APPLICATION OF THE SOCIAL ACCOUNTING MATRIX (SAM) IN ASSESSING EMPLOYMENT IMPACTS IN ZAMBIA

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Abstract

This paper explores the application of the Social Accounting Matrix (SAM) as a comprehensive analytical framework to assess employment dynamics in Zambia. By integrating sectoral data and income flows, the SAM enables a detailed examination of how economic activities influence employment across various sectors. The study demonstrates the utility of SAM in identifying employment multipliers, sectoral dependencies, and policy implications for sustainable employment generation. Findings suggest that targeted interventions in agriculture, manufacturing, and services can significantly expand employment, emphasizing the importance of a holistic approach to policy formulation.

Keywords: Social Accounting Matrix; Employment Assessment; Zambia; Economic Modelling; Policy Implications

1 Introduction

Employment remains a critical driver of economic development and social stability in Zambia. Despite ongoing efforts to stimulate economic growth, unemployment and underemployment persist, disproportionately affecting vulnerable populations and reducing overall productivity. The challenge for policymakers has been to identify effective strategies that promote job creation across diverse sectors of the economy.

Traditional employment assessment methods often rely on limited data sources such as household surveys or labor force statistics, which may not fully capture the complex intersectoral relationships and spillover effects that influence employment dynamics. To address these limitations, this study employs the Social Accounting Matrix (SAM), a comprehensive analytical tool that captures the interconnections among sectors, factors of production, households, and institutions within the economy (Klasen & Pieters, 2012; Bank of Zambia, 2020).

The utilization of SAM enables a more holistic understanding of how economic activities generate employment and how targeted interventions might catalyze employment growth in specific sectors. The Social Accounting Matrix (SAM) a comprehensive data framework capturing transactions among economic agents—offers a valuable tool for analyzing employment impacts within an integrated macroeconomic context (Thirlwall, 2009).

In the context of Zambia - a country characterized by a primarily resource-based economy with significant informal employment sectors such analysis can provide nuanced insights for designing effective employment policies aligned with national development strategies.

This study aims to construct a detailed SAM for Zambia and use it to assess the employment impact of various economic activities. The findings are intended to guide policymakers in identifying high-employment sectors and designing targeted policies that foster sustainable employment creation, thereby contributing to Zambia's broader development objectives.

2 Literature Review

The Social Accounting Matrix captures transactions between economic agents, offering a tool for analyzing employment impacts within an integrated macroeconomic context. The SAM framework has been widely employed in economic analysis, particularly in developing countries, to evaluate income distribution, sectoral linkages, and policy impacts. Existing literature shows that SAM frameworks can be adapted to analyze sector-specific contributions to a country's economic growth and employment

Lofgren et al. (Lofgren et al., n.d.) provide a detailed methodology for constructing CGE models based on SAM data, which has been effectively employed in assessing sectoral impacts in developing countries.

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data, which has been effectively employed in assessing sectoral impacts in developing countries (Louw & Van der Merwe, 2018). In Zambia, such approaches have been used to analyze growth policies (Haggblade & Valdès, 2012; World Bank, 2019. Its application for employment assessment has gained traction, with studies highlighting its ability to trace employment multipliers and the effects of policy shocks (Haggblade & Valdès, 2012; Klasen & Pieters, 2012).

The SAM's ability to capture the intricate linkages between various sectors enables a comprehensive analysis of the potential impacts of policies and external shocks on employment by integrating employment explicitly into the SAM framework, policymakers can gain insights into the potential trade-offs and complementarities between different policy objectives, such as economic growth, employment generation, and poverty reduction

3 Methodology

This study employs a quantitative research approach centered around the construction and analysis of a Social Accounting Matrix (SAM) for Zambia to assess employment dynamics. The methodology comprises data collection, SAM construction, and analytical techniques, including multiplier analysis and scenario simulations.

3.1 Data Sources

The Zambia-specific SAM used in this research draws on the most recent Supply-Use Tables (Central Statistical Office [CSO], 2019), the 2018 Living Conditions Monitoring Survey (LCMS, 2019), the Integrated Business Survey (Ministry of Commerce, 2020), and fiscal accounts from the Ministry of Finance (2021). Employment coefficients by sector were obtained from the Labour Force Survey (LFS, 2020), disaggregated into skilled and unskilled categories. All monetary values were converted to constant 2021 Zambian kwacha to eliminate inflationary distortions.

3.2 Construction of the Zambia SAM

The SAM framework models the economy as a square matrix, linking sectors, factors of production, households, government, and foreign trade sectors. The construction process involves several steps:

Classification of Sectors: The economy is decomposed into key sectors such as agriculture, mining, manufacturing, services, and construction.

Data Compilation: Sectoral data including gross output, intermediate consumption, value added, and employment figures are collected and aligned with macroeconomic totals.

Balancing and Consistency Checks: The matrix is balanced to ensure that total incomes equal total expenditures, adhering to national accounting principles.

Integration of Labor Data: Employment figures are integrated into the SAM by distributing factor payments among sectors based on observed employment patterns and wages.

Analytical Techniques Multiplier Analysis: Leontief multipliers derived from the SAM quantify the indirect effects of changes in final demand on sector outputs and employment levels.

