *Role of Strategic Grain Reserves in Enhancing Food Security in Zambia and Zimbabwe* (World Bank, 2021e) evaluates its evolving role, fiscal cost, and effects in the maize market. It finds that the management of the SGR has imposed a major cost on the Treasury, while the price stabilization policy has had negative effects on private sector participation and depressed investment in the maize sector. Currently, the FRA is a major market player in the maize market, buying the commodity even in areas that are well served by the private sector and generally above market prices.

The FRA should limit its purchases to the required SGR amount and buy stocks from areas where the private sector is less likely to operate. To incentivize farmers to produce for the next season, the FRA should assume the role of buyer of last resort, ensuring that its resources are available to farmers when they fail to find a market, or when the market price fails to rise above the floor price offered by the FRA. Serving as a buyer of last resort means that the FRA would be buying at the tail end of the market, giving farmers more options to market their crops, while limiting pressure on the Treasury. The report also demonstrates avenues for improvement: (i) logistics and geographical distribution of grain reserve storage facilities across the country, which in most cases do not coincide with disaster hotspots; (ii) early warning information, including on the position of stocks; and (iii) diversification of the current emergency food distribution to provide nutrition benefits to food insecure households.

Zambia has a history of inconsistent agricultural trade policies and ad hoc market interventions. Selective import and export bans on commodities, especially maize and soya, are common. Combined with government interventions in maize market prices and unfavorable tax policies, they make Zambia a challenging agricultural trading partner, despite the country's potential to be a food basket. There have been periods when only the FRA has been allowed to export through government-to-government deals without private sector participation. Even without export restrictions, agricultural trade remains heavily regulated. Maize grain and flour are allowed for export on a month-to-month basis through a quota system valid for 30 days only, limiting traders' ability to negotiate forward contracts with farmers and buyers alike. This system discourages large commercial farms from investing in maize production. Additionally, all maize and maize-related products are subject to a 10 percent export levy, while transport permits are required to move the crop across domestic district borders, adding to the costs and putting small- and medium-sized firms at a disadvantage (World Bank, 2022b).

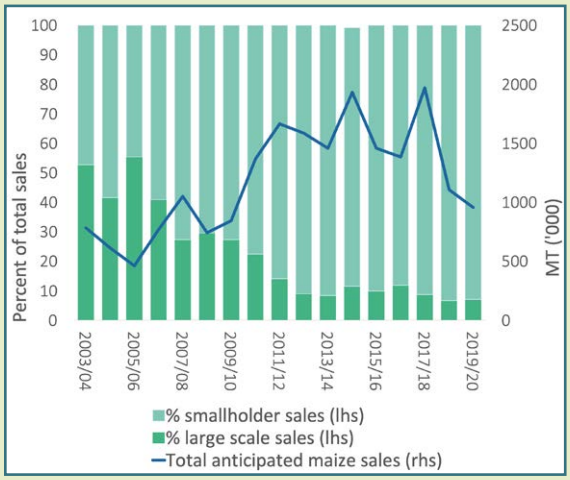
Maize marketing and trade interventions have crowded out the private sector in Zambia

Figure 46. Maize price (US$/Mt) and export controls monthly



Source: World Bank, 2022b

Figure 47. Maize sales by farmers and FRA anticipated sales in Zambia



Source: World Bank, 2022b

Uncertain trade policies also discourage private sector participants from investing in agricultural markets

Combined with maize market distortions, these trade disruptions and barriers have further undermined private sector investments in agricultural production and processing. This is evidenced by the exit of large farms and large multi-national grain-trading and agribusiness companies. Zambia used to have an active ecosystem of international grain traders, which were important for sector modernization and productivity gains. The World Bank (2022b) assessed the impact of maize trade policies in Zambia using partial equilibrium modeling and found that trade restrictions reduce maize prices on average by 17 percent, and producer revenue by 17 percent. Short-term gains for consumers are offset in the medium term by production losses due to shifting planting decisions and reduced investment in the sector.

To quantify the efficiency of spending around 80 percent of the agricultural budget on FISP and FRA, a productivity analysis was conducted for this report on several farm structures in three major production regions. This exercise allows for an assessment of the social efficiency and welfare effects of the FISP and FRA. Domestic resource cost ratios (DRCs) and net profit per hectare were computed based on primary and secondary data (Box 6). The analysis covers different types of smallholders (supported or not by FRA, FISP or both) and large commercialized farms (not supported by FISP or FRA). It was conducted for four production seasons, as prices evolve year-round depending on supply, demand, and storage costs.

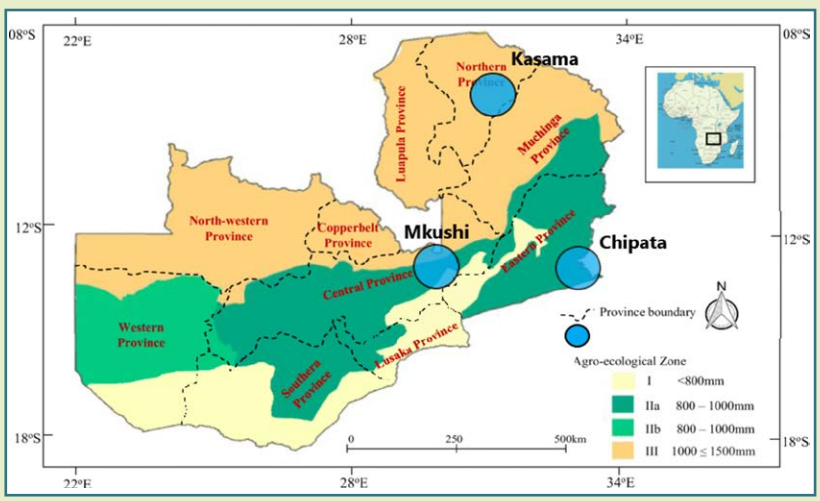
BOX 6: Methodology of the productivity analysis

The productivity analysis updates a World Bank (2014b) analysis of maize profitability, production efficiency and welfare implications for Zambia. It was updated for maize and extended to soybean and sunflower. Detailed methodology and results can be found in Kuteya and Mulenga (2023). The analysis covers large commercial farmers (LCF) in Mkushi (Central province) and smallholders in Mkushi, Chipata (Eastern province) and Kasama (Northern province) (Figure 48). LCF are differentiated into rainfed ("low productivity") or irrigated ("high productivity") according to their water management. Eight types of smallholder farms are considered, depending on: (i) their input suppliers (FISP or private traders) and output buyers (FRA or private traders); and (ii) their input use. In this case, "high productivity" farms apply the general recommended fertilizer rate and have larger yields than "low productivity" farms, which applied half of it or less.

In-person interviews were conducted with all farm types and in consultation with the District Agriculture Coordinating Offices. Industry experts (e.g., from the Grain Traders Association of Zambia, Zambia National Farmers Union) and the District Marketing and Development Offices in Chipata, Mkushi and Kasama were also consulted. Data was collected from primary and secondary sources on production, storage, transportation and marketing costs; output prices; export prices (from South African Futures Exchange); and trader margins.

To account for seasonal variation in market conditions, the analysis considers four market scenarios: (i) pre-season exports of irrigated maize when prices are at their peak; (ii) early-season exports, when prices begin to decline as the new crop rolls in; (iii) peak season exports when prices are at their lowest because the market is flooded with produce; and (iv) long-season exports, enabled by several months of storage for export during the following rainy season.

Figure 48. Location of study regions in Zambia



Source: Modified from Makondo and Thomas, 2020

The analysis assessed the social efficiency and welfare effects of the FISP and FRA, in addition to the profitability of farms. Social efficiency and competitiveness were measured using domestic resource cost ratios (DRC). A DRC is the ratio of the domestic resources used to produce and market a unit of tradable commodity compared with the foreign profits earned at economic prices. A DRC of over 1 indicates that the system consumes more domestic resources than the value of tradable output, implying a social loss. Conversely, the lower the DRC, the greater the efficiency (Kikuchi, et al., 2016; Balassa & Schydlowsky, 1968). Moreover, net profits per hectare, a measure of productivity, were computed to assess farmers' income. The net profit per hectare was compared to the poverty threshold, estimated by the authors at 260 US$/ha (the net profit per hectare needed for an average farm of 6 hectares, with two full time workers, to earn 2.15 US$/day).

Farms that benefit from both the FRA and FISP are the least socially efficient

The analysis confirms that the social efficiency of FRA and FISP is low and varies significantly by region, season, and farm productivity level. Figure 49 shows the average DRCs across regions, productivities, and seasons for smallholder farms who are either supported by the FRA, FISP or both, those who are not supported, and large commercialized farms. Farms that benefit from both programs are the least efficient. The DRC of maize farms which benefit from both FISP and FRA averaged 0.72, against 0.48 for smallholders that do not get these supports and 0.39 for large commercial farms. A closer look at results per region and per level of farm productivity has further implications (Figure 50). In Mkushi (Central Province), smallholder maize farms that are supported by FISP and FRA have a DRC well over 1, underscoring that public expenditures on these programs represent a net loss. Smallholder maize farms in Kasama (Northern Province) which are supported by both programs have a DRC ranging from 0.78 to 0.90, while in Chipata (Eastern Province) it ranges from 0.71 to 1.07. Although results for soybeans are less stark, they are consistent with the finding that smallholders supported by FISP and FRA are the least efficient.[39]

The analysis demonstrates that Zambian farms which do not benefit from FISP and FRA support are the most competitive, particularly large commercial farms, and thus have greater export potential. For all three crops studied, and for both smallholders and large commercialized farms, our results show that Zambian farms which do not benefit from FISP and FRA have the lower DRC ratios (highest efficiency). This implies that they are also more competitive in export markets. In particular, the lowest DRCs are observed for large commercial farms and for smallholder farms that do not benefit from the FISP and FRA.

Supporting maize production through the FISP and FRA is the least socially efficient option for Zambia, with efficiency ratios varying by region, season, and crop type

Figure 49. DRC per crop type across farm types

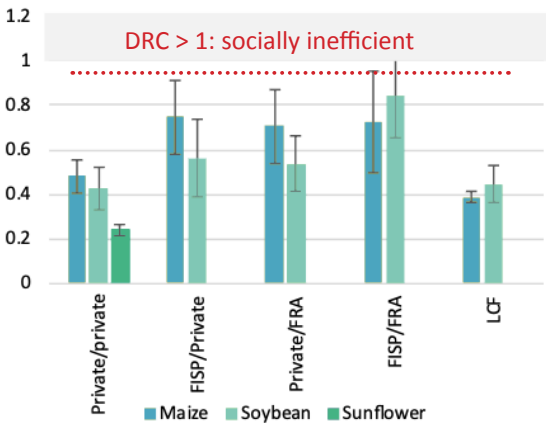
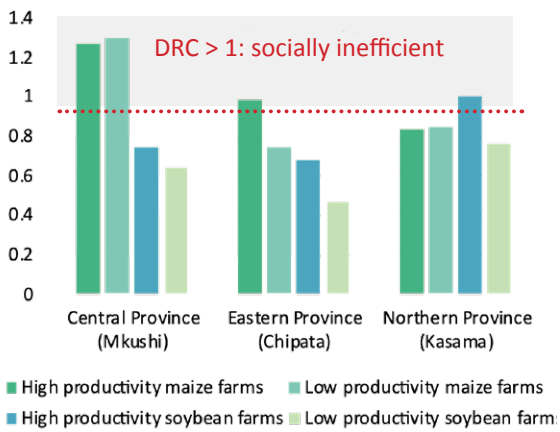


Figure 50. Variation in social efficiency of FISP and FRA support by region



Note: "Private/private" smallholder farms purchase private inputs and sell their outputs to private traders. "FISP/private" smallholder farms get inputs from FISP and sell their output to private traders. "Private/FRA" farms purchase inputs from private traders and sell their outputs to FRA. "FISP/FRA" smallholder farms get inputs from FISP and sell their output to FRA. LCF are large commercial farms who do not receive FISP or FRA support. Error bars reflect output price variability across farm productivity levels, regions and market conditions studied. The lower the DRC, the higher the social efficiency.
Source: authors, based on the background paper by Kuteya and Mulenga (2023)

[39] Table A3 in Annex 2 provides the detailed DRCs calculated by Kuteya and Mulenga (2023).

Smallholder farmers who solely produce maize are less likely to escape poverty, while agricultural diversification, including in livestock value chains, could lead to more and better jobs

Results show that solely producing maize cannot alleviate poverty, calling for an acceleration of agricultural diversification policies. The average smallholder who solely produces maize earns below the poverty threshold of US$2.15/day, even when they are supported by the FISP and FRA (Figure 51). Maize smallholder producers who are above the poverty threshold have a more input-intensive production system (high levels of input use), are supported by FISP, and sell their produce to private traders. This highlights that the FISP has a role as an income support system for maize producers. However, producing soya beans and sunflower is more profitable, suggesting that diversifying into other crops might provide a more stable pathway to increase incomes and alleviate poverty in rural areas. Profits are nonetheless highly variable across farm productivity levels, seasons, and regions, calling for a more detailed analysis of success factors at farm level. The most profitable soya beans are those sold to the FRA, hinting that the agency purchases the commodity above market prices.

Better infrastructure and a conducive trade environment are key for commercialized farm profitability, which is critical for private sector-led growth and job creation. Large-scale farms have up to eight times more profit per hectare when they irrigate maize compared to when production is rainfed (Table 1). They also double their profits when they sell maize early in the season before most of the supply hits the market.[40] Therefore, large commercial farms need to enter the export market early to benefit from high regional prices and optimize profits. Once farmers enter the main harvest season, maize market prices decline as domestic and regional supply increases. Delayed exports, frequently caused by ad hoc export bans or export quotas, can cause Zambian farm competitiveness to plummet. Finally, the high costs of storage reduce farms' profitability for both smallholders and large commercialized farms during the long season. Investments in trade facilitation, transport, and storage infrastructure could thus yield higher incomes for smallholders and large farms alike.

Table 1. Large-scale farms' competitiveness indicators for maize

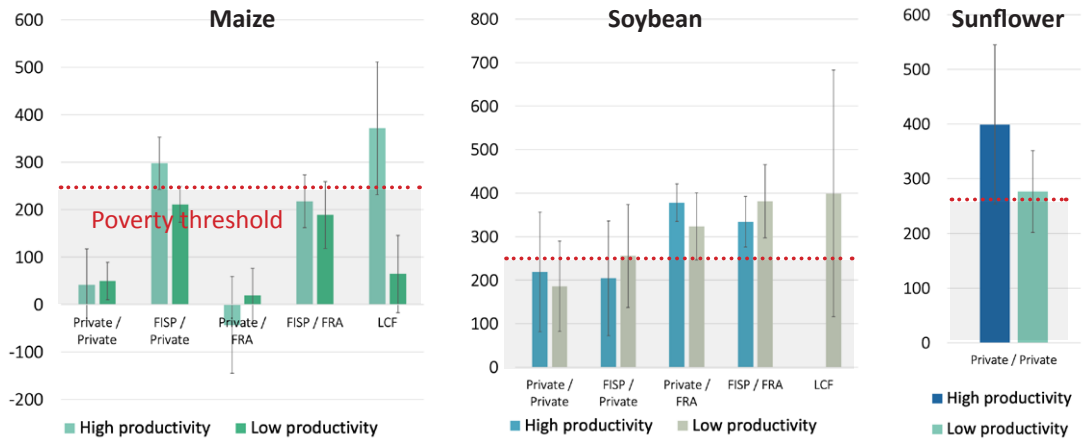
	Preseason	Early	Peak	Long
LCF irrigated (10 mt/ha)				
DRC	0.42	0.35	0.35	0.35
Net profit (US$/ha)	385.50	508.44	376.24	229.34
LCF rainfed (7 mt/ha)				
DRC	n/a	0.43	0.45	0.40
Net profit (US$/ha)	n/a	152.24	48.92	(8.39)

Source: Background paper by Kuteya and Mulenga (2023). Note: DRC = domestic resource cost ratio; LCF = large commercial farm

[40] Output prices and profitability decreases as the cropping season advances—the net profit for rainfed soybeans drops from US$ 685/ha in the early season to US$ 395/ha in the long season. Similarly, for irrigated maize it falls from US$ 508/ha in the early season to US$ 229/ha in the long season, and for rainfed maize from US$ 152/ha to a net loss of US$ 8/ha.

Supporting maize production with the FISP and FRA is not bringing farmers out of poverty

Figure 51. Profitability analysis: net profit (US$/ha) per crop type



Note: "High productivity" smallholder farms use more inputs and have higher yields than "low productivity" farms. "High productivity" large commercial farms (LCFs) are irrigated; "Low productivity" LCF are rainfed. Error bars: variability across regions and market conditions (early, peak, or long season).

Source: authors, based on the background paper by Kuteya and Mulenga (2023)

2.4 POLICY RECOMMENDATIONS

To increase productivity, Zambia needs to reform the FISP and FRA to free up fiscal space for productive investments, especially in climate change adaptation

The authorities have initiated critical agriculture reforms, but progress is slow. The government has committed to an open trade regime for agricultural exports and imports and is seeking to implement a new comprehensive agriculture support program with a reduced allocation for the FISP. In December 2022, the Cabinet approved the Action Plan to migrate the FISP to an e-voucher system which, among others, creates more fiscal space for the GRZ to invest in research, extension, climate-resilience, and irrigation (Box 4). However, implementation is slow. The 2024 budget allocation to the FISP has fallen by 6 percent in nominal terms, but only because using domestically produced fertilizer has contained costs. The Strategic Reserve budget allocation has almost tripled in the 2024 budget to Kwacha 1.68 billion. This allocation is much higher than planned in the 2023-25 medium-term expenditure framework (Kwacha 615 million). The FRA will now participate more strongly in the grains market (beyond covering three months of consumption) to ensure food security and help stabilize food prices at the expense of market efficiency.

