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## **Multidimensional poverty of children in Mozambique**

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**Abstract:** We analyse the multidimensional wellbeing of children aged 0–17 in Mozambique and find that 46.3 per cent can be considered multidimensionally poor. A substantial divide exists between urban and rural areas and between northern and southern provinces. We compare Mozambican children’s wellbeing with that of children in other regional countries. Despite impressive gains in some indicators, multidimensional child poverty in Mozambique still substantially exceeds that in neighbouring countries. Targeted policies considering the specificities of child welfare are needed to ensure that the national-level growth and poverty reduction experienced by the population as a whole translate into better living conditions for children.

**Keywords:** multidimensional poverty; children; child wellbeing; Mozambique.

**JEL classification:** I32, J13

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## 1 Introduction

The more than 20-year period following the end of war in Mozambique has been marked by periods of rapid growth and broad-based reduction in multidimensional and consumption poverty. Arndt et al. (2016) and DEEF (2016) present a comprehensive review of this progress. Though the situation of Mozambican children has also improved, evidence suggests that indicators particularly relevant to children may be more resistant to advancement. UNICEF analysis of deprivation-based child poverty in 2003 and 2008 indicates that significant improvements in severe health, nutrition, and education deprivations were tempered by deteriorating access to safe water<sup>1</sup> (UNICEF 2006, 2011). Deprivation-based poverty—the percentage of children experiencing deprivation in two or more indicators—remained high at 49 per cent, despite an 11-point reduction between 2003 and 2008.

Arndt et al. (2012) confirm these findings with an alternative approach to multidimensional welfare measurement based on first-order dominance (FOD). Applying this approach to 2003 Demographic and Health Survey (DHS) and 2008 Multiple Indicator Cluster Surveys (MICS) data in the dimensions of water, sanitation, shelter, education, and information, FOD suggests that welfare for children aged 7–17 essentially stagnated between 2003 and 2008, with gains only evident in a couple of provinces. They also find that spatial inequality did not decrease.

UNICEF's situation analysis of Mozambican children (UNICEF 2014) and MISAU et al. (2013) find that between 2008 and 2011, chronic under-nutrition (stunting) of children under five remained virtually unchanged at one of the highest levels in the world (43 per cent).<sup>2</sup> Access to improved water and sanitation both increased during this period. However, in contrast to earlier progress, primary school enrolment and completion declined between 2008 and 2011 (UNICEF 2014).

The 2014/15 Mozambique household budget survey, *Inquérito aos Agregados Familiares sobre Orçamento Familiar* (IOF; see DEEF 2016; INE 2015), provides a salient opportunity to reassess the welfare of Mozambican children. This analysis will examine urban/rural, regional, gender, and age disparities in child multidimensional welfare using the Alkire-Foster (AF) methodology. It includes an examination of child welfare indicators and the contribution of the different welfare dimensions to child multidimensional poverty. The relationship between multidimensional and consumption poverty at aggregate and individual levels is also considered.

Moreover, to provide a regional context, the wellbeing situation and trends of Mozambican children are compared to those of children in four neighbouring countries: Malawi, Tanzania, Zambia, and Zimbabwe. International comparisons are conducted using compatible DHS data from two recent time periods. The paper proceeds as follows: Section 2 briefly describes the AF methodology. Section 3 presents an analysis of multidimensional poverty in Mozambique. Section 4 provides DHS-based international comparison, while Section 5 concludes.

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<sup>1</sup> In this study, unsafe water is defined to be either surface water or water more than 30 minutes from the home.

<sup>2</sup> Furthermore, Cardoso et al. (2016) highlight that chronic malnutrition appears to be strictly linked to household wealth, mother's education, area of residence, and access to safe water and improved sanitation facilities, and that the relative importance of these variables remained mostly unchanged between 2003 and 2011.

## 2 Methodology: the Alkire-Foster approach

The Alkire-Foster approach developed by Alkire and Foster (2007) is well known for its application in the assessment of multidimensional poverty in developing countries worldwide, and especially in the United Nations Development Programme (UNDP) Multidimensional Poverty Index (MPI), which assesses welfare in over one hundred countries (see, for example, Alkire and Santos 2010). This method has the advantage of being simple and intuitive as well as directly relevant to policy goals relating to specific welfare dimensions. This section provides a brief overview of the methodology. Alkire et al. (2015) provide a recent and comprehensive discussion of an array of multidimensional poverty measures.

The AF approach aggregates individual welfare outcomes across multiple dimensions into a single index that reflects both the incidence and the intensity of multidimensional poverty. The index is created in two steps: identification and aggregation. A dual cut-off method first applies dimension-specific thresholds to identify individual deprivation in each dimension. An across-dimension cut-off ( $k$ ) then distinguishes the multidimensionally poor from the non-poor; those with a weighted deprivation count which is greater than  $k$  are deemed poor. Poverty incidence ( $H$ ) is a headcount measure of the percentage of individuals or households identified as multidimensionally poor. The headcount ratio cannot fully reflect changes in multidimensional poverty because it does not capture changes in the number of deprivations faced by the poor. Therefore, poverty intensity ( $A$ ) is incorporated to measure the average weighted deprivation count among those who are identified as multidimensionally poor. The final AF poverty index,  $M_0$ , is expressed as the product of the incidence and the intensity of poverty,  $M_0 = HA$ .

## 3 Multidimensional poverty in Mozambique

### 3.1 Indicators and data

The primary purpose of this analysis is to assess the current situation of children in Mozambique based on the 2014/15 IOF. To target aspects of wellbeing most relevant in distinct stages of a child's life, we consider three populations of children, aged 0–4, 5–12, and 13–17. Welfare outcomes considered in this study evolved from a 2016 workshop, hosted by UNICEF in Maputo, where participants were engaged in determining what constitutes a deprivation for a Mozambican child. Deprivations are categorized in eight dimensions: family; nutrition; child labour; education; health; water, sanitation, and hygiene (WASH); participation; and housing. Within each dimension one or more indicators were defined to measure dimensional deprivation. Ultimately, deprivation indicator choices and the associated thresholds differentiating between deprived and not deprived are rooted in both critical aspects of child wellbeing in Mozambique and the availability of information in the 2014/15 IOF. Indicator weights were assigned by age group such that each dimension is given equal weight and, within dimensions, each indicator is given equal weight. The resulting indicators and weights are presented in Table 1.

Table 1: IOF deprivation indicators

Dimension	Indicator	Threshold	Weight by age group		
			0–4	5–12	13–17
Family	Parents	At least one parent dead	(1/6)	(1/7)	
	Marriage	Child ever married or in a marital union			(1/7)
Nutrition	Stunting	Height for age less than –2 standard deviation from WHO reference	(1/18)		
	Underweight	Weight for age less than –2 standard deviation from WHO reference	(1/18)		
	Wasting	Weight for height for age less than –2 standard deviation from WHO reference	(1/18)		
Education	Enrolment	Did not attend school in the last year		(1/7)	
	Primary	Did not complete primary two (seven years)			(1/7)
Child labour	Child labour	Engages in child labour according to UNICEF/International Labour Organisation definition (UNICEF 2013)		(1/7)	(1/7)
Health	Bed net	Did not sleep under a bed net	(1/12)		
	Distance to health facility	More than 30 minutes to nearest health facility	(1/12)	(1/7)	(1/7)
WASH	Water	Unimproved source of drinking water	(1/18)	(1/21)	(1/21)
	Distance to water	More than 30 minutes to water source	(1/18)	(1/21)	(1/21)
	Sanitation	Unimproved sanitation type	(1/18)	(1/21)	(1/21)
Participation	Information	No information device (TV, radio, any phone, or computer)	(1/6)	(1/7)	(1/7)
Housing	Crowding	More than four people per room	(1/18)	(1/21)	(1/21)
	Floor and roof	Both floor and roof of primitive materials	(1/18)	(1/21)	(1/21)
	Electricity	Primary energy source for lighting is not electricity	(1/18)	(1/21)	(1/21)

Source: Authors' elaboration.

