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CHILD POVERTY IN MOZAMBIQUE – MULTIPLE OVERLAPPING DEPRIVATION ANALYSIS

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ABSTRACT

In this paper, we provide estimates and analysis of child multidimensional poverty in Mozambique. Drawing on data from the Mozambique Household Budget Survey of 2014/15 (IOF), we define child multidimensional poverty using the Multiple Overlapping Analysis (MODA). We define three age groups of children, and a total of seven dimensions of deprivation: Family, Nutrition, Education, Child Labour, Health, WASH, Participation, and Housing. Results show that 81 per cent of children are deprived in at least two dimensions. Children are especially vulnerable in rural areas, where deprivation rates reach 95 per cent, and in the provinces of Niassa, Zambezia, and Cabo Delgado. The dimensions that more frequently overlap in Mozambique are Housing, Health, and WASH, with one third of children being deprived in these three dimensions at the same time. The data also allow the analysis of the interplay between monetary and multidimensional child poverty: 46 per cent of children suffer both forms of poverty. Children who are poor and deprived are children who live in rural areas, in more remote provinces; they live in households whose heads are less educated and whose main activity is agriculture. Finally, there is a direct correlation with shocks affecting the household and multidimensional poverty, with children of families who experienced weather shocks being more likely to be poor, deprived, or both.

CONTENTS

1. INTRODUCTION

There are several reasons to measure child poverty separately from the rest of the population, and the reason to measure it in with a multidimensional approach is at least double. Children globally make up more than half of those in severe poverty,[1] while representing only one-third of the global population (Newhouse, Suarez-Becerra, Evans, & Data for Goals Group, 2016), and we know poverty has long lasting consequences on the life of a child (Brooks-Gunn & Duncan, 1997). Children are also likely to experience poverty differently. They are dependent on others (guardians, parents) for their well-being, they rarely control resources and don't usually have decision-making power within the household, making them more vulnerable. Finally, the goods and services needed for children to develop are often publicly provided by the state, or may not have functioning markets, such as access to health, education, or protection from exploitation and violence. For these reasons, a measure that is founded in income or consumption alone is not adequate to fully capture the extent of child poverty. As a matter of fact, the UN defines child poverty as a state of deprivation and lacking the fundamental goods and services needed by a child to develop and reach her full potential; this very definition is much more akin to that of multidimensional poverty. Monetary and multidimensional poverty measures should be used together (as well as other dimensions of poverty) whenever possible, to provide a holistic picture of child well-being.

Recently, the Sustainable Development Goals (SDGs) explicitly recognized the importance role of multidimensional measures of poverty, and the fact that poverty affects different groups of the population differently. Target 1.2 states: *"By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions."* This target explicitly addresses children, referencing to all dimensions of poverty, and stressing the role of national definitions of poverty. More recently, the Atkinson commission on Global Poverty endorsed the measurement of multidimensional poverty, along monetary poverty, to track progress towards this important goal (World Bank, 2017). This is therefore the perfect time for a country to construct a specific, nationally validated, child-centred multidimensional poverty indicator. Globally, estimates of child multidimensional poverty conducted using the global MPI (Alkire, Jindra, Robles, & Vaz, 2017) suggest that 37 per cent of children are multidimensionally poor, and that children constitute up to half the total of the multidimensional poor around the world. Estimates of child poverty conducted for Sub-Saharan Africa using a more child-specific measure identify as multidimensionally poor around two-thirds of the children in the region (67 per cent).

Measuring multidimensional child poverty in Mozambique is part of a global effort that UNICEF has carried on since 2007 with the Global Report on Child Poverty and Disparities (UNICEF, 2007), of which Mozambique was part. In the last two years, UNICEF has been involved in the effort to measure multidimensional child poverty in national context in many countries (around forty countries as of December 2016), especially in the Eastern and Southern Africa region. Since the definition of SDG target 1.2, the need to define and measure multidimensional child poverty in the national context has become a relevant topic. Mozambique has started to measure and report child deprivation since 2010; that study showed that 59 per cent of children experienced two or more severe deprivations in 2003, and 48 per cent in 2008, with a substantial decline over time (UNICEF Mozambique, 2011). This report therefore follows in this tradition, updating the measurement of multidimensional child poverty and reporting deprivation of children in 2015.

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1   Measured as $1.99PPP (World Bank)

2. METHODOLOGY

Acknowledging the multidimensional nature of poverty, critical advances have been made in its measurement over the past decade (see Atkinson, 2003; Bourguignon and Chakravarty, 2003; Gordon et al 2003; Alkire and Foster, 2011; Alkire et al., 2015). The Multiple Overlapping Deprivation Analysis (MODA) is methodology rooted in this measurement tradition that UNICEF developed to identify the extent and nature of deprivation experienced by children (see de Neubourg et al., 2012). It draws on the international framework of child rights to construct dimensions of child well-being in the domains of survival, development, protection and social participation. Thus, it includes aspects of children's well-being that may not even be directly related to the family's monetary resources, but are instead affected by the lack of local infrastructure (e.g. water and sanitation) or relationships within the household (e.g. protection from violence). One of the key features of MODA methodology is to be adaptable to different contexts; while there are two standardized cross-country applications, MODA has been adopted in a number of different national studies, both in middle- and lower-income countries, especially in view of the SDGs.

MODA methodology is strongly based on the Bristol method (Gordon, Nandy, Pantazis, Pemberton, & Townsend, 2003), which informed the *Global Study on Child Poverty and Disparities* in 2007.[2] However, it updates the methodology with a greater emphasis on the life-cycle of children, so that dimensions and indicators are differentiated by the age of the child whenever possible, and with the inclusion of analytical tools derived from the Alkire & Foster method (Alkire & Foster, 2011). MODA uses a 'three steps' process[3] to define multidimensionally poor children. First, indicators and their respective thresholds are defined, according to national or international definitions. Indicators are then aggregated into dimensions using the union approach: child is deprived if he or she is deprived in any of the indicators of that dimension. Finally, dimensions are counted applying equal weighting. MODA does not define, on principle, the threshold to define multidimensional poverty, instead reporting results for each possible cut-off point, and leaving to policy discussion to define such multidimensional child poverty as it better suited for the context. However, as basis for policy discussion and to simplify the presentation of certain results, in this study, a child will be considered deprived if he or she suffers from two or more deprivations,[4] which is the same threshold adopted in a regional study in SSA (de Milliano & Plavgo, 2017) .

Finally, MODA produces three sets of multidimensional results: the headcount ratio, or the proportion of children deprived according to a cut-off; the intensity of deprivation, or how many deprivations are experienced on average by deprived children (as defined above), which is a measure of the depth of deprivation; and finally, the adjusted headcount ratio, which is the product of the raw headcount and the intensity. This makes it particularly useful for decomposition analysis and comparisons between groups: two groups may have similar raw headcounts, but different intensity of deprivation. The group with a higher intensity will report a higher adjusted headcount, reflecting the higher level of deprivation experienced by its members.

The dimensions and indicators for this multidimensional poverty analysis were discussed during a Workshop hosted by UNICEF Mozambique in Maputo, in August 2016. During the workshop, participants were engaged to think about child poverty in multidimensional terms, and to reflect

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2   UNICEF Social Inclusion: https://www.unicef.org/socialpolicy/index_45357.html

3   Differently from the Multidimensional Poverty Index, which uses a 'dual cut-off' approach (Alkire & Foster, 2011)

4   Some results are also presented for children deprived in three or more dimensions, to provide more nuance.

about what constitutes a deprivation for a Mozambican child. The first exercise of the workshop asked participants to define what they consider relevant for a child in the Mozambican context, and then discuss the outcomes and group them into domains (dimensions). The dimensions that were identified by participants are: **Education, Nutrition (and food security), Protection/Security, Water and Sanitation, Family, Leisure, Health, Child Labour, and Participation**. The discussion was particularly engaged and highlighted several areas of interest that should be taken into consideration into a comprehensive child poverty report, even if the current data don't allow to include them into a child MULTIDIMENSIONAL poverty measure for the time being. In particular, it was felt that the dimensions of Security (protection from physical violence), Participation (the ability of children to participate in decisions) and Leisure, are relevant dimensions for child well-being that should be taken into account and addressed by a child poverty report. Participants were also engaged in a discussion about what constitutes a deprivation, and what are the factors more likely to cause or be correlated to deprivation. For example, how harmful cultural practices can lead to deprivation in several domains (e.g. child labour, child marriage).

The final dimensions, divided by age group, are reported in Table 1, darker shading indicates dimensions measured at the household level, while the lighter rows report dimensions defined at the individual level. The full list of dimensions and indicators, with definition of the respective cut-offs, is shown in Table 2.

Table 1: Dimensions of deprivation and age groups

0 – 4 years old	5 -12 years old	13 – 18 years old
Family	Family	Family
Nutrition		
	Education	Education
	Child Labour	Child Labour
Health	Health	Health
WASH	WASH	WASH
Participation	Participation	Participation
Housing	Housing	Housing

Table 2: Dimensions and indicators of deprivation by age groups

Dimension	Indicator	Threshold	Age Groups		
			0 – 4	5 -12	13 - 18
Family	No parents	At least one parent dead	X	X	
	Early marriage	Married before 18			X
Nutrition	Stunting	Height for Age less than -2 standard deviation from WHO reference	X		
	Underweight	Weight for Age less than -2 standard deviation from WHO reference	X		
	Wasting	Weight for Height for Age less than -2 standard deviation from WHO reference	X		
Education	Not enrolled	Not going to school in the last school year		X	
	Primary	Completed primary			X
Child labour	Child labour	Engages in child labour according to ILO-UNICEF definition[5]		X	X
Health	Bed-net	Slept under bed-net	X		
	Distance to facility	More than 30' to nearest health facility	X	X	X
WASH	Drinking water	Unimproved source of drinking water	X	X	X
	Water distance	Water source more than 30' away	X	X	X
	Sanitation	Unimproved sanitation type	X	X	X
Participation	Information assets	No information device (TV, radio, mobile, computer)	X	X	X
Housing	Crowding	More than 5 people per room	X	X	X
	Floor and roof	Both floor and roof of natural materials	X	X	X
	Electricity	HH has no electricity	X	X	X

This study draws form the Mozambique Household Budget Survey of 2014/15,[6] a nationally representative survey conducted by the National Institute of Statistics (Instituto Nacional de Estatística). The survey collects information on a range of topics, including anthropometrics of children under 5, and the consumption of households, therefore making it possible to study child poverty from both angles of multidimensional and monetary deprivation, and therefore delivering

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5   UNICEF-ILO definition: 6 to 11 years old: more than 1 hour of economic activity, and/or more than 28 hours of domestic chores; 12 to 14 years old: more than 14 hours per week of economic activity, and/or more than 28 hours of domestic chores; 15 to 17 years old: more than 43 hours of combined domestic and economic activity.

6   Inquérito sobre Orcçamento Familiar – IOF 2014/15 (INE http://www.ine.gov.mz/)

a more complete picture of the status of children. Monetary poverty is defined using the national poverty line of consumption per capita per adult equivalent, using data only for the first trimester; this choice was made first, because many child deprivation indicators are available only for first trimester, and therefore to ensure perfect comparability. Secondly, due to adverse weather, the attrition rate in northern provinces and in Zambezia proved to be quite high and non-random, which would have resulted in distorted estimates of child multidimensional poverty.

Finally, throughout the study multivariate regression has been used to assess the relationship between child deprivation and several factors: age, gender, characteristics of the household head, geographical location, and monetary means of the household. The following table (Table 3) describes these variables, presenting their average value, separately by national, rural, and urban settings.

The average age is around 8 years old (a little older in urban areas, a little younger in rural ones), which is reflected in the fact that the largest share of children belongs to the middle age group: five to twelve years old. About one quarter of children live with a female head of household, of these, less than one fourth (23 per cent) is also living without a parent. Therefore, while children living with a female head of household are more likely to be deprived in the 'parents' indicator, this is not necessarily the case.

The large majority of children live with a head of household who has completed primary education (60 per cent, both in urban and rural areas); however, around one third of children lives with an uneducated head of household. The primary activity of head of household is agriculture (64 per cent), which reaches almost eighty per cent in rural areas, while it's around 26 per cent in urban settings. The second most common activity is manual work (not in agriculture), while small business owners represent less than 10 per cent of all household with children. This share is higher in urban areas (16 per cent), than in rural ones.

All regressions control for the demographic composition of the household, accounting for the number of children in each age group, and for the number of adults divided in five groups: youth (18 to 24 years old), young adults (25 to 34 years old), adult 35 to 50 years old, adults 51 to 64 years old, and elderly aged 65 and over. These groups have the only purpose to serve as controls, roughly dividing stages of adult life. The results for the demographic components of the household are not reported here, for space and clarity reasons; they are generally not statistically significant with the exception of the number of children (generally increases deprivation) and the number of adults in productive ages, which generally decreases deprivation.

Table 3: Average values of correlates, by area – All children

	All	Urban	Rural
Age (years)	7.8	8.5	7.6
Children under 5	29.3	26.5	30.4
Children 5 to 12	49.1	47.1	50.0
Children 13 to 17	21.5	26.4	19.6
Male	49.9	48.8	50.4
Female head of HH	24.6	27.1	23.6
Head has no education	29.6	18.2	34.3
Head has completed primary	61.0	59.7	61.5
Head has completed secondary	7.7	16.8	4.0
Head has tertiary education or more	1.7	5.3	0.2
Head does not work	6.8	13.6	4.1
Head works in agriculture	64.0	26.2	79.4
Head is manual worker (not agr.)	15.6	31.4	9.2
Head runs small business	8.3	16.1	5.0
Head is in third sector / administration	5.3	12.7	2.3
Log of monthly consumption	6.7	6.9	6.7
Cabo Delgado	7.2	5.6	7.9
Gaza	5.9	4.9	6.3
Inhambane	5.5	4.3	6.0
Manica	7.8	6.1	8.5
Maputo Cidade	3.6	12.6	0.0
Maputo Prov'ncia	5.7	13.3	2.6
Nampula	20.4	21.5	19.9
Niassa	7.0	5.3	7.7
Sofala	8.4	9.9	7.7
Tete	10.2	4.5	12.4
Zambezia	18.3	12.0	20.8
N. of Under 5	1.3	1.1	1.4
N. of Child 5-12	2.1	1.9	2.2
N. of Child 13-17	0.91	1.1	0.9
N. of Youth 18-24	0.6	0.8	0.5
N. of Young adult 25-34	0.7	0.8	0.6
N. of Adult 35-50	0.8	0.8	0.8
N. of Adult 51-64	0.3	0.3	0.3
N. of 65+	0.1	0.2	0.1

3. RESULTS: DEPRIVATION AND POVERTY AMONG CHILDREN

Single deprivation analysis

Table 4 presents the rate of deprivation in each indicator. Deprivation rates are particularly high in access to electricity and improved sanitation, among the household dimensions: almost three quarter (73 per cent) of children live in household without electricity, and this proportion is more than ninety per cent (91 per cent) in rural areas. A similar proportion of children (73 per cent) live in household without improved sanitation facility.