Redirecting public expenditures on the FISP and FRA to productive investments is essential to increase agricultural productivity, achieve inclusive economic growth and reduce poverty. The FISP, FRA, and trade disruptions have heavily incentivized smallholders to rely on maize production, crowding out private actors and large-scale farm development without alleviating poverty. Their income-support role could more efficiently be achieved by using social safety nets or cash transfers. The recent opening of FRA and FISP interventions to the soybean value chain is a promising step forward to support smallholder agricultural diversification. However, bolder reforms are needed.

Repurposing public spending on FISP and FRA to instead support productive investments in transport and storage infrastructure, capacity building, innovation and climate change adaptation is vital to reduce poverty and generate inclusive sectoral growth.

Halting the decline in Zambia's agricultural productivity will mean investing in climate change adaptation and stopping the degradation of environmental resources, starting with the soil. Zambia's production is becoming increasingly volatile due to climate change and related weather shocks (Section 2.1). Productivity is falling despite the uptake of fertilizers and improved seeds, owing to high soil degradation, inadequate fertility management and insufficient water management (Section 2.2). Agricultural production depends on a well-functioning agroecosystem, which will be under increasing stress in the coming decades. As a result, improving agricultural productivity in Zambia will require a more holistic approach to soil health, as well as more sustainable and diversified agricultural production techniques. Agronomic solutions have already been identified by the GRZ (crop diversification and rotation, improved fertility management, liming, irrigation, and agroforestry, among others) but need to be implemented rapidly and at scale. During the 2015 drought, Alfani et al. (2019) found that livestock diversification, income diversification, and agroforestry adoption moderated its impact on farmers.

Successful localized crop diversification and climate adaptation experiences need to be replicated and scaled up nationwide. While the yield of long-maturing maize varieties is projected to drop from between 33-35 percent (Luapula, Northwestern) to around 80-90 percent (Copperbelt, Muchinga), species such as finger millet, sorghum, cowpeas, and groundnuts may serve as climate-resilient alternative staples (Hunter et al., 2020). The climate-related risks to agricultural households in each province are a function of the impact of climate change on crop production and the adaptive capacities of each community to manage climate risks. Hunter et al. (2020) found that the Central, Northern and Lusaka provinces had higher adaptive capacities than the North-Western, Western and Eastern provinces.

Repurposing FISP and FRA spending could free up fiscal space for productive infrastructure, facilitating private investment, increasing climate resilience, and generating sustained and inclusive growth in rural areas. Zambian farms are export-competitive, particularly large, commercialized farms; improving market access would boost their profitability (Section 2.3). Building resilient, diversified, and productive farm production systems requires farm mechanization, transport infrastructure, and storage and processing facilities to develop domestic and regional markets. Road and rail infrastructure is critical to connect high-potential farm regions to markets and to allow people and goods to circulate cost-effectively. As well as farmers, such investments would benefit traders, processors, and consumers.

Investing in resource-efficient irrigation is paramount for adapting to climate change. Large commercial farms make about eight times higher profits during peak season when they irrigate their fields than farms which rely on rainfed production (Section 2.3). This finding aligns with results for SSA, where irrigation is known to yield among the highest returns on public spending (11 to 22 percent, according to Goyal and Nash, 2017). Overreliance on rainfed production by smallholder farmers exposes the sector to climate change and variability. Public-private partnerships could be used to cooperate with farming communities to invest in irrigation and to establish well-defined water user rights and fees. In addition, there is a need to continue to promote water-conserving

tillage practices such as minimum tillage, cover crops, and residue retention to reduce water stress during dry periods.

A supportive business environment and removing trade barriers can help boost productivity and quality jobs in agribusiness and commercial farming

Increasing productivity and creating better jobs in the agri-food system, including in commercial agriculture, and increasing production in higher value-added crops, livestock, and aquaculture, will require a supportive business environment with improved extension services and skills. Section 2.3 highlighted the large variations in farm efficiency and profitability. These variations suggest considerable growth potential and job opportunities if successful farm practices and management can become more widespread. There has also been greater growth in other high value-added crops, and potential exists in other subsectors like livestock and aquaculture (Box 7). This will depend on greater capacity to support an enabling environment that catalyzes private sector investment. Enhancing education and training in modern technologies and practices for profitable and sustainable operations, access to finance and insurance, plant health protection and veterinary services, and early warning systems will be key, all of which are innovation intensive. In addition, building human capital, including knowledge transfer and skill development in modern production practices, is a cornerstone of agri-entrepreneurship.

Finally, removing trade barriers and facilitating exports would boost Zambia's export and commercial agriculture potential. Zambia still suffers from multiple trade barriers—ranging from restrictions on the size of trucks that can transport maize, to export permits that expire after 30 days, among others. Unexpected transport or administrative delays significatively increase the cost of doing business and decrease the competitiveness of Zambian agricultural exports. Removing these constraints would require administrative actions. In addition, smooth-flowing market information provides transparency, which is essential to the open trade of agricultural commodities. An independent agricultural information system would improve market efficiency, benefiting all stakeholders, in particular smallholders. Digital innovation can improve the quality and access to such market information platforms.

BOX 7: The high growth potential of livestock and aquaculture subsectors in Zambia

The livestock and aquaculture sub-sectors contribute 3.2 percent to national GDP and 42 percent to agriculture GDP, playing an important economic and social function (Ministry of Fisheries and Livestock et al., 2023). The 2022 Zambia Livestock Survey established that 33 percent of farm households (around 1.2 million) are specialized in livestock, with 35 percent rearing cattle and 48 percent rearing goats. The livestock sector is dominated by low-productive and smallholder-owned herds kept on a wide diversity of farm systems. Despite the nation's rich endowment in natural resources and high and expanding demand, disease burden and inadequate nutrition hamper the livestock sector's productivity. It remains small compared to other countries in the subregion, with growth mainly anchored around emergent large-scale farmers, particularly in poultry (UNECA, 2020; Dutilly et al., 2020).

Mixed crop-livestock systems have a growing potential to support economic growth. Cattle and goat breeding works in a mixed crop/free-range grazing livestock system, with livestock playing an insurance role when crops fail. These mixed rainfed systems are the main contributors to agricultural added value, even if specialized intensive systems provide around 45 percent of meat and milk production. For instance, the large dairy systems provide 45 percent of the milk supply but contribute only around 3 percent of livestock added value, while the mixed rainfed systems (accounting for 32 percent of the milk production) contribute to 56 percent of livestock added value. There are increasing benefits and opportunities to mixed crop and livestock production systems, with efficiency gains in using resources by different animal products and mixed crop production (Dutilly et al., 2020).

The poultry subsector stands out in Zambia due to its rapid supply and demand growth since the early 2000s, tripling over the last five years. Unlike cattle and goats, most poultry (layers and broilers) are produced on specialized farms. The growing trend was triggered by public policies and incentives, and large private investments from local and multinational firms, which trickled down the value chain. While village backyard chickens still constitute the bulk of the production, the broiler industry is now highly concentrated at the primary producer level for parent breeding stock (with a duopoly controlling most of the production parameters). However, the broiler value chain becomes less concentrated as you move up the value chain. Production mostly serves the domestic market, as its volumes and competitiveness are below South America's imports transiting through South Africa. To be competitive on the regional market, Zambia's poultry sector would require improvements to both production and productivity of both feed and poultry, which would need infrastructure investments, improved access to finance and extension services, lower transportation costs and facilitating trade procedures (Samboko et al., 2018).

Aquaculture and fisheries are another subsector with great potential in Zambia; the country possesses about 45 percent of the water resources in southern Africa. Aquaculture production has more than tripled in Zambia in the past decade. The country produces about 60,000 metric tons and 90,000 metric tons annually from, respectively, aquaculture and natural water bodies, while it imports about 80,000 tons of fish (Ministry of Fisheries and Livestock, 2023). Although the country is among the largest aquaculture producers in SSA, production is failing to keep pace with its rapid population growth and increasing demand for fish, a popular staple. Trade statistics show a 15-fold increase in fish imports to Zambia over 2010-2020. The fisheries sub-sector supports around one million people in Zambia, with about 72,000 fishers. Aquaculture development is limited by access to quality fish seed and fingerlings, poor aquatic health management, underdeveloped value chains and a lack of investment capital (WAS, 2023; FAO, 2023). Zambia has just launched the Fisheries and Aquaculture Policy and its Implementation Plan (2022-2026) to address these shortcomings.

Table 2 summarizes the main policy recommendations made in this chapter for unleashing the potential of agriculture in Zambia.

Table 2. Top policy recommendations for unleashing agricultural productivity

Policy Problem	Short-Term Actions	Medium-Term Actions
Inefficient and ineffective agricultural support programs prevent productivity growth, hinder crop diversification, and discourage much-needed productivity enhancing investment	Reallocate FISP and FRA expenditures toward productive investment in infrastructure (e.g., transport, storage, processing), capacity building, innovation, climate change adaptation, irrigation, crop diversification, extension services, and plant health protection and veterinary services	
	Improve the targeting of FISP to avoid "ghost" beneficiaries	Limit the role of FRA to that of a strategic food reserve (with a 300 kMt ceiling)
	Accelerate the switch of FISP to the e-voucher system	
Multiple trade barriers increase the cost of doing business, crowd-out private actors, and decrease the competitiveness of Zambian agricultural exports	Maintain an open trade regime for agricultural commodities	Improve predictability and transparency surrounding agricultural trade disruptions
	Facilitate trade by alleviating technical barriers and roadblocks, such as extending export permits	Improve predictability and transparency on agricultural trade disruptions
Overreliance on rainfed production by smallholder farmers exposes the sector to climate variability	Incentivize water harvesting and low-cost, energy and water-saving technologies for water use and management	Develop public-private partnership models to cooperate with farming communities to invest in irrigation with well-defined water user rights and fees
Inappropriate fertilizer use is causing severe soil degradation	Accelerate farmers' access to a wider range of fertilizers and soil-supplements (lime) and soil testing	Support a more holistic approach to soil health, as well as sustainable and diversified agricultural production
Lack of extension services and adequate skills are holding back better jobs in the agri-food system and the formal agricultural sector	Increase support and spending on research, innovation, training, and capacity building	Accelerate the digitalization of agricultural services in Zambia (extension services, market information, access to finance)

ANNEX 2. UNDERLYING DATA AND FIGURES

Table A1. Zambia's agricultural exports (million US$)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total	Av. yearly growth 2018-21	% total
Maize and related products	199.95	429.24	171.12	99.28	212.49	192.31	114.60	51.81	46.97	61.06	91.60	1670.42	23.6%	19.0%
Tobacco	101.25	156.57	215.82	143.36	88.35	64.94	88.49	104.64	69.76	116.63	129.04	1278.85	14.8%	14.5%
Sugar (raw and refined)	148.92	124.60	122.45	132.47	118.92	113.71	119.85	105.30	116.67	86.95	78.79	1268.62	-8.0%	14.4%
Cotton and related products	138.95	347.70	128.81	85.54	62.07	81.11	46.68	64.59	59.63	35.54	31.92	1082.55	-19.4%	12.3%
Bever-ages	16.47	5.45	216.66	13.76	21.01	31.70	50.58	73.20	70.70	88.59	142.86	730.96	27.7%	8.3%
Soya beans and related products	3.66	6.33	32.01	36.13	20.83	10.78	88.32	73.08	39.21	41.40	110.53	462.27	42.1%	5.3%
Wheat and related products	30.12	34.47	59.40	44.36	16.77	8.03	1.95	0.57	0.59	1.14	1.94	199.35	55.3%	2.3%
Fruits & vegeta-bles	10.92	17.16	33.73	15.12	11.19	14.51	14.84	15.52	11.65	16.61	29.71	190.97	32.2%	2.2%

Dairy & meat products	4.25	3.41	3.28	4.52	0.94	1.88	6.23	10.13	23.28	25.13	53.27	136.30	83.2%	1.5%
Coffee & tea	3.32	2.86	2.10	0.85	0.60	2.08	7.75	6.28	4.21	6.89	14.30	51.23	46.1%	0.6%
Sunflower and related products	10.48	0.77	15.71	1.45	1.33	0.88	1.34	2.01	3.58	2.83	4.31	44.69	36.7%	0.5%
Groundnuts	0.52	0.16	0.64	2.60	0.46	0.72	0.93	1.37	1.74	1.80	2.04	12.98	14.6%	0.1%
Total of 12 top ag. exports	668.81	1128.73	1001.71	579.43	554.95	522.64	541.57	508.50	448.00	484.56	690.30	7129.19	12.9%	81.0%
Total export	751.28	1293.72	1215.94	790.98	695.29	671.40	645.11	633.98	583.21	629.68	891.12	8801.70	13.8%	100.0%
Top 12 ag. exports as share of total ag. exports	*89.0%*	*87.2%*	*82.4%*	*73.3%*	*79.8%*	*77.8%*	*83.9%*	*80.2%*	*76.8%*	*77.0%*	*77.5%*	*81.0%*		

Table A2. Zambia's agricultural area harvested

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Maize	48.7%	44.5%	42.6%	49.9%	45.4%	48.9%	52.1%	45.7%	42.2%	51.7%	49.5%
Soybean	2.7%	3.5%	5.3%	4.7%	5.9%	5.8%	8.2%	8.1%	9.9%	8.2%	10.9%
Groundnut	9.3%	7.3%	8.9%	9.8%	11.7%	9.5%	9.5%	10.9%	10.5%	7.5%	9.1%
Sunflower	1.6%	1.6%	2.8%	2.6%	3.4%	4.9%	3.6%	3.8%	3.1%	3.7%	5.0%
Cassava	8.7%	7.9%	8.2%	3.9%	2.9%	3.5%	3.9%	5.0%	6.4%	4.5%	3.8%
Common beans	3.5%	3.7%	3.9%	4.2%	4.3%	3.2%	2.7%	3.5%	4.4%	3.3%	2.9%
Sugar cane	1.8%	1.8%	1.9%	1.8%	2.1%	1.7%	1.5%	1.9%	2.3%	1.8%	1.7%
Millet	1.7%	1.2%	1.4%	1.4%	1.8%	2.0%	1.7%	1.7%	1.4%	2.5%	1.7%
Rice	1.2%	1.1%	1.6%	1.4%	0.9%	0.9%	1.1%	1.3%	1.2%	1.0%	1.6%
Cotton	5.4%	13.0%	7.4%	5.2%	6.7%	5.5%	3.8%	4.5%	4.5%	2.6%	1.4%
Sorghum	1.0%	0.7%	1.0%	0.6%	0.5%	1.1%	1.0%	0.8%	0.4%	1.4%	1.1%
Wheat	1.7%	1.5%	1.8%	1.2%	1.6%	1.0%	1.0%	0.9%	1.1%	1.0%	1.1%
Cow pea	0.2%	0.2%	0.4%	0.5%	0.7%	1.1%	1.1%	0.7%	0.9%	0.9%	0.8%
Unmanufactured tobacco	2.8%	2.9%	3.1%	3.1%	0.8%	0.4%	0.4%	0.6%	0.8%	0.6%	0.5%
Others	9.8%	9.0%	9.6%	9.6%	11.3%	10.4%	8.3%	10.4%	10.9%	9.4%	9.0%
Total (000 ha)	2,260	2,413	2,340	2,416	1,904	2,369	2,751	2,374	1,992	2,580	2,850
Annual growth		*6.7%*	*-3.0%*	*3.2%*	*-21.2%*	*24.4%*	*16.2%*	*-13.7%*	*-16.1%*	*29.5%*	*10.5%*

Table A3. Comparison of efficiency indicators for maize, soybeans, and sunflower for family farmers

Input	Output	DRCs								
		Early			Peak			Long		
		Maize	Soybeans	Sunflower	Maize	Soybeans	Sunflower	Maize	Soybeans	Sunflower
Central Province (Mkushi)										
FAM-high (Mt/ha @ 4×4)										
Private	Private	0.48	0.39	0.20	0.48	0.50	0.20	0.49	0.40	0.21
FISP	Private	0.99	0.52	n/a	1.00	0.79	n/a	1.00	0.69	n/a
Private	FRA	0.60	0.46	n/a	0.54	0.60	n/a	0.68	0.50	n/a
FISP	FRA	1.19	0.60	n/a	1.27	0.80	n/a	1.36	0.85	n/a
FAM-low (Mt/ha @ 2×2)										
Private	Private	0.61	0.38	0.18	0.62	0.50	0.17	0.61	0.38	0.18
FISP	Private	1.00	0.46	n/a	1.02	0.50	n/a	0.69	0.46	n/a
Private	FRA	0.77	0.44	n/a	0.82	0.63	n/a	0.87	0.38	n/a
FISP	FRA	1.22	0.55	n/a	1.30	0.76	n/a	1.39	0.61	n/a
Eastern Province (Chipata)										
FAM-high (Mt/ha @ 4×4)										
Private	Private	0.42	0.30	0.22	0.53	0.42	0.22	0.53	0.33	0.24
FISP	Private	0.65	0.38	n/a	0.72	0.54	n/a	0.71	0.42	n/a
Private	FRA	0.92	0.48	n/a	0.99	0.65	n/a	1.07	0.53	n/a
FISP	FRA	0.92	0.59	n/a	0.97	0.79	n/a	1.07	0.66	n/a
FAM-low (Mt/ha @ 2×2)										
Private	Private	0.44	0.27	0.26	0.44	0.35	0.26	0.44	0.27	0.22
FISP	Private	0.60	0.32	n/a	0.61	0.40	n/a	0.60	0.32	n/a
Private	FRA	0.52	0.32	n/a	0.55	0.42	n/a	0.59	0.35	n/a
FISP	FRA	0.71	0.36	n/a	0.74	0.48	n/a	0.79	0.57	n/a
Northern Province (Kasama)										
FAM-high (Mt/ha @ 4×4)										
Private	Private	0.36	7.25	0.24	0.48	0.55	0.25	0.48	0.59	0.27
FISP	Private	0.63	0.84	n/a	0.64	0.78	n/a	0.62	0.84	n/a
Private	FRA	0.60	0.70	n/a	0.64	0.68	n/a	0.69	0.77	n/a
FISP	FRA	0.78	0.98	n/a	0.83	0.95	n/a	0.90	1.09	n/a
FAM-low (Mt/ha @ 2×2)										
Private	Private	0.46	0.49	0.28	0.47	0.44	0.27	0.47	0.49	0.28
FISP	Private	0.65	0.65	n/a	0.66	0.60	n/a	0.65	0.61	n/a
Private	FRA	0.58	0.58	n/a	0.62	0.56	n/a	0.66	0.64	n/a
FISP	FRA	0.79	0.76	n/a	0.84	0.70	n/a	0.90	0.83	n/a

