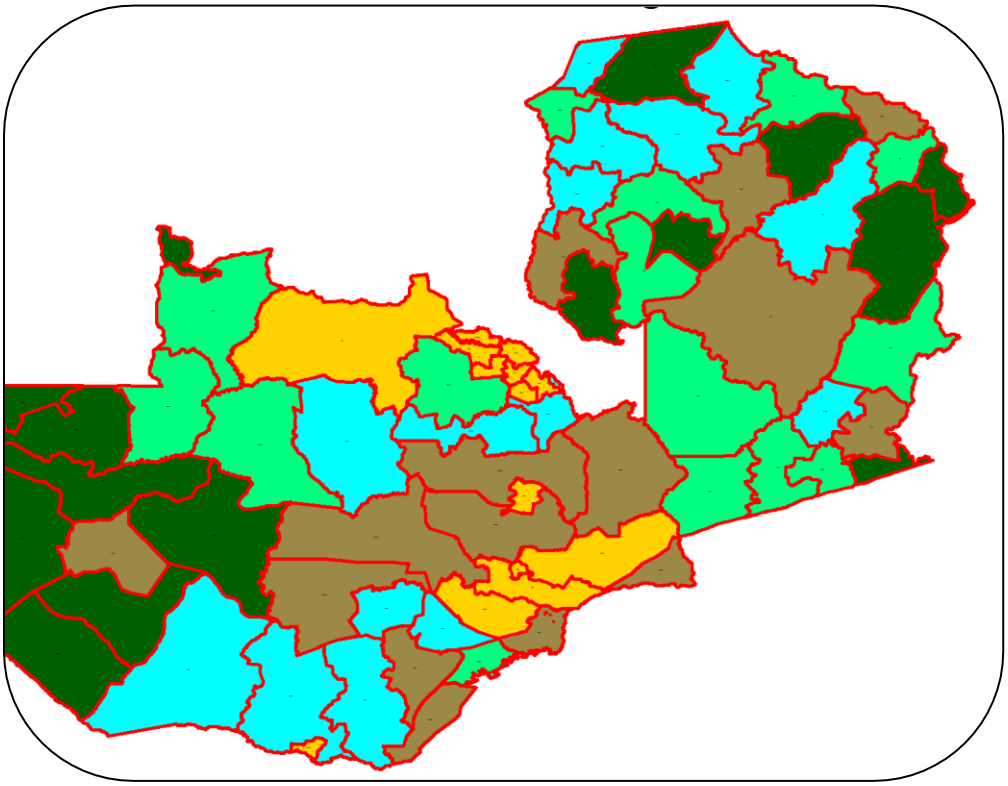
Comparison of Welfare Status of Districts in Zambia



By Gibson Masumbu and Kristi Mahrt

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Abstract

In this paper we make welfare comparisons among districts of Zambia using multidimensional wellbeing indicators observed at the household level. The comparisons are conducted using a first order dominance approach developed by Arndt et al. (2012). It is assumed that the levels of deprivation for each indicator can be ranked ordinally from worse to better. The ranking is done without making any assumptions about the relative importance of any of the indicators. This approach is applied to the 2010 Census of Population and Housing data. The analysis has generated information on the poverty status of provinces and districts in Zambia and has ranked them from the relatively well off to the worse off. This information has been presented on a map showing the districts according to their poverty status. It is expected that this paper will contribute to fine tuning geographic poverty targeting efforts in Zambia. The rationale is that with the availability of such analysis, it will be possible to make budgetary provisions that allow for the equitable distribution of public resources. The overriding objective of the government should be to channel public resources based on the spatial distribution of poverty.

1. Introduction

Poverty reduction remains an important policy objective of the Zambian government. Through various policies and programmes, the government endeavours to achieve broad based pro-poor growth. In the last decade the country has experienced significant poverty reduction in urban areas whilst rural areas remain behind. To create a balance of development between the urban and rural areas, the government will need to formulate and implement programmes that deliberately target areas that are lagging behind. Since poverty is multidimensional in nature, dimensions where people are deprived will differ greatly from place to place. Areas where most people are deprived in energy require a different poverty reduction strategy compared to an area where most people are deprived in unemployment. Because of this, policy makers require adequate information on the state of poverty in order to formulate appropriate strategies to reduce it.

