"Poverty and Inequality in Mozambique: What is at Stake?
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Levels and Trends in Multidimensional Poverty in some Southern and Eastern African countries, using counting based approaches

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Summary

1. Motivation
2. Methodology
3. Results from poverty measures for Malawi, Mozambique, Tanzania and Zimbabwe

1. Motivation

- In September 2015 : SD1.2 Ending Poverty in all its forms everywhere➔ Explicit multidimensional focus.
- Simultaneouly, SDG's encompass explicit and implicit goals addressing inequality.

- MPI (Multidimensional Poverty Index) by UNDP since 2010 an illustration of the importance of taking into account the multiple dimensions of poverty.
  MPI assesses poverty along the same dimensions of the HDI.
  - It is an extension of the FGT.
  - MPI is able to deliver useful information to policy makers on the incidence and intensity of multidimensional poverty among those classified as poor people.

- ➔ Concerns regarding issues to be addressed within multidimensional framework : the sensitivity of measures to inequality among the poor in counting approaches.

- Recently UNDP adds a separate measure in deprivation counts among poor individuals which is a multiple variance echoing the recent adoption by the World Bank of the mean income of the bottom of 40% population to account for inequality.

1. Motivation

■ However, alternative methods for defining poverty indices using a counting approach have been suggested in independent studies.

➔ Framework : Silber and Yalonetzky (2013).

➔ Decomposability properties of counting based poverty measures : Bérenger (2017).

■ **The main goal of this paper:**

is to make use of the decomposibility properties of the 4 main poverty measures suggested by the literature in order to highlight their complementarities in our understanding of the levels of trends of poverty in 4 African countries: Malawi, Mozambique, Tanzania and Zimbabwe.

2. Methodology
Making use of the decomposability properties of 4 poverty counting based measures.

- **Alkire & Foster (2011)**

Additive decomposability by subgroup of population and **factor** *But violates Transfer axioms*

$$P_0^{AF} = \frac{1}{n} \sum_{i=1}^{n} \psi^{AF}\left(x_i, z, k\right) c_i$$

- **Rippin (2010, 2012)**

Additive decomposability by subgroup of population and **factor** *; Transfer axioms*

$$P_\gamma^{RI} = \frac{1}{n} \sum_{i=1}^{n} c_i^{\gamma+1}$$

- **Chakravarty & d'Ambrosio (2006)**

Additive decomposability by subgroup of population ; transfer axioms

Decomposition into the **extent** of and **dispersion** in multiple deprivations.

$$P_\alpha^{CD} = \frac{1}{n} \sum_{i=1}^{n} c_i^{\alpha}$$

- **Silber & Yalonetzky (2013) : extension of Aaberge and Peluso (2012)**

Distribution sensitive but not subgroup consistency

Decomposition into the **extent** of and **dispersion** in multiple deprivations.

$$P^{SY} = \sum_{h=1}^{m} w_h \Gamma\left(S(h)\right)$$

2. Methodology

Decomposition highligting inequality component of the distribution of deprivation counts among individuals

- Chakravarty & d'Ambrosio (2006) for value of $\alpha = 2$:

Variance

$$P_2^{CD} = \left(P_0^{AFunion}\right)^2 - \sigma^2$$

Admits also a decomposition as a function of the square of the coefficient of variation of weighted deprivations among the poor.

- Rippin (2010, 2012) (computed for $\gamma = 1.5$)

Generalized Entropy Index of inequality among the poor

$$P_\gamma^{RI} = H \ A^{\gamma+1} \left\{1 + \left[(\gamma+1)^2 - (\gamma+1)\right] GE_{\gamma+1}(c)\right\}$$

- Silber & Yalonetzky (2013) : extension of Aaberge and Peluso (2012) computed using $\Gamma(S) = 2S - S^2$

Gini mean Difference

Mean Gap

$$P^{SY}(x;z) = \frac{m'}{m'-k+1} \sum_{h=k}^{m'} \omega_h \left[\Gamma[S(h)] - S(h)\right] + \frac{m'}{m'-k+1} H \left[A - c_{k-1}\right]$$

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3. Main Results for the case of Malawi, Mozambique, Tanzania and Zimbabwe since 2000s

	Period	GDP per capita Growth	Poverty rate initial	Percentage Poverty change
Malawi	2004-10	3,6	73,6	-0,62
Mozambique	2002-14	4,32	80,4	-2,02
Tanzania	2007-11	2,99	55,1	-2,84
Zimbabwe	2011	XXX	21,4	XXX

Data from: Demographic and Health Surveys
Malawi (2004, 2010, 2015), Mozambique (2003, 2011), Tanzania (2004, 2010 and 2015) and Zimbabwe (2005, 2010 and 2015).

	Period	GDP pc GR
Malawi	2004-10	3,6
	2010-15	1,05
Mozambique	2003-11	4,48
Tanzania	2004-10	3,17
	2010-15	3,56
Zimbabwe	2005-10	-2,46
	2010-15	5,3

3. Main Results for the case of Malawi, Mozambique, Tanzania and Zimbabwe since 2000s

■ 3 dimensions as the MPI by UNDP:

| Dimension	Indicators	Cut-off	Relative weight
Education	Child enrollment	Any school-aged child (6-15) is not attending school	1/6
	Years of schooling	No household member aged 10 years or older has completed 6 years of schooling	1/6
Health	Nutrition	One or more adults are underweight (in terms of BMI) or a child is undernourished (in terms of height for age)	1/6
	Mortality	Any child from a household who has died	1/6
Standard of Living	Water	No access to safe drinking water source within 30 minutes one-way distance from the residence	1/18
	Electricity	Household has no electricity	1/18
	Sanitation	Household sanitation facility is not improved or shared.	1/18
	Floor	Household has rudimentary floor	1/18
	Cooking fuel	Household cook with dung, wood, charcoal and other solid fuels.	1/18
	Assets	Household does not own more than one radio, TV, telephone, bicycle, motorcycle refrigerator and does not own a car	1/18