Table A4. Comparison of financial profitability indicators for maize, soybeans, and sunflower for family farmers

Input	Output	Net profit (US$/Ha)								
		Early			Peak			Long		
		Maize	Soy-beans	Sunflower	Maize	Soy-beans	Sunflower	Maize	Soy-beans	Sunflower
Central Province (Mkushi)										
FAM-high (Mt/ha @ 4×4)										
Private	Private	166.10	352.63	593.59	134.18	192.72	602.89	94.45	319.45	551.45
FISP	Private	321.80	315.24	n/a	295.78	183.83	n/a	260.08	274.88	n/a
Private	FRA	(18.74)	394.48	n/a	68.26	394.48	n/a	(18.74)	394.48	n/a
FISP	FRA	184.21	357.59	n/a	184.21	357.59	n/a	184.21	340.53	n/a
FAM-low (Mt/ha @ 2×2)										
Private	Private	47.05	211.23	376.99	30.50	106.07	383.50	9.90	190.55	347.49
FISP	Private	192.48	325.24	n/a	177.11	273.60	n/a	175.98	301.99	n/a
Private	FRA	(58.18)	244.48	n/a	(58.18)	239.98	n/a	(58.18)	267.43	n/a
FISP	FRA	94.76	357.59	n/a	94.76	357.59	n/a	94.76	357.59	n/a
Eastern Province (Chipata)										
FAM-high (Mt/ha @ 4×4)										
Private	Private	46.73	379.36	366.53	14.81	208.47	373.04	(24.92)	345.76	337.03
FISP	Private	402.18	376.06	n/a	345.21	215.91	n/a	306.95	332.08	n/a
Private	FRA	(173.74)	417.65	n/a	(173.74)	417.65	n/a	(173.74)	417.65	n/a
FISP	FRA	181.99	392.90	n/a	181.99	392.90	n/a	167.54	386.79	n/a
FAM-low (Mt/ha @ 2×2)										
Private	Private	118.83	354.03	263.70	95.77	211.46	257.24	67.07	211.46	257.49
FISP	Private	289.72	415.39	n/a	195.17	256.24	n/a	240.62	256.24	n/a
Private	FRA	57.10	422.37	n/a	57.10	422.37	n/a	57.10	422.37	n/a
FISP	FRA	231.15	494.85	n/a	231.15	494.85	n/a	231.15	474.85	n/a
Northern Province (Kasama)										
FAM-high (Mt/ha @ 4×4)										
Private	Private	13.79	58.11	261.47	(11.75)	76.66	266.59	(57.37)	36.77	238.30
FISP	Private	281.72	48.80	n/a	246.24	63.64	n/a	218.77	28.39	n/a
Private	FRA	34.65	322.37	n/a	34.65	322.37	n/a	34.65	322.37	n/a
FISP	FRA	291.15	260.20	n/a	291.15	260.20	n/a	291.15	260.20	n/a
FAM-low (Mt/ha @ 2×2)										
Private	Private	50.81	86.69	205.81	27.16	112.64	209.90	(2.27)	69.62	187.27
FISP	Private	234.29	110.17	n/a	211.82	123.15	n/a	183.86	106.34	n/a
Private	FRA	57.10	298.09	n/a	57.10	298.09	n/a	57.10	298.09	n/a
FISP	FRA	240.26	295.15	n/a	240.26	306.26	n/a	240.26	295.15	n/a

CHAPTER 3
RAISING THE PRODUCTIVITY OF FIRMS AND WORKERS[41]

Main messages

1. **Zambia needs to create over 10 million new jobs by 2050 to maintain its employment rate.** Zambia's private sector also needs to make jobs more productive, so they contribute to economic transformation and poverty reduction. Formal firms and jobs are generally more productive and offer higher wages, but they are still in a minority in Zambia. In addition, formal job creation has been concentrated in lower-paying, low-productivity sectors.

2. **Aggregate labor productivity of formal firms weakened between 2014-2021, driven by secular within-firm declines in the non-mining industry and services sectors.** By contrast, labor productivity grew in agriculture and remained flat in mining over the same period. Real wage trends for formal workers have mostly mirrored labor productivity dynamics, declining 40-50 percent across non-agriculture sectors but growing slightly in agriculture.

3. **The declines in labor productivity and wages reflect business environment challenges related to access to finance and electricity, as well as burdensome formal compliance requirements and competition with the informal sector.** Domestic credit to the private sector stands at just 11 percent of GDP, and only 47 percent of Zambians have access to electricity. Over 60 percent of formal Zambian firms report challenges competing with firms in the informal sector, reflecting difficulties in accessing markets and amplifying the effect of formal regulatory and tax burdens.

[41] This chapter was led by Ryan Kuo and Sophia Muradyan, with contributions from Laban Simbeye, Eliya Lungu, Jonathan Msoni, Edna Banda, and Andreya Kumwenda from the Zambia Revenue Authority and Soujanya Chodavarapu, Isaku Endo, Ahmed Rostom, Shaun Mann, Vanina Daphne Forget, and Mohammad Farid Al Azim Bin Noruzi from the World Bank.

4. **Within-firm labor productivity challenges also reflect low skills and capacity—including low technology adoption—among both firms and workers.** For example, only 10 percent of formal Zambian firms report using technology licensed from foreign companies, well below peer countries such as Zimbabwe (21 percent). Human Capital Index data suggests that the productivity of workers in Zambia is 60 percent of their full potential due to education and health gaps.

5. **Critical financial and business environment reforms are needed to unlock the private sector's role in driving jobs and economic transformation.** To improve access to finance, Zambia could consider dismantling arrears, scaling up and refining credit guarantee schemes for private sector lending, improving financial infrastructure (e.g., credit information systems), and working with financial intermediaries to diversify product offerings. Regulatory streamlining—including for trade and foreign direct investment—would help decrease competitive distortions from competition with the informal sector and increase exports and FDI, which are critical channels for productivity improvement. Energy sector reforms such as improved systems planning would help to increase the quality of and access to electricity for firms and citizens alike.

6. **Firm-level interventions will improve productivity and resilience.** Programs to enhance technology transfer linkages between anchor firms and their suppliers and buyers could help Zambian firms upgrade their capacity and improve productivity, as could programs to directly promote technology use by firms. At the same time, investments in water management and other climate change mitigation and adaptation measures will be critical to build resilience and reduce volatility.

3.1 HARNESSING ZAMBIA'S PRIVATE SECTOR FOR BETTER JOBS

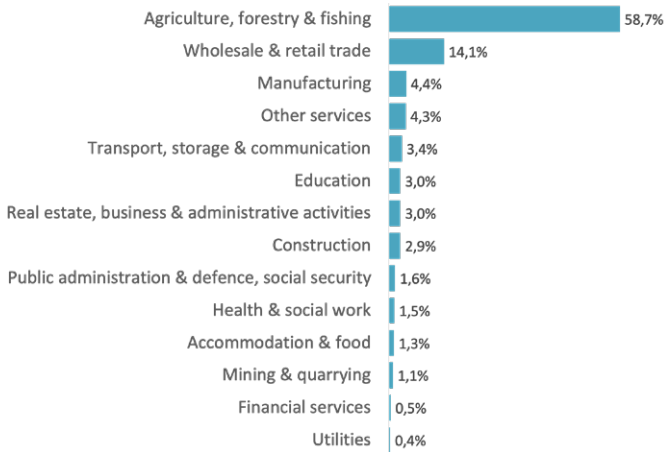
Zambia's private sector needs to create more productive jobs for sustained and inclusive growth

Zambia's private sector must deliver quality jobs at scale to keep up with the expanding working age population, contribute to economic transformation, and reduce poverty. Based on population growth projections, Zambia needs to create over 10 million new jobs by 2050 to keep its labor force participation and employment rates from declining. The country's working age population is projected to more than double between 2022 and 2050 (Merotto, 2017). This growth will provide a demographic dividend if Zambia can drive productivity growth and economic transformation. However, if Zambia's private sector fails to generate enough good jobs to absorb this expansion, economic growth will fail to permeate to the rest of the economy as new working-age Zambians will be unable to access productive opportunities. This will limit its impact on poverty reduction and increase the risk of upheaval.

As well as creating new jobs, Zambia's private sector needs to make existing jobs more productive. Low productivity is limiting Zambia's potential to diversify its sources of growth and to create quality jobs and firms. While shifts in labor to higher-productivity sectors and within-sector productivity improvements can contribute to labor productivity growth and higher wages, Zambia's private sector has had limited success in both areas. Lower-productivity sectors such as agriculture (58.7

Employment is concentrated in low-productivity sectors such as agriculture and wholesale and retail trade

Figure 52. Percentage share of employed population by sector in Zambia, 2021



Source: ILO-modelled projections (Nov 2022).

percent of employment) and wholesale and retail trade (14.1 percent) still account for most employment (Figure 52). Existing high-productivity sectors tend to generate few jobs. These include financial services (0.5 percent of jobs) and mining, which accounts for only 1.1 percent of jobs despite its role as Zambia's primary export driver.[42] Meanwhile,lower-productivity informal employment accounts for three-quarters of jobs (Zambia MLSS, 2022), and the informal sector is where most new jobs have been generated in recent years. As the youth get more educated, cities grow, and the rural population shifts from lower to higher productivity sectors (both within agriculture and other sectors), better jobs will be needed in private sector formal firms across the economy.

This deep dive analyzes the dynamics of formal firms to identify the drivers and barriers to productivity and job growth in Zambia. Leveraging firm and worker administrative tax data in close collaboration with the Zambia Revenue Authority (ZRA), this chapter analyzes firm and sector-level productivity trends and patterns in formal job creation and wages. Building on these insights, it also provides policy recommendations to unlock the private sector's potential to drive jobs and economic transformation.

3.2 EXPLORING FORMAL FIRMS AND JOBS IN ZAMBIA

Most Zambian formal firms are small, registered in Lusaka, and belong to the services sector

Formal firms constitute a growing—but small—part of Zambia's economy. For our analysis for this report, we used corporate income tax (CIT) and monthly pay-as-you-earn (PAYE) tax returns as proxies for firm and employment formalization (Box 8). The number of registered formal firms has expanded significantly between 2014 and 2021, particularly micro firms (up to 10 employees; +26 percent) and large firms (defined in Zambia as having over 100 employees; +25 percent). Still, as of 2021, while 75 percent of formal firms were micro or small (with 50 or fewer employees), large formal firms accounted for the majority workers (85 percent) and value added (88 percent) of formal firms. Firms registered in Lusaka and Copperbelt provinces also account for most formal firms, value added, and labor (Figures 53 to Figure 58).

[42] Source: ILO-modelled estimates (November 2022). Methodological changes have been made since the 2017 Labour Force Surveys (following ILO ICLS-19) where employment indicators include only those engaged in market production activities. ILO modelled estimates follow the previous employment definition (ICLS-13), which includes non-market activities (such as production for own consumption), and thus capture a greater segment of the agriculture sector. Differences in total employment in the remaining sectors are small when compared to the 2021 Labour Force Survey, and thus overall conclusions do not change.

Despite making up only 20 percent of the formal firm spectrum, large firms account for most of Zambia's formal firms' total value added and labor

Figure 53. Share of formal firms by province of registration

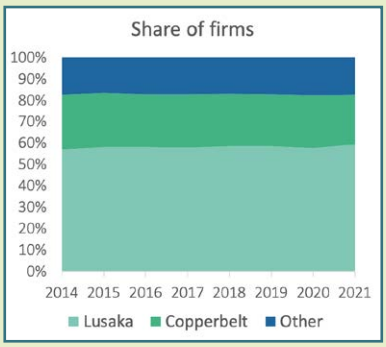


Figure 54. Share of real value added of formal firms by province of registration (constant 2010 prices)

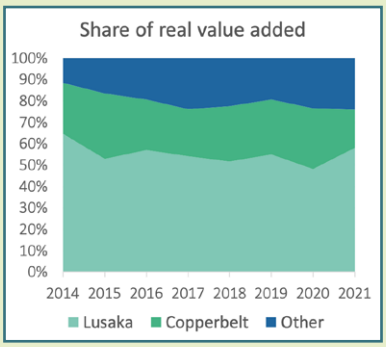


Figure 55. Share of labor of formal firms by province of registration

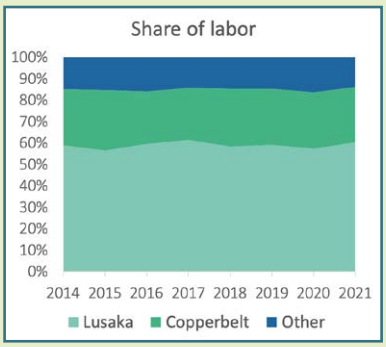


Figure 56. Share of formal firms by size

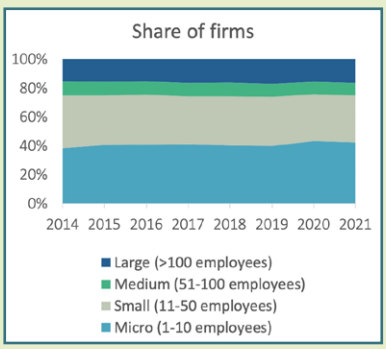


Figure 57. Share of real value added of formal firms by size (constant 2010 prices)

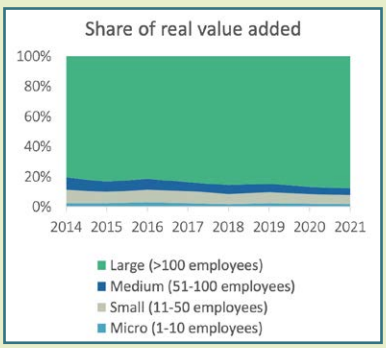


Figure 58. Share of labor of formal firms by size

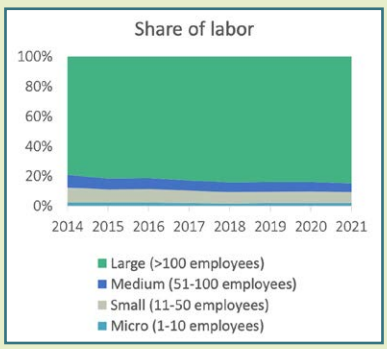


Figure 59. Share of formal firms by overall sector

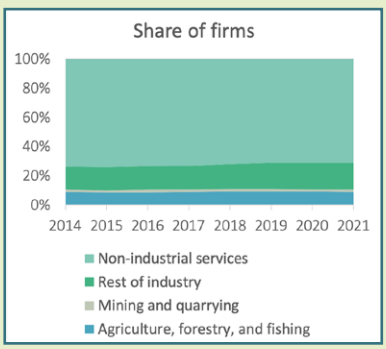


Figure 60. Share of real value added of formal firms by overall sector (constant 2010 prices)

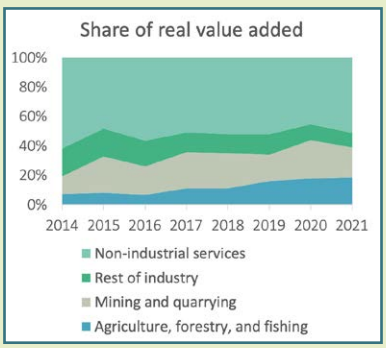
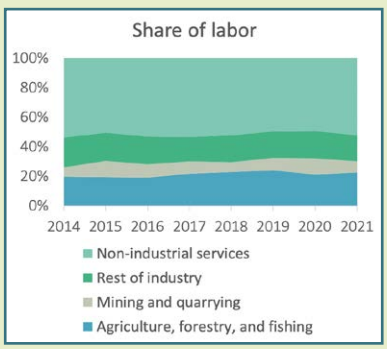


Figure 61. Share of labor of formal firms by overall sector



Source: World Bank and ZRA staff calculations based on CIT database

BOX 8: Overview of data and conceptual approach to productivity

This chapter draws upon administrative tax data from the ZRA, derived from annual CIT tax returns at the firm level and monthly PAYE tax returns at the worker level. Filing for CIT and PAYE is used as proxies for firm and employment formalization, respectively. The CIT database contains panel data covering formal firms' sector of operations, registration location, sales, cost of sales, and wage bills. The PAYE database contains information on formal workers' sector of operations and gross pay. CIT data are available for 2014-2021, while PAYE data are available for 2014-2022.