Table 4: Deprivation rates by indicator and area

Dimension	Indicator	Age	National	Urban	Rural
Family	One or both parents dead 0-12	0-12	9.6	10.9	9.1
	Married before 18	13-17	6.3	4.1	7.6
Nutrition	Child is stunted		42.4	34.4	45.2
	Child is underweight	0-4	15.7	10.8	17.4
	Child is wasted		4.4	3.5	4.8
Education	Child not attending school	5-12	25.9	15.4	29.9
	Not completed primary school	13-17	68.1	45.6	80.3
Child Labour	Child engages in economic activities	5-17	11.5	4.5	14.6
Health	Did not sleep under mosquito net	0-4	38.6	26.9	42.8
	Health centre more than 30'	0-17	32.8	25.6	35.8
WASH	Unimproved source of water		42.5	13.3	54.4
	Water source more than 30'	0-17	9	2.1	11.8
	Unimproved sanitation		73.5	44	85.6
Participation	No info/communication device	0-17	24.9	12	30.2
Housing	More than 4 people per room		16.2	6.9	20.1
	Floor and roof of natural material	0-17	57.2	23	71.2
	No electricity		73.6	30.1	91.3

Source: Author's calculation based on IOF 2014/15 data.

Among individual indicators, we observe that a high proportion (68 per cent) of children aged 13 to 18 have not completed primary, a rate that reaches more than three out of four children (78 per cent) in rural parts of the countries. The highest deprivation rates for children under five are found in stunting (43 per cent) and not sleeping under a bed-net (39 per cent). The rate of children 0 to 12 years old who have experienced the death of at least one of her parents is around 13 per cent, and it is higher among children in urban areas: 14 per cent, versus about 11 per cent in rural settings.

The rate or child marriage[7] is quite low: a little over 6 per cent, including both boys and girls. While it seems low for the region, it should be noted that this result reflects the average of a point in time: better information on child marriage is collected through retrospective information, *i.e.* asking older

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7   Child marriage is defined as being married before age 18. Marital status is derived from the household roster section of the questionnaire. This definition does not include informal cohabitation or engagement to marry.

people about their age at first marriage. This information is typically collected retrospectively for all women in reproductive age in demographic surveys, and the proportion of women 20-24 at the time of the survey who were married before 18 or 15 is typically used to calculate child marriage rates. Generally, child marriage has declined in Mozambique, even if only recently (Koski, Clark, & Nandi, 2017). Estimates from the Demographic and Health Survey in 2011 report that 48 per cent of women age 20-24 were married before age 18, however the rate of girls 15-17 who were married or living in union was 27.3 per cent[8], the comparable marriage rate for girls 15-17 in the IOF is 20%: not so distant. Two other factors to consider are that very recent decreases among younger cohorts is reflected in a much lower rate in the present survey (Koski, Clark, & Nandi, 2017), and that demographic surveys oversample women, with respect to economic surveys such as the IOF. Finally, DHS also include informal unions and 'living together', which are not similarly stated in the IOF. All these factors may explain the apparent discrepancy.

Similarly, child labour[9] estimates are relatively low (11.5 per cent); however, it should be noted that the data do not allow including the category of household chores (such as fetching firewood or water, or cooking, etc.) in the number of calculated hours. This unfortunately leads to an underestimation of child labour prevalence in Mozambique, and most likely to an underestimation of gender disparities.[10]

Figure 1 shows deprivation rates by dimension. Children are mostly deprived in WASH, and Housing (78 per cent in each). Almost half of the children under five are deprived in Nutrition (46 per cent), and around forty per cent of children 5 to 17 are deprived in Education. Deprivation is relatively low in Child Labour (11 per cent), Family Relations (13 per cent) and Participation (25 per cent).

Children in rural areas are generally worse off than children living in urban settings, especially in those dimensions that tend to be more dependent on infrastructure such as WASH and Housing.

Figure 1: Rate of Deprivation by dimension - all children
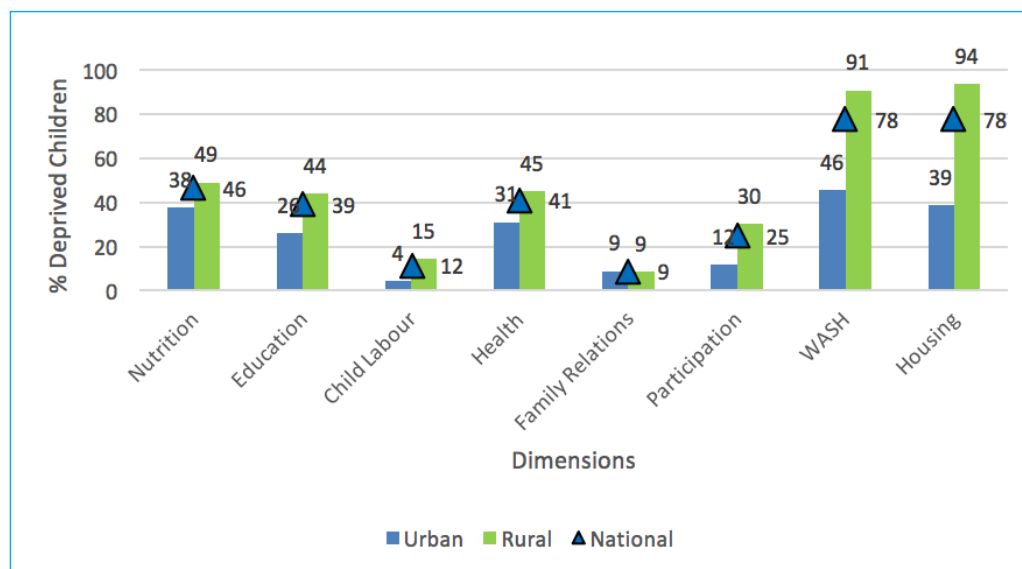
Source: Author's calculation based on IOF 2014/15 data.

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8 Own elaboration on DHS 2011 Data (available at: http://www.dhsprogram.com/what-we-do/survey/survey–display-362.cfm)

9 Child labour is constructed using the employment module of the questionnaire.

10 Data from 2008 report that 22 per cent of children 5-14 were engaged in child labour (UNICEF Mozambique, 2011)

Gender differences in deprivation are small (Figure 2): they are not statistically significant –at the 95 per cent confidence level in Health, Participation, and WASH. In general, boys tend to be more deprived than girls, except for the Family dimension, where the difference is driven by child marriage. The largest difference is found in Nutrition, where 50 per cent of boys are deprived versus 43 per cent of girls.

Figure 2: Dimensions by gender - All children
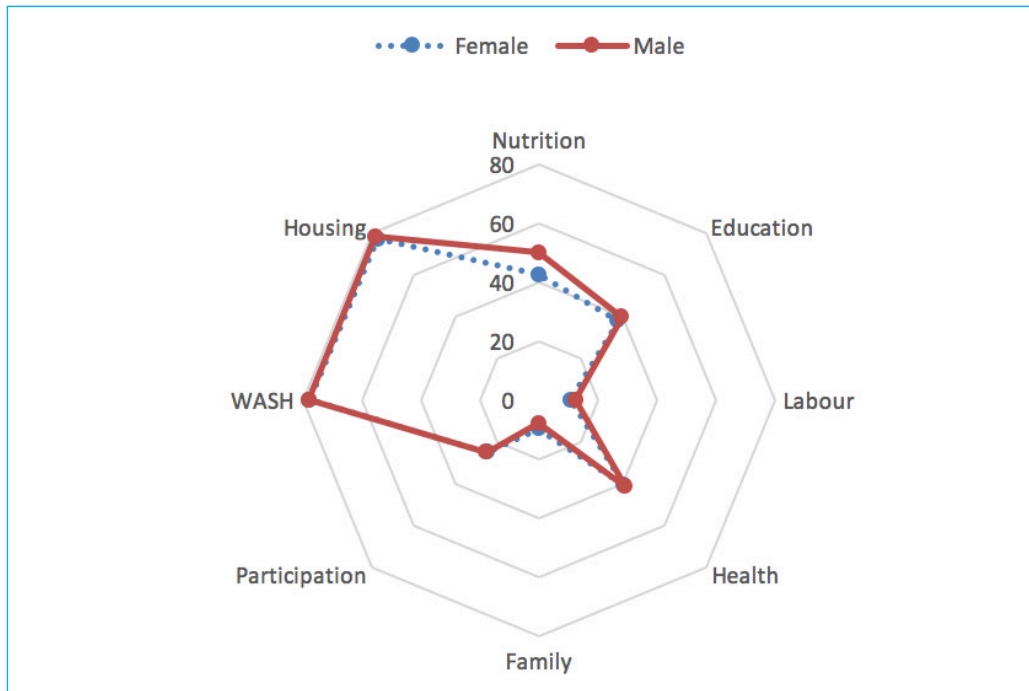
Source: Author's calculation based on IOF 2014/15 data.

Figure 3 illustrates the rate of deprivation in four dimensions: Nutrition, Health, Education, and WASH, by four provinces: Maputo City, Inhambane, Cabo Delgado, and Zambezia. Full results for all dimensions and provinces, are shown in the appendix in Table A1. Across the four dimensions, there is a considerable variation in deprivation rates among provinces, depending on the dimension considered. Interestingly, for example, one in three children in the territory of Maputo City is deprived in Nutrition (34 per cent): a rate higher than the one in Inhambane, (as well as the one of Gaza and Maputo Province –see Table A1). Zambezia has the highest deprivation in WASH, but lower than Cabo Delgado in Nutrition, Health, and Education. Deprivation in Maputo City is generally lower than in other provinces, with the notable exception of Nutrition.

Figure 3: Rate of deprivation in Nutrition, Health, Education, and WASH, for four provinces
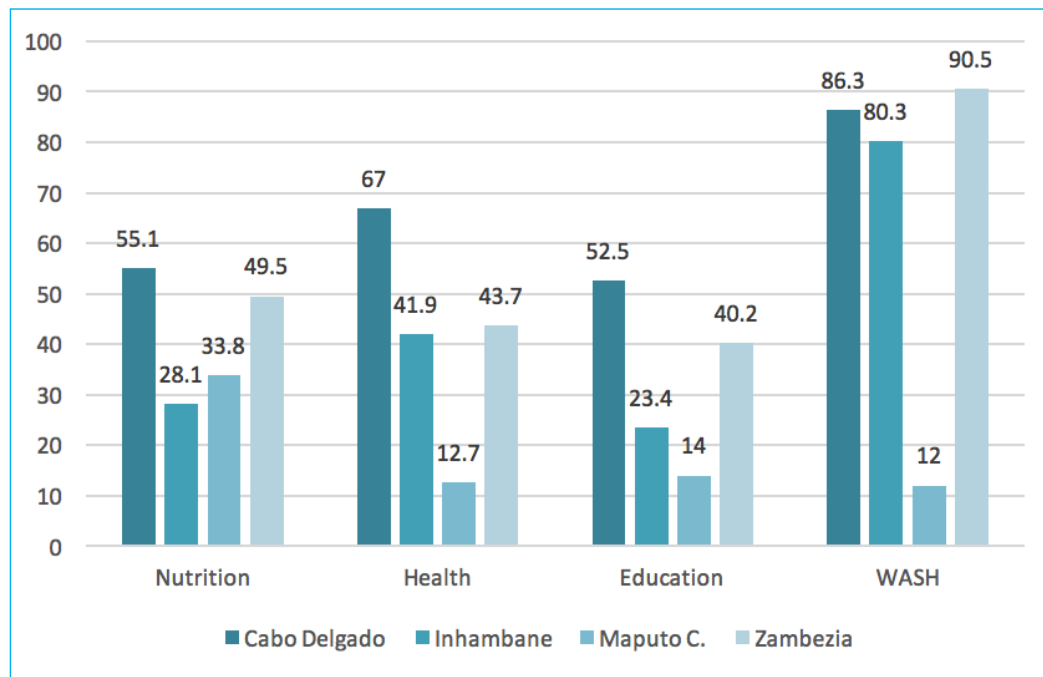
Source: Author's calculation based on IOF 2014/15 data.

Generally, deprivation rates are higher in provinces with higher monetary poverty rates (see figure 13, later); however, the ranking of provinces by dimension of deprivation does not perfectly match the one of monetary poverty rates. The provinces with the highest rate of deprivation in Nutrition are Nampula (56 per cent), Cabo Delgado (55 per cent), and Niassa (51 per cent). The highest rate of deprivation in Education are found in Cabo Delgado (53 per cent), while Child Labour is highest in Tete (17 per cent). Health deprivation is highest in Cabo Delgado (67 per cent) and Niassa (44 per cent), and deprivation in Family Relations is highest in Gaza and Manica (12 and 11 per cent). Deprivation in Participation is highest in Zambezia (35 per cent) and Tete (32 per cent). Finally, deprivations in WASH and Housing conditions are highest (between 85 and 90 per cent) in Zambesia, Niassa, Nampula, Tete, and Cabo Delgado (see table A1 in Appendix).

The next figures illustrate the relationship between each dimension and the consumption aggregate;[11] understanding this relation is particularly important in designing optimal policies to reduce deprivation, and can provide a useful tool to understand which dimensions are more correlated to monetary means, and therefore can benefit more from policies such as child grants, and which dimensions would be better tackled from the supply-side, or other types of interventions. The flatter the line, the weaker the relationship between household's consumption and deprivation in that dimension: an increase in one unit of consumption is related to a less than proportional decrease in deprivation. Conversely, a steeper line signals a stronger relation between the two.

Figure 4 reports results for individual dimensions: Nutrition, Education, Child Labour, and Family. As Figure 3 shows, most of the lines for individual dimensions are flat or almost flat, even below the poverty line (the red vertical line). Nutrition seems to be more responsive to an increase in consumption in urban areas, as well as Education. It is possible that this is due to a supply-side effect:

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11   Consumption is calculated only for the 1 trimester (see below).

in urban area services (such as schools), infrastructure, and markets are more readily available. All these factors are likely to impact the relationship between deprivation and monetary means. The dimensions of Child Labour and Family are flat for both rural and urban areas, most likely due to their low prevalence.