The 2014/15 IOF was conducted by the Mozambican National Statistics Institute (INE) and provides information on daily, monthly, and yearly consumption expenditures, housing characteristics, health status, education, and employment. The data are representative at the national, urban/rural, regional, and provincial levels. The 2014/15 IOF was conducted as a panel survey with each household interviewed in three quarters. However, most household welfare data that are used in the current analysis of multidimensional wellbeing were only released for the first

quarter and therefore the present analysis is restricted to this period (August to November 2014).<sup>3</sup> The first-quarter survey includes 30,924 children aged 0–17. For further details regarding the 2014/15 IOF please refer to DEEF (2016) and INE (2015).

The AF methodology determines multidimensional poverty by comparing the children’s weighted deprivation count with a poverty cut-off, which in this analysis is set to  $k = 1/3$ . The cut-off of one-third is commonly chosen in the literature, including the 2016 Global MPI (Alkire and Robles 2016) and the 2017 Mozambique MPI (OPHI 2017). The AF methodology requires that the sample be restricted to children with non-missing values for all indicators considered for their age group. Though in most cases missing values are scarce, anthropometric and child labour data are an exception. All children are eligible to be measured in the IOF; however, 17 per cent of the under-5 sample are dropped because either children were not actually measured or the measurements were infeasible.<sup>4</sup> To a lesser degree, labour data for children aged 5–17 are often missing, and as a result 4 per cent of the 5–12 and the 13–17 samples are dropped.

### 3.2 Deprivation rates

Table 2 presents deprivations in each indicator by relevant age ranges.<sup>5</sup> Overall, deprivation is substantially higher in rural than urban areas and increases moving from the south to the north. The parent indicator follows the opposite pattern, with rural and northern children facing somewhat lower deprivation rates. Nearly three-quarters of all children are deprived in sanitation and electricity and more than two-thirds of Mozambican teens have not completed primary school. The rural–urban gap is profound and particularly striking in household indicators. For instance, 54 per cent of rural children do not have access to a safe drinking water source, compared with only 13 per cent of urban children. Figure 1 highlights the extent of the rural–urban divide across indicators.

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<sup>3</sup> It is likely that certain indicators such as underweight, wasting, child labour, and bed net usage could vary by season.

<sup>4</sup> Children aged 0–4 who are missing anthropometric data and children aged 12–17 who are missing labour data are poorer than their counterparts. Of children missing anthropometric data, 55.5 per cent are poor compared to 49.3 per cent with complete data. Similarly, 56.2 per cent of children missing labour data are poor compared to 48.0 per cent of children with complete data. The non-random nature of the subsamples with non-missing values might cause our multidimensional poverty estimates to underestimate multidimensional poverty in the country.

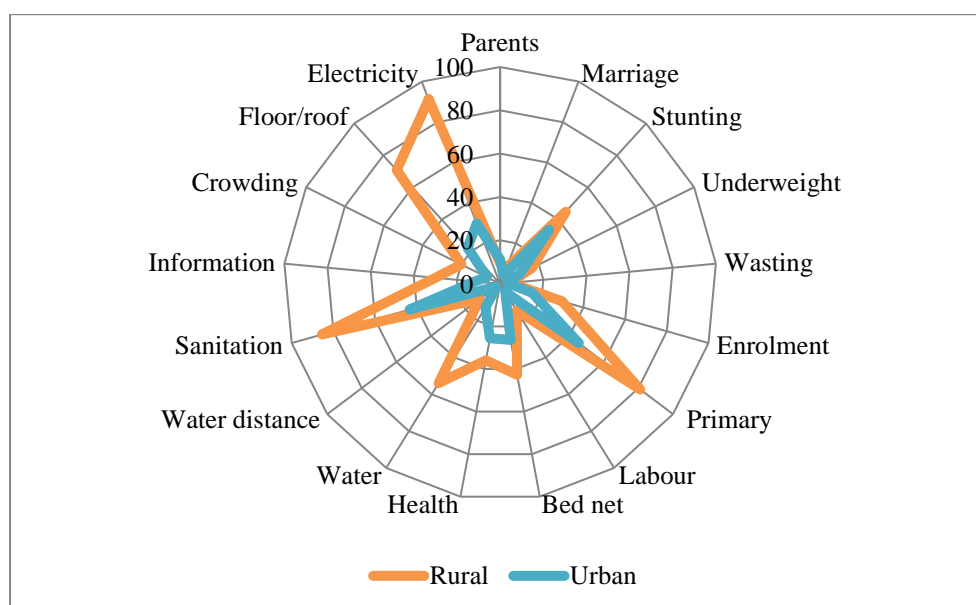
<sup>5</sup> For consistency with official figures, descriptive statistics presented in this section are based on the full sample of children, which includes children with missing values in one or more indicators.

Table 2: Deprivation rates by indicator and area

			National	Rural	Urban	North	Centre	South
Family	Parents	0–12	9.6	9.1	10.9	8.1	10.1	11.2
	Marriage	13–17	6.3	7.6	4.1	7.3	6.8	4.4
Nutrition	Stunting	0–4	42.4	45.2	34.4	49.8	43.4	25.6
	Underweight		15.7	17.4	10.8	19.6	16.0	6.9
	Wasting		4.4	4.8	3.5	6.6	3.8	1.8
Education	Enrolment	5–12	25.9	29.9	15.4	37.9	24.5	7.6
	Primary	13–17	68.1	80.3	45.6	82.2	73.7	42.5
Labour	Labour	5–17	11.5	14.6	4.5	13.0	11.6	9.1
Health	Bed net	0–4	38.6	42.8	26.9	33.0	41.3	42.4
	Health facility	0–17	32.8	35.8	25.6	41.3	32.8	19.2
WASH	Water	0–17	42.5	54.4	13.3	50.7	48.5	15.9
	Water distance		9.0	11.8	2.1	12.8	7.6	5.7
	Sanitation		73.5	85.6	44.0	79.0	81.0	48.4
Participation	Information	0–17	24.9	30.2	12.0	35.2	26.5	4.7
Housing	Crowding	0–17	16.2	20.1	6.9	11.6	20.9	13.9
	Floor/roof		57.2	71.2	23.0	73.3	66.2	11.7
	Electricity		73.6	91.3	30.1	78.4	82.6	46.3

Source: Authors' calculations based on 2014/15 Mozambican household budget survey data (IOF 2014/15).

Figure 1: Rural–urban divide in deprivation by indicator



Source: Authors' calculations based on 2014/15 Mozambican household budget survey data (IOF 2014/15).

Deprivation rates by sex are presented in Table 3 for non-household indicators.<sup>6</sup> Girls outperform boys in nearly all indicators except for marriage and, to a small degree, wasting. The marriage rate for boys is less than 2 per cent in all areas, compared with more than 11 per cent for girls nationally. This disparity is even greater in rural areas and the north, where marriage rates for girls are double

<sup>6</sup> The household indicators are not reported since they are not related to the sex of the children in the house.

those of urban and southern areas. Boys experience considerably higher deprivation rates in stunting in all regions (nationally, 47 per cent compared with 38 per cent among girls). Interestingly, girls' advantage in the primary completion indicator is greatest in urban areas and the south, where the deprivation gap is approximately 4 and 10 percentage points, respectively.