Employment Impact Assessment: By linking labor data to sectoral activities, the model estimates the number of jobs generated per unit increase in economic activity within each sector.

Scenario Analysis: Hypothetical policies, such as increased investment in the manufacturing sector or expansion of agriculture, are simulated within the SAM to assess their potential employment effects.

This methodological framework allows for a systematic analysis of intersectoral linkages and provides evidence-based insights into the potential for employment generation through various economic strategies in Zambia.

3.3 Employment Multiplier Analysis

Let A be the matrix of average expenditure propensities derived from the balanced SAM, and let

$$L = (I - A)^{-1}$$

denote the Leontief inverse (Miller & Blair, 2009).

The employment multiplier for sector i is:

$$EM_i = e' L_i / x_i$$

where e is a diagonal vector of direct employment coefficients (jobs per million kwacha of output) and x_i is total output of sector i.

Three policy-relevant simulations were run by exogenously increasing final demand in (i) agriculture by 10 %, (ii) manufacturing by 15 %, and (iii) services by 20 %. Resulting job creation was decomposed into direct, indirect, skilled and unskilled components.

4 Results

4.1 Descriptive Insights from the SAM

Agriculture accounts for 15 % of national output yet 41 % of direct jobs, illustrating its labour intensity. Manufacturing contributes 11 % of output and 9 % of jobs, while services dominate output (52 %) but represent only 32 % of employment, reflecting greater capital intensity.

4.2 Employment Multipliers

Economy-wide average multipliers (jobs per ZMW 1 million of final demand) are:

• Agriculture 22.4	• Agro-processing 18.7	• Light mfg 14.1
• Heavy mfg 9.3	• Services 8.6	

4.3 Scenario Simulations

Table 1: Additional Employment Generated by Final-Demand Shocks

Scenario	Shock	Total jobs	Direct	Indirect	Skilled	Unskilled
Agriculture-led	+10 %	152 000	64 %	36 %	18 %	82 %
Manufacturing-led	+15 %	138 400	52 %	48 %	34 %	66 %
Services-led	+20 %	129 700	47 %	53 %	42 %	58 %

Agriculture, despite the smallest shock, yields the most jobs owing to high labour coefficients; manufacturing delivers the highest share of skilled positions; services create the largest proportion of indirect jobs.

4.4 Sensitivity Analysis

Varying import propensities by ±10 % and value-added shares by ±5 % altered multipliers by < 7 %, demonstrating robustness.

5 Discussion

Results reaffirm agriculture's centrality to employment but also underscore its low wage and skill profile. Manufacturing emerges as a strategic sector for quality job growth, consistent with Rodrik's (2018) "escalator" hypothesis. Services function mainly as an enabling platform; relying on them alone is unlikely to absorb Zambia's fast-growing labour force. Hence an integrated strategy is required—one that raises agricultural productivity, deepens agro-processing, and scaffolds both through efficient service inputs such as transport, ICT, and finance. These findings complement country-specific CGE evidence by the World Bank (2019), and align with cross-country stylised facts on late-industrialising economies (Rodrik, 2018).

6 Policy Implications

6.1 Targeted Support for Agro-processing

- Introduce matching-grant schemes for SME processors to adopt food-safety certification and energy-efficient dryers.
- Scale up feeder-road rehabilitation in the 20 highest-surplus districts; estimated cost ZMW 1.4 billion, financed via the Roads Fund and a 10 % top-slice of mining royalties.

6.2 Industrial Parks and Cluster Development

- Convert the Chambishi MFEZ pilot into a multi-sector light-manufacturing park with conditional tax holidays tied to local-sourcing ratios ≥ 40 %.
- Establish mobile TVET units to deliver competency-based training inside the parks, reducing mismatch lags identified in the Labour Force Survey (2020).

6.3 Services as an Enabler, not a Substitute

- Prioritize universal 4G coverage and national fibre backbones; bundle this with wholesale-access regulation to curb telco mark-ups.
- Capitalize a ZMW 200 million Digital Logistics Challenge Fund that co-finances platforms linking small farmers to urban markets.

6.4 Cross-Cutting Measures

- Create a Jobs & Competitiveness Fund, seeded with 0.5 % of GDP, to leverage donor co-financing for cluster infrastructure.
- Embed climate-smart agronomic packages (conservation farming, solar irrigation) in all farm-input support to safeguard long-run job multipliers.
- Make grant eligibility contingent on employing ≥ 40 % women and ≥ 30 % youth, directly tackling demographic employment gaps.

7 Conclusion

By constructing and analysing a Zambia-specific Social Accounting Matrix, this study quantified the direct and indirect employment gains from alternative sector-led growth paths. Agriculture remains the most potent generator of jobs per unit of demand, yet manufacturing offers superior wage and skill profiles, while services provide essential enabling linkages. A balanced growth strategy—simultaneously boosting agricultural productivity, nurturing light manufacturing clusters, and strengthening service-sector infrastructure—offers the greatest promise for meeting Zambia's Vision 2030 employment targets.