The subset of Zambian firms and workers captured in these databases is economically critical to jobs and economic transformation. Given statutory thresholds for tax filing and firm- and worker-specific drivers of tax compliance, firms and workers in the CIT and PAYE databases are likely to be quite different from excluded firms and workers. However, the firms and workers in the datasets constitute an economically significant portion of the Zambian economy. For 2021, the CIT dataset covers over 5,000 firms, which collectively account for ZMK 329 billion in sales, 118 billion in value added (equivalent to 27 percent of GDP), and 527,000 estimated workers. For the same year, the PAYE dataset covers over 800,000 unique workers, filing over 6.3 million monthly returns. Beyond their collective size, formal firms, and workers—as proxied through these datasets—are especially critical to economic transformation as they are likely to constitute the most productive segment of the economy and such firms are most likely to export (Amin, Ohnsorge and Okou, 2019).

The analysis in this chapter focuses on labor productivity. Labor productivity (LP) and total factor productivity (TFP) are two ways of computing firms' efficiency at converting inputs (e.g., capital, labor) to produce goods or services (output). Conceptually, LP measures output per worker and therefore looks only at how labor is converted into output, while TFP incorporates adjustments in other production factors (e.g., capital stock and intermediate inputs) as well as technology, innovation, management practices, and other ways of augmenting firm output with the same input endowment (Syverson, 2011). Although TFP presents a more complete view of productivity, this analysis relies on LP given the lack of reliable data measuring capital or investment. As no data on firm-level prices or quantities are available for Zambia, this paper calculates LP as value added (defined as sales less non-labor costs of sales) per worker, rather than in terms of physical quantity. LP calculated in this way reflects not only firm physical efficiency in production, but also prices that reflect product quality and marketing, in addition to input costs (Cusolito and Maloney, 2018). This analysis is unfortunately unable to capture these price-related dimensions and thus cannot definitively conclude that phenomena such as productivity dispersion are the result of allocative efficiency (or lack thereof), quality, or markups.

Formal firms in the services sector account for most firms, value added and labor throughout the study period. In 2021, 71 percent of formal firms, 51 percent of real value added from formal firms, and 52 percent of labor in formal firms were in the services sector. The share of formal firms and corresponding labor shares across sectors remained stable over the study period, while their shares of real value-added were more volatile. Between 2014 and 2021, agriculture's share of formal firms fluctuated between 8 and 9 percent, and its formal labor shares between 20-23 percent; mining and quarrying's share of formal firms was around 2 percent and labor shares 8-10 percent; the rest of industry's firms share was 15-18 percent and labor shares 18-20 percent; and non-industrial services' firms share was 71-74 percent and labor 50-55 percent (Figures 59 to 61).[43]

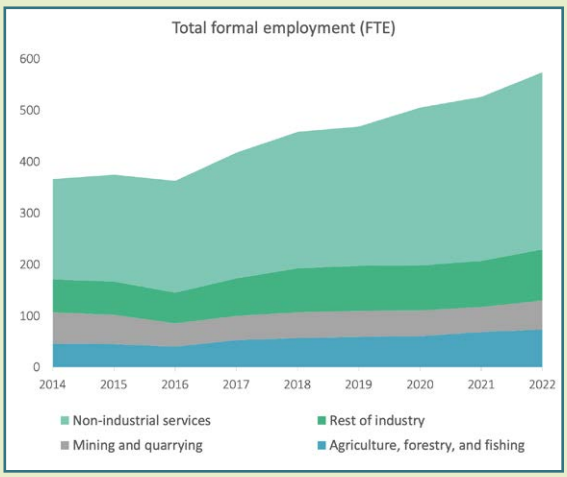
[43] Annex 3 of this chapter contains further details.

Most formal job creation happens in larger firms in low-productivity sectors, with real wages declining over time

Moreover, formal jobs—proxied in this chapter by PAYE taxes— have been increasing over time in Zambia but account for only a small subset of the working-age population.[44] Full time-equivalent formal workers in the PAYE dataset reached 574,142 in 2022, up from 366,417 in 2014 (Figure 62).[45] However, this figure still constitutes a small subset of the working-age population in Zambia (over 11 million people aged 15-64 in 2022). Across sectors, services account for the most formal employment, followed by non-mining industry, agriculture, and mining. Over time, the mining sector's share of formal employment has declined, while agriculture's and service's have increased their share, with services' employment growth largely driven by wholesale and retail trade. Across provinces, most formal jobs are in firms registered in the Lusaka and Copperbelt provinces (Figure 63).

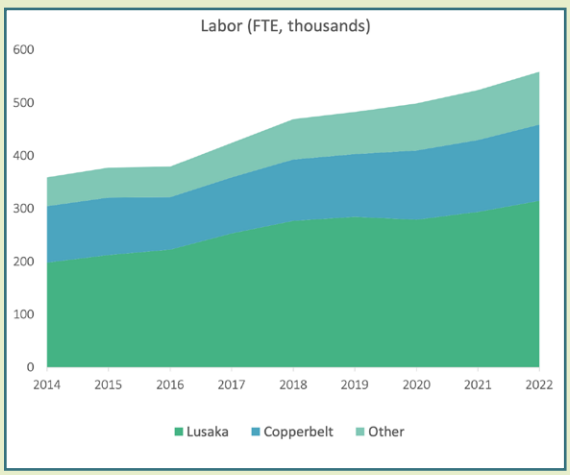
Formal employment has been growing (albeit from a small base) and is concentrated in services and the Lusaka and Copperbelt Provinces

Figure 62. Total formal employment by sector, 2014-2022 (FTE)



Note: FTE (full-time equivalents) defined as 12-monthly returns to account for seasonal employment.

Figure 63. Total formal employment by province of employer registration (thousands), 2014-2022 (FTE)



Source: World Bank and ZRA staff calculations based on PAYE database
Note: FTE defined as 12-monthly returns to account for seasonal employment. Data on province of employment (as opposed to registration location of employer) is not sufficiently complete for analysis. In some cases (most commonly in agriculture), the employer's province of registration may differ from actual province of operations. Slight differences in totals with other charts are attributable to completeness of provincial data.

[44] For the purposes of this chapter, formal employment (i.e., jobs covered by PAYE taxes) can occur at both formal firms (i.e., firms paying into CIT) and informal firms. Similarly, formal firms may have both formal and informal employees.
[45] This figure constitutes a subset of the estimated 848,413 formal workers cited in the 2021 Labour Force Survey for Zambia, reflecting the slightly different definition of formal worker used in this chapter (i.e., paying into PAYE) and in the Labour Force Survey (i.e., covered by social security). In general, due to tax reporting thresholds, the PAYE definition constitutes a lower definition. The estimates based on the PAYE definitions are also roughly in line with estimated labor in formal firms paying CIT (526,649).

Most formal job creation has occurred within existing large companies. Large firms (more than 100 employees) account for 70 percent of formal employment, medium firms for 10 percent, and micro and small firms for 20 percent (Figure 64). Although large firms' share of formal employment declined slightly between 2014 and 2022, their absolute size means that they have still driven most net formal job creation over this period (over 120,00 net new jobs). Net job creation tends to occur at the intensive margin (within existing firms) rather than the extensive margin (from entry of new firms) (Figure 65). The contribution of medium-size firms to the stock of formal jobs and flow of new jobs is marginal. These patterns align with findings from other developing countries: large firms tend to be more sophisticated than their smaller counterparts and better able to tap into global value chains and to export, driving growth and economic transformation. At the same time, firm-level capability constraints and distortions that stifle fair competition could prevent smaller firms from scaling up (Ciani, et al., 2020).

Most formal job creation has been driven by large companies and at the intensive margin

Figure 64. Total formal employment by size of firm, 2014-2022 (FTE)

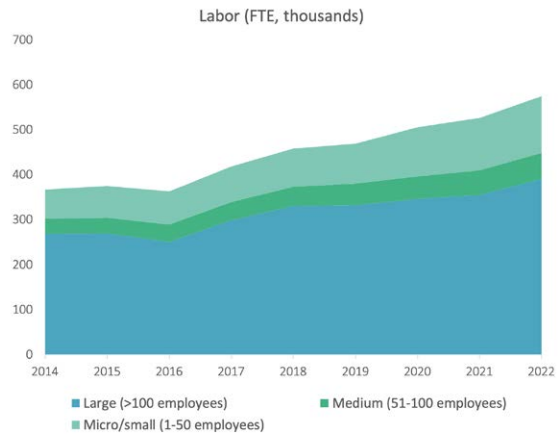


Figure 65. Year-on-year change in formal employment by driver, 2014-2022 (FTE)

Source: World Bank and ZRA staff calculations based on PAYE database
Note: FTE (full-time equivalents) defined as 12-monthly returns to account for seasonal employment.

In line with labor productivity trends, real wages have declined in Zambia across several subsectors. Real wage declines have been driven by within-firm real wage deterioration, pointing to the broad-based nature of wage declines as productivity and pay have struggled to keep pace with inflation (Figure 66). The average Zambian formal worker in the PAYE dataset earned over ZMK 73,000 annually in 2014, which decreased by almost half to about ZMK 39,000 in 2022 (in constant 2010 ZMK terms).[46] This pattern is consistent across a wide array of sectors and subsectors (Figure 67)—real wages for formal workers have declined in mining and quarrying, manufacturing, construction, wholesale and retail trade, financial services, and transport. Real wage declines in the formal sector are also in line with overall real wage declines in Zambia (i.e., for both formal and informal workers).

[46] Wages are deflated by the Consumer Price Index (CPI) to derive real wages that reflect the purchasing power of workers.

These are observed in Zambia's Labour Force Survey data: between 2017 and 2021, real average monthly earnings declined by 24 percent (Zambia MLSS, 2022). An exception to this trend is formal workers in agriculture, forestry, and fishing, which is in line with the sector's relatively stronger labor productivity performance. Although formal workers in this sector continue to have lower wages than in other sectors, real wages remained stable for most of the period and increased in the last year of the study period.

Net formal job creation has generally been in lower-paying subsectors. The largest net formal job creators have been agriculture, forestry, and fishing (28,000 net new jobs between 2014 and 2022), retail trade (28,000), manufacturing (21,000), and other service activities (23,000).[47] These are all relatively low-wage sectors (Figure 68). By contrast, there has been limited new formal job creation in financial services (5,000 new jobs)—the highest-wage subsector—and there have been net formal job losses in mining (5,000 fewer jobs in 2022 versus 2014)—the third highest-paying subsector. As a result, across-sector shifts in the formal workforce have also contributed to total average real wage declines for formal workers in Zambia. Formal job creation in lower-paying subsectors may translate into better livelihoods on a net basis for Zambians who are transitioning from lower-paying informal jobs. Nevertheless, this trend highlights the limited remaining job-creating potential of mining and the untapped potential for job creation at scale in other higher value-added sectors.

Real wages have declined for formal workers across Zambia, driven by within-firm declines in pay, with agriculture being a notable exception

Figure 66. Cumulative change in log real wage,2014-2022 (base year: 2010)

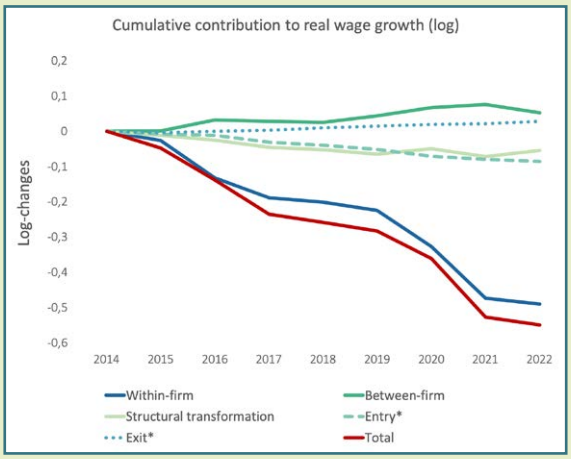
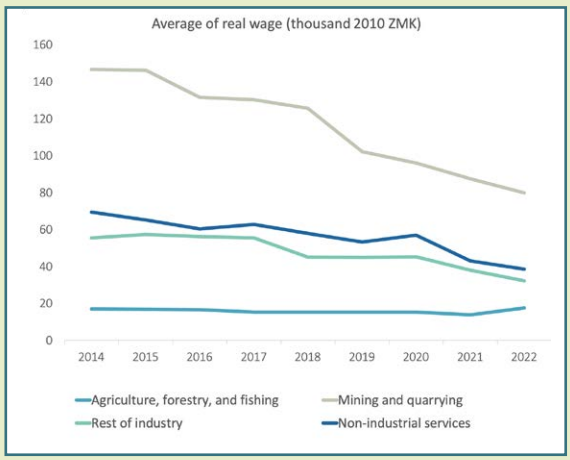


Figure 67. Real wage by overall sector, 2014-2022 (thousand 2010 ZMK)

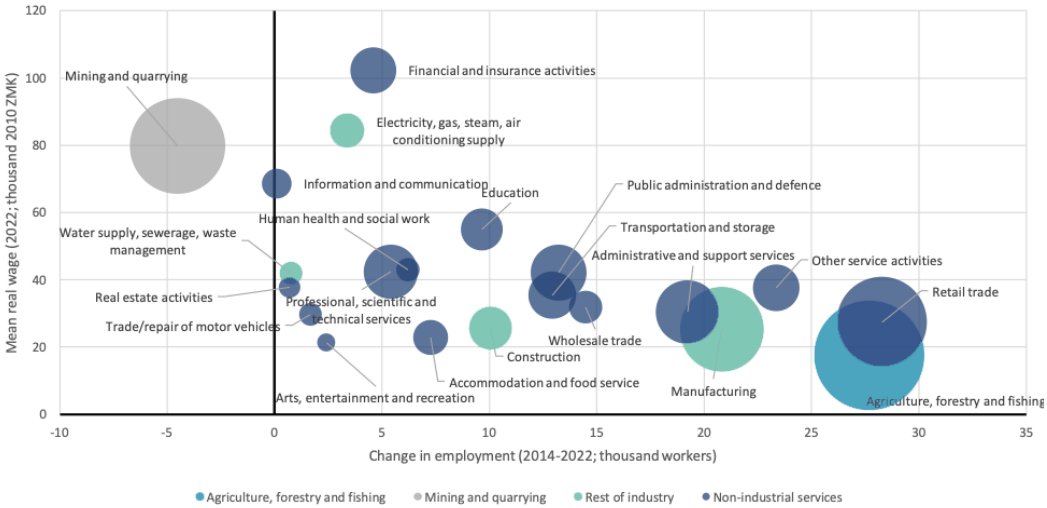


Source: World Bank and ZRA staff calculations based on PAYE database
Note: Wages are deflated by the Consumer Price Index (CPI).

[47] In Zambia, these mostly account for personal care and service jobs.

Most new formal jobs were created in the lowest-paying sectors, while higher-paying sectors created fewer new jobs

Figure 68. Change in formal employment, mean real wage, and total formal employment by ISIC 1-digit subsector, 2014-2022



Source: World Bank and ZRA staff analysis based on PAYE database
Note: Bubble size corresponds to 2022 formal employment.

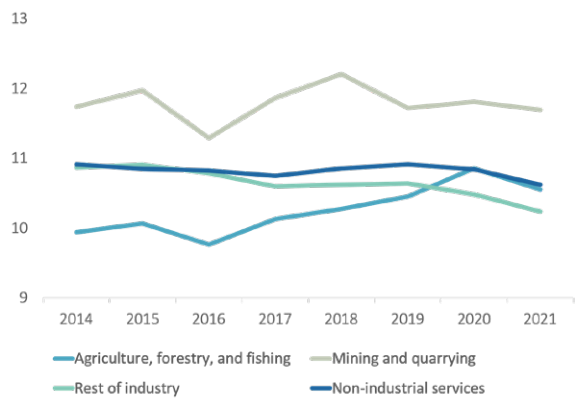
3.3 FALLING LABOR PRODUCTIVITY IN THE FORMAL SECTOR

Labor productivity in formal firms has been falling in recent years, mirroring overall productivity trends

The mining sector has the highest labor productivity in the economy. Formal firms in the rest of industry and services sectors are the next most productive, followed by agriculture. On average, labor productivity in the mining sector was 4.5 times higher than in agriculture in the studied period. However, in more recent years, the labor productivity of formal firms in agriculture has increased and even exceeded that of formal firms in the rest of industry sector (Figure 69).

Mining and quarrying have generally had the highest labor productivity, followed by non-industrial services, rest of industry, and agriculture

Figure 69. Weighted average log labor productivity by sector, 2014-2021 (constant 2010 prices)



Source: World Bank and ZRA staff calculations based on CIT database
Note: Averages are weighted by firms' share of labor.

The labor productivity of formal firms in Zambia has declined between 2014 and 2021. Changes in labor productivity can be driven by within-firm productivity changes (changes in technical efficiency), the reallocation of resources (labor, in the case of labor productivity) between firms of different productivity levels within a sector, reallocation of resources across sectors (i.e., structural transformation), and the entry and exit of firms.[48] Within-firm declines have been the most consistent contributor to the decline in formal firms' labor productivity (Figure 70). These within-firm declines have largely occurred in non-mining industry and services, whereas labor productivity has grown in agriculture and mining. By contrast, the contribution of between-firm reallocation within sectors and structural transformation has been muted, reflecting the stable allocation of resources during the study period.[49]

However, this cumulative change obscures significant year-to-year volatility in labor productivity growth. Labor productivity generally grew between 2014 to 2015 and over the 2017-2020 period. By contrast, there were sharp drops between 2015 and 2016 and between 2020 and 2021 (Figure 71). This volatility is primarily driven by agriculture, forestry, and fishing (reflecting exogenous climate-related shocks) and mining and quarrying (reflecting the combination of high concentration and idiosyncratic shocks to individual firms' performance).