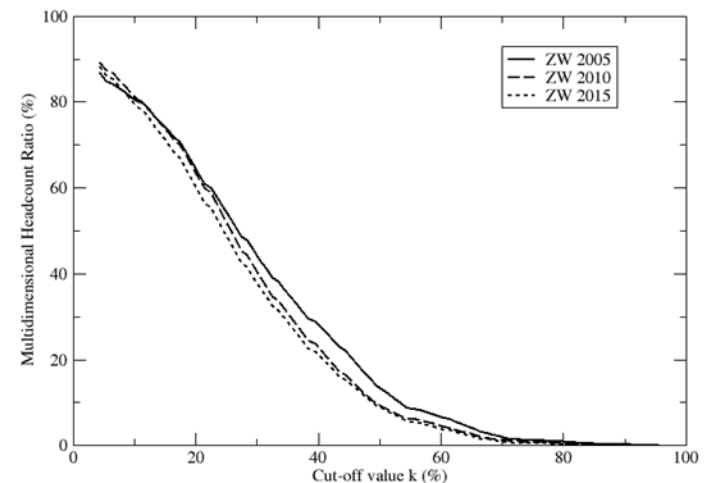# Multidimensional headcount ratios (H)
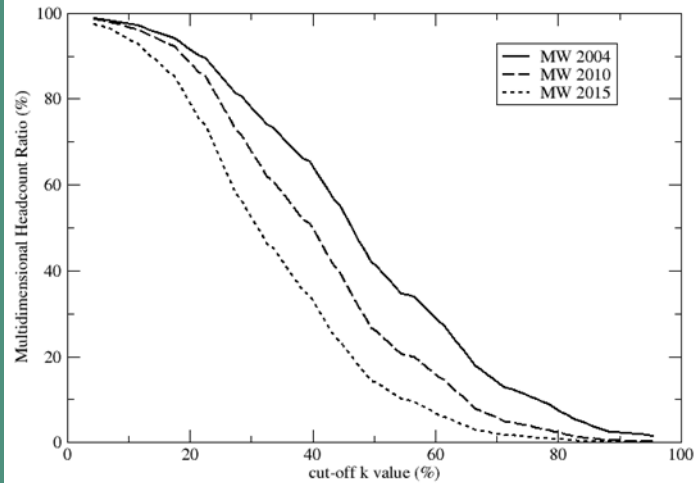
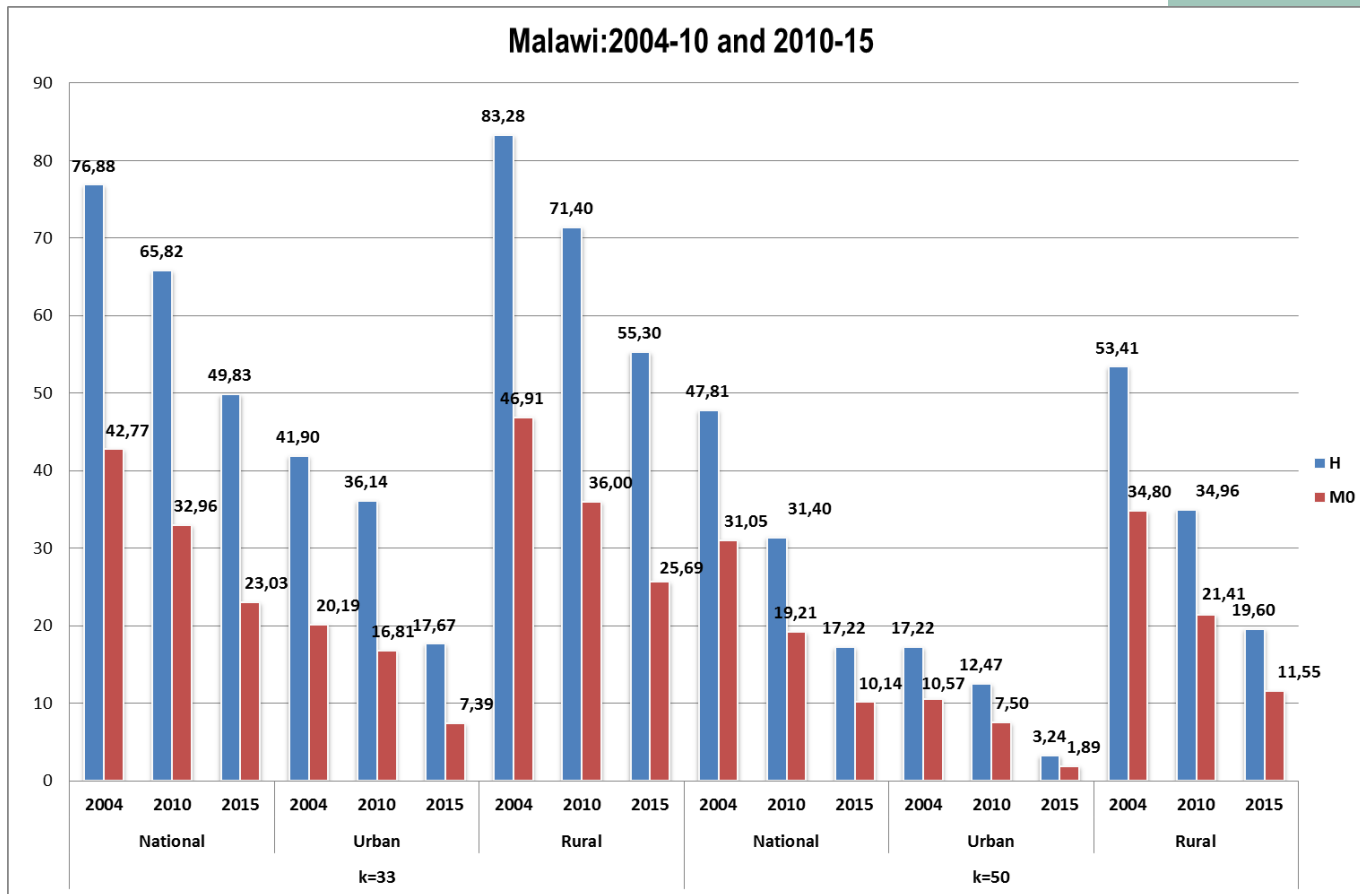Malawi (k=77% in 2015)
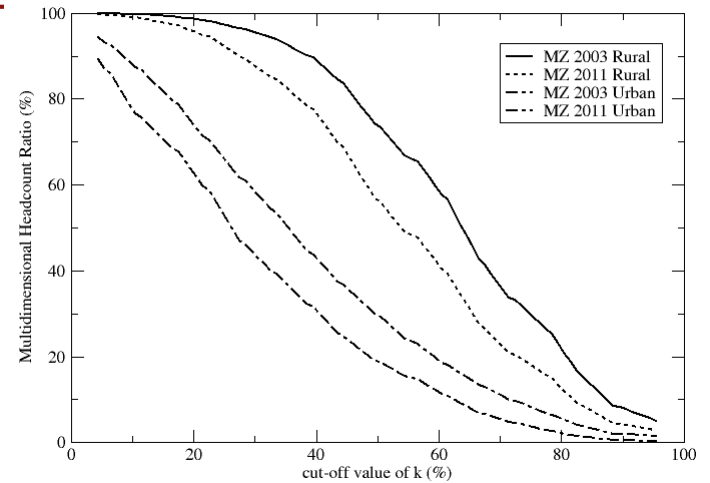
Mozambique (k=99% in 2011)
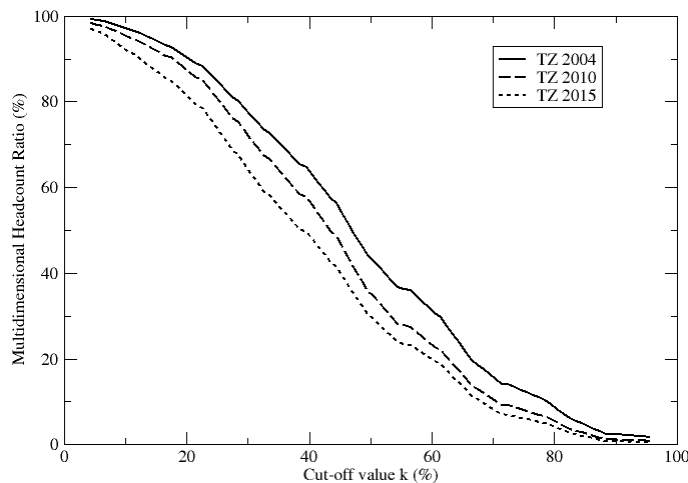
Tanzania k=84% in 2015

Zimbabwe(k=67% in 2015)

Multidimensional poverty measures following the Alkire and Foster approach


Values of Multidimensional Headcount Ratio H and the Adjusted Headcount Ratio M0 which takes into account of the breadth of poverty (A : average % of deprivations among the poor)