In the past, studies on poverty have based their analyses on one-dimensional measures such as income or consumption. Such analyses tend to assume homogeneity in the conditions driving poverty, while in reality factors such as demographic and geographic variations across a nation, provinces, or districts may play a crucial role in the composition of poverty. Because the complex composition of poverty is not incorporated in the analyses and spatial differences are not duly taken into account, the resulting poverty analyses may misinform policy-makers, subsequently resulting in poor resource allocation within the country. The overall consequence is that public resources cannot be effectively used to fight poverty.

Therefore a study that recognizes that poverty is too complex of a condition to be captured by monetary measures alone and incorporates its multidimensional nature in its measures will have a greater ability to identify a complete picture of deprivation in Zambia. Furthermore a study that maps Zambian poverty at a micro level, such as the district level, will contribute to fine tuning geographic poverty reduction efforts throughout the nation. The rationale is that with the availability of such analysis, it will be possible to make budgetary provisions that allow for the effective distribution of public resources to strive for equality among regions. The overriding objective of the government should be to channel public resources based on the spatial distribution of poverty.

This study, therefore seeks to provide policy makers with reliable information that will make it possible to specifically identify poorer areas and to deliberately target resources based on the specific deprivations in these areas as a matter of national priority. The main objective of this study is to produce information on the welfare of Zambian households at a micro level with a view to informing formulation of policies and programmes for poverty interventions. In addition, by using multidimensional indicators of poverty to measure welfare, policy makers will have a much clearer picture of the state of poverty. In this way, policy makers will be able to enhance the design of policies and implementation of poverty reduction programme.

2. **Methodology**

Much of the poverty assessments in Zambia have been based on the data from the Central Statistics Office (CSO). Since 1996, the CSO has successfully conducted six rounds of Living Conditions and Monitoring Surveys (LCMS) with the latest being in 2010. The CSO uses the concept of income deprivation when measuring poverty, a concept that follows a process of identifying the poor on the basis of comparison of household disposable income to the cost of the basic needs basket (CSO 2010). The key poverty measures in the LCMS are based on the Foster-Greer-Thorbecke (FGT) class of poverty measurement (CSO 2010). The poor in this case are identified by setting a poverty line corresponding to a minimum poverty level below which a person is considered poor.

In 2007, the CSO conducted the first ever Micro level Estimates of Poverty in Zambia utilizing data from the 2000 census and the 2003 LCMS (CSO 2007) . The study used the income approach to generate the FGT poverty indices, which were then used to map poverty at national, district, constituencies and wards. In July, 2011, the Food Security Research Project produced a report titled Factors affecting Food Dynamics in Rural Areas (Chapoto et al 2011). The study used nationally representative longitudinal data on 4,284 households sampled in Zambia surveyed in 2001, 2004, and 2008. The study also used household income as the measurement of welfare.

2.1 The First order dominance (FOD) approach

In the recent past, there has been increasing emphasis on the use of multidimensional poverty measures to estimate poverty. In Zambia, a Multidimensional Poverty Index (MPI) has been estimated by the UNDP in the Human Development Report (UNDP 2010). The MPI is based on a class of multidimensional poverty measurements developed by Alkire and Foster (2009). The index uses dimensions which are internationally comparable, including education, health and living standards. This methodology applies a weighting scheme that aggregates across multiple indicators of poverty and wellbeing. Other scholars have endeavored to develop alternative "robust" methods that compare population welfare using multidimensional indicators. Among these methods, is the use of the First Order Dominance Approach (FOD) developed by Arndt, et al. (2012) which makes welfare comparisons on the basis of a series of multidimensional data.