Figure 4: Individual dimensions and consumptions
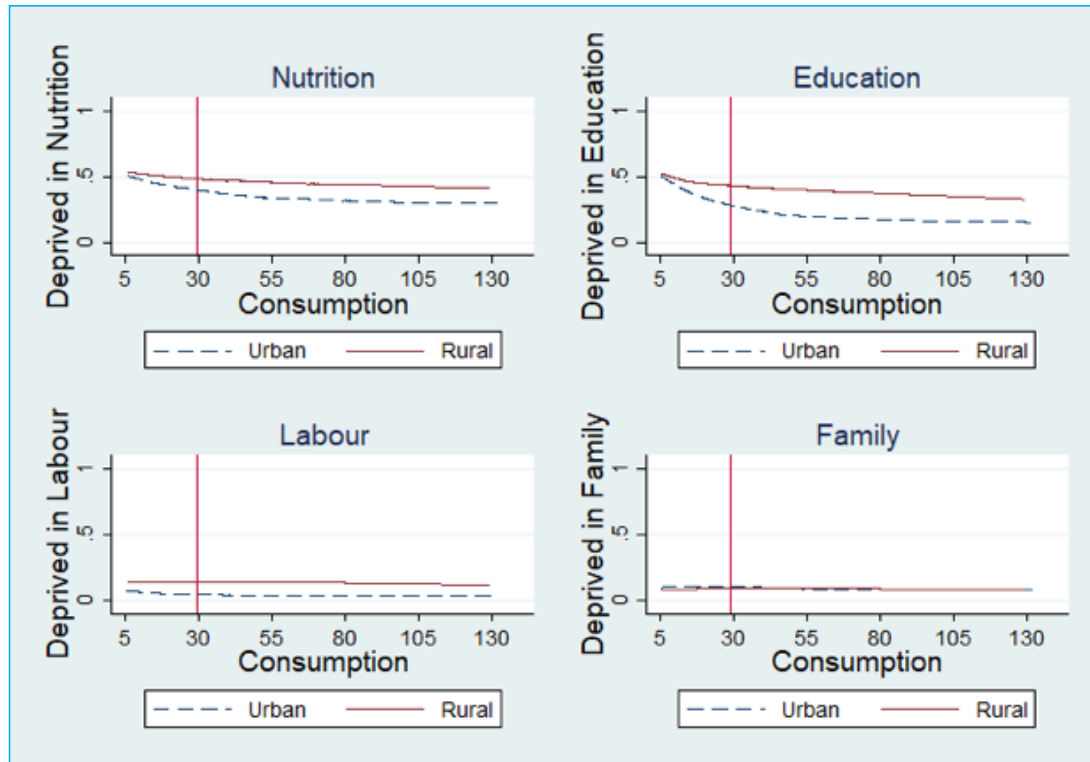
Source: Author's calculation based on IOF 2014/15 data.

While figure 4 reports household level dimensions: Health,[12] Participation, WASH, and Housing. The same type of flat or almost-flat relationship is observed for the Health dimension, especially in rural areas; since this dimension is defined by the distance from a health centre, it is easy to understand how the effect of consumption on this dimension is very limited, while structural factors play a far more important role. The dimensions of Participation, WASH, and Housing are more reactive to an increase in consumption, in particular for poor residents, while the line becomes flatter at increasing levels of consumption, and it is generally flatter in rural areas.

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12   Health is measured by a household level indicator for children 5-17, but with an individual one for children under 5

Figure 5: Household dimensions and consumption
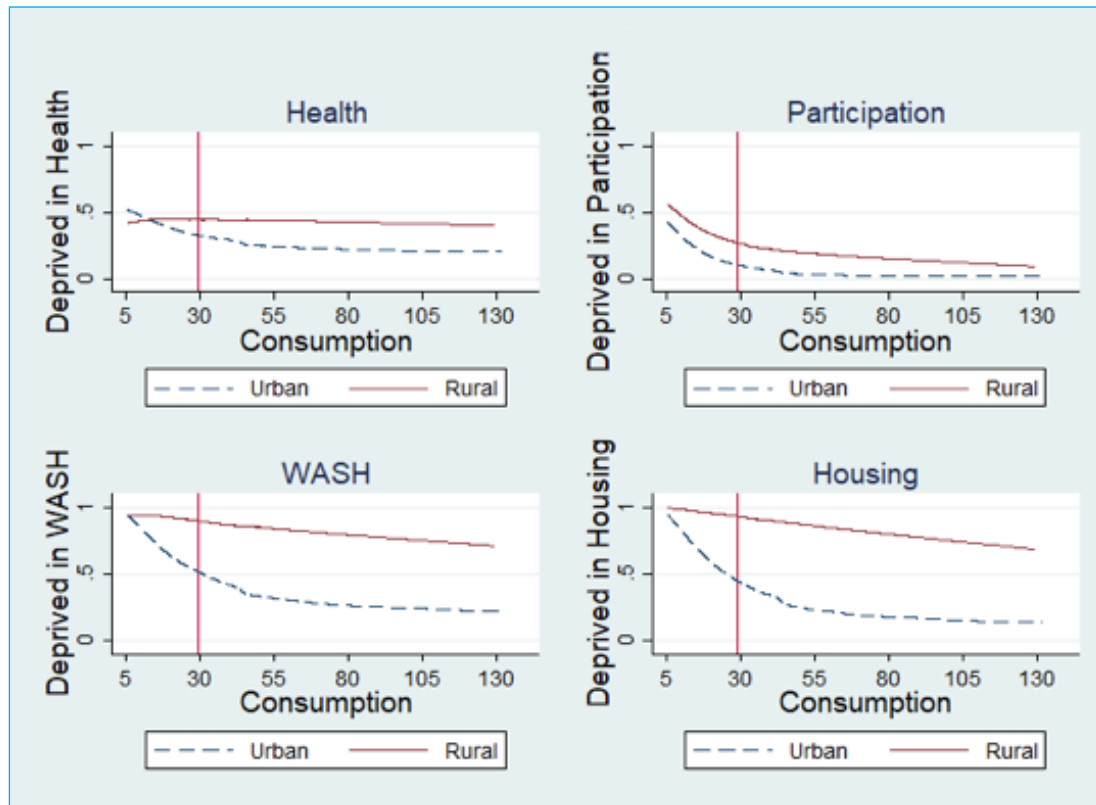
Source: Author's calculation based on IOF 2014/15 data.

Overlap between dimensions

Most children deprived in any dimension are also deprived in 3 to 5 additional dimensions (Figure 6).[13] This is true for all dimensions, and particularly so for children deprived in Housing, WASH, Education, and Health. Part of the reason lies in the fact that these are the deprivations with the highest headcount. This, however, is not always the case: there may be instances for which a dimension presents a high rate of deprivation, but is nonetheless separated from the rest. Similarly, if only a couple or three dimensions were responsible for the overlaps, we would observe a very different pattern in Figure 5, with the majority of children being deprived in 'this and 1 additional' or 'this and 2 additional'.

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13   The categories 'Only this' and '6 additional' have been removed from the graph in order to make it easier to read.

Figure 6: Overlap between dimensions
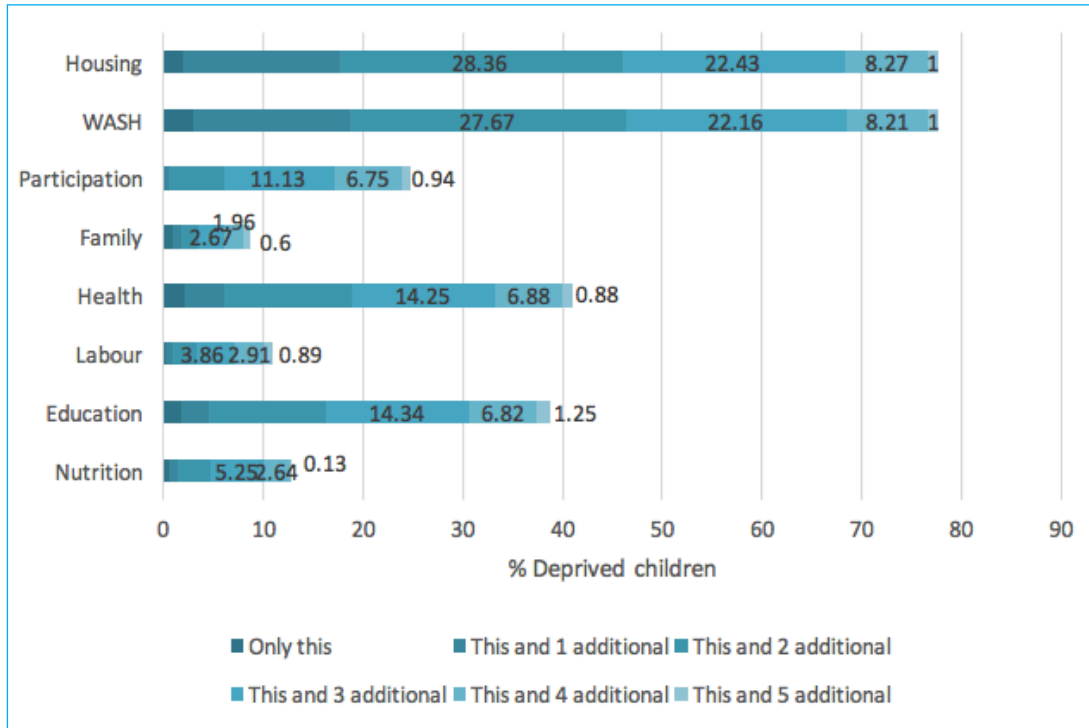
Source: Author's calculation based on IOF 2014/15 data.

The Venn diagram below (Figure 7) shows the overlap of three dimensions: Health, WASH, and Housing. One-third (32 per cent) of children who are deprived in any of these dimensions, are deprived in all three simultaneously, while 14 per cent are not suffering any of these deprivations. Figure 8 reports the overlap of three important dimensions for children under five: Nutrition, WASH, and Health. Over one in five children is deprived in all three dimensions, and around the same number is deprived in Health and WASH simultaneously. These results are particularly relevant because these dimensions are likely to be correlated, and should be addressed together.

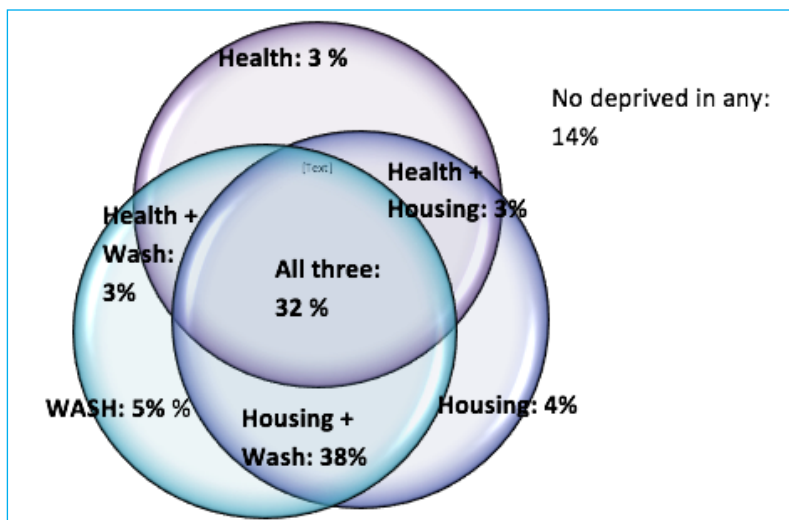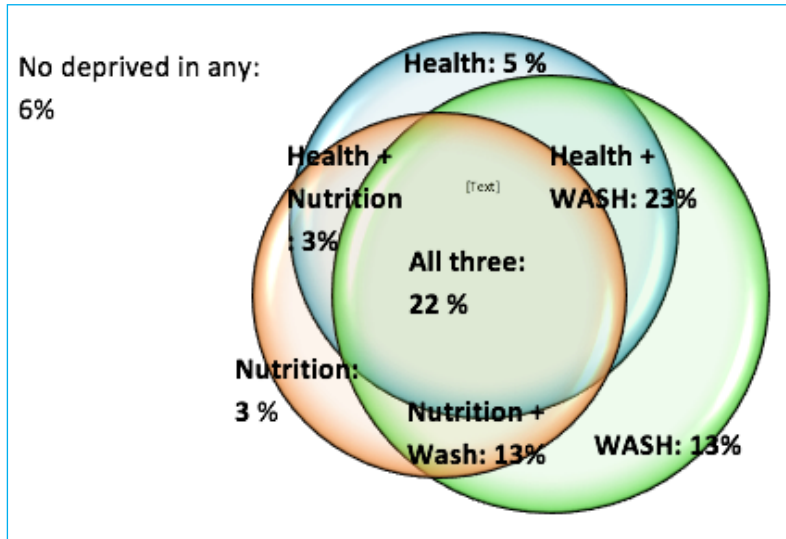**Figure 7: Overlap of Health, WASH, and Housing - All children**

Figure 8: Overlap of Nutrition, Health, and WASH – Children under 5

Source: Author's calculation based on IOF 2014/15 data.

This widespread interdependence and simultaneous occurrence of deprivations makes it more difficult to devise a single intervention to reduce multidimensional child poverty: any strategy to this effect will have to be multi-sectoral and able to address multiple issues at the same time. Furthermore, interventions and policies that focus solely on the demand-side, will not likely succeed, as deprivations need to be tackled also from the supply-side.

To have more precise picture of who these children are, Figure 9 reports the effects of several child and household characteristics on the probability to be deprived in Health, WASH, and Housing[14] at the same time, *i.e.* the probability of a child to be in the centre of the diagram in Figure 6.

Economic Factors

Living in a richer household significantly decreases the probability of being deprived in all three dimensions, as expected: children in the richest quintile have a 22.5 lower per centage point probability of being deprived than children in the poorest consumption quintile. The sector of employment of the household head also influences the probability of a child being deprived in all three dimensions; if the household head works in agriculture, the child is 2.8 per centage points more likely to be deprived than children living with a household head that is not working[15].

Demographic Factors

Living in a female headed household increases the probability of the simultaneous occurrence of these deprivations by 7.3 per centage points. The education of the head of household, even controlling for his sector of employment and the quintile of household expenditures, strongly decreases the probability of a child being deprived. A child living with a head of household who has completed primary education is 7.2 per centage points less likely to be deprived in all three dimensions. Finally, age and gender of the child are not significant.