# Multidimensional poverty measures following the Alkire and Foster approach

Malawi: 2004-10 and 2010-15
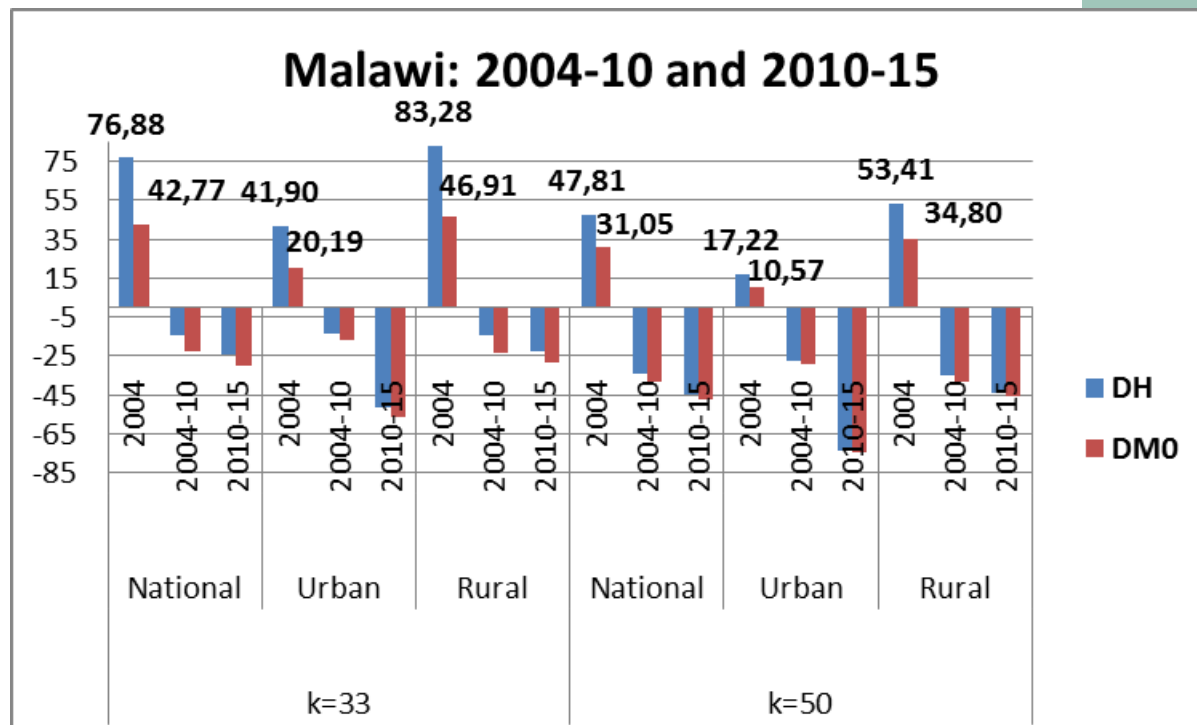
- *Larger decrease in poverty between 2010-2015 than between 2004-10. The decrease is due to the compounding effect of the decrease in H and A (Intensity of poverty).*
- *Higher decrease in rural areas than in urban areas 2004-10 but higher performance in urban areas 2010-2015 (-56% M0) contributes to widening the gap with rural areas.*
- *The urban/rural gap is larger in 2015 than it was in 2004.*

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Multidimensional poverty measures following the Alkire and Foster approach

Mozambique: 2003-11
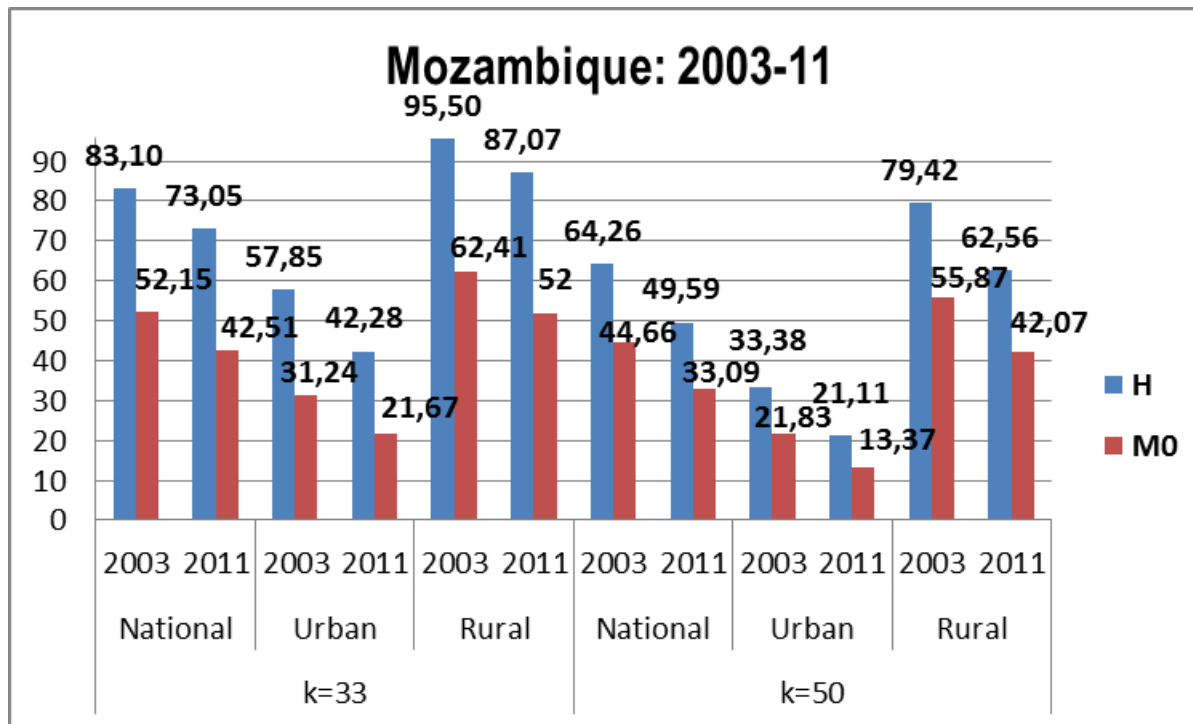
- *Poverty declined at the national level between 2003 and 2011 and both in urban and rural areas.*
- *Striking disparities between urban and rural areas:*
  In rural areas, H is roughly 3 times the level registered in urban areas using k=33% (87.1% vs. 42.3%)

Multidimensional poverty measures following the Alkire and Foster approach

Mozambique: 2003-11
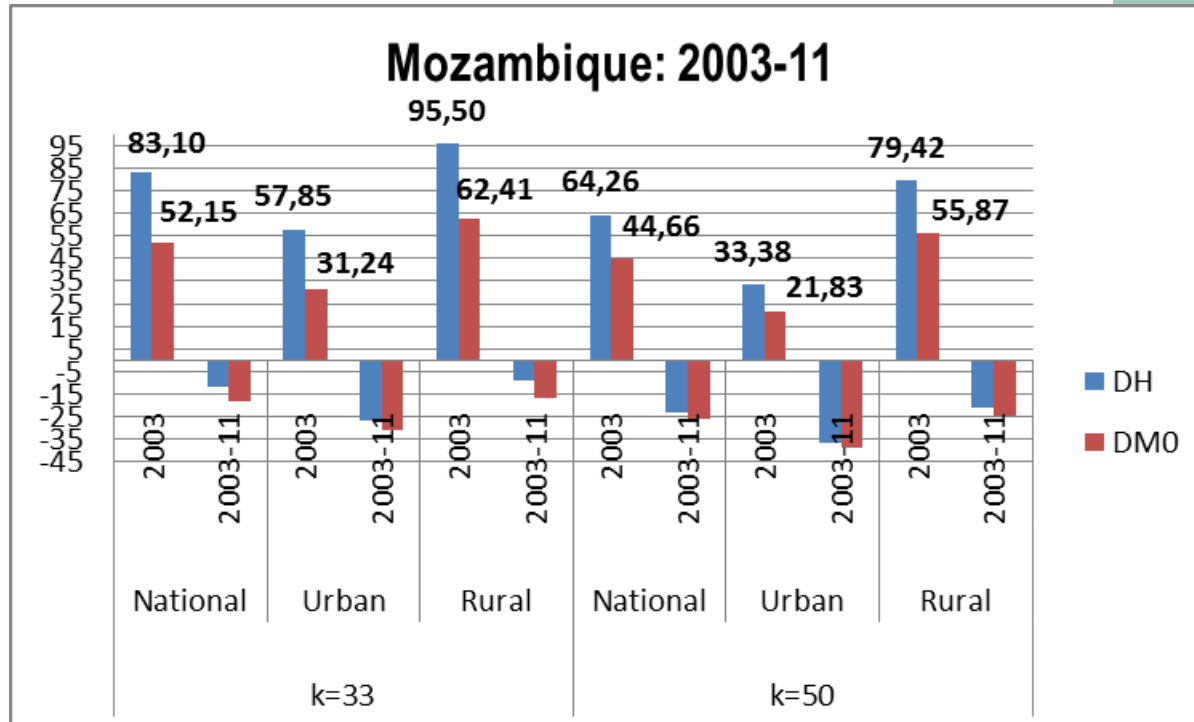
- *The pace of poverty reduction has been lower in comparison with Malawi.*
- *Faster rate of decrease in poverty in urban than in rural areas according to H and M0.*
- *The poor in rural areas experienced a higher reduction in the number of their deprived dimensions (A) than in urban areas, as the contribution of A effect represents more than 50% (only roughly 12% in urban areas) of the variation of M0 using k=33%.*