In this paper, we draw upon the FOD methodology developed by Arndt et al. (2012) which allows us to make welfare comparisons among populations in a situation where only ordinal information is available at the micro level in terms of multidimensional, discrete well-being indicators[1]. The methodology employs a reliable algorithm for empirically determining whether one population dominates another on the basis of available binary indicators by

[1] *The term "ordinal" here means that, for each well-being indicator, the levels can be ranked from worse to better. However, no assumptions are made about the strength of preference for each dimension, nor about the relative desirability of changes between levels within or between dimensions or the complementarity/substitutability between the dimensions*

drawing upon linear programing theory. The linear programing technique is operationalized in GAMS.

Drawing upon the intuition behind FOD described in Arndt et al. (2013), compare two populations A and B based on five binary indicators. The populations can be divided into 2^5 =32 states that describe whether A and B are deprived or not in various combinations of the indicators. Those who are not deprived in any dimension are best off and those who are deprived in all the dimensions are worst off. Furthermore, define 0 to be deprived and 1 to be not deprived and compare the combinations of indicators (0,1,1,0,0) and (0,0,1,0,0). The first combination is unambiguously better than the second because it is at least as well off in all dimensions and is better in one dimension (Arndt et al. 2012). On the other hand, without further information, the states (0,0,1,0,1) and (0,0,0,1,1) are indeterminate. Likewise, we cannot tell which state is better between (0,0,0,1,1) and (0,1,0,0,0) because there is no degree of relative importance attached to any of the indicators.

As highlighted in Arndt et al. (2012) the strength of the FOD mainly lies in the fact that it removes the need to use arbitrary weighing schemes. However, there are some challenges that come with it. These include the potential inability of the procedure to determine any difference between two populations. There are situations where by population A is not better than population B and population B does is not better than A, which means that the welfare ranking, based on FOD, is indeterminate. Also, since binary indicators are being used, there is no additional information to tell the extent of dominance between two populations. These challenges are, however, addressed through the application of a bootstrap approach. Through FOD analysis of repeated bootstrap samples, empirical probabilities are generated that yield significantly more information than the static application of FOD including the ability to estimate the extent to which one area dominates the other.

2.2 Data

The main data source used in this study is the 2010 National Census of Population and Housing. The Census was conducted by the Central Statistics Office (CSO) and contains basic information on all households in the country (CSO 2012). The Census captured information related to housing conditions, health and sanitation, education, asset accumulation, employment, and agriculture activities.

We use five indicators which are inspired by the national development goals as outlined in the Sixth National Development Plan (SNDP) (GRZ 2011). These include sanitation, housing, energy, education, and employment creation. If a welfare measure for a small area is going to help guide the allocation of public expenditures on items such as water, sanitation, education, and electrification across space, then direct indicators associated with these expenditure priorities would appear to be logical guides (Arndt et al. 2013).

The table below defines the deprivations in the context of each of the indicators.

Table 1: FOD indicators

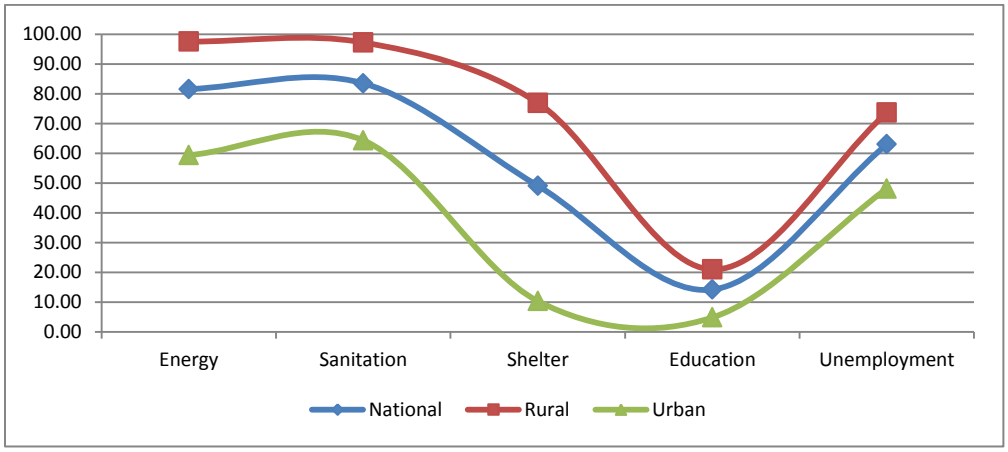
Indicators	***Definitions***
Access to sanitation	*Deprived if household has no toilet or uses a bucket and other facilities*
Employment	*Deprived if household head is unemployed or unpaid family worker*
Housing	*Deprived if house has floor made of mud, wood (not wooden tiles or other)*
Electricity	*Deprived if household uses wood, cow dung, charcoal or none*
Education	*Deprived If head of Household has no education*