Table 3: Deprivation rates by indicator, area, and sex

	13–17		0–4				5–12		13–17		5–17		0–4			
	Marriage		Stunting		Underweight		Wasting		Enrolment		Primary		Labour		Bed net	
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F
National	1.7	11.4	47.0	38.1	16.7	14.7	4.2	4.6	26.1	25.6	69.2	66.8	12.3	10.7	39.1	38.2
Rural	1.8	14.1	50.1	40.6	18.6	16.2	4.3	5.2	30.0	29.9	80.3	80.3	15.4	13.7	43.2	42.3
Urban	1.5	6.7	38.1	31.1	11.3	10.3	3.9	3.2	15.7	15.1	47.8	43.4	4.9	4.0	27.3	26.5
North	1.6	13.9	54.3	45.5	21.3	18.0	6.4	6.8	38.9	36.9	81.7	82.9	14.1	11.7	34.6	31.4
Centre	1.8	12.2	47.9	39.0	16.6	15.5	3.4	4.2	23.6	25.3	73.3	74.1	11.9	11.3	41.1	41.6
South	1.6	7.3	30.0	21.6	7.8	6.0	2.2	1.6	8.3	6.9	47.3	37.7	10.3	7.9	42.5	42.3

Source: Authors' calculations based on on 2014/15 Mozambican household budget survey data (IOF 2014/15).

Using previous household budget surveys, we calculated deprivation rates for indicators that could be consistently defined over time using the same underlying assumptions. Table 4 provides mixed evidence of improved child welfare since the first household survey was conducted in 1996. While most indicators have steadily declined, child marriage and stunting have improved only modestly. Though both enrolment and crowding initially improved, deprivation rates deteriorated in 2014/15. Increased crowding is consistent with DHS evidence presented in Table 10. Using the 2008 MICS and the 2011 DHS to measure primary net attendance ratios, UNICEF (2014) also finds evidence of reduced primary school enrolment between 2008 and 2011.

Table 4: Deprivation rates by indicator and survey

		1996/97	2002/03	2008/09	2014/15	Annual level change
Family	Marriage	8	8	7	6	-0.09
Nutrition	Stunting	49		45	42	-0.38
	Underweight	25		20	16	-0.55
	Wasting	8		7	4	-0.22
Education	Enrolment	49	26	20	26	-1.27
	Primary	95	90	77	68	-1.49
Health	Bed net			54	39	-2.58
WASH	Water		63	58	42	-1.75
	Sanitation		87	83	74	-1.10
Participation	Information	62	43	37	25	-2.05
Housing	Crowding	12		10	16	0.26
	Floor/roof	75		67	57	-0.96
	Electricity	94	92	86	74	-1.13

Note: The definition of safe water differs slightly in 2002/03 and 2008/09 due to survey differences.

Source: Authors' calculations based on 1996/97, 2002/03, 2008/09, and 2014/15 Mozambican household budget survey data (IAF 1996/97, IAF 2002/03, IOF 2008/09, and IOF 2014/15, respectively).



### 3.3 Multidimensional poverty

In the AF approach, the multidimensional poverty index ( $M_0$ ) is the product of the incidence ( $H$ ) and intensity ( $A$ ) of poverty (Alkire et al. 2015). Incidence measures the proportion of the population that is multidimensionally poor—those with a weighted deprivation count greater than the cut-off, which in this analysis is set to  $k = 1/3$ . Intensity measures the average weighted deprivation count among those who are multidimensionally poor. It is important to note that the level of the poverty index computed in this study is not directly comparable with consumption poverty rates or other indices based on the AF methodology. A specific index is rooted in the choice of indicators, deprivation thresholds, the poverty cut-off ( $k$ ), and weights, and is therefore strictly a reflection of deprivation given these parameters. So, weighted deprivation counts are driven by the age-group-specific weights and indicators outlined in Table 1. From these age-group parameters, the poverty index and incidence and intensity rates can be identified for all children.

Table 5 reports multidimensional poverty outcomes by area, age group, and sex. For reference, first-quarter and annual consumption poverty rates are also reported both for children and for all ages. Nationally, a poverty index level of 0.212 reflects that 46.3 per cent of all children are deprived in at least one-third of the weighted indicators, and that these multidimensionally poor children are deprived in an average of 45.7 per cent of the weighted indicators. Intensity of poverty is quite similar by area, age group, and sex and is only somewhat lower in the south (41.1 per cent). Therefore, differences in the poverty index across areas and age groups are driven primarily by the incidence rather than the intensity of poverty. Furthermore, relative patterns of multidimensional poverty as indicated by poverty incidence and the poverty index are nearly identical.

Nationally the multidimensional poverty incidence approximates the consumption poverty rate for children in the first quarter, 46.3 versus 49.0 per cent respectively. However, the multidimensional divide between urban and rural areas and between northern and southern regions and provinces is greatly magnified and is reflected in both incidence and the poverty index (Figure 2). Rural poverty incidence (57.6 per cent) is more than three times that of urban areas (18.6 per cent). Regional and provincial disparities are even greater, with the north four times poorer than the south, and the poorest provinces—Niassa, Cabo Delgado, Nampula, and Zambezia—are about 50 times as poor as Maputo City. While area differentials are also seen in consumption poverty rates, they are markedly lower relative to multidimensional poverty.

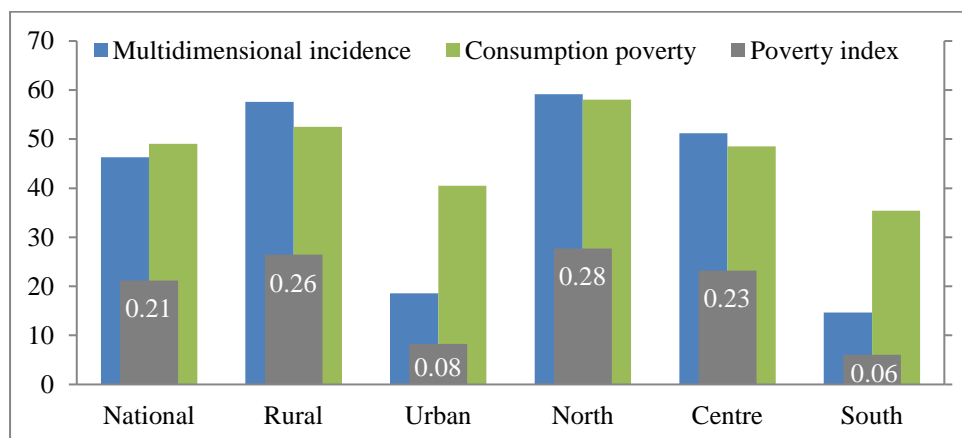
Figure 3 displays multidimensional poverty incidence by age group. Children aged 13–17 appear to be more deprived than younger children. However, age group differentials are rooted in part in the choice of age-specific indicators and do not necessarily indicate that children aged 13–17 would be more deprived in a common set of indicators. This differential is driven by the high rate of children who have not completed primary school, particularly in rural areas.