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Note: For an easier presentation values of poverty measures in red bars have been multiplied by 100

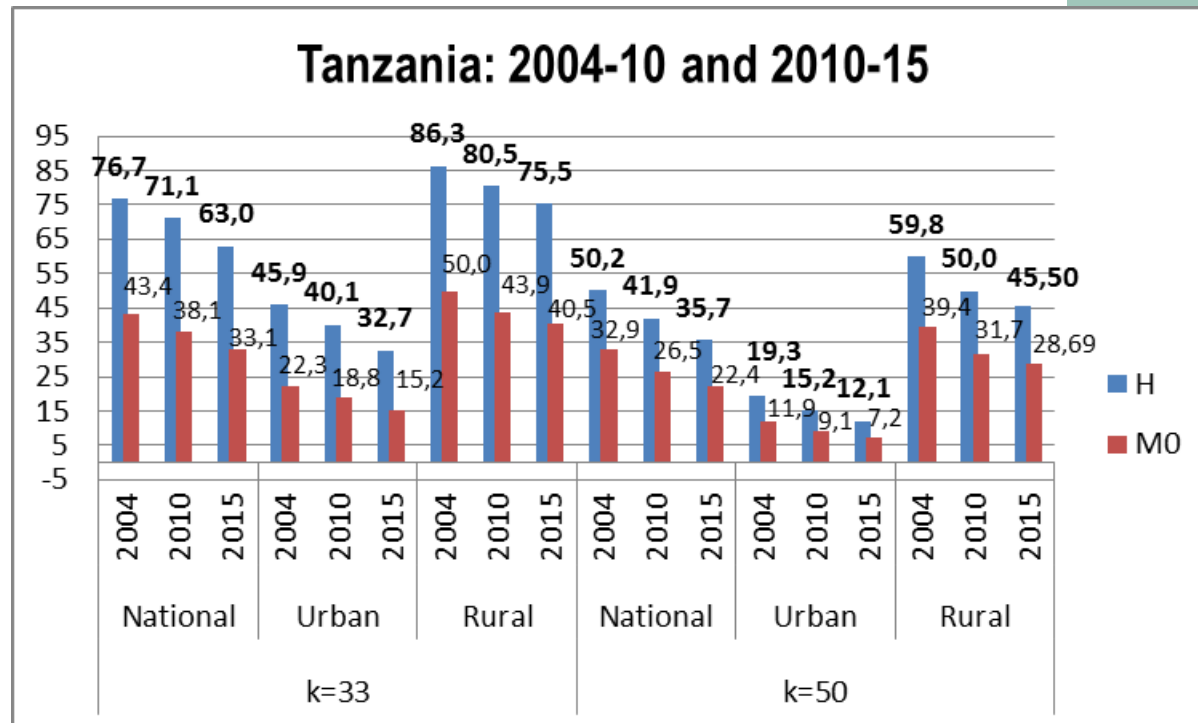# Multidimensional poverty measures following the Alkire and Foster approach

Mozambique: additional information regarding the trends observed in some regions:

- In 2011 H varies from **13.8% in Maputo Cidade to 89.7% in Zambezia for k=33%** and from 3% in Maputo Cidade to 68.8% in Zambezia, when focusing on the severely poor).

- Cases of *Niassa and Cabo Delgado*:
    - With a similar percentage of multidimensional poor people, **Niassa experienced higher decreases in poverty than Cabo Delgado.**
    - Cases of *Cabo Delgado and Zambezia*: **Zambezia which is the worse-off province** .

    Following a similar pattern as Cabo Delgado , its evolution is even worse, since the alleviation of poverty is accompanied **by an increase in A the severely poor** lowering the decrease in M0 as compared to that of H.

These trends show that the pace of poverty decline has been uneven among provinces and as a result, progress favors provinces that were already the least disadvantaged.

Multidimensional poverty measures following the Alkire and Foster approach

Tanzania: 2004-10 and 2010-15

Note: For an easier presentation values of poverty measures *in purple bars* have been multiplied by 100

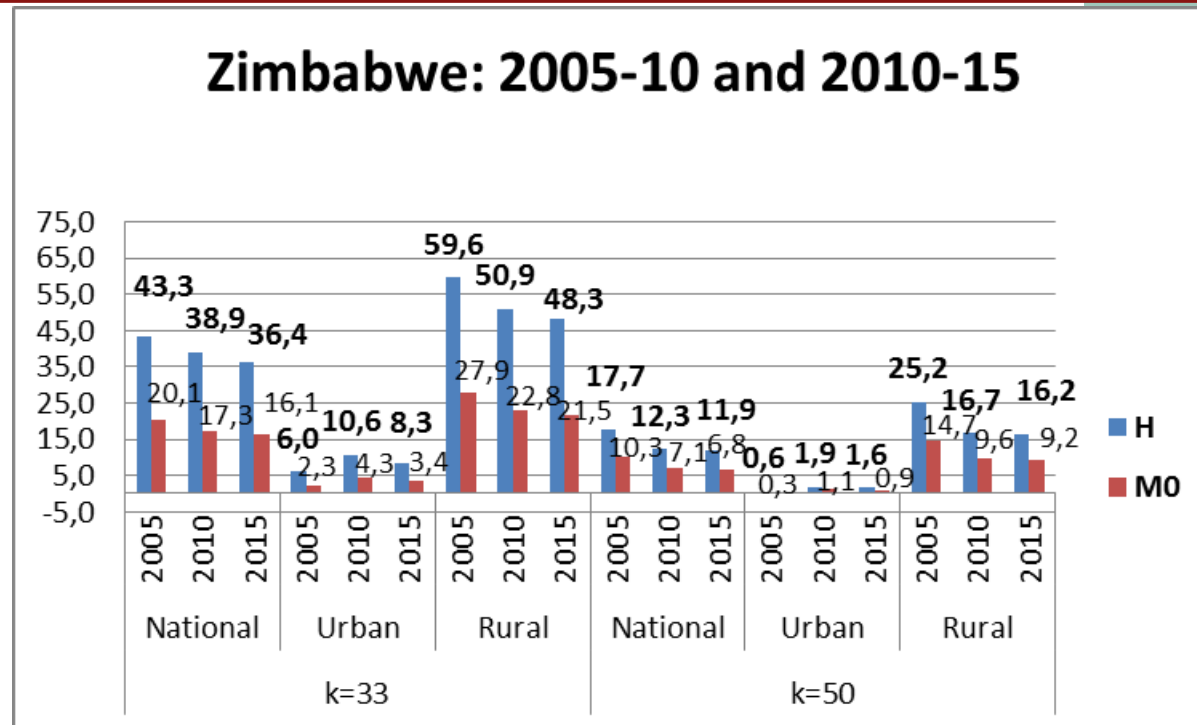# Multidimensional poverty measures following the Alkire and Foster approach