3. Results

3.1 Deprivation by dimensions

Figure 1 presents statistics on how the country is faring in the five indicators under consideration. At the national level, the extent of deprivation across the five indicators is relatively high for energy, sanitation, and unemployment. Eighty-three percent of households lack access to sanitation, 80% lack access to electricity, and 63% do not have decent employment. The proportion of households headed by people who have never been to school is only 14%, and that of households without a floor is 49%. Figure 1 below also shows the depth of deprivations across regions. For most of the indicators, the disparity between urban and rural areas is high. Housing has the largest disparity (66%) between the rural and urban areas. The smallest difference between the two regions is in education (17%).

Figure 1: Levels of deprivations for the five dimensions



Source: Author's computations from the CSO 2010 Census of Population and Housing

3.2 Deprivations by province

Table 2 compares the share of households deprived in each welfare indicator across the provinces. For each indicator, the highest level of deprivation is circled and the lowest is underlined. Luapula has the highest levels of deprivation in three dimensions; energy (97.58%), sanitation (96.78%) and shelter (85.79%). The highest levels of deprivation in education and unemployment are in Eastern (29.26%) and Western (78.27%), respectively.

Lusaka fares best in three dimensions namely energy (53%), housing (6.55%), and unemployment (43.33%). Copperbelt province leads in sanitation and education with deprivations in only 53.41% and 5.47% of households.

Table 2: Deprivation shares across provinces

	Energy	Sanitation	Shelter	Education	Unemployment
Central	89.23	89.19	58.14	13.20	64.87
Copperbelt	64.77	53.41	16.71	5.47	54.10
Eastern	96.05	96.10	65.52	29.26	69.99
Luapula	97.50	96.78	85.79	16.03	70.74
Lusaka	53.33	74.21	6.55	5.51	43.23
Muchinga	96.69	95.66	77.41	16.33	71.41
North -Western	93.88	94.76	63.91	20.40	73.34
Northern	96.57	95.91	83.51	16.68	72.78
Southern	87.08	87.80	52.44	12.15	68.91
Western	95.81	96.35	80.50	26.45	78.27

Source: Author's computations from the CSO 2010 Census of Population and Housing

3.3 Share of deprivations per province

Table 3 provides statistics on the number of deprivations faced by households in each province. A summary of table 3 is presented below:

Overall, households in all provinces suffer from one deprivation or another. However, there are relatively more households in Copperbelt (16%) followed by Lusaka (13%) who are not deprived in any of the five dimensions. In contrast six provinces, Eastern, Luapula, Muchinga, North-Western, Northern and Western, have a very small proportion of households who are not deprived in any of the five dimensions. The proportion of households who suffer only one deprivation is highest in Lusaka (26%) and Copperbelt (24%). In Lusaka among households that face only one deprivation, the most common deprivation is sanitation (15%) and unemployment (9%). In Copperbelt, it is mainly unemployment (15%) and energy (7%). Again six provinces, Eastern, Luapula, Muchinga, North-Western, Northern, and Western have at most 5% of households who are deprived only in one of the five dimensions.

Northern (56%), Luapula (56%), Muchinga (51%), and Western (51%) have the highest proportion of households who suffer multiple deprivations with over half of households deprived in four out of five dimensions. The proportion of households deprived in four dimensions is also relatively high in Eastern (40%), Southern (38%), and North-Western (32%). Lusaka has the lowest number of people suffering deprivation in four dimensions at 5% followed by Copperbelt at 12%.