Table 5: Multidimensional and consumption poverty by area, age group, and sex

	Multidimensional poverty			Consumption poverty			
	Pov. index	Incidence	Intensity	Children		All ages	
				1st quarter	Annual	1st quarter	Annual
National	0.212	46.3	45.7	49.0	51.1	43.9	46.1
Rural	0.265	57.6	45.9	52.5	54.2	48.1	50.1
Urban	0.082	18.6	44.4	40.5	43.4	34.8	37.4
North	0.277	59.2	46.9	58.0	59.8	53.5	55.1
Centre	0.232	51.2	45.4	48.5	50.2	43.9	46.2
South	0.060	14.6	41.1	35.4	38.7	29.9	32.8
Niassa	0.271	58.5	46.3	64.0	64.4	60.1	60.6
Cabo Delgado	0.288	60.6	47.6	50.4	50.2	45.5	44.8
Nampula	0.276	58.9	46.8	58.7	61.6	54.4	57.1
Zambezia	0.271	59.1	45.8	60.0	61.5	54.2	56.5
Tete	0.254	54.9	46.3	39.3	34.9	35.7	31.8
Manica	0.172	39.1	44.0	38.8	44.2	35.2	41.0
Sofala	0.178	40.8	43.5	42.4	48.7	38.1	44.2
Inhambane	0.127	30.5	41.6	48.8	53.3	43.8	48.6
Gaza	0.066	16.2	40.6	47.7	55.1	44.3	51.2
Maputo Province	0.025	6.1	40.5	20.8	22.8	17.3	18.9
Maputo City	0.005	1.3	38.5	17.8	15.2	13.7	11.6
Age 0–4	0.206	44.9	45.8	50.5	52.4	50.5	52.4
Age 5–12	0.202	44.8	45.1	50.2	52.4	50.2	52.4
Age 13–17	0.243	51.8	46.9	44.1	45.9	44.1	45.9
Age 18+	-	-	-	-	-	37.7	40.1
Male	0.216	47.3	45.6	49.7	51.8	43.9	46.0
Female	0.208	45.4	45.8	48.4	50.4	43.9	45.8

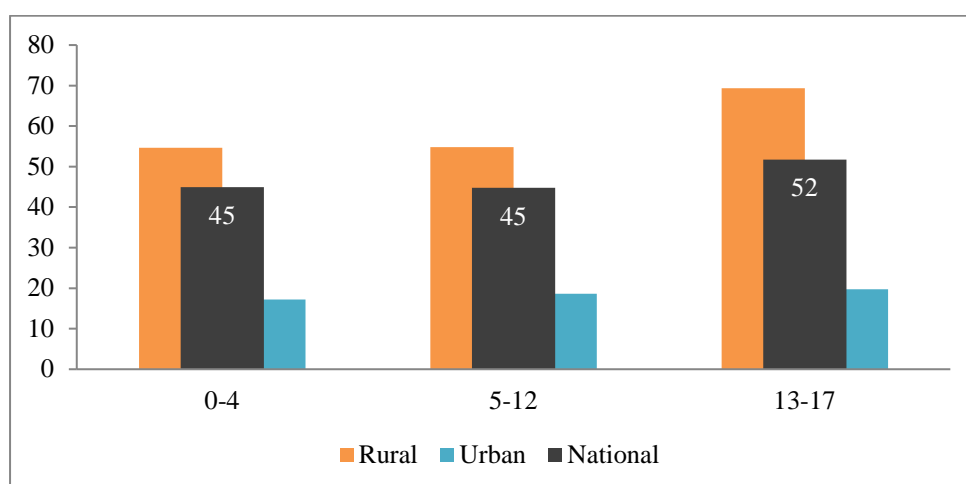
Source: Authors' calculations based on 2014/15 Mozambican household budget survey data (IOF 2014/15) and DEEF (2016).

Figure 2: Multidimensional and consumption poverty by area



Source: Authors' calculations based on 2014/15 Mozambican household budget survey data (IOF 2014/15) and DEEF (2016).

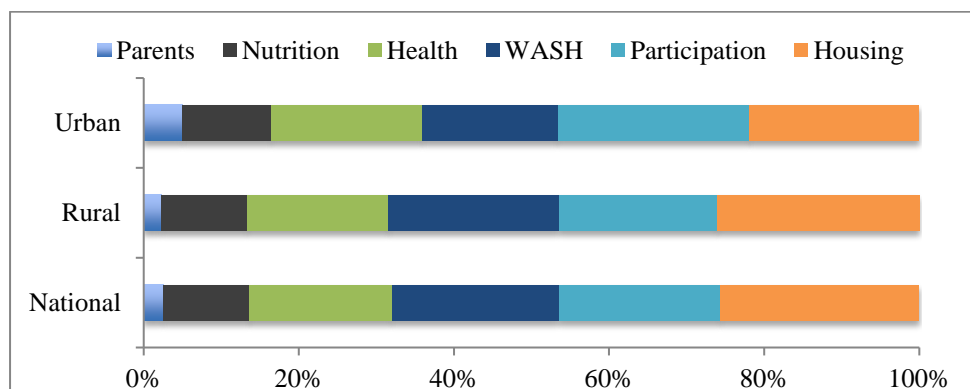
Figure 3: Multidimensional poverty incidence by area and age group



Source: Authors' calculations based on 2014/15 Mozambican household budget survey data (IOF 2014/15).

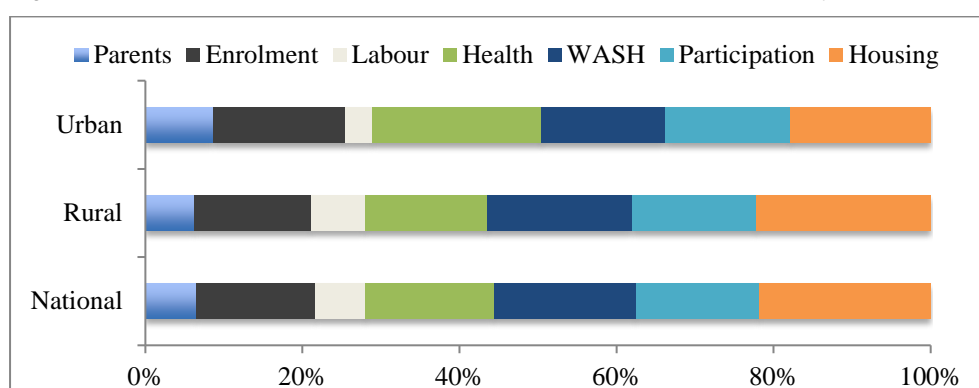
Figures 4a–4c represent the relative degree to which each deprivation dimension contributes to the poverty index by age group. A few points emerge. First, for the nation and rural areas in the 0–4 and 5–12 age groups, housing, participation, WASH, health, and enrolment (5–12) are the dominant factors, with housing and WASH being the most significant of these. Health and participation (0–4) contribute to urban poverty to a greater degree, while WASH and housing contribute to a slightly lesser degree, than in rural areas. Finally, the failure to complete primary school dominates the poverty index for the 13–17 age group more than any other dimension across age groups and areas.