Tanzania: 2004-10 and 2010-15
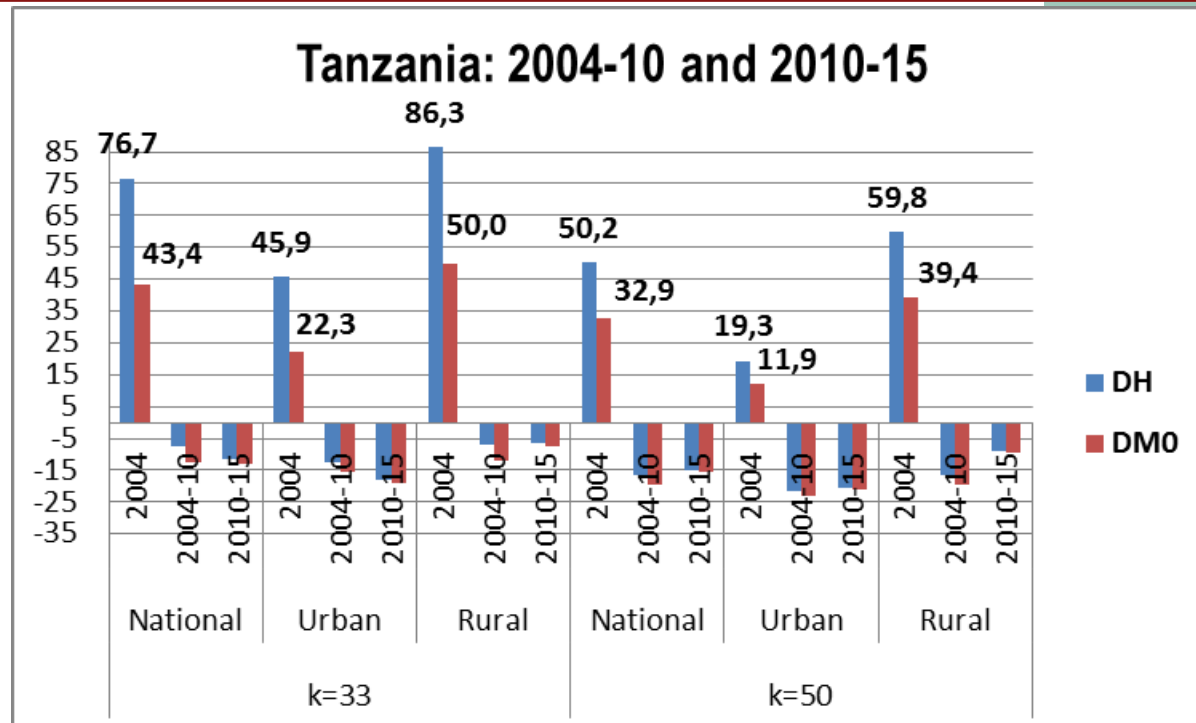
- *Poverty declined at the national level but at different paces over the two sub-periods (k).*
- *Decomposition by areas of residence gives us a clearer idea of the trends during the two sub-periods: poverty decreases at a slower rate in rural areas than in urban areas during the two sub-periods (-12,2% vs -15,4% and -7,7%vs. -19,1% for M0) deepening the gap with urban areas.*

Note: For an easier presentation values of poverty measures *in purple bars* have been multiplied by 100

Multidimensional poverty measures following the Alkire and Foster approach

Zimbabwe: 2005-10 and 2010-15

- *Poverty levels are significantly lower than in the three other countries.*
- *A decline in poverty is observed at the national level over the two sub-periods.*
- *A slowdown of poverty reduction over the second subperiod.*
- *National trends conceal a non-monotonic evolution of poverty by areas of residence.*

Note: For an easier presentation values of poverty measures *in purple bars* have been multiplied by 100

Multidimensional poverty measures following the Alkire and Foster approach

Zimbabwe: 2005-10 and 2010-15
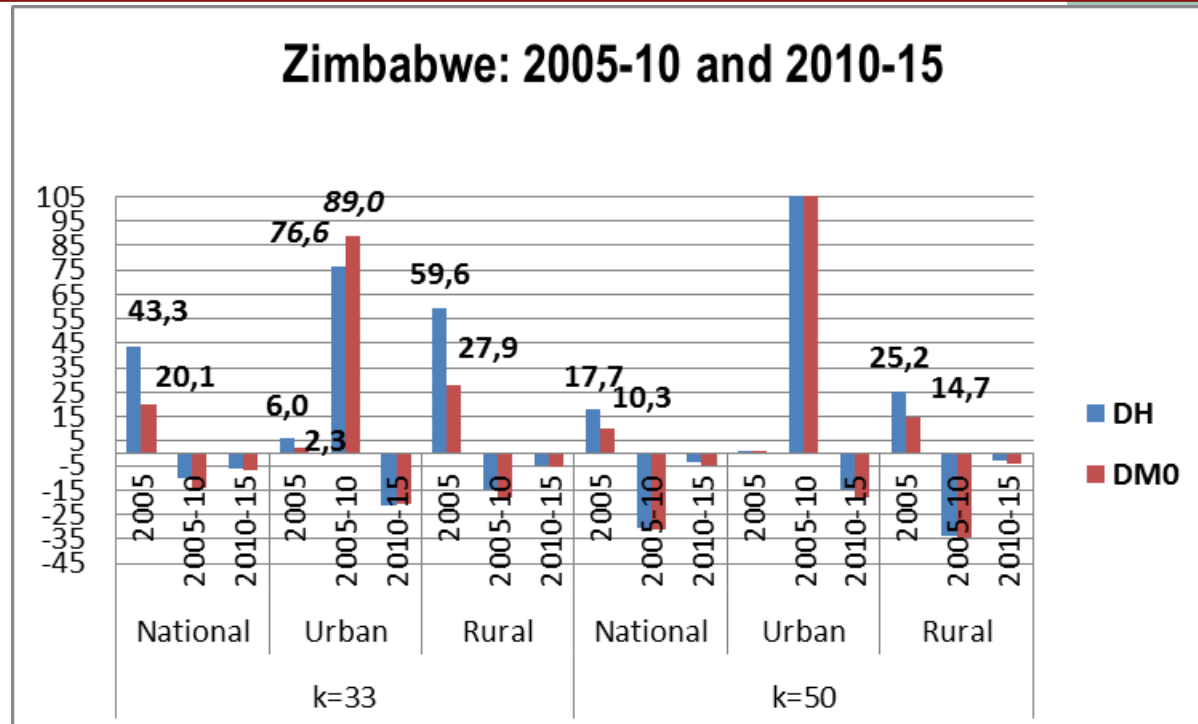
- *Poverty increases in urban areas between 2005 and 2010 and declines during the sub-period 2010-2015. Decline in poverty during the sub-period: 2010-15 not sufficient to recover at least the initial levels of 2005.*
- *H in 2015 is higher than in 2005 and the poor were also poorer because they suffered from a higher A, implying an increase of over the whole period.*
- *Continued reductions in H and M0 in rural areas but substantial slowdown in poverty reduction between 2010 and 2015.*
- *Magnitude of the gap between rural and urban poverty rates is illustrative of these contrasting developments.*

Multidimensional poverty measures sensitive to the distribution of deprivation counts

Do PCD, PRIP and PSY bring something new to the understanding of the trends of multidimensional poverty over time in these 4 countries?

- All these measures take implicitly or explicitly a union approach to poverty.

- As AF's measures stress more the identification of the poor, while these alternative measures put a greater emphasis on the intensity and the inequality in deprivations in the population, we propose to explore the behavior of these poverty measures using an intermediate approach as for the index based on the Alkire and Foster approach.

- *The idea is to show how their decomposability properties can be used to provide a comprehensive picture on poverty trends .*

- Decli... of dep... ...CD and PSY meas...
- We n...
- Acce... ...reinforced by a...
- We n... ...71% in 2004 which... ...f living (or a...