Western province has the highest number of households deprived in all the five dimensions at 21%. Compared to other provinces, the proportion for Eastern province is also high at 17%. Luapula, Muchinga, and Northern have 11% of households deprived in all the five dimensions. The proportion for Central, North-Western, and Southern is 7%, 8%, and 7% respectively. Lusaka and Copperbelt have very few households suffering from all five dimensions.

Table 3: Welfare indicator combination

Welfare Indicator Combination																	
Fuel	Sanitation	Housing	Education	Unemployment	Nat.	Rural	Urban	C.	Copperbelt	E.	Luapula	Lusaka	Muchinga	N.	N.W.	S.	W.
0	0	0	0	0	8.32	13.66	0.87	7.42	1.87	16.96	10.83	0.74	11.40	11.63	14.19	6.57	20.55
0	0	0	0	1	2.57	4.12	0.42	2.64	0.60	5.75	4.29	0.37	3.19	3.98	2.83	2.03	4.36
0	0	0	1	0	28.06	44.64	4.96	33.79	9.50	30.96	50.64	2.77	46.70	50.90	36.96	33.66	45.01
0	0	0	1	1	9.21	13.52	3.20	13.22	3.57	11.19	18.75	1.87	14.81	15.96	9.19	9.43	9.99
0	0	1	0	0	1.89	2.08	1.63	1.84	1.51	4.62	0.47	1.83	0.99	0.61	2.49	2.16	1.07
0	0	1	0	1	0.89	0.77	1.05	0.89	0.68	1.57	0.16	1.54	0.45	0.23	0.61	1.01	0.29
0	0	1	1	0	14.12	11.37	17.94	15.57	16.18	14.75	6.30	17.14	9.46	6.87	16.11	18.72	8.77
0	0	1	1	1	11.65	5.70	19.95	10.73	15.51	8.54	3.90	22.79	7.08	4.21	9.60	9.97	4.40
0	1	0	0	0	0.06	0.10	0.02	0.08	0.02	0.10	0.13	0.01	0.14	0.11	0.10	0.04	0.04
0	1	0	0	1	0.02	0.04	0.01	0.04	0.01	0.03	0.04	0.00	0.07	0.05	0.02	0.01	0.02
0	1	0	1	0	0.28	0.39	0.12	0.39	0.19	0.22	0.58	0.05	0.62	0.49	0.23	0.30	0.19
0	1	0	1	1	0.14	0.17	0.10	0.24	0.17	0.09	0.26	0.04	0.24	0.17	0.06	0.14	0.07
0	1	1	0	0	0.11	0.04	0.21	0.07	0.34	0.08	0.03	0.12	0.02	0.02	0.03	0.09	0.02
0	1	1	0	1	0.05	0.02	0.10	0.04	0.16	0.03	0.01	0.07	0.01	0.01	0.01	0.06	0.01
0	1	1	1	0	2.23	0.45	4.70	1.16	7.83	0.63	0.60	2.02	0.70	0.67	0.71	1.60	0.53
0	1	1	1	1	1.97	0.44	4.10	1.11	6.64	0.52	0.59	1.97	0.81	0.68	0.74	1.27	0.50
1	0	0	0	0	0.02	0.04	0.01	0.02	0.01	0.04	0.04	0.00	0.03	0.02	0.06	0.02	0.06
1	0	0	0	1	0.01	0.02	0.00	0.01	0.00	0.03	0.01	0.01	0.01	0.01	0.01	0.01	0.02
1	0	0	1	0	0.09	0.12	0.04	0.10	0.04	0.09	0.15	0.04	0.12	0.12	0.12	0.10	0.15
1	0	0	1	1	0.07	0.07	0.05	0.14	0.04	0.05	0.06	0.09	0.05	0.05	0.05	0.05	0.04
1	0	1	0	0	0.08	0.02	0.16	0.04	0.04	0.03	0.01	0.30	0.00	0.01	0.03	0.05	0.02
1	0	1	0	1	0.07	0.03	0.13	0.05	0.02	0.02	0.01	0.31	0.00	0.00	0.01	0.03	0.00
1	0	1	1	0	2.55	0.34	5.63	1.02	1.57	0.65	0.51	9.34	0.59	0.59	1.04	1.78	0.81
1	0	1	1	1	3.89	0.73	8.30	1.71	2.27	0.86	0.64	15.06	0.78	0.71	1.49	2.20	0.83
1	1	0	0	0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	1	0	0	1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1	1	0	1	0	0.09	0.01	0.20	0.02	0.29	0.01	0.01	0.18	0.01	0.00	0.02	0.03	0.01
1	1	0	1	1	0.15	0.02	0.32	0.03	0.39	0.01	0.00	0.38	0.01	0.01	0.07	0.04	0.01
1	1	1	0	0	0.05	0.00	0.12	0.03	0.14	0.01	0.00	0.10	0.00	0.00	0.01	0.04	0.00
1	1	1	0	1	0.04	0.01	0.08	0.02	0.07	0.01	0.00	0.10	0.00	0.00	0.00	0.03	0.00
1	1	1	1	0	5.05	0.39	11.54	3.33	14.57	0.86	0.43	8.57	0.61	0.74	1.24	3.74	1.06
1	1	1	1	1	6.28	0.68	14.07	4.26	15.77	1.31	0.53	12.17	1.08	1.15	1.99	4.81	1.19