Figure 4a: Relative contribution of deprivation dimensions to the 0–4 poverty index



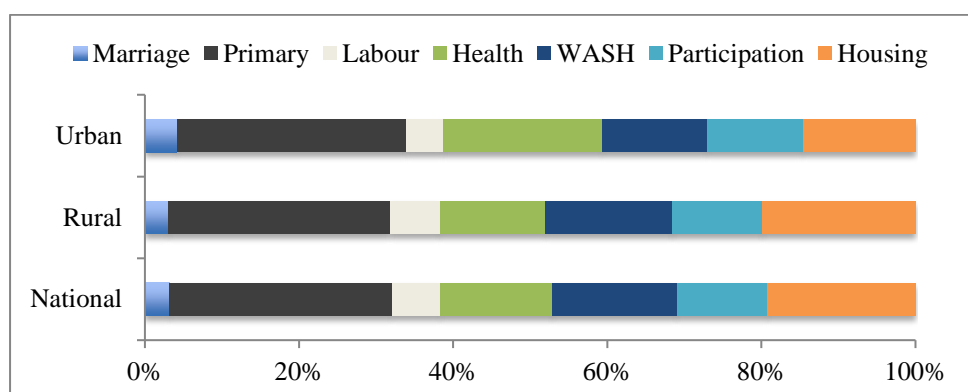
Source: Authors' calculations based on 2014/15 Mozambican household budget survey data (IOF 2014/15).

Figure 4b: Relative contribution of deprivation dimensions to the 5–12 poverty index



Source: Authors' calculations based on 2014/15 Mozambican household budget survey data (IOF 2014/15).

Figure 4c: Relative contribution of deprivation dimensions to the 13–17 poverty index



Source: Authors' calculations based on 2014/15 Mozambican household budget survey data (IOF 2014/15).

### 3.4 Sensitivity to the poverty cut-off

The results presented in previous sections clearly show that estimates of multidimensional poverty based on the AF method can be greatly influenced by the indicators selected, the weights assigned to each indicator, and the cut-off ( $k$ ) used to define poverty. In Table 6, we show the poverty incidence in the case of the choice of different cut-offs ( $k = 0.2, 0.3, 0.4, 0.5, 0.6, 0.7, 0.8$ ) at national and provincial level. We observe that, in general, the most relevant findings are confirmed; regional differences and regional rankings are essentially stable, regardless of the choice of  $k$ . The

rural/urban and especially the north/south divides increase, with higher poverty cut-offs and lower national poverty rates, but only slightly. However, multidimensional poverty incidence is quite different in absolute values in the seven cases analysed because the greater the proportion of deprivation needed to consider a household as poor, the lower the poverty incidence. Hence, as expected, the poverty incidence levels are substantially lower in the case of  $k > 40$  per cent than in the other cases.

Table 6: Sensitivity of poverty incidence to poverty cut-offs ( $k$ )

	0.2	0.3	0.4	0.5	0.6	0.7	0.8
National	65.4	48.4	29.1	13.8	5.8	1.3	0.2
Rural	79.1	60.2	36.7	17.4	7.4	1.7	0.3
Urban	31.7	19.4	10.5	4.9	1.9	0.4	0.0
North	77.7	61.1	39.5	19.8	9.3	2.0	0.2
Centre	71.6	53.7	31.7	14.6	5.7	1.4	0.3
South	31.8	15.9	6.4	2.0	0.4	0.1	0.0

Source: Authors' calculations based on 2014/15 Mozambican household budget survey data (IOF 2014/15).

### 3.5 Multidimensional and consumption poverty

As seen in Figure 2, multidimensional and consumption poverty do not necessarily correspond. This section explores this relationship in greater depth and shows that conclusions regarding this relationship are sensitive to the level of analysis. Figure 2 indicates that multidimensional and consumption poverty rates in rural areas and northern and central regions are similar. In contrast, multidimensional poverty is considerably lower than consumption poverty in urban areas and the south. Table 7 presents provincial rankings by multidimensional and consumption poverty rates. Multidimensional poverty rankings closely follow a north-to-south gradient, particularly when viewed in regional clusters. While consumption poverty rates also follow this overall pattern, there is a bit more shuffling among southern and central provinces. The resulting spearman rank correlation coefficient is 0.77. The correlation between provincial poverty rates rather than rankings is slightly higher at 0.81.

Table 7: Provincial ranks by poverty incidence and consumption poverty

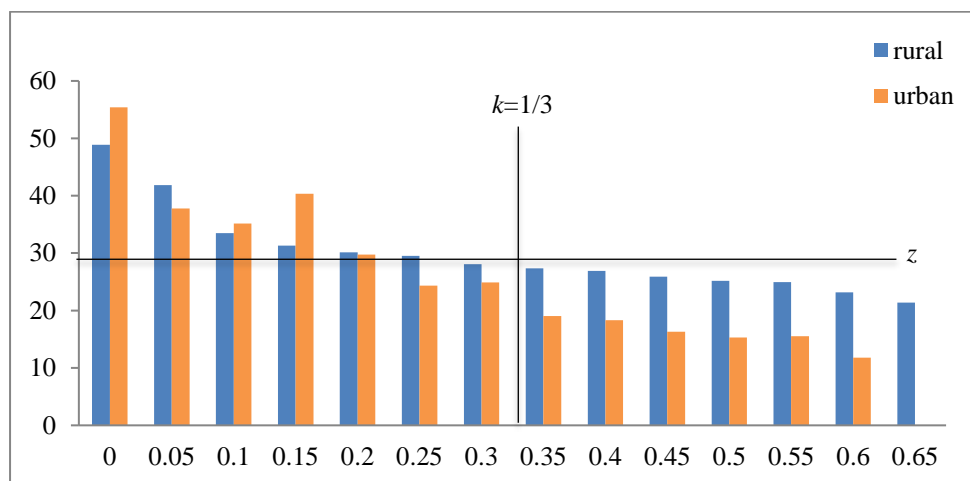
		Multidimensional poverty incidence ( $H$ )	Consumption poverty*
North	Niassa	8	11
	Cabo Delgado	11	8
	Nampula	9	9
Centre	Zambezia	10	10
	Tete	7	4
	Manica	5	3
	Sofala	6	5
South	Inhambane	4	7
	Gaza	3	6
	Maputo Province	2	2
	Maputo City	1	1
Correlations	Rankings		0.77
	Poverty rates		0.81

Note: \* Based on first-quarter child poverty estimates (see Table 5).

Source: Authors' calculations based on 2014/15 Mozambican household budget survey data (IOF 2014/15) and DEEF (2016).

Figure 5 presents median adjusted daily household per capita consumption by weighted deprivation counts, which fall in the range [0,1]. Consumption is spatially adjusted based on regional poverty line estimates (DNPO 1998, 2004; MPD and DNEAP 2010; DEEF 2016). Overall, the figure shows that median household consumption decreases as the deprivation count increases. The relationship between multidimensional and consumption poverty is markedly different in rural and urban areas. Children just below the multidimensional poverty level ( $k = 1/3$ ) live in households with median consumption below the spatially adjusted poverty line ( $z = 29.2$ ). While this holds in both urban and rural areas, urban children with deprivation levels greater than 0.20 have median consumption levels below the poverty line and are poorer than rural children. This gap widens at greater deprivation levels. The figure indicates that rural children experiencing severe multidimensional poverty have only moderately low median consumption levels. Furthermore, the relationship between consumption and multidimensional poverty is flatter for rural children, which might suggest that urban multidimensional poverty may be relatively more responsive to improvements in household consumption. This is not surprising given that a large share of rural households is primarily engaged in subsistence farming rather than income-generating activities.