Malawi
k=33%

Legend: PCD, IPCD, PRIP, IPRIP, PSY, GPSY, IPSY

National — 25,75 · 29,52 · 20,56 · 19,71
Urban — 7,88 · 10,55 · 12,84 · 7,62
Rural — 32,21 · 22,88 · 22,26 · 28,54

Years: 2004 · 2004-10 · 2010-15

k=33
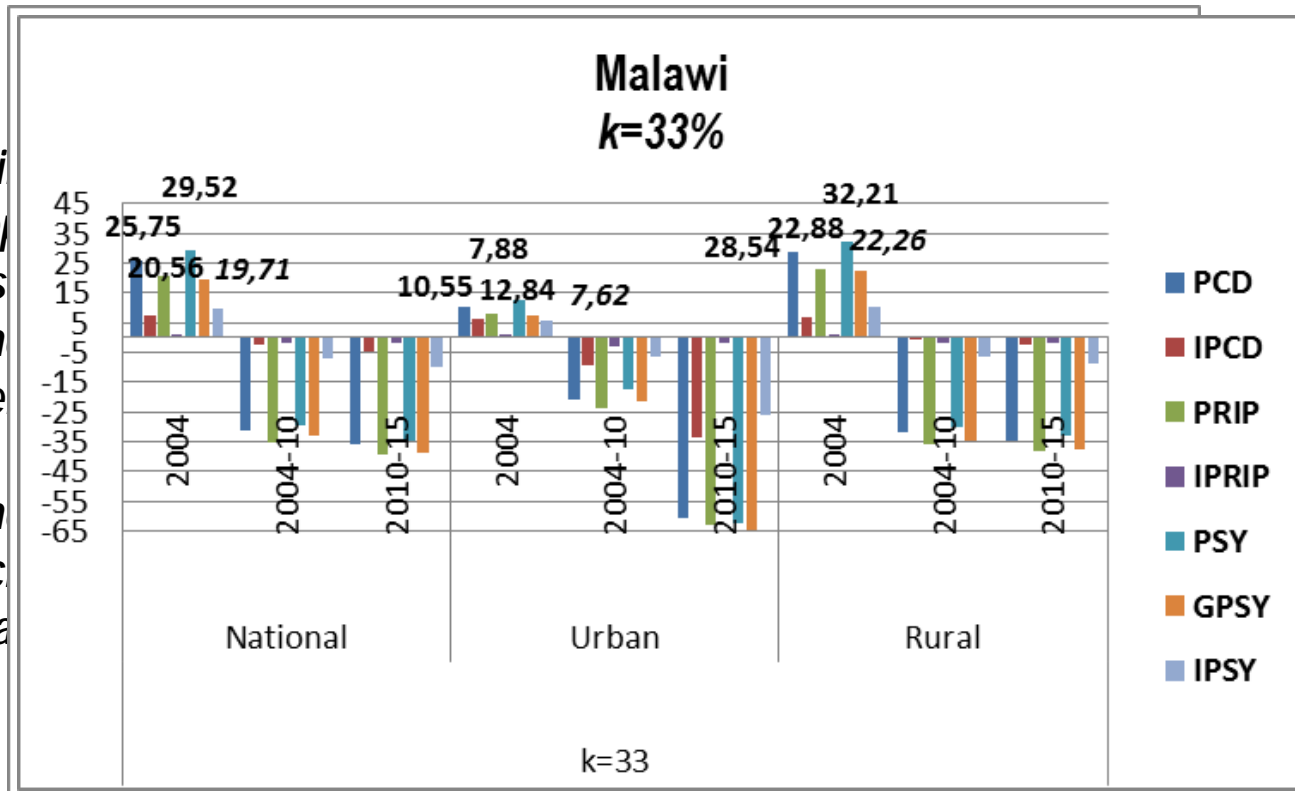
Multidimensional poverty measures sensitive to the distribution of deprivation counts

Decomp ... rural
 areas th ... ncrease
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urban a ... *k* and
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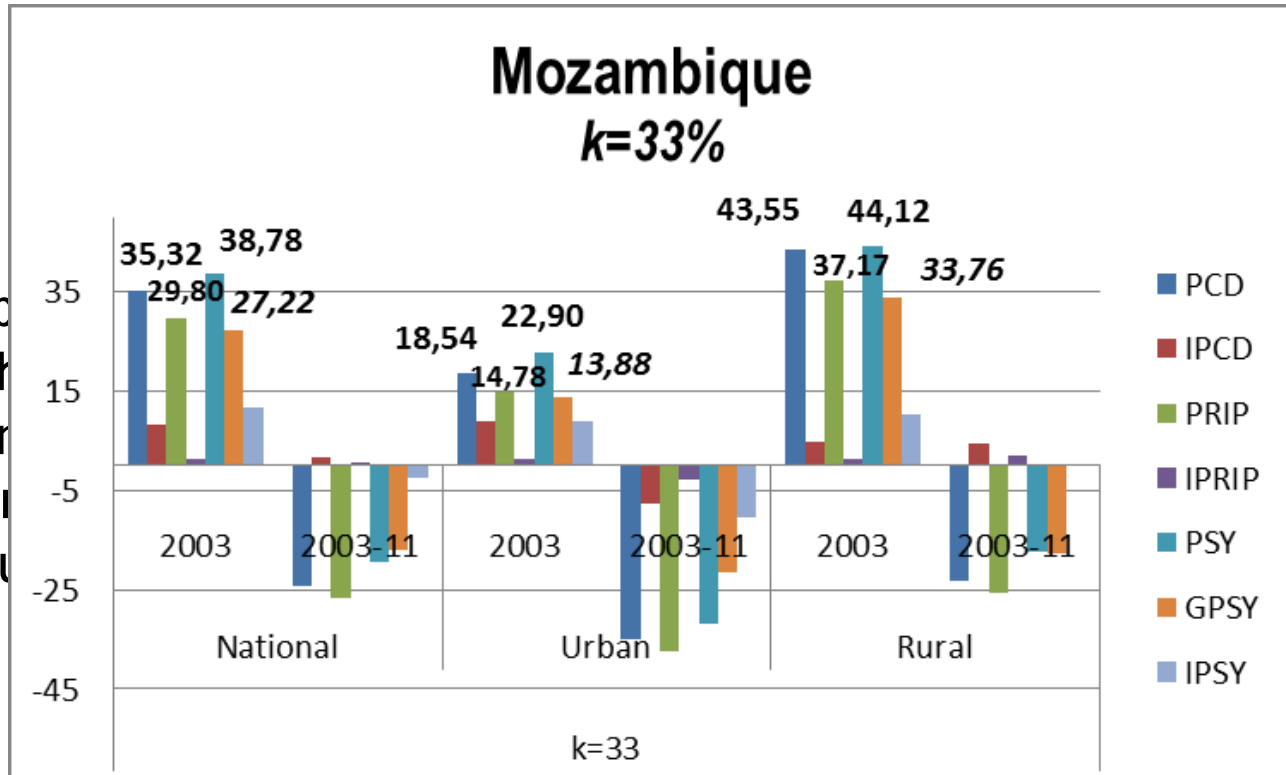
Multidimensional poverty measures sensitive to the distribution of deprivation counts
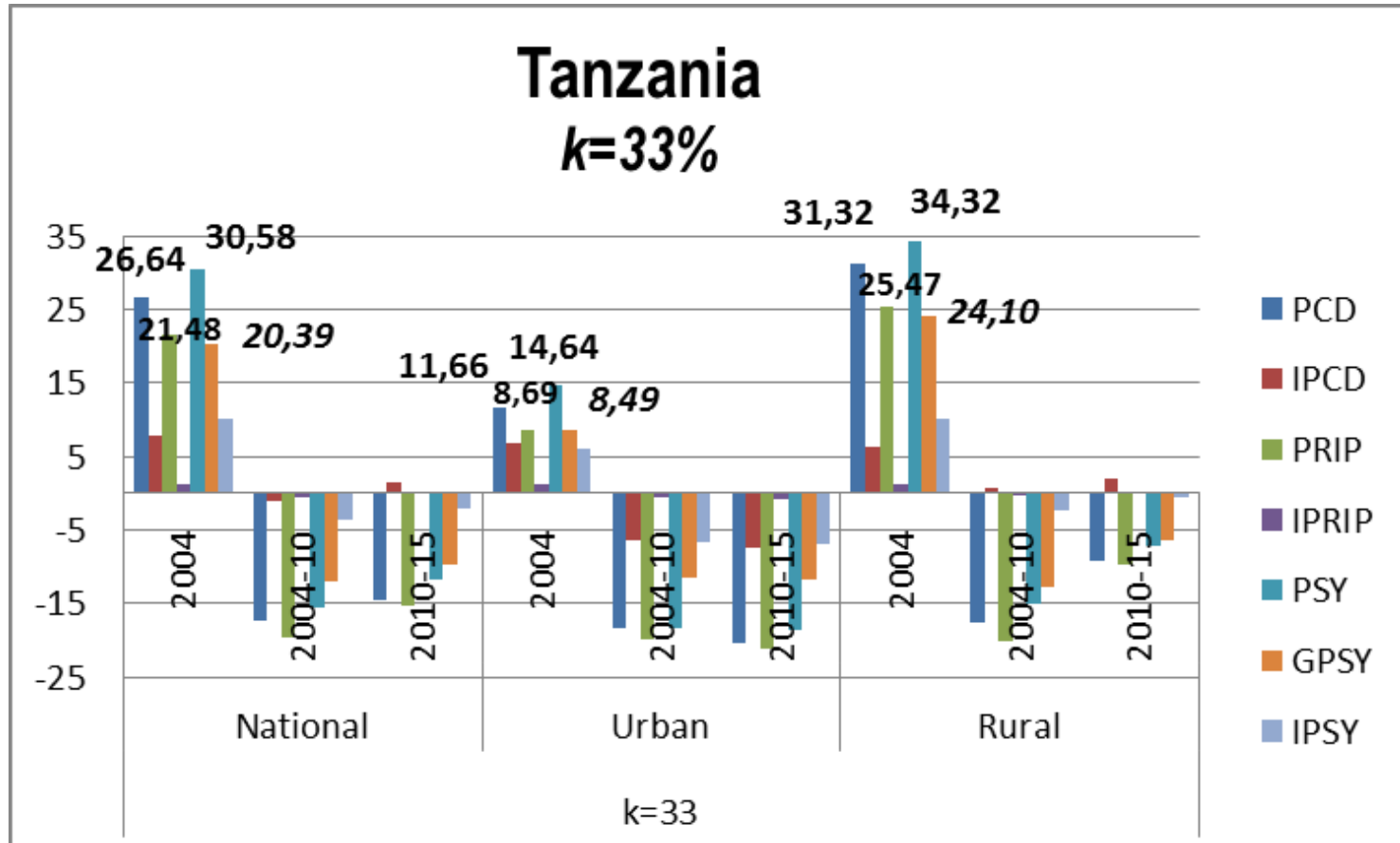
M0. value of sub-perio