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14   Results of a *probit* multivariate regression, expressed in average marginal effects. Controlled also for demographic composition of the household (effects not reported).

15   Not working could pertain both to unemployed and out of the labour force. Given too few observations it was not possible to separate the two categories.

Geographical Factors

Living in a rural area or in any province different from Maputo City similarly increases the probability of being deprived in all three dimensions: children in rural areas are 12 per centage points more likely to be deprived, while children living in Nanpula or Zambezia are 30 per centage points more likely to be deprived simultaneously in these three dimensions.

Figure 9: Correlates with the probability of being deprived in Health, Wash, and Housing
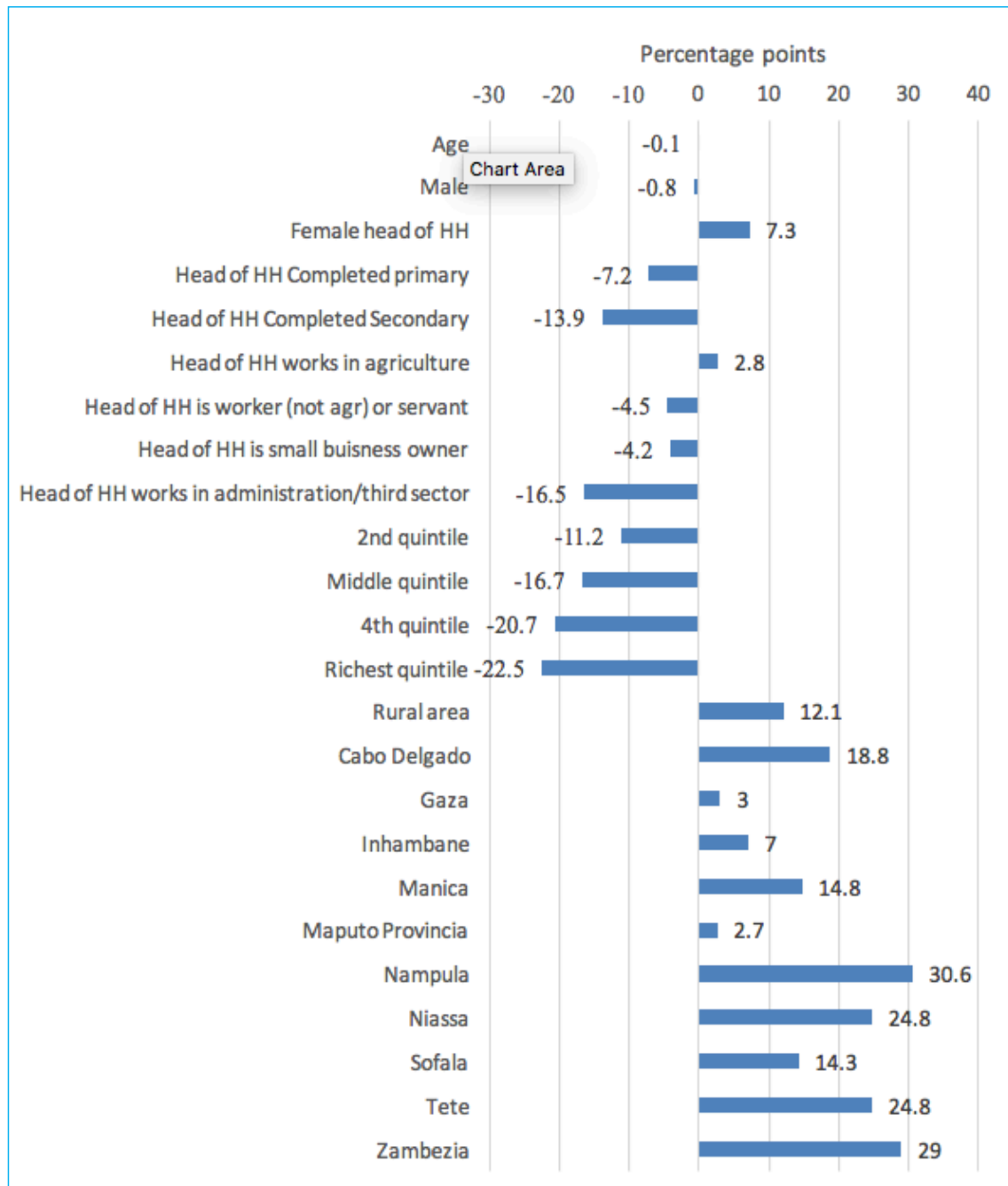
Source: Author's calculation based on IOF 2014/15 data.

Multiple Deprivation Analysis

The next graph (Figure 10) illustrates the distribution of deprivation among children, by area of residence and at the national level. Most children in Mozambique suffer from at least three deprivations at a time, and the distribution is concentrated between two and five, with 30 per cent of children deprived in 3 dimensions and 23 per cent of children deprived in four. Fewer than one in ten children are not deprived in any dimension (9 per cent), and very few are also deprived in six and seven (less 2 per cent combined). In urban areas, the proportion of deprived children declines steadily as the number of deprivations increases: about 27 per cent of urban children are not deprived, and around one if four are deprived in just one. On the contrary, no rural child is unaffected by deprivation (1 per cent), and the vast majority are deprived in two or more dimensions at a time.

Figure 10: Share of children deprived in number of deprivations
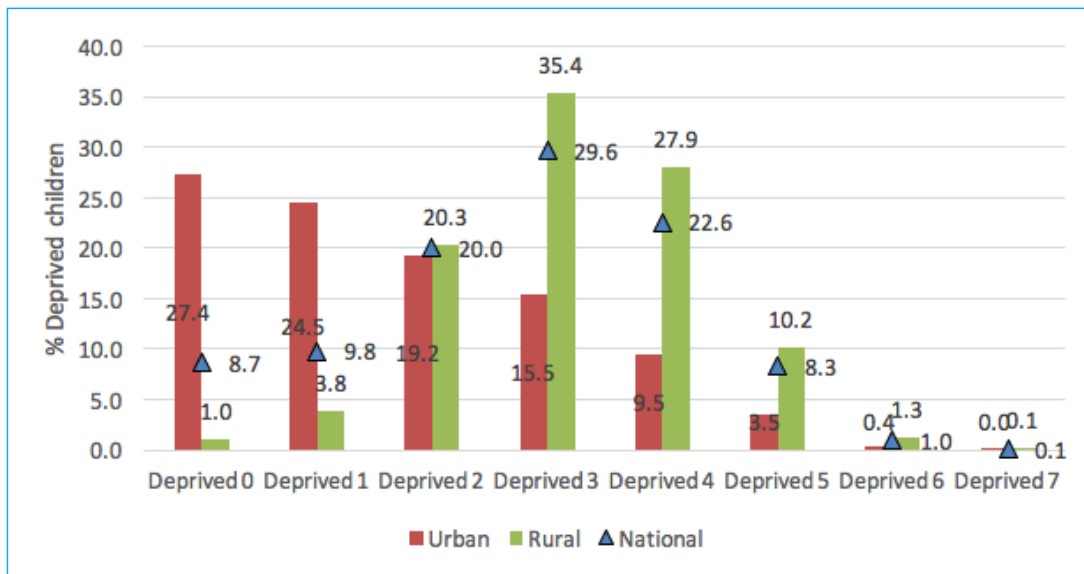
Source: Author's calculation based on IOF 2014/15 data.

Figure 11 illustrates the same results for children per age groups: children aged 5 to 12 years old and 13 to 17 years old can experience more deprivations in total than children under five, so we expect them to be more likely deprived in a higher number of deprivations. However, children under five are mostly deprived in 3 or more dimensions, while school-age children (5 to 12 years old) seems to be the group relatively better off: they are mostly deprived in 2 or 3 deprivations, and 2 out of 10 are either not deprived or deprived in just one dimension. Older children are the most likely to be deprived in 4 or 5 deprivations at a time (26 and 10 per cent), however, they are also the more likely to not be deprived in any or just 1 dimension. Finally, virtually no child of any age group experiences 7 deprivations (less than 1 per cent).

Figure 11: Deprivation by age group
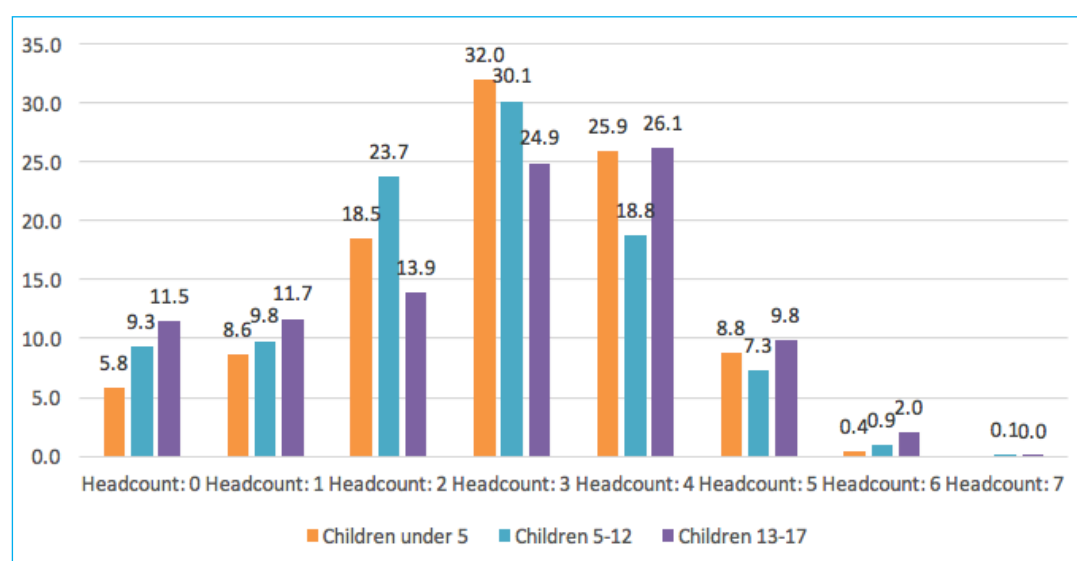
Source: Author's calculation based on IOF 2014/15 data.

Table 5 shows the headcount, intensity, and adjusted headcount ratio for each cut-off, at national level and disaggregated by area of residence. The vast majority (91 per cent) of children are deprived in at least one dimension at the national level, while 82 per cent are deprived in 2 or more. Around two-thirds of children (62 per cent) are deprived in at least three deprivations, while 32 per cent are deprived in four or more. Children in rural areas are systematically and considerably more likely to be deprived than children in urban areas: at the cut-off of 2+, about one-half of urban children is deprived, while almost all children (95 per cent) are deprived in rural areas. The intensity of deprivation is around fifty per cent at national level, meaning that children who are deprived in at least one deprivation, experience on average 45 per cent of all possible deprivations, or around 3 deprivations. Again, children in rural areas are considerably worse off, with an intensity of 49 per cent.

Table 5: Deprivation rates at each cut-off by area

	Headcount			Intensity (%)			Adjusted headcount ratio		
	National	Urban	Rural	National	Urban	Rural	National	Urban	Rural
Deprived 1+	91.4	72.6	99.0	45.8	34.6	49.1	0.42	0.25	0.49
Deprived 2+	81.5	48.0	95.2	49.5	44.8	50.5	0.40	0.21	0.48
Deprived 3+	61.8	28.9	75.2	55.8	54.6	56.0	0.34	0.16	0.42
Deprived 4+	32.7	13.6	40.5	65.4	65.4	65.4	0.21	0.09	0.27
Deprived 5+	9.8	4.1	12.1	77.0	77.0	76.9	0.08	0.03	0.09
Deprived 6+	1.4	0.5	1.8	86.8	86.8	86.7	0.01	0.00	0.02

Source: Author's calculation based on IOF 2014/15 data.

The adjusted headcount ratio is a composite index that combines the headcount and the intensity of deprivation: it can be interpreted as the per centage (if multiplied by 100) of the total possible deprivations that children in Mozambique could experience. Therefore, children deprived in at least

one deprivation, with an adjusted headcount ratio of 0.42, experience 42 per cent of all possible deprivations. While intensity of deprivation increases as the cut-off increases, the adjusted headcount –as well as the regular headcount- decreases. At the cut-off of two or more, the adjusted headcount is 0.40. Since the adjusted headcount incorporates the intensity of deprivation, it also is useful to compare groups at a glance. If we look at urban and rural children (the last two columns in Table 4), we see how the adjusted headcount remains high in rural areas, while it declines rapidly for urban children. In urban areas it goes from 0.25 at the first cut-off, to 0.16 at three or more, while in rural areas it reaches 0.09 only at the cut-off of 5 or more deprivations.

Tables 6 breaks down the results by age group. It is important to underscore that, since some of the dimensions are different for each age group, part of the differences in deprivation rate are driven by this fact. At the cut-off of 2+, children under 5 are the most deprived (85.6 per cent) while older children are the least deprived group (77 per cent). However, at the cut-off of 3+, children 5-12 are the least likely to be deprived (57.2 per cent), and at the cut-off of 4+ older children are actually the group most likely to be deprived, with the headcount of 38 per cent. Considering the adjusted headcount, at the 2+ cut-off, both groups of older children show a similar number, 0.37 and 0.38 respectively, while younger children have an adjusted headcount of 0.47: they are more deprived both in number and intensity of deprivation. While older children are more likely to be deprived at higher cut-offs, younger children are more likely to be deprived at lower cut-offs and experience considerably more intense deprivation: younger children can therefore be considered the group most affected by deprivation.

Table 6: Deprivation rates at each cut-off by age group

	Headcount			Intensity (%)			Adjusted headcount ratio		
	Under 5	**5-12**	**13-17**	**Under 5**	**5-12**	**13-17**	**Under 5**	**5-12**	**13-17**
Deprived 1+	94.2	90.7	88.5	51.6	41.8	45.2	0.49	0.38	0.4
Deprived 2+	85.6	80.9	76.8	55.1	45.1	49.9	0.47	0.37	0.38
Deprived 3+	67	57.2	62.9	61.1	52	54.7	0.41	0.3	0.34
Deprived 4+	35.1	27.1	38	71.2	62.2	62.4	0.25	0.17	0.24
Deprived 5+	9.2	8.3	11.9	84.1	73.5	74	0.08	0.06	0.09
Deprived 6+		1.1	2.1		87.4	86		0.01	0.02

Source: Author's calculation based on IOF 2014/15 data.