Figure 5: Median daily per capita consumption by weighted deprivation counts

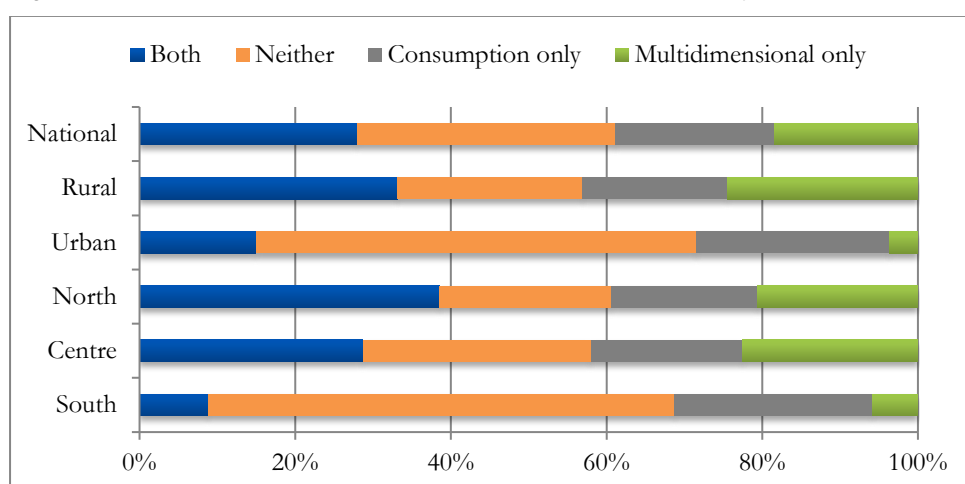


Notes: Median consumption is reported by weighted deprivation counts rounded to the nearest five-hundredth. The graph is truncated to include deprivation counts below 0.6 and 0.65 in urban and rural areas respectively due to the small number of observations for higher deprivation counts (see Table 6). The spatially adjusted poverty line,  $z$ , equals 29.2 Mozambican meticaís (MT). This number is not comparable to unadjusted regional and national average poverty lines reported in the fourth national poverty assessment (DEEF 2016).

Source: Authors' calculations based on 2014/15 Mozambican household budget survey data (IOF 2014/15) and DEEF (2016).

Figure 6 considers the overlap between multidimensional and consumption poverty by displaying the percentage of children with different combinations of poverty outcomes. The relationship between multidimensional and consumption poverty status is strongest in urban areas, where 72 per cent of children are poor either by both or by neither definition, compared with 57 per cent in rural areas. Rural and northern children are most likely to be poor by both definitions while urban and southern children are most likely to not be poor by either definition. If a child is deprived in only one form of poverty it is more often multidimensional poverty in rural areas and the north but consumption poverty in urban areas and the south. Urban and southern children are unlikely to be only multidimensionally poor (4 and 6 per cent, respectively).

Figure 6: Overlap between multidimensional and consumption poverty



Source: Authors' calculations based on 2014/15 Mozambican household budget survey data (IOF 2014/15) and DEEF (2016).

The relationship between child consumption and multidimensional poverty presented in Figures 5 and 6 is extremely important and deserves further attention and analysis. A deeper analysis of its determinants might suggest that focusing on reducing consumption poverty in urban areas may be effective in alleviating both forms of poverty in those areas, whereas efforts to simultaneously improve both consumption levels and multidimensional deprivation levels may be key to improving child wellbeing in rural settings.

#### **4 International multidimensional poverty comparisons**

To provide international and temporal context to the situation of Mozambican children, we also conduct AF analysis based on DHS surveys in two time periods for Mozambique and four additional countries in the region—Malawi, Tanzania, Zambia, and Zimbabwe. International deprivation indicators are drawn from DHS data which address household and child welfare in a harmonized manner across countries and, as much as possible, over time. The use of such harmonized data allows consistent and universally applicable deprivation indicators to be defined across time and space, which results in an internationally relevant and comparable measure of basic wellbeing. This stands in contrast to monetary poverty analysis that is rooted in either national or global poverty lines such as the World Bank US\$1.90 or \$2.20 a day lines. While national poverty lines identify the local costs of meeting basic needs but are not internationally comparable, the reverse is true with global poverty lines.

A second set of indicators was defined with as little modification as possible to those in Table 1 to provide consistent international comparisons. These indicators are presented in Table 8. Major differences from the IOF indicators include the absence of child labour and distance to health facilities indicators, an alternative sanitation threshold, and the use of floor only to measure housing quality. The DHS inquires about the marital status of children aged 15 and older. Consequently, the family dimension is measured by the parent indicator for children aged 0–14 and the marriage indicator for children aged 15–17.

Table 9 provides specific sample details, including years covered, sample sizes, and the percentage of the sample that is rural, as well as the percentage of children falling into each age group. For each country, data are used from the most recent DHS survey and a DHS survey from the early 2000s.<sup>7</sup>

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<sup>7</sup> The 2001 Zambia DHS was not used due to the absence of data on number of rooms in the household.



Table 8: International DHS deprivation indicators

Dimension	Indicator	Threshold	Weight by age group		
			0–4	5–12	13–17
Family	Parents	At least one parent dead or it is not known (0–14)	(1/6)	(1/5)	
	Marriage	Child ever married or in an informal union (15–17)			(1/5)
Nutrition	Stunting	Height for age less than –2 standard deviation from WHO reference	(1/18)		
	Underweight	Weight for age less than –2 standard deviation from WHO reference	(1/18)		
	Wasting	Weight for height for age less than –2 standard deviation from WHO reference	(1/18)		
Education	Enrolment	Did not attend school in the current school year		(1/5)	
	Primary	Did not complete seven years of schooling			(1/5)
Health	Bed net	Did not sleep under a bed net	(1/6)		
WASH	Water	Unimproved source of drinking water	(1/18)	(1/15)	(1/15)
	Distance to water	Water source more than 30 minutes away	(1/18)	(1/15)	(1/15)
	Sanitation	No sanitation facility	(1/18)	(1/15)	(1/15)
Participation	Information	No information device (TV, radio, or any phone)	(1/6)	(1/5)	(1/5)
Housing	Crowding	More than four people per room	(1/18)	(1/15)	(1/15)
	Floor and roof	Floor of primitive materials	(1/18)	(1/15)	(1/15)
	Electricity	No electricity in the household	(1/18)	(1/15)	(1/15)

Source: Authors' elaboration.

Table 9: Sample information for DHS comparisons

	Survey years	Sample size		Per cent rural		Per cent by age group					
		$t_1$	$t_2$	$t_1$	$t_2$	0–4		5–12		13–17	
						$t_1$	$t_2$	$t_1$	$t_2$	$t_1$	$t_2$
Malawi	2004, 2015	28,668	52,050	0.86	0.87	0.30	0.11	0.53	0.62	0.17	0.27
Mozambique	2003, 2011	28,950	32,028	0.68	0.70	0.31	0.31	0.53	0.48	0.16	0.20
Tanzania	2004, 2015	23,829	33,001	0.79	0.74	0.34	0.31	0.47	0.47	0.18	0.22
Zambia	2007, 2013	18,248	42,609	0.67	0.64	0.30	0.28	0.47	0.49	0.22	0.23
Zimbabwe	2005, 2015	20,162	20,490	0.75	0.75	0.24	0.29	0.49	0.46	0.26	0.25

Source: Authors' calculations based on the 2004 and 2015 DHS for Malawi; the 2003 and 2011 DHS for Mozambique; the 2004 and 2015 DHS for Tanzania; the 2007 and 2013 DHS for Zambia; and the 2005 and 2015 DHS for Zimbabwe (DHS 2017).

Data used in this analysis are restricted to children with non-missing values for all age-group-specific indicators, and therefore sample sizes reported in Table 9 are smaller than the full DHS child samples. Anthropometric, marriage, and, to a much lesser degree, distance-to-water data have the greatest impacts on sample sizes. The 2015 Malawi DHS collected anthropometric data for a subsample of children that, after dropping missing values among eligible children, amounted to about 30 per cent of the full under-5 sample, or 5,500 children. Furthermore, though all children under 5 were eligible to be measured in the remaining country surveys, a sizeable number of children were either not measured or flagged and dropped for potentially infeasible measurements. Thus, the remaining under-5 samples used in this study range from about 80 to 90 per cent of the full sample. In several first-period studies (Malawi, Mozambique, and Tanzania), only the subsample of boys selected for the men's questionnaires were queried on their marital status. Thus these samples are imbalanced, with nearly all girls in the 13–17 age group retained compared with 53 to 60 per cent of boys.<sup>8</sup>

#### 4.1 Deprivation rates

Table 10 displays deprivation rates in the first and second period for each country. In the final survey period, Mozambique has the highest deprivation rates in more than half of the indicators (marriage, stunting, underweight, wasting, enrolment, primary, water, and sanitation) and is within a few points of the highest rate in several other indicators (parents, water distance, information, and floor). Performance in the enrolment, primary, water, and sanitation indicators is particularly poor; however, these are the areas where Mozambique has also made impressive gains.

<sup>8</sup> Since few boys are married, sensitivity analysis was conducted comparing multidimensional poverty using two approaches to this issue: (1) dropping all boys without marital status data and (2) assuming all boys without this data are unmarried. Differences in poverty outcomes were negligible and therefore we opt to drop boys without data.

Table 10: Deprivation rates (per cent) and annual level changes

	Malawi			Mozambique			Tanzania			Zambia			Zimbabwe		
	$t_1$	$t_2$	change	$t_1$	$t_2$	change	$t_1$	$t_2$	change	$t_1$	$t_2$	change	$t_1$	$t_2$	change
Parents	14	12	-0.21	11	12	-0.28	9	8	-0.14	14	10	-0.54	24	15	-0.88
Marriage	14	6	-0.69	20	16	1.50	11	7	-0.41	5	4	-0.14	7	8	0.04
Stunting	52	38	-1.35	47	43	1.43	44	34	-0.91	46	40	-0.92	34	27	-0.78
Underweight	17	12	-0.52	20	15	1.57	16	13	-0.27	15	15	0.02	13	8	-0.50
Wasting	6	3	-0.30	5	6	-0.25	3	4	0.09	5	6	0.15	7	3	-0.37
Enrolled	16	5	-1.04	36	25	3.49	27	20	-0.63	24	23	-0.31	9	3	-0.54
Primary	77	68	-0.75	92	71	6.93	77	46	-2.81	62	55	-1.15	27	28	0.16
Bed net	79	50	-2.65	90	61	9.55	69	40	-2.67	67	57	-1.60	93	89	-0.47
Water	39	14	-2.28	62	48	4.48	55	45	-0.86	60	39	-3.47	27	28	0.09
Water distance	7	11	0.32	6	10	-1.30	12	12	-0.08	2	3	0.11	5	6	0.09
Sanitation	15	5	-0.85	49	40	2.73	15	12	-0.29	25	17	-1.27	36	27	-0.90
Information	35	35	0.03	39	33	1.94	38	14	-2.18	33	20	-2.10	51	9	-4.23
Crowding	21	15	-0.61	14	17	-0.84	15	12	-0.30	32	23	-1.54	16	13	-0.34
Floor	80	76	-0.35	75	74	0.48	77	63	-1.27	63	59	-0.73	38	31	-0.72
Electricity	93	91	-0.25	90	79	3.79	91	83	-0.72	81	76	-0.76	73	75	0.26

Source: Authors' calculations based on the 2004 and 2015 DHS for Malawi; the 2003 and 2011 DHS for Mozambique; the 2004 and 2015 DHS for Tanzania; the 2007 and 2013 DHS for Zambia; and the 2005 and 2015 DHS for Zimbabwe (DHS 2017).

The relatively early final survey used for Mozambique (2011 compared with 2013 or 2015) may overstate deprivation relative to the other study countries that have later final surveys. For example, Mozambique made enormous strides in reducing the percentage of under-5s who do not sleep under a bed net from 90 per cent in 2003 to 61 per cent in 2011. The 2014/15 IOF rate of 39 per cent provides evidence that bed net deprivation may have further declined in recent years. The explosion of mobile phone usage in recent years may also mean that Mozambique’s information deprivation is overstated—the 2011 DHS deprivation rate is 33 per cent compared with 25 per cent in the 2014/15 IOF.<sup>9</sup>

Table 11 provides final-period deprivation rates by sex for non-household indicators. The Mozambican child marriage rate for girls is 27 per cent in 2011, which is more than double the 12 per cent 2014/15 IOF value that is reported in Table 3. The IOF rate for girls in a comparable age range, 15–17, is 20 per cent. The remaining 7-percentage-point difference is likely due to the inclusion of informal unions or ‘living together’ in the DHS marriage variable, which is not clearly specified in the IOF questionnaire. In the 2003 DHS, 20 per cent of girls in this age range are classified as ‘living together’ with a partner. This figure is substantially lower in other countries (2, 2, 0.2, and 0.3 in Malawi, Tanzania, Zambia, and Zimbabwe, respectively). Though informal unions are also included in later-year DHS classifications, they are grouped together with formal unions. This distinction appears to be an important consideration when evaluating child marriage rates in Mozambique.

Table 11: Deprivation rates in *t* by indicator and sex

	Malawi		Mozambique		Tanzania		Zambia		Zimbabwe	
	M	F	M	F	M	F	M	F	M	F
Marriage	1.7	11.4	3.8	26.9	1.4	12.7	0.5	7.2	2.6	13.2
Stunting	39.8	35.5	45.2	40.8	36.7	32.1	42.4	37.7	29.5	23.9
Underweight	12.7	10.4	16.9	13.4	13.8	13.0	15.9	13.6	8.3	8.0
Wasting	3.3	2.1	6.5	5.5	5.2	3.8	6.2	5.8	3.3	3.1
Enrolment	5.3	4.0	25.2	25.1	21.7	17.5	24.3	20.8	4.2	2.5
Primary	70.3	66.5	71.8	70.0	51.4	40.8	57.9	51.6	33.4	23.1
Bed net	50.1	49.9	61.0	61.2	39.9	39.4	57.1	56.9	88.3	88.8

Source: Authors’ calculations based on the 2004 and 2015 DHS for Malawi; the 2003 and 2011 DHS for Mozambique; the 2004 and 2015 DHS for Tanzania; the 2007 and 2013 DHS for Zambia; and the 2005 and 2015 DHS for Zimbabwe (DHS 2017).

Boys are more deprived in both primary school enrolment for children aged 5–12 and primary school completion for children aged 13–17. This is most striking for children in Tanzania, where the gap is 4 points in enrolment and more than 10 points in primary completion. Mozambique stands out as having relatively little gender difference at the national level in either indicator. However, as seen in the 2014/15 IOF primary completion deprivation levels (Table 4), gender educational gaps do indeed occur in Mozambique, where boys are less deprived in the central region and more deprived in the south.

## 4.2 Multidimensional poverty

Mozambique’s multidimensional poverty, in terms of all three measures (incidence, intensity, and poverty index), exceeds that of its neighbours by a large margin (Table 12). Mozambique makes

<sup>9</sup>The DHS information indicator does not include computer ownership; however, the deprivation status would change for only 15 children if computers were excluded from the IOF definition.

relatively small annual-level and percentage gains in poverty incidence. Moreover, poor children in Mozambique face the highest average percentage of deprivations. Initially this difference is small (1–4 percentage points), but Mozambique reduced intensity by considerably less than its neighbours (1 percentage point compared to 3–6 percentage points). Thus, the resulting poverty index reflects this divergence in both the incidence and the intensity of poverty.