# Multidimensional poverty measures sensitive to the distribution of deprivation counts

- We recover the overall picture obtained from using M0. Decrease in poverty in rural areas seems to benefit the poorest of the poor, as inequality decreased, whatever the identification approach selected, except for PRI which shows conflicting results using the union approach.
- We note the deterioration of the situation of the poor in urban areas particularly between 2004 and 2010 though poverty being initially very low.
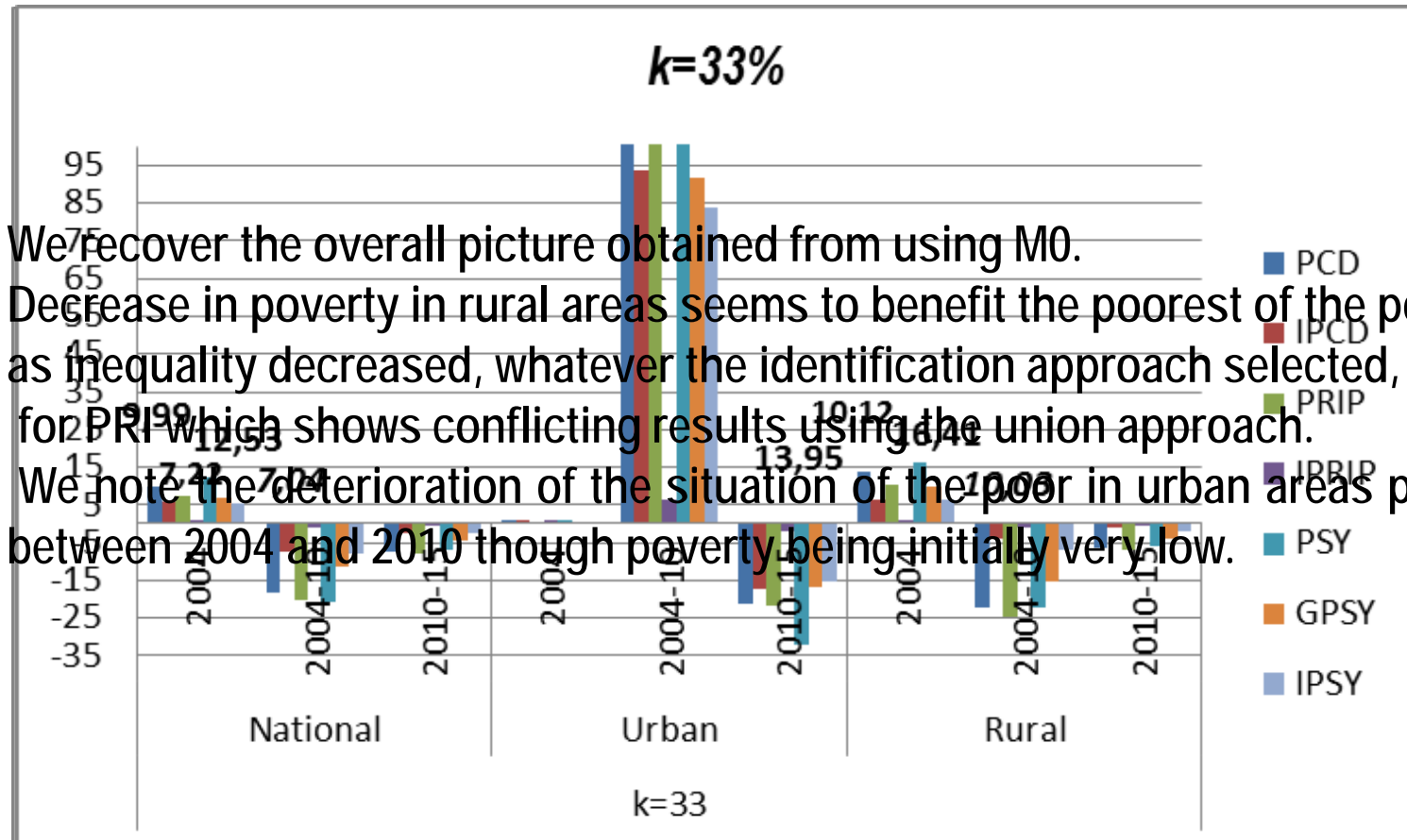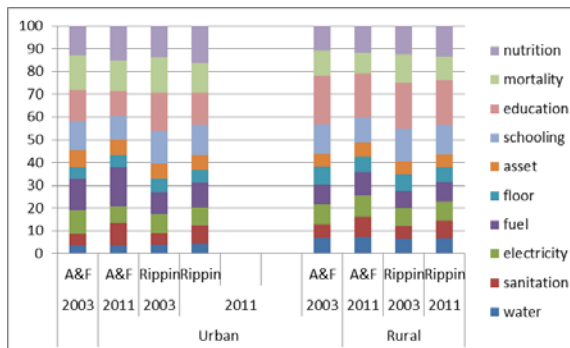
Contribution of each dimension to overall poverty: comparing the results from Alkire &Foster and Rippin using k=33%