Formal firms' labor productivity has declined overall, driven by within-firm declines, although there is significant year-to-year volatility

Figure 70. Cumulative change in weighted average log labor productivity, 2014-2021 (constant 2010 prices)

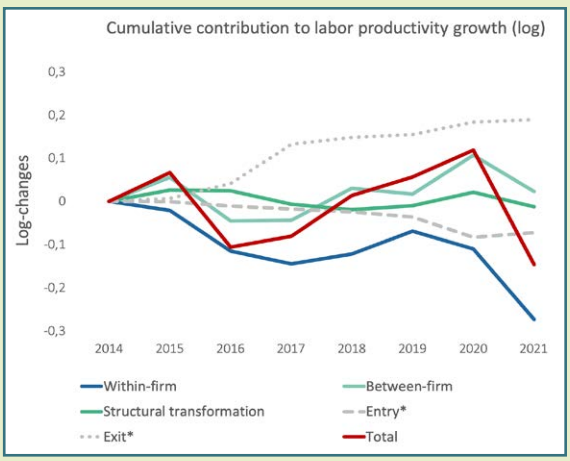
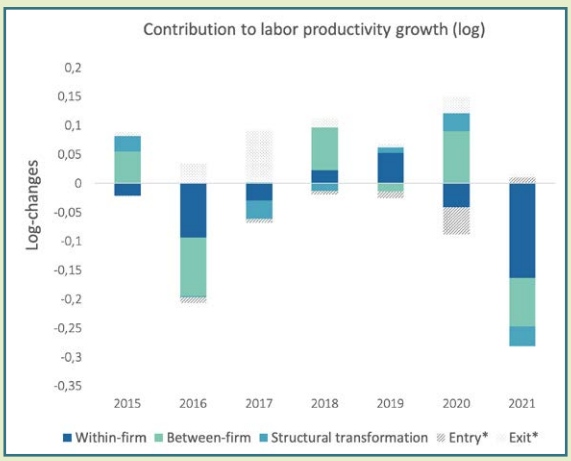


Figure 71. Annual change in weighted average log labor productivity, 2014-2021 (constant 2010 prices)



Source: World Bank and ZRA staff calculations based on CIT database
Note: Averages are weighted by firms' share of labor.

[48] This method of decomposing productivity growth is derived from Melitz and Polanec (2015) and Patiño Peña and Ferro (forthcoming). For further details refer to Annex 3.

[49] Entry and exit of firms in the dataset have respectively driven decline and growth in average labor productivity. However, because of year-to-year fluctuations in tax compliance at the individual firm level, the data does not allow for definitive conclusions on whether entry and exit seen in the dataset reflect true entry and exit from the market. For example, over half of firms that exited the dataset in 2014 (i.e., those that do not appear in 2015) appear in a subsequent year after 2015. As such, while the quantitative analyses incorporate entry and exit to strip out the effects of the extensive margin, this chapter does not focus on drawing conclusions from the entry and exit data.

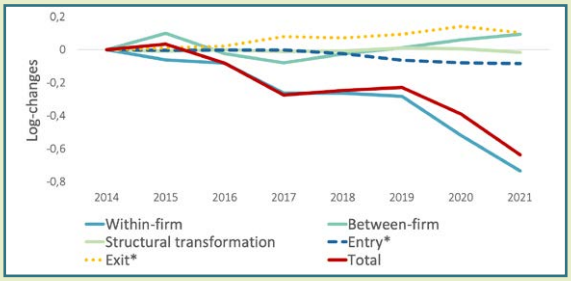
Weakening productivity trends in the non-mining industry and services sectors are driven by within-firm declines

Within-firm underperformance in non-mining industry and services has been driving the overall decline in formal firms' labor productivity. Between 2014 and 2021, both sectors saw steep falls in labor productivity, driven by within-firm declines. The decline in non-mining industry productivity has been especially sharp, and these patterns are consistent for nearly all the largest non-mining industrial subsectors (manufacturing and construction) and the largest non-industrial services subsectors (wholesale and retail trade, transportation, and financial services) (Figure 72). These declines in labor productivity in non-mining industry and services are consistent with labor productivity trends seen in the broader macroeconomic data.

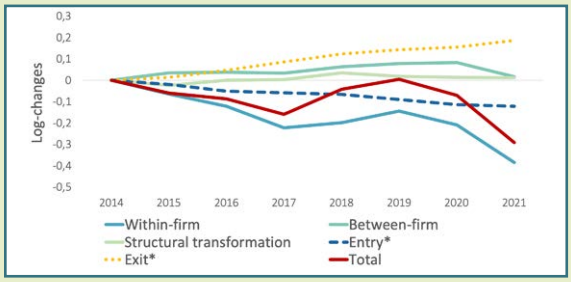
Formal firms in non-mining industry and services have seen sharp falls in labor productivity, driven by within-firm declines

Figure 72. Cumulative change in weighted average log labor productivity by sector, 2014-2021 (constant 2010 prices)

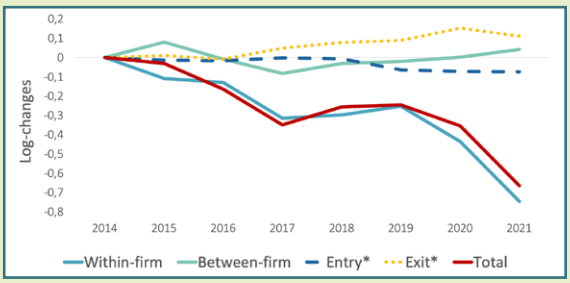
Panel a. Non-mining industry



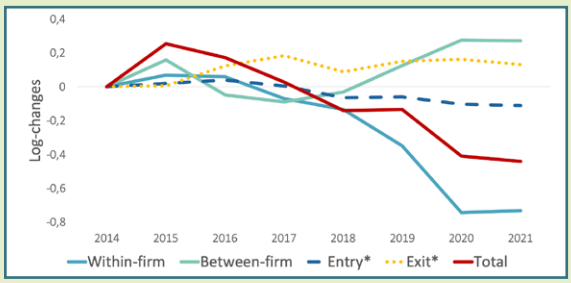
Panel b. Non-industrial services



Panel c. Manufacturing (subset of non-mining industry)

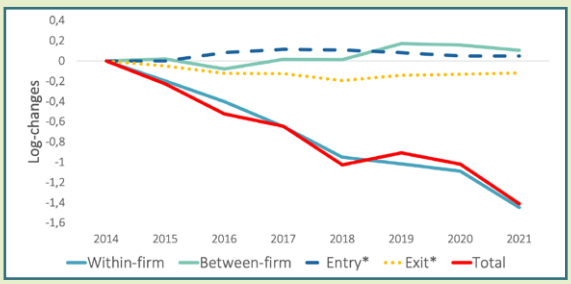


Panel d. Construction (subset of non-mining industry)

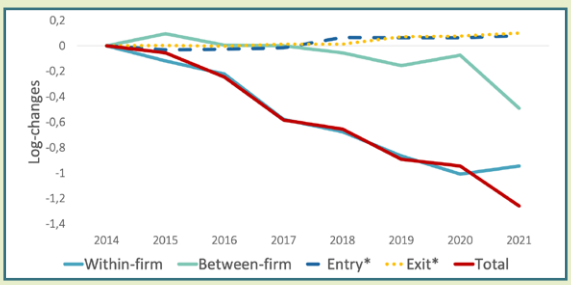


Panel e. Retail trade (subset of non-industrial services)

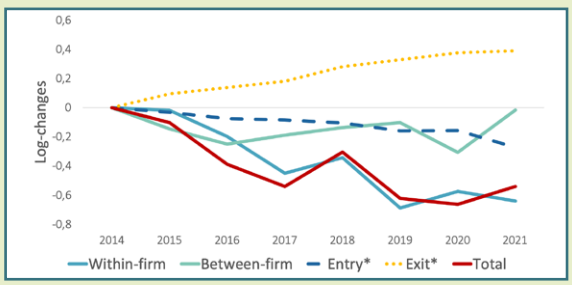
Panel f. Wholesale trade (subset of non-industrial services)



Panel g. Transport and storage (subset of non-industrial services)



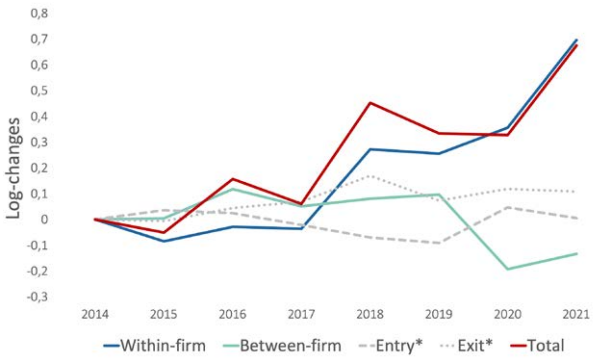
Panel h. Financial services (subset of non-industrial services)



Source: World Bank and ZRA staff calculations based on CIT database
Note: Averages are weighted by firms' share of labor.

The accommodation and food services subsector is a key exception, seeing labor productivity growth between 2014-2021, despite a dip around the COVID-19 period

Figure 73. Cumulative change in weighted average log labor productivity, 2014-2021 (accommodation and food services, constant 2010 prices)



Source: World Bank and ZRA staff calculations based on CIT database
Note: Averages are weighted by firms' share of labor.

The accommodation and food services subsector is the most notable exception to this trend, experiencing productivity growth between 2014-2021. Further research is needed to assess the drivers of the subsector's strong labor productivity performance (Figure 73), which may be related to recent high-profile FDI in the subsector.[50] It has also experienced steady, but modest, growth in its share of formal firms' labor (from 1.8 percent in 2014 to 3.1 percent in 2021).

Productivity increases in agriculture and mining are driven by sector-specific developments

In contrast to other sectors, formal firms in agriculture, forestry, and fishing experienced steady increases in labor productivity between 2014-2021, driven by within-firm growth (Figure 74). This performance also contrasts with downward trends seen in formal firms in other sectors and the economy-wide trend for labor productivity in agriculture. The divergence is explained by the fact that agricultural firms in the CIT dataset are often large-scale commercialized farms. These farms could provide a significant growth pathway for Zambia and could drive jobs and economic transformation. They can better leverage Zambia's resource endowments by investing in productivity-enhancing technological and process improvements, diversifying away from maize, and tapping into global value chains and export markets. However, formal agricultural firms still account for a very small portion of the total agricultural labor force (an estimated 119,000 workers). Similarly, large-scale commercialized farms—of which firms in the CIT database are a subset—only farm about 0.7 percent of Zambia's total cropped area and represent less than 0.08 percent of all farming entities (see Figure 39 in Chapter 2), highlighting the opportunity embodied in increasing commercialization.

Climate change shocks cause significant volatility in labor productivity, affecting agricultural firms and farmers across the board. The general upward trend in labor productivity was interrupted by a sharp drop in 2016 (Figure 75). This sudden deterioration was driven by an intense drought in 2015-2016, attributable to El Niño and climate change, which translated into steep within-firm productivity declines (Alfani, et al., 2019). Climate change will likely exacerbate the likelihood and intensity of extreme climactic shocks, highlighting the need to increase the resilience of the sector (Chapter 2) (Thorton and Lipper, 2014). In 2019, Zambia experienced another drought, though formal agricultural firms' performance was more robust then because the drought was less intense and it did not severely affect the Copperbelt and Eastern provinces, which host many large commercial farms.

[50] Major recent investments include the acquisition of the Protea Hotels brand by Marriott and subsequent expansion of the Protea Hotel in Lusaka, the acquisition of the InterContinental Hotel Lusaka by Mauritius-based QG Africa Hotel, and acquisition of a portion of Sun International's portfolio (including the Royal Livingstone Hotel) by the Thailand-based Minor Hotels.

Formal agricultural firms have generally experienced labor productivity improvements over time, although there has been significant climate change-related volatility

Figure 74. Cumulative change in weighted average log labor productivity, 2014-2021 (agriculture, forestry, and fishing; constant 2010 prices)

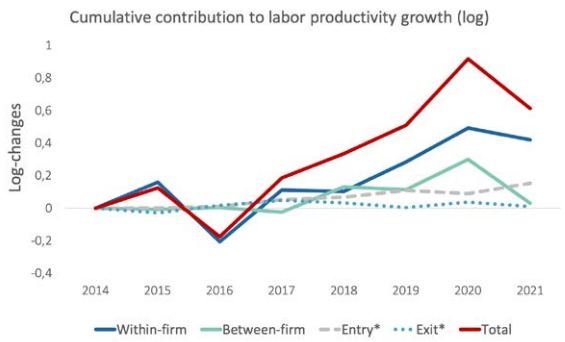
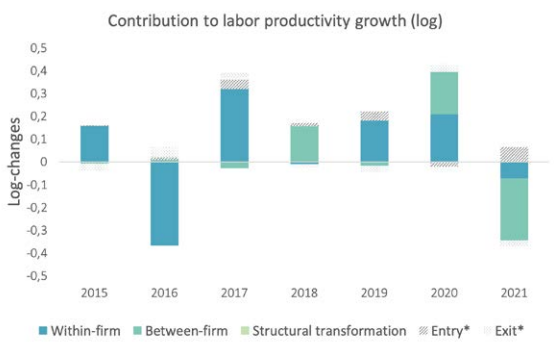


Figure 75. Annual change in weighted average log labor productivity, 2014-2021 (agriculture, forestry, and fishing; constant 2010 prices)



Note: Averages are weighted by firms' share of labor.
Source: World Bank and ZRA staff calculations based on CIT database

The mining and quarrying sector has also avoided the secular labor productivity declines seen in other sectors, but it has been subject to even more extreme annual volatility. Average labor productivity levels amongst formal mining and quarrying firms in 2021 are roughly in line with 2014 levels in log terms and somewhat higher in level terms, reflecting overall sector trends (Figure 76).[51] However, unlike agriculture, there is no clearly discernible secular trend, with growth and even overall productivity levels fluctuating significantly from year to year (Figure 77).

Formal mining and quarrying firms have not experienced secular labor productivity decline but have been subject to extreme year-to-year volatility

Figure 76. Cumulative change in weighted average log labor productivity, 2014-2021 (mining and quarrying; constant 2010 prices)

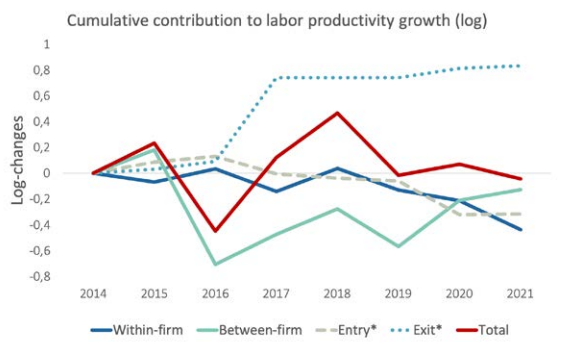
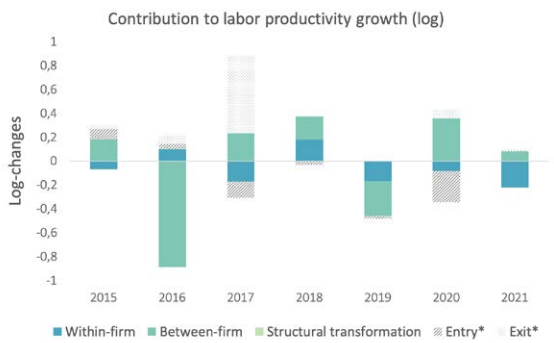


Figure 77. Annual change in weighted average log labor productivity, 2014-2021 (mining and quarrying; constant 2010 prices)



Source: World Bank and ZRA staff calculations based on CIT database
Note: Averages are weighted by firms' share of labor.

[51] The slight difference in trend between the two measures stems from the convexity of natural log function.

Specific within-sector developments have driven labor productivity volatility in the mining sector. The swings in labor productivity in the formal mining sector are driven by changes in between-firm allocative efficiency. This reflects high concentration in the sector and significant annual unpredictability in operations at individual mines (e.g., from varying ore grades and operational disruptions). For example, the sharp decrease seen in 2016 is attributable to firm-specific safety incidents leading to the temporary shutdown of one of Zambia's largest copper mines in terms of employment. The sharp increase in 2017 reflected the rapid scale-up of a recently opened mine that was employing the latest technology (i.e., scale-up in employment of a high-productivity firm, leading to allocative efficiency improvements).[52]

3.4 WHAT'S DRIVING PRODUCTIVITY DECLINE?

Within-firm productivity declines are driven by business environment constraints and insufficient access to quality growth enablers

That the within-firm component is the main drag on labor productivity growth across various sectors suggests that economy-wide productivity constraints are a critical factor in Zambia. Cross-cutting factors such as poor infrastructure, burdensome regulations, and low technology adoption are more likely to affect firms and sectors similarly, thus impacting the within-firm component of productivity growth and leading to broad-based declines across sectors. By contrast, distortions to competition from entry barriers, policies that create an uneven playing field, and poor enforcement of anticompetitive behavior are more likely to impact allocative efficiency (the between-firm, entry, exit, and structural transformation components of productivity growth). The salience of the within-firm component in explaining productivity and wage declines in Zambia underscores the severity of business environment and firm capability constraints in the country.

Moreover, Zambia stands out from other developing countries for which similar analyses have been conducted. The between-firm component has been found to be the main constraint in places like Croatia, Côte d'Ivoire, Ecuador, and Türkiye, meaning salient allocative efficiency problems (Patiño Peña & Ferro, forthcoming; World Bank, 2019c; World Bank, 2021b; World Bank, 2022c). It is less common to see economy-wide productivity declines driven by the within-sector component. This chapter analyzes specific business environment constraints that are especially salient and relevant to firm productivity—and, by extension, wage—trends in Zambia.