Source: Author's computations from the CSO 2010 Census of Population and Housing

3.4 Dominance comparisons

Following Arndt et al. (2012), we employ FOD techniques to determine the degree of Domination at the provincial and district levels using 2010 Census data. In Table 4, the row averages show the fraction of times a row region dominates all other regions. The column averages indicate the fraction of times a column region is dominated by all other regions. The row averages for relatively well-off regions are large and the column averages for the relatively poor regions are also large. FOD results are also presented at the national, urban, and rural levels. Copperbelt and Lusaka provinces and urban areas are shown to be relatively better off whilst Western province is shown to be the poorest province.

Table 4: Spatial FOD comparisons for Zambia, 2010

Area	National	Rural	Urban	Central	Copperbelt	Eastern	Luapula	Lusaka	Muchinga	Northern	N. Western	Southern	Western	Avg.
National		1				1	1		1	1	1		1	0.58
Rural														0.00
Urban	1	1		1		1	1		1	1	1	1	1	0.83
Central		1				1	1		1	1	1		1	0.58
Copperbelt	1	1		1		1	1		1	1	1	1	1	0.83
Eastern														0.00
Luapula														0.00
Lusaka	1	1		1		1	1		1	1	1	1	1	0.83
Muchinga														0.00
North-Western													1	0.08
Northern														0.00
Southern		1				1	1		1	1	1		1	0.58
Western														0.00
Average	0.25	0.50	0.00	0.25	0.00	0.50	0.50	0.00	0.50	0.50	0.50	0.25	0.58	

Source: Author's computations from the CSO 2010 Census of Population and Housing

3.5 Ranking of Provinces

FOD process derives measures that yield cardinal welfare rankings across the provincial and district levels. The average probability of net domination is the number of times an area dominates all other areas minus the probability it is dominated by all other areas. Looking at Table 4, the probability of net domination is the province's row average minus its column average. Using this number, we are able to rank populations by welfare status without imposing weights on the various chosen binary welfare indicators. The rankings of the nation, urban and rural areas, and provinces based on net domination are given in Table 5.

Table 5: Spatial FOD ranking and probability of net domination

Area	Domination	Rank
Urban (average)	0.83	1
Copperbelt	0.83	2
Lusaka	0.83	3
Central	0.33	4
Southern	0.33	5
National (average)	0.09	6
Luapula	-0.42	7
Northern	-0.42	8
Muchinga	-0.42	9
North-Western	-0.48	10
Rural (average)	-0.50	11
Eastern	-0.50	12
Western	-0.52	13

Source: Author's computations from the CSO 2010 Census of Population and Housing

As can be seen, from Table 5, Copperbelt and Lusaka net dominate as often as urban areas (83%). These areas are followed by Central and Southern provinces that net dominate other provinces 33% of the time. The results further show that the welfare status of Copperbelt, Lusaka, Central, and Southern are relatively better than the nation as a whole.