The adjusted headcount can also be decomposed by the contribution of each dimension to the overall deprivation rate. Figure 12 and 13 illustrate the decomposition by dimension of the adjusted headcount at the cut-off of 2 or more deprivations, separately for children under five and children 5 to 17 (the reason being that some dimensions are calculated only for one of the two age-groups). For children under 5, the largest contribution to deprivation comes from Housing, WASH, and Health. The latter accounts for 20 per cent of the total adjusted headcount, while Nutrition accounts for about 14 per cent. For older children, the pattern is similar: household dimensions contribute the lion's share to deprivation. Education contributes 14 per cent, while Labour contributes just a little over 4 per cent to the overall rate of deprivation. For both age groups, the smallest contribution comes from Family, respectively 1.4 per cent for under five and 3.8 per cent for older children.

Figure 12: Contribution of each dimensions to the adjusted headcount - Children 0-4

Contribution (%)

■ Nutrition ■ Health ■ Family
■ Participation ■ WASH ■ Housing
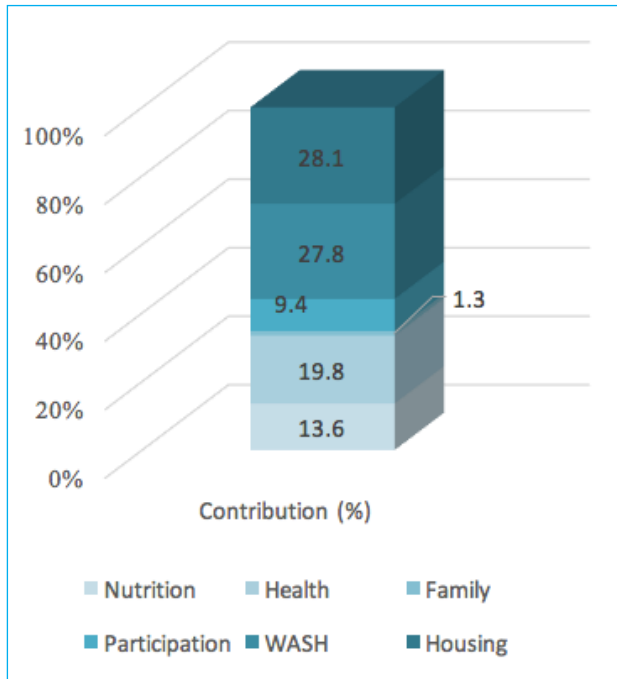
Figure 13: Contribution of each dimensions to the adjusted headcount - Children 5-17

Contribution (%)

■ Education ■ Labour ■ Health
■ Family ■ Participation ■ WASH
■ Housing
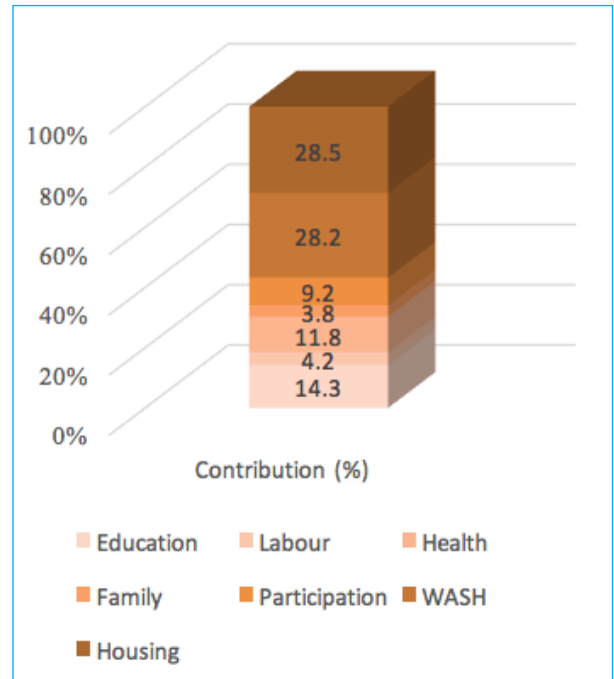
Source: Author's calculation based on IOF 2014/15 data.

Deprivation rates by Province

Deprivation rates are similar across province and generally high, with the notable exception of Maputo City and Province (figure 14), where deprivation rates are the lowest for both cut-offs. Deprivation rates are highest in Niassa, Zambezia, and Cabo Delgado.

Figure 14: Rate of deprived children in 2+ and intensity by province
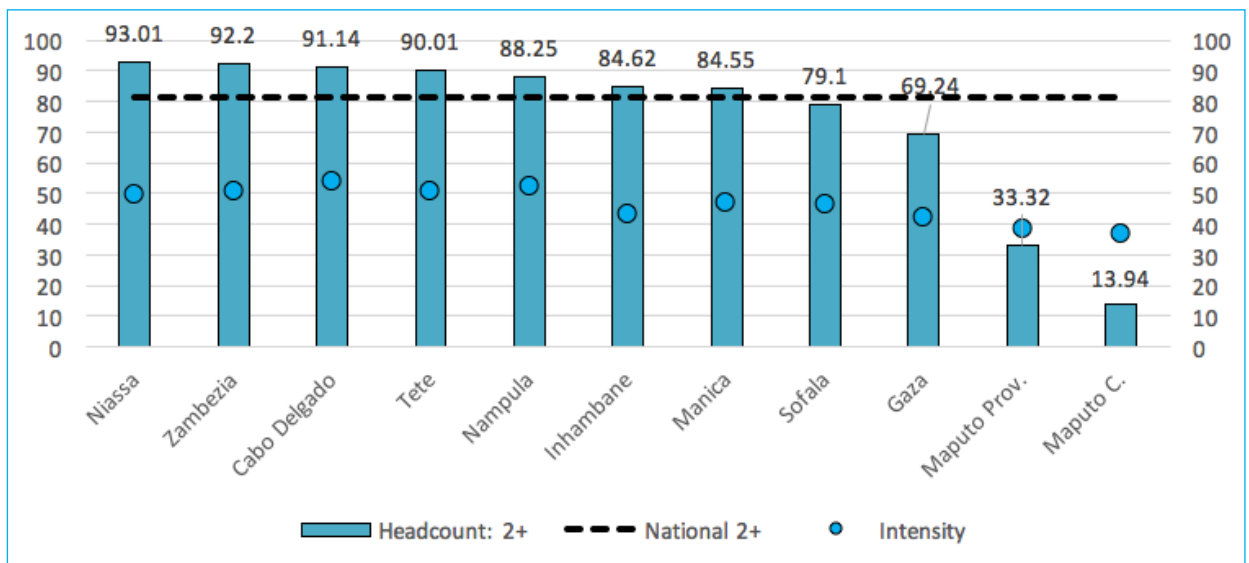
Source: Author's calculation based on IOF 2014/15 data.

Figure 14 shows, reading on the right-hand axis, the average intensity of deprivation in each province: the graph illustrates how intensity does not necessarily follow the same pattern, and provinces with higher deprivation can show lower intensity. In particular, deprived children in Maputo City exhibit an intensity of deprivation similar to that of children in Maputo Province: 37 and 38 per cent respectively. This points out how children in Maputo City face greater inequality, where deprivations are less spread out in the population, but are more concentrated on those who are deprived. Similarly, children in Gaza show a slightly higher intensity (42 per cent), whereas the deprivation headcount is close to 70 per cent.

Since the adjusted headcount combines both headcount and intensity, its decomposition can shed light as to which provinces are worse off. The provinces that contribute the most to the national rate of deprivation (at the cut-off of 2+) are Nampula and Zambezia, respectively contributing by 23 and 22 per cent to the adjusted headcount ratio (figure 15). The provinces that contribute less are Maputo City, Maputo Province, and Gaza. As predicted, the ranking of provinces is slightly different than that shown in the previous figure.[16]
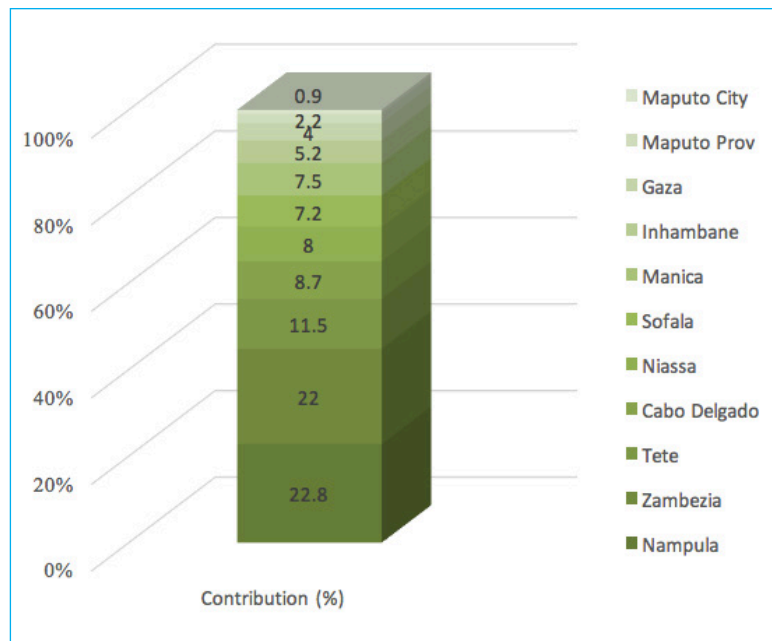
Figure 15: Contribution to the Adj. HC of each province - All children

Source: Author's calculation based on IOF 2014/15 data.

To analyse the correlates of deprivation, we performed a regression analysis on the probability of a child being deprived at the cut-off of 2+ and 3+.[17] The results are shown in Figure 16. They are reported in marginal effects, or, in other words: the change in per centage points of the probability of being deprived, associated on average with a certain characteristic. Most effects are statistically significant at the 1 per cent confidence level.

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16   The results are also influenced by population size in each province.

17   Results of a *probit* model; it controls for demographic composition of the household, not reported.

Individual and household Factors

Having a head of household with a higher education strongly reduces the probability of being deprived: children who have a head of household with an education above secondary level are 40 per centage point less likely to be deprived in 3 or more deprivations, and 20 per centage point less likely to be deprived in 2 or more. Just having finished secondary school decreases the probability of being deprived by 18 per centage points, for the cut-off of three, and by 12 for the cut-off of 2.

Economic Factors

The previous effects take into account the sector of employment of the head of the household: working in agriculture increases the chances of being deprived by 8 per centage points at both cut-off.[18] Children of small business owners are also slightly more likely to be deprived (2 and 3 per centage points, respectively). Children living in richer households have an increasingly lower risk of being deprived at both cut-offs: children in the richest quintile are 26 per centage points less likely to be deprived in at least 3 dimensions, and 30 per centage points to be deprived in at least 2.

Geographical Factors

Living in rural areas increases the probability of being deprived, as well as living in any other province which is not Maputo City, with the only exception of Maputo Province, which is associated with a 1.5 per centage point lower probability of deprivation; however, this effect is not significant.

Among correlates that are not statistically significant, is the child being male, indicating that there are not strong gender differences in deprivation, and age of the child; controlling for other factors, age is not a strong correlate of deprivation. Effects are generally larger for the cut-off of 3 or more dimensions, reflecting the fact that there are fewer children deprived at this cut-off. The results also control for the demographic composition of the household, but results are not reported.

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18   This finding is coherent with similar analysis for SSA, specifically for Tanzania (UNICEF 2016) and Malawi (UNICEF 2016)

Figure 16: Correlates with the probability of being deprived in 2+ and 3+
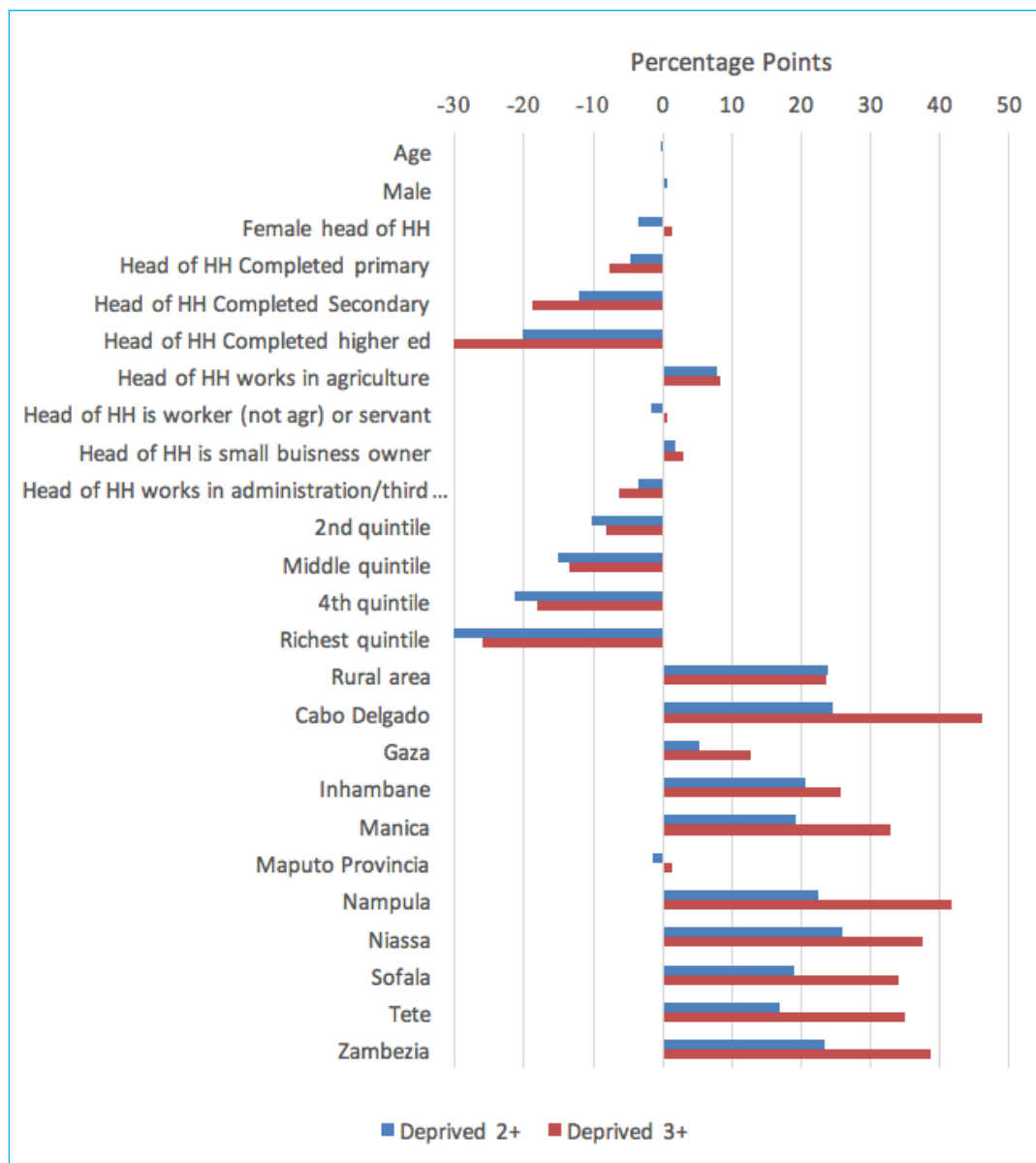
Source: Author's calculation based on IOF 2014/15 data.