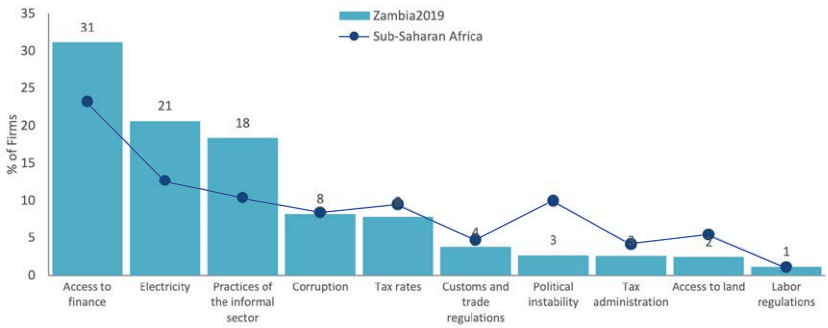
Recent evidence confirms that labor productivity declines within formal firms in the non-mining industry and services sectors partly reflect business environment constraints. To analyze these constraints, this chapter uses data from World Bank Enterprise Surveys, along with other sources specific to individual themes, given the lack of variables related to performance drivers in the CIT and PAYE datasets. Over 600 Zambian firms across manufacturing, construction, wholesale and retail trade, hotels, restaurants, transportation, and information technology were surveyed between 2019 and 2020 for the World Bank Enterprise Survey (World Bank, 2020c and d).

[52] Due to the sensitive nature of the firm-level tax data, further details on the specific firms cannot be disclosed.

When respondents were asked about the biggest obstacles to their business, the most cited factors were access to finance (cited by 31 percent of respondents as their top obstacle); access to electricity (21 percent);[53] and practices of the informal sector (18 percent) (World Bank, 2020c and d). The rates at which these obstacles were cited were well above SSA averages (Figure 78). In the sections which follow, we discuss these three limiting factors, as well as low levels of skills and capabilities, which are also holding back firm growth.

Access to finance, electricity, and practices of the informal sector are the biggest business environment obstacles faced by formal firms in non-mining industry and services sectors

Figure 78. Top reported business obstacle in Zambia, 2019 (Percent of latest Enterprise Survey Respondents)



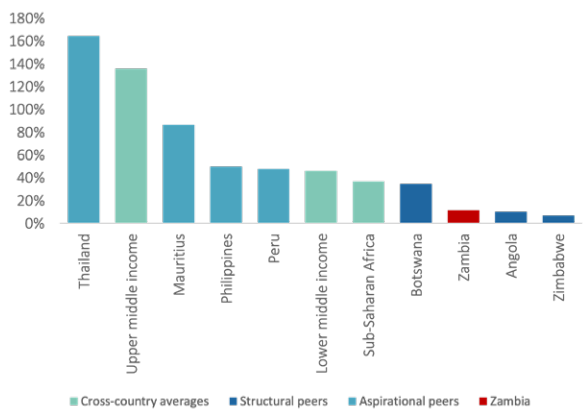
Source: World Bank (2020c and d)

Difficulties accessing finance

Inadequate access to finance constrains Zambian firms' ability to make productivity-enhancing investments. This was the most widely cited constraint in the latest Enterprise Survey for Zambia for firms of all sizes (World Bank 2020c and d). Domestic credit flows to the private sector amounted to just 11.3 percent of GDP in 2021—well below levels seen in peer countries—reflecting Zambia's financial intermediation challenges (Figure 79). The loans that are made tend to be expensive: commercial banks' average published nominal lending rates were above 25 percent in June 2023, and lending rates for micro-finance institutions catering to smaller firms and individuals are even higher (Bank of Zambia, 2023a).

Private sector access to credit is severely constrained in Zambia

Figure 79. Domestic credit to the private sector, 2021 (Percent of GDP)



Source: World Bank (2020c and d)

[53] Electricity access issues may have been especially pronounced in 2019 given electricity generation problems driven by the impact of drought on hydropower. Nevertheless, electricity was also the third-most cited constraint in the Enterprise Survey for Zambia in 2013, highlighting the persistence of the issue (World Bank, 2014a).

As a result, relatively few Zambian firms are able to access to credit. Only 10 percent of Zambian Enterprise Survey respondents report having a bank loan or line of credit—well below most peer countries (Figure 80)—and 34 percent of Zambian Enterprise Survey respondents who reported applying for loans recently saw their loan applications rejected—again, well above most other peer countries (Figure 81). Despite the prevalence of banks vis-à-vis other sources of finance, less than 9 percent of Zambian Enterprise Survey respondents report having used bank financing for capital investments, and less than 5 percent report having used it for working capital, both of which are lower than in most structural and aspirational peer countries.

Relatively few Zambian firms are able to access external financing

Figure 80. Firms with a bank loan or line of credit (percent of latest Enterprise Survey respondents)

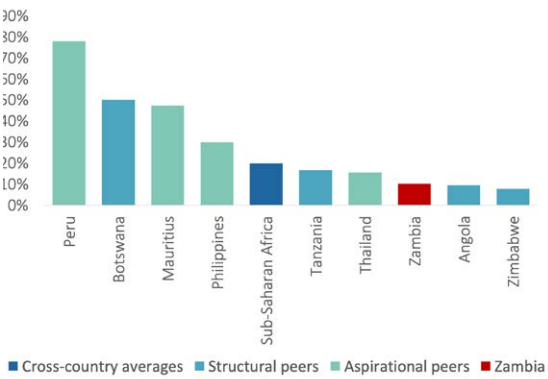
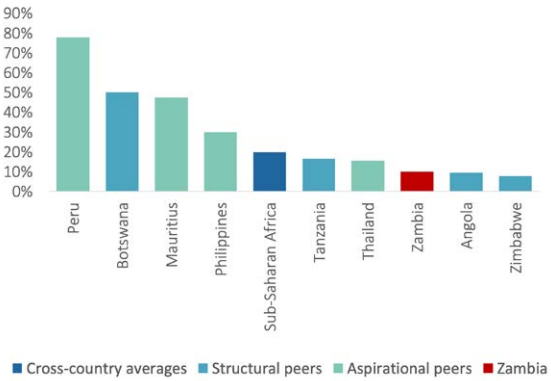


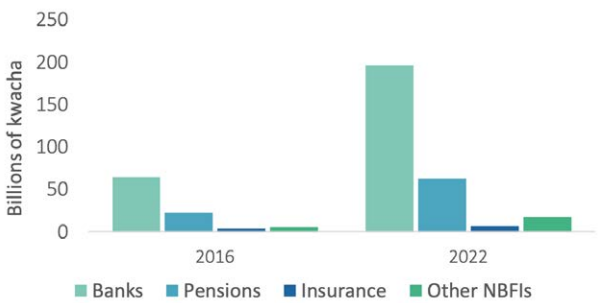
Figure 81. Firms whose recent loan applications were rejected (percent of latest Enterprise Survey respondents)



Source: World Bank staff calculations based on Enterprise Survey data (World Bank, 2020c and d) and the Investment Climate Assessment 2.0 toolkit

Zambia's financial sector is small, with most lending provided by a handful of banks

Figure 82. Zambia's financial sector structure, assets in Kwacha (billions)



Source: Bank of Zambia and IMF staff calculations (IMF, 2023)
Note: NBFI: non-bank financial institutions

Weak sectoral diversification limits financing to the private sector. Credit to the private sector in Zambia is concentrated in a handful of sectors, including manufacturing, agriculture, and mining. Banking credit to the private sector has been decreasing over the past few years as a percentage of GDP and is lagging behind nominal GDP growth, reflecting the banking sector's preference for investing in lower-risk, high-earning government securities (IMF, 2023). Banks generally provide little flexibility in collateral requirements, have made few innovations in credit products, and have complex application processes for credit. Critically, banks are not seen as supporters of private sector growth, despite generous prudential forbearance measures during the COVID-19 pandemic between 2020 and 2022 (IMF, 2023).

The financial sector's structure and low risk tolerance constrain access to finance. Banking sector assets account for around 41 percent of GDP. The rest of the financial sector—including smaller non-bank financial institutions (NBFIs), such as pension funds, insurance companies, and a relatively large number of micro-finance institutions—account for only 18 percent. NBFI assets are small and not critical in income securitization or asset creation for underserved segments in Zambia (Figure 82). Other alternative funding sources, such as venture capital, private equity, crowd funding, and capital markets, remain undeveloped (GRZ, 2017).

Women-led firms are disproportionally affected by lack of financing, particularly SMEs. Women in Zambia own an estimated 42 percent of micro enterprises and 36 percent of small and medium enterprises (SMEs) in the country. However, compared to their male counterparts, women-led firms are disproportionally constrained by lack of access to adequate financing to start and grow their businesses. For example, a recent World Bank study found that female-led SMEs have a higher likelihood of having a bank-loan application rejected than male-led SMEs. And when they are successful, loans to female-led SMEs tend to be smaller and have shorter repayment periods. There is significant potential for women-led SME lending in Zambia, with an estimated market size of ZMK 2.2 billion (US$168.8 million) for loans, but they are underserved in terms of credit products and lack of appropriate collateral, among other issues (World Bank, 2021a).

The potential for leveraging digital technologies to reduce costs and expand formal financial sector outreach has not been fully exploited. The Finscope 2020 survey indicated that only 20.7 percent of adults in Zambia used physical banks, while 58.4 percent used mobile money (Bank of Zambia, 2021). Mobile money accounts for 55 percent of the total volume of banking transactions, a sharp increase from 14 percent in 2019 (Bank of Zambia, 2021). The government has made rapid strides recently in implementing the National Financial Switch (NFS), which enables interoperability between payment systems. It catalyzed an increase in the volume (750 million transactions in 2021) and value (ZMK 114.7 billion) of transactions on the NFS (Bank of Zambia, 2022a). However, this expansion could be broadened further as individuals only make four transactions per month on average.

Weak firm-level capabilities and skills

Poor labor productivity trends amongst formal Zambian firms in the non-mining industry and services sectors also reflect firm-level capability and technological constraints. Firms often lack critical managerial, technological, and vocational skills. The Zambian training system is inadequate when it comes to the business and entrepreneurial skills needed for establishing and growing businesses (GRZ, 2020b). A relatively low percentage of firms in Zambia have licenses to use international technologies (Figure 83) or have internationally recognized quality certifications (Figure 84), proxies for the level of technology adoption, and managerial and operational sophistication. Without these factors, firms in Zambia will find it challenging to significantly scale, diversify, innovate, adopt new technologies, or compete internationally. As a result, Zambia ranks 100th out of 132 countries for its business sophistication on the World Intellectual Property Organization's Global Innovation Index (2022), below countries such as Peru (49th), Thailand (43rd), and even Zimbabwe (90th) (World Intellectual Property Organization, 2022).

Zambian firms in non-mining industry and services exhibit low levels of technological and managerial sophistication

Figure 83. Firms using technology licensed from foreign companies
(Percent of latest Enterprise Survey respondents)

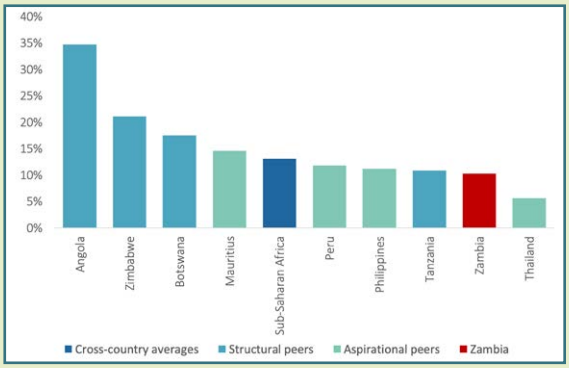
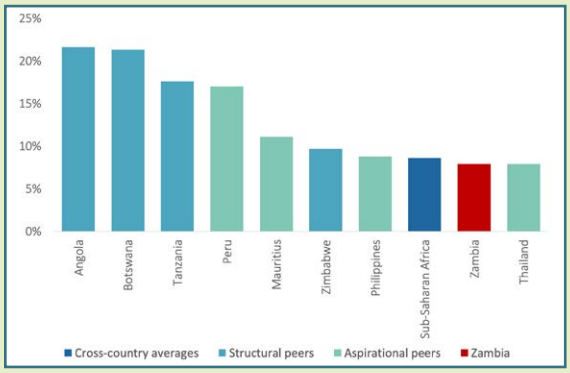


Figure 84. Firms with internationally recognized quality certification
(Percent of latest Enterprise Survey respondents)

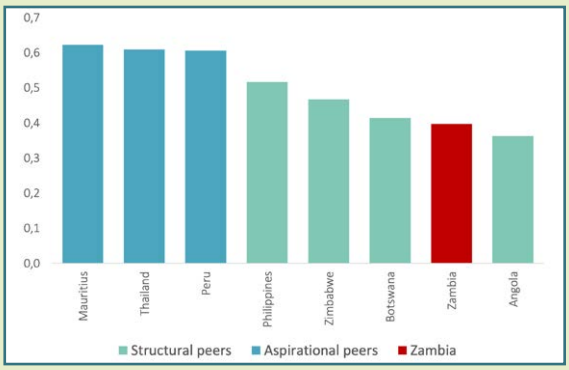


Source: World Bank staff calculations based on Enterprise Survey data (World Bank, 2020c and d) and the Investment Climate Assessment 2.0 toolkit
Note: Some aspirational peers such as Thailand also have lower scores, although in such cases the low score reflects the ready availability of domestically developed technology rather than low business sophistication.

Workers in Zambian firms also face skills and capability constraints. Zambia's Human Capital Index (HCI)—a measure of the contribution of health and education to worker productivity—is well below most aspirational and structural peer countries (Figure 85). Although a large portion of formal Zambian firms report offering training, it is only offered to a small share of employees (Figure 86).

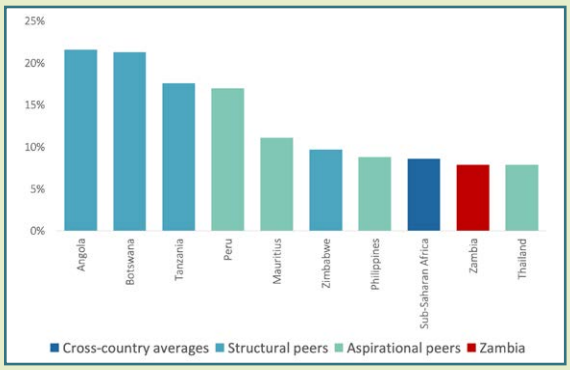
Low human capital and lack of in-service training hold back productivity in Zambia's formal firms

Figure 85. Human Capital Index, 2020



Source: World Bank, World Development Indicators
Note: The index calculates the contributions of health and education to worker productivity. The final index score ranges from zero to one and measures the productivity as a future worker of child born today relative to the benchmark of full health and complete education

Figure 86. Proportion of workers offered formal training (average of latest Enterprise Survey respondents)



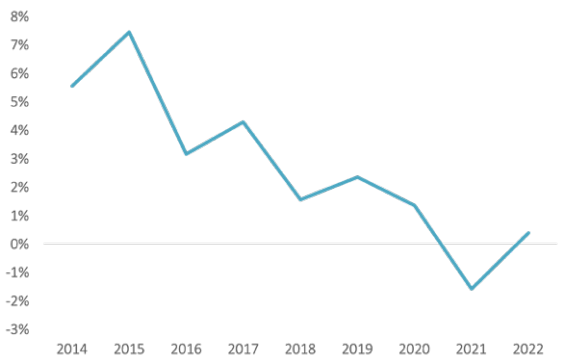
Source: World Bank staff calculations based on Enterprise Survey data (World Bank, 2020c and d) and the Investment Climate Assessment 2.0 toolkit

Weak digital skills are a significant obstacle. The World Bank's Digital Economy for Africa Initiative recognizes the digital economy as a tool to achieve private and public sector goals.[54] The COVID-19 pandemic has accelerated global digitalization trends. There is an unprecedented opportunity to expand access to financial services, raise productivity (particularly in agriculture), foster entrepreneurship, and encourage formalization through increased adoption of digital technologies. However, only seven percent of Zambians know how to use a computer, and less than one percent can program (World Bank, 2020a). These gaps are exacerbated by poor ICT infrastructure, making it harder for managers and workers to gain or leverage digital skills. As a result,World Economic Forum's Zambia ranked 115th for technological readiness on the World Economic Forum's Global Competitiveness Index (2016-2017).

FDI offers a critical pathway for improving firm capabilities and productivity but has played a limited role in driving economic transformation. FDI benefits host country firms and citizens by creating jobs, promoting technology transfer, and helping develop stronger linkages to global value chains (Echandi, Krajcovicova and Qiang, 2015). While Zambia's FDI stock-to-GDP ratio is relatively high—56 percent as compared to 37 percent for Sub-Saharan Africa (UNCTAD, 2023)—FDI stock in Zambia is concentrated in mining: as of 2021, the mining sector accounted for 65 percent of Zambia's FDI stock, more than 4 times any other sector. By contrast, the manufacturing, wholesale and retail trade, banking, and electricity sectors combined only accounted for 30 percent (Bank of Zambia, 2022b). Given commodity price trends, this pattern also exposes aggregate FDI to sector-specific shocks and volatility (Figure 87). Weak FDI diversification combined with previous unpredictable fiscal policies, a cumbersome business environment (especially related to taxes and VAT refunds), and unreliable electricity supply, has limited the contribution of FDI to sectoral productivity (IMF, 2023). As a result, and exacerbated by declining copper prices, FDI inflows have declined sharply in recent years compared to most peer countries (Figure 88).