Luapula, Northern, Muchinga, and North-Western are ranked below the nation but are relatively better than rural areas. Luapula, Northern, and Muchinga have a net domination of -42% and North-Western -48%. A negative probability of net domination indicates that the number of times these areas are dominated by other provinces is higher than the number of times they dominate others. Eastern and Western provinces are ranked the lowest, thus in comparison with other provinces, these two areas are the poorest. Western province falls below the welfare status of rural areas.

3.6 Ranking of districts[2]

The FOD ranking for districts in Zambia is presented below. The ranking is grouped in quintiles with the fifth quintile representing the relatively well-off districts and the first quintile representing the relatively poorest districts in Zambia. From the tables, Livingstone district is ranked highest of all 73 districts in Zambia. Livingstone dominates all other districts 90% of the time. The relatively poorest district is Shangombo in Western province, which is ranked the 74th with a net domination of -72%.

[2] This data represent the districts that existed in 2010 and do not include the new ones created since 2011.

Table 6a: Fifth quintile: Spatial FOD ranking and probability of net domination

District	Domination	Rank
Livingstone	0.9	1
Kitwe	0.88	2
Chililabombwe	0.87	3
Chingola	0.87	4
Lusaka	0.86	5
Ndola	0.84	6
Mufulira	0.84	7
Kafue	0.83	8
Luanshya	0.82	9
Kabwe	0.81	10
Kalulushi	0.8	11
Mazabuka	0.51	12
Chongwe	0.44	13
Solwezi	0.35	14

Source: Author's computations from the CSO 2010 Census of Population and Housing

Table 6b: Fourth quintile: Spatial FOD ranking and probability of net domination

District	Domination	Rank
Kasama	0.32	15
Kapiri	0.26	16
Choma	0.25	17
Chibombo	0.23	18
Mkushi	0.21	19
Luangwa	0.2	20
Mansa	0.19	21
Nakonde	0.17	22
Mongu	0.16	23
Itezhi-tezhi	0.12	24
Sinazongwe	0.11	25
Mpika	0.09	26
Chipata	0.09	27
Siavonga	0.08	28
Mumbwa	0.07	29

Source: Author's computations from the CSO 2010 Census of Population and Housing

Table 6c: Third quintile: Spatial FOD ranking and probability of net domination

District	Domination	Rank
Monze	0.04	30
Chinsali	0.02	31
Namwala	-0.02	32
Masaiti	-0.05	33
Mambwe	-0.05	34
Chienge	-0.09	35
Mpongwe	-0.09	36
Sesheke	-0.1	37
Mpulungu	-0.14	38
Kasempa	-0.15	39
Kazungula	-0.16	40
Mporokoso	-0.17	41
Kalomo	-0.17	42
Kawambwa	-0.18	43
Mwense	-0.21	44

Source: Author's computations from the CSO 2010 Census of Population and Housing

Table 6d: Second quintile: Spatial FOD ranking and probability of net domination

District	Domination	Rank
Serenje	-0.23	45
Katete	-0.24	46
Mbala	-0.26	47
Lufwanyama	-0.26	48
Gwembe	-0.27	49
Petauke	-0.28	50
Nchelenge	-0.29	51
Lundazi	-0.31	52
Kabompo	-0.31	53
Nyimba	-0.33	54
Mwinilunga	-0.33	55
Isoka	-0.34	56
Luwingu	-0.34	57
Samfya	-0.35	58
Mufumbwe	-0.35	59