4. MONETARY POVERTY AND DEPRIVATION

Global estimates of extreme poverty show that children are more likely to live in poverty than adults (Newhouse, Suarez-Becerra, Evans, & Data for Goals Group, 2016), and the same has been observed in other countries in the region.[19] 46 per cent of people are poor in Mozambique, according to the national poverty line (Table 7).[20] One-half of children (51 per cent) are poor, according to the official annual poverty line, while the poverty rate for adults is 40 per cent, lower than the national rate and 20 per cent lower than that of children. Poverty rates are also higher in rural areas than in urban ones, and in the north of the country, for all age groups.

Breaking down the child poverty rate by age group, we observe that young children are substantially more likely to be poor: both children under five and children 5 to 12 years old show a poverty rate above fifty per cent. On the contrary, older children (13-17) present a poverty rate in line with the national average (45.9 per cent).

Table 7: Poverty rates by age and area

	Children		All population	
	First Quarter	**Annual**	**First Quarter**	**Annual**
National	49.0	51.1	43.9	46.1
Rural	52.5	54.2	48.1	50.1
Urban	40.5	43.4	34.8	37.4
North	58.0	59.8	53.5	55.1
Center	48.5	50.2	43.9	46.2
South	35.4	38.7	29.9	32.8
Age 0-4	50.5	52.4	50.5	52.4
Age 5-12	50.2	52.4	50.2	52.4
Age 13-17	44.1	45.9	44.1	45.9
Age 18+	-	-	37.7	40.1
Male	49.7	51.8	43.9	46
Female	48.4	50.4	43.9	45.8

Source: Mahrt & Salvucci (2017) based on IOF 2014/15 data and DEEF (2016).

At the same time, children make up the majority of the poor population in both urban and rural areas, respectively 58 and 61 per cent (Figure 17 and 18).

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19 See, for example, the national MODA studies of Tanzania (https://www.unicef.org/tanzania/resources_18551.html) and Malawi (https://www.unicef.org/malawi/resources_18568.html)

20 Table 5 reports separate poverty estimates for the whole year and for the 1 trimester only. Overlap analysis with deprivation is calculated only for the 1 trimester (see text).

Figure 17: Poor 1 by age group - Urban 1 Trim
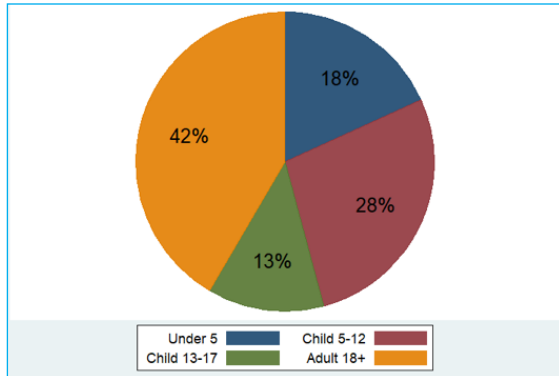
Figure 18: Poor by age group - Rural 1 Trim
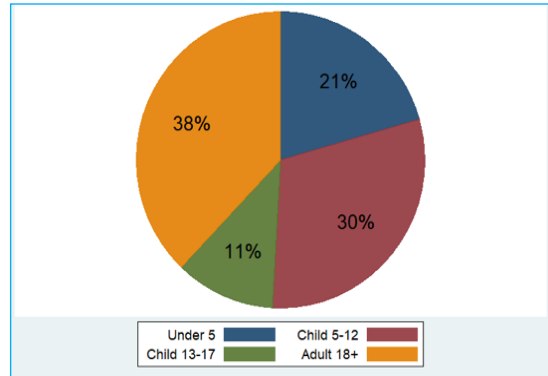
Source: Author's calculation based on IOF 2014/15 data.

The distribution of poverty by province (Figure 19) follows the same pattern seen at national level, with children systematically poorer than adults in each province. Poverty rates overall are generally higher in Niassa (61 per cent), Nampula and Zambezia (57 per cent), and Gaza (51 per cent). Poverty rates are the lowest in Maputo City (12 per cent) and Maputo Province (19 per cent).

Figure 19: Poverty rates by province and age
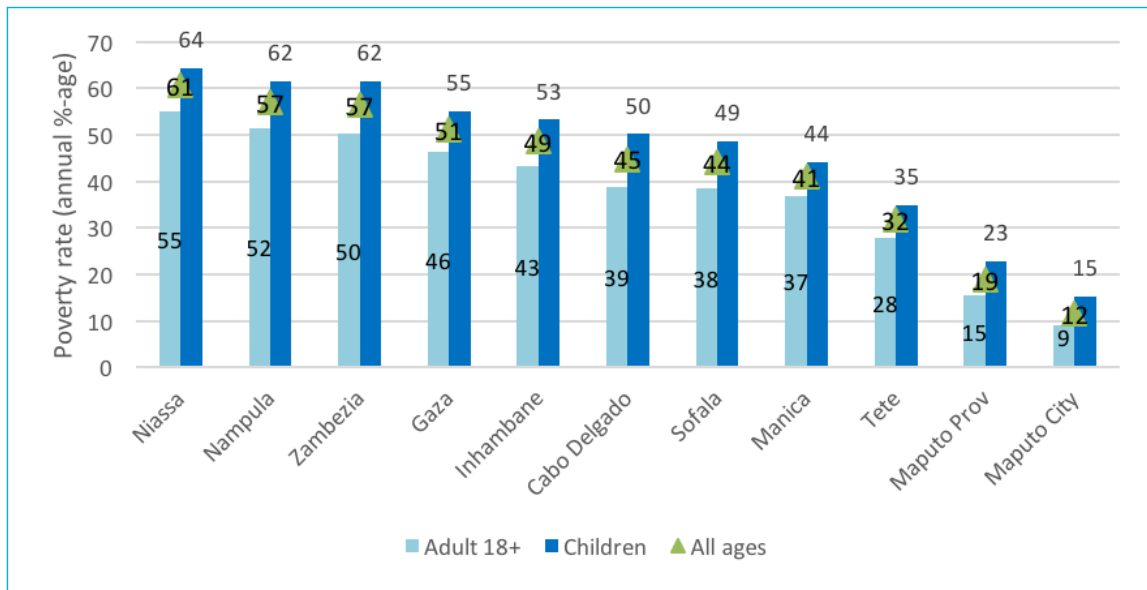
Source: Author's calculation based on IOF 2014/15 data.

Since indicators for deprivation are completely available only for the first trimester, the analysis of the overlap between deprivation and monetary poverty will be conducted using expenditure data only for the first trimester.

The overlap between multidimensional and monetary poverty is illustrated in Table 8, for the cut-off of two or more dimension. Nationally, almost 46 per cent of children are both poor and deprived,

39 per cent are deprived without living in a poor household. Only 3 per cent of children are poor only.[21] The degree of overlap is higher in rural areas and lower in urban ones. However, the mismatch between monetary and multidimensional poverty is similar in both settings, while the overall rates of poverty and deprivation are lower in urban areas.

Table 8: Overlap of monetary poverty and deprivation (2+)

	All	Urban	Rural
Poor[a] and Deprived[b]	45.53	30.97	51.47
Poor only	3.51	9.53	1.05
Deprived but not poor	36.02	17.16	43.71
Not poor and not deprived	14.94	42.34	3.77
Deprived	81.55	48.13	95.18
Poor	49.04	40.5	52.52

(a)   *A child who lives in a monetary poor household, according to the national poverty line in the 1 trimester*
(b)   *A child deprived in 2 or more dimensions*

Source: Author's calculation based on IOF 2014/15 data.

This mismatch in poverty and deprivation follows from the non-linear relationship between the two; while it is true that poorer children are more likely to be more deprived, on average, the effect is far from straightforward, as was discussed in the single deprivation section. As the cut-off increases, the proportion of children who are deprived only decreases, and this happens partially because the relationship is stronger at higher number of deprivations, and partially is an effect of the decreasing proportion of children deprived at higher cut-offs.

Figure 20 illustrate the relationship between number of deprivations and consumption, separately for rural and urban household, where the vertical line represents the poverty line.
For children in rural household, the relationship is weak, and an increase in consumption achieves only a small decrease in deprivation. For children in urban areas, the relationship is stronger below the poverty line, meaning that for poor households, an increase in consumption would be more effective in reducing deprivation. However, the line flattens as the relationship weakens when consumption increases.

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21   Poor only here indicates children who are monetary poor, and are not deprived according to the specified cut-off. They could, however, still be deprived in 1 dimension.

Figure 20: Deprivation and Consumption
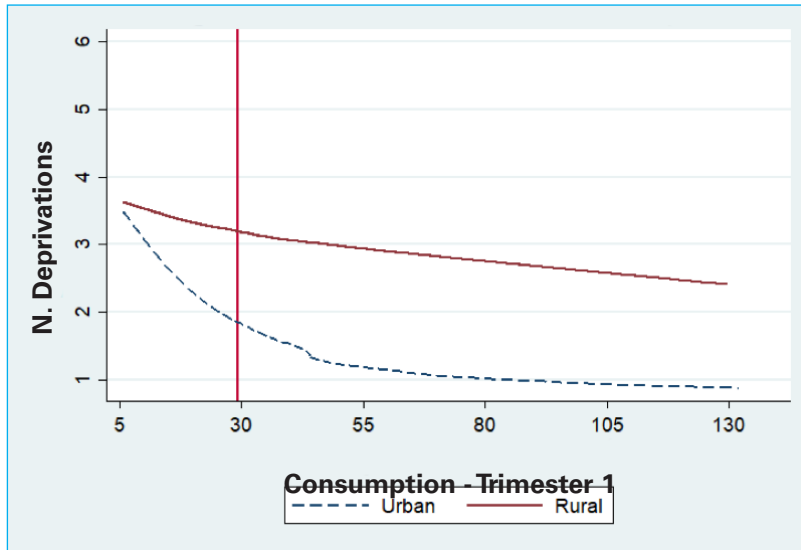
The relationship between deprivation and poverty at the province level is illustrated by Figure 21. On the horizontal axis is the per centage of poor children, while on the vertical axis are represented children deprived in 2 or more. The size of each bubble represents the relative size of the child population in a given province.

Figure 21: Poverty and deprivation (2+) in each province
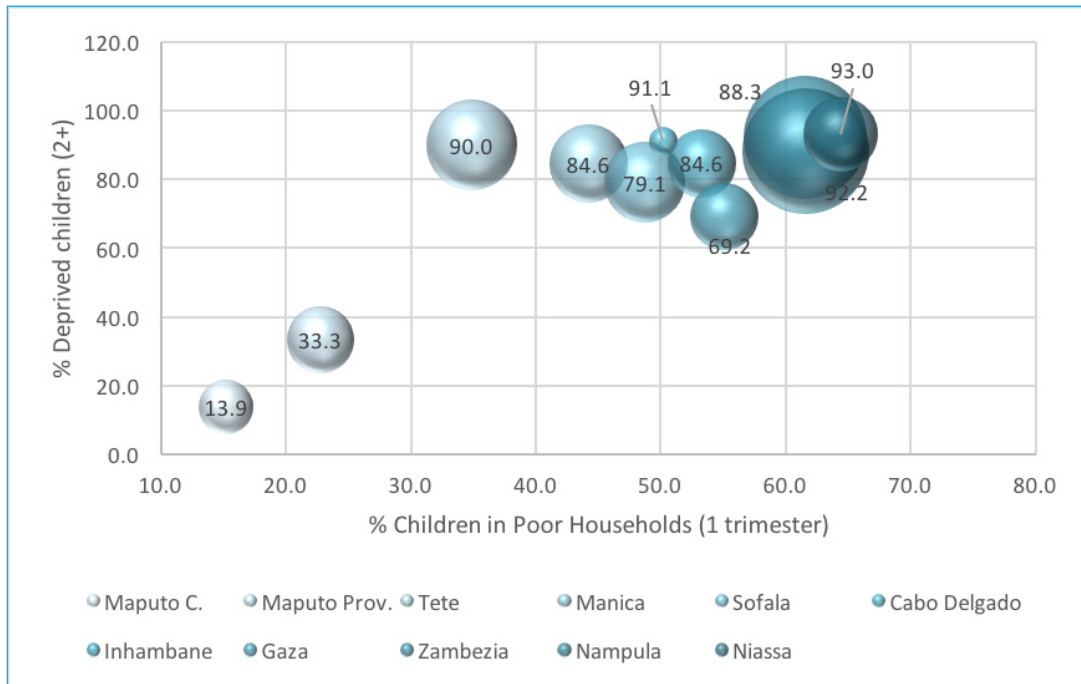
Source: Author's calculation based on IOF 2014/15 data.

Again, the relationship is far from linear: provinces with similar rates of deprivation show a great variation in poverty rates. For example, Manica and Inhambane have similar rates of deprivation, around 84 per cent, however they have very different poverty rates: in Manica 38 per cent of children are monetary poor, whereas Inhambane has a 49 per cent poverty rate. Similary, Tete and Zambezia

both have very high rates of deprivation (92 and 90 per cent respectively) but very different poverty rates, where Zambezia has one of the highest poverty rates, 60 per cent, and Tete a considerably lower, 39 per cent. These results reveal the complexity of the relationship between the lack on monetary means, childhood deprivations, and demographic and geographical factors. Any policy aimed at eradicating child poverty should encompass all of these domains.

Figure 22 illustrates the overlap between poverty and deprivation in each province. The proportion of children who are poor only is generally low, and a more consistent share is present only in Maputo City (13 per cent) and Maputo Province (8 per cent). The share of children who are deprived without living in a poor household varies across provinces, from 53 per cent in Tete, to 31 per cent in Niassa (excluding Maputo City and Province); however, Niassa is also the province with the higher share (62 per cent) of children both poor and deprived.