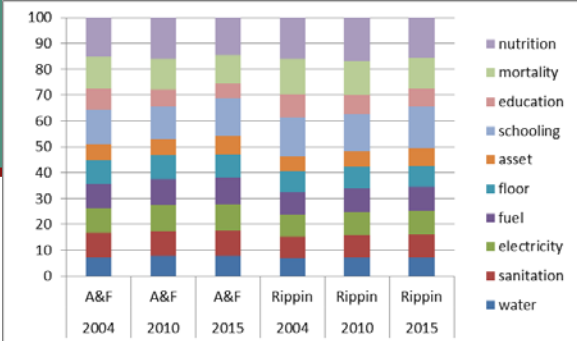Decompositions that are particularly useful for policy targeting
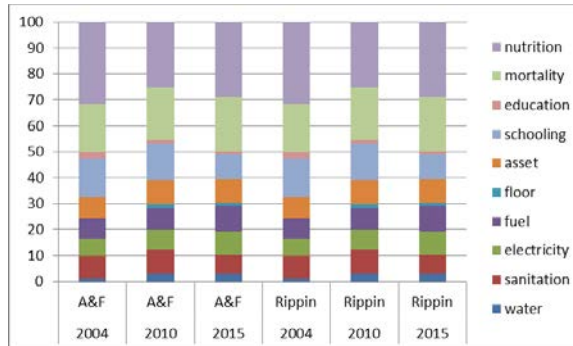
Rural Malawi

Mozambique
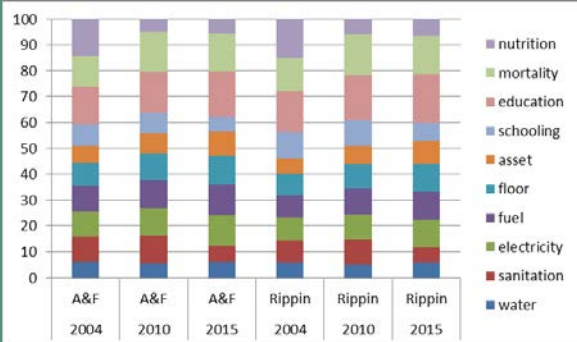
Rural Tanzania

Urban Zimbabwe

Highest contributor:
Nutrition in MW
Mortality in MZ
Education in TZ and ZW

Highest contribution increases
MW: Child mortality (urban)
        Asset (rural)
MZ : Sanitation
TZ: Schooling (urban)
        Asset (rural)
ZW: Basic services (urban)
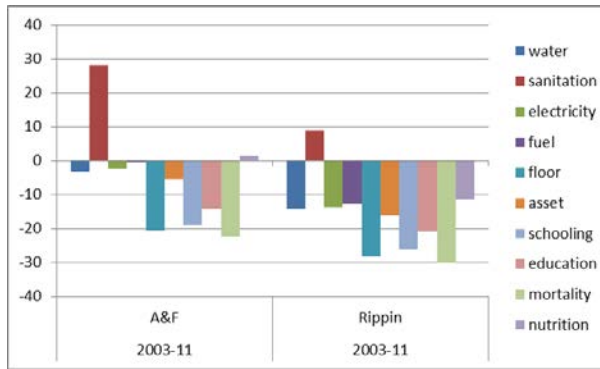   Child mortality (rural)

Contribution of each dimension to overall poverty: comparing the results from Alkire &Foster and Rippin *using k=33%*

Variation deprivation among the poor for each indicator ➡
identifying indicators for which the decline in deprivation has been the highest
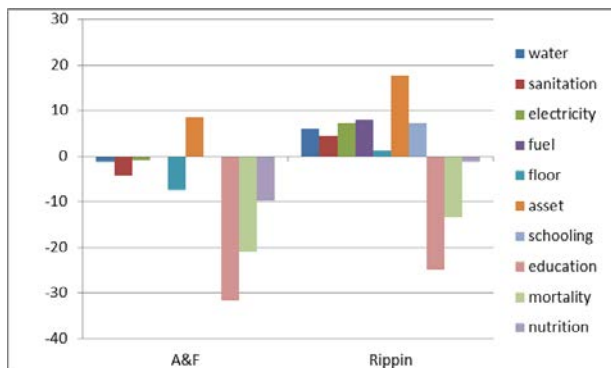
Rural Malawi
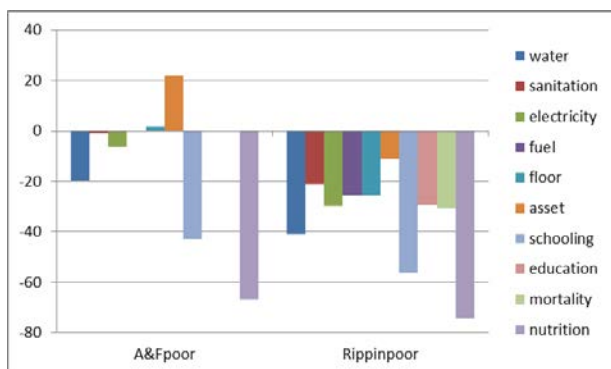
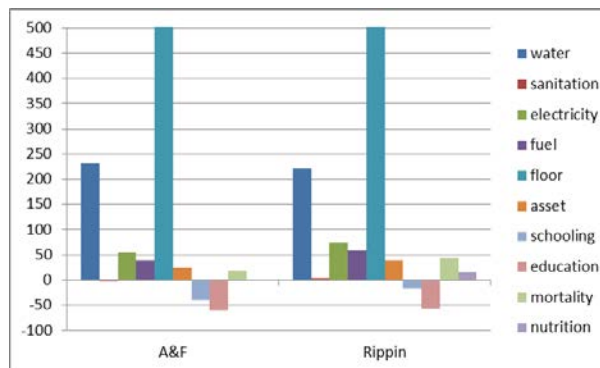### Rural Mozambique

Highest performances :
  MW: Nutrition -Schooling
  MZ : Child Mortality
  TZ: Education
  ZW: Schooling (rural)

Rural Tanzania

Urban Zimbabwe

Worse performances :
  MW: Asset?
  MZ : Sanitation-
        Nutrition?
  TZ: Asset and other
     attributes with Rippin
  ZW: Housing conditions
Nutrition and Child Mortality

Concluding comments

- **Comparisons of 4 counting based multidimensional poverty measures**.
- **Their decomposability properties** provide a full picture of poverty trends over time in Malawi, Mozambique, Tanzania and Zimbabwe.
- *MW:* High performance in multidimensional poverty decrease standing in contrast with to official monetary poverty. Poverty decrease has been equally shared among the poor in spite of a widening gap between urban and rural poor.
- *MZ:* Striking disparities between urban and rural areas. Lower performance in poverty decrease in rural areas due to the **increase in the dispersion of deprivations among the poor**. Particular attention must be given to **sanitation and nutrition in rural areas.**
- *TZ* : a slowdown in the poverty decrease in rural areas during the second sub-period. Poverty decrease benefits the poorest of the poor in urban areas but the results are less conclusive in rural areas. An increase of **deprivations in Access to basic services and assets among the rural poo**r .
- *ZW*: Low levels of multidimensional poverty. **Non monotonic evolution of poverty by areas of residence.** An increase in urban poverty while poverty decreases in rural areas. Special attention to housing conditions, nutrition and children mortality.
- *Empirical findings for these 4 countries can then be analysed in the light of the economic and social changes underway.*

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Thank you for your attention