Source: Author's computations from the CSO 2010 Census of Population and Housing

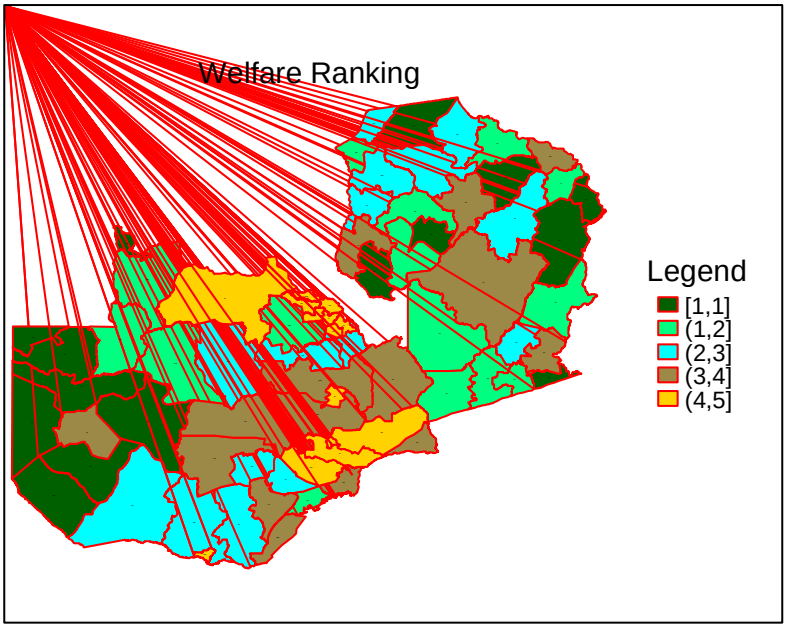
Table 6e: First quintile: Spatial FOD ranking and probability of net domination

District	Domination	Rank
Kaputa	-0.37	60
Kaoma	-0.39	61
Chavuma	-0.4	62
Senanga	-0.4	63
Chilubi	-0.4	64
Mungwi	-0.42	65
Zambezi	-0.42	66
Chadiza	-0.43	67
Lukulu	-0.46	68
Chama	-0.48	69
Mafinga	-0.49	70
Milenge	-0.55	71
Ikelenge	-0.58	72
Kalabo	-0.67	73
Shang'ombo	-0.72	74

Source: Author's computations from the CSO 2010 Census of Population and Housing

3.7 Poverty status map

The welfare comparisons at district levels are presented in the map below. The well-off regions in the fifth quintile are represented by gold. The fourth quintile is represented by brown, third quintile by cyan. The well off regions is mainly clustered on the Copperbelt and Lusaka provinces. Livingstone, Kabwe, and Solwezi are the other well off districts in the first quintile. The relatively poor regions in the second and first quintiles are represented by light green and dark green respectively. These are concentrated mainly in Western province with Eastern, Northern, Luapula, and North-Western contributing a share as well.



Source: Author's computations from the CSO 2010 Census of Population and Housing

Note: The legend colours and numbers represent quintile categories. The fifth quintile (4,5) colored gold represent the regions that are relatively well-off and the first quintile (1,1) and colored dark green represent the relatively worse-off regions.

4. Conclusion

In this paper, the welfare status of provinces and districts has been analyzed based on five indicators relating to publicly provided goods and services. In this way, the paper has provided a fairly clear picture of how economic development and development policies have shaped the welfare of people across the country. The information on the level of development of provinces and districts, ranked from the best to the worst, will help policy formulation and resource allocation in the country. At the very least, targeted policy intervention should be devised with a view to enabling the regions that are worse off to begin to improve their welfare status. This study has shown that at the provincial level, the welfare status of Western and Eastern provinces fall below the average for rural areas. This is an important indication that these areas may need particular attention to develop from the current levels. At the district level, most districts in Western province are among the most impoverished, falling in the first quintile. The districts in Eastern province are mostly in the second quintile. The analysis has further revealed that areas are mostly deprived in four indicators, energy, sanitation, housing, and unemployment.

The analysis in this paper has been restricted to the 2010 Census data. However, application of this analysis on past surveys and indeed future surveys will work as an important monitoring and evaluation framework for public policy specifically as it relates to implementation of the national development plans and similar policies and strategies.

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