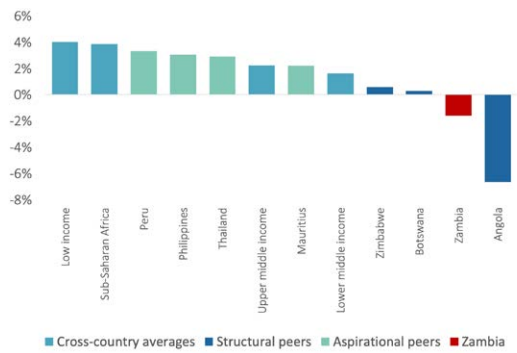
Zambia's FDI performance has been weak in recent years, limiting opportunities for technology transfer

Figure 87. Net FDI inflows, 2014-2022 (percent of GDP)



Source: World Bank WDI

Figure 88. Net FDI inflows by country, 2021 (percent of GDP)



Source: World Bank WDI

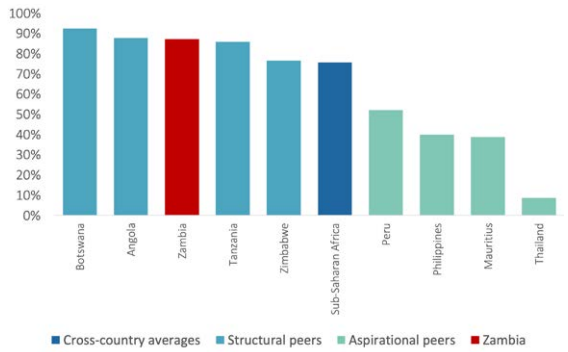
[54] https://www.worldbank.org/en/programs/all-africa-digital-transformation

Inadequate access to electricity

Subpar access to electricity is another constraint to labor productivity in formal firms. One-fifth of Enterprise Survey respondents report that electricity access is their top business environment constraint. Less than half of the population has access to electricity. Even where there is access, the quality of electricity supply is low. Over 80 percent of respondent firms experience outages—lasting 10 hours on average—well above structural and regional peers (Figure 89 and Figure 90). The average firm respondent suffers losses of nearly 20 percent of revenue due to electricity outages (World Bank, 2020c and d).

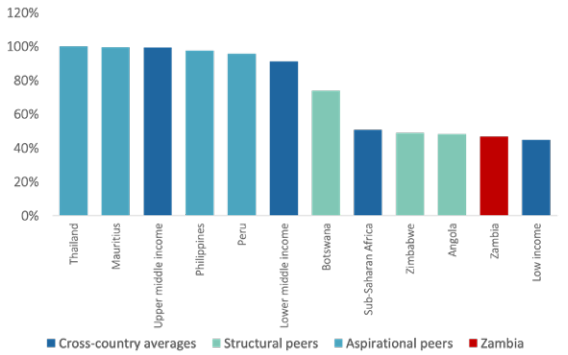
Access to electricity is low in Zambia low quality

Figure 89. Firms experiencing blackouts (Percent of latest Enterprise Survey respondents)



Source: World Bank staff calculations based on Enterprise Survey data (World Bank, 2020c and d) and the Investment Climate Assessment 2.0 toolkit

Figure 90. Access to electricity, 2021 (Percent of population)



Source: World Bank WDI

Poor electricity access and quality reflects the country's dependence on hydropower and increasing climate hazards, among other issues. Hydropower accounts for over 80 percent of installed power generation capacity and is vulnerable to droughts. Droughts in 2015/2016 and 2019 led to blackouts and power rationing (UNCTAD, 2022). Climate change is increasing the frequency and intensity of extreme weather events (Chapter 2), challenging not only the agricultural sector but the entire private sector, and affecting the development of firms and jobs.

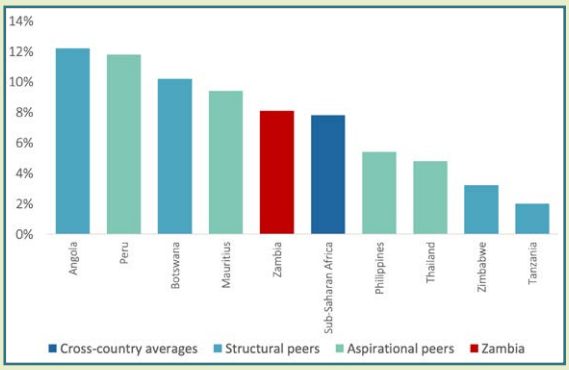
Financial challenges at the state-owned electricity utility, a weak coordinating environment, and limited private sector participation contribute to limited access to electricity in Zambia. The country's electricity system is dominated by state-owned ZESCO, which owns about 75 percent of generation capacity and most transmission and distribution assets in the country (UNECA, 2021). ZESCO has consistently faced financial difficulties—in part due to tariffs being set below cost recovery by the Energy Regulation Board (ERB)—preventing it from maintaining and investing in generating assets and potentially discouraging generation investments by the independent power producers (IPPs) who sell power to ZESCO (UNCTAD, 2022). The policy and institutional framework governing the power sector is also characterized by limited coordination between government and private sector players (e.g., on systems planning), leading to lengthy processes and high costs for prospective investors (UNCTAD, 2022).

Regulatory environment and confluence with informality

Formal firms in Zambia compete heavily with informal firms, reflecting difficulties in accessing higher-value markets and amplifying distortions from excessive formal regulatory and tax burdens. Informal firms may hinder the scale-up of formal competitors if their informal status provides them with cost or operational advantages (e.g., lower regulatory or tax burdens), creating an uneven playing field (Amin, Ohnsorge and Okou, 2019). Since informal firms are not covered in this analysis, their impact on productivity can be observed as productivity declines amongst formal firms that experience sales or margin declines, rather than as cross-firm reallocation of resources. According to the 2019 Enterprise Survey (World Bank, 2020c and d), nearly 65 percent of firms compete with informal firms—higher than many peer countries (Figure 91)—and informal sector practices are the third-most cited business environment obstacle (Figure 78). These competitive distortions result from informal competition coinciding with burdensome requirements for formal firms. Senior managers of formal firms in Zambia report spending 8 percent of their time dealing with regulatory requirements, higher than the averages for SSA and aspirational peers (Figure 92). Competition with the informal sector may also reflect weak market access and poor capabilities of formal firms, forcing the latter to compete with informal firms for a limited pool of local customers.

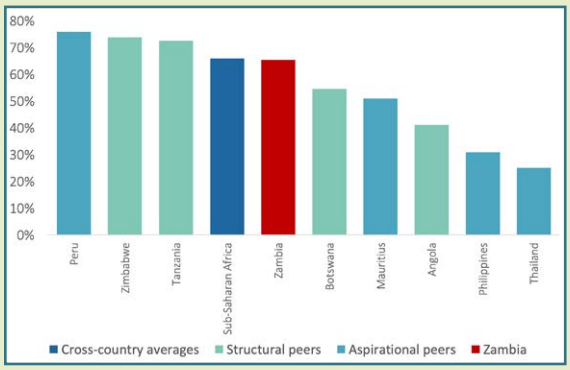
Zambian firms in non-mining industry and services are very likely to compete with the informal sector, while time-consuming regulatory requirements are a burden for formal firms

Figure 91. Firms competing with informal firms (Percent of latest Enterprise Survey respondents)



Source: World Bank staff calculations based on Enterprise Survey data (World Bank, 2020c and d) and the Investment Climate Assessment 2.0 toolkit

Figure 92. Share of senior management time spent on regulatory requirements (Average of latest Enterprise Survey respondents)



Source: World Bank staff calculations based on Enterprise Survey data (World Bank, 2020c and d) and the Investment Climate Assessment 2.0 toolkit

3.5 POLICY RECOMMENDATIONS

Zambia needs to improve its business environment to create and grow productive firms

To create quality jobs at scale, Zambia must expand its private sector and increase labor productivity in formal firms. The barriers to productivity growth and job creation are multifaceted, ranging from a poor business environment and lack of infrastructure to firm and worker weaknesses, and climate change. GRZ should consider holistic measures to increase access to finance, enhance the business environment, improve infrastructure, boost firm and worker competitiveness, and improve climate resilience. Implementing such measures will also require improving institutional capacity for implementing private sector-related reforms and programs.

Macroeconomic stability is key to increasing productivity, creating more and better jobs, and reducing poverty. A combination of severe fiscal and external imbalances – including a decade of fiscal expansion and unsustainable debt accumulation, and climate shocks – led to a deterioration of Zambia's macroeconomic environment, including lagging growth and rising inflation (see Chapter 1). Among others, macroeconomic instability generally disrupts households and firms´ spending and investment decisions, slowing down job creation and decreasing real incomes, further hurting the poor (Davodi et al., 2021). Current measures implemented by the GRZ aim to restore fiscal sustainability and credibility and boost private sector-led growth. Although these have already yielded important results, it is key to maintain macroeconomic stability going forward to increase productivity, create more and better jobs, and reduce poverty.[55]

Access to finance must be scaled up and product offerings expanded

Accelerating the dismantling of arrears would release much-needed liquidity for near-term operations, particularly for cash-strapped SMEs, triggering spill-over effects to the rest of the economy. While the government has cleared some debt in recent years, FISP arrears and VAT refunds—which account for almost 40 percent of the total debt—increased considerably during the COVID-19 pandemic. Clearing these arrears would improve cash flow in sectors with large public procurements or due VAT refunds (construction and mining). Domestic arrears can generate surplus liquidity if commercial banks can refinance them through safe and attractive options (for example, against receivables). This repurposing can create multiplier effects by unlocking capital and providing a stimulus to the economy. The design of such policies and options should be based on international practices adapted to the Zambian context.

The government could also consider upgrading and refining credit guarantee schemes for bank loans to SMEs to continue risk mitigation efforts. In order to address common market failures for SME finance, public credit guarantee schemes can provide third-party risk mitigation to lenders for credit to SMEs, an especially important consideration in Zambia, where banks have historically had government-centric lending portfolios and been risk-averse when lending to the private sector (World Bank, 2015). Since its operationalization in 2019, the Zambia Credit Guarantee Scheme has performed well, albeit on a relatively small-scale basis due to the amount of capital committed and limited use of leverage. In the 2024 budget presented to parliament, the authorities proposed increasing the Zambia Credit Guarantee Scheme allocation for de-risking formal lending to

[55] An in-depth analysis and policies to strengthen the country's macro-fiscal framework is being prepared alongside this report (World Bank, 2024a. Zambia Public Expenditure Review).

SMEs. The scheme could be refined and—fiscal space permitting—scaled up further, along with reforms in credit infrastructure (e.g., credit registry improvements, encouraging first-generation entrepreneurs by facilitating collateral-free/third party guarantee-free loans). Guarantee coverage could vary further based on the sector, job generation potential, and size of firm.

In the medium to long term, GRZ and the international community should work with financial institutions to improve product offerings and services. Financial institutions should be encouraged to develop products and services based on demand, considering priority sectors such as women and youth-led SMEs, agriculture, green industries, and fintech sectors. Lenders could be encouraged to consider non-traditional forms of collateral, including movable assets, to target the significant proportion of firms that do not possess fixed collateral. Efforts should prioritize alternative sources of private sector capital such as venture capital and crowdfunding and include awareness raising amongst Zambian firms. The government and international community could support these innovations by conducting and disseminating research and convening stakeholders to promote dialogue on financing.

Firms need to enhance capabilities and adopt digital technologies

Strengthening domestic and international market linkages would improve market access and firm capabilities. GRZ and the international community should continue connecting local firms to value chains by linking them to lead firms, local affiliates of multinational enterprises, and special economic zones. Doing so would improve market access, facilitate transfer of technology and knowledge, and generate alternative sources of capital. While industry associations in Zambia already organize business linkage and networking events for domestic firms, these generally lack clear measurable outcomes. In addition, follow-up on implementation is weak and firms are often unable to fully use the business linkages and networking opportunities. Better end-to-end support could involve structuring arrangements around supplier-off-taker alliances, targeted technical and financial support to enhance readiness, awareness-building amongst firms, and convening suppliers and off-takers to build sourcing partnerships. However, in doing so it should take care to avoid interventions that distort market incentives or create an uneven playing field. Any support to firms should follow a transparent, market-driven process for beneficiary selection and be accompanied by robust monitoring and evaluation.

GRZ could prioritize policies to promote greater use of digital technologies, enable digital entrepreneurship, and leverage digital systems. Greater use of digital technologies could be achieved by streamlining compliance costs for connectivity providers; strengthening the government's capacity to protect consumers, data, and critical digital infrastructure; developing a roadmap for modernizing the ID system; and further mapping data and skills needs to support evidence-based training and education policy. The government could also consider programs to promote uptake of digital solutions at the firm level. Enabling digital entrepreneurship could entail regulatory reviews related to startups, implementing regulatory sandboxes to test new products under regulatory supervision, and developing a startup strategy that incorporates PPPs to seed and scale up startup ecosystems. To start with, the government could identify two or three priority sectors for transformation and work with the digital entrepreneurship community to develop innovative solutions for them.[56]

[56] More recommendations can be found in the World Bank's Accelerating Digital Transformation in Zambia report (World Bank, 2020b).

Zambia should also improve access to public procurement for the Zambian private sector, especially SMEs. Public procurement can provide critical new markets for SMEs, also helping them to scale up their operations and capabilities. While the Public Procurement Act uses preference margins to support SMEs' access to government tenders, they have not resulted in SME participation at scale. To improve SME access to public procurement, the government could consider raising awareness of tender processes, tweaking eligibility criteria, streamlining and simplifying relevant application processes, and adjusting requirements in tender documents to better account for SMEs.

Better access to electricity is vital

GRZ should build upon recent electricity reforms to crowd in private sector investment. The authorities have advanced electricity sector reforms and the opening up of the electricity market by allowing in IPPs. Although further in-depth research is required to identify specific reforms and programming, potential reforms to explore include: (i) implementing dedicated regulations for system planning; (ii) developing and communicating investment plans to the private sector; (iii) enhancing ERB's budgetary and human resources; (iv) strengthening open access regulations by adopting a standard framework for connection agreements with the grid operator; (v) returning ZESCO to profitability and improving its creditworthiness, which is a prerequisite for attracting the private sector, and (vi) gradually adopting cost-reflecting tariffs while ensuring targeted support for vulnerable households (UNECA, 2021).

To strengthen climate resilience, Zambia needs to accelerate diversification into non-hydro renewable energy. The GRZ is currently developing a comprehensive 30-year Integrated Resource Plan that, inter alia, charts the investments needed to meet the country's economic development objectives. In particular, it highlights new grid and off-grid expansions to reach full access to electricity by 2030, and the diversification of the energy mix into thermal, solar, and wind power generation. Given how electricity constraints are affecting businesses and households, and the urgency of implementing measures to adapt to increasing climate hazards, the GRZ could consider accelerating investments in non-hydro renewables to increase the potential of the private sector to generate jobs and reduce climate-related vulnerabilities.

The regulatory and business environment needs to be streamlined

Zambia should continue streamlining its regulatory regime and systems via technological solutions and risk-based regulatory approaches. While certain reforms to streamline regulations at the local and national levels have been implemented successfully, regulatory burdens and uncertainty still need to be reduced urgently. Critical short-term reforms include rolling out the e-Registry of licenses to local authorities to improve the predictability, transparency, and efficiency of government procedures; and introducing risk-based regulation to reduce the burden on lower-risk businesses and scarce government resources by focusing resources on higher-risk firms and topics. These interventions would ease the cost of doing business in Zambia and make it more attractive as an investment destination, contributing to lower informality and higher entry of job-creating firms. They would also reduce competitive distortions between formal and informal firms (Box 9).

Introducing trade facilitation and logistics measures to improve the business environment for trade should be a medium- to long-term priority. Zambia is a member of the Southern African Development Community (SADC) and the Common Market for Eastern and Southern Africa (COMESA) and has formalized its membership of the Africa Continental Free Trade Area (AfCFTA).[57] To take full advantage of AfCFTA and its markets, Zambia must address issues associated with poor logistics infrastructure, trade regulation and access to serviced land (Ministry of Commerce, 2022). Government agencies can play a pivotal role in addressing information and coordination failures by building awareness and capacity within the private sector around market opportunities, product standards and certification requirements. Given recent experiences in the disruption of supplies of raw materials and essential products, promoting local production and regional value chains within COMESA and other regional economic corridors, including AfCFTA, is critical. Enabling exports could increase sales and induce job creation for Zambian firms. These opportunities can also improve exporters' capabilities, given the well-documented link between exports and firm capabilities (Trachuk and Linder, 2018).

GRZ could also improve the business environment for foreign investors to aid FDI diversification beyond mining. The COVID-19 crisis placed Zambia's investment base at risk, underscoring the need to attract and retain FDI. In the short term, policy support aimed at strengthening the Zambia Development Agency's (ZDA) capacity to attract and retain investment and enhance sector targeting—especially in non-mining sectors—is crucial. In parallel, the GRZ should simplify investor entry processes (rationalizing screening requirements) and analyze investment incentives considering fiscal constraints. In the medium to long term, Zambia must strengthen capacities to develop and negotiate international investment agreements. Increased FDI activity resulting from such interventions would drive job creation and improvements in firm productivity and capabilities, catalyzing FDI spillovers and technology transfer (Echandi, Krajcovicova and Qiang, 2015).

BOX 9: Managing informality to increase productivity

According to Enterprise Survey (2019) data, competition with the informal sector is the third most-cited business environment obstacle by surveyed firms in Zambia (Figure 78). Studies show that formal firms facing informal competition are less productive than formal firms that do not face such competition (World Bank, 2019; Amin and Okou, 2020). Addressing the informality challenge is therefore critical for improving the overall productivity of the economy.