8 Limitations and Future Research

- Data Vintage: 2019–2021 data may not fully capture post-COVID structural shifts; a new SAM round using 2023 supply-use tables is recommended.
- Fixed-Coefficient Assumption: Multipliers ignore price responses and capacity constraints; embedding the SAM in a CGE model would remedy this.
- Spatial Heterogeneity: National averages hide provincial disparities; future work should build regional SAMs to inform place-based policy.
- Informality: Current matrix treats informal output implicitly; explicit disaggregation would refine labour-intensive sector multipliers.

9 Acknowledgements

The author thanks the Zambia Statistics Agency for access to unpublished supply-use tables and the Ministry of Finance Macroeconomic Modelling Unit for technical guidance. Helpful comments from two anonymous reviewers.

Bank of Zambia. (2020). Annual report 2019. Bank of Zambia. https://www.boz.zm

Central Statistical Office. (2019). Supply-use tables 2016 (revised ed.). Government of the Republic of Zambia.

Junius, T., & Oosterhaven, J. (2003). The solution of updating or regionalizing a matrix with both positive and negative entries. Economic Systems Research, 15(1), 87–96. https://doi.org/10.1080/0953531032000056956

Klasen, S., & Pieters, J. (2012). Push or pull? Drivers of female labor-force participation during India's economic boom (IZA Discussion Paper No. 6395). Institute of Labor Economics.

Kydd, J., & Dorward, A. (2015). Agricultural development and pro-poor economic growth in Sub-Saharan Africa. Routledge.

Labour Force Survey. (2020). Labour force survey 2019: Key indicators report. Zambia Statistics Agency.

LCMS. (2019). Living conditions monitoring survey 2018: Analytical report. Zambia Statistics Agency.

Miller, R. E., & Blair, P. D. (2009). Input-output analysis: Foundations and extensions (2nd ed.). Cambridge University Press.

Ministry of Commerce, Trade and Industry. (2020). Integrated business survey 2019: National synthesis report. Government of the Republic of Zambia.

Ministry of Finance. (2021). Financial report 2020. Government of the Republic of Zambia.

Pyatt, G., & Roe, A. R. (1977). Social accounting for development planning with special reference to Sri Lanka. Cambridge University Press.

Rodrik, D. (2018). New technologies, global value chains, and developing economies (NBER Working Paper No. 25164). National Bureau of Economic Research. https://doi.org/10.3386/w25164

Round, J. I. (2003). Social accounting matrices and SAM-based multiplier analysis. In F. Bourguignon & L. A. Pereira da Silva (Eds.), the impact of economic policies on poverty and income distribution (pp. 261–276). World Bank & Oxford University Press.

Thirlwall, A. P. (2009). Growth and development: With special reference to developing economies (8th ed.). Palgrave Macmillan.

World Bank. (2019). Future of work in Africa: Harnessing the potential of digital technologies for all. World Bank.

Appendix A. Sector Classification Mapping (37-sector SAM → 10-sector presentation)

#	Original SAM Sector (37)	Aggregated Sector (10)
1	Maize	Agriculture
2	Other cereals	Agriculture
3	Roots & tubers	Agriculture
4	Pulses & oil-seeds	Agriculture
5	Horticulture	Agriculture
6	Livestock & poultry	Agriculture
7	Forestry & logging	Agriculture
8	Fisheries	Agriculture
9	Mining of copper & cobalt	Mining
10	Other metallic minerals	Mining
11	Quarrying & construction materials	Mining
12	Meat & dairy processing	Agro-processing
13	Grain-milling & bakeries	Agro-processing
14	Sugar & confectionery	Agro-processing
15	| Edible oils & fats	Agro-processing
16	Beverages & tobacco	Agro-processing
17	Textiles & garments	Light manufacturing
18	Leather & footwear	Light manufacturing
19	Wood & furniture	Light manufacturing
20	Paper & publishing	Light manufacturing
21	Plastics & rubber	Light manufacturing
22	Chemicals & fertilizers	Heavy manufacturing
23	Non-metallic mineral products	Heavy manufacturing
24	Basic metals & fabricated metal	Heavy manufacturing
25	Machinery & equipment	Heavy manufacturing
26	Motor vehicles & trailers	Heavy manufacturing
27	Electricity & gas	Utilities
28	Water supply & waste management	| Utilities
29	Construction	Construction
30	Wholesale & retail trade	Trade
31	Transport & storage	Transport
32	Post & telecommunications	ICT
33	| Financial & insurance	Business services
34	Real-estate & renting	Business services
35	Public administration & defence	Public services
36	Education	Public services
37	Health & social work	Public services

Appendix B. Selected Sectoral Employment Coefficients and Multipliers

Aggregated sector	Direct jobs per ZMW 1 m output	Total employment multiplier*
Agriculture	18.4	22.4
Agro-processing	10.9	18.7
Light mfg	8.1	14.1
Heavy mfg	4.7	9.3
Utilities	1.5	3.8
Construction	7.6	11.9
Trade	6.3	10.4
Transport	4.2	8.2
ICT	2.9	6.7
Public services	5.5	7.6

*Total employment multiplier = direct + indirect jobs generated per ZMW 1 million increase in final demand (Section 3.3).