Figure 22: Overlap of monetary poverty and deprivation by province
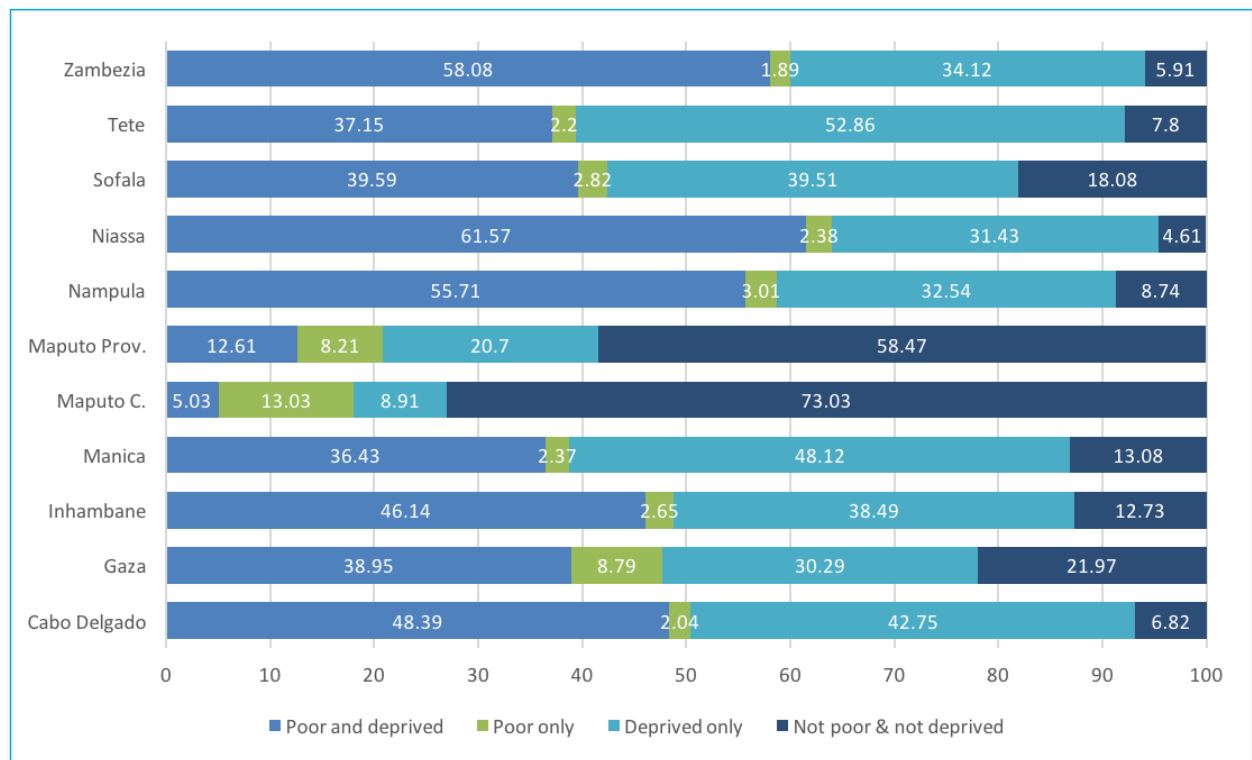
Source: Author's calculation based on IOF 2014/15 data.

Finally, Table 9 reports the marginal effects correlated with the probability of being deprived in 5 or more dimensions (first column), the probability of being deprived and poor (second column), and the probability of a child being neither poor nor deprived (third column). This comparison allows us to understand if and what are the critical differences and similarities between these groups; children who are poor and deprived, as well as children who are deprived in five or more dimensions, figure among the poorest of children, while children who do not experience either form of poverty are among the most well off.

Individual and household factors

The gender of the household head has somewhat of an ambiguous effect. It increases both the

probability of the child not being poor and deprived—therefore a positive effect on the child well-being; and it increases a child's probability of being deprived in 5 or more dimensions, therefore having negative influence on the child's life. It is possible that it has some form of U shaped relationship with poverty and deprivation, where female heads of household are either extremely poor, and therefore the children living in those household are very deprived, or quite affluent.

The education of the head of the household has a very strong negative correlation with the probability of being deprived in 5+, and, conversely, a very strong positive correlation with the probability of being neither poor nor deprived. Children of better educated heads of household are better off, because they are less likely to be deprived in many dimensions, and more likely to not be deprived or poor. However, it has a smaller (and less significant) effect on the probability of being both poor and deprived, reducing it by only 1 per centage point.

The age and gender of the child do not play any significant role in any of the three cases; for children deprived in 5 or more dimension an additional year of age is correlated with a slight increase in the probability of being deprived (0.4 per centage points). In this case age is used linearly, therefore measuring the effect of a one year increase in age; if we use the three age groups we observe that children 5 to 12 are generally less likely, with respect to children under five, to be deprived in five or more dimensions, and to be poor and deprived, while adolescents are more likely to be deprived and poor. This confirms the earlier descriptive result that children in the second age group are better off. Again, this is in part due to the different definition of deprivation for the different age groups. The gender of the child is never statistically significant.

Economic Factors

Consumption has the expected sign, with a positive relationship on the probability of not being deprived and poor, and a negative relationship on the probability of being deprived in five or more dimensions, and the probability of being both poor and deprived.

Holding consumption constant, the sector of activity of the household head does not seem to have a strong relation with the probability of being deprived and/or poor, contrary to what we have shown in previous results. The only exception is working in agriculture (farmer or worker), and working in the third sector. If the household head works in the third sector, a child is 7 per centage points less likely to be deprived in 5 or more dimensions, while if the head works in agriculture, it is less probable (-3.7 per centage points) that the child is neither poor nor deprived.

Geographical Factors

Children in rural areas are worse off, experiencing an increased probability of being deprived in five and more dimensions, and of being both monetarily poor and deprived. Provinces follow the same pattern relative to Maputo City.

Table 9: Correlates of different states of deprivation (marginal effects)

	Deprived 5+	Poor & Deprived 2+	Not poor not deprived 2+
Age	0.004***	0.000	0.000
	(0.001)	(0.000)	(0.000)
Child is male	-0.002	-0.002	-0.003
	(0.004)	(0.003)	(0.003)
Female head of HH	0.029***	-0.002	0.024***
	(0.007)	(0.007)	(0.006)
Head of HH Completed primary	-0.035***	-0.011*	0.031***
	(0.007)	(0.006)	(0.006)
Head of HH Completed Secondary	-0.050***	-0.027*	0.070***
	(0.017)	(0.015)	(0.010)
Head of HH works in agriculture	0.013	0.012	-0.037***
	(0.012)	(0.014)	(0.009)
Head of HH is worker (not agr) or servant	-0.026*	-0.021	0.004
	(0.014)	(0.016)	(0.009)
Head of HH is small business owner	-0.007	0.004	-0.013
	(0.016)	(0.016)	(0.009)
Head of HH works in administration/third sector	-0.071***	-0.005	0.014
	(0.013)	(0.024)	(0.012)
Log of monthly consumption	-0.042***	-0.591***	0.114***
	(0.006)	(0.004)	(0.005)
Rural area	0.056***	0.101***	-0.131***
	(0.011)	(0.010)	(0.006)
Cabo Delgado	0.155***	0.109***	-0.100***
	(0.016)	(0.027)	(0.013)
Gaza	0.007	0.047	0.009
	(0.005)	(0.030)	(0.022)
Inhambane	0.021***	0.114***	-0.087***
	(0.007)	(0.028)	(0.015)
Manica	0.062***	0.120***	-0.076***
	(0.010)	(0.027)	(0.013)
Maputo Provincia	0.003	0.014	0.029*
	(0.006)	(0.030)	(0.016)
Nampula	0.130***	0.103***	-0.088***
	(0.011)	(0.027)	(0.013)
Niassa	0.094***	0.119***	-0.105***
	(0.013)	(0.027)	(0.016)
Sofala	0.058***	0.112***	-0.084***
	(0.012)	(0.027)	(0.013)
Tete	0.098***	0.084***	-0.069***
	(0.013)	(0.027)	(0.015)
Zambezia	0.094***	0.127***	-0.102***
	(0.010)	(0.027)	(0.014)
Observations	*29,076*	*29,076*	*30,003*

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Source: Author's calculation based on IOF 2014/15 data.

Correlation with deprivation and poverty are quite heterogeneous, and different children seem to be influenced by different sets of characteristics. Any policy aimed at reducing child poverty should take these effects into account. Demographic composition of the household, while not reported, has expected effects. The number of small children increases the probability of a child being deprived and/or poor, while more adults in productive ages has generally a positive effect, decreasing the probability of both monetary poverty and deprivation.

Child poverty and weather shocks

The increased frequency of extreme weather events due to climate change is a general cause for concern, especially in developing countries. Weather shocks threaten the livelihoods of families that depend on agricultural activities (Hare, Cramer, Schaeffer, Battaglini, & Jaeger, 2011) (Roudier, Sultan, Quirion, & Berg, 2011) ; they render incomes and prices more volatile and less predictable, thus putting the resilience capacity of households and communities under pressure (Wheeler & von Braun, 2013) (Ahmed, Diffenbaugh, & Hertel, 2009). Recently, Mozambique experienced extreme floods Zambezia. Children who live in disaster-prone areas are more vulnerable to poverty and deprivation; this section presents a brief descriptive analysis of the relationship between deprivation and poverty, and weather shocks.

Here we use the self-reported information on natural calamities experienced by the household in the past year. Since this information only refers to the first trimester of the survey period (2014/15), it misses some of the more extreme events that occurred in the country the following year. Here we do not have the means to establish causal links, nor is this the aim of the present work. In fact, our goal here is to trace some patterns that can inform further studies.

The following maps (Figure 23, 24, 25) illustrate, for each province: the average number of deprivations experienced by children (fig. 23), the monetary child poverty rate (fig. 24), and the prevalence of households that have experienced at least one natural disaster (fig. 25).
The pattern is similar, while not exactly the same. For example, a higher proportion of households report having experienced at least one weather shock in the southern part of the country, while the share of deprived and poor children is lower in this part of the country compared to the northern part.

Figure 23: Deprived children in each Province

Share of children deprived in 2+ (%)
- 91.1 - 93.0
- 88.3 - 91.1
- 84.5 - 88.3
- 69.3 - 84.5
- 13.9 - 69.3
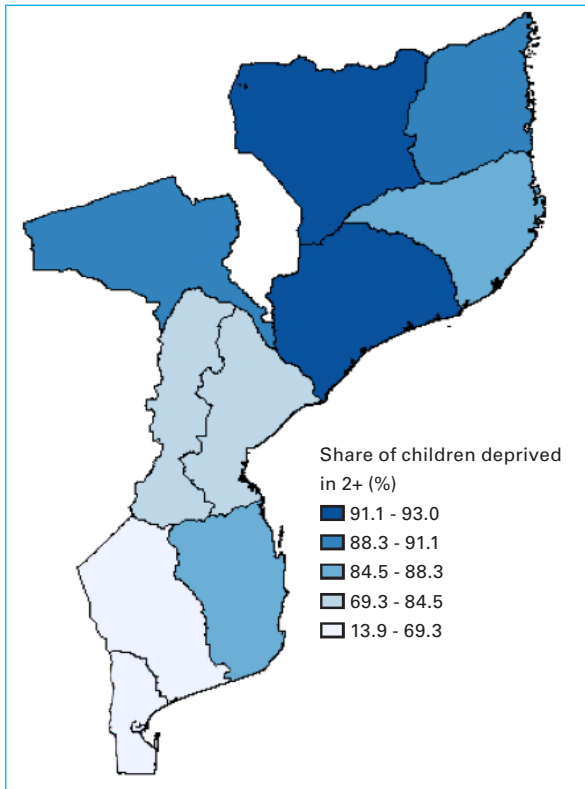
Figure 24: Child poverty rate by Province

Proportion of poor children (%)
- 54.1 - 60.1
- 44.3 - 54.1
- 38.1 - 44.3
- 35.2 - 38.1
- 14.0 - 35.2
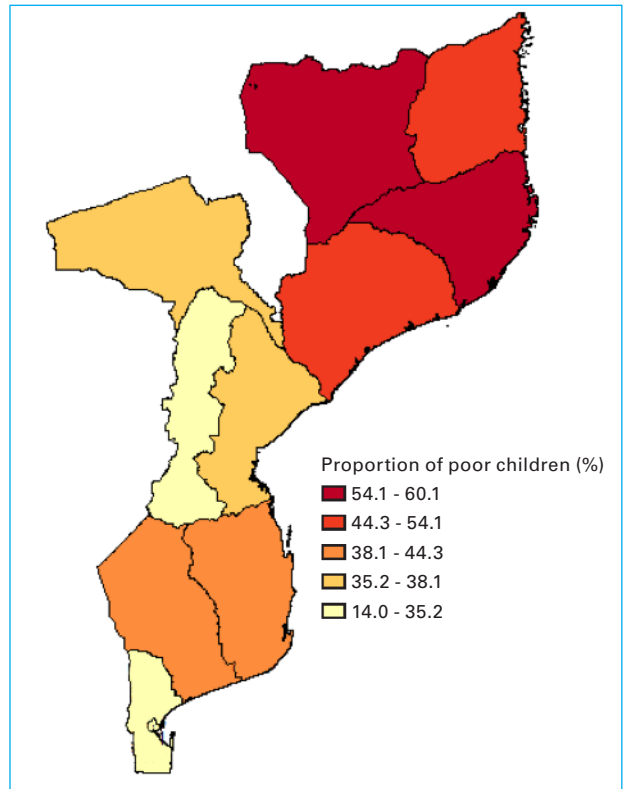
Figure 25: Prevalence of weather disasters

HH experienced any weather disaster
- 36.5 - 54.0
- 23.2 - 36.5
- 21.8 - 23.2
- 14.6 - 21.8
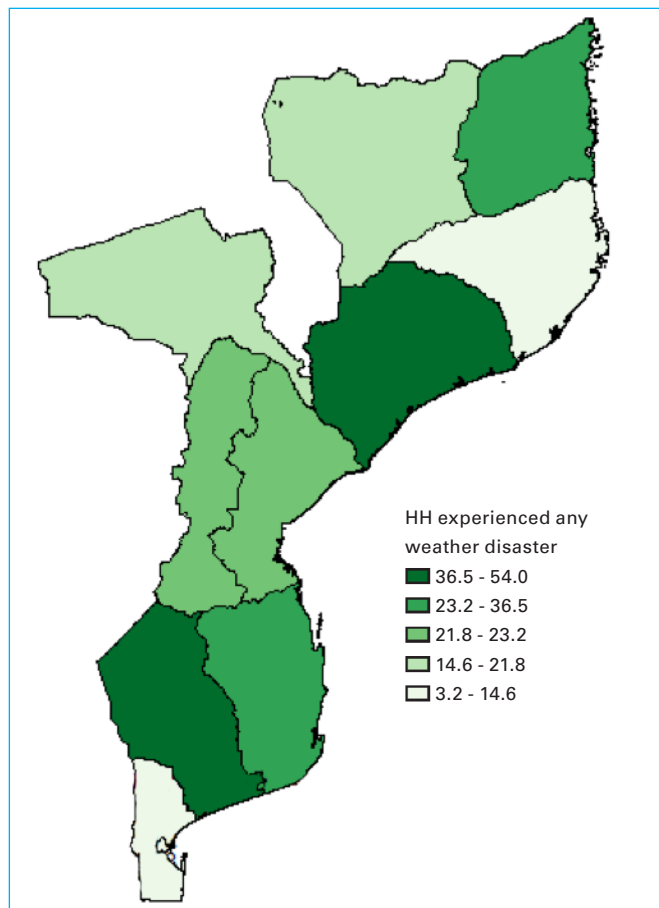- 3.2 - 14.6

Figure 26 illustrate the different rate of deprivation in each dimension by children who have experienced at least a weather event, and children who did not. Differences in Nutrition, Education, and Family are not statistically significant, and the difference in Participation is only marginally significant (90% confidence level). However, children who live in households that experienced at least one weather shock in the previous year are substantially more likely to be deprived in Child Labour (13.3 per cent vs 11 per cent), Health (44 vs 40 per cent), WASH (86 vs 75 per cent), and Housing (89 vs 73 per cent).