Critically, however, reducing these distortions does not necessarily imply pushing for formalization and stepped-up enforcement to prevent informal practices. Governments have traditionally sought to address informality through information dissemination, process rationalization, reducing compliance costs, and strengthening enforcement. However, many of these 'conventional' measures are ineffective at reducing informality in a significant and lasting manner. Emerging evidence suggests that innovative approaches—such as multi-dimensional packages of assistance, measures that seek to increase the 'demand' for formality, and initiatives that create linkages between unregistered firms or between registered and unregistered firms—may hold promise as tools to address informality. Achieving substantial and long-term reductions, however, requires tackling the 'deep determinants' of informality. Enhancing the provision of public goods, reducing undue formal regulatory compliance burdens, and tax reforms are particularly critical.

[57] Two main economic regions with a combined market of 30 countries, a total population of over 780 million, a GDP of US$1.3 trillion, and global export/import trade in goods worth US$520 billion.

Firms need to become resilient to climate change

GRZ should promote climate adaptation measures to make the private sector's contribution to jobs and economic transformation more resilient. Even before the COVID-19 pandemic, Zambia's economy was grappling with the effects of climate change, with the agriculture and energy sectors being the worst affected due to their reliance on rain (Chapter 2). Evidence from an economy-wide modeling assessment suggests that, in the absence of mitigation and adaptation policies, climate change is expected to reduce Zambia's GDP by 6 percent by 2050 (World Bank, 2022). Specific policy measures to promote private sector adaptation include: : (i) supporting Zambian businesses to develop bankable projects on climate change adaptation and mitigation, focusing on climate sensitive sectors such as agriculture, water, and energy (e.g., for irrigation – see Chapter 2 – or diversification away from hydropower); (ii) increasing targeted domestic credit for bankable projects on climate change adaptation and mitigation; and (iii) harnessing impact investment in a circular economy and in enterprises in the renewable energy and clean-tech sectors.

Institutional capacity needs to be built

GRZ should invest in greater implementation capacity for private sector policy and programming to address cross-cutting constraints to productivity and wage growth. Efforts to improve the business environment have not always been accompanied by the required implementation capacity amongst relevant government agencies. Coordination failures among relevant agencies and high turnover of officials have exacerbated these gaps. Government endorsement of new projects (e.g., infrastructure and green growth) could be an effective tool to anchor expectations and boost the confidence of private entrepreneurs at a time when many are delaying investments amidst uncertainty. In addition, improved institutional capabilities and safeguards (e.g., staff enhancement at ZDA) are critical for improving service delivery, guiding project selection with optimal social and economic returns, and avoiding cost overruns.

There is also ample room to enhance data collection to inform decision making. The government's information systems could be expanded with key data for analysis and decision making on firms' performance. In addition, the government could explore new systems to improve data collection and processing and establish a centralized data bank for access by diverse government and external stakeholders. Finally, systematizing tools such as Business Pulse Surveys to generate real-time updates on how firms are affected by and responding to pandemics or other shocks would strengthen decision making. These tools should cover firms' operating capacity, uptake of digital solutions, labor adjustments, extent of supply disruptions, ability to meet payments, and knowledge and uptake of government assistance programs. Such data could in turn provide for more robust and wide-ranging analysis of the drivers of firm performance and quality job creation, although data protection and privacy must be protected in the process. For example, firm census data with ownership and more reliable balance sheet information would allow for the estimation of firm- and sector-level impacts of FDI and access to finance.

Table 3. Top policy recommendations to improve firm-level productivity and create better jobs

Policy Problem	Short-Term Actions	Medium-Term Actions
Macroeconomic imbalances caused by weak fiscal discipline and excessive borrowing, which affect the business environment	Raise capital spending efficiency, improve the allocation of public resources, strengthen budgetary and public sector institutions (including SOEs), and boost fiscal revenues	
Lack of access to finance for the private sector due to crowding out by government borrowing, low risk tolerance of financial intermediaries, and bank-centric financial system	Accelerate dismantling of government arrears	Collaborate with investors and financial institutions to develop new products (including fintech solutions) responding to the financing needs of the private sector (e.g., moveable collateral, crowdfunding)
	Upgrade and refine credit guarantee schemes for bank loans to SMEs	
	Identify and address gaps in financial infrastructure (e.g., via improvements in the credit information system)	
Inadequate technology adoption, capabilities, and skills at the firm level	Facilitate development of domestic and international market linkages through targeted technical and financial support	Strengthen capacity to protect consumers' data, and promote digital infrastructure
	Implement programs to promote firm-level uptake of digital solutions (e.g., digital sandboxes)	Modernize identification system to promote use of digital ID
	Enable digital entrepreneurship through regulatory sandboxes and startup ecosystem support	Reform education and training system to emphasize digital skills
		Tailor public procurement processes (e.g., forms) to SME needs and capabilities
Poor access and quality of electricity supply	Implement dedicated regulation for system planning	Strengthen ERB budgetary and human resources
	Develop and communicate specific investment plans to the private sector	Accelerate investment in non-hydro renewables
	Strengthen open access regulations	
	Gradually adopt cost-reflecting tariff while targeting support for vulnerable households	

Policy Problem	Short-Term Actions	Medium-Term Actions
Burdensome legal and regulatory environment for formal firms and distortions vis-à-vis informal sector	Roll out e-Registry of licenses to local authorities	Adopt risk-based regulatory approaches
	Improve trade facilitation and logistics (e.g., product standards harmonization and awareness-building), with special focus on AfCFTA	Build government institutional capacity to implement, monitor, and evaluate business regulatory reform processes
	Strengthen ZDA and GRZ capacity in end-to-end investment promotion and investment agreements (including AfCFTA); streamline foreign investment processes	
Economic volatility due to climate change impacts including floods and droughts	Strengthen and clarify national strategic framework for climate change adaptation and mitigation	Collaborate with investors (including impact investors) and financial sector to develop green financing products (including blended finance)
	Provide technical support to businesses for developing bankable projects centered on climate change adaptation/ mitigation	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ANNEX 3. DETAILED PRODUCTIVITY ESTIMATION AND DECOMPOSITION METHODOLOGY

This chapter defines labor productivity as value added per worker. Value added is defined as sales less non-labor cost of sales. The number of workers is estimated by dividing firms' total wages bills by average annual wages at the ISIC A*38 level (calculated from the PAYE database).[58] Value added is deflated in line with sectoral deflators obtained from ZamStat, which are roughly in line with the ISIC A*38 level of aggregation. For analyses using the PAYE data (i.e., worker count and real wage analyses), this chapter defines one full-time equivalent worker (FTE) as 12 monthly returns to account for seasonal labor and deflates wages by the Consumer Price Index (CPI) to align real wages to spending power.

The methodology for decomposing labor productivity growth is drawn from Olley and Pakes (1996), Melitz and Polanec (2015) and Patiño Peña and Ferro (forthcoming). Labor productivity is estimated and decomposed at the ISIC 1-digit level given the low number of observations per sector at the ISIC 2-digit and A*38 levels.[59] The methodology defines sector $j's$ aggregate productivity, $\Omega_{j,t}$, as the weighted average of firm-level productivities:

$$\Omega_{j,t} = \sum_{i=1}^{N_{j,t}} s_{ij,t}\omega_{ij,t}, \tag{1}$$

where $s_{ij,t}$ is the share of firm i's labor in total sector labor, $\omega_{ij,t}$ is the labor productivity of firm i, and $N_{j,t}$ is the total number of firms in sector j and in year t. As in Olley and Pakes, aggregate sector productivity, $\Omega_{j,t}$, can be decomposed into two terms:

$$\Omega_{j,t} = \bar{\omega}_{j,t} + \sum_{i=1}^{N_{j,t}} \left(\omega_{ij,t} - \bar{\omega}_{j,t}\right)\left(s_{ij,t} - \bar{s}_{j,t}\right). \tag{2}$$

The first term in Equation (2) captures the level of efficiency with which firms in sector j transform factor inputs into output, i.e., the technical efficiency of sector j, measured as the unweighted mean of firm productivities within the sector, $\bar{\omega}_{j,t} = \frac{1}{N_{j,t}}\sum_{i=1}^{N_{j,t}} \omega_{ij,t}$. The second component of Equation (2) measures the extent to which more productive firms capture a larger share of the sector's economic activity, i.e., the allocative efficiency of sector j, expressed as the covariance between firms' productivity and the share of their labor in the overall labor of sector j, $\sum_{i=1}^{N_{j,t}}\left(\omega_{ij,t} - \bar{\omega}_{j,t}\right)\left(s_{ij,t} - \bar{s}_{j,t}\right)$. Higher values of this term indicate greater allocative efficiency within the sector. Furthermore, differencing Equation (2) between year t and year $t-1$, helps identify whether changes in aggregate productivity in sector j are driven by variations in technical or allocative efficiency. Last, aggregate productivity of formal firms in the Zambian economy is defined as the weighted average of sector-level productivities:

[58] Worker counts are not available through the CIT database. Although the data technically allow for merging of the CIT database and PAYE database (which does contain worker counts), the PAYE database is unlikely to capture all workers in a given formal firm due to the tax payment thresholds for PAYE at the individual worker level, especially in sectors where formal firms nevertheless hire informal workers (e.g., agriculture). These informal workers at formal firms are reflected in CIT wage bill data but not PAYE worker count data. Conversely, the PAYE data contain information on all workers paying into PAYE, regardless of whether their firms pay into CIT. Thus, we rely on the CIT data to proxy the universe of formal firms (and their workers, who may or may not be formal), while we rely on the PAYE data to proxy the universe of formally employed workers and their employers (who may or may not pay into CIT).

[59] Wholesale and retail trade of motor vehicles and motorcycles, wholesale trade, and retail trade are split into the ISIC 2-digit level given the high number of observations in these 2-digit sectors. All other sectors are at the ISIC 1-digit level.

$$\Omega_t = \sum_j \lambda_{j,t}\Omega_{j,t}, \tag{3}$$

where $\lambda_{j,t}$ is the share of sector $j's$ labor in the total economy's labor.

Following the approach developed by Melitz and Polanec (2015) and Patiño Peña and Ferro (Forthcoming), aggregate productivity growth ($\Delta\Omega_t = \Omega_t - \Omega_{t-1}$) in Zambia is decomposed into five components: the within, between, entry, exit, and structural transformation components. The decomposition can be expressed as:

$$\Delta\Omega_t = \sum_j \lambda_{j,t}\Delta\bar{\omega}_{j,t}^{survivor} + \sum_j \lambda_{j,t}\Delta Cov_{j,t}^{survivor} + \sum_j \lambda_{j,t}Entry_{j,t} + \sum_j \lambda_{j,t}Exit_{j,t-1} + \sum_j \Delta\lambda_{j,t}\Omega_{j,t-1}. \tag{4}$$

The within component, $\sum_j \lambda_{j,t}\Delta\bar{\omega}_{j,t}^{survivor}$, captures aggregate productivity changes resulting from changes in the technical efficiency of survivor firms. The between component, $\sum_j \lambda_{j,t}\Delta Cov_{j,t}^{survivor}$, accounts for changes in aggregate productivity due to resource reallocation among surviving firms. The entry component, $\sum_j \lambda_{j,t}Entry_{j,t}$, reflects aggregate productivity changes driven by the entry of new firms in the market in period t. Last, the exit component, $\sum_j \lambda_{j,t}Exit_{j,t-1}$, corresponds to aggregate productivity changes resulting from the exit of firms between period $t-1$ and t. These first four components of Equation (4) capture changes in aggregate productivity driven by firm dynamics that occur within sectors, as they are weighted averages of sector-level measures. The last component of Equation (4) is the structural transformation component, $\sum_j \Delta\lambda_{j,t}\Omega_{j,t-1}$, and reflects changes in aggregate productivity driven by the reallocation of economic activity across sectors. The following paragraphs provide further detail on the derivation of this decomposition approach.

The decomposition outlined above requires firm panel data that allows the classification of firms into three groups at the sector level, for a pair of two consecutive years, $t-1$ and t. For this, the set of all firms in sector j and in year t is defined as $I_{j,t} = \{1, \ldots, N_{j,t}\}$. The first group of firms in sector j corresponds to survivors, which are firms that operate in both years $t-1$ and t. The set of survivor firms is denoted as $C_{j,t} = I_{j,t} \cap I_{j,t-1}$. The second group of firms in sector j is comprised of enterprises, which did not operate in year $t-1$, but operated in year t, the entrant firms. This set of firms is defined as $E_{j,t} = \{i \in I_{j,t} \text{ and } i \notin I_{j,t-1}\}$. Last, the third group of firms in sector j are exiters, which operated in year $t-1$, but did not operate in year t. The set of exiter firms is given by $X_{j,t-1} = \{i \notin I_{j,t} \text{ and } i \in I_{j,t-1}\}$.

As in Melitz and Polanec (2015) and Patiño Peña and Ferro (Forthcoming), sector j's aggregate productivity growth, $\Delta\Omega_{j,t} = \Omega_{j,t} - \Omega_{j,t-1}$, can be decomposed as:

$$\Delta\Omega_{j,t} = \Delta\bar{\omega}_{j,t}^{survivor} + \Delta Corr_{j,t}^{survivor} + Entry_{j,t} + Exit_{j,t-1}. \tag{5}$$

The first element of Equation (5) captures changes in the technical efficiency of survivor firms in sector j, measured as the difference in the simple average of survivor firms' productivity in the sector:

$$\Delta\bar{\omega}_{j,t}^{survivor} = \bar{\omega}_{j,t}^{survivor} - \bar{\omega}_{j,t-1}^{survivor}.$$

where $\bar{\omega}_{j,t}^{survivor} = \frac{1}{|C_{j,t}|}\sum_{i\in C_{j,t}} \omega_{ij,t}$ and $\bar{\omega}_{j,t-1}^{survivor} = \frac{1}{|C_{j,t}|}\sum_{i\in C_{j,t}} \omega_{ij,t-1}$. The second element of Equation (5) measures shifts of labor market shares, within sector j, between firms that operated in both periods by differencing the covariance between firms' productivity and the share of firms' labor share in sector j's labor at times t and $t-1$:

$$\Delta Cov_{j,t}^{survivor} = \sum_{i\in C_{j,t}} \left(\omega_{ij,t} - \bar{\omega}_{j,t}^{survivor}\right)\left(s_{ij,t} - \bar{s}_{j,t}^{survivor}\right) - \sum_{i\in C_{j,t}} \left(\omega_{ij,t-1} - \bar{\omega}_{j,t-1}^{survivor}\right)\left(s_{ij,t-1} - \bar{s}_{j,t-1}^{survivor}\right)$$

where $\bar{s}_{j,t}^{survivor} = \frac{1}{|C_{j,t}|}\sum_{i\in C_{j,t}} s_{ij,t}$ and $\bar{s}_{j,t-1}^{survivor} = \frac{1}{|C_{j,t}|}\sum_{i\in C_{j,t}} s_{ij,t-1}$. The third element of Equation (5) captures changes in sector aggregate productivity arising from the entrance of new firms. It is calculated as the labor shares of sector j's entrants times the difference between the weighted sum of firm-level productivities of sector j's entrants, $\Omega_{j,t}^{E} = \sum_{i\in E_{j,t}} s_{ij,t}\omega_{ij,t}$, and the weighted sum of firm-level productivities of sector j's survivors, $\Omega_{j,t}^{C} = \sum_{i\in C_{j,t}} s_{ij,t}\omega_{ij,t}$, in period t:

$$Entry_{j,t} = \left(\sum_{i\in E_{j,t}} s_{ij,t}\right)\left(\Omega_{j,t}^{E} - \Omega_{j,t}^{C}\right).$$

The last element of Equation (5) quantifies the contribution of exiters to sector aggregate productivity growth and is measured as the market share of sector j's exiter firms times the difference between the weighted sum of firm-level productivities of sector j's survivors, $\Omega_{j,t-1}^{C} = \sum_{i\in C_{j,t}} s_{ij,t-1}\omega_{ij,t-1}$, and the weighted sum of firm-level productivities of sector j's exiters, $\Omega_{j,t-1}^{X} = \sum_{i\in X_{j,t-1}} s_{ij,t-1}\omega_{ij,t-1}$, in period $t-1$:

$$Exit_{j,t-1} = \left(\sum_{i\in X_{j,t-1}} s_{ij,t-1}\right)\left(\Omega_{j,t-1}^{C} - \Omega_{j,t-1}^{X}\right).$$

This decomposition of sector aggregate productivity is then used to define the decomposition of economy-wide aggregate productivity. By differencing aggregate productivity Ω_t between periods t and $t-1$ using Equation (4), change in aggregate productivity can be expressed as:

$$\Delta\Omega_t = \sum_j \lambda_{j,t}\Omega_{j,t} - \sum_j \lambda_{j,t-1}\Omega_{j,t-1} = \sum_j \left\{\lambda_{j,t}\Delta\Omega_{j,t} + \Delta\lambda_{j,t}\Omega_{j,t-1}\right\}.$$

Replacing $\Delta\Omega_{j,t}$ with the expression of Equation (5) into the equation above, total economy aggregate productivity growth is characterized as in Equation (4):

$$\Delta\Omega_t = \sum_j \lambda_{j,t}\Delta\bar{\omega}_{j,t}^{survivor} + \sum_j \lambda_{j,t}\Delta Cov_{j,t}^{survivor} + \sum_j \lambda_{j,t}Entry_{j,t} + \sum_j \lambda_{j,t}Exit_{j,t-1} + \sum_j \Delta\lambda_{j,t}\Omega_{j,t-1}.$$

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