The final two columns of Table 12 report each country’s poverty index as a percentage of Mozambique’s index. Most striking is the considerable increase in the disparity between Mozambique and Tanzania, which had the second-highest deprivation rate in the first period. Tanzania reduced its poverty index by 4.1 per cent annually, compared with Mozambique’s 2.4 per cent reduction.

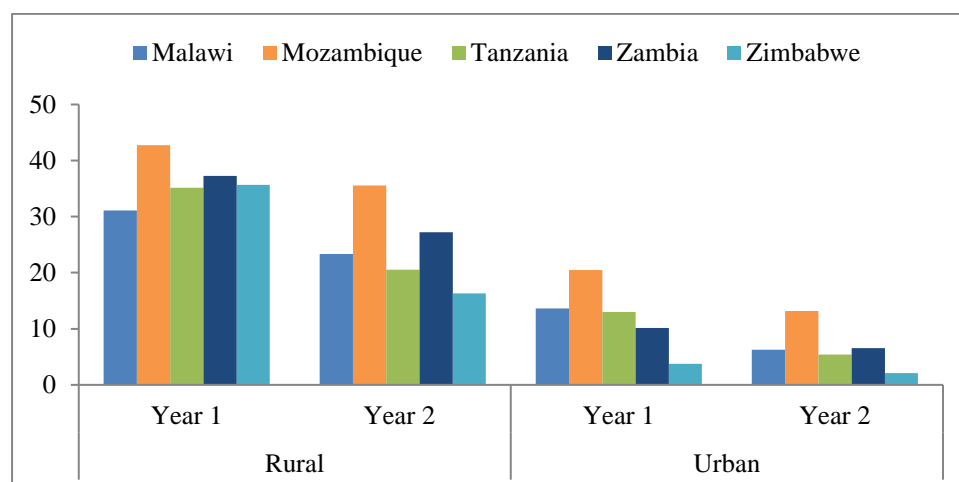
Table 12: Multidimensional poverty outcomes by country and survey period

	<i>H</i>		<i>A</i>		<i>M<sub>0</sub></i>		Annual change ( <i>M<sub>0</sub></i> )		% of MZ ( <i>M<sub>0</sub></i> )	
	<i>t<sub>1</sub></i>	<i>t<sub>2</sub></i>	<i>t<sub>1</sub></i>	<i>t<sub>2</sub></i>	<i>t<sub>1</sub></i>	<i>t<sub>2</sub></i>	Level	%	<i>t<sub>1</sub></i>	<i>t<sub>2</sub></i>
Malawi	60.6	48.1	47.3	44.0	0.287	0.212	-0.007	-2.4	80	73
Mozambique	69.4	57.6	51.3	50.2	0.356	0.289	-0.008	-2.3	-	-
Tanzania	62.7	37.6	48.6	44.3	0.305	0.166	-0.013	-4.1	86	58
Zambia	56.7	42.8	49.8	46.3	0.283	0.198	-0.014	-5.0	79	69
Zimbabwe	55.6	29.5	49.6	43.2	0.276	0.127	-0.015	-5.4	78	44

Source: Authors’ calculations based on the 2004 and 2015 DHS for Malawi; the 2003 and 2011 DHS for Mozambique; the 2004 and 2015 DHS for Tanzania; the 2007 and 2013 DHS for Zambia; and the 2005 and 2015 DHS for Zimbabwe (DHS 2017).

While relative improvements in rural areas are similar to national trends, progress in urban areas follows a distinct pattern. Figure 7 reports the rural and urban poverty index in both periods. Notably, Mozambique, Malawi, and Tanzania reduced the urban poverty index by about 0.075. When translated to annual gains, Mozambique achieved the greatest reduction in the poverty index, and, though not reported here, in poverty incidence as well. Zambia and Zimbabwe started at a substantially lower urban deprivation level and achieved smaller gains. As a result, in the second period, urban Malawi and Tanzania experienced lower multidimensional poverty than urban Zambia.

Figure 7: Rural and urban poverty index (*M<sub>0</sub>*) by survey year



Source: Authors’ calculations based on the 2004 and 2015 DHS for Malawi; the 2003 and 2011 DHS for Mozambique; the 2004 and 2015 DHS for Tanzania; the 2007 and 2013 DHS for Zambia; and the 2005 and 2015 DHS for Zimbabwe (DHS 2017).

## 5 Conclusions

During the last 25 years, Mozambique has experienced periods of rapid and steady growth, accompanied by significant reduction in both multidimensional and consumption poverty, especially between 1996/97 and 2002/03 and between 2008/09 and 2014/15. However, it appears that not all provinces or areas and not all population groups have benefited in the same way. In this study, we focused on multidimensional child wellbeing, computed using the data from the most recent household budget survey implemented in 2014/15. It emerged that some welfare indicators particularly relevant to children aged 0–17, such as child marriage and stunting, appear to have been more resistant to advancement than other indicators. Using the Alkire-Foster methodology, we compute that 46.3 per cent of all children can be considered multidimensionally poor and that these multidimensionally poor children are deprived in an average of 45.7 per cent of the weighted indicators. Moreover, most welfare indicators appear to be substantially worse for rural than urban areas and to worsen moving from the south to the north. This translates into a substantial multidimensional poverty divide between urban and rural areas and between northern and southern provinces. A significant, and striking, result of our analysis is that rural poverty incidence for children aged 0–17 is more than three times that of urban areas, and the four poorest provinces—Niassa, Cabo Delgado, Nampula, and Zambezia—are about 50 times poorer than the richest—Maputo City.

Considering multidimensional and consumption poverty, we also notice that a much higher percentage of children in rural areas and northern provinces are simultaneously poor from the consumption and the multidimensional points of view (about 33 and 38 per cent, compared with 9 and 15 per cent in urban areas and the south). While further analysis is merited, the results presented in this study suggest that reducing consumption poverty in urban areas may also be effective in alleviating urban multidimensional poverty. However, rural multidimensional poverty appears to be less responsive to consumption, and therefore efforts to simultaneously improve both consumption and multidimensional deprivation levels may be essential to improve child wellbeing in rural settings.

The wellbeing situation and trends of Mozambican children were also compared to those of Malawi, Tanzania, Zambia, and Zimbabwe using two compatible recent waves of DHS data for the five countries. Our findings suggest that despite impressive gains in some welfare indicators, Mozambique continues to have the highest child welfare deprivation rates in more than half of the selected indicators, and that its multidimensional poverty level exceeds that of its neighbours by a large margin. At the same time, it is worth highlighting that Mozambique achieved the greatest reduction in the urban poverty index, which once more confirms the impression of an uneven development process, not inclusive of all regions or population groups, particularly children in rural and central/northern regions.

These results inevitably lead to the conclusion that a series of targeted policies that explicitly consider the specificities of child welfare should be put in place to ensure that growth and poverty reduction experienced at the national level for the population as a whole are also translated into better living conditions for children. Increased efforts to tackle chronic malnutrition, improve access to safe water sources and quality sanitation, and reduce dropout rates among teenagers seem particularly urgent from this point of view, and government expenditures in these sectors should be protected even during economic slowdowns like the one currently experienced by Mozambique.

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