Figure 26 - Deprivation in each dimension by weather event
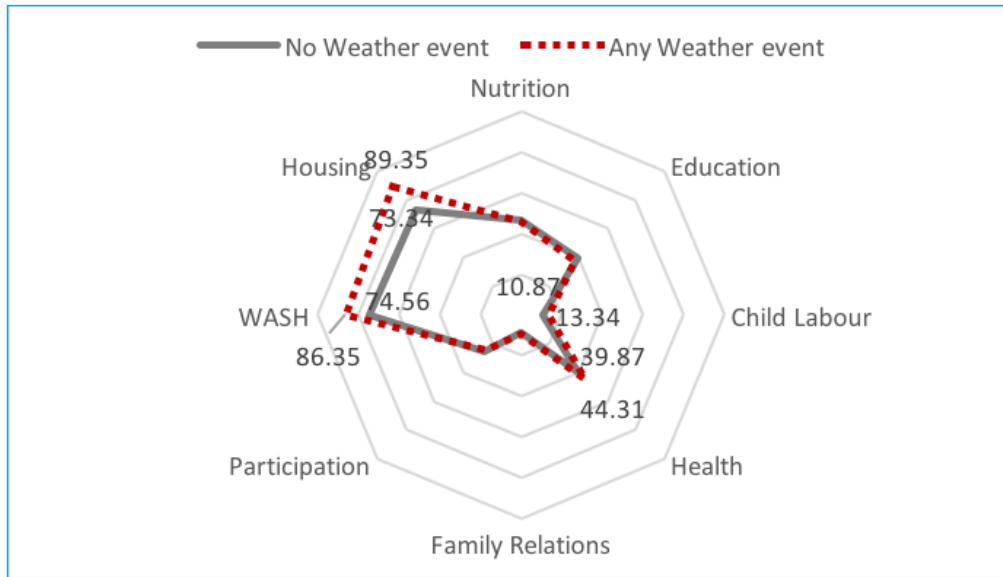
While we can assume that the occurrence of weather shocks is independent of other variables such as poverty and deprivation status, at the same time there could be other factors affecting self-reporting of shocks, which affect at the same time the probability of poverty and deprivation, rendering impossible to draw casual links.[22] However, we observe that children who live in risk-prone environment are more vulnerable to deprivation, both at structural level (Housing, WASH), where past vulnerability is likely to add up to present deprivation, and at individual level: the higher engagement of children in child labour could be a household response to past shocks.

Finally, Table 10 reports the overlap of monetary poverty and deprivation by exposure to weather event. Children in households who were exposed to weather shocks are more likely to be poor and deprived even if not monetarily poor; they are less likely to be only monetarily poor, and 10 per centage points less likely to be not poor and not deprived, than children who live in households not hit by a weather shock.

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22   See, for example, Dercon and Porter (2014)

Table 10: Deprivation and poverty by exposure to weather shocks

	No Weather event	Any Weather event	p-value
Poor and Deprived	43.47	50.63	0.000
Poor only	3.92	2.40	0.000
Deprived but not poor	34.67	39.97	0.000
Not poor and not deprived	17.94	7.00	0.000

However, when assessing the probability of being deprived, controlling for other covariates via a multivariate regression, as the one presented in Table 8 (and indeed, the same model used throughout this work), having experienced a weather shock becomes not statistically significant in the probability of a child being deprived. This potentially indicates that other factors can reverse or worsen the effects of adverse weather events.

5. DISCUSSION AND CONCLUSIONS

The main findings of this paper show that, in Mozambique, about 81 per cent of children are deprived in at least two dimensions at a time. Most children are deprived in Housing and WASH: they lack adequate shelter, and access to water and sanitation. A considerable number of children under five are deprived in Nutrition: 46 per cent, and one in two children aged 5 to 17 is deprived in Education.

With the exception of the City of Maputo, and, to a lesser extent, of the Province of Maputo, deprivation is high in all provinces, and particularly in rural areas, where virtually no child is immune to at least one deprivation; 95 per cent of children are deprived in 2 or more dimensions, while the same proportion is less than fifty per cent in urban areas.

Deprived children are more likely to live in rural areas, to have less educated heads of household who work in the agricultural sector. Children who live in monetary poor households are also more likely to be deprived. However, the overlap between monetary and multidimensional poverty is far from perfect; while 45 per cent of children are both poor and deprived, still 36 per cent are deprived while not being monetarily poor.

Results show that multidimensional poverty in Mozambique is not driven by only one or two main sources of deprivation, instead, dimensions are intertwined; for example, 32 per cent of children are deprived simultaneously in WASH, Housing, and Health, and 22 per cent of children under five are deprived in Nutrition, WASH, and Health. In this scenario, any approach to reduce child multidimensional poverty must be multi-sectoral. In order to decrease the impact of multidimensional child poverty, interventions need to be designed to address multiple sectors, while the supply/ infrastructural side must be addressed as well as the demand-side. Deprivations such as WASH and Housing pertain to the provision of infrastructure as well as to the means and behaviour of the household and its members.

Children who are more deprived live in rural areas and have less educated heads of household, who are likely to work in agriculture. For children under five, the most widespread deprivation is Nutrition, with almost one in two children deprived. This is driven mainly by the levels of stunting, which remain quite high across the country. While we cannot follow the same children over time, and we cannot track the same deprivation over time, it is demonstrated by a body of literature that stunting has dire and long-term consequences on children (Dewey & begum, 2011), hindering their development prospects, including in school achievement (Fink & Rockers, 2014). Among older children, the highest deprivation is Education: almost seventy per cent of children 13-17 have not finished primary school. Apart from being a deprivation in itself, this is worrisome because we observe here how children of more educated heads of household are substantially less likely to be deprived, even controlling for their sector of employment and for the household's level of consumption. There is therefore a strong case for more investment in children's education. Investing in children's education, increasing completion rate of primary education, and investing in young children's nutrition are crucial parts in breaking the cycle of poverty, and they should be imperative priorities.

This paper also examines the relationship of multidimensional poverty with monetary poverty: the relationship is far from linear. While generally poorer children are worse off, and 45 per cent of children are both monetarily and multidimensionally poor, an increase in households' expenditure power is not likely to cause a substantial decrease in child deprivation, especially for children who live in not-poor households. This poses a question for public policy design. While social protection

schemes, such as child grants and generally unconditional cash transfers have been proven very effective on a range of outcomes for poor households, they are less likely to be as effective on child multidimensional poverty, in particular for the share of children (36 per cent) who are deprived while not being income poor.

This in turn raises two subsequent issues: the targeting of social interventions and the integration of other forms of public intervention alongside cash. If monetary means are the only criterion used to target programs, many vulnerable children are likely to be left out of interventions. Recently, evidence showed how about three-quarters of undernourished women and children in Africa are not found in poor households (Brown, Ravallion, & van de Walle, 2017): this confirms the results we observe when using multidimensional poverty alongside monetary metrics. Furthermore, provinces with the same, high, level of multidimensional poverty present very different rates of monetary poverty, confirming the non-linearity of the relationship between these two types of poverty. On the other hand, we observe how multidimensional poverty is a cross-cutting issue, affecting not only children who are poor or near-poor, but children at any point of the monetary distribution. Monetary interventions alone are far less likely to work for these deprived children.

The different nature and correlates of monetary poverty and deprivation, as well as the different interplay of the two that is found at the local level, is something decision makers need to take fully into account in order to design effective policies. The need for complex and multi-sectoral social protection schemes, such as 'Cash Plus' programs that tie together cash transfers and other interventions (for example providing information, supply of materials, or behavioural interventions), is clear, as well as the need for policies focused on improving the supply-side of the equation.

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Table A2: Deprivation rates by Dimension and Province

	Cabo Delgado	Gaza	Inhambane	Manica	Maputo C.	Maputo Prov.	Nampula	Niassa	Sofala	Tete	Zambezia
Deprived in Nutrition	55.1	30.4	28.1	47.0	33.8	23.8	56.1	51.1	42.9	47.0	49.5
Deprived in Education	52.5	23.9	23.4	32.3	14.0	16.8	50.0	46.0	37.1	45.0	40.2
Deprived in Child Labour	16.6	13.1	11.5	11.6	1.7	7.3	13.7	7.1	10.0	17.4	9.1
Deprived in Health	67.0	28.4	41.9	43.6	12.7	22.1	41.4	44.1	37.2	38.7	43.7
Deprived in Family Relations	8.5	11.6	9.0	11.5	7.8	9.2	8.1	7.6	9.7	7.7	9.7
Deprived in Participation	23.2	4.6	8.4	14.0	1.1	2.2	39.2	34.7	11.3	31.9	35.0
Deprived in WASH	86.3	66.0	80.3	80.3	12.0	28.4	84.7	86.0	75.8	84.7	90.5
Deprived in Housing	86.6	64.3	83.2	78.5	10.2	27.5	80.9	90.7	76.2	90.5	90.2

Table A2: Deprivation rates by indicator and province

	Cabo Delgado	Gaza	Inhambane	Manica	Maputo C.	Maputo Prov.	Nampula	Niassa	Sofala	Tete	Zambezia
Child engages in econ activities	15.89	12.92	10.44	11.18	1.57	6.98	13.42	6.61	9.86	16.77	8.52
Not completed primary	85.55	54.12	46.89	65.18	29.07	37.94	81.47	80.73	63.49	80.13	79.62
Child not attending school 5 - 12	40.57	8.84	10.71	15.95	4.69	4.86	38.92	33.16	23.62	30.12	25.03
Married before 18	5.53	4.82	4.94	7.93	1.74	2.85	6.69	5.15	5.28	4.03	5.53
One or both parents dead 0-12	10.60	15.44	12.04	15.61	14.68	14.15	9.48	10.35	13.84	10.04	13.19
Did not sleep under mosquito net	25.15	55.30	38.77	49.56	34.42	36.25	34.00	34.71	17.21	59.46	37.97
Child is underweight	19.08	7.57	7.87	14.89	6.27	5.35	20.68	17.85	16.61	17.60	16.02
Child is stunted	51.87	28.71	26.10	41.82	31.59	22.26	50.17	47.52	40.73	43.24	46.47
Child is wasted	3.56	1.66	1.97	5.46	3.00	1.44	8.41	3.91	2.21	4.13	3.62
No info/ communication device	25.39	4.94	9.42	14.40	0.98	3.08	39.87	37.07	11.18	31.42	35.79
Floor and roof of natural material	70.71	12.83	27.67	51.96	0.04	2.04	70.45	85.95	52.66	68.18	76.43
No electricity	82.40	61.54	80.95	75.67	5.49	22.44	74.76	85.73	73.59	88.11	86.17
More than 4 people per room	4.62	10.91	25.76	8.44	6.93	9.63	8.88	26.18	33.39	31.89	14.88
Unimproved sanitation	82.35	63.46	77.50	78.74	11.66	27.59	78.20	80.88	74.13	77.88	86.39
Unimproved source of water	48.16	18.26	32.61	42.34	0.28	6.52	53.12	50.95	26.00	43.67	63.25
Water source more than 30'	9.81	5.47	12.99	5.83	0.00	1.96	14.09	10.89	15.85	3.65	6.96
Health centre more than 30'	65.82	53.93	53.35	47.24	27.82	42.12	55.21	49.31	57.91	44.23	53.31

Table A3: Share of missing values by indicator and province

	National	Cabo Delgado	Gaza	Inhambane	Manica	Maputo C.	Maputo Prov.	Nampula	Niassa	Sofala	Tete	Zambezia
Child engages in econ activities	0.20	0.00	0.00	0.00	0.36	0.00	0.00	0.04	0.16	0.00	1.38	0.22
Not completed primary	0.01	0.00	0.17	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Child not attending school 5 - 12	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Married before 18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
One or both parents dead 0-12	0.03	0.00	0.06	0.00	0.00	0.00	0.00	0.06	0.00	0.04	0.00	0.06
Did not sleep under mosquito net	1.60	4.18	0.46	1.12	1.34	1.12	0.90	0.92	1.58	1.66	2.38	1.66
Child is under-weight	13.39	14.50	10.55	16.17	12.93	13.48	11.11	8.90	10.83	10.52	16.67	20.32
Child is overweight	15.45	16.09	10.40	17.66	14.49	18.78	11.41	13.57	13.14	11.85	17.38	22.28
Child is stunted	15.63	16.95	11.16	18.22	15.05	16.85	11.71	13.11	13.63	11.96	17.50	22.81
Child is wasted	15.45	16.09	10.40	17.66	14.49	18.78	11.41	13.57	13.14	11.85	17.38	22.28
No info/communication device	0.03	0.23	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.05
Floor and roof of natural material	0.03	0.23	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.05
No electricity	0.03	0.23	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.05
More than 4 people per room	0.03	0.23	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.05
Unimproved sanitation	0.03	0.23	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.05
Unimproved source of water	0.03	0.23	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.05
Water source more than 30'	0.03	0.23	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.05
Health centre more than 30'	0.03	0.23	0.00	0.00	0.00	0.09	0.00	0.00	0.00	0.00	0.